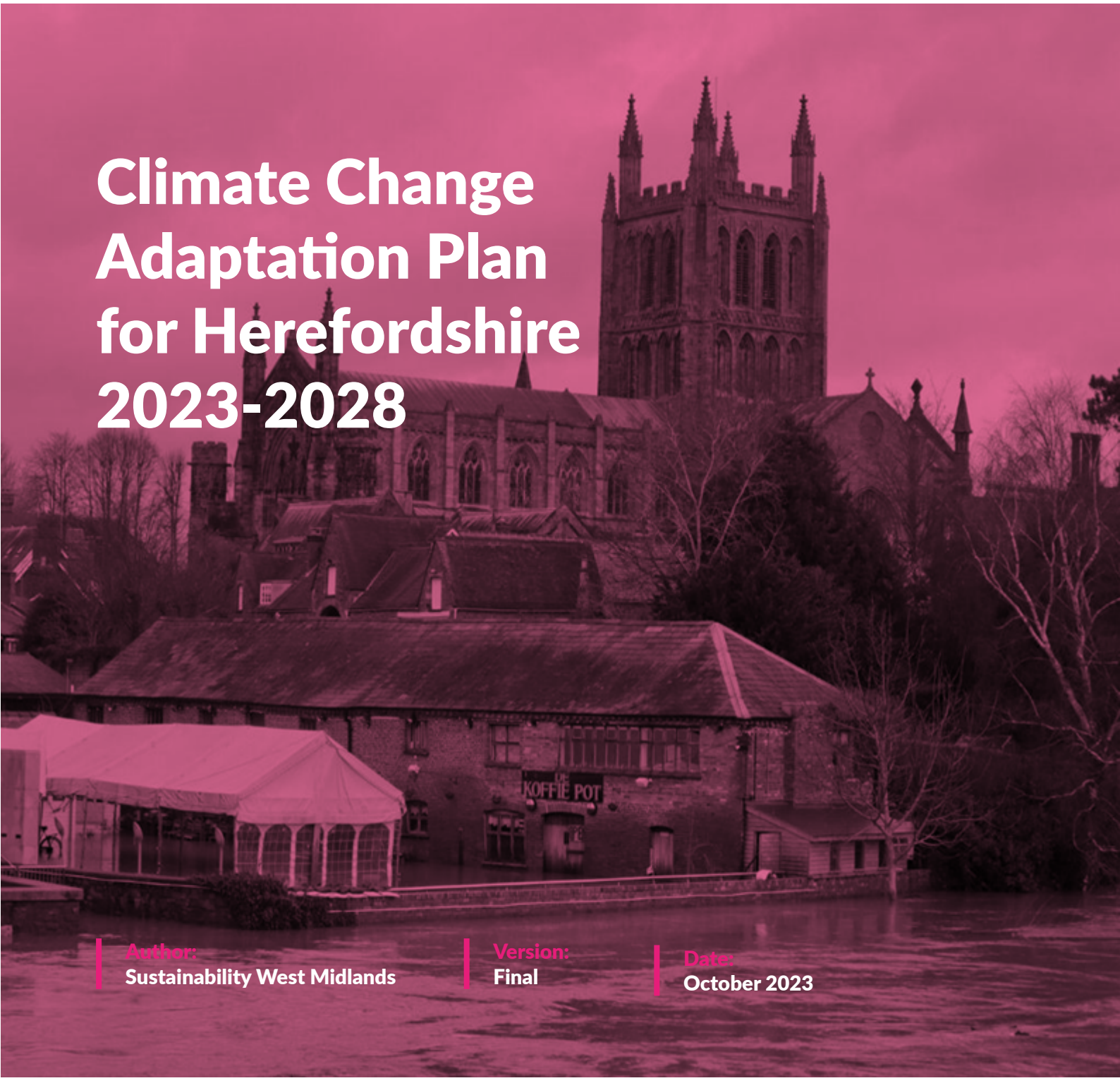
Produced for:
Herefordshire Council

Climate Change Adaptation Plan for Herefordshire 2023-2028



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Report information

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About Sustainability West Midlands

Sustainability West Midlands (SWM) was established in 2002 as an independent, not-for-profit company and is the sustainability adviser for the leaders of the West Midlands.

Our vision is that the West Midlands is leading in contributing to the national target of net zero greenhouse gas emissions by 2050 whilst addressing health inequality and driving inclusive growth. We monitor the West Midlands Sustainability 2030 Roadmap which acts as a framework that all organisations based or operating in the region can use to help them make changes to their activities in the knowledge that they will contribute to wider regional ambition.

SWM's support our members and other local stakeholders in the public, private and third sectors to implement these changes by enabling them to demonstrate innovation and leadership and provide opportunities to collaborate and celebrate success.

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Above: Swollen River Wye at Victoria Bridge, Hereford © Herefordshire Council
Front cover image: Flooding in the centre of Hereford © Herefordshire Council

Foreword by Herefordshire Council

“Intelligence is the ability to adapt to change.” – Stephen Hawking.

We know that the climate on Planet Earth is changing.

Global effort needs to be put into mitigation to reduce the scale of change to one that is manageable for future generations. However, mitigation is not adaptation. Mitigation is the actions taken to reduce or prevent an outcome; adaptation is the actions taken to cope with an outcome.

Herefordshire Council took an early lead in mitigation and has reduced its carbon footprint by around 60% since 2008. Work is continuing to achieve the target of net zero by 2030 enshrined in the climate and ecological emergency declaration made by the council in 2019 and reaffirmed in 2023.

This strategy is the first to define the adaptation measures that will have to be developed to build resilience to the impacts of climate change.

In Herefordshire, we have already seen record breaking rainfall and flooding. Of the 14 flood events where the river exceeded five metres in Hereford, eight were between 1945 and 2019 (a return period of nine-and-a-half years) and six have occurred since October 2019 (a return period of six months).

We have also had extended periods of drought where the agricultural sector has struggled and the impact on our local ecosystems has been no less severe.

We have seen how climate change impacts human health, the natural world, the economy and society. This action plan identifies what we need to do over the next five years to develop our adaptive capacity and build resilience with our residents, communities and businesses to help protect each other from the worst of these impacts.

As we always do in Herefordshire, we will need to reach out and work with the parishes to help them to support their communities, we will need to take a highly collaborative approach and work with partners and stakeholders to identify and adapt to risk. The answer will not lie with one organisation but with a million small things done by individuals and groups. If we pull together we are less likely to fall apart.

This county Adaptation Strategy is the commitment of Herefordshire Council and partners to tackle the urgent threat of impacts from the climate crisis, and to promote adaptation to extreme weather events, creating resilient communities ready for the future.

We have significant challenges ahead. This agenda must be at the heart of local authority decision making and is also key to our external partners’ policies and projects.

Councillor Elissa Swinglehurst,
Cabinet Member for the Environment and Deputy Leader of Herefordshire Council.

Summary of very high priority actions

This document sets out the climate change adaptation actions that should be considered for implementation by decision makers in Herefordshire, to ensure that the county's natural environment, people, infrastructure, buildings and businesses are prepared for the impacts of climate change, including greater incidence and severity of flooding, a higher likelihood of water scarcity and more intense and prolonged heatwaves. Following research and engagement with key stakeholders, the following list summarises those actions that are deemed a 'very high' priority for implementation. We recommend that some of these, based on the stakeholder engagement and gaps in progress, should be actioned/ commenced with some immediacy, as indicated. Other actions that are deemed 'high' or 'medium' in priority are discussed in the main Action Plan, Section 5.

