













INTERPRETATION REPORT

The Carbon Landscape

A Great Manchester Wetlands Partnership project

ACKNOWLEDGEMENTS

This report has been produced by the Great Manchester Wetland Partnership Technical Group, which supports the evidence base to the Partnership. The Technical Group consists of representatives from the following organisations:

University of Manchester
Manchester Metropolitan University
University of Salford
University of Liverpool
Edge Hill University
Greater Manchester Ecology Unit
Cheshire Wildlife Trust
Lancashire Wildlife Trust
Wigan Leisure and Culture Trust
Natural England

Natural England, through Tom Squires, has led the coordination and development of this report.

Additional information and images have been provided by partners within the Great Manchester Wetlands Partnership:

Wigan Borough Council
Salford Borough Council
Warrington Borough Council
Environment Agency
Woolston Eyes Conservation Group
Red Rose Forest

Please note: All information in this document has been sourced using the partners reference material, reports and photographs.

28th May 2014

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SUMMARY

The Great Manchester Wetlands project is a 48,000 ha (480 km^2) community and natural heritage project, the aim of which is to deliver an ecological network between the two heavily urbanised areas of Manchester and Merseyside. The programme area covers the mosslands to the South and the post-industrial coalfields to the North and West – providing a unique combination of peatscapes and brownfield sites. It straddles the Lancashire Coalfields Natural Character Area to the north and the Mersey Valley NCA to the south within the North West.

The project area in this report and for the development of a HLF LPS is situated in the industrial belt stretching from Manchester to Warrington, bounded to the south by the Manchester Ship Canal. The landscape has developed from a Carbon base – based around coal measures and peat and it is dominated by the historical impact of the extractive industries for these and the support to these industries. All of these have left their mark on the landscape, but part of the legacy of these industries is an extraordinarily rich and diverse natural heritage. Today, this landscape is primarily wetland in its form, characterised by open water, fen, wet grassland, wet woodland and lowland raised bog. However, the industrial past has also left a legacy within thin the communities of this landscape, leaving these areas of exceptionally high and valuable biodiversity surrounded by some of the areas of highest social deprivation in the country.

The assessment underpinning this report identified three broad landscape character types that could be focused upon within a possible Landscape Partnership Scheme. These three core zones are The Flashes, The Mosslands and The Mersey Wetlands Corridor, within which the core natural and cultural heritage was assessed. Each contained a rich array of key sites, for example: Abram Flashes SSSI and Leeds Liverpool Canal in The Flashes; Risley Moss SAC/SSSI and Bridgewater Canal in the Mosslands; and, Woolston Eyes SSSI and Rixton Clay Pits in The Mersey Wetlands Corridor. Across these key sites, there is a range of existing community engagement, such as volunteering opportunities and Friends Groups, providing a range of activities and benefits.

The assessment found that there were wider opportunities for landscape restoration and community engagement. Whilst the area is rich in assets, the study showed a lack of landscape join up between individual sites and a need for wider restoration between the individual sites. Further, it also identified a need for ongoing restoration within these key sites to maximise their value in terms of biodiversity, and also as a community asset, for access and recreation.

The landscape characterisation identified this as a Carbon Landscape, not just in terms of the underlying geology and evolution of the landscape, but also in terms of the industrial and cultural heritage, and of the ability of this landscape to adapt and mitigate against climate change. The restoration of the peat base to lowland raised bog will provide an excellent opportunity for carbon sequestration and storage.

The resulting legacy in the landscape from the collapse of the historical industry of coal mining has led to high levels of deprivation. However, over the last 30 years, the transformation of this landscape has begun, with enhancement in biodiversity as well as recreation uses across a number of sites, such as Wigan Flashes LNR. There are considerable opportunities for further enhancements and specifically, linking up key sites and providing wider recreational and health benefits. One such opportunity is the recommendation to develop a 'Carbon Trail' linking the key sites across the landscape and provide low carbon recreation through footpaths and cycle routes. These, if coupled with appropriate interpretation and signage, could also provide additional learning benefits, such as links to primary schools, and to health benefits, such as links to Walking to Health Schemes.

Overall, the assessment for this report identified three key objectives, each underpinned by three recommendations from this synthesis of information and evidence:

- Restoration of the landscape – To restore and continue restoring a derelict landscape thus ensuring connectivity and resilience
- Improved access and use of that landscape – To reconnect people to this landscape
- Better understanding of the landscape – To raise awareness and engender community ownership in this landscape

The 9 Recommendations highlight the key themes and findings from this report and the supporting studies on Community Engagement Mapping and the report on the feasibility of a 'Carbon Trail, which is one of unifying the landscape through engagement and access opportunities alongside landscape scale restoration activity to remediate the functioning of this landscape as an ecosystem.

INTRODUCTION

This report has been developed to clarify the landscape and cultural assets of the Great Manchester Wetlands Partnership and the networks which link the communities within and surrounding the programme area. The report outlines the history of the programme area and the legacy of previous land use and exploitation in today's landscape. It includes a range of mapped heritage, both natural and cultural, along with a basic landscape character description. Provided through research by the University of Manchester, a brief assessment of the movement networks within the programme area and an assessment of the current community engagement across the core partnership area are included. This evidence has been used to provide recommendations to the Partnership on potential programme development.

This report aims to provide the broader evidence for further landscape scale programme development, and in particular, provide the underpinning evidence to support the development of a HLF Landscape Partnership Scheme bid on behalf of the Partnership.

The Greater Manchester Wetlands Partnership (GMWP) is a collaboration of environmental and community organisations that are seeking to transform the landscape between Great Manchester and Merseyside by 2025 into a thriving, resilient and inspirational landscape that delivers real benefits to local communities and the local economy. The GMWP was originally established to develop a bid for the national 'Nature Improvement Area' (NIA) scheme. It reached the final 20 and the GMWP have continued to strive towards their vision of establishing an interconnected wetlands landscape to realise environmental, social and economic benefits.

The Partnership is delivering a £3.7m programme to 2014/15. In May 2013 it was adopted as a local NIA by the Greater Manchester and Cheshire Local Nature Partnerships.

The GMWP area of interest covers some 480km^2. Its programme includes: restoration of mossland areas; creation of new wetlands and improvement of existing ones; and creation of new reedbeds and wet woodland areas.

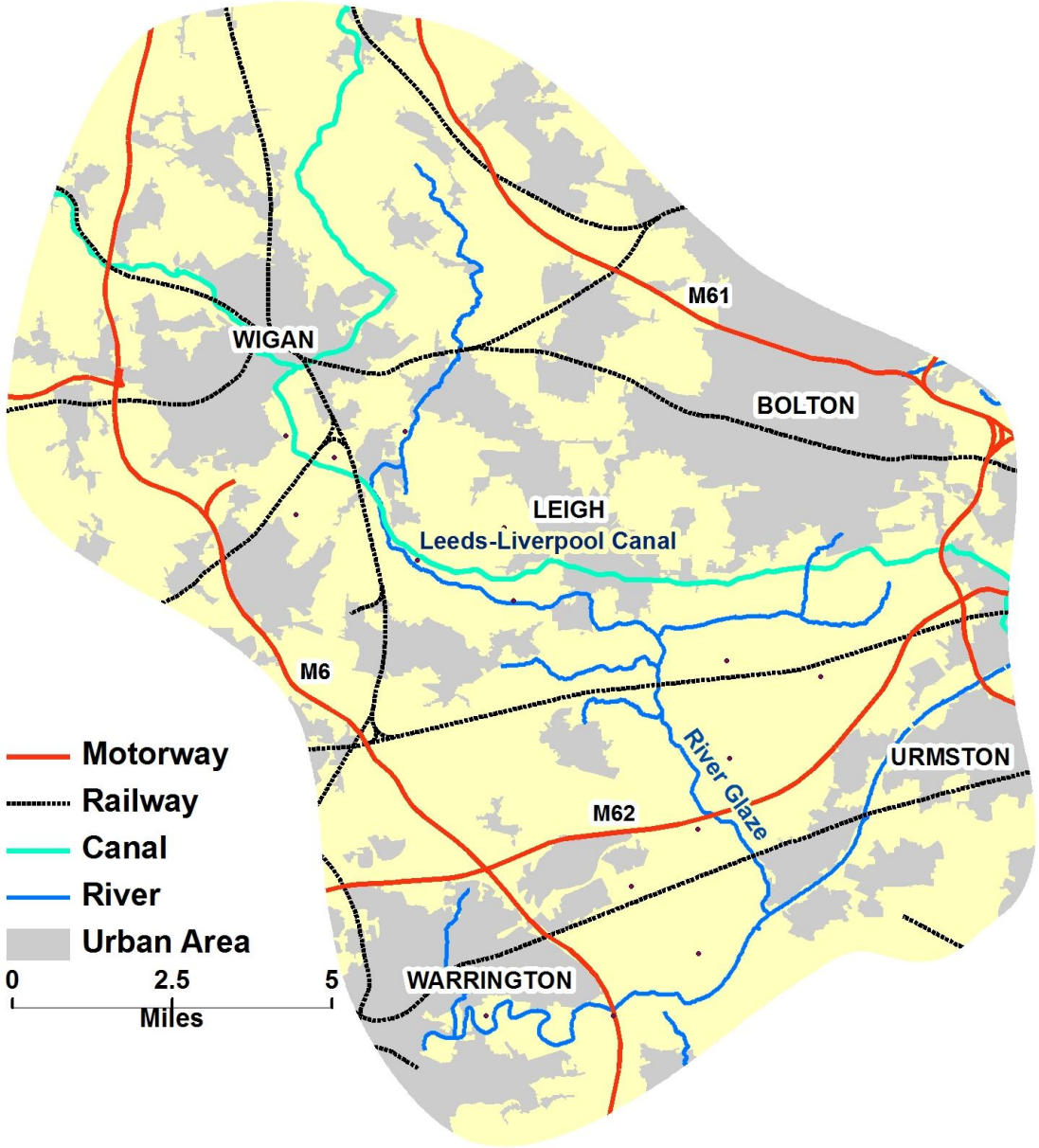
The Partnership is taking an Ecosystem Approach to the restoration of the landscape and sees the engagement of local communities in developing and delivering the programme as fundamental.

The Partnership of 19 organisations includes statutory bodies, NGOs, local government, private companies, community groups, charities and the academic community. The Partnership is chaired by Lancashire Wildlife Trust and currently receives funding from DEFRA to develop the programme and partnership.

BASIC GEOGRAPHY

Great Manchester Wetlands

- Covers 48,000 hectares, incorporating urban areas such as Wigan, Leigh, Warrington and Bolton
- Major cities of Liverpool and Manchester are just west and east of the area respectively
- 3,800 ha are designated for their habitats and wildlife
- Northern area drains into River Ribble via the River Douglas
- Southern area drains into the River Mersey and Manchester Ship Canal through the River Glaze
- The Leeds-Liverpool Canal is Britain's longest canal built as a single waterway
- The Bridgewater Canal was the first canal in Britain to be built without following an existing water-course



HISTORY OF THE AREA

The Evolution of the Landscape

Geology

In the north of the area lie the Carboniferous coal measures, which were formed between 315 and 307 million years ago in an equatorial environment characterised by fluctuating sea levels. Terrestrial phases saw the land colonised by dense rainforest, which later died and were buried by sediments as sea levels rose. These eventually became the coal seams. As the tectonic plates shifted northwards over the next 100 million years, they moved through sub-tropical latitudes which then - as now - are characterised by hot desert conditions. These are reflected in the predominantly red, iron-rich sandstones which overlie the Carboniferous rocks.

Over the past 2.6 million years, the area has been subjected to periodic glaciations of which the last is the only one recorded in any detail. This lasted from about 27,000 to 18,000 years ago and apart from one short return to a cold climate, has been followed by fluctuating but generally warm conditions. It is the effects of these events which have done most to create the landscape that we see today.

The glacial and meltwater deposits left by the retreating glaciers did not form a flat surface. In places, detached blocks of melting ice led to the creation of kettle holes which gradually filled with peat. Red Moss, located on the watershed between the Croal and Yarrow catchments, probably began in this way with peat beginning to accumulate 13,000 years ago. The depressions that initiated the development of Chat Moss appear to have been larger, though by no means as extensive as the peat cover eventually came. Early development began in the deeper pockets but the main development phase occurred from 7,500 years ago. The climate at this time was wet and mild, which probably led to groundwater flooding and the creation of more extensive areas of open water.

Prehistory

In prehistoric times settlements were confined to moorland edges to the north of the area. The expanding population during the warm Bronze Age started to move down from the moors into the lowlands. The extensive wet mosslands in the south-east of the area were sites to be avoided, although the drier edges of these may have been attractive since they would offer fuel and in the Iron Age, ritual sites. Wet clayey soils were not attractive until the heavy metal plough allowed their cultivation. Conversely, well-drained soils could be cultivated easily and were favoured along with low hills within the glacial till.

