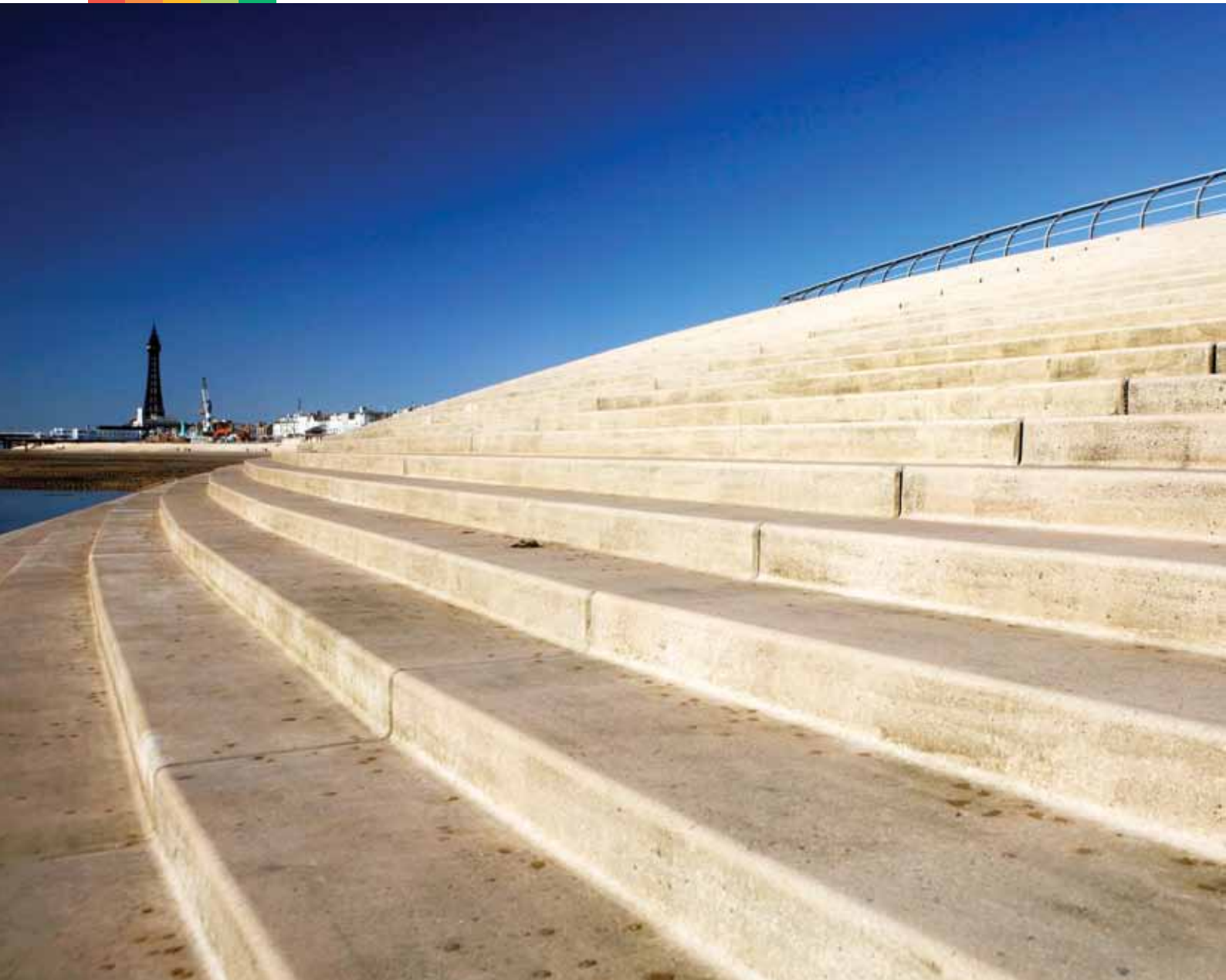




A Summary of Climate Change Risks for North West England

To coincide with the publication of the UK Climate Change Risk Assessment (CCRA) 2012





Introduction

The North West is an area of stark contrasts and striking landscapes. It has the vibrant world cities of Manchester and Liverpool, areas of outstanding beauty such as the Lake District, historic cities such as Chester, Lancaster and Carlisle and a superb coastline, including the iconic resort of Blackpool. The North West is also home to some of the best universities in the world and has a fantastic cultural and sporting offers.

It is the equivalent of Europe's 12th largest economy and is the UK's largest manufacturing region. It has real strengths in the professional, bio-medical and digital and creative industries as well as advanced manufacturing, nuclear and aerospace sectors, making it home to some of the world's leading companies.

The North West is blessed with a range of outstanding natural assets including National Parks, internationally important habitats and two World Heritage Sites. Over 80% is rural in nature as well as coastal resorts and urban heritage. Over 80% of the region is rural in nature and much of the coastline is recognised at European scale for its environmental importance. Morecambe Bay has the largest intertidal area in Britain and the Sefton coast hosts the largest continuous sand dune system in England.

