


YORKSHIRE AND HUMBER CLIMATE CHANGE ADAPTATION STUDY

LOCAL AREA REPORT NORTH YORKSHIRE COUNTY

<p>Location</p>	
<p>Description of District:</p>	<p>North Yorkshire County makes up approximately half of the study area. It consists of vast areas of countryside including the North York Moors and the Yorkshire Dales National Park.</p>
<p>Future Climate Projections:</p>	<p>The nature of climate change will vary across the region due to the varied nature of the county (urban, rural, coastal, upland and lowland). Greater detail is provided on the sheets prepared for the local Authority Areas which comprise the County.</p>

Key Impacts and Adaptation Actions

Although principally a regional / sub-regional study, there are a range of issues that are of particular relevance to North Yorkshire County. These are set out below, using the same 'sector' headings as the main report. These points are not the only issues for consideration, however, and should not be read in isolation. Sub-regional and regional reports, as well as the thematic or sectoral areas of the website, and the sections addressing the local authority areas which make up north Yorkshire do cover other relevant issues.

Flooding

Key Impacts

- Greater rainfall leading to increasing and more frequent flood problems for local properties, businesses and infrastructure;
- Greater flood risk (fluvial, sewer/drainage, and from direct surface runoff) due to faster flood flows off the Yorkshire Dales and North York Moors and likely to increase with higher intensity rainfall and flashy flood flows;
- Increased erosion and more frequent breaching of historic defences requiring increased maintenance works;
- Traffic impacts on main routes impacting on the co-ordination of emergency services, business deliveries, residents' access, and the provision of critical council services;
- Increased risk to highly vulnerable caravan parks and camping sites; and
- Increasing potential for tidal flood impacts and coastal erosion with rising sea levels.

Key Adaptations

- Develop flood management strategies to protect local businesses and properties, or encourage flood-resilience of buildings. Look for more innovative sustainable flood management approaches rather than traditional flood defences;
- Protect critical infrastructure and emergency services to ensure continuation of service, or relocate away from flood risk areas;
- Use changes in local land management in rural areas to reduce rates of surface runoff;
- Produce multi-agency response plans to co-ordinate responses during extreme events and ensure clear access routes are kept available;
- Ensure appropriate planning regulation is undertaken for caravan and camping parks with increased tourism as sites are vulnerable; and

- Ongoing monitoring of natural and man-made sea defences and necessary improvements to ensure ongoing protection of coastal communities.

Coastal Erosion

Key Impacts

- Increased rates of sea cliff recession due to erosion or landsliding caused by rising sea levels and increased winter rainfall;
- Increased movement of sand from beaches, leading to beach lowering at the toe of structures and ultimately defence undermining. This is likely to remain a seasonal process most observed during winter storms. Beach levels are likely to continue to recover during calmer conditions, but it could lead to defence deterioration and failure; and
- Increased overtopping of coastal defence structures due to rising sea levels.

Key Adaptations

- Increased rates of coastal erosion and landsliding will require a suite of adaptation approaches to ensure sustainable approaches are to be adopted; and
- Increased overtopping or undermining of coastal defences will require either defence improvements, or more formalised management of public access to vulnerable promenades and piers during storm events.

Business and Economy

Key Impacts

- Changing temperature and water regimes will affect woodland and forestry, with impacts on both yield and the viability of species. Damage and economic impacts to woodlands through increased storminess are also likely to be a concern;
- Increases in pest and disease spread, together with the potential for more 'exotic' species and increased vulnerability of crops and livestock, are likely to have significant effects on the district's agriculture;
- Higher summer temperatures are expected to increase demand for leisure and tourism, and especially outdoor amenity and coastal destinations. However, increased numbers of tourists may place significant strain on existing attractions and infrastructure;
- Management of sports venues and heritage and amenity sites will be affected by changing temperatures and rainfall/storm patterns. This will affect grounds management, building fabric, and have implications for visitor health and wellbeing. Festivals and outdoor events may become more susceptible to disruption from weather; and

- Digital industries will be particularly vulnerable to effects on telecommunications infrastructure, and to the effects of increased flooding on data storage and electrical services.

Key Adaptations

- There will be opportunities for agricultural and woodland diversification, exploiting the ability to grow new crops and benefit from wider incentives to produce food and non-food crops (for instance for biofuels and timber production);
- There is potential for expansion of woodland areas as part of wider catchment and flood management schemes in order to ameliorate flood risks in downstream areas;
- Initiate, develop and review pest management strategies, in particular in those rural areas frequented by visitors, to ensure the early identification and treatment of any species or conditions which may negatively affect the district's habitats or agriculture;
- Long-term changes in the tourism industry should be built into visitor management strategies, and the expected future needs and demands of increased numbers of tourists should be built into infrastructure and other regional plans. These should focus on ensuring that future development of the industry is sustainable and does not cause significant damage to natural environments and community structures;
- Visitor education campaigns could manage expectation about what the changing climate will mean for especially amenity location (eg whether fine grass lawns will be viable, and should be expected, during hotter drier summers); and
- Raise awareness of the impacts of climate change among the digital industries and those business sectors heavily reliant on data transmission and storage. Also ensure that networks and transmission infrastructure is adequately designed for future conditions.

Public and Voluntary Services

Key Impacts

- A higher fraction of the workload of rural Fire and Rescue Services are secondary fires, and it is secondary fires that will see the largest proportional increase in incidents. With the North York Moors National Park within the council area, heightened summer temperatures and drier soil conditions could result in increased strain on the Fire and Rescue Service;
- The drying out of soils followed by heavy rainfall could lead to increased risk of subsidence and slope instability, together with inundation and/or erosion of low lying and coastal public assets and facilities.

Key Adaptations

- Review built assets and resource availability and location to ensure resilience to future demands;
- Emergency planning will need well developed communication links with the Armed Forces Units to prepare for resourcing when required. Catterick Army garrison in North Yorkshire could provide a contingency resource for emergency planning operation and emergency services; and
- Future coastal erosion and maintenance of coastal defences should be considered when planning for future facilities, including for example for waste management.

Infrastructure and Utilities

Key Impacts

- Surface melt of rural road surfaces and associated knock-on effects, such as disruption to travel;
- Increased number of traffic accidents delays on A1(M) and A66 caused by increased winter rainfall and winter average wind speeds;
- Increased demand on water resources, particularly from agriculture;
- Increased tourist and recreational use of Yorkshire Dales National Park, including increased pressure on rural road networks;
- Increased blockage of drains, culverts and gullies;
- Mechanical operations within the water distribution grid could be affected by climate-related disruption to power supplies;
- Occasional deficits in volumes in individual surface water reservoirs;
- Increased frequency of flooding from drainage and sewer systems in urban areas, especially in winter;
- Increased risk of coastal erosion leading to loss of rail line at Filey and roads at Sandsend and Filey to Scarborough; and
- Increased overtopping of sea defences and piers.

Key Adaptations

- Allow additional resources for use of alternative road surfacing materials in carriageway maintenance programmes to ensure higher melt resistance;
- Weather and travel warnings issued to users of key road networks during storm events and anticipate increased resource requirements for emergency responses;
- Farm-holdings to consider local winter water storage reservoirs to assist with summer irrigation or livestock watering;
- Plan for increased visitor numbers and provide additional public transport;

- Re-evaluate resources and approaches for inspection and clearance of drain, culvert and gully blockages;
- Increased awareness of inter-dependencies between critical infrastructure;
- Balance water supply from other local sources or from the Yorkshire Grid at times of individual reservoir deficits;
- Capital programmes should consider improved sewer and drainage design capacity;
- Plan now for longer-term realignment of sections of rail and road near the coastal margin; and
- Improved coastal defence performance through capital upgrades and ongoing maintenance throughout the design life.

Biodiversity

Key Impacts

- Blanket bog occurs on flat moorland which is most exposed to solar gain during hot summer months and it would therefore be expected to shrink. This would have an impact on breeding bird populations. Blanket bog would be expected to increase in winter months although this may only be a temporary effect;
- There is extensive heathland in North Yorkshire and models predict that some species may increase whilst others decline with some species disappearing;
- Changes in moorland habitat will affect upland breeding bird populations and species such as hefted sheep;
- Grassland habitats are likely to change from their current species mix to more drought tolerant species; and
- Coastal habitats are prone to sea level rise which change exposure to air and water and loss by erosion.

Key Adaptations

- Wherever possible allow natural processes to continue, and therefore adaptation to change to occur naturally;
- Increase the area of blanket bog in North Yorkshire, and reduce other pressures on it;
- Manage heathland to ensure its continuity as much as possible;
- An overall enhancement in ecological connectivity of habitats. This will maximise opportunities for mobile species to adapt to climate change; and
- Increase woodland cover across North Yorkshire and improve its connectivity in urban and rural areas. Plant appropriate species from southern areas progressively into areas of new climate space and plant current species further north or at altitude.

Health and welfare

Impacts

- Impacts upon mental and physical health due to increasing temperatures, exacerbated by an increasingly elderly population moving into rural parts of the County; and
- Increased coastal erosion and risk from coastal and other flooding with effects on mental and physical health.

Adaptation

- Building a network of support and healthcare services to cater for an increasingly elderly population and develop community resilience; and
- Minimise disturbance to natural drainage systems and require better building control and regulation, rainwater capture and harvesting, and carry out flood preparedness work with vulnerable communities.