SECTION 2.0

GREEN INFRASTRUCTURE IN THE LEEDS CITY REGION

The Leeds City Region has much to build its future green infrastructure investment on in terms of the diversity and quality of the existing semi-natural and man-made assets it possesses and the partnerships that are in place that have already begun to demonstrate the advantages of working across boundaries and agendas to deliver green infrastructure.

2.1 INTRODUCTION TO THE LEEDS CITY REGION

The city region has a diverse range of environmental assets adding significantly to its overall identity and national profile. Most of these assets are well known and cherished by local communities and visitors alike. Others are more subtle but their value is no less important.

Wide areas across the north and west of the city region have been recognised for their significant landscape and recreational value. Almost all of the Nidderdale Area of Outstanding Natural Beauty (AONB) lies within its boundary, along with a significant proportion of the Yorkshire Dales National Park. The eastern extent of the Forest of Bowland AONB and northern limits of the Peak District National Park also lie within the city region.

Lowland agricultural areas, cities and towns, are equally regarded, albeit perhaps at a more local scale by the communities that live and work in them. It is important not to overlook the enormous contribution that unremarkable, everyday and degraded landscape makes to the city region's green infrastructure asset base. Indeed, some heavily damaged areas have the potential to sustain useful new developments, perhaps to counter the effects of climate change or to benefit wildlife.

Six millennia of changes in social organisation and in the concept of land ownership and control are etched into the landscape of the city region; visible in the patterns created by linear earthworks, field boundaries, drainage ditches and tracks. Indeed, the broad patterns of farmed land, grazing and woodland evident today were all probably in place by the medieval period, as were the principal settlements and communications routes across the uplands and along the river valleys. It is onto this ancient framework that three centuries of profound change in industry, agriculture and transportation have had an equally significant impact on the character of the rural landscape and the city region's principal towns, many of which owe their size and status to rapid expansion during the eighteenth and nineteenth centuries. Remnants of industrial and mining heritage add further layers to the rich history of the city region and influences wider perceptions of landscape evolution, quality and sense of place.

The city region's watercourses have a notable impact on the character of the area, in the uplands as well as the lowlands. As transportation routes and sources of water and power, they have shaped the development of settlements, industries and agriculture. Today, rivers continue to exert a strong influence on the character of the city region, binding together the densely settled towns to the farmed rural areas across the lowlands and to the more remote moorland hills where many rivers and streams originate. The river corridors also often act as linear habitat and movement corridors, linking disparate and otherwise separate areas of the city region together.

The city region has a wealth of habitat types, and significant areas have been designated on account of their biodiversity value. These include nationally significant networks of Ancient Woodlands that follow the main river valleys. The most extensive areas afforded protection lie across the blanket bogs and heaths of the Yorkshire Dales, Nidderdale, South Pennines and Peak District. The Yorkshire Dales, the Peak District and the Pennine Dale Fringe also feature a high proportion of Access Land under the Countryside and Rights of Way Act 2000. This Access Land is mainly located on the higher ground, as low-lying land tends to be cultivated or used as pasture.

2.2 CITY REGION PARTNERSHIP WORKING

Whilst the city region clearly demonstrates a wealth of green infrastructure assets, various pressures, such as securing sustainable economic growth and mitigating and adapting to the effects of climate change, will continue to drive investment and activity and necessitate the protection and enhancement of existing assets and the creation of new green infrastructure.

Collaborative working is already underway to tackle these issues, covering several of the areas highlighted as of importance in this strategy. Indeed it is clear from successes achieved to-date that the city region benefits from partnerships consisting of a wide range of organisations to deliver their desired outcomes. Examples of successful projects and interventions are identified throughout the strategy, and several city region scale multi-agency partnership examples are set out below:

WHITE ROSE FOREST PARTNERSHIP

The White Rose Forest (WRF) partnership, established in 2000, brings together local authorities, government and voluntary sector groups throughout West Yorkshire to "play its part in creating a healthy, prosperous and environmentally resilient place for the people, economy and wildlife of our city region." The WRF Partnership was formalised in 2002 with the signing of a Joint Venture Agreement and has delivered numerous local projects and community initiatives. Successes have included the establishment of 100 hectares of community woodland in a £1million urban forestry programme and investing £200,000 in two acclaimed regeneration projects. Key milestones have included the establishment of the Green Infrastructure Group in 2005 and the Yorkshire Forward funded £2million West Yorkshire Green Infrastructure Programme 2008-2010