This natural environment underpins our quality, vibrancy

and diversity - providing the eco-system services to support our economy and making it a great place to live, work, learn, visit and invest in.

Climate change is already impacting on us, through coastal change, temperature rise, and changes to water availability. Putting pressure on the infrastructure and support services which underpin our economy and society.

The UK's climate change risk assessment (UKCCRA) provides us with a national appraisal of climate risks across the country that starts to highlight how these might differ across the UK. Some impacts will be less relevant to the North West and for others we'll already be well placed to manage them. Understanding our risks and how we will manage and adapt to them is critical to ensuring the North West continues to prosper and grow.

UK Climate Change Risk Assessment

The UK Climate Change Risk Assessment (CCRA) is an independent research project, funded by UK Government and Devolved Governments that analyses the main risks and opportunities to the UK, arising from climate change over the coming years. It provides the underpinning evidence to inform discussions on adaptation action needed in such areas as infrastructure, health, environment and business. It will be updated every five years taking account of new climate observations and improved understanding of future climate change and risks.

The CCRA methodology is novel in that it allows for comparison of over 100 risks (prioritised from an initial list of over 700) from a number of disparate sectors based on the magnitude of the impact and confidence in the evidence base. A key strength of the analysis is using a consistent method and set of climate projections to look at current and future risks and opportunities.

The CCRA methodology has been developed through a number of stages involving expert peer review.

The approach developed is a tractable, repeatable methodology that is not dependent on changes in long term plans between the 5 year cycles of the CCRA.

The assessment considered population growth, where relevant, but did not quantify the impacts of other societal changes on future risks, for example due to economic growth, or developments in new technologies, or the full range of planned and potential future Government policies or private sector adaptation investment plans.

Excluding these factors from the analysis provides a more robust 'baseline' against which the effects of different plans and policies can be more easily assessed. However, when utilising the outputs of the CCRA, it is essential to consider that Government and key organisations are already taking action in many areas to minimise climate change risks and these interventions need to be considered when assessing where further action may be best directed or needed.



Key National Messages

Some key findings show why we must act now to prepare ourselves and our businesses for the future impact of climate change. The research reveals that without action we could see:-

- Increases in the frequency of flooding affecting people's homes and wellbeing, especially for vulnerable groups (e.g. those affected by poverty, older people, people in poor health and those with disabilities), and the operation of businesses and critical infrastructure systems. Annual damage to properties in England and Wales, due to flooding from rivers and the sea, rises from £1.2 billion to between £2.1 billion and £12 billion by the 2080s. Without action, a range of important infrastructure such as roads and railways may be affected by a significantly increased risk of flooding based on future population growth and if no adaptive action is taken.
- Summer overheating potentially contributing to heat-related health problems. Premature deaths due to hotter summers are projected to increase (e.g. by between 580 and 5900 by the 2050s). This is likely to place different burdens on National Health Service (NHS), public health and social care services. Other health risks that may increase include problems caused by ground-level ozone and by marine and freshwater pathogens.
- Reductions in water availability, particularly during the summer, leading to more frequent water use restrictions and, in the longer term, water shortages. The gap between demand and availability will potentially widen, impacting homes, businesses, schools and hospitals. By the 2050s, between 27 million and 59 million people in the UK may be living in areas affected by water supply-demand deficits (based on existing population levels). Adaptation action will be needed to increase water efficiency across all sectors and decrease levels of water abstraction in the summer months.

This pack was commissioned to coincide with the publication of the UK's first Climate Change Risk Assessment. While drawing on the CCRA where there is regional or local information (which at times is limited due to lack of data) this pack presents a local perspective of the CCRA risks and opportunities. The pack offers an illustration of what climate change means for people, businesses, community groups, local authorities, and other organisations across key sectors, at the local level, highlighting what is already happening and where there is a strong case for greater local action.

Detailed results from the CCRA are presented in:

- An extensive and comprehensive UK CCRA Evidence Report;
- A suite of technical reports on 11 key sectors.
- The UK CCRA: Government Report, which highlights actions already in place to manage the risk identified in the CCRA, and outlines UK Government plans for the future.

To read these publications, please visit: <http://www.defra.gov.uk/environment/climate/government/>



Key Risks and Implications

Some Key Regional Climate Implications



Business

- North West businesses will see an increase in damages from flood risk due to climate change, and is the most significant threat to our economy unless continual action is taken.
- Over half of our economy is located in the Mersey Belt, which will become increasingly prone to the climate risks of higher temperatures, flood risk, and extreme weather.
- Two thirds of our 230,000 small businesses are not currently taking action on climate change, but 95% of our larger businesses are.



