



# Harrogate Borough Council Climate Change Comprehensive Risk Assessment, 2011



<b>Contents</b>	<b>Page</b>
1. Executive Summary	2
2. Methodology	2
3. Key risks to Harrogate Borough from a changing climate	3
4. LCLIP Evidence for Harrogate Borough	3
5. UKCP09 predictions for Harrogate Borough	4
6. Summary of key risks to Harrogate Borough Council from a changing Climate	4
7. Harrogate Borough Council Service Based Comprehensive Risk Assessment	7
8. Harrogate Borough Council Climate Adaptation Action Plan	10
9. Conclusion	14
Appendix 1 – Detailed Methodology	14
Appendix 2 – Acknowledgements	15

HBC = Harrogate Borough Council

## **1. Executive Summary**

Services throughout Harrogate Borough Council will be affected in the future by episodes of weather extremes and the Regional Improvement and Efficiency Partnership (RIEP) funded two local government officers to come into North Yorkshire Authorities to interview key council department representatives to understand what can be done at a service level to adapt each individual Local Authority against future disruption which will cost time and money.

A weather extreme assessment examining the past five years was carried in 2010 by AECOM to understand past weather extreme events in Harrogate. This report indicates that the majority of impacts in Harrogate borough are caused by excessive rainfall (45%) and snow and blizzards (41%).

Extreme weather events in Harrogate borough have impacts on service delivery and affect different services in both positive and negative ways. The challenge now is to proactively work to find solutions to enable services to run continually throughout the year and overall to consider climate change adaptation in the decision making process.

During the interview process several positive actions were generated by the individual services, which indicate how Harrogate Borough Council can progress the extreme weather adaptation agenda in the future to reduce the risk on business continuity and the time and cost constraints associated with a reduced or postponed service.

### **Disclaimer**

All information and content provided in this report has been collected from service representatives of Harrogate Borough Council as part of the RIEP funded work. All actions/ risks stated in the action plan were suggested by the service representative and are written only as a guide or suggestions of the types of actions that could be taken and therefore no liability is held with the author/s of this report.

## **2. Methodology**

The sustainability officers group for York and North Yorkshire has drawn on RIEP funding to employ two climate risk assessment project offices to undertake climate risk assessment work in the local authorities of York and North Yorkshire. The major risks and suggested actions required to address the risks have been assessed from interviews and discussions with Council staff across its key services whilst giving regard to the predicted future climatic conditions.

Interviews were conducted with representatives of key council departments that delivered services or that managed areas which were likely to be impacted by climate change. The officers were reminded of the key conclusion of the Local Climate Impact Profile (LCLIP) which showed the current vulnerability – see below.

The officers were taken through the likely changes in climate as identified from the regional climate change study and the United Kingdom Climate Impacts Programme (UKCIP) model - known as UKCP09 - highlighted in Table 1 below. Discussions took place on the likely impacts on their services and work.

<b>Future Climatic condition</b>	<b>2020</b>	<b>2050</b>	<b>2080</b>
Increased summer temperature	+ 1.3°C	+ 2.3°C	+ 3.3°C
Decreased summer rainfall	- 8%	- 19%	- 23%
Increased winter temperature	+ 1.3°C	+ 1.9°C	+ 2.9°C
Increased winter rainfall	+ 4%	+ 11%	+ 15%
Increased storminess	Increase overtime		
Increased rainfall intensity	Increase overtime		
Rising sea level	22cm by 2050, 36cm by 2080*		

Table 1. Predicted climate change.

Source: Weathering the storm: Yorkshire and Humber regional adaptation study, 2009. \* UKClimate Change Projections 2009.

For each service area, the key risks were identified and the actions needed to deal with these risks were recorded. These might be changes to service plans, gathering further evidence or better working with partners. The facilitator used the comments on the likelihood and severity of the impact on their services and budget to rank the risk according to the methodology as listed below. The risks and actions were those identified by those officers being interviewed or provided in workshops. The detailed methodology used on the day can be seen at Appendix 1 below.

### **3. Key risks to Harrogate Borough from a changing climate**

Key climate change risks are drawn from the previously produced LCLIP and from the UKCP09 predictions.