Governance, reporting and monitoring

- **(Immediate action)** Recruit and employ at least one Climate Change Adaptation Officer role embedded within the Sustainability and Climate Change Team at Herefordshire Council (HC). This role can help to aid the effective delivery of the Herefordshire Climate Adaptation Working Group (see below).
- **(Immediate action)** Set up a Herefordshire Climate Adaptation Working Group, and/or ensure adaptation is fully integrated into existing boards/groups, to help drive forward some of these actions and lobby national and local funders and policymakers to ensure adaptation to climate change is at the heart of all activities. This should include those reporting under the Adaptation Reporting Power (ARP), such as Network Rail and National Highways.
- Through the Working Group and/or its subgroups, facilitate potential partnerships and/or funding sources to take forward projects across the county and research innovative approaches to adaptation financing.
- **(Immediate action)** Run an engagement programme and advice sessions for public and private sector organisations to help them develop their own climate risk assessments and adaptation plans. Ascertain whether support packages announced in the third National Adaptation Programme (NAP3) could help with this.
- Develop an awareness campaign and set of legacy resources that are specifically targeted at officers, Cabinet Members and Councillors across the county to engage them in the climate adaptation agenda. Given political changes occur regularly, these must be transferable from one administration to the next and provide the 'business case' for adaptation.
- **(Immediate action)** Embed climate adaptation into a range of strategies and plans being produced by council departments/ external partners. Some examples are included in separate actions in the main Plan (Section 5, e.g. Local Nature Recovery Strategies (LNRS), planning) but others could include council and external Net Zero Plans, Health & Wellbeing Strategies, Highways Maintenance Plans, Schools Capital Investment Strategy, Water Resources Plans, and so on.
- Collate a list of data sources and contacts that can be used to monitor the impact that severe weather events have on the council/ county. Investigate use of the Severe Weather Impacts Monitoring System (SWIMS) tool to make this process easier.
- **(Immediate action)** Update this Plan annually to ensure actions are kept relevant and set up a monitoring process to ensure actions are being delivered with success measures identified. One

of the first actions that HC should undertake is the development of a monitoring system that goes alongside this Plan to track progress.

Natural environment and assets

- Ensure that climate change adaptation forms a key part of the emerging LNRS for Herefordshire, and embedded into any other biodiversity/ ecological focused strategy. This should include consideration of the role of Biodiversity Net Gain and Environmental Net Gain and the role that the re-introduction of keystone species can have on (e.g.) water management.

- Ensure that engagement takes place with organisations leading on wider catchment-based schemes, e.g. the River Severn Partnership, to ensure that activities taking place in nearby counties or tributaries consider the impact on Herefordshire.

Flooded fields in Herefordshire © Herefordshire Council

- Lobby for, apply to and, if possible, establish long-term funding options for natural environment restoration programmes (such as those examples listed above) that will result in a more joined up approach to projects and where county-wide partners can work collaboratively. Utilise existing public and private funding options that currently focus on other areas, e.g. carbon, catchment and nature markets to integrate adaptation activity where feasible. Ensure that funding conditions include evidence that projects will include climate adaptation measures.

- Capitalise on the rollout of local tree-planting programmes by ensuring that all schemes contribute to climate adaptation objectives, e.g. that they help to reduce flood risk, contribute to urban cooling etc, continuing to adhere to the 'right tree, right place' concept. Utilise the Forestry Commission's Woodland Creation Offer, where climate resilience is a key objective, and consult the 'Managing England's woodlands in a climate emergency' publication to support informed decisions on projects.

- (Immediate action) Continue the implementation of Nature Based Solutions and Natural Flood Management (NFM) projects (such as floodplain woodlands, river restoration projects etc.) in areas where they would be of most benefit. Continue to learn lessons from previous successes (e.g. NFM pilot project, Yazor Brooks restoration project), and ensure all partners are engaged in scoping and that projects are logged on relevant databases.

- Build on existing work and use existing evidence, research, surveys and mapping to identify which of Herefordshire's habitats, species and crops could be most at risk of the negative impacts of new pests, pathogens or invasive, non-native species which are more likely to establish themselves as a result of climate change. If possible, obtain data from the Forestry Commission's TreeAlert system to aid this identification.

- Alongside the above, set up community-led groups who routinely monitor the areas identified as potentially being most vulnerable to pests and diseases and utilise the TreeAlert system for more systematic logging of observed impacts.
- **(Immediate action)** Possibly as part of the Wye Adapt to Climate Change Programme, undertake detailed modelling of rivers and catchments in Herefordshire to determine their likely behaviour against a range of future climate scenarios, including the influence of sea level rise, to obtain a clearer picture of future water management practices that may need to take place to reduce both flood and drought impacts.

Infrastructure

- Undertake an assessment/ mapping exercise on the local road network (i.e. those not managed by National Highways) to determine which are most likely to be at risk from failing in future climatic conditions. This should include areas most vulnerable to flood risk, slope failure, drainage pressure and damage caused by storms or overheating, coupled with the strategic importance of the road and popular bus routes. Learn from National Highways approach on adaptation to identify potentially suitable responses and work with them given the required connectivity of the Strategic Road Network and local roads.
- Continue the funding and rollout of strategic flood management schemes and ensure that any properties (residential or commercial) that are not protected by such schemes, but remain vulnerable to flooding, are considered for property/site-level flood resilience measures.
- Ensure that all new flood management schemes, be they 'hard engineering' schemes or nature-based schemes, continue to consider **future** flood risk as a result of climate change. Also, analyse existing schemes to ensure that they remain fit for purpose in future.
- A Climate Change Adaptation Plan and risk assessment needs to be developed by Welsh Water, covering resilience of assets, supply, and operations. This should build on existing activity, such as linking to the Incident Response Manual and other strategies, and projects such as increasing bottled water when required, rolling out standby generators and water saving programmes (see below).
- Ensure climate adaptation is integrated into the design and planning for new infrastructure assets (new roads, sub-stations, drainage etc.). Ensure climate change and its impacts are addressed consistently across the county to support this approach.

Health, communities and the built environment

- **(Immediate action)** Conduct an assessment of all hospitals, care homes and other health centres that support physically and mentally vulnerable people in Herefordshire to identify which are most at risk of overheating and identify the most suitable measures to reduce overheating risk, such as implementing green infrastructure, better ventilation etc, and how these could link with potential measures to achieve Net Zero.
- Ensure Wye Valley NHS Trust, with support from the Integrated Care System (ICS) takes the opportunity of the requirement to develop 'Green Plans' by integrating effective adaptation measures into these plans to help ensure hospitals and other NHS health settings are protected from the impacts of a future climate. Use SWM's forthcoming adaptation guidance for the NHS to assist with this and, if necessary, produce a separate adaptation plan.

- Work with all relevant partners to ensure that climate risks are addressed and considered in the commissioning and provision of all health and social care services and assets, referring to the National Planning Policy Framework (NPPF) for details on new developments and climate change.

- **(Immediate action)** Ensure climate risks to health, buildings and infrastructure that affect hospitals, care homes, GPs and other health and care settings are embedded into corporate risk / business continuity plans.

- **(Immediate action)** Establish community resilience programmes in areas where climate risks and demographic vulnerabilities intersect (see Annex 1), to ensure that these areas are better prepared for more frequent and intense extreme weather events (flooding, heatwaves and storms), and can respond and recover more effectively. This could also include an analysis of the impacts on homeless people, and interventions to help protect them from extreme conditions. Work with Flood Groups and expand on the community resilience plan templates to produce a climate adaptation/ severe weather plan for vulnerable and isolated locations/ parishes that are at risk of being cut off during periods of (e.g.) extreme flooding.