Health and Wellbeing

- Although not as vulnerable as the south of England, higher temperatures will mean that the North West will see increases in mortalities and hospital admissions in summer and correspondingly lower rates in winter.
- Health in the North West could be particularly impacted by climate change due to our high levels of deprivation and vulnerable households, particularly in our most dense urban areas at higher risk of flooding and heat island effect.
- There is a significant opportunity to use green infrastructure to both manage climate impacts of health, promote healthy low-carbon lifestyles and to provide wider community benefits.



Buildings and Infrastructure

- 147,000 properties in the Northwest are currently at risk from river and coastal flooding. This will increase with climate change, and the value of property potentially non-mortgageable and uninsurable by 2080 is the highest outside of London.
- The comfort and utility of our major urban areas will become increasingly threatened by higher temperatures, especially due to the projected urban heat island effect within Greater Manchester.
- Overall the North West's energy, water and transport infrastructure is relatively more resilient than other regions, but requires continual effective management and a focus on specific network vulnerabilities.



Agriculture and Forestry

- The North West is likely to see a relatively lesser change in the agroclimate compared to the south and east, however due to the nature of our agri-economy there will still be opportunities for new crops and higher yields, and also increased vulnerability caused by water availability and extreme events.
- Increased temperatures will impact on our dominant livestock farming sector particularly through animal health and pests/diseases, and increased rainfall will impact through increased waterlogging.
- Forest productivity will be maintained across most of the North West, increasing the economic potential of the sector. However, pest and disease outbreaks, in part driven by climate change, remain the greatest threat.



Natural Environment

- The North West's natural environment is already changing due to climate change,
- Our protected landscapes are currently more resilient to climate change than our urban south and coastal plains which have historically seen lower investment.
- There will be increased pressures on our habitats and species from the opportunities climate change will bring to our agri-economy and visitor offer.
- Opportunities exist to build the North West's ecosystem services through capitalising on the many benefits of effective management and improved green infrastructure to combat climate change.



Key Risks and Implications

Key National Risks from the UK CCRA 2012

- Climate change represents a potentially significant issue for all UK business sectors.
- Main climate challenges to businesses include flooding and coastal erosion, increased competition for water, and disruption of transport and communication links.
- The degree to which individual organisations are affected depends upon their level of vulnerability and adaptive capacity.
- There are potentially significant commercial and competitive advantages to be gained for those businesses taking on the challenge.



Business

- Climate change could have significant implications for the health and wellbeing of the UK population.
- Implications affect public health, the continuity of health and social care services both within the NHS and beyond, the resilience of local emergency services, and the most socially vulnerable.
- There may be some welcome benefits, but there are likely to be outweighed by a range of negative effects.



Health and Wellbeing

- The built environment and infrastructure are already vulnerable to extreme weather such as flooding, storms, heatwaves, and droughts.
- Most of today's buildings were designed for the climate that existed when they were built and are not necessarily equipped to cope with current and future climates.
- Around 70% of buildings that will be in use in the 2050s already exist, but there may be opportunities for innovative building services and urban planning in the UK and overseas.
- The government has already prioritised the need to improve the long-term resilience of new and existing infrastructure networks in the energy, ICT, transport and water sectors.



Buildings and Infrastructure

- Agriculture and forestry are sensitive to climatic conditions; changes in climate have a profound impact on productivity and economic viability.
- Climate change may alter the impact that agriculture and forestry have on the natural environment and the value of the ecosystem services provided.
- Warmer temperatures and carbon fertilisation may present some opportunities to increase yields, in the short term.
- Low water availability in the summer, increased flooding and coastal erosion, increased prevalence of pests diseases, and frequent wildfires may limit opportunities in the longer term.