In ancient times the mosses were regarded as dangerous wildernesses; with deep dark pools of acidic water; treacherous areas of boggy ground; mists and fogs; and the haunt of wild animals. The name Little Woolden is derived from Vuluedene meaning "Wolf Valley", suggesting the wildlife that would have been present. As such, these areas were good for hunting (on foot) but were to be avoided at other times. The spiritual dread with which these wildernesses were regarded may readily be guessed at with the discovery of a corpse known as the 'Druid Prince', whose amazingly well preserved remains were dug out of the peat at Lindow Moss to the south-east. The fact that he appears to have been possibly drugged and then ritually sacrificed gives some indication of how Iron Age man may have regarded the mosses. In 1958, the severed head of what was believed to be a local Celt was found in Chat Moss near Worsley.

In 1726, the writer Daniel Defoe passed through the area, journeying from Warrington along Manchester Road, recording his visit in a book published a year later:

> *'From hence, on the road to Manchester, we passed the great bog or waste called Chatmos, the first of that kind that we see in England, from any of the south parts hither. It extends on the left-hand of the road for five or six miles east and west, and they told us it was, in some places, seven or eight miles from north to south. The nature of these mosses, for we found there were many of them in this country, is this, and you will take this for a description of all the rest. The surface, at a distance, looks black and dirty, and is indeed frightful to think of, for it will bear neither horse or man, unless in an extremely dry season, and then not so as to be passable, or that any one should travel over them. What nature meant by such a useless production, tis hard to imagine; but the land is entirely waste, except for the poor cottager's fuel, and the quantity used for that is very small.'*
>
> Defoe, Daniel 'A Tour Through The Whole Island of Great Britain', published in three volumes 1724 –1726.

Defoe's opinion of the mosses shows that perhaps little had changed in nearly 2,000 years. The mosses were still dreadful places to be avoided at all costs. Defoe mentions the 'poor cottager's fuel' and this is perhaps a reference to peat, which was widely used as a low quality fuel. In the C19th and early C20th, peat was dug at Risley for fuel and a small narrow gauge railway was used to transport it to horse-drawn carts. Medieval and post Medieval farmers tried to drain some of the mosslands around the fringes in order to cultivate the rich peaty soils. Clearly, unless the 'valley bog' - the original depression in which the peat formed - could be drained then any efforts to drain the perimeter would be fraught with difficulty. For this reason many of the original peripheral field shapes were in plan like the slices of a pie, cutting into the moss. The large chain of mosses along the Mersey effectively channelled many of the roads through the area into the gaps between them.

The strategic importance of this string of mosses was extremely high. Added to the formidable obstacle of the River Mersey, the mosses acted as a further barrier to forces moving north or south through north-west England. For example, in 1745, the Jacobite army of Bonnie Prince Charlie marched south through Carlisle and Preston towards Warrington, but at Wigan the army turned east towards Manchester unable to pass through the mossland after the bridge at Warrington had been demolished by Brigadier Douglas and the Liverpool Blues (a militia unit).

Industrialisation and Exploitation

The area is special and distinctive as a landscape because of its industrial heritage. The exploitation of the high levels of natural carbon resources throughout the landscape, in the form of coal and peat, helped fuel the Industrial Revolution from the late C18th. Extractive industries continued to shape the landscape significantly up to the mid C20th, with coalfields in the north and east and peat, clay and sand extraction sites in the south.

COAL

Coal mining began to develop as early as Roman times. During the late Middle Ages it developed more widely, leading to large growth in the population. By 1660, Wigan was the third largest town in South Lancashire with important brass and pewter industries.

Some of the region's key historic transport routes cross the landscape. The Bridgewater Canal, built in 1761, was the first canal not to follow an existing watercourse and was used to transport coal from Worsley to Manchester.

During the Industrial Revolution the small towns and villages in the coal belt expanded as more mines were opened, linked by the canal system to Manchester and Liverpool.

The construction of the Leeds and Liverpool Canal and its linkage to the Bridgewater Canal in 1820 transformed the area. This enabled coal to be exported from the Wigan area on a large scale to the major industrial cities adjacent and collieries sprang up all the way along its course through the Wigan coalfield. This resulted in massive areas of underground colliery workings and subsequent large-scale subsidence of the surrounding land as mines began to collapse when coal had been extracted from the seams below.

PEAT

Peat has been extensively cut for fuel in the past and it continued until recently to be harvested for horticultural purposes in the area, for example at Chat and Little Woolden Mosses. In the medieval period people had 'rights of turbary' i.e. the right to cut peat for fuel. Mosses were therefore divided into long, thin strips known as moss rooms, from which turfs were cut. This pattern is fossilised in most of the larger mosses as hedgerows were introduced to enclose this former open area.

Older roads and tracks tend to fringe the mosses and these were used by farmers for access to cultivate the mossland edges. The advent of large scale mechanisation enabled farmers to undertake substantial drainage and 'reclamation' schemes, resulting in the straight drainage ditches and tracks seen today.

Commercial peat extraction dates back to at least the early 1960s. Previously, extraction was conducted by cutting blocks of peat which left some vegetation intact. However, in more recent decades the particularly destructive 'milling' method has been used on the large peat extraction sites, creating a barren landscape.

The Liverpool-Manchester railway, built by George Stephenson and opened in 1830, was the first inter-urban passenger railway and bisects the mosslands, innovatively crossing the unstable peat of Chat Moss by being floated on birchwood bundles and tar barrels. It was the first public transport system which did not use animal traction power. To this day, the track across Chat Moss floats on the hurdles that Stephenson's men laid and it is possible to feel the ground move as a train passes if stood alongside. It is worth noting that the line now supports trains 25 times the weight of the Rocket, which hauled the first experimental train over the Moss in January 1830.

The introduction of the railway meant that by the mid-to-late C19th most of the mossland areas of Wigan were reclaimed. The use of light railways with lightweight steam locomotives meant that material could be moved with ease to and from the mosses. Drainage ditches were dug through most of the mosses, although their construction was still based on human labour which was a limiting factor.

The image shows the picture 'View of the Railway Across Chat Moss', by Henry Pyall (1831)

(http://commons.wikimedia.org/wiki/File:View_of_the_Railway_across_Chat_Moss,_from_Bury's_Liverpool_and_Manchester_Railway,_1831_-_artfinder_267570_full_1024x836.jpg)

During the C19th the population of the area expanded fivefold, drawing in immigrants from other parts of the country and Ireland. Large areas of agriculture were also developed on the fertile peats of the mosslands that helped supply Manchester with its vegetable produce. After 1845 Manchester Council took responsibility for removing refuse, including night soil and slaughter house refuse. At night, men removed the 'night soil' by horse and cart. The sheer scale of the task led to the purchase of Carrington Moss by the City in 1886, as a place for the disposal of refuse, whilst at the same time reclaiming the land for agricultural purposes.

Farmers on Chat Moss were legally required by their tenancy agreements to accept a specified amount of refuse on their land, and were even obliged to pay for it! Because of the success of this scheme, and the further expansion of the City in 1890, Chat Moss was purchased in 1895. The waste was conveyed to the Mosses by light railway.

In the early C20th, farmers finally had the tools to deal with the mosslands. Mechanisation meant that long, deep drainage trenches could be cut through the mossland in a relatively short period of time, allowing the moss to dry out enough to support the weight of a tractor. The rich peaty soils, once drained, were very productive. Farmers who had land adjoining the mossland, as well as in the mossland itself, benefited greatly and were able to remove hedges and trees to facilitate mechanised farming.

The improvements in drainage, particularly deep drainage, which came with the use of steam in the Industrial Revolution, meant that coal deposits hitherto unavailable to miners could now be accessed. As a result, collieries were established at Astley and chiefly in Ince, with massive disturbance impacts on the adjacent mosslands. Some of the disturbance prolonged the life of adjacent mossland as land was inundated through subsidence, but in general the colliery spoil covered and contaminated the mossland and it disappeared.

The Flashes were created as the collapsed ground levels were inundated by Hey Brook and by the residual water from Ince Moss. The majority of the flashes seem to have appeared during the C20th. One of the consequences of the subsidence was that the Leeds and Liverpool Canal and the railway lines through the area also began to subside with potentially disastrous consequences. To counter this, embankments were raised using colliery spoil and over time these became substantial landscape features. The Flashes were also used as dumping grounds for the colliery spoil extracted from beneath them as well as other materials, such as ash from the Westwood Power Station. This had a significant effect on the legacy in the landscape.

Train at Ince Moss Colliery

Peat extraction

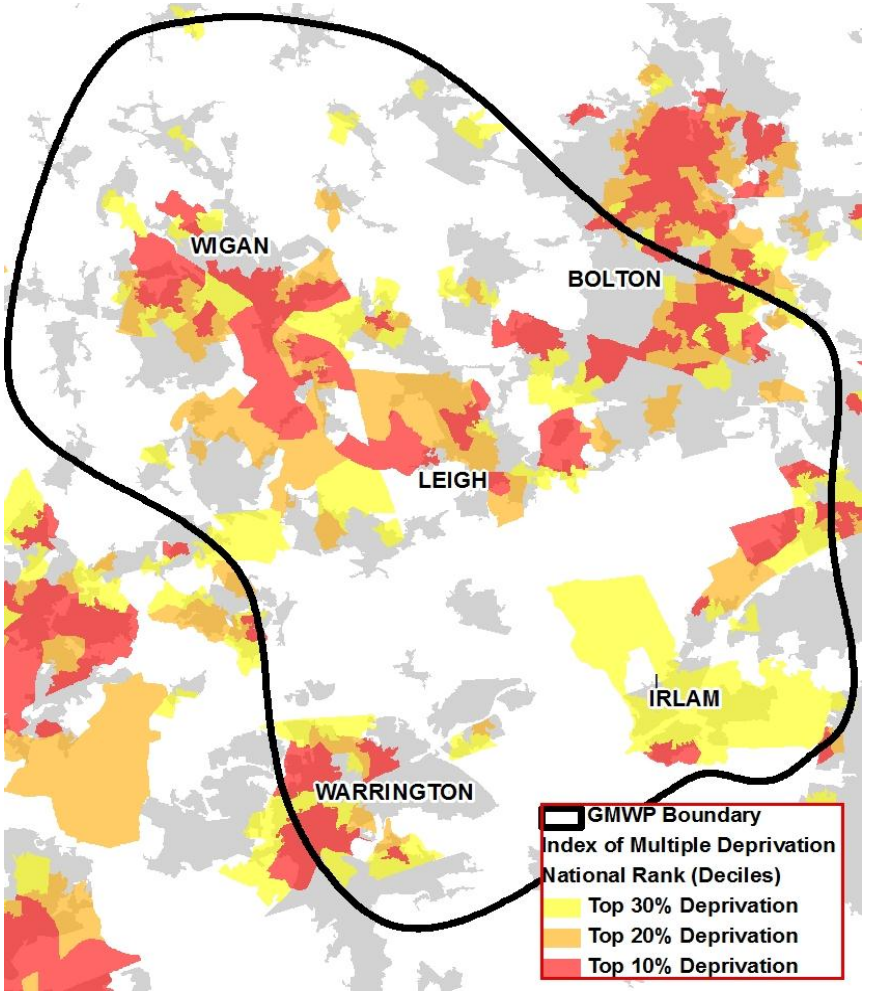
Manchester Ship Canal

Drainage of peat

Coal mining

LEGACY IN THE LANDSCAPE

- Dereliction of sites: large tracts of land were left disused and derelict after the mass closures of industry, especially collieries around Wigan.
- Water pollution: water was heavily polluted following dereliction of sites. Underused and undervalued, toxic refuse was regularly dumped in open water causing negative environmental impacts.
- Spoil heaps: large heaps of toxic spoil were left at derelict sites, creating an environmental problem. The lack of perceived value for this land delayed restoration.
- Habitat loss: habitats were lost as a result of pollution and change of land-use.
- Habitat fragmentation: former continuous tracts of habitat were broken up by transport routes and alternative land-uses, creating barriers for species movement through the landscape.
- Associated social deprivation: closure of industrial sites led to high levels of unemployment, worsening health levels and poorer levels of education.




Three Sisters spoil heaps


Pennington Water Pollution


Pearson's Flash


Westwood Power Station

SHOOTS OF RECOVERY - restoration begins…

From the 1970s people started to recognise the damage caused to the Great Manchester Wetlands. Restoration efforts began and whilst there is much work still to do, there have been significant improvements at many sites, such as through Wigan's Greenheart Regional Park project. Together with projects planned for the future, this will contribute to a working ecological network that aids species movement through the wetland landscape and one that is more accessible for local communities. The following case studies show how much can be achieved in the Great Manchester Wetlands.

