


# YORKSHIRE AND HUMBER CLIMATE CHANGE ADAPTATION STUDY

## LOCAL AREA REPORT SCARBOROUGH BOROUGH DISTRICT

<p><b>Location</b></p>	
<p><b>Description of District</b></p>	<p>Scarborough is a rural and coastal district. Local industry is mainly tourism and retail. The coastline is Heritage coast and the west borders the North York Moors.</p>
<p><b>Future Climate Projections</b></p>	<p>The results of the modelling carried out for the Yorkshire and Humber Regional Climate Change Adaptation Study suggest that the following changes are likely by 2050:</p> <ul style="list-style-type: none"> <li>• Summer average temperatures are expected to increase by 2.2 °C;</li> <li>• Winter average rainfall will increase by 16%;</li> <li>• Summer average rainfall will decrease by ~23%;</li> <li>• The number of longer dry spells will increase; and</li> <li>• Annual snowfall will reduce by 60%</li> </ul> <p>These figures relate to the nearest modelled cell, which was Scarborough.</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 the Scarborough Borough. 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, do cover other issues relevant to this local authority area.

### Flooding

#### *Key Impacts*

- Increasing potential for tidal flood impacts with rising sea levels and increased storminess;
- Greater flood risk (fluvial, sewer/drainage, and from direct surface runoff) due to faster flood flows from the North York Moors and likely to increase with the increasing seasonality and intensity of rainfall, particularly during the summer months. Increasing impacts on small coastal catchments, such as at Filey;
- Flooding affecting access along key transport routes between coastal towns and affecting the co-ordination of emergency services, business deliveries, residents' access, and the critical council services; and
- Increased risk to highly vulnerable caravan parks and camping sites.

#### *Key Adaptations*

- Ongoing monitoring of natural and man-made sea defences and necessary improvements to ensure protection of coastal communities;
- Improvements to monitoring and flood warning for small flashy catchments to provide increased downstream protection; and
- Develop small-scale flood management techniques and strategies to ensure the continuity of local services and transport; and
- Consider relocation of moveable assets away from areas at risk of flooding and erosion, and steer new development to other areas. Ensure appropriate planning regulation is applied for caravan and camping parks.

### Coastal Erosion

#### *Key Impacts*

- Increased rates of sea cliff recession due to erosion or landsliding caused by rising sea levels and increased winter rainfall, particularly in areas of complex landslides such as Cayton Bay, Flat Cliff, Hunmanby Gap and Reighton Gap.

- Increased movement of sand from beaches, leading to beach lowering and 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 progressively undermining could lead to defence deterioration and ultimately failure;
- Increased overtopping of coastal defence structures due to rising sea levels, particularly along the Scarborough frontage and at Whitby Harbour piers; and
- Increased risk of loss of Blue Flag status of beaches due to reduction in dilution of discharges during lower summer river flows.

### *Key Adaptations*

- Increased rates of coastal erosion and landsliding will require a suite of adaptation approaches to ensure sustainable approaches are adopted. Where existing defences are present, it will be critical to invest in maintenance and periodic capital upgrades. Some assets will require relocation as it will not be sustainable to continue to defend them, or to provide new defences. It is considerably more difficult to relocate 'harder' infrastructure such as properties and roads and in doing so some communities will undoubtedly be severely affected. Due to this the earliest possible discussions regarding longer-term relocation are needed. Long-term monitoring of rates of beach and cliff erosion will also be critically important to inform future management decisions and the timing of appropriate intervention; and
- Increased overtopping will require either defence improvements, such as raising of crest levels or placement of rock at the defence toe, or more formalised management of public access to vulnerable areas 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 is also likely to be a concern;
- Increases in pest and disease spread, together with the potential for '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 this may also 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 and building management as well as 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. New timber species may need to be planted and research should be targeted at identifying suitable species and provenances;
- 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 economy;
- Long-term changes in the tourism industry should be built into visitor management strategies, and the expected future needs and demands of tourists should be built into infrastructure and other regional plans, and longer-term maintenance regimes; and
- Raise awareness of the impacts of climate change among the digital industries and those business sectors heavily reliant on data transmission and storage. In tandem, ensure that networks and transmission infrastructure are adequately designed.

## **Public and Voluntary Services**

### *Key Impacts*

- With the North York Moors National Park within the council area, heightened summer temperatures and drier soil conditions could see a noticeable increase in upland and moorland fires;
- 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 coastal facilities; and
- With the expected increase in winter rainfall and extreme rainfall, flooding events will become increasingly frequent and intense, impacting on social housing residents, housing association, public services and emergency services' ability to operate.

### *Key Adaptations*

- Emergency planning will need well developed communication links with the Armed Forces Units to prepare for resourcing when required; and

- Future coastal erosion and maintenance of coastal defences should be considered when planning for future facilities, including for example for waste management; and
- Review built assets and resource availability and location to ensure resilience to future demands.

## Infrastructure and Utilities

### *Key Impacts*

- Surface melt of rural road surfaces and associated knock-on effects, such as disruption to travel and welfare provision;
- Increased frequency of flooding from urban drainage and sewer systems in Filey, Scarborough and Whitby, especially in winter;
- Increased demand on water resources, particularly from agriculture;
- Increased tourist and recreational use of North York Moors National Park and coast, including increased pressure on rural road networks;
- Increased blockage of drains, culverts and gullies;
- Increased risk of coastal erosion leading to loss of rail line at Filey and roads at Sandsend and Filey to Scarborough;
- Increased overtopping of sea defences and piers, leading to safety issues and structural damage; and
- Mechanical operations within the water distribution grid could be affected by climate-related disruption to power supplies.

### *Key Adaptations*

- Allow additional resources for use of alternative road surfacing materials in carriageway maintenance programs to ensure higher melt thresholds;
- Capital programs should consider improved sewer and drainage design capacity;
- 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 gulley blockages;
- Plan now for longer-term realignment of sections of rail and road near the coastal margin;
- Improved coastal defence performance through capital upgrades and ongoing maintenance throughout the design life; and
- Increased awareness of inter-dependencies between critical infrastructures, leading to improved resilience planning.

## Biodiversity

### *Key Impacts*

- There has been a spread of invasive species including rhododendron and Himalayan Balsam in wet and acid woodland and increased drought conditions combined with land drainage accelerates this threat to the status of wet woodland;
- Changes in sea level will alter those habitats which have adapted to a saline influence such as woodland located near Whitby. There may be a spread in saline adapted species depending upon their ability to disperse with sea level rise and changes on coastal hydrology associated with impacts on soils and water flow;
- Calcareous grassland which is a rare habitat could face increasing pressure to change as a result of the acidification of soils due to enhanced rainfall and drying impacts in summer months; and
- Mesotrophic lakes will become more susceptible to changes in water quality. Hot dry summers are expected to result in a lowering of water level and decreased dilution. This alongside enhanced erosion resulting from increased winter rainfall will enhance eutrophication and sediment and nutrient loading in these lakes.

### *Key Adaptations*

- Wherever possible allow natural processes to continue, and therefore adaptation to change to occur naturally;
- 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;
- Integration of biodiversity with coastal planning to ensure a joined up approach building on interdependences; and
- Maximise the potential for 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*

- 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 flooding due to increased storminess and rising sea levels.

*Key Adaptations*

- Building and enhancing networks of support and healthcare services to cater for an increasingly elderly population, and raising awareness about climate change impacts, educating and building community resilience; and
- Uphold limitations on further development in areas liable to coastal erosion or coastal flooding.