Agriculture and Forestry

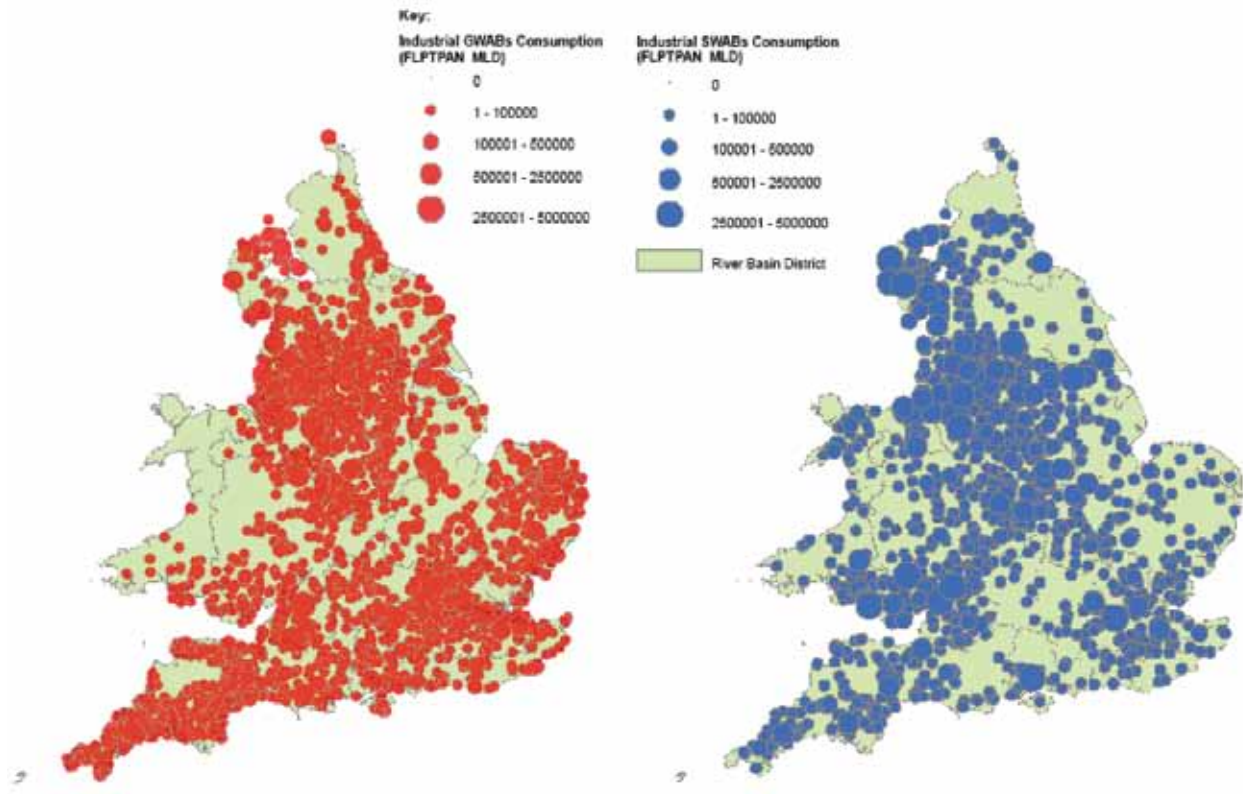
- Climate change may exacerbate and/or alter the pressures placed on the natural environment, especially those caused by human activity.
- Heightened impacts may in turn affect the way humans are able to use the environment – for example growing crops or obtaining high quality drinking water.
- The natural environment is crucial to our ability to adapt, reducing flood risk, cooling cities and storing water.



Natural Environment



Business



Map of Industrial Groundwater Abstractions, showing the concentration in the North West (UK CCRA 2012)

The Northwest has almost a quarter of a million businesses, mainly small and medium sized enterprises, comprising a tenth of the UK economy and larger than 11 European countries.

The North West has a hugely diverse economy, with large chemicals and manufacturing companies, a large small business base, the largest professional services hub outside of London, world renowned nuclear, biomedical, aerospace companies, a growing media centre, and a vibrant tourism sector boasting the second most visited city in the UK and the world famous Lake District.

This diversity is reflected in the complexity of climate impacts across all these business sectors, and it is critical that individual companies and sector organisations seek to understand fully the impact of climate change, not just from operations within the UK but those of supply chains across the globe. However, evidence has shown that over two thirds of businesses are not yet responding to climate change and building responses into their forward and contingency planning. This is especially true for small businesses that often lack the capacity and resources.



Threats

- A recent study estimated that over 10,000 businesses in the NW were at significant flood risk [URS, 2009], and if you take river and coastal flooding alone, the same study estimates the current damages to business across the NW is on average £43 million per year; and this will, with climate change, potentially increase 223% to an average of £138m per year.
- Increased monetary loss as a result of increased interruption to business through flooding could also be significant, especially where it affects wider business continuity through damage and impact on supporting infrastructure. (transport, utilities)
- All business sectors are likely to be impacted by lost working days due to higher temperatures above 26 degrees, with a range of between 0.2 and 3.14 days per employee by 2080. This will be particularly important for the service sector in the south of the region. Staff days lost to flooding are small but also predicted to increase by 2080 to be between 2 to 4 times the current levels of 400 days per year.
- Projections for the change in water abstraction in the North West are less than the areas in the south, however the large amount of industrial abstraction in the North West area could mean that a small shift in long term availability, which consistently affects time of peak demand, could translate into a significant risk for industrial processes. Overall the UKCCRA states that the North West is projected to not lose a significant amount of turnover from constraints on water abstraction at £46m by 2080 (High Scenario).
- Most of the North West's chemical industry is located in tidal flood plains, comprising 25% of the UK sector.
- Threats to businesses should also bear in mind impacts on infrastructure, in particular through energy and water supply, and logistics.
- The impact of climate change on supply chains, especially outside of the UK, is uncertain at present and requires further evidence.