- Ensure planning decisions adhere to the NPPF, which states that new developments avoid flood risk in accordance with the sequential test in the NPPF and inappropriate development is directed away from areas of existing or future flood risk. New developments should not cause flooding elsewhere and be resilient to the impacts of climate change.

- Ensure that the new Core Strategy includes the requirement to assess all new developments for their resilience to climate change, including overheating, and includes a strategy to safeguard areas from development that can (e.g.) help to reduce flood risk, e.g. water meadows. Develop a new/ updated Supplementary Planning Document (SPD) to support the rollout of adaptation measures (sustainable urban drainage systems (SUDS), rainwater harvesting, overheating prevention measures etc) and that these adhered are to by developers. Build on the existing Herefordshire Future Homes Standard advice.

- Ensure climate adaptation standards are considered when building new homes to high Net Zero standards, i.e., use the progress on Net Zero design to integrate adaptation measures that also help to reduce carbon. This could include natural ventilation to improve thermal performance and comfort during heatwaves, natural greening, roof reflectivity and rainwater harvesting and water storage to reduce freshwater use. Design guidelines should be produced for large capital investment projects, which set out how to use locally specific climate projections and adaptation options.

- Ensure home retrofit programmes that are required alongside the delivery of Net Zero targets integrate adaptation measures where possible, such as installation of water efficiency measures, shading options, better ventilation to reduce the overheating risk and to improve indoor air quality, etc.

Business and industry, including agriculture

- **(Immediate action)** Possibly as part of the Wye Adapt to Climate Change Programme, establish a programme of engagement on how farmers can effectively adapt both their business activities (e.g. crop types etc.) to climate change and contribute positively to local land management to help flood alleviation, especially in flood-prone areas, through soil management techniques. Use the forthcoming SWM 'Weathering the Storm for Agriculture' guidance to assist with this.

Flood defences being erected © Herefordshire Council

1 Introduction and background

SWM has been commissioned by Herefordshire Council to carry out the following:

- An analysis of how severe weather has impacted on the county over the last 15 years, who has been affected and how events have been dealt with.
- An analysis of how the climate is likely to change in Herefordshire up to the end of this century.
- The development of a climate change risk register that sets out the key risks the county is likely to face.
- **The production of a climate change adaptation plan, aimed at providing a series of actions that should be considered for implementation by decision makers in Herefordshire, to ensure that the county's natural environment, people, infrastructure, buildings and businesses are prepared for the impacts of climate change. This is the primary output, informed by the previous analyses (this document).**

The core objective is to ensure Herefordshire can better manage, prepare for and respond to severe weather events and an increasing likelihood and severity of these in future.

1.1 Purpose of this document

This document sets out the climate change adaptation actions that should be considered for implementation by decision makers in Herefordshire, to ensure that the county's natural environment, people, infrastructure, buildings and businesses are prepared for the impacts of climate change, including greater incidence and severity of flooding, a higher likelihood of water scarcity and more intense and prolonged heatwaves.

This Plan should be continuously updated via a rigorous monitoring system, with a full refresh conducted in 2028, i.e. five years after its creation. Many of the actions included within the Plan will commence from now, although many may take longer than five years to complete, and some may not be able to be implemented until after 2028. In short, there is a need for regular scrutiny and updating of this document so that decision-making can be done in advance and as accurately as possible, in light of continuously changing circumstances. Much is likely to have changed by 2028 and we feel this is a reasonable timescale by which to conduct a full Plan review.

The document provides:

- A summary of the impacts that extreme weather has brought about in Herefordshire over the past 15 years, and the response and action taken to address these.
- A summary of climate projections for Herefordshire, outlining how the climate is likely to change in the county.
- A list of climate risks, drawing on the West Midlands Climate Change Risk Assessment, in itself drawn from the England assessment of the Independent Assessment of UK Climate Risk and extracting those risks relevant to Herefordshire. Stakeholder engagement has been carried out to determine whether any changes ought to be made to their magnitude and urgency scores.

- A Climate Change Adaptation Plan that sets out a series of possible responses to the above risks and associated impacts.
- Case studies reflected existing good practice.
- An analysis of how the adaptation actions can help to strengthen Herefordshire's priorities as given in the County Plan 2020-2024.
- Recommended next steps and initial quick wins, and suggestions for monitoring and evaluation processes.

This document does not provide a detailed, technical assessment of potential adaptation actions. For example, an action included in this Plan is to 'assess care homes and hospitals that are at risk from overheating.' It is only through such an assessment that detailed information would be provided on which care homes are most at risk and why (building type, resident population etc.) and what the most appropriate actions are to address these risks (building modifications to improve ventilation, green infrastructure for more shading etc.) against a range of future climatic scenarios. This Plan aims to trigger more detailed assessments where required, which would be commissioned and funded by national and local decision makers.

1.2 Background and context

Adaptation vs mitigation

This Plan should be considered alongside others that the council and other organisations in Herefordshire have published which convey how the county intends to become more sustainable. This includes a Carbon Management Plan and various county-wide climate action plans that focus on specific thematic areas, such as waste and transport.

These plans largely focus on climate change mitigation, i.e. how actions can reduce greenhouse gas emissions. By contrast, this Plan focuses on accepting that we are already locked-in to a certain degree of climatic change regardless of the amount of greenhouse gases that are emitted henceforth, and that we therefore need to deal with the consequences of this. This is known as climate adaptation. The defined differences between mitigation and adaptation are as follows:

- **Climate change mitigation** means avoiding and reducing emissions of heat-trapping greenhouse gases (e.g. carbon dioxide) into the atmosphere to prevent the planet from warming to more extreme temperatures.
- **Climate change adaptation** means altering our behaviour, systems, and, in some cases, ways of life to protect our families, our economies, and the environment in which we live from the impacts of climate change. We see adaptation to climate change as being proactive rather than reactive (e.g. responding to emergencies) wherever possible.

This Plan focuses on climate change adaptation, although it should be borne in mind throughout this document that some of the actions included here (Section 5) could also enhance and accelerate the county's targets to meet Net Zero by 2030. Similarly, actions included in the plans that largely focus on mitigation will also give opportunities to adapt. The key message is that Herefordshire **needs to do both** in order to strengthen its overall climate resilience and, wherever possible, needs to identify ways that it can deliver projects that both reduce greenhouse gas emissions and adapt to climate impacts concurrently.

Adaptation national context

The Climate Change Committee (CCC) is the Government's statutory adviser on preparing for climate change. Under the Climate Change Act (2008) the CCC, through its Adaptation Committee and secretariat, has two main roles in relation to climate change adaptation:

- To provide independent, expert advice on the UK Climate Change Risk Assessment (CCRA).
- To report to Parliament on progress with implementation of the Government's National Adaptation Programme (NAP).

Rock salt being spread during a heatwave © Herefordshire Council

In June 2021, the CCC launched its latest Independent Assessment of UK Climate Risk for Government to form the basis of the third CCRA. Over 450 people from more than 130 organisations contributed evidence to the report, which is then used to assess the risks to the UK from climate change and the magnitude and urgency of these risks.

This assessment was then used to develop the next UK CCRA, published by Defra in January 2022, and the third National Adaptation Programme (NAP3) published in July 2023 , within which are numerous actions that are intended to accelerate adaptation action in the UK, alongside recommendations for local authorities on what they can do to adapt.

Alongside this, adaptation forms a key part of the Government's Environmental Improvement Plan published in January 2023. This should be referred to alongside globally-focused agreements at recent United Nations Climate Change Conferences (COP) events, such as the measures to halt and reverse nature loss, including putting 30% of the planet and 30% of degraded ecosystems under protection by 2030 which was agreed at COP15. Without climate change adaptation, such targets cannot realistically be met as the expected climate impacts of more extreme weather and its consequences (flooding, heatwaves, wildfires, drought) will undermine them.