### **4. LCLIP Evidence for Harrogate Borough**

The media database indicates that the majority of impacts are caused by excessive rainfall (45%) and snow and blizzards (41%). No events regarding drought or heatwaves and high temperatures were recorded. It has been the smaller communities and rural areas which have suffered the majority of weather extreme impacts over the past six years.

Excessive rainfall leading to flooding has caused the greatest impact to Harrogate Borough with flooding events being recorded in each of the last five years. The June 2007 floods in Harrogate were some of the most severe events that have occurred in the county. Flooding in December 2009 which was centred on Knaresborough resulted in damage to infrastructure (including power failure) and significantly increased the risk of injury.

Landslips on the A59 near Blubberhouse in 2007 and 2008 resulted in the road becoming closed for several weeks, affecting local businesses and requiring significant investment in road improvement works. Ripon suffered the most impacts at a single location, primarily due to the flooding events during June 2007.

Snows and blizzards account for 64% of recorded impacts in Knaresborough leading to impacts on the transport network and reductions in Council services. Harrogate is also affected most by snow and blizzards, with reductions to services occurring almost annually.

Storms and high winds result in localised incidents of medium severity. High winds, reaching 120mph caused damage across the Borough in 2005.

In general, weather events cause a reduction in the availability of Council services, they affect the transport network and cause damage to buildings and increase the risk of injury and death. Of the services provided for by the Borough Council, the Leisure & Culture Service suffered the most impacts, followed by the refuse collection service.

## 5. UKCP09 Predictions for Harrogate borough

UKCIP conducted a piece of work in 2009 to project how the climate may change in 2020, 2050 and 2080 and below shows how this work projects how the weather could change over the next 70 years in Harrogate district.

### 2020 Yorkshire and Humber Climate Projections

The estimate of increase in **winter mean temperature** is 1.3°C.

The estimate of increase in **summer mean temperature** is between 1.3 - 1.4°C.

The estimate of increase in **summer mean daily maximum temperature** is 1.7 - 1.8°C.

The estimate of increase in **summer mean daily minimum temperature** is 1.5°C.

The estimate of change in **winter mean precipitation** is 5%.

The estimate of change in **summer mean precipitation** is 6% - 5%.

### 2050 Yorkshire and Humber Climate Projections

The estimate of increase in **winter mean temperature** is 1.9°C - 2.5°C.

The estimate of increase in **summer mean temperature** is 2.2°C - 2.6°C.

The estimate of increase in **summer mean daily maximum temperature** is 2.9°C - 3.5°C.

The estimate of increase in **summer mean daily minimum temperature** is 2.4°C - 2.9°C.

The estimate of change in **winter mean precipitation** is 9% - 12%.

The estimate of change in **summer mean precipitation** is -15% -18%.

### 2080 Yorkshire and Humber Climate Projections

The estimate of increase in **winter mean temperature** is 2.5°C - 3.6°C.

The estimate of increase in **summer mean temperature** is 2.5°C - 4.2°C.

The estimate of increase in **summer mean daily maximum temperature** is 3.4°C - 5.6°C.

The estimate of increase in **summer mean daily minimum temperature** is 2.8°C - 4.7°C.

The estimate of change in **winter mean precipitation** is 12% - 20%.

The estimate of change in **summer mean precipitation** is -17% -28%.

## 6. Summary of key risks to Harrogate Borough Council from a changing climate

Regional and local climate data has been collated to provide likely scenarios for key services (receptors) and is presented in table 2 below.

Severity and likelihood of incidents was scored by service representatives during the interviews and workshops and these have been multiplied to give the colour-coded level of risk. The table gives the service type, the likely impact and consequences of future climatic conditions and a risk rating for now, 2020, 2040 and 2080.

The risk of negative issues is quantified as follows:

1-9 = low (green)

10-15 = medium (amber)

16-25 = high (red)

The opportunity for positive outcomes is indicated as follows:  
Pale blue indicates a low level of opportunity  
Dark blue indicates a high level of opportunity.