Opportunities

- Action by businesses on climate resilience will have significant benefits to the competitiveness of the North West economy, not just to secure the sustainable growth of individual businesses, but also in building new markets for adaptation products and services and encouraging action by supply chains.
- Our tourism sector could see an increase by 2080 of between £1.83bn and £3.77bn on business as usual projections, the highest change in England outside of the South West. However, there will be an increasing threat to coastal beech assets between 2-9 km² which may impact upon the ability of the North West to capitalise on this opportunity.



Manchester Ship Canal



Health and Well-being



The impact of climate change on health and wellbeing is one of the most difficult areas to assess, but research indicates that climate impacts will disproportionately affect the health of our most vulnerable, particularly those in areas of high levels of deprivation, and may increase health inequalities.

The North West contains the highest proportion of deprived areas falling within England, for example Liverpool has the highest proportion of neighbourhoods falling in the most deprived nationally, and Manchester and Knowsley also in the top four. Many of our deprived areas are also located where the urban heat island and flood risk is amongst the greatest.

Our overall level of health is also lower than the national average. Our 6.9 million residents are living longer, but continue to experience a lower life expectancy compared with other parts of the country. Men can expect to live 2.9 years less than those in the South East, whilst women can expect to live 2.5 years less than those in the South West. Although there are significant variations and many factors affecting health and health inequalities in different parts of the region, this existing vulnerability of the population could become an increasingly important factor in a changing climate.



Threats

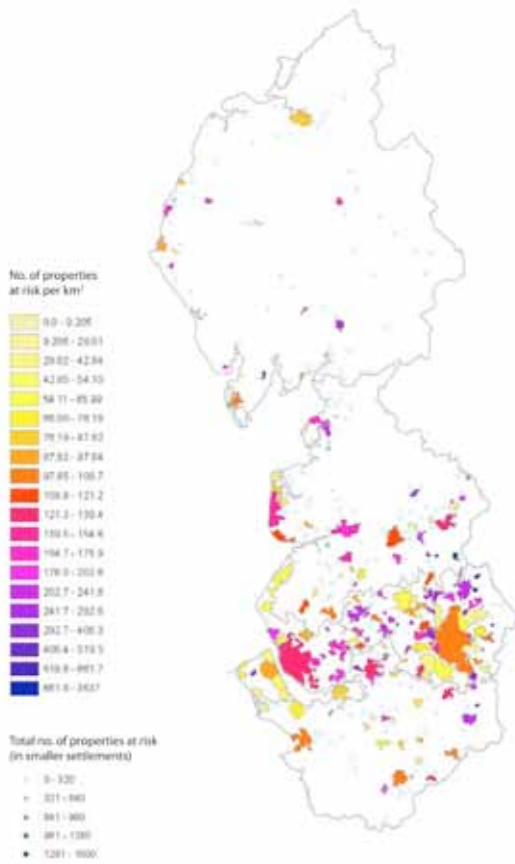
- Higher temperatures will increase mortality rates and hospital admissions in the North West, however there will be a benefit in lower rates from higher winter temperatures.
- Climate change will have specific impacts on certain diseases at a greater level in the North West than elsewhere:
 - The North West has a high proportion of communities which have an increased vulnerability to cardiovascular diseases, which regional studies have found could be impacted by exposure to both warmer and cooler spells.
 - We have an aging population which is increasingly vulnerable to respiratory diseases, which climate change will affect due to higher levels of air pollutants.
 - The North West is seeing a significant increase in skin cancers which may be further affected by increased UV exposure from climate change.
- The UKCCRA identifies that there is an increase in people suffering from mental health effects as a result of increased flooding, due to loss of homes and property and dislocation.
- The North West has a significant number of isolated communities and individuals, with relatively limited access to healthcare and other wellbeing services which will be more impacted by extreme weather and prolonged incidences of flooding and heat.

Opportunities

- There are potential benefits of reduced mortality and hospital admissions in winter, however this is still not fully understood and requires further investigation.
- Many higher temperature impacts in cities can be reduced by effective green infrastructure to reduce the heat island effect, for example research in Manchester has shown that a 10% increase in greenspace can cool dense urban areas by 2 degrees.
- Health professionals and communities across the North West are already working hard to understand the impacts of climate change on well-being, ensuring that services are adapted to meet these new challenges.
- There is a significant role for local communities in minimising the impacts of a changing climate, particularly in building capacity in relation to extreme events.



Buildings and Infrastructure



Number of properties at risk of surface water flooding.
Community Forests Northwest



Regional projections of rail buckling - Medium emissions scenario.
(UK CCRA 2012)

The North West's infrastructure for energy, water and transport is well managed and less at threat than other regions. However, the concentration of activity within the southern part of the region, the age, often remoteness and spinal nature of much of our infrastructure, means that the North West is still highly sensitive to climate induced disruption, especially from extreme events.