HOLMFIRTH, IMAGE COURTESY OF PENNINE PROSPECTS

PENNINE PROSPECTS

In response to the strategic significance of the South Pennine Moors, the South Pennines Heritage Area was 'self declared' with a Heritage Strategy drawn up in 2001. This included the principles and key actions of the Integrated Management Strategy and Conservation Action Programme (IMSACAP) drawn up earlier to cover the specific South Pennine Moors Special Area of Conservation and Special Protection Area. Until recently large scale funding has not been available to deliver the key priorities of the IMSACAP and Heritage Strategy. In response Pennine Prospects (the Southern Pennines Regeneration Company) was set up in 2005 as a not-for-profit company to address this. Pennine Prospects is a partnership between the local authorities of Bradford, Calderdale, Kirklees, Lancashire, Rochdale and Oldham, plus representatives of Yorkshire Water and United Utilities, the NFU, Northern Rail, the National Trust, Pennine Heritage, the South Pennines Association, Natural England and the Environment Agency. It exists to raise the profile and develop a positive image for the Southern Pennines through partnership working, and is focused on delivering achievements to support sub-regional strategies as they are developed. An example of large scale intervention is the Watershed Landscape Project which received £2m of funding from the Heritage Lottery Fund and will deliver a suite of projects in the South Pennine uplands over the period to 2013.

STRATEGIC PARTNERSHIP FOR THE RIVER OUSE AND ITS TRIBUTARIES

In 2004 a Strategic Partnership for the River Ouse and its Tributaries was formed by the Environment Agency to progress the aim of improving the environmental assets of the River Ouse and its tributaries as set out in the York and North Yorkshire Sub Region Investment Plan. As a result, the Ouse Enhancement Project was established. The project area, covering 6,000 sq km of North Yorkshire includes the river catchments of the swale, Ure, Nidd, part of the Wharf, Ouse and Derwent. In 2007 the Enhancement of the River Ouse and Its Tributaries Opportunity Plan (the plan) was prepared on behalf of the Environment Agency to act as the catalyst for the renaissance of North Yorkshire's rivers that flow into the Ouse to ensure that they are able to meet the challenges of the 21st century. In essence the project provides an environmental foundation for economic investment and growth over the next 25 years and beyond. The plan identifies a portfolio of projects, which itself forms the North Yorkshire Rivers Renaissance Programme. Six investment priorities are identified, each of which has a set of projects, making a total of thirty projects in all. The portfolio ranges from short term projects which may be implemented in the period to 2012, and longer term projects which may be implemented over a much longer period to 2025 and beyond.

OLD MOOR, IMAGE COURTESY OF ANDY HAY, RSPB IMAGES

STRATEGIC WATERWAYS GROUP

The Strategic Waterways Group have prepared a study[14] that presents a strategic assessment of the work needed on the rivers of West Yorkshire within the area covered by the Ridings Office to support the development of funding bids, by identifying and prioritising biodiversity opportunities on West Yorkshire's rivers, according to their associated benefits, both for biodiversity and ecosystem-related services e.g. public access and recreation, flood defence and habitat network connectivity.

The study identifies a range of biodiversity opportunities in the various reaches and sub reaches of rivers and tributaries. Criteria were then applied to the opportunities to determine the benefits that the opportunities could achieve on a local, regional and national scale. The result was the identification of priority opportunities for 26 sub reaches of West Yorkshire's rivers, such as key areas for habitat creation and enhancement that will be used to inform the next stage of the study which is to determine which opportunities to focus on initially for delivery.

THE DEARNE VALLEY GREEN HEART PARTNERSHIP

The Dearne Valley Green Heart partnership (DVGH) is led by the Environment Agency, Natural England, and RSPB together with Barnsley, Rotherham and Doncaster Councils. Its objective is to bring about landscape-scale environmental improvements in the Dearne Valley. The three lead partners are working with a wide range of organisations including the three local authorities of the Valley and a range of environmental and community groups. DVGH is developing a programme of projects which will take several years to implement. This programme is needed to help regeneration and face the new challenge of climate change. The projects the partnership is working on can be divided in to three main areas: Habitats and Places; Access; People and Communities.