WIGAN FLASHES LOCAL NATURE RESERVE

Formed by subsidence from deep coal mines which subsequently filled with water, the Wigan Flashes have always been closely linked to Wigan's industrial past. During the 1960s and 1970s this link was all too clear, as industrial iron waste polluted the water so heavily that it became bright orange in colour, with added problems of sewage pollution. The site was fringed with colliery spoil waste tips and a domestic refuse tip. Very little vegetation was present and the site provided no benefit to nature or the local community, which also suffered high levels of social deprivation.

Over the last 20 years this bleak picture has been transformed by restoration efforts from conservation groups, charities, and local council and government agencies. The complex of eight shallow wetlands covering 240 hectares now supports reedbed, willow carr, mossland and fens. These habitats have become important sites for wetland bird species including Bittern and Willow Tit, many fish species, small mammals and an array of invertebrates.

People have also benefitted from the restoration of these wetlands. Volunteer opportunities are offered which can help develop skills. Recreational uses include angling, bird-watching, walking, cycling, running and sailing. Three million people live within a 30 minute drive of this site, showing that with further work there is plenty more potential to increase the benefits for surrounding communities.

THEN

NOW

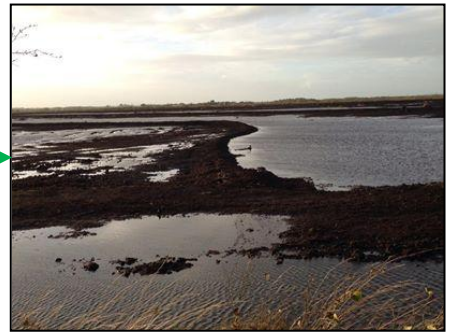
LITTLE WOOLDEN MOSS

This is a 100 hectare former peat extraction site that was purchased by the Lancashire Wildlife Trust using Heritage Lottery Funding in 2012. Restoration has been underway since the purchase, with the primary focus on returning the site's hydrology to natural levels following years of drainage. The filling in of drainage ditches, re-levelling of peat and the introduction of bunds has raised water levels, helping to reduce erosion and desiccation of the remaining peat resource.

Re-vegetation of the site with typical mossland flora is the next step in restoration, and site staff and volunteers are working to introduce species such as Common Cottongrass and Sphagnum mosses to cover the bare peat surface. This site is of importance for both wildlife and people, with huge potential carbon benefits if the bog is restored to become a sink rather than a source of emissions. Furthermore, it provides a stepping stone that connects the wetlands in the south to the mosses further north.

Before Restoration

After re-wetting



RIXTON CLAY PITS

This 34 hectare site was formerly used as a clay extraction site for brick manufacturing. Extraction began in the 1920s but had ceased by 1965. Applications were made and refused to turn the site into landfill. Extraction of clay at different periods left a mosaic of water-filled hollows and clay banks which now support a diversity of habitats of varying maturity, including wetlands, grassland, scrub and woodland.

Following biological surveys one area was designated as a SSSI in 1979, with a further two units added in 1990. The site is considered of high biological importance because it holds the largest breeding population of Great Crested Newts in the county of Cheshire and has important areas of calcareous grassland habitat.

In 1996, the site owners Warrington Borough Council named the entire site a Local Nature Reserve, signifying its importance for people and wildlife. Now it has a network of paths and a visitor centre to offer better access and facilities.

Restored ponds, mosaic of vegetation types and interpretation

DESIGNATED SITES

Manchester Mosses Special Area for Conservation (SAC): 172 hectares of the mossland area are designate because of the degraded raised bog habitat present which has the potential for restoration. All except Holcroft Moss have been cut for peat, but some wet patches remain that hold specialised bog species.

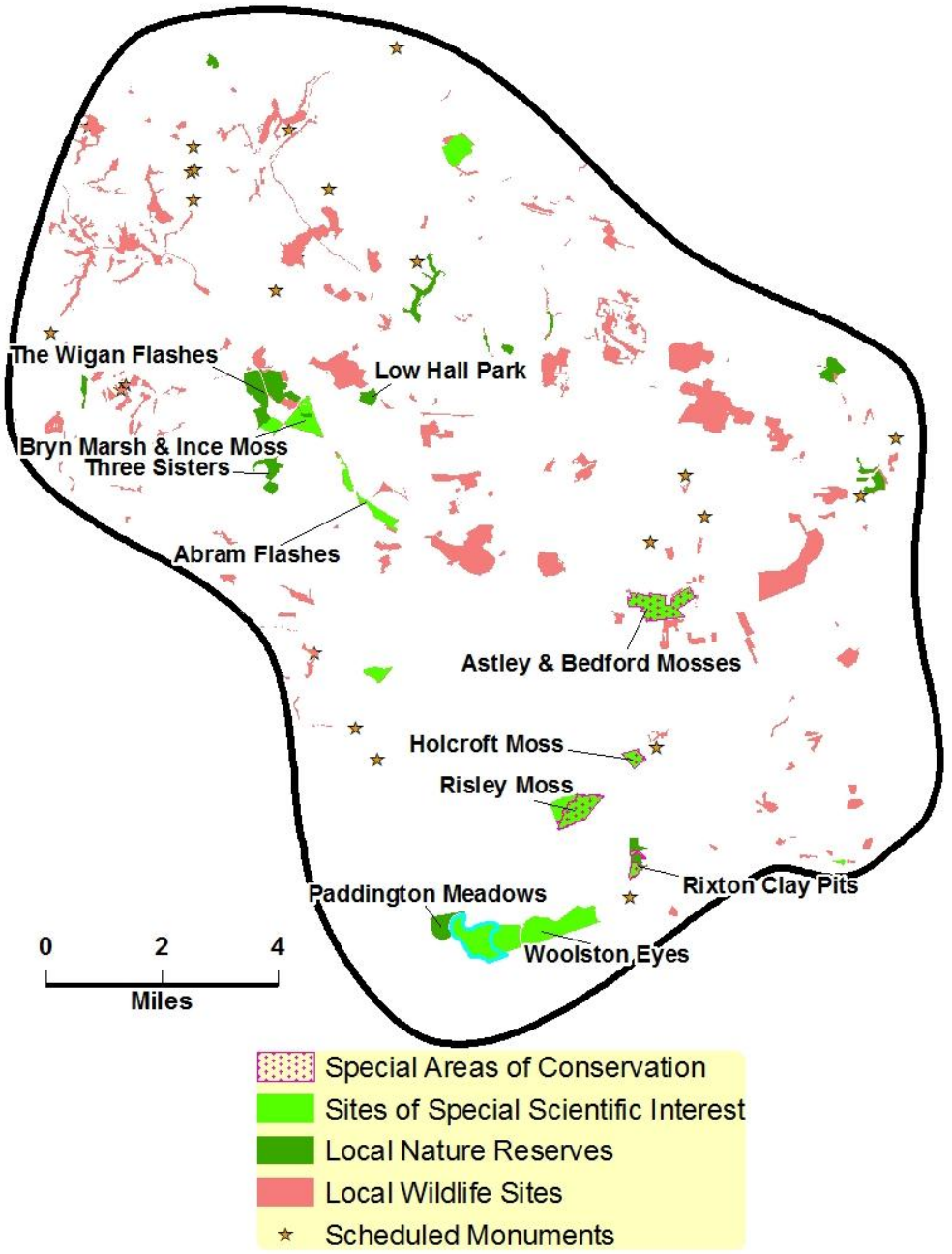
Rixton Clay Pits SAC: The site covers 14ha and is notified for its significant Great Crested Newt population.

Site of Special Scientific Interest (SSSI) Network: There are 10 SSSIs covering 655 hectares in the Great Manchester Wetlands. Sites have been notified for habitats of interest including raised bog and mire communities; swamp communities; lowland fens; reedbeds; wet woodland and wet grassland; and for species such as breeding bird assemblages; dragonfly assemblages; and Great Crested Newt populations.

Local Nature Reserves: There are 14 LNRs in the Great Manchester Wetlands covering 500 hectares and offering opportunities for local communities to engage with the wildlife on their doorstep.

Local Wildlife Sites: 2,440 hectares across 177 locally designated non-statutory sites important for wildlife.

Scheduled Monuments: a total of 24 in the area, with most associated with historic buildings that are moated. Two monuments are related to the industrial mining heritage and there are some monuments associated with historical religious activities.

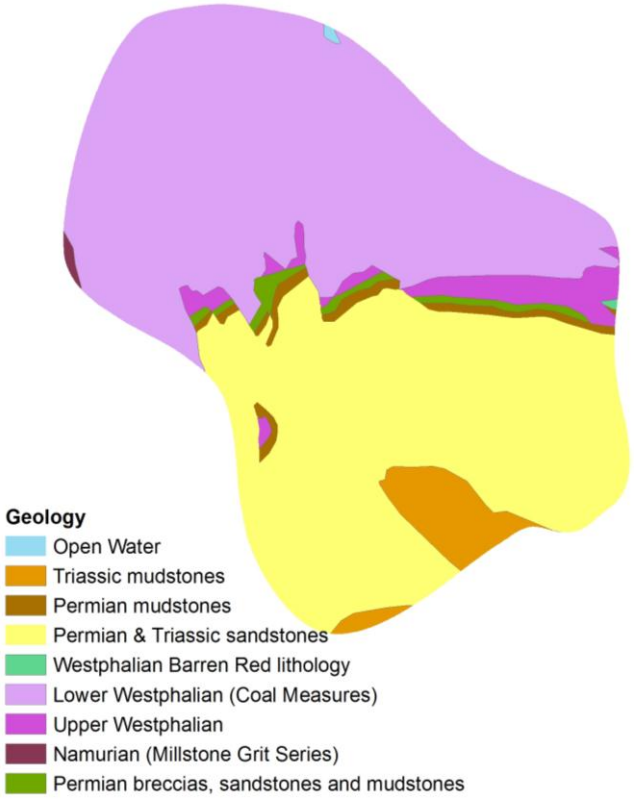


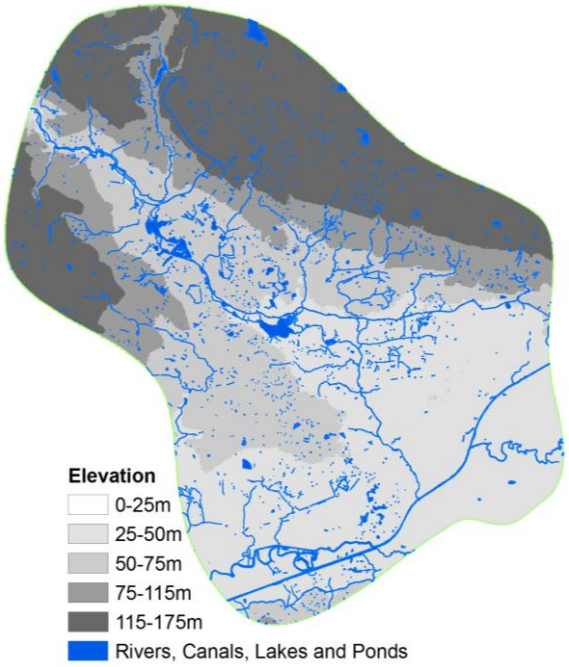
LANDSCAPE CHARACTER ASSESSMENT

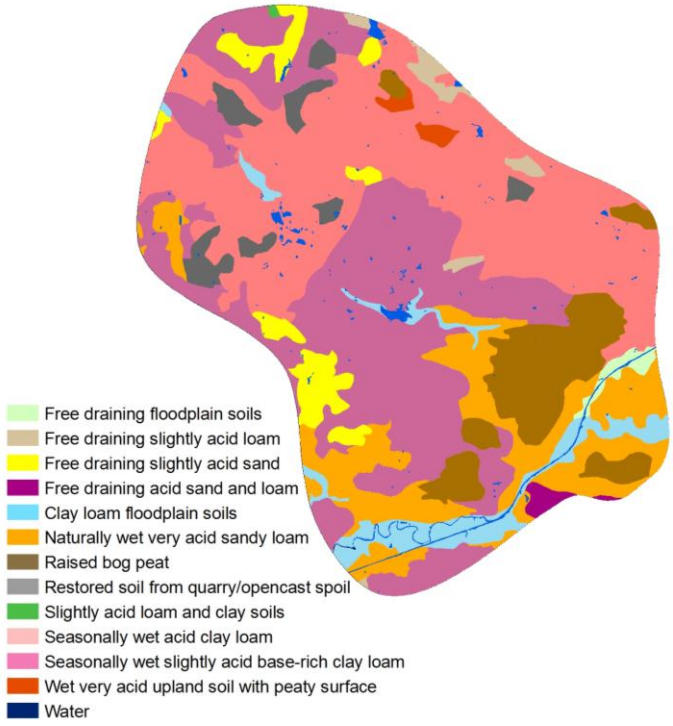
The Great Manchester Wetlands is predominantly a low-lying landscape with an extensive network of rivers, canals, lakes and ponds. To the north the hydrology drains into the River Douglas and the River Ribble whilst to the south it drains through the Hey Brook Corridor and River Glaze to join the Manchester Ship Canal and River Mersey.