This concentration in the southern part of the region, where housing and building density are the highest, also coincide with some of our highest levels of flood risk. These areas are also likely to see higher temperatures due to climate change and the impact of the urban heat island, with the UKCCRA stating that night time temperatures in central Manchester have been recorded to be between 5 to 10 degrees centigrade higher than surrounding areas.



Threats

- Our buildings and infrastructure are particularly vulnerable in locations at risk of fluvial flooding, which in the North West is projected to increase. The UKCCRA predicts that under the central estimate of the high emissions scenario, events in the North West which currently have an annual probability of 1:100 are likely to happen more often and their probably could exceed 1:20 by the 2080's - the highest of any region in England.
- Coastal infrastructure is also projected to see an increasing vulnerability due to average sea level increases by the 2080s of up to 63cm (UKCP09) across most of the region and from more frequent storm surges.
- The number of buildings at risk of flooding will increase from the current 147,000 due to projections not just from fluvial and tidal flooding, but also surface water flooding. There are already over 40,000 properties at risk of 1:200 year surface water flood with a depth of over 0.3m, which will increase with climate change. Whilst the overall numbers at risk are less than in some regions, in the North West these tend to be concentrated in very dense urban areas, increasing the impact and consequences of any major flood event. For example, Warrington still ranks very highly nationally for the number of properties at significant risk of flooding and Cumbria suffered severe flooding in January 2005 and November 2009.
- The economic impact of this could be considerable in the North West, with the estimate total value of north west residential properties at risk of being non mortgagable and uninsurable due to climate change induced flooding is the highest outside of London, ranging from £5.57bn to £7.44bn in 2080.
- The UKCCRA states that our urban infrastructure will be particularly vulnerable to increased summer minimum air temperatures, with an increase by 2.5 degrees by the 2050's and 3.6 degrees in the 2080s under the medium emissions 50 percentile estimate. This is likely to be an underestimate in Manchester by 2050 where the UKCCRA states that the urban heat island may start to have a major effect.
- The nature of the Northwest's transport infrastructure makes it particularly vulnerable to extreme weather events. The region relies heavily on the West Coast Mainline, M6 and M62 which have potential vulnerabilities around Warrington, across the Pennines and in Cumbria.
- Regional data suggests that the economic cost of road disruption in the region resulting from a 1 in 100 year flood could be as much as £11.7 million per annum. These costs are expected to be greatest in Lancashire, Cheshire and Merseyside. Although the costs of flooding of rail infrastructure are less at £0.17 million, the UKCCRA states that the likelihood of delays arising from rail buckling in the North West is the highest outside of London, which would cause significant impacts due to limited alternatives.
- The main threat to the electricity network is the damage caused by flooding, and Electricity North West have put in place a plan to increase flood resilience. There will however be increased demand for cooling across the North West, which is being factored into future energy requirements.
- One of the strengths of the NW's water supply system is that it is highly integrated and being improved. However, this is not the case in some areas such as West Cumbria.
- Climate change could see river flows in the late summer and early autumn reduce by as much as 80% in rivers such as the Eden, Derwent, Lune, Mersey and Weaver, all of which have major water supply abstractions and wastewater discharges. This could impact on households and businesses, particularly high water use industries, especially at times of drought.

Opportunities

- Efficient use of our buildings and infrastructure has the potential to reduce the demands we place on them. Peoples behaviour and activities can play an important part in reducing pressure on these assets and increasing their capacity to cope with expected pressures from climate change.



Agriculture and Forestry



The North West has a significant farming and forestry sector which is already adapting to the impacts of climate change and will increasingly adapt to not just the threats posed, but also the opportunities of a warmer, milder climate. Overall, the North West is projected to see a lesser impact from climate change than the south and east of England, but there will still be significant impacts and opportunities due to the nature of our sector.

The sector is dominated by livestock farming, with 784,000 of the 933,000 total farmed area utilised for grassland and rough grazing. Arable production only uses 11% of the available land in the North West, dairy farming 17% of the land with beef and sheep farming using the remaining land. The impacts of climate change on the livestock sector will therefore have significant bearing for the region, as it continues to dominate even when there is a projected increase in potential for arable and other crops.