RECEPTOR	FUTURE CLIMATIC CONDITION	IMPACT	CONSEQUENCE	level of risk = severity x likelihood			
				Now	2020	2040	2080
Built Infrastructure - all types of property	Increased winter rainfall	Flooding	buildings on low-lying areas at risk of flooding, increased property damage, threat to properties unaware of being in a flood risk zone due to surface water flooding	8	12	20	25
Transport	Increased winter rainfall	Flooding	Serious flooding of highway network leading to road closure and impacts accessibility for service delivery	8	12	20	25
Natural Environment	Hotter/Drier summers and increased rainfall intensity	Summer flash Flooding	Unpredictability of flood zones due to localised weather events leading to disruptions in service delivery.	4	9	12	20
Built Infrastructure - all types of property	Increased summer temperatures	Overheating	Reduced comfort in buildings for occupants - increased need for climate controlled environments. Impacts on the health, safety and wellbeing of the	6	9	16	20

			workforce and residents.				
Tourism and Economic Development	Increased winter rainfall, Increased rainfall intensity, increased storminess	Winter and summer flooding, storms	Loss of key outdoor events and attraction to the area.	4	9	16	25
Tourism	Increased summer temperature, increased winter temperature, decreased summer rainfall	Longer tourist season	Increased number of tourists leading to potential income opportunities for businesses.	1	4	9	16
Road network	Increased summer temperature/ decreased summer rainfall	Heatwaves - increased risk of melting road surfaces and damaged road structures	Restrictions to the road network and vehicle usage.	15	15	25	25

Table 2. Key risks to Harrogate Borough Council from a changing climate.



## **7. Harrogate Borough Council Service Based Comprehensive Risk Assessment and Action Plan**

Service representatives were interviewed in 2011 using the methodology given in appendix 1. The following are the findings of this work and include descriptions of climate adaptation work already being undertaken and suggested actions which have gone forward into the action plan (Table 3).

### Emergency Planning Team

Plans are in place within Harrogate Borough Council to cover all aspects of extreme weather.

Flooding in Harrogate has occurred at frequent intervals over the past few years and occurs across the seasons. An annual exercise is carried out through the multi agency flood plan to discuss a proactive approach to tackling flooding. The emergency planning team uses a hazard manager and river level flows to assist with distributing resources and reacting to need. Harrogate has just employed a community resilience officer to work in North Yorkshire and East Riding to complete Parish Flood Plans. Community plans have been started in Harrogate and resources have been used to purchase flood defence equipment in certain localities.

Snow and ice cause the most problems to Harrogate from an Emergency Planning perspective and during past episodes of extreme cold and snow regular meetings are set up by the team to continually review the situation and react to need and service demands.

### Actions

- Increase preparedness and awareness-raising of weather extreme in communities.
- Annually check rest centres for energy and water availability and whether they are prone to weather extremes (located in flood plains, risk of frozen pipes, etc)

### Arboriculture Service

This service is proactive towards climate change adaptation, but this turns to a reactive approach in extreme circumstances.

The service surveys trees on a five year cycle unless the survey states an earlier date. Tree disease is included in the survey and a risk assessment is carried out as to the trees future. Tree diseases are a national problem but Harrogate monitors the situation constantly. Draught and waterlogging cause problems to this service, due to limited access to land and the reduced growth during these periods. This is because the service is suspended in certain times of year due to demands of other services like gritting in snowy conditions.

### Actions

- Consider where viable, planting trees in areas to slow the flow of water to watercourses.
- Consider building salt defences/ protection to protect prone trees and vegetation from winter gritting.
- Consider climate change adaptation when purchasing new vehicles.
- Future proof landscaping by planting species of plant that are best adapted to likely future climatic conditions, such as drought resistant species. Investigate and implement techniques to water current planting schemes in drought periods.

### Parks Service

Warmer, wetter summers have caused a staffing problem to this service as some staff are on summer contracts which do not cover an extended growing season. Parks also has an issue with waterlogged land when staff manage grassland areas. This is especially difficult on land that is rented out for events or sporting/ leisure activities as it can damage the state of the ground for months afterwards.

Parks service has a licence to abstract water from a bore hole to water plants throughout the year, but this is not a sustainable and is not a reliable supply of water as it has dried up in some years.

Parks service work on winter gritting duties and these are priorities during wintry/ icy periods. Employees can access their work locations during the winter periods.

Weather extremes cause more damage to the play area infrastructure and cost the Council to maintain them to a safe standard.

The market service suffers in the winter periods, but generally there is a good turnout throughout the year.