Despite this, there remains an absence of local targets, reporting requirements and resourcing to assist local authorities and their partners to adequately adapt to climate change. That is why this Plan is required, so that key actors in Herefordshire can begin to prioritise and simplify how actions to adapt to climate change can be embedded into other activities, e.g. nature enhancement projects.

Developing this Plan

SWM and our associates supported the development of the Independent Assessment of UK Climate Risk through a commission aimed at improving the accessibility of CCRA3, that is, producing outputs alongside the main technical reports to allow Government users to digest the information and apply it to their main areas of work. Part of this work was to write a summary of the risks for each UK nation, with SWM writing the summary for England. As a result of this work, we were in a strong position to use this as a basis to form the West Midlands Climate Change Risk Assessment and Adaptation Plan, supplementing the England summary with West Midlands evidence.

This Adaptation Plan for Herefordshire has been informed by these assessments, using a combination of stakeholder engagement and other evidence (the methodology is provided in Annex 2) to provide a series of actions that should be considered for implementation to help the county adapt to a future climate. This Plan fills a gap in adaptation planning in the county, recognised by Herefordshire Council with whom we have collaborated to produce this document.

2 Herefordshire Severe Weather Impacts

See: Herefordshire Severe Weather Impact Assessment accompanying document

The purpose of the Impact Assessment was to assess the impacts of severe weather on organisations based in or operating throughout Herefordshire, on the services of Herefordshire Council and the people who live here, on infrastructure, businesses and the natural environment within the county in the last 15 years. This helped to contextualise and support the creation of this Adaptation Plan. By undertaking an analysis of how the county has been affected by severe weather in the past, we can begin to paint a picture of how it may be affected in future in light of a changing climate, and we have used the Impact Assessment for this purpose. The summary findings of the Impact Assessment are as follows:

- **Forty-one** severe weather events were identified between and including 2008 and 2022.
- **Twenty-six** of these events we have determined to be 'significant' or of 'high significance.'
- Of the events classed as being of 'high significance,' **11 were associated with flooding** (some of which also included high winds), three were related to heatwaves and dry conditions, and two were associated with extreme cold and snow.

Storm damage in Hereford © Herefordshire Council

- **Only 14 of the 41 events took place in the first half of the 15 year period** (01 January 2008 to mid-July 2015). This may suggest an increase in the number of events over time, or it could be due to greater documentation or ease of access of information in more recent years.
- **Flooding is the most common** event type, followed by cold-weather related events.
- **There is a well-coordinated response to flooding events** in Herefordshire, and whilst most investment into dealing with severe weather has been to reduce flood risk, flooding still has the greatest impact on costs and disruption to people's lives.
- **Other severe weather events are less well prepared for**, especially heatwaves. This is likely to be due to their less frequent occurrence compared to flooding, but the impacts of heatwaves are still exceptionally significant and must be considered in future planning.
- In addition, despite flooding being most common, **high temperature-related events have the greatest impact on people's health.**
- The sectors most commonly impacted by severe weather in Herefordshire are **transport (particularly roads), homes and businesses**. Again, flooding generates the greatest impact, with at least 17 of the 41 events resulting in flooding affecting homes.

- Twenty-eight events **impacted on roads** in Herefordshire, primarily due to flooding or heavy snowfall.

- Evidence shows that **agriculture is also significantly impacted** by severe weather.

- **Nature, infrastructure and utilities have also all been affected** by severe weather in Herefordshire, leading to knock-on effects to people and services.

- So that the council and other organisations can continue to monitor the impact of severe weather events, the database should now be **continuously updated** to capture events that have taken place in 2023 and onwards, such as the September 2023 unseasonable heatwave.

3 Herefordshire Climate Projections

See: Herefordshire Climate Change Technical Report accompanying document

The purpose of the Climate Change Technical Report is to analyse how the climate may change in Herefordshire in the next 70+ years, up to 2100. It used the UK Climate Projections 2018 (UKCP18) to look at future projected trends, and other sources of data to determine how weather impacts, such as those documented in the Severe Weather Impact Assessment (see Section 2), may change in frequency and severity. Such impacts include heavy rainfall and subsequent flooding, heatwaves, droughts, storms and overall climatic variations, and the analysis has helped us to ensure that the actions included in this Plan are reflective of the projected changes.

The below tables summarise the key changes that Herefordshire is likely to experience in the coming decades. The full explanation to what these tables mean is included in the accompanying Technical Report, and an explanation of the use of percentiles is outlined in the following box.

If a temperature change is stated to be '2.5°C at the 95th percentile,' that means there is 95% probability that the actual temperature change seen will be less than 2.5°C. **The 95th percentile is therefore usually used to demonstrate the extreme end of any scenario.**

If a change is stated to be '+3mm of precipitation at the 50th percentile,' that means there is a 50% probability that the actual change in precipitation seen will be less than 3mm. **The 50th percentile is therefore usually used to demonstrate the medium change in any scenario.**

If a change is stated to be '0.7°C at the 5th percentile,' that means there is only a 5% probability that the actual change in temperature seen will be less than 0.7°C. **The 5th percentile is therefore usually used to demonstrate the lowest/most conservative aspect of any scenario.**

Figure 1a: Summary results of temperature change for Herefordshire in the 2050s at RCP6.0, 5th, 50th and 95th percentile, generated via Met Office UKCP18 User Interface

	Mean Annual Temperature	Mean Winter Temperature	Mean Summer Temperature
Observed Baseline 1981-2010 °C	9.66	4.25	15.54
2050s (2040-2069) Pathway RCP 6.0 **5th percentile:** Change in °C	0.26	-0.11	0.11
°C	9.92	4.14	15.65
2050s (2040-2069) Pathway RCP 6.0 **50th percentile:** Change in °C	1.17	1.02	1.51
°C	10.83	5.27	17.05
2050s (2040-2069) Pathway RCP 6.0 **95th percentile:** Change in °C	2.20	2.23	3.11
°C	11.86	6.48	18.65

Figure 1b: Summary results of % precipitation change for Herefordshire in the 2050s and 2080s at RCP6.0, 5th, 50th and 95th percentile, generated via Met Office UKCP18 User Interface

	Mean Winter Precipitation	Mean Summer Precipitation
2050s (2040-2069) Pathway RCP 6.0 **5th percentile:** % Change	-9.28	-37.79
2050s (2040-2069) Pathway RCP 6.0 **50th percentile:** % Change	+4.96	-11.43
2050s (2040-2069) Pathway RCP 6.0 **95th percentile:** % Change	+21.59	+14.65
2080s (2070-2099) Pathway RCP 6.0 **5th percentile:** % Change	-6.84	-54.43
2080s (2070-2099) Pathway RCP 6.0 **50th percentile:** % Change	+12.83	-26.79
2080s (2070-2099) Pathway RCP 6.0 **95th percentile:** % Change	+35.76	+3.38

Figure 1c: Summary results of High Impact Weather changes, generated via Met Office Climate Data Portal

	Baseline – (2001 – 2020) 0.87°C warmed world	Future, if global temperatures rise by 3°C
Days per year above 25°C	10 – 30	30 – 50
Nights per year above 20°C	0 – 0.1	0.1 – 0.7
Annual Growing Degree Days	1,500 – 2,500	2,000 – 3,000
Drought Severity Index	5 – 10	5 – 25

In short, the projections show that flooding could become more intense and unpredictable, heatwaves and droughts more common and prolonged, and storms more extreme and damaging. However, the key message is to keep a watching brief on how the climate changes in Herefordshire, and how this may impact the county's ability to adapt over time.