Carboniferous coal measures dominate the geology in the north. The south is mostly Triassic sandstone that was overlain by glacial till deposited during the retreat of the last Ice Age. Soils in the south are mostly clayey or sandy, but are interspersed with large expanses of peat in the south-east. Floodplain soils track the major waterways whilst restored soils, indicating former coal mining sites, can be found scattered around the Wigan conurbation.

Overall, it is a carbon-based landscape which has been shaped not just by the development of the underlying carbon base of coal and peat, but also by the exploitation of those resources. This has led to an industrialised landscape of urban and brownfield sites with scars left over from previous exploitation interspersed by high quality agricultural land providing horticulture and arable produce.







There are two National Character Areas (56 - Lancashire Coal Measures and 60 - Mersey Valley) and numerous existing Landscape Character Assessments (Wigan, Salford and Warrington as well as Red Rose Forest Landscape Assessment) which cover parts of the Great Manchester Wetlands. This Interpretation Report does not include a distinct LCA for the Great Manchester Wetlands and would recommend that one is carried out in the future.

Extracts from Natural Character Area Profiles

Lancashire Coal Measures

Rocks from the Carboniferous Coal Measures underlie most of the area, giving rise to a varied topography of gentle hills and valleys, with patchy layers of glacial deposits.

This is an area of urban and industrial development. The settlement pattern is based around the historical development of mines and industry centred on Wigan and St Helens, leading to a scattered layout and close intermingling of housing and industry.

The area is dominated by its industrial heritage, long associated with mining activity. The resulting landscape is a complex mosaic of farmland, scattered urban centres, industry, active mineral sites and derelict or reclaimed workings, giving this area a strong and distinctive identity.

Mersey Valley

It is a varied landscape that extends from the mosslands near the Manchester Conurbation in the east, to the Merseyside Conurbation and the wide estuary with intertidal mudflats/sand flats and salt marsh in the west.

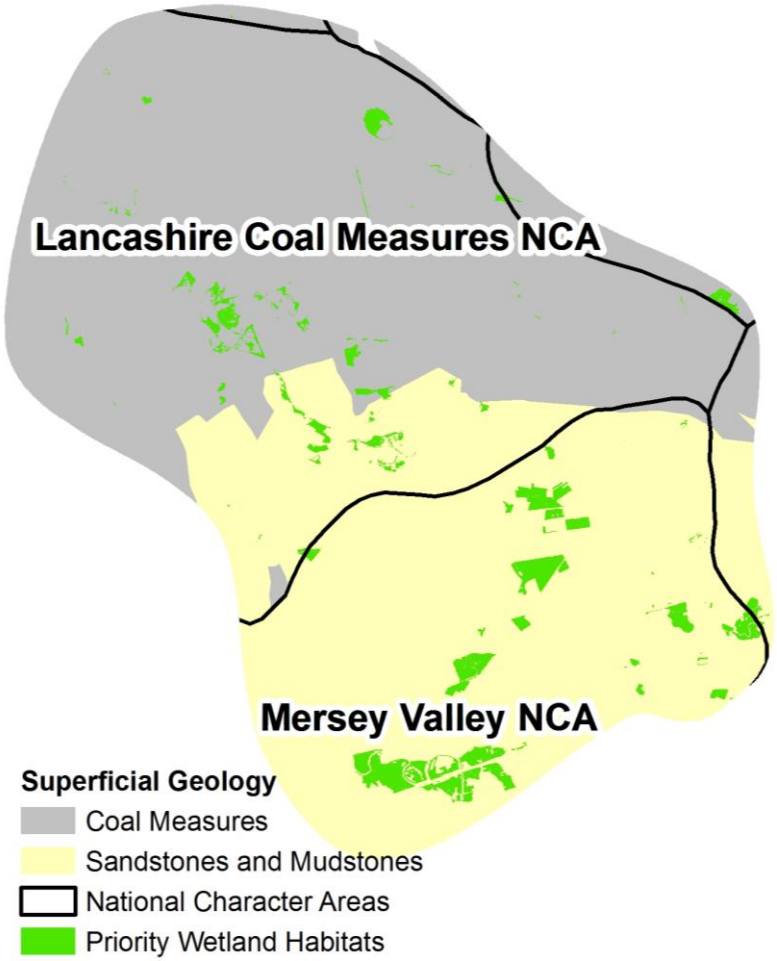
In the east, open, flat farmland is found on the rich, dark peaty soils of the former mosses, with a complex network of drainage ditches. Urban and industrial developments line the banks of the River Mersey. Industrial infrastructure is often prominent, with large-scale, highly visible development including chemical works and oil refineries. The Manchester Ship Canal links the estuary to the heart of Manchester, perpetuating the industrial development of the area.

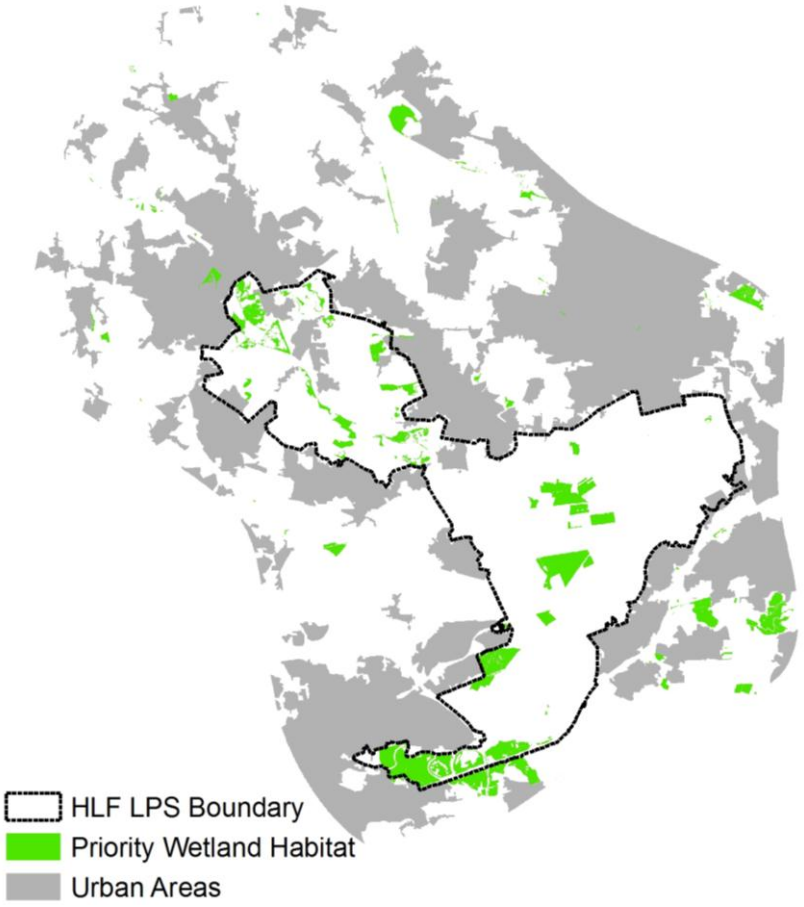
There is a dense communication network of major roads, railways, canals and transmission lines. The urban and suburban areas provide housing for those working in neighbouring conurbations, as well as in the industries of the Mersey Valley.

LANDSCAPE CHARACTER ASSESSMENT - deciding a project boundary

To devise the Landscape Partnership Scheme project boundary, an assessment of the Great Manchester Wetlands was made in terms of its geology, soils, hydrology, topography and the distribution of priority habitats, designated sites and urban areas. This method embraced the rationale of the National Character Areas, creating a boundary based on landscape features rather than administrative lines. A core area was identified for wetland biodiversity, from Wigan in the north through the Manchester Mosses to Warrington in the south. This broadly follows the Wigan Flashes complex and the Hey Brook and River Glaze corridors, although the eastern boundary is defined by the distribution of peat soils and urban areas.

Whilst the boundary spans two National Character Areas, the arc of priority wetland habitats is unified by two common themes: carbon and water. Both the natural and cultural heritage of the landscape has been shaped by these two elements, creating distinct and unique landscape characters within the region.





Features within the proposed Landscape Partnership Scheme - priority habitats and species

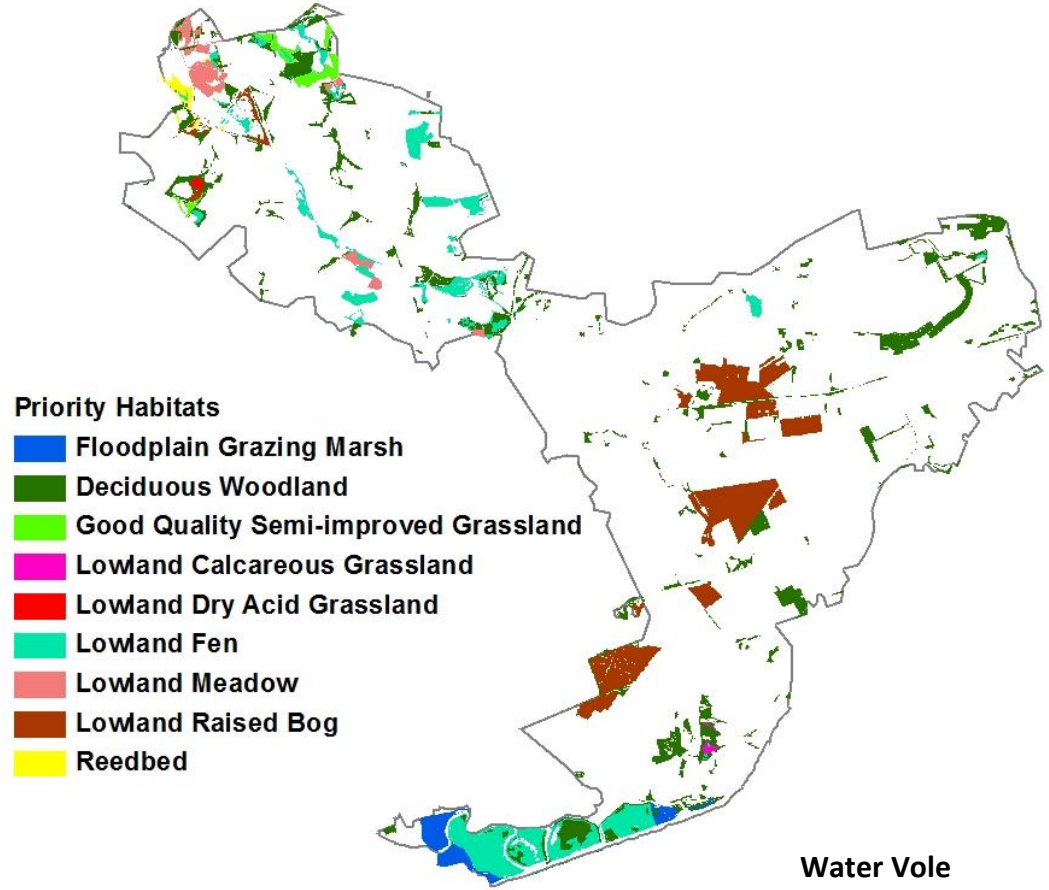
The arc-shaped mosaic of priority wetland habitats in the Great Manchester Wetlands forms a conduit that can facilitate wetland species movement through the landscape. In the south are predominantly open wetland habitats such as lowland fen and floodplain grazing marsh, with areas of wet deciduous woodland scattered inbetween. A vast expanse of peat with patches of lowland raised bog, one of the rarest habitats globally, occupies the central area. To the north-west are areas of open water surrounded by wet woodland and a mixture of grassland, reedbed and lowland fen. Together, this area's habitats are recognised as being nationally important for the Section 41 Species (threatened or declining species) shown on this page.