#### Actions

- Review bedding plant planting schemes and recommend appropriate species and varieties for the likely future climate.
- Investigate and provide alternative water supply in times of draught or bore hole abstraction failure.
- Deliver a comprehensive training programme on winter driving to gritter drivers.
- Prepare and deliver a tool box talk covering weather extreme issues such as heat stress, dehydration etc.
- Develop and implement techniques which protect land used for events, so that event sites are sustainable.

#### Economic Development Team

Economic Development supports business growth in Harrogate which includes efforts to combat flooding and weather extremes and ensuring market trading can go ahead. Most weather extreme enquiries are signposted to other organisations or services within Harrogate Borough Council.

Businesses are very reluctant to look at business risks associated with extreme weather as it is low priority and the businesses have the day to day running to complete.

Improved communication networks have, in recent years, reduced risk to businesses as home working is now possible from some areas of North Yorkshire.

#### Actions

- Raise awareness and promote the importance of climate change adaptation to businesses in the borough, through working with key contacts.

#### Nidderdale Area of Outstanding Natural Beauty Team

Currently the AONB is undertaking adaptation work. For example, flood reduction through planting trees, which slows the flow of runoff. The AONB is also involved in a peat conservation project to reduce the amount of surface runoff by blocking moorland drainage channels (known as grips) and by managing the risk of moorland fires.

The character of the AONB will significantly change if the 2080 UKCP09 projections are accurate – as they will lead to changes in habitat and species composition.

During extreme cold periods all work in the AONB is suspended due to the weather conditions and most officers either work from home or at the office instead of conducting field visits etc.

One likely impact of more favourable weather is the increase in visitor pressure on the AONB, which will lead to issues of congestion and erosion of some rights of way.

#### Actions

- Add heat stress, de-hydration and other extreme weather concerns to the lone working policy.
- Manage congestion and erosion to the Public Rights of Way network in the AONB.

### Facilities Management

Currently looking at re-locating and consolidating teams and services into other buildings in the Borough.

During the winter of 2010/11 extreme cold temperate caused damage to public toilets in the Borough.

### Actions

- Include climate change adaptation to the Service's asset management survey/ assessment and the accommodation strategy.
- Implement long-term solutions to burst pipes in public toilets.
- Where viable, future proof buildings against adverse climatic conditions.

### Policy Team

Policy staff have been trained by the emergency planning team to act as incident room operatives during times of crisis.

The media team is proactive during weather extremes, disseminating accurate information to people via local radio and press, and advising council services how to manage certain situations.

Policy staff administer and control the different tiers of the risk register within Harrogate Borough Council.

### Actions

- Include climate change adaptation as a risk in the Environmental department's risk register to reduce the corporate risk to all services in future weather extremes.

### Planning Service

The Heritage planning team is currently producing guidance on adapting to climate change. Climate Change is considered as part of the Local Development Framework (LDF) core strategy through issues including settlement hierarchy, reducing the need to travel and flood mapping. The spread of settlements is assessed on a site by site basis as setting a development in a certain location may cause flooding. Guidance notes will be produced for each site, identifying what a developer needs to do to obtain planning consent.

The planning team is currently writing guidance on land drainage and surface water runoff, including advice on sustainable urban drainage schemes (SUDS).

### Actions

- Include climate change guidance in the LDF.
- Write and disseminate guidance on SUDS.

### Waste, Recycling, Pest Control and Street Cleansing Services

Harrogate is currently rolling out a domestic, alternate week collection scheme.

During the snow and ice in 2010/11 two days were missed due to weather conditions. The drivers are responsible for deciding if a road/route is accessible or not.

Pest numbers are likely to be higher in the future, based on the projected climatic changes. Issues include pests such as rats and cockroaches breeding prolifically in warm conditions and pests not being killed off in mild winters.

### Actions

- Ensure assessing icy road condition is included in the workforces training plan.
- Conduct tool box talks on heat stress, dehydration and other issues related to extreme weather conditions.
- Consider climate change adaptation when purchasing vehicles.

### Housing wardens

In wintery conditions all services in housing are affected, including ambulances not getting to their destinations. All wardens have lone working arrangements and are able to attend residencies throughout the winter period as they are familiar with the local surroundings.

### Actions

- Provide training for wardens on driving in extreme weather conditions.

### Housing Maintenance

The cold winter conditions of the past few years have impacted on this service area quite severely in terms of freezing of pipes and damage to the plumbing infrastructure. Colleagues grit priority housing schemes during wintry conditions.