4 Herefordshire Climate Change Risk Assessment

This section summarises the risks and opportunities that climate change presents in Herefordshire. The list of risks and opportunities marries up with the West Midlands assessment, which in itself is based on the English assessment formulated by the CCC as part of their Independent Assessment in informing the latest UK Climate Change Risk Assessment published in 2022, alongside the UKCP18 scenarios outlined in Section 3 and the extreme weather impacts Herefordshire has already experienced outlined in Section 2. More details about the methodology that was used to produce the England assessment and the urgency scores can be found on the UK Climate Risk website and, regarding the formation of urgency scores, is summarised below.

Category	Description
More action needed	New, stronger or different Government action, whether policies, implementation activities or enabling environment for adaptation, over and above those already planned, are beneficial in the next five years to reduce climate risks or take advantage of opportunities. This will include different responses according to the nature of the risks and the type of adaptation: • Addressing current and near-term risks or opportunities with low and no-regret options (implementing activities or building capacity). • Integrating climate change in near-term decisions with a long lifetime or lock-in. • Early adaptation for decisions with long lead-times or where early planning is needed as part of adaptive management.
Further investigation	On the basis of available information, it is not known if more action is needed or not. More evidence is urgently needed to fill significant gaps or reduce the uncertainty in the current level of understanding in order to assess the need for additional action.
Sustain current action	Current or planned levels of activity are appropriate, but continued implementation of these policies or plans is needed to ensure that the risk or opportunity continues to be managed in the future.
Watching brief	The evidence in these areas should be kept under review, with continuous monitoring of risk levels and adaptation activity (or the potential for opportunities and adaptation) so that further action can be taken if necessary.

The resulting risk and opportunity assessment is presented below, which differs slightly from the West Midlands assessment and provides a more bespoke assessment for Herefordshire. Risks and opportunities highlighted in yellow are those added to the West Midlands assessment that also apply to Herefordshire, but that differ to the England assessment. Those risks and opportunities highlighted in orange represent slight variations on the risks/opportunities included in the West Midlands assessment. There is one new risk added, highlighted in green, that is specifically applicable to Herefordshire.

It should be emphasised that many of these risks overlap and interact with each other. For example, if infrastructure networks (IR2) fail, this will have a knock-on effect for businesses and homes, leading to some of the risks affecting these sectors becoming more likely to occur. More information on this risk interactivity can be found in one of the accompanying research pieces commissioned by the CCC for CCRA3.

Note that International Dimensions risks (presented here in Chapter 8) have not been included in the Herefordshire assessment as, in the main, these risks are UK-wide and unlikely to be influenced greatly by local circumstance, activity and/or policy.

As demonstrated in Section 5 of this report, we have used this risk assessment to structure the Action Plan and to develop the actions within it.

Natural environment and assets

Risk or Opportunity	Risk code	Receptor	Nature of risk/opportunity	Urgency score
RISK	NR1	Terrestrial species and habitats	Changing climatic conditions and extreme events, including temperature change, water scarcity, flooding, wind, and altered hydrology (including water scarcity and flooding) causing irreversible damage to terrestrial biodiversity	More action needed
RISK	NR2	Terrestrial species and habitats	Pests, pathogens and invasive species as a result of climatic changes causing irreversible damage to terrestrial biodiversity	More action needed
RISK	NR3	Terrestrial species, habitats and landscapes	Fires/ wildfires causing destruction to animal and plant species, landscapes, agriculture, buildings and heritage	Further investigation
RISK	NR4	Soils	Changing climatic conditions, including seasonal aridity and wetness, damaging soil quality	More action needed
RISK	NR5	Agriculture	Pests, pathogens and invasive species as a result of climatic changes causing irreversible damage to agriculture and food availability	More action needed
RISK	NR6	Forestry	Pests, pathogens and invasive species as a result of climatic changes causing irreversible damage to woodland species	More action needed
RISK	NR7	Freshwater species and habitats	Changing climatic conditions and extreme events, including higher water temperatures, flooding, water scarcity and phenological shifts causing irreversible damage to freshwater biodiversity	More action needed
RISK	NR8	Freshwater species and habitats	Pests, pathogens and invasive species as a result of climatic changes causing irreversible damage to freshwater biodiversity	More action needed
RISK	NR9	Agricultural and forestry productivity	Extreme events and changing climatic conditions (including temperature change, water scarcity, wildfire, flooding, wind) leading to a reduction in the productivity of farm and woodland businesses	More action needed
RISK & OPPORTUNITY	NRO 10	Natural carbon stores, carbon sequestration and greenhouse gas (GHG) emissions	Changing climatic conditions, including temperature change and water scarcity causing destruction and release of locked-in carbon	More action needed
RISK & OPPORTUNITY	NRO 11	Landscape character	Extreme events and changing climatic conditions (including temperature change, water scarcity, wildfire, flooding, wind) permanently altering/ damaging landscape character	Further investigation
OPPORTUNITY	NO12	Terrestrial species and habitats	New species colonisations as a result of climatic changes	Further investigation
OPPORTUNITY	NO13	Agricultural and forestry productivity	New/alternative species becoming suitable as a result of climatic changes	Further investigation
OPPORTUNITY	NO14	Freshwater species and habitats	New species colonisations as a result of climatic changes	Sustain current action

Infrastructure

Risk or Opportunity	Risk code	Receptor	Nature of risk/opportunity	Urgency score
RISK	IR1	Infrastructure networks (water, energy, transport, ICT)	Cascading failure of the infrastructure network; failure of one system leading to multiple failures in others as a result of more extreme weather	More action needed
RISK	IR2	Infrastructure networks and services	More frequent and extensive river, surface water and groundwater flooding causing damage and disruption to various infrastructure services	More action needed
RISK	IR3	Transport networks	Greater incidence of slope and embankment failure, and consequential damage and disruption, as a result of climatic changes	More action needed
RISK	IR4	Transport	Greater incidence of high and low temperature extremes, high winds and lightning as a result of climatic changes, leading to damage and disruption to transport infrastructure	More action needed
RISK	IR5	Bridges and pipelines	More frequent flooding and severe erosion leading to connectivity collapse	Further investigation
RISK	IR6	Energy	Greater incidence of high and low temperature extremes, high winds and lightning as a result of climatic changes, leading to power supply issues	Further investigation
RISK	IR7	Hydroelectric generation	More frequent and extreme low or high river flows as a result of climatic changes leading to a reduction in stability of hydropower	Further investigation
RISK	IR8	Energy generation	Reduced water availability for generation plants as a result of climatic changes, leading to potential power supply issues	Further investigation
RISK	IR9	Public water supplies	Reduced water availability as a result of climatic changes	More action needed
RISK	IR10	Subterranean and surface infrastructure (cables, pipes etc)	Greater incidence of subsidence as a result of climatic changes leading to damage and disruption of power/ water supplies etc.	Further investigation
RISK	IR11	Digital infrastructure, telecoms and ICT	Greater incidence of high and low temperature extremes, high winds and lightning as a result of climatic changes, disrupting telecommunications	Further investigation