Willow Tit

Inhabit wet woodland in the north-west of the area. Tracts of woodland are actively managed for Willow Tits, with woodland thinning and scrub and ground flora development encouraged

Tree Sparrow

The Great Manchester Wetlands are of regional importance for this species, which is beginning to increase in numbers after massive declines due to agricultural intensification and hedgerow removal



Water Vole

Reliant on wetland habitats, Water Voles have experienced a sharp decline in numbers due to habitat loss, predation and climate change. The Wigan Flashes remains an important stronghold for the species

Lapwing

This charismatic wading bird has declined in numbers but continues to breed in the area. It relies on short vegetation and rough grassland for foraging. Agricultural intensification threatens this species, causing losses of both foraging and nesting habitat

Grey Partridge

This species has undergone a severe decline. Inhabiting lowland farmland, the Mosslands are particularly important in the local region for Grey Partridge. The intensification of agricultural practices is one of their biggest threats

LANDSCAPE CHARACTER TYPES

The landscape of the Great Manchester Wetlands has now been described. From this, and from those assessments outside of this Report, three distinct Landscape Character Types can be discerned and they are recognised as:

- **Type 1 – The Flashes**
- **Type 2 – The Mosslands**
- **Type 3 – The Mersey Wetlands Corridor**

Each Landscape Character Type represents a part of the proposed project area. This may be reflected in the area's topographical or geological characteristics, its ecology, land-use or cultural history. In many cases it is a combination of all these factors.

The Flashes

The Mosslands

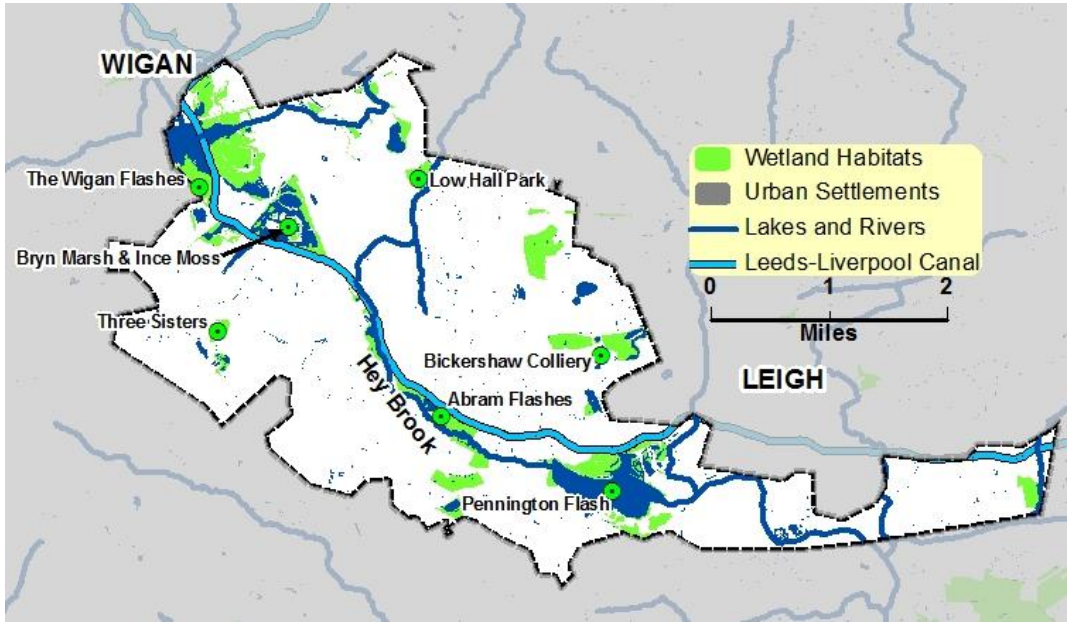
Mersey Wetlands Corridor

The Flashes

Situated in the north-west of the Great Manchester Wetlands and surrounding Wigan, The Flashes is an area profoundly influenced by its geology and industrial past.

The area is remarkable for its industrial heritage and the individual flashes actually formed as a result of ground subsidence associated with deep mining for coal. Former mineral workings and spoil heaps have left a legacy of polluted sites but in recent decades conditions have improved and an area that was once heavily polluted has become important for people and wildlife.

Today, many areas of former industrial activity have been reclaimed, resulting in a network of lowland wetland habitats and open water-bodies. This area boasts a mosaic of reedbed, open water, wet meadows, lowland fen and carr scrub that together support an array of wetland specialist species such as Bittern, Willow Tit, Water Vole and an array of invertebrates including 15 species of dragonfly. Surrounding this is a matrix of farmland that provides habitat for farmland birds and Brown Hare.



HERITAGE

CULTURAL

- **Bickershaw Colliery**: former deep shaft coal mining site
- **Pennington Flash Country Park**: offers a variety of recreational activities: sailing, windsurfing, angling, horse riding and bird watching
- **Leeds & Liverpool Canal**: opened in 1816, the canal is a recreational route for boating, cycling and walking
- **Amberswood**: outdoor woodland classroom for local primary schools

NATURAL

- **Abram Flashes** SSSI: open water, swamp, fen and wet grassland supports breeding waterfowl
- **Bryn Marsh & Ince Moss** SSSI: swamp and fen habitats support dragonfly populations and breeding birds
- **Wigan Flashes** LNR: mixed wetland habitats, notable for wintering Bittern and Water Vole populations
- **Low Hall Park** LNR **& Amberswood Common** SBI: wetland, mixed woodland and grassland habitats

Horrock's Flash

Three Sisters

Bryn Marsh

Pennington Flash

Abram Flash

ISSUES	RECOMMENDATIONS
Cultural heritage of The Flashes' industrial past is at risk of being lost	Conserve and publicise cultural heritage features to safeguard the strong cultural identity and mining heritage of the area
Heritage features are surrounded by large urban populations which contain high levels of Multiple Deprivation	Build on existing initiatives to involve local communities in developing the value and benefits of local heritage
Although popular with visitors and well used, there is a lack of visitor infrastructure such as visitor centres	Develop visitor infrastructure to make access to facilities easier and ensure visitors are attracted to the area
Large tracts of underused and neglected land remain as a result of historical coal mining activities	Restore habitat to provide benefits for biodiversity and local communities
Invasive species pose a risk to the environment, particularly along water courses and in wetland habitats	Develop catchment wide control strategies as well as local interventions. Raising awareness in local communities to enlist help may be possible
There is insufficient reedbed of the correct type to enable Bitterns to breed	Encourage suitable habitat creation and improvement projects
Invasion of unmanaged scrub has degraded some habitats, forming a barrier to species movement	Develop suitable schemes for improving or creating habitat and introducing wildlife corridors

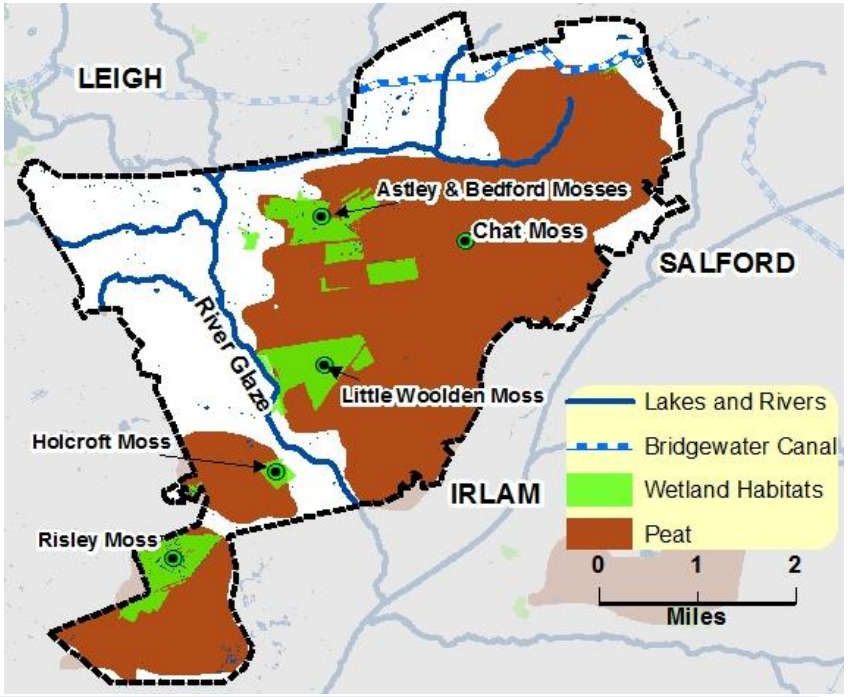
Mosslands

The Mosslands area is bordered by Salford to the east and Irlam to the south. Its past has been defined by the peaty soils and the flat topography associated with the former lowland bogs.

The peat was formed over a period of 10,000 years since the last Ice Age and supports internationally important lowland raised bog habitat and many species such as Common Lizard, Brown Hare, Black Darter Dragonfly and Sundew plants. The high agricultural quality of this land has resulted in much of it being converted to farmland following drainage. In the C19th this area was renowned for its production of high quality salad and vegetable crops which fed Manchester's burgeoning population.

Peat extraction for compost has impacted the remaining areas of lowland raised bog which are now degraded. In total, 96% of mosslands in Greater Manchester have been destroyed, with the rest suffering significantly due chiefly to drainage.

The remnant lowland raised bogs are highly valued for their plants and wildlife as well as their current and potential contribution to ecosystem services such as carbon storage. Restoration and management are underway on a number of sites, with attempts being made to reintroduce bog-building Sphagnum moss species and to manage water levels to aid their recovery.



HERITAGE

CULTURAL

- **Risley Moss**: Visitor Centre which houses exhibitions and runs a volunteer group (Risley Moss Action Group).
- **Liverpool to Manchester Railway Line**: first inter-urban floating passenger railway line, opened in 1830
- **Bridgewater Canal**: opened in 1761 as Britain's first commercial canal
- **Astley Green Colliery Museum**: Former colliery site now a museum run by the Red Rose Steam Society and protected as a Scheduled Monument

NATURAL

- **Astley & Bedford Mosses** SSSI/Manchester Mosses SAC (MMSAC): 90ha of mire communities important for wintering raptors, amphibians, dragonflies & Common Lizard
- **Holcroft Moss** MMSAC/SSSI: degraded mire with an intact dome
- **Risley Moss** MMSAC/SSSI: mosaic of mire communities under restoration
- **Botany Bay Wood**: largest continuous woodland block in region
- **Little Woolden Moss**: Large scale restoration project underway to restore the biodiversity value of this site

Risley Moss

Astley Moss

Bridgewater Canal

Cadishead Moss

Twelve Yards Road

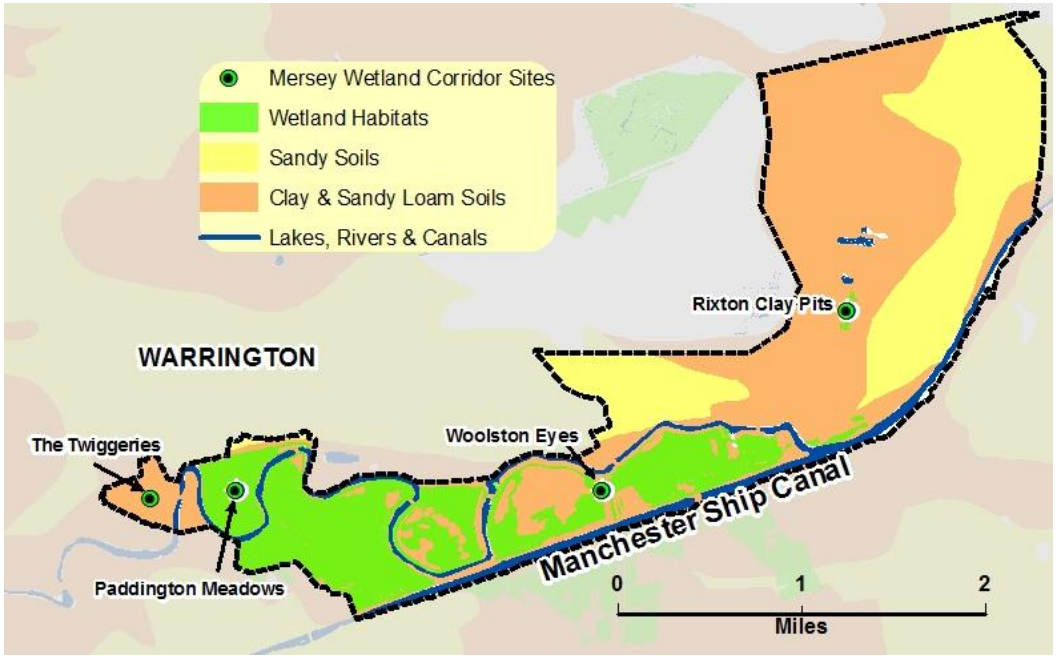
ISSUES	RECOMMENDATIONS
There is a lack of access routes into this area, restricting local communities' opportunities to benefit from the natural and cultural heritage	Reconnect local communities with their heritage by developing access routes and delivering community engagement initiatives
Cultural and natural heritage are abundant but are not publicised to the local communities enough	Install better interpretation, signage and virtual guides to put this area on the map as a natural and cultural resource for local communities
Continued exploitation occurs in parts of the peatland, degrading the natural and cultural heritage	Increase local awareness of issues through interpretation and further community engagement (volunteer groups)
The remaining mosslands are fragmented and have been impacted by previous land uses, such as peat extraction	Restore undesignated areas of peatland to strengthen the links between mossland sites in the Manchester Mosses SAC and reduce fragmentation
Intensive drainage surrounding existing mosslands sites is causing significant damage isolates them in terms of hydrology	The uptake of wetland paludiculture trials by local farmers could help investigate whether this is a sustainable option to remedy the issue
There are patches of wet woodland that require restoration	Promote further restoration of wet woodland to build on work already carried out

Mersey Wetlands Corridor

Bordering the Warrington conurbation, the Mersey Wetlands Corridor forms the southern part of the Great Manchester Wetlands. Canalisation transformed the Rivers Irwell and Mersey into the Manchester Ship Canal which borders the area and is one of its most prominent landscape features.