### Actions

- Check all council house/ residency addresses on the Environment Agency website to identify if any are vulnerable to flooding.
- Promote tips on extreme weather in the Council or other appropriate newsletters, e.g.: turning off stop taps when going away in the winter period.
- Update the stock management program by adding in required climate adaptations and adding comments regarding how extreme weather conditions impact on property.
- Put up signs in housing schemes warning vehicle users of un-gritted surfaces, to reduce liability of private car claims for damage to private vehicles.

### Environmental Protection Team

This service provides help and advice to residents of the borough that have been flooded including how to deal with the aftermath of owning a flooded dwelling.

A flood pack was sent out to residents in flooded areas but this now needs reviewing as it four years old.

In snow and icy conditions the advice is not to travel unless essential for staff to visit a site, so they use other communications media to continue the service. Environmental Health is currently piloting the home working scheme.

During excessive warm periods complaints increase and the food safety officers provide advice to food premises on storing food.

### Actions

- Review the residential flood pack.
- Train staff how to drive in snow conditions if they are likely to need to drive during extreme winter weather conditions.
- Provide understanding on weather extremes via team meetings.
- During hot periods give advice to clients on heat stress in the work environment.

## 8. Harrogate Borough Council Climate Adaptation Action Plan

The actions from the interviews have been tabulated to give a 2011 climate adaptation action plan (Table 3).

Table 3 – Harrogate BC Climate Adaptation Action Plan 2011

ID	Action	Service	Action Plan	Service Plan	Risk Register
1	Increase preparedness and awareness-raising of weather extremes in communities.	Emergency Planning	X		
2	Annually check rest centres for energy and water availability and whether they are prone to weather extremes (located in flood plains, risk of frozen pipes, etc).	Emergency Planning	X		
3	Consider where viable, planting trees in areas to slow the flow of water to watercourses.	Arborist	X		
4	Consider building salt defences/ protection to protect prone trees and vegetation from winter gritting.	Arborist	X		
5	Consider climate change adaptation when purchasing new vehicles.	Arborist	X		
6	Future proof landscaping by planting species of plant that are best adapted to likely future climatic conditions, such as drought resistant species. Investigate and implement techniques to water current planting schemes in drought periods.	Arborist	X		
7	Review bedding plant planting schemes and recommend appropriate species and varieties for the likely future climate.	Parks	X		
8	Investigate and provide alternative water supply in times of draught or bore hole abstraction failure.	Parks	X		

9	Deliver a comprehensive training programme on winter driving to gritter drivers.	Parks		X	
10	Prepare and deliver a tool box talk covering weather extreme issues such as heat stress, dehydration etc.	Parks		X	
11	Develop and implement techniques which protect land used for events, so that event sites are sustainable.	Parks	X		
12	Raise awareness and promote the importance of climate change adaptation to businesses in the borough, through working with key contacts.	Economic Development	X		
13	Add heat stress, dehydration and other extreme weather risks to the lone working policy.	Nidderdale AONB	X		
14	Manage congestion and erosion to the Public Rights of Way network in the AONB.	Nidderdale AONB	X		
15	Include climate change adaptation to the Service's asset management survey/assessment and the accommodation strategy.	Facilities Management	X		
16	Implement long-term solutions to burst pipes in public toilets.	Facilities Management			X
17	Where viable future proof buildings against adverse climatic conditions.	Facilities Management	X		
18	Include climate change adaptation as a risk in the Environmental departmental risk register to reduce the Corporate risk to all services in future weather extremes.	Policy			X

19	Include climate change guidance in the LDF.	Planning	X		
20	Write and disseminate guidance on SUDS.	Planning	X		
21	Ensure assessing icy road condition is included in the workforces training plan.	Waste, Recycling, Pest Control and Street Cleansing	X		
22	Conduct tool box talks on heat stress, dehydration and other issues related to extreme weather conditions.	Waste, Recycling, Pest Control and Street Cleansing	X		
23	Consider climate change adaptation when purchasing vehicles.	Waste, Recycling, Pest Control and Street Cleansing	X		
24	Provide training for wardens on driving in extreme weather conditions	Housing Wardens	X		
25	Check all council house/residency addresses on the Environment Agency website to identify if any are vulnerable to flooding.	Housing Maintenance			X
26	Promote tips on extreme weather in the Council or other appropriate newsletters, e.g.: turning off stop taps when going away in the winter period.	Housing Maintenance	X		
27	Update the stock management program by adding in required climate adaptations and adding comments regarding how extreme weather conditions impact on property.	Housing Maintenance		X	
28	Put up signs in housing schemes warning vehicle users of un-gritted surfaces, to reduce liability of private car claims for damage to private vehicles.	Housing Maintenance		X	
29	Review the residential flood pack.	Environmental Health	X		