Health, communities and the built environment

Risk or Opportunity	Risk code	Receptor	Nature of risk/opportunity	Urgency score
RISK	HR1	Health and wellbeing	Greater incidence of high temperatures resulting in heat related health problems, especially for the most vulnerable	More action needed
RISK	HR2	Health and wellbeing	Widening health inequalities as a result of greater climate disadvantage due to more extreme weather	Further investigation
RISK	HR3	Health and wellbeing	Changes in indoor and outdoor air quality driven by climate changes, leading to subsequent health impacts	Further investigation
RISK	HR4	Health	Greater incidence of vector-borne disease as a result of climatic changes, leading to subsequent health impacts	More action needed
RISK	HR5	Health	Poor water quality and household water supply interruptions as a result of climatic changes, leading to subsequent health impacts	Further investigation
RISK	HR6	Food safety and food security	Higher temperatures (affecting food safety) and extreme weather (affecting food security) as a result of climatic changes, leading to subsequent health impacts	Further investigation
RISK	HR7	People, communities and buildings	Greater frequency and extent of flooding as a result of climatic changes, leading to damage and displacement	More action needed
RISK	HR8	People, communities and buildings	Flooding and other extreme weather events leading to communities and individuals being isolated and cut-off due to extreme rurality and lack of accessibility	Further investigation
RISK	HR9	Health and social care delivery	Greater incidence of extreme weather affecting service delivery, leading to subsequent health impacts	More action needed
RISK	HR10	Education services	Greater incidence of extreme weather affecting education services delivery and building function, leading to disruption and potential health impacts	More action needed
RISK	HR11	Building fabric	Potential damage caused by moisture, wind and driving rain, leading to unliveable conditions and damage to properties	Further investigation
RISK	HR12	Cultural heritage	Irreversible damage to heritage assets due to changes in temperature, precipitation, groundwater, landscape change	More action needed
RISK & OPPORTUNITY	HRO 13	Household energy demand	Summer and winter temperature changes potentially reducing heating need but increasing cooling need	More action needed
OPPORTUNITY	HO14	Health and wellbeing	Drier, warmer summers leading to more opportunities to use outdoor spaces and (e.g.) boost tourism	Further investigation

Business and industry

Risk or Opportunity	Risk code	Receptor	Nature of risk/opportunity	Urgency score
RISK	BR1	Flooding of business sites	More frequent and extensive river, surface water and groundwater flooding causing disruption to business (including farming) operations and local economic impacts	More action needed
RISK	BR2	Business production processes	Water scarcity as a result of climatic changes causing disruption to business (including farming) operations and local economic impacts	More action needed
RISK	BR3	Business access to finance, investment and insurance	Greater incidence of extreme weather leading to disruption and reduction in a business's ability to access investment	Sustain current action
RISK	BR4	Disruption to business supply chains and distribution networks	Greater incidence of extreme weather in the UK and abroad leading to disruption to business supply chains and subsequent impact on the local economy	More action needed
RISK	BR5	Reduced employee productivity in businesses	Greater incidence of infrastructure disruption as a result of climatic changes and higher temperatures in working environments, leading to reduction in business and farming output	Further investigation
OPPORTUNITY	BO6	Changes in demand for goods and services	Long term climate change effects resulting in opportunities for business diversification	Further investigation

The justification, based on the stakeholder engagement process, for any changes/additions to risks as specified is set out below. The one new risk bespoke to Herefordshire has been allocated a 'further investigation' urgency score, to reflect that the same rigorous analysis would need to apply to ensure that this risk is sound, and to determine the level of action already being taken to address it, or that is otherwise required.

Risks not included in England or West Midlands assessment, added explicitly for Herefordshire

Risk code	Nature of risk/opportunity	Justification for addition to Herefordshire assessment compared to the England or West Midlands assessment
HR8	Flooding and other extreme weather events leading to communities and individuals being isolated and cut-off due to extreme rurality and lack of accessibility	A range of stakeholders we engaged with to develop this Plan talked about the issue of rural isolation in Herefordshire, having experienced how (especially) flooding has led to communities being cut-off and disconnected for a substantial period of time. This was mirrored in the accompanying Impact Assessment. Climate projections suggest that this is only likely to worsen and, given Herefordshire's rurality, this is likely to become a significant problem in years to come, hence worthy of including a specific risk focusing on this issue.

Risks not explicitly in the England assessment, but that were added in the West Midlands assessment, and that also apply to Herefordshire

Risk code	Nature of risk/opportunity	Justification for addition to Herefordshire assessment compared to the England or West Midlands assessment
NR3	Fires/ wildfires causing destruction to animal and plant species, landscapes, agriculture, buildings and heritage	An increase in natural fire risk is deemed a particularly high risk of both likelihood of occurrence and extent of impact in Herefordshire. Many stakeholders expressed concern and lived experience in an increase in fires in recent years, largely owing to the rurality of the county. This risk was added as an explicit risk for the West Midlands as a whole, but the wording has also been tweaked for Herefordshire due to the lesser impact on the potential effect of peat fires leading to the release of carbon, a greater issue in other areas of the region, e.g. Staffordshire Moorlands.
HR2	Widening health inequalities as a result of greater climate disadvantage due to more extreme weather	Health inequality is discussed within the England CCRA Independent Assessment, but it was deemed appropriate at West Midlands level to make explicit reference to it in the risk assessment. This remains the case in Herefordshire, especially given that the England CCRA was conducted prior to the cost of living crisis, and that Herefordshire's rurality presents additional concerns such as social isolation.

Risks included in the England and West Midlands assessment, tweaked for the Herefordshire assessment

Risk code	Nature of risk/opportunity	Justification for addition to Herefordshire assessment compared to the England or West Midlands assessment
NR9	Extreme events and changing climatic conditions (including temperature change, water scarcity, wildfire, flooding, wind) leading to a reduction in the productivity of farm and woodland businesses	In the England and West Midlands assessment, this risk was deemed both a risk and opportunity. Given the range and outweighing of negative impacts on agricultural productivity in Herefordshire, due to the reliability of county's economy on the agricultural sector, this has been changed from a 'risk and opportunity' to solely a 'risk' for this assessment.
HR10	Greater incidence of extreme weather affecting education services delivery and building function, leading to disruption and potential health impacts	This risk included prisons, as well as education institutions, in the England and West Midlands assessment. There are no prisons in Herefordshire, so this has been tweaked to just include education services.
BR1	More frequent and extensive river, surface water and groundwater flooding causing disruption to business (including farming) operations and local economic impacts	The wording of these risks has been tweaked, to specifically mention farming and agriculture businesses, given how significant they are to the economy of Herefordshire. Many stakeholders told us how we need to ensure that farmers are seen as businesses, and integration within the business section of the risk assessment is a way of recognising this.
BR2	Water scarcity as a result of climatic changes causing disruption to business (including farming) operations and local economic impacts	The wording of these risks has been tweaked, to specifically mention farming and agriculture businesses, given how significant they are to the economy of Herefordshire. Many stakeholders told us how we need to ensure that farmers are seen as businesses, and integration within the business section of the risk assessment is a way of recognising this.
BR5	Greater incidence of infrastructure disruption as a result of climatic changes and higher temperatures in working environments, leading to reduction in business and farming output	The wording of these risks has been tweaked, to specifically mention farming and agriculture businesses, given how significant they are to the economy of Herefordshire. Many stakeholders told us how we need to ensure that farmers are seen as businesses, and integration within the business section of the risk assessment is a way of recognising this.

Risk code	Nature of risk/opportunity	Justification for addition to Herefordshire assessment compared to the England or West Midlands assessment
BR2	Water scarcity as a result of climatic changes causing disruption to business (including farming) operations and local economic impacts	Along with the change to wording (see above), we have also increased the urgency score of this risk from 'further investigation' to 'more action needed.' This is because many of the stakeholders we spoke to were concerned about the impact of water scarcity in the county, especially given its rurality and reliability on farming and the impact a lack of water could have on agricultural businesses.