The area's geology is sandstone and mudstone and most soils are alluvial drift material, owing to its proximity to the River Mersey. Areas of past human industrial activity have developed into more natural habitats through re-colonisation and management - for example, the former brickwork quarry at Rixton Clay Pits now supports a large population of Great Crested Newts.

Within the area there are a variety of habitats that support a rich assortment of plants and animals. Wet grassland, lowland fens and a network of ponds all feature and are predominantly man-made. Woolston Eyes receives the dredging material from the Manchester Ship Canal into its lagoons and this has become an important site for wintering wildfowl and a breeding site for summer visitors such as Black-necked Grebes and an assortment of warblers.



HERITAGE

CULTURAL

- **Woolston Eyes**: Woolston Eyes Conservation Group carry out volunteering activities on this site
- **Manchester Ship Canal**: opened in 1894, 36 miles of canal navigable by ocean-going ships allows them direct access to Manchester
- **Rixton Clay Pits**: a former clay extraction site for a neighbouring brickworks, this site is used as an amenity and angling is permitted in some areas

NATURAL

- **Paddington Meadows** LNR: important wet grassland site for its associated plant and animal species
- **Woolston Eyes** SSSI: network of lagoons, reedbed and scrub vegetation important for wintering wildfowl
- **Rixton Clay Pits** SSSI/LNR: former clay extraction site now has a mosaic of fen, swamp, meadow and wet woodland habitats present
- **The Twiggeries**: a mix of open grassland and wet woodland habitat

Woolston Eyes

Rixton Clay Pits

Manchester Ship Canal

Paddington Meadows

R. Mersey at Woolston

ISSUES	RECOMMENDATIONS
This area lacks an effective access network and is not well connected with the rest of the Great Manchester Wetlands	Development of an extensive access network would improve the connections between this and the other areas, as well as make individual sites easier to visit
The wealth of natural heritage in this area is not well known	Improve the connection of local communities to their heritage through better interpretation, both physical and virtual
Little effort has been made historically to 'join up' the wetland sites to create an ecological corridor	Build on proposals for an Environment Agency Flood Relief scheme for Warrington to improve habitats and create better ecological linkages
There are physical barriers to aquatic species migration	Reduce physical barriers to the migration of aquatic species in the river systems
There are some redundant structures and disused land in the area	Form wildlife corridors by the targeted re-naturalising of disused land and structures
There has been a decline in quality and quantity of hedgerows and wildflower meadows in this area	Restoration and creation of these habitats will aid management and will provide valuable habitat for wildlife and for people to enjoy
Great Crested Newt populations are important in this area and any potential to increase their distribution and abundance should be explored	Where feasible improve breeding, feeding and hibernating habitats for this species

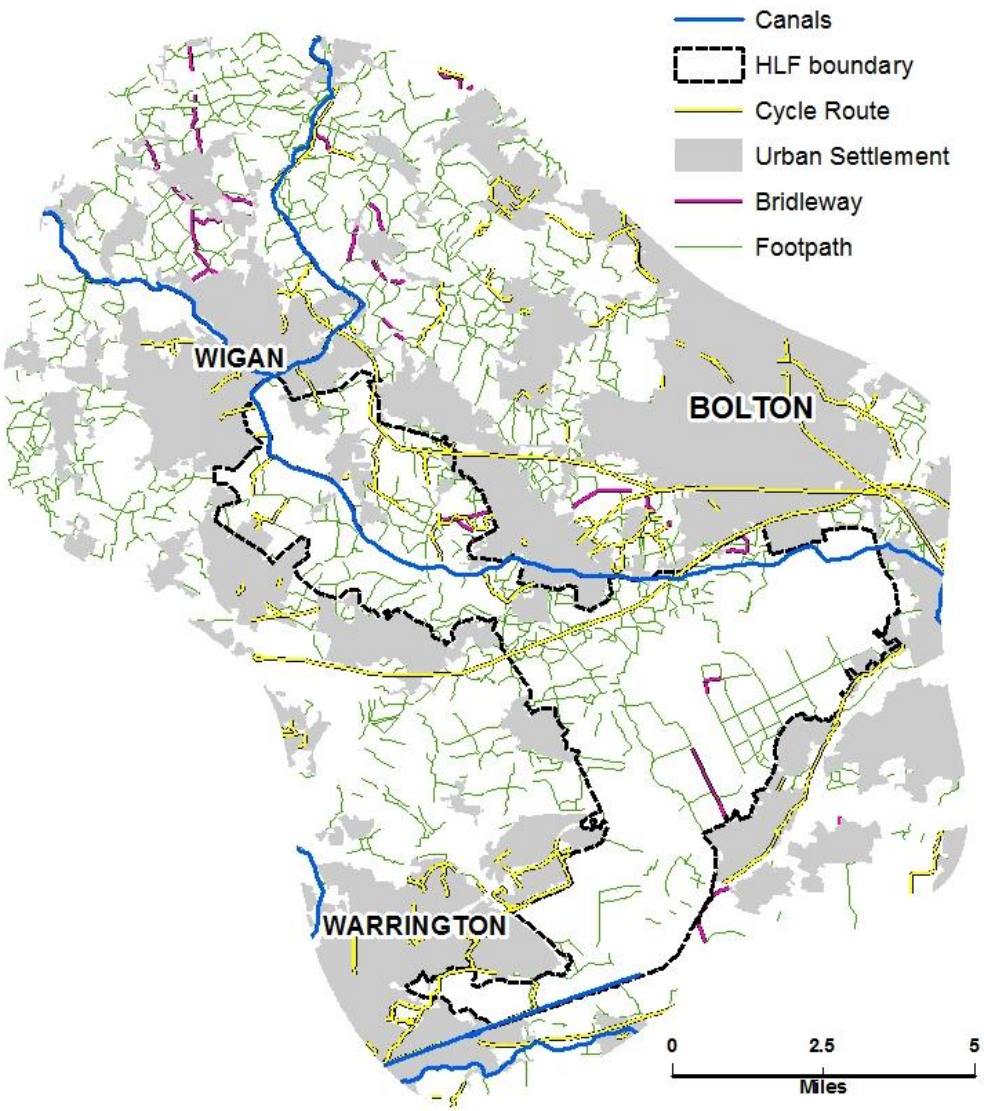
MOVEMENT NETWORKS

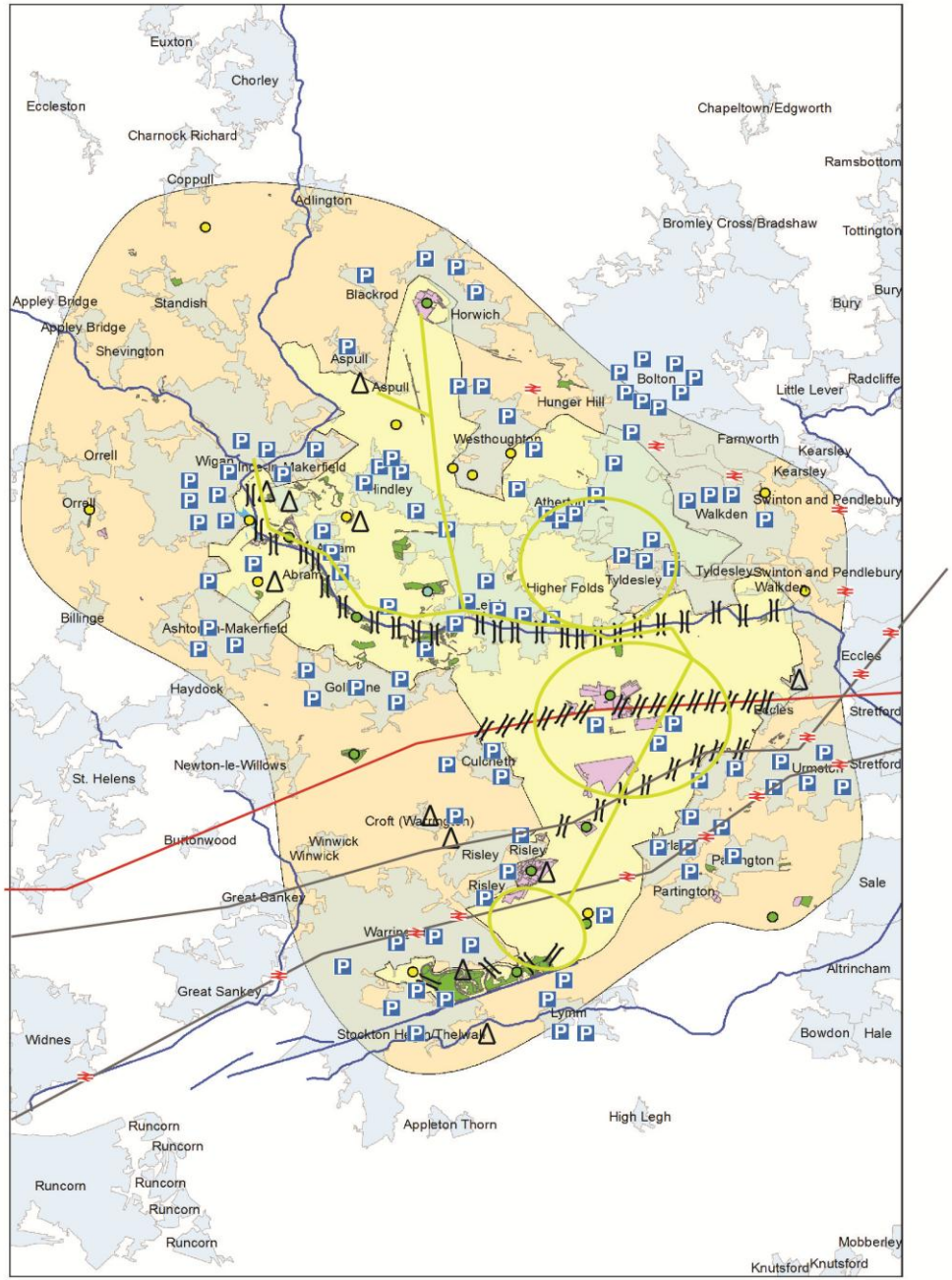
The movement network across the Great Manchester Wetlands was assessed during a study undertaken on behalf of the Partnership by Post-Graduate Planning Students at the University of Manchester (Aull, Bryan, Cooney and Croft, 2014). The aim was to investigate the current movement network across the GMWP area and to assess potential routes for cycling and walking to potentially create a 'Carbon Trail' across the landscape.

The routes will aim to connect the areas from Wigan to Warrington through the wetlands and mosslands, incorporating existing communities (particularly those with high deprivation), existing infrastructure, facilities and special landscape features of the area.

The study initially found, through desk based research, that the network is of varying quality (see image). There are a number of well connected sites, particularly in the north of the area surrounding Wigan. There is a wide-ranging footpath network across the area, with only small gaps present, that facilitates movement of local communities into the green space.

The existing cycle route network is also more extensive in the north, with routes primarily alongside historic transport links, such as the Leeds-Liverpool Canal and Bridgewater Canal. Besides a small stretch of cycle route alongside the Manchester Ship Canal, the southern area lacks any cycle route connections away from roads. Additionally, there are very few bridleways in any locality of the Great Manchester Wetlands.





The study found a range of barriers in the movement network, but a large number of crossing opportunities to those barriers – see image highlighting crossings over the canal, rail and motorway network. Furthermore, it identified an abundance of formal car parks.