30	Train staff how to drive in snow conditions if they are likely to need to drive during extreme winter weather conditions.	Environmental Health	X		
31	Provide understanding on weather extremes via team meetings.	Environmental Health	X		
32	During hot periods give advice to clients on heat stress in the work environment.	Environmental Health	X		

### 9. Conclusion

This piece of work was funded by RIEP and the intention is for the Harrogate BC sustainable development officer to work across the service areas to implement the results and in particular the action plan. Action at an early stage is likely to save considerable resources in the future as the climate changes and climate adaptation measures are needed.



## APPENDIX 1 – Detailed Methodology

The risk assessment was conducted by meeting with individuals or groups of staff in the Council and following the method and questions outlined below.

### Key activities at risk:

Please consider the key activities that your service/work area currently have responsibility for and consider the major impacts that a changing climate might have on your work. A matrix has already been partly completed by pulling out actions from a similar exercise in West Yorkshire and based on the work City of York Council did at the Tackling Climate event in 2009 and through the local impact assessment for York 2010.

### Future climatic conditions affecting activities:

Please use the menu below to select the individual climatic condition relevant to the chosen activity. Table 4 below outlines these future climatic conditions:

<b>Future Climatic condition</b>	<b>2020</b>	<b>2050</b>	<b>2080</b>
Increased summer temperature	+ 1.3°C	+ 2.3°C	+ 3.3°C
Decreased summer rainfall	- 8%	- 19%	- 23%
Increased winter temperature	+ 1.3°C	+ 1.9°C	+ 2.9°C
Increased winter rainfall	+ 4%	+ 11%	+ 15%
Increased storminess	Increase overtime		
Increased rainfall intensity	Increase overtime		

Table 4. Future climatic conditions. Source: Weathering the storm: Yorkshire and Humber regional adaptation study, 2009

### Impact:

Please list the key impacts that the different climatic conditions (above) would have on the activities e.g. flooding or heatwave.

### Consequence:

What are the results of the impacts? Who or what is impacted? Please list positive & negative consequences e.g.: Increased tourism (+) or road closed (-). If the consequence is positive, then highlight in blue.

### How severe is the impact:

Please rank using the following scores:

- 1 = Insignificant
- 2 = Minor
- 3 = Moderate
- 4 = Major
- 5 = Catastrophic

### How likely is the risk:

Please rank using the following scores:

- 1 = Low
- 2 = Fairly low
- 3 = Medium
- 4 = Fairly high
- 5 = High

### Level of risk:

This is an automatic calculation (severity x likelihood = risk).

We have followed normal risks assessment protocol by selected scores of:

1-9 to be green  
10-15 to be amber  
16+ to be red

Taking each red risk

Please list any actions that are currently in place or will soon be out in place to address the risk. If there are none, please propose what would be necessary to deal with the risk. Each action should be colour-coded to represent whether the action is needed, planned or done.

Red = needed

Amber = planned

Green = done

Cost of action

Score low, medium or high. Monetary values were not used as the cost will be relative to each service or sector and should not be used as a comparable measure.

## APPENDIX 2 – Acknowledgements

RIEP would like to thank the following individuals and organisations in their support in the creation of this document;

West Yorkshire Comprehensive Risk Assessment  
East Midlands Comprehensive Risk Assessment

Harrogate Borough Council

<b>Job Title</b>
Emergency Planning Officer
Arboriculture Officer
Parks Development Manager
Economic Development Officer (Business Development)
AONB Officer
Chief Facilities Manager
Corporate Improvement Officer (Governance)
Chief Planner (Forward Planning)
Technical Manager
Warden Services Manager
Property Services Manager Neighbourhood Services Manager
Environmental Protection Manager