The programme will build on the three principal existing 'green assets' of the Dearne Valley, RSPB nature spaces including Old Moor, the Trans Pennine Trail and the River Dearne itself. The work of the DVGH is centred on the river corridor and in particular the washlands. Whilst fully retaining their flood management function, DVGH is working to change land-use within the washlands to biodiversity and appropriate recreation.

RAWCLIFFE MEADOW, YORK - BEFORE. IMAGE COURTESY OF CITY OF YORK COUNCIL

RAWCLIFFE MEADOW, YORK - AFTER. IMAGE COURTESY OF CITY OF YORK COUNCIL

2.3 RELATIONSHIP OF THE GREEN INFRASTRUCTURE STRATEGY TO NATURAL ENGLAND'S GREEN INFRASTRUCTURE CORRIDORS

Over recent years Natural England, working in collaboration with a range of partner organisations including local planning authorities, has developed a region-wide Strategic Green Infrastructure Map. The evidence base is a significant achievement and has necessitated collaboration across the entire Yorkshire and Humber region. The results of the process of evidence gathering and interpretation have been to create a GIS evidence base of green infrastructure assets using national, regional and local data and to provide mapped infrastructure placed in a hierarchy.

The aim is to give local authorities, statutory agencies, voluntary sector organisations and the private sector the evidence necessary to protect strategic and local green infrastructure corridors and networks, focus enhancement in areas where gains will be maximised, increase awareness of which green infrastructure functions exist and where and how they complement each other and establish a baseline of information from which change can be measured.

This strategy identifies where strategic green infrastructure investment could be best targeted to address strategic objectives. Although it is not always necessary to link green infrastructure assets together in order to realise their value, additional benefits can be gained from providing these physical networks.

Many of the strategic initiatives in this strategy are located within the regional, sub-regional and local green corridors identified in Natural England's work. However, we recognise that to deliver our ambitions for the natural environment we must look at opportunities for investment in green infrastructure projects and initiatives in addition to the linking of assets through corridors. Where the initiatives proposed in this strategy coincide with one or more of these corridors then this is noted in the table 'Summary of Strategic Initiatives' presented at the end of section 3. More detailed information on the corridors is included in the accompanying Technical Baseline Report.

At the local level, these green infrastructure corridors will become even more relevant, especially in terms of protecting multi-functional green infrastructure assets but also in identifying the potential to link assets spatially.

The Forestry Commission and Natural England are undertaking an Integrated Habitat Network Study with the aim of improving our understanding about how semi-natural habitats are connected and allow species to move through the landscape. As climate changes, so wildlife will need to adapt and move. The Study will provide evidence for the future targeting of resources to enhance and extend habitat networks within the Leeds city region.

WILDLIFE TRUST VOLUNTEERS, IMAGE COURTESY OF PAUL CARTER

2.4 WHAT IS DRIVING GREEN INFRASTRUCTURE INVESTMENT?

A full overview of strategy and policy driving green infrastructure investment at the national, regional and local levels has been undertaken as part of the development of this strategy and is presented in the accompanying Technical Baseline Report.

At the national level, the inclusion of green infrastructure in government planning, climate change and health policy statements in recent years has raised its profile as an infrastructure of economic and social as well as environmental importance. For example, a variety of planning policy statements identify green infrastructure as an integral part of spatial policy formulation[15]. Most recently, draft statements on the natural and healthy environment and on climate change have established green infrastructure as a core principle in achieving sustainable development and tackling climate change. Similarly, policies on improving the nation's health now identify the importance of accessible green space and promoting walking and cycling.

In regional terms, a combination of regional spatial planning, economic, biodiversity, forestry and climate change strategies now promote the benefits of planning for green infrastructure as a vital element in the improvement of economic and environmental performance.

The Yorkshire & Humber Regional Spatial Strategy[16] policy has been an important driver for the strategy. Its policy on green infrastructure (YH8) identifies that green infrastructure will play a key role in improving accessibility to a healthier local environment and to addressing climate change. Although the Regional Spatial Strategies are due to be abolished[17], Leeds City Region Local Authorities will continue to integrate of green infrastructure policies into local plans, which this strategy will support.