Risks added to West Midlands assessment, but that have been removed for Herefordshire assessment

Risk code	Nature of risk/opportunity	Justification for addition to Herefordshire assessment compared to the England or West Midlands assessment
Previously BR2	Increase in flood risk leading to greater pollution risk due to high presence of industrial sites	This risk was added to the West Midlands due to the high presence of industrial sites, especially in areas such as the Black Country and the Potteries, and the consequential impact more flooding of such sites could have on pollution risk. While Herefordshire is not devoid of such industry, it is less of a risk in the county than it is in high-intensity industrial clusters elsewhere in the region, such as those areas outlined above.
Previously NRO9	More frequent estuarine flooding, changes in salinity and impacts on species migration	While riverine risks are significant in Herefordshire, potential risks and opportunities explicit to estuaries are not well-defined enough, based on the evidence provided, to include a specific risk focusing on this for Herefordshire.

5 Herefordshire Climate Change Adaptation Action Plan 2023-2028

Provided overleaf is an Action Plan that sets out:

- Actions that have been identified that, if implemented, could help to adapt Herefordshire's natural environment, infrastructure, people and businesses to a changing climate, and a justification as to why these actions have been selected.
- (An) organisation(s) that may be able to lead on the implementation of these actions or that could fund the activity.
- Partners with whom the potential lead organisation may benefit from collaborating with, or potential resourcing partners should the suggested lead authority not be in a position to provide this.
- Whether the action should be (either due to urgency or its simplicity) be implemented in the short (within the next two years), medium (two-10 years) or long (>10 years) term.
- Whether implementing this action is expected to be intense from a resourcing and cost perspective, from L (Low), Medium (M) to H (High).
- Based on the evidence provided on urgency, resourcing and likely impact, whether the implementation of the specified action be a medium (M), high (H), or very high (VH) priority. We have also indicated whether we think this action should be implemented or commenced with some immediacy, through use of the acronym VH-I and highlighting the number of the relevant actions dark red (e.g. actions 1 and 2).

We have also used the principles set out in the Local Partnerships Adaptation Toolkit (Section 4.3) when selecting and considering actions:

Effectiveness – will the actions meet your objectives and if so how? ☐	**Legitimacy** – is it politically, ethically and socially acceptable? ☐
Efficiency – do the benefits exceed the costs? If not, how can they? ☐	**Urgency** – how soon could each option be implemented? ☐
Equity – the action should not adversely affect other areas or vulnerable groups ☐	**Costs** – consider social and environmental costs, not just economic ☐
Flexibility – is each option flexible and will it allow for adjustments and incremental implementation? ☐	**Robust** – is each option able to cope with a range of future climate projections? ☐
Sustainability – does each option contribute to sustainability objectives, and are they themselves sustainable? ☐	**Synergies/coherence with other strategic objectives** – does each option help to achieve other objectives? ☐
Practical – can the action be implemented on relevant timescales? ☐	

We have ensured that the actions listed do not (e.g.) contradict other local priorities, disadvantage vulnerable people, and consider cost and efficiency, rather than merely suggesting a set of unrealistic and potentially counterproductive actions that could lead to maladaptation.

As described in the introduction, these actions are recommendations from SWM to local (and potentially regional and national decision makers), based on the evidence and feedback provided, to help minimise the risks and associated projected impacts of climate change in Herefordshire.

The actions included are those where there is no strong evidence of a coordinated response. Where there is evidence to suggest action is taking place, such as actions included in the plans published by organisations under the jurisdiction of the Adaptation Reporting Power (ARP), we have not included these in this Plan and will assume these actions continue to be implemented. This would include, for example, ensuring the local rail network is resilient to extreme heat events, and ensuring electricity substations are protected from flood risk. It is important, however, to ensure that the organisations bound to report under the ARP are consulted in activities that may be affected by, or where they could add value to, any new adaptation actions implemented locally.

We recognise that some of these actions may be being implemented or considered by organisations that we did not consult with during the evidence-gathering stage. It is recommended that this Plan is reviewed again next year (2024) to factor in any new activity that comes to light and would encourage organisations to provide evidence on such activity in the meantime.

List of acronyms

The table below includes potential lead, supporting and funding organisations that may be able to help implement the suggested action. Most of these are given in acronyms, and they are listed below. It should be noted that organisations listed in the Plan are only potential implementors of the specified actions; it may be that the action is best led by an organisation not listed in the Plan.

Acronym	Organisation
AONB	Wye Valley Area of Outstanding Natural Beauty
BBLP	Balfour Beatty Living Places
BITC	Business in the Community
BRE	Building Research Establishment
C&RT	Canal and River Trust
DB&T	Department for Business & Trade
Defra	Department for Environment, Food and Rural Affairs
DESNZ	Department for Energy Security and Net Zero
DfE	Department for Education
DfT	Department for Transport
DHSC	Department for Health and Social Care
DLUHC	Department for Levelling Up, Housing and Communities
EA	Environment Agency
EAUC	The Alliance for Sustainability Leadership and Education
EP	Emergency Planning
FC	Forestry Commission
FSA	Food Standards Agency
FSB	Federation of Small Businesses
GWWM	Groundwork West Midlands

Acronym	Organisation
HC	Herefordshire Council
HCNPB	Herefordshire Climate and Nature Partnership Board
HE	Historic England
HFA	Herefordshire Food Alliance
HGN	Herefordshire Green Network
HWT	Herefordshire Wildlife Trust
IAWM	Innovation Alliance for the West Midlands
IDBS	Internal Drainage Board
LEP	Marches Local Enterprise Partnership
LRF	Local Resilience Forum
MHCLG	Ministry of Housing, Communities and Local Government
NE	Natural England
NFF	National Flood Forum
NFU	National Farmers Union
NH	National Highways
NHS	National Health Service
NLCF	National Lottery Communities Fund
NLHF	National Lottery Heritage Fund
NMITE	New Model Institute for Technology & Engineering
NR	Network Rail
NT	National Trust
RSPB	Royal Society for the Protection of Birds
SHAP	Sustainable Housing Action Partnership
STW	Severn Trent Water
SWM	Sustainability West Midlands
TCPA	Town and Country Planning Association
UKHSA	UK Health Security Agency
WW	Welsh Water

Overleaf commences the main Adaptation Plan for Herefordshire.

Adaptation Action Plan: Governance, reporting and monitoring

People, engagement and communications

Action No.	Action	Justification	Possible delivery organisation(s)	Possible example partner(s)	Possible example funder(s)	Timescales for implement	Resource Intensity	Priority
1	Recruit and employ at least one Climate Change Adaptation Officer role embedded within the Sustainability and Climate Change Team at Herefordshire Council (HC). This role can help to aid the effective delivery of the Climate Adaptation Working Group.	This will help ensure there is at least one individual dedicated to driving forward the actions in this Plan, monitoring their progress and supporting those colleagues/ organisations assigned with actions.	HC Sustainability & Climate Change	SWM can help to promote advert	-	Short-term	M	VH-I
2	Set up a Herefordshire Climate Adaptation Working Group, and/or ensure adaptation is fully integrated into existing boards/groups, to help drive forward some of these actions and lobby national and local funders and policymakers to ensure adaptation to climate change is at the heart of all activities. This should include those reporting under the ARP, such as Network Rail and National Highways.	Without this coordination and longer-term effort, we risk this Plan becoming an unrealistic document that will never be looked at and acted upon. Establishing an expert and influential group representative of the political, economic and sectoral make-up of the county should reduce the risk of this happening and help catalyse the implementation of these actions.	HC Sustainability & Climate Change	SWM	EA Defra All potential group members	Short-term, on-going	L/M	VH-I
3	Identify adaptation leads and other equivalent working groups in neighbouring counties (Shropshire, Gloucestershire, Worcestershire, Powys, Monmouthshire) in recognition that climate risks and adaptation solutions do not stop at boundaries (e.g. catchment-scale actions), and ensure two-way engagement and cooperation takes place.	This will ensure there is, where required, a mechanism to allow solutions to be developed across boundaries, especially relevant in relation to river restoration for example, to prevent maladaptation (e.g. flood protection in one area leading to worsening issues in another) and to share wider good practice and expertise.	HC Sustainability & Climate Change	Relevant partners as specified SWM has contacts in some authorities	-	Short-term	L	H
4	Through the Working Group and/ or its subgroups, facilitate potential partnerships and/or funding sources to take forward projects across the county and research innovative approaches to adaptation financing.	Ultimately, funding will be required to take forward many of the actions given in this Plan. Working collaboratively to identify suitable sources will help to be innovative about how to unlock this funding.	HC Sustainability & Climate Change NMITE	Local and national bodies who can influence the implementation of the actions in this Plan (inc. SWM)	To be determined by this action	Short-term	L/M	VH