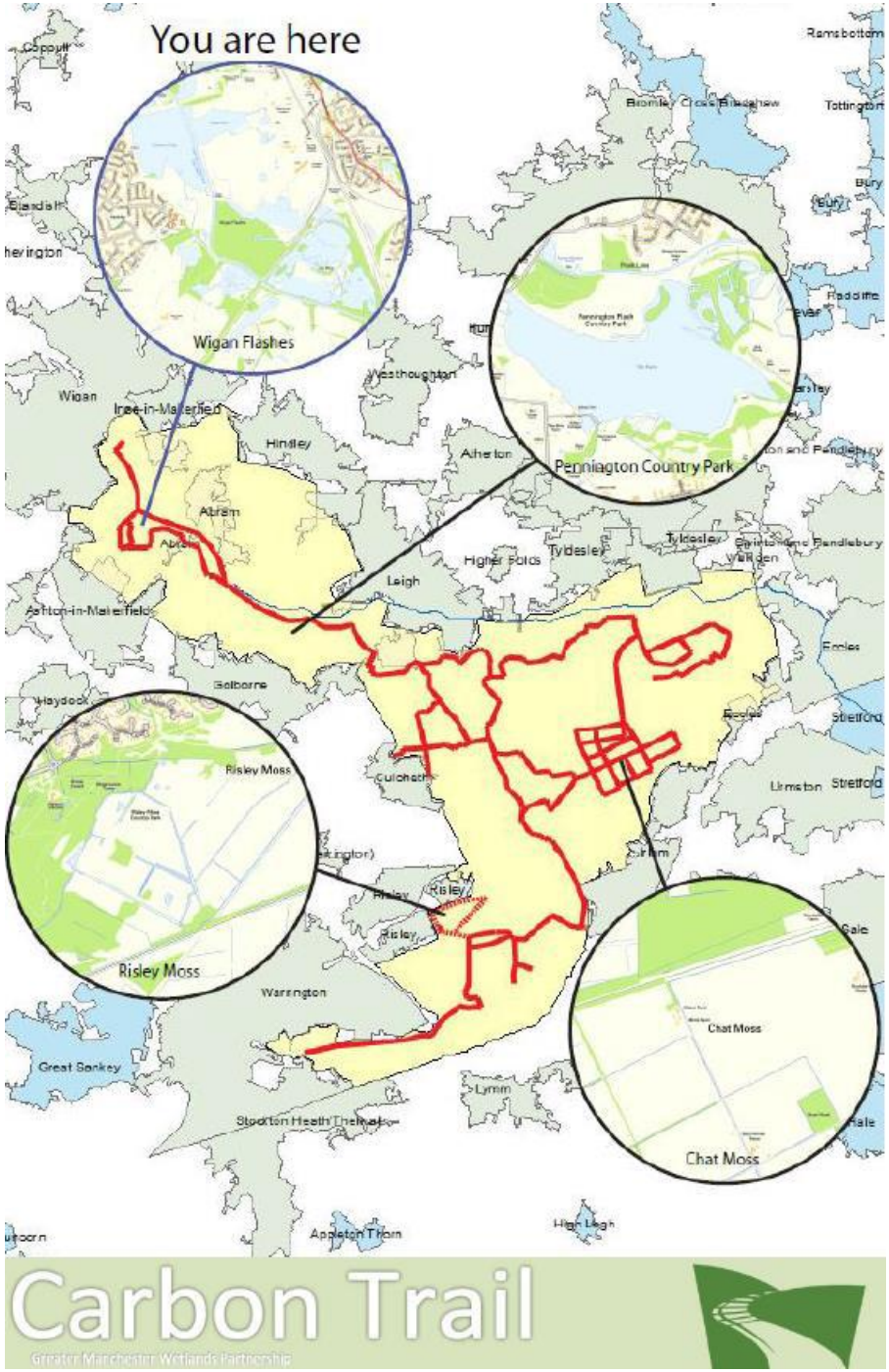
Following desk based research and field excursions, the study identified a number of potential trails across the area and assessed opportunities and constraints for those:

Opportunities

- To increase the usage of Rixton Claypits through more promotion and access availability.
- To use the extensive existing network of trails as part of the Carbon Trail to connect the wetlands using interpretation
- To improve signage in the area to achieve more connectivity and ease of access
- To highlight the key interesting sites in the Great Manchester Wetlands onsite, across the GMWP area, and virtually using an online space

Constraints

- A lack of signage at present preventing easy location of key sites and connections to the wider area
- A lack of connection by existing trails within the wider GMWP area to Risley Moss
- Poor condition of some of the existing trails for example parts of the Glazebrook Trail
- Few existing trails that can be used by cyclists
- Issues surrounding access for disabled users



The Carbon Trail Proposal

The study proposed a series of walking trails of varying lengths, linking up a range of key interest sites across the proposed project boundary. Key interest sites included:

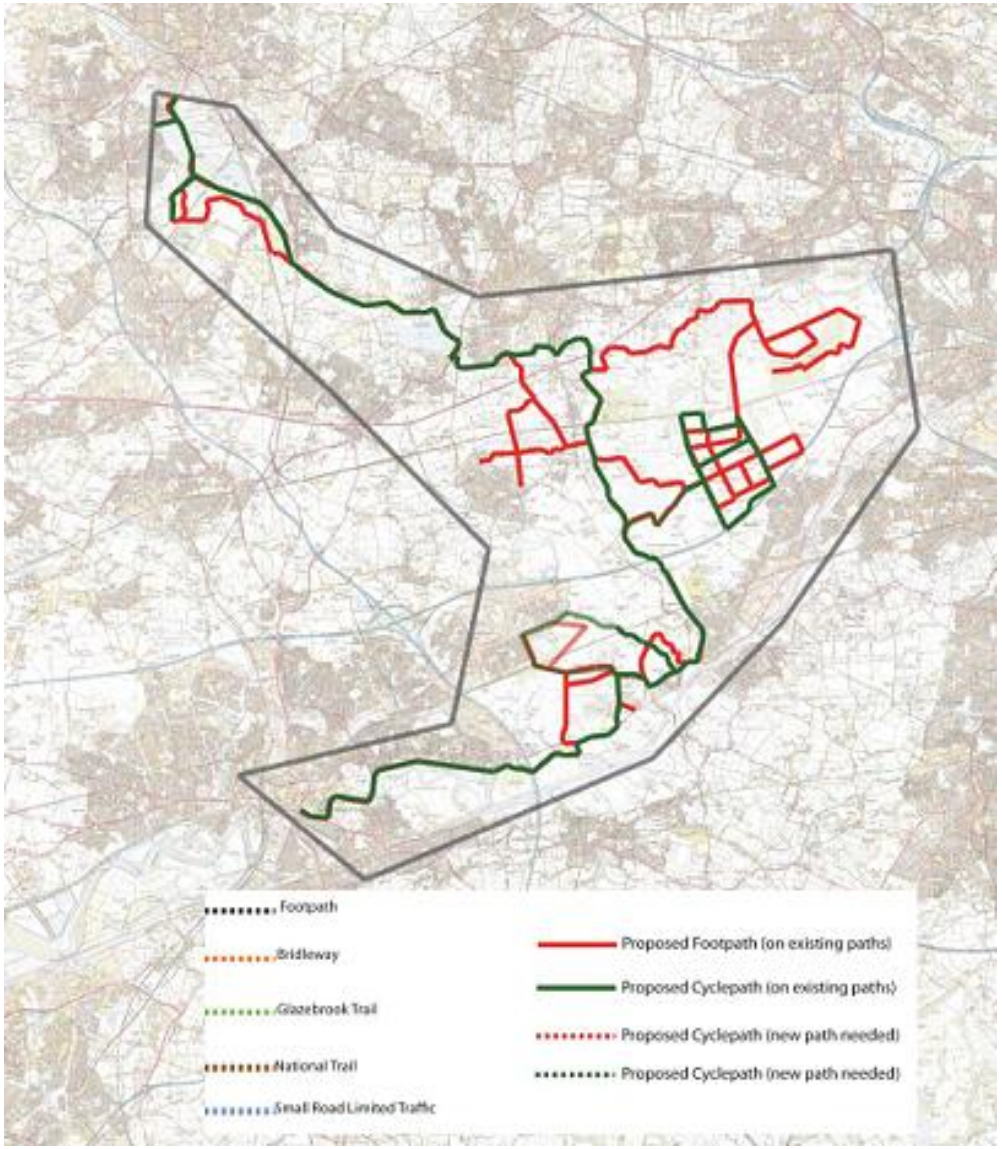
- Woolston Eyes
- Rixton Clay Pits
- Risley Moss
- Chat Moss
- Pennington Flash Country Park
- Three Sisters Recreation Area
- Wigan Flashes LNR

The route of the trail is based on the existing footpaths, national trails, bridleways and other access routes already present in the project area. The areas where new trails would be required have been kept to a minimum.

Through the use of linear and circular routes of different lengths, the trail is accessible and should attract a wide variety of users. These are also connected to the main urban areas adjacent to the proposed Carbon Trail, allowing easy access by visitors from further afield. This is also hoped to increase the usage of the trails and the area by local communities and schools.

A linear route across this landscape will help to connect the key sites within the area and with effective signage should increase the usage of the project area as a whole. Furthermore, the GMWP should investigate the interpretation opportunities along the proposed trails to increase the educational potential of the landscape. Effective interpretation could inform visitors about its history and its evolution, and could also place it in context with future restoration and enhancement.

The Proposed Carbon Trail



Strengths

- There are many crossings of the railway lines, motorways, and canals
- There are enough existing trails to need a very limited amount of new trail to enable the Carbon Trail to link the key sites
- All of the sites are located in safe, walkable areas
- Rixton Claypits is a hidden gem of the wetlands. It is one of the most interesting and aesthetically pleasing sites
- Risley Moss has a visitor centre and is a good site to walk around. The view from Risley Moss observation tower is a main attraction of the wetlands
- The Glazebrook National Trail is excellent. It runs through parts of the wetlands and can be used by both cyclists and walkers
- The Wigan Flashes are well established recreational sites

Weaknesses

- There are currently no cycle or walking paths connecting Risley Moss to the rest of the proposed trail. There is no direct route by road connecting Rixton Claypits with nearby Risley Moss
- There are no signs at any of the sites in the wetlands which show people where the next site is or where they are within the Great Manchester Wetlands
- Parts of the Glazebrook Trail are in need of better signage and improvement for access and awareness
- Holcroft Moss has been identified within this study as potentially of less interest to the general public. If it is to be included within the Trail network it would require future access improvements
- Chat Moss currently has a more specialised interest, both to those interested in the carbon landscape and for bird watchers. It may be of less interest currently to the general public

COMMUNITY ENGAGEMENT

This summary has been taken from an independent review of community engagement across the partnership undertaken by The University of Manchester (Tippett and Connelly, 2014). This review included workshops with community members and partner organisations and analysis of data provided by partners.

Mapping Community Engagement in the Greater Manchester Wetlands Partnership

Community engagement is central to the way the Partnership works, as demonstrated in this synthesis map of partners' community engagement activities. This map shows areas of particular strengths classified by the priority outcomes of the Heritage Lottery Fund.

The greatest levels of active engagement were found to be in practical activities, such as the implementation of biodiversity projects on the ground, monitoring wildlife and citizen science. These activities are regarded as highly important to the conservation work undertaken in the partnership.

'Satisfaction from making a difference' was identified as a key driver to engage, but much more could be done to celebrate the difference being made and to help others who are not yet engaged feel that they could contribute. Other key drivers for engagement were: 'Friendship and connections', 'Health and wellbeing', 'Education and skills' and 'Enjoyment'.

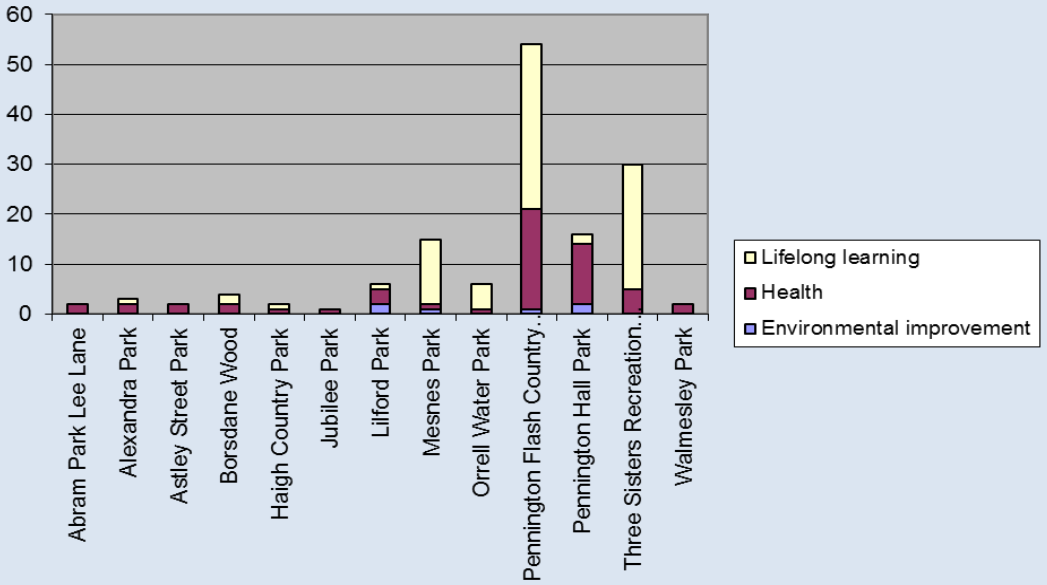
Benefits to volunteers are recorded across several sites, with all of the sites gathering data showing health benefits and some showing particularly strong benefits for lifelong learning.

A Partner's Example – Wigan Leisure and Culture Trust

Wigan Leisure and Culture Trust (WLCT) collects data about the main benefits to be derived from its events, including information on the main target audience for the events and qualitative feedback from those running the events.

The Figure shows WLCT analysis of participants' main benefits received by those attending events across a number of sites (2010 – 2013).

Lifelong learning is seen a key driver for participants and volunteers at these events.



Above are images from a 2013 workshop using Ketso to explore 'what works' in current community engagement and future possibilities for improvement, with over 50 participants from Wigan's Wetlands and Woodlands Custodians. Used with permission of Wigan Leisure and Culture Trust.

There were clear requests from the community to enable and support more community engagement. For example, comments included:

- More engagement with schools & young people;
- More training & development of volunteers;
- Encouraging social enterprises and managing sites for the future.

Given that people living in areas considered amongst the 20 percent most deprived neighbourhoods in England are considered 'hard to reach', having a total of roughly 10 percent of WLCT volunteer visits and 20 percent of LWT's volunteers drawn from this population shows that quite a bit has already been done to engage with people living in such neighbourhoods (roughly 30 percent of the Wigan Borough's population falls into this category).

A key lesson from the activities of the partnership so far is the value of *sustained* engagement efforts, particularly with respect to gaining work experience and training accreditation. For example, the IMPACT project demonstrated success in engaging with those Not in Education, Employment or Training (NEETs) and the evaluation developed an innovative 'social return on investment' framework which showed that for each £1 of investment put into the project, an estimated £3.52 was gained.

This approach demonstrates the multiple benefits that can accrue through initial financial stimulation and the lessons learned about effective engagement could be shared throughout partnership.

The study found that making biodiversity improvements in the landscape and linking these to the heritage of the industrial revolution that has shaped the landscape would offer an opportunity to engage with community members, schools and local businesses about ecological improvement and sustainable ways of working.

Examples of good practice in community engagement, which could provide lessons across the partnership include:

- Lightshaw Meadows (integrated approach to engagement)
- From Grey to Green (wide ranging engagement of groups and ages in citizen science)
- Chat Moss Oral History Project (linking heritage to the landscape)
- IMPACT project (skills development for NEETs through sustained engagement)
- Mosslands Volunteer Group (activities most weeks and a named person running it)
- Woolston Eyes (community led friends group: active in delivering restoration)
- Wigan's Wetland and Woodland Custodians (new way of volunteering)
- Astley Green Museum (interpretive information linking heritage and landscape)

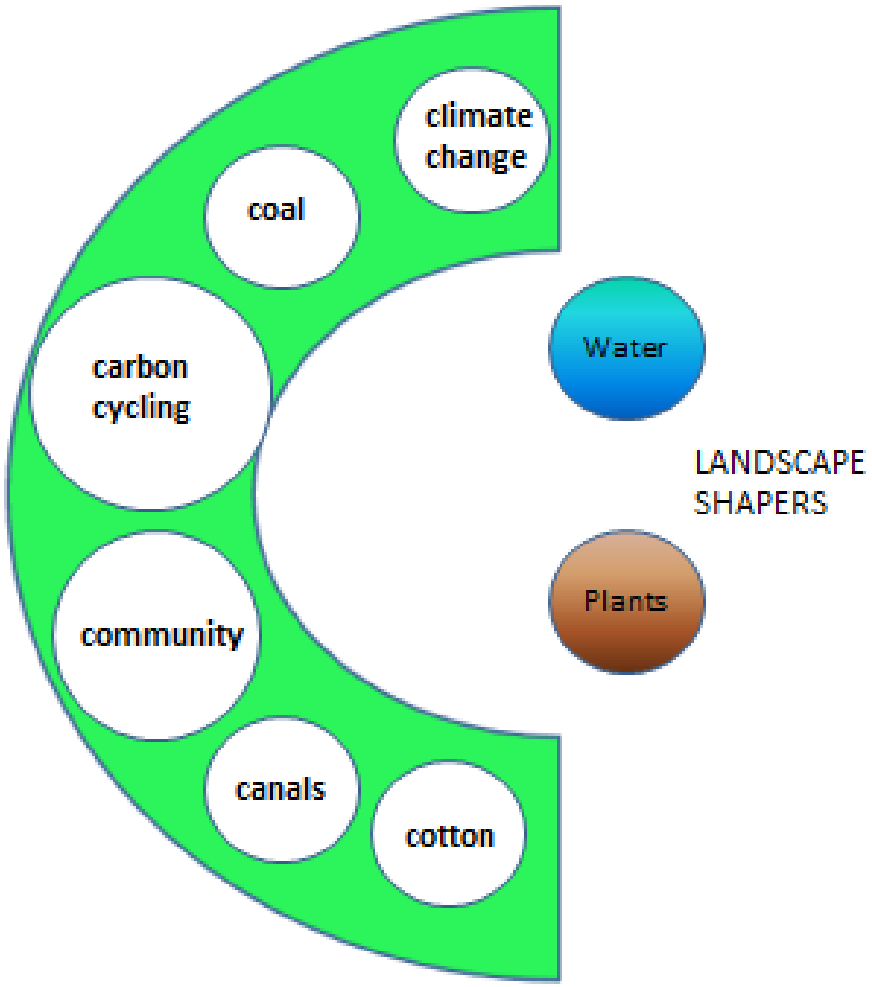
There is a strong base to work from across the partnership in engaging with the community to protect and learn from the unique heritage of the area. Volunteers are keen to expand upon the existing available activities and the benefits of doing so range from personal gains such as health, enjoyment and education & training, through to wider social benefits such as stronger and more resilient social networks and potential opportunities for community based enterprise.

Tippett, J; Connelly, A. (2013) *Mapping Community Engagement in the Great Manchester Wetlands Partnership*, Project Report, Planning and Environmental Management, School of Environment, Education and Development, University of Manchester, 60 pages

ISSUES	RECOMMENDATIONS
There is little data to suggest that the full range of 'hard to reach' groups are engaged in activities, e.g. people from ethnic minorities, refugees, the disabled, Travellers	Further develop and resource an inclusive engagement strategy, make a proactive plan for engagement with 'hard-to-reach' groups across the community
The main barriers to engagement are perceived to be: lack of awareness of opportunities; lack of confidence and skills; lack of awareness of how people can make a difference, with concerns about physical accessibility	Increase range of activities and promotion (e.g. website with events calendar and volunteering opportunities, use social media), develop marketing messages and celebrations, more training & development of volunteers
A huge amount of citizen science is being undertaken, but the full value of this is not realised due to a lack of coordination and pooling of information gathered	Develop an on-line platform as a more integrated and visible approach to curating the data collected through citizen science activities in the area
Most engagement is at the local level, but there is interest in more involvement in planning and decision making, in addition to practical implementation	Provide more opportunities for active engagement in planning and decision making, actively link local engagement to strategic planning for whole landscape
Need to develop synergies and engage more with sectors outside of biodiversity, e.g. Planning, Housing, Health and Social Care and Economic Development	Link engagement in restoring the Carbon Landscape to wider agendas, invite broader range of stakeholders to planning events to help link up opportunities for change
There is a potential for a narrative of decline in the story of the Carbon Landscape and its despoliation through industry, with subsequent loss of livelihoods in the area	Link improvements in the Carbon Landscape to a broader understanding of global sustainability; create opportunities to develop skills in sustainability planning
Landscape restoration projects can seem isolated from the heritage of the area, wiping out the scars of the past instead of linking the past to the future	Develop the Carbon Trail as a journey through the history of the landscape through the story of carbon, developing community-led art and educational resources

KEY FINDINGS AND RECOMMENDATIONS

This report, alongside the two supporting studies around Community Engagement and Movement Networks, has shown that there is a cohesive landscape across the Great Manchester Wetlands area with three distinct Landscape Character Types identified –all of which having carbon as their unifying characteristic. That may be directly through the underlying coal measures and peat present in places, or indirectly due to the infrastructure built to exploit these carbon resources such as the canal network. We would recommend viewing this landscape as a **'Carbon Landscape'**



The Carbon Landscape

- Is underlain by carbon based geology and soils
- Has an industrial history driven by underlying carbon resource and access to water
- Has been exploited in the past, creating a desolate landscape
- Is now recovering to a functioning landscape, building the area's resilience to climate change

Three key approaches are recommended from this synthesis of information and evidence:

- Restoration of the landscape – to restore and continue restoring a derelict landscape thus ensuring ecological connectivity and resilience
- Improved access and use of the landscape – to reconnect people with the landscape
- Better understanding of the landscape – To raise awareness and engender community ownership in the landscape

To restore and continue restoring a derelict landscape, ensuring ecological connectivity and resilience

The Great Manchester Wetlands Partnership area provides a potential ecological network that bisects the urban centres of Manchester and Merseyside. This could facilitate north-south (or south-north) movements of species within a changing climate. Species benefitting could include priority species such as Water Vole and Willow Tit.

That network is currently based upon a series of stepping stones of priority wetland habitats of lowland raised bog, reedbed and fen, wet woodland and ponds, connected by the river and canal network. Some of these are currently protected through designation and are under management to improve their biodiversity. Examples include: the Special Area for Conservation (SAC) at Risley Moss; Astley and Bedford Mosses (Manchester Mosses SAC); and Local Nature Reserves such as Three Sisters and Wigan Flashes LNR.

Recommendation 1

Where opportunities allow, restore and create priority wetland habitat, focusing on buffering existing sites, or undesignated areas of peatland to strengthen links between existing designated sites and to reduce habitat fragmentation.

Recommendation 2

Improve habitat connectivity and create better ecological linkages through riverine corridor restoration and habitat management for canal-side habitats.

Recommendation 3

Restore underused and neglected land that resulted from the ceasing of industries such as historical coal mining activities, to achieve biodiversity benefits and increase access and recreational opportunities for local communities.

Connecting People to the Landscape

The study from the University of Manchester and the evidence within this report shows that the access network into this landscape is variable, with a wealth of footpath and cycleway opportunities in the north of the area but less in the south. There are extensive routes adjacent to historical transport links such as the Leeds-Liverpool Canal (at 127km, the longest canal in Britain built as a single waterway) and good access exists to a number of key sites within the programme area.

However, the outcome of the Community Engagement mapping and the proposals for improved access and linkages across the landscape indicate that there are needs to improve or create linkages between key sites both physically and virtually. Furthermore, there is a need to improve awareness and signage across access routes to integrate this area as a cohesive, single landscape through signage and interpretation.

Recommendation 4

Develop the proposals for a 'Carbon Trail' across the landscape, linking up key sites and providing low carbon opportunities for movement across and into the landscape by foot, cycle and where possible, providing disabled access.

Recommendation 5

Develop a virtual 'hub' for the Carbon Landscape, providing interpretation, event information, and volunteering opportunities across the whole landscape to provide maximum awareness of the wider landscape and its heritage.

Recommendation 6

Investigate and provide more opportunities for active engagement in planning and local decision making across this landscape, looking at the possibility for actively linking local engagement to strategic planning for the whole landscape.

To raise awareness and engender community ownership in this landscape

This Carbon Landscape, dominated by the historical impact of extractive industries and their supporting industries, has inherited the legacy of an extraordinarily rich and diverse natural heritage and a strong cultural heritage and identity. The Community Engagement Mapping study identified that there is a good base to work from across the partnership in engaging with the community to protect and learn from the unique heritage of the area. There are examples of good practice in community engagement already taking place across the landscape, which could support wider engagement and learning opportunities.

There were clear requests during the Community Engagement Mapping study made by the community, asking the partnership to enable and support further engagement, such as:

- with schools and young people
- training and development of volunteers

Recommendation 7

Link the engagement of communities in the restoration of the Carbon Landscape with other agendas, such as health and social care, by inviting a broader range of stakeholders and community champions to planning events to help link up potential opportunities for change.

Recommendation 8

Investigate and develop interpretation possibilities, both virtual and on-site, to provide clear information and learning material around the wider landscape and its evolution, exploitation and restoration, and its future.

Recommendation 9

Investigate novel approaches and opportunities to ensure sustained engagement with local communities, such as through work experience, training accreditation and apprenticeships