At the City Region level we are working across agendas to deliver our ambitions to move to a low carbon economy. We are working closely with central government departments to ensure we have the right freedoms and flexibilities to lead the economic growth of our area. In particular, the City Region agenda addresses the four key pillars of growth that will make a substantial impact on economic growth:

- **Housing and Regeneration** - this agenda is aimed at accelerating strategic growth, promoting eco-living, delivering strategic urban renewal and supporting a rural economic renaissance. To support this agenda, we have recently developed the Leeds City Region Housing & Regeneration Strategy[18]. The aims of the Strategy will be delivered through the joint Leeds City Region and Homes and Communities Agency (HCA) Board with funding secured through the City Region Housing Investment Plan[19].

- **Economic Drivers & Innovation** – this is aimed at identifying and supporting the drivers of our economy and innovation within our key growth sectors. This agenda is motivated by the need to understand our strengths, challenges and opportunities as an economy. The Innovation Capital Programme[20] — sets out a number of priorities and programmes aimed at putting the city region on the map as an Innovation Capital, world renowned for its innovation and competitive economy. The programme aims to better connect innovation actors with businesses, and specifically recognises the need to promote innovation in low carbon infrastructure and environmental assets.

- **Transport** – the recent Leeds City Region Transport Strategy[21] promotes strategic investments in our transport networks that will strengthen the city region's economic competitiveness and contribute to achieving the nation's carbon reduction targets.

- **Skills and Worklessness** – the City Region's Employment and Skills Strategy[22], seeks increase employment and skills across the city region, to ensure that adult skills provision meets demand. The Strategy recognises that there will be increasing demand across the city region for skills relating to the introduction of low carbon infrastructure.

Properly planned and integrated, green infrastructure will contribute to each of these agendas and have implications for the way they need to develop. Moving forward, the strategy will be used to underpin the forthcoming Leeds City Region Integrated Strategy, which will co-ordinate city region strategy and policy across agendas.

In order to realise these opportunities, we need to know what factors will be driving the demand for green infrastructure investment in coming years so that we can secure and target our resources to best effect. The drivers are mostly shaped by public policy, nationally and locally, which in turn influences investment by the private and independent sectors. The four key drivers of green infrastructure demand are:

- sustainable economic growth and regeneration;
- climate change;
- health and well-being; and
- biodiversity.

Each of these drivers presents increasing challenges that are stimulating the demand for green infrastructure solutions. In the case of economic growth for example, this demand is already being expressed in financial terms, with significant increases in public funds to meet that demand. In others, like climate change, the issue is relatively new, with investment only now beginning to fund green infrastructure actions.

A summary of the four key drivers is set out below.

SUSTAINABLE ECONOMIC GROWTH AND REGENERATION

The city region is expected to remain a significant economic driver of the economy in the North and will therefore accommodate a significant household and jobs growth over the next twenty years. This level of growth will place increasing pressure on the existing urban infrastructure, including green infrastructure assets, which will require upgrading and extending to serve new households and employees.

In places, especially those areas of regeneration, the advance delivery of new infrastructure will play a key role in promoting development opportunities. The role of green infrastructure in helping to attract greater levels of investment and improving the economic performance of local economies (in terms of workforce productivity, tourism development, and overall 'place' branding) is increasingly being recognised[23]. In addition, as the city region places greater emphasis on achieving a step change in business and skills performance, so the need to create quality places, improve quality of life, and address environmental remediation increases.

The city region's Growth Points, Urban Eco-Settlements and other major urban extensions will therefore create a new demand for green infrastructure investment, primarily made by

OTLEY CHEVIN, IMAGE COURTESY OF LEEDS CITY COUNCIL

those promoting development proposals but also with likely public funding support. Each of the City Region Housing Investment Plan key themes - accelerating strategic growth, promoting eco-living, delivering strategic urban renewal, supporting rural economic renaissance – identify investing in green infrastructure as one of their critical success factors and this plan will become an important source of future growth-led green infrastructure funding.

Whilst the recent downturn in economic performance makes the city region's goals more challenging, moving to a low carbon economy will contribute to leading the area out of recession and sustaining long term economic growth. The City Region will seek to bring forward green and other infrastructure projects to unlock barriers to housing growth and regeneration, accelerate delivery of its Urban Eco Settlements and Growth Points and promote innovative, new city region models of finance and delivery for housing and regeneration. It will also focus new development to support priority economic growth locations and focus regeneration and new development to support strategic transport corridors and adopt high design and sustainability standards. The City Region Housing Investment Plan will set out how public funding will be made over the next three years to realise these investment opportunities.

Similarly, the city region's Transport Strategy provides a strategic framework for the development of the next round of Local Transport Plans in the city region. The key benefit of green infrastructure in this respect is in protecting, enhancing and creating attractive, safe and convenient walking and cycling routes linked to enhanced public transport nodes, especially in those parts of the city region with high population concentrations. This has clear benefits for reducing reliance on the car, and also more generally through promoting active lifestyles. Greening transport routes can also improve the visual appearance of towns and cities and the wider countryside and gateway sites that currently suffer from a degraded or neglected appearance.

Investment in green infrastructure will help shape the emerging city region employment and skills strategy and innovation prospectus. The green space and technology sectors will both demand more of the city region's businesses and workforce in terms of addressing local skills gaps and in finding new solutions to financing and delivering low carbon-based regeneration. The demand for new green infrastructure technology solutions and business models should provide a stimulus to new green business innovation.

OVENDEN MOOR, IMAGE COURTESY OF CALDERDALE METROPOLITAN BOROUGH COUNCIL

CLIMATE CHANGE

As the full consequences of adapting to, and mitigating, climate change become clearer, so the benefits of green infrastructure are emerging as central to increasing the resilience of regional economies.

The Stern Report[24] makes clear the economic case for tackling climate change, both in terms of using solutions to generate new economic and social wealth and of avoiding the financial consequences of failure. Locally, the Yorkshire & Humber Climate Change Action Plan[25] contains a stark assessment of the impact of climate change on this region, with the Leeds City Region likely to be particularly vulnerable.

The Read Report[26] on the role of forests in combating climate change makes a strong scientific case for protecting and managing the trees we already have, and to plant more woodlands as a matter of urgency. The report advocates a national planting target of 25,000ha of new woodland a year for the next 40 years – this represents a 4% change in land use across the country as a whole. A significant proportion of this target needs to be located in and around our urban centres for the wider public benefits it would bring. The Leeds City Region needs to consider how it should respond to this challenging target.

The city region expects that future development will need to show how it will adapt to the inevitable changes in climate which are already underway - drier summers, wetter winters, and more extreme rainfall events. Green Infrastructure has a particularly important role to play in helping to ameliorate climate extremes in urban areas, as demonstrated by the groundbreaking work by Gill and Handley in Manchester[27]. Wherever suitable and feasible, development should also seek to mitigate the causes of climate change by minimising its carbon footprint, such as through reducing or eliminating greenhouse gas production. Outside of the planning of new development, the demand for green infrastructure projects to minimise greenhouse gas production, to lock up carbon as peat soil or biomass, and to provide alternative fuel sources to coal and oil and gas, for example will also increase.

The demand for green infrastructure investment to tackle climate change will also come from public agencies such as the Environment Agency using green infrastructure actions to address flooding problems for example[28]. It is also emerging from companies seeking means of offsetting all or part of their carbon footprint by investing in green infrastructure projects in their local area, or more often in accredited international projects[29].

It is anticipated that these demands will each increase substantially in coming years as public policy instruments such as carbon trading, building regulations and planning policies become more stringent as the impacts of climate change become more damaging[30]. It can therefore be assumed that green infrastructure interventions that offer direct and local climate change related benefits will be targeted for public and private sector investment.

STOODLEY PIKE, TODMORDEN, IMAGE COURTESY OF CALDERDALE METROPOLITAN BOROUGH COUNCIL

HEALTH AND WELL-BEING

Although life expectancy in the city region is improving, other local health indicators like obesity, diabetes and heart disease are significant and continuing problems in parts of the city region as they coincide with areas of low income households and poorer housing quality[31]. There is now considerable research that identifies the positive contribution that local green space and convenient and safe walking and cycling routes make to improving physical and mental health and social wellbeing, particularly in our cities and towns[32].