Action No.	Action	Justification	Possible delivery organisation(s)	Possible example partner(s)	Possible example funder(s)	Timescales for implement	Resource Intensity	Priority
5	Integrate climate adaptation as a key theme in existing Youth Boards / Councils across the county (e.g. Hereford Youth Council). Consider including a 'young person's voice' on the Working Group (see action 2).	Young people in the county will be affected the most by climate change and have the greatest to lose by ineffective adaptation. We need to give them a voice on this issue via existing platforms.	HC Education HCNPB	Colleges NMITE EAUC	-	Short-term	L	H
6	Run an engagement programme and advice sessions for public and private sector organisations to help them develop their own climate risk assessments and adaptation plans. Ascertain whether support packages announced in NAP3 could help with this.	This will help to accelerate adaptation in organisations that have limited resource and give them a helping hand and a starting point for action.	HC Sustainability & Climate Change Members of the Working Group	SWM	Defra EA	Short-term, on-going	L/M	VH-I
7	Linked to the above, establish a communications campaign that highlights the importance of climate adaptation to individuals and organisations, including aspects such as the importance of saving water. This should be framed positively and linked with the Net Zero agenda, but emphasising that further action still needs to be taken beyond reducing carbon.	A programme emphasising the importance of adaptation needs to be established and rolled out to ensure consistent messaging and to encourage further actions such as those outlined in this Plan. Lessons could be learnt on how messaging on Covid-19 was established, which resulted in rapid and fundamental change.	HC Comms HC Sustainability & Climate Change	Members of the Working Group Climate Outreach NMITE	Defra EA	Short-term	L/M	H
8	Also aligned with the above, develop an awareness campaign and set of legacy resources that are specifically targeted at officers, Cabinet Members and Councillors across the county to engage them in the climate adaptation agenda. Given political changes occur regularly, these must be transferable from one administration to the next and provide the 'business case' for adaptation.	Cabinet Members and Councillors are crucial to enabling local action on climate adaptation. Without their support, many of these actions either could not be implemented at all or as effectively, and therefore their buy-in underpins many actions within this Plan.	HC Sustainability & Climate Change HC Member Support	SWM	-	Short-term	L	VH

Action No.	Action	Justification	Possible delivery organisation(s)	Possible example partner(s)	Possible example funder(s)	Timescales for implement	Resource Intensity	Priority
9	Provide a climate adaptation webpage which includes a 'hub' of resources on climate adaptation, including this Adaptation Plan. Link this to existing hubs such as ALARM and key resources such as the NAP, CCRA and any relevant local activity. Further information could be embedded onto other websites that engage with specific audiences, such as provision of advice for communities on the Talk Community website.	This can act as a useful 'one-stop-shop' for advice, guidance and good practice to help organisations adapt their own estates and make it easier for decision-makers to take forward actions.	HC Comms HC Sustainability & Climate Change with input from various departments	-	-	Short-term, on-going	L/M	M

Data strategy and monitoring

Action No.	Action	Justification	Possible delivery organisation(s)	Possible example partner(s)	Possible example funder(s)	Timescales for implement	Resource Intensity	Priority
10	Embed climate adaptation into a range of strategies and plans being produced by council departments/ external partners. Some examples are included in separate actions below (e.g. LNRS, planning) but others could include council and external Net Zero Plans, Health & Wellbeing Strategies, Highways Maintenance Plans, Schools Capital Investment Strategy, Water Resources Plans, and so on.	Along with allocating actions in this Plan to a range of partners and departments, embedment of adaptation into strategies is crucial to ensure that decision making is factoring in what impact climate change could have on various future policies. Without this, many of these strategies and action plans may not be fit for purpose.	HC Sustainability & Climate Change	Numerous council depts and external partners	-	Short-term, on-going	L	VH-I
11	Ensure there is a mechanism to provide regular updates on climate change adaptation, and progress with implementing this Plan, to the HC Environment and Sustainability Scrutiny Committee.	This will ensure senior Councillors and council leaders will be kept up to date on progress with the implementation of this Plan and allow for them to consider adaptation in the development of future policies.	HC Sustainability & Climate Change HC Member Support	-	-	Short-term	L	H
12	Ensure climate risks are embedded into corporate risk assessments and the Community Risk Register to enable addressing these risks to take place at a strategic level.	This will help to ensure climate risks and adaptation responses are considered in all decisions made by organisations and in the community, and that there is a recognition that the current risk level of factors such as flooding and heatwaves are unlikely to be accurate in the future.	HC EP LRF Other organisations that run capital projects	SWM EA Defra	-	Short-term	L	H

Action No.	Action	Justification	Possible delivery organisation(s)	Possible example partner(s)	Possible example funder(s)	Timescales for implement	Resource Intensity	Priority
13	Keep the Severe Weather Impact Assessment spreadsheet, that sits alongside this report, continuously up to date.	Linked to the below, this will allow the council and partners to better monitor how severe weather impacts the county to allow for better decision making as circumstances change. If possible, allow other authorities (e.g. fire service) to collaborate with the council for a more complete picture.	HC Sustainability & Climate Change	LRF Fire Service WW EA	-	Short-term, on-going	L	H
14	Collate a list of data sources and contacts that can be used to monitor the impact severe weather events have on the council/ county. Investigate use of the SWIMS tool to make this process easier.	This will help determine the impact of these weather events on people, services and from a financial point of view, allowing for better planning. SWM attempted to obtain much of this data for the purposes of the Impact Assessment that sits alongside this report, and it was huge challenge as, in many cases, either data were not collected or no-one knew who the data holder was. A central bank of data sources would be beneficial to allow quantification of weather related impacts and, over time, climate change impacts.	HC Sustainability & Climate Change, with input from various departments, particularly Floods	SWM Fire Service EA Police HWT WW AONB NT/HE Other partners	-	Short-term, on-going	L/M	VH
15	Establish a comprehensive database of projects that are, wholly or in part, focusing on climate adaptation in Herefordshire. Update this at least monthly.	This would help to ensure a joined-up approach to activity and enabling the sharing of good practice across the county to avoid 'reinventing wheels.'	HC Sustainability & Climate Change	Organisations working on climate adaptation projects	-	Short-term	L/M	H
16	Update this Plan annually to ensure actions are kept relevant and set up a monitoring process to ensure actions are being delivered with success measures identified. One of the first actions that HC should undertake is the development of a monitoring system that goes alongside this Plan to track progress.	This will ensure that the progress the county is making on climate adaptation will be maintained.	HC Sustainability & Climate Change	All partners listed	Defra EA	On-going	L/M	VH-I

Adaptation Action Plