


YORKSHIRE AND HUMBER CLIMATE CHANGE ADAPTATION STUDY

LOCAL AREA REPORT BRADFORD METROPOLITAN DISTRICT

<p>Location</p>	
<p>Description of Area</p>	<p>The Metropolitan Borough of Bradford is an urban district to the west of Leeds.</p>
<p>Future Climate Projections</p>	<p>The results of the modelling carried out for the Yorkshire and Humber Climate Change Adaptation Study suggest that the following changes are likely by 2050:</p> <ul style="list-style-type: none"> • Winter average temperature rising by 1.4°C; • Extreme cold temperatures rising by 1.7°C but remaining below 0°C during the winter; • Hotter and drier summers, with average temperatures increasing by 2.4°C and a 23% reduction in rainfall; • Snowfall days will reduce by 60%; • Winter average rainfall increasing by 15%; and • Winter wind speeds will increase slightly. <p>These figures relate to the nearest modelled cell, which was Leeds.</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 Bradford Metropolitan District. These are set out below, using the same 'sector' headings as the main report. These points are not the only issues for consideration, however, as sub-regional and regional reports, as well as the thematic or sectoral areas of the website, do cover other issues relevant to this local authority area.

Flooding

Key Impacts

- Greater flood risk (fluvial, sewer/drainage, and from direct surface runoff) to local businesses and properties due to faster flood flows from the Yorkshire Dales and Pennines. Also exacerbating problems at culverts under roads, bridges and through urban centres.
- Traffic impacts on main routes affecting local businesses and residents, and the co-ordination of local services;
- Increased watercourse blockages and siltation reducing channel capacity and requiring greater maintenance works; and
- Increased surface water flooding in heavily urbanised areas during higher intensity, more extreme storms, and also affecting low sections of roads and railways.

Key Adaptations

- Continue river flow monitoring for fluvial flood events to provide advanced flood warning to critical risk areas;
- Concentrate flood management on protecting critical infrastructure assets and services; and
- Improve current drainage design standards to incorporate future climate changes, and strategically plan and implement system improvements across the drainage network. Consider a wide range of flood reduction techniques across urban areas.

Business and Economy

Key Impacts

- Industrial processes, and in particular those requiring large amounts of water, may be impacted by water shortages resulting from lower rainfall and warmer temperatures. Heavy users may find greater controls placed on abstraction, potentially reducing process efficiency and output, and increasing costs; and

- Impacts of climate change on the built environment, in particular business premises, will have a significant effect on employee and customer wellbeing.

Key Adaptations

- Build climate adaptation into regular process reviews, and programme any necessary adaptations (for instance to improve water efficiency) into maintenance and upgrade cycles.
- Using shade trees in urban areas limit the heat island effect through shading and evaporative cooling. Their use in new developments, and inclusion in redevelopment or renovation schemes, should be maximised, although ensuring that they will not increase wind-blown damage to buildings, or subsidence;
- Raise awareness of the impacts of climate change, and in particular flooding, on the digital industries and those business sectors heavily reliant on data transmission and storage; and
- Design climate adaptation into all aspects of new developments, particularly bearing in mind the high levels of regeneration within the district.

Public and Voluntary Services

Key Impacts

- Indoor air temperatures are likely to rise in the summer in schools and public buildings, particularly in urban areas, with impacts on indoor air quality also;
- With the expected increase in winter rainfall and extreme rainfall, localised flooding events will become increasingly frequent and intense, impacting buildings as well as social housing residents, housing association, public services and emergency service ability to operate.

Key Adaptations

- A set-aside maintenance and repair budget for school buildings and public service offices, developed through adapting current budgetary mechanisms, would ease the costs of any damage that is incurred as a result of climate impacts. This budget should also be used to upgrade to appropriate guttering and sustainable drainage systems, green roofs, water butts, grey water systems, passive ventilation and shading, and renewable sources of energy; and
- Local authorities and regional bodies should ensure full participation in regional resilience forums and regional flood groups and undertake precautionary as well as adaptive measures.

Infrastructure and Utilities

Key Impacts

- Occasional water deficits in individual surface water reservoirs;
- Increased number of traffic delays caused by increased winter rainfall and wind speeds (and expected extreme wind speeds);
- Increased frequency of flooding from urban drainage and sewer systems in Bradford, especially in winter;
- Increased blockage of drains, culverts and gullies from storm debris;
- Increased slippages in road or rail embankments or cuttings; and
- Mechanical operations within the water distribution grid could be affected by climate-related disruption to power supplies.

Key Adaptations

- Balance water supply from other local sources or from the Yorkshire Grid at times of individual reservoir deficits;
- Weather and travel warnings issued to users of principal roads during forecast storm events. Anticipate increased resource requirements for emergency responses;
- Capital programmes should consider improved sewer and drainage design;
- Review resources and systems for inspecting and clearing drain, culvert and gully blockages;
- Plan to increase resource allocations for inspection and maintenance of embankments and slopes; and
- Increased awareness of inter-dependencies between critical infrastructures, leading to improved resilience planning.

Biodiversity

Key Impacts

- Changes to upland wetland will occur due to the impact of hotter drier summers and warmer wetter winters. The exact effect will depend on local factors and existing pressures. Given that most blanket bog is on flatter moorland there could be more effect from drought which would result in greater separation of habitats. Mobile species are likely to adapt, however other species may not; and
- There may be a loss of upland oak woodland as its climate space is predicted to move northward or to higher altitude. Tree loss is also possible where they become waterlogged and affected by wind.

Key Adaptations

- Wherever possible allow natural processes to continue, and therefore adaptation to change to occur naturally;

- Facilitate an overall expansion in habitat types currently suffering from isolation or fragmentation, to improve habitat permeability. The overall connectivity of existing and newly created habitats needs to be enhanced to enable species to migrate and disperse as easily as possible; and
- Maximise the linkages between different habitats and species to help sustain each other. New habitats may take on functional roles such as buffering natural hazards such as wind, flooding and drought.

Health and Welfare

Key Impacts

- Increasing temperatures resulting in mental and physical health problems as people at home, work and school are unable to stay comfortable. This will be a particular problem in areas of deprivation; and
- Growing number of cases of respiratory illnesses due to more, and more intense, air pollution episodes.

Key Adaptations

- Revitalising urban design to minimise the heat island effect as much as possible. Introducing new building designs, passive temperature control, renewable energy generation and use of green spaces; trees, parks, open spaces and green roofs; and
- Raising awareness, educating and building community resilience to climate change and its likely impacts.
- Targeting vulnerable and BME groups – reducing social and economic inequalities will allow people to more easily adapt to the impacts of climate change.