Green infrastructure in the form of private gardens makes a valuable contribution to health and well-being. However, access is very much dependent on the socio-economic status of individuals and therefore limited in the benefits they can bring to all of our residents. As such the importance of publically accessible recreational parks and green areas have long been recognised as providing opportunities for people to walk, run, cycle and play for health improvement and stress relief. In addition various studies highlight the role that access to green areas can have to reducing sickness, and improving longevity, levels of physical activity and health among senior citizens.

Other health benefits are delivered through well planned and designed multi functional green infrastructure. Research indicates that increasing tree cover by 10% could reduce total heating and cooling energy use by 5 to 10% and also assist in adding humidity to uncomfortable dry city air and improving air quality.

It is likely that the demand for green infrastructure investment will increase to meet health and well-being objectives and that greater preventative public health funding will be made available for this purpose. The recent investment of the NHS in its 'NHS Forests' initiative[33] is one such example.

IMAGE COURTESY OF JO MEAYS

BIODIVERSITY

Despite the rise of environmental awareness and the popularity of nature conservation programmes over the past few decades, studies demonstrate the dramatic and worrying loss of biodiversity and deterioration of terrestrial and aquatic ecosystems in the UK. In the city region, progress has been made to address habitat decline and in some areas biodiversity is improving[34]. Elsewhere challenges such as development and climate change continue to threaten biodiversity directly or through the increasing fragmentation of habitats that is particularly damaging to populations of rare or vulnerable species.

There is a growing recognition that the traditional approach to protecting wildlife, through designating sites, is not enough to halt the loss of biodiversity or ensure that existing biodiversity remains viable into the future. Strategic documents, such as the Yorkshire and Humber Biodiversity Strategy[35], highlight the imperative to work at a landscape scale by improving functional habitat networks and enhancing the wider environment of rural and urban areas. An initial assessment of existing functional habitat networks was produced by English Nature in 2007, and the Forestry Commission is now planning to take this approach forward and produce a detailed analysis on habitat networks across the Leeds city region. Such an approach also offers the possibility of being able to monitor change over time in the ecological connectivity of the wider landscape.

Public policy at the international, national and regional levels has long regarded declining biodiversity as a major environmental challenge. Investment in green infrastructure to improve biodiversity specifically has generally been made by environmental organisations using members', charitable and public funds. Often, such opportunities will be realised on the back of projects designed to achieve another complementary objective, for example as part of new or enhanced public park.

The future demand for green infrastructure investment to secure biodiversity gain may increase in future if new habitat banking or biodiversity offsetting mechanisms are introduced into the UK. The Department for Energy & Climate Change and Natural England are currently considering how such mechanisms may operate[36]. If introduced, they may create new sources of funds, and a demand for offsetting projects, especially in areas facing biodiversity losses as a result of economic growth.

In addition, the opportunities to achieve biodiversity gain through green infrastructure investment made primarily to achieve other benefits, perhaps in response to heath and well being or climate change drivers or to develop ecosystem services, will increase as the other three drivers described above become increasingly important. The concept of multi-functionality is critical, and it will be important to consider wider benefits to wildlife in all green infrastructure interventions and investments made in the future. A good example would be the

NIDDERDALE, IMAGE COURTESY OF G X MEGSON. NORTH YORKSHIRE COUNTY COUNCIL

enhancement of woodland biodiversity through the development of a management regime that is primarily focussed on securing a sustainable crop of woodfuel.

Much of the activity required to protect and enhance biodiversity across the city region is delivered at the local or site scale. However, it is evident that landscape-scale or region wide initiatives are already in development and delivering success. Examples include the Yorkshire Wildlife Trust's Living Landscapes Project[37] and actions to secure the return of native fish populations, such as salmon, to the river systems of the city region.

The European Water Framework Directive presents the opportunity to plan and deliver a better water environment, focussing on ecology[38]. Whilst water quality has improved substantially over the past few decades, green infrastructure interventions around river corridors, such as planting trees and woodlands[39] can have a significant impact on reducing pollutants entering our rivers as well as providing valuable wildlife habitat. More critically, areas of the rivers that have been heavily modified by weirs are acting as obstructions to the natural movement of fish through the city region[40]. The addition of fish passes - interventions to allow fish to navigate man made obstructions - at specific pressure points along the river system will significantly contribute to the restoration of self-sustaining fisheries within our rivers and deliver a wide range of social, economic and environmental benefits.