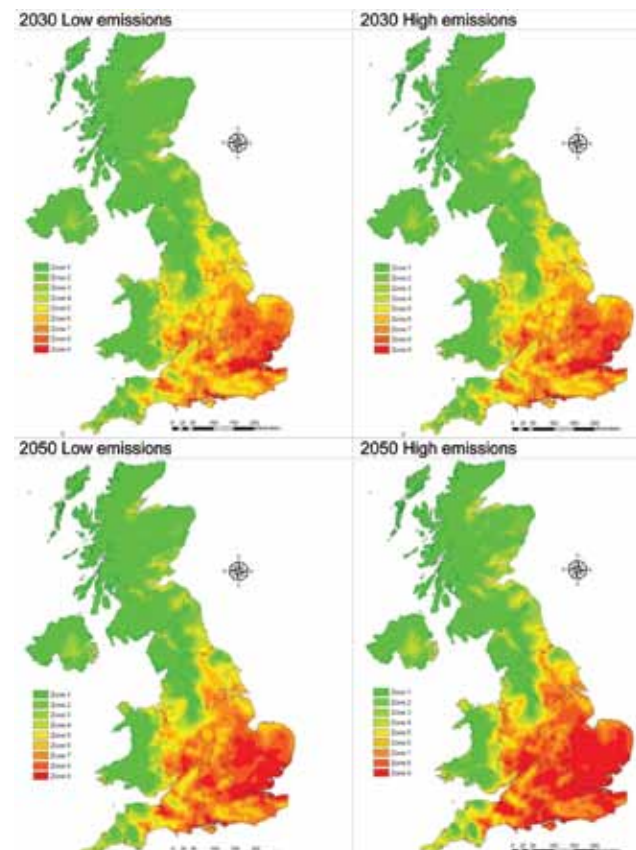
Threats

- Water use due to agriculture could increase in the North West as new, more water intensive, crops migrate from the south and east of England, and as soils become drier.
- Horticulture may start to compete with grazing or land previously put over to provide feed and fodder for the livestock sector.
- Extreme events and an increase in pest and disease outbreaks, could have a significant impact on our forestry sector.
- Some forests in the drier parts of the region could become unsuitable for timber production, if species and origin of planting stock are not adapted to the changing conditions.
- Extreme weather may also temporarily reduce agricultural yields and, where this is for crops to support livestock, this will have a disproportionately significant effect on the North West.
- Increasing temperatures due to climate change will have a limited impact on animal health, including on thermal stress in livestock during housing, grazing and transport.
- Whilst total number of unworkable days due to water logging is predicted to decrease annually, projected small increases in winter could have impact because of the predominance of livestock/dairy production in the NW and the potential tendency to leave animals outside for longer periods.
- Intense rain or general wetter environments may have implications on grazing areas, particularly in terms of increased erosion.
- Climate change will have impacts on how organic manures are stored and applied to land. Increased rainfall over the winter months may lead to farmers requiring more storage capacity for organic manures.

Opportunities

- The NW will have the potential for new crops currently common to the south and east, and increased yields due to climate change.
- The existing livestock farming will have the potential to increase with milder winters and increased grassland yields, however more exposed areas could be vulnerable to increased extreme weather.
- Forest productivity will be maintained across most of the region with increases likely in some areas. The economic resilience of the sector should improve.
- Recreational use of forests may increase as the climate changes, providing new business opportunities.
- Tree planting and woodland creation will help to increase the resilience of fragile landscapes, including in our towns and cities.
- The UKCCRA states that the North West is projected to see the largest increase in horticultural crops in England.
- There may increased potential for production of energy crops.

Projected changes in agroclimate (PSMDmax) in the UK for selected UKCP09 emissions scenarios (low, high) for the 2030s and 2080s. (UK CCRA 2012)





Natural Environment



The North West's natural environment is one of its key assets. Around 29% of the NW is designated as protected landscape, comprising National Parks and Areas of Outstanding Natural Beauty. The Lake District National Park is the largest National Park in England.

80% of length of North West's coast is also of international importance for wildlife and contains 6 internationally important estuaries of which 5 are in the top 10 estuaries in the UK for numbers of wintering waterfowl. Whilst the UKCCRA predicts that coastal erosion is to be less than for some other regions, the value and importance of this natural resource (both in ecological and amenity terms) is significant for the NW, particularly when considered in conjunction with expected increases in visitor pressures in these environments.

The outstanding nature of much of its natural environment makes a significant contribution to our economy, with the visitor economy worth over £13.6 billion and supporting over 215,000 jobs. In 2008, the Lake District National Park Authority had a total economic impact of £677.19 million and 8.3 million visitors, accounting for 54% of Cumbria's total visitor number. Green Infrastructure itself is estimated to be worth over £2.6bn to the North West economy, supporting 109,000 jobs in environmental and related fields.

However, climate change is having an increasing impact on the ability of our natural environment to provide the ecosystem services required to support the way we live and work.

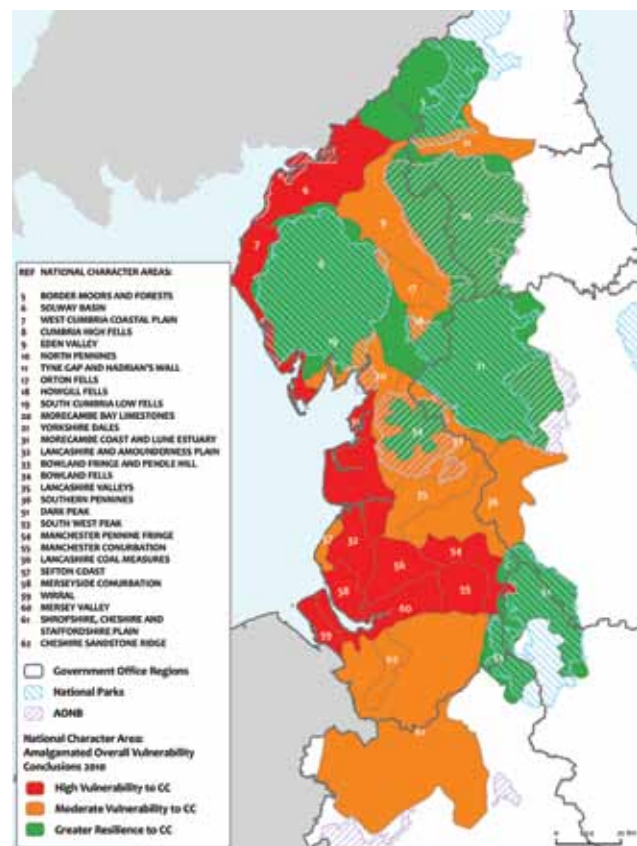


Threats

- All of our natural areas will be under increased stress and pressure due to climate change, which will require a significant level of managed adaptation to ensure that species are able to migrate and become resilient, especially some in the North that may struggle to sustain suitable niches.
- Regional evidence has shown that many of our protected landscapes are often also our most resilient areas, this may be due in part to historical levels of investment. The most highly at risk areas correspond with our most built up areas, which also form a significant barrier to movement of species up through the North West. The low lying and coastal locations are also at high risk from sea level inundation and habitat degradation, although there is significant potential to recreate habitats and landscapes.
- Expected increases in temperatures may result in increased demand for access to outdoor recreation, putting increased pressure on some of our most valuable destinations in the future.
- The increase in occurrences of wildfires is relatively less significant in the North West, however it is still projected to increase in the Lake District by 30% and the Peak District by 40%.
- The UKCCRA states that headwaters might dry up completely in summer months leading to significant changes to our river systems, including the upland streams and lakes in the North West. A recent report by the Environment Agency states that rivers such as the Lune in Lancashire could be vulnerable and there is a need to plan carefully to secure sustainable water supplies for people, businesses and the environment.
- The North West contains over a quarter of the English resource of blanket bogs, lowland raised bogs, upland calcareous grassland, upland meadows, limestone pavement and coastal saltmarsh. Changes to water availability or demand could have major impacts on the condition of this valuable resource.

Opportunities

- The action required to minimise the impact of climate change, such as improving remaining habitats, creating buffer sites and improving local connectivity, will have knock on benefits to our economy and communities.
- The UKCCRA states that the changes in the natural environment that climate change and other drivers will bring about will be both positive as well as negative. For example, some of England's southern species may be able to increase their range by expanding north.
- Improving our green infrastructure in our towns and cities will not just help to combat climate change but will also have wider socio-economic benefits. Regional research has shown that it assists with mitigation, flood alleviation and water management, quality of place, health and well-being, land and property values, economic growth and investment, labour productivity, tourism, recreation and leisure, land and biodiversity, and products from the land.



North West Region: Natural Environment Vulnerability to Climate Change Overall Conclusions 2010 Map: by Amalgamation of Three Vulnerability Assessment Results. Natural England.

Where next?

Following publication of the National Climate Change Risk Assessment, the North West Climate Change Partnership (NWCCP) will continue to work with partners across the North West of England, ClimateUK and the Environment Agency to deliver on our vision of a 'low carbon and well adapting north west by 2020'.

We will do this by providing the information and advocacy to our key sectors, helping them understand what the key climate change risks identified within the UKCCRA mean for them locally in the North West.

In particular we will work with partners to strengthen our existing Climate Change Local Area Support Programme (www.claspinfo.org). This will ensure that all NW Local Authorities and their partners have access to the best information, best practice and guidance on climate change adaptation. We will also work to accelerate climate resilience understanding and activity within the private sector by developing a focused programme of technical assistance to support local businesses and the new Local Enterprise Partnerships. We will contribute to increasing neighbourhood resilience and develop and deliver practical solutions to climate change adaptation by providing support to the planning process.

Finally, Climate Change Northwest would also like to thank the organisations and individuals who have contributed, and continue to contribute, to the National Climate Change Risk Assessment and building our local evidence base to inform the policies and strategies of all our counties, cities and localities.

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This information pack was commissioned by the Department for Environment, Food and Rural Affairs (Defra) to coincide with the publication of the UK CCRA 2012. The content of this pack represents the initial interpretation of the North West Climate Change Partnership drawing on the CCRA and other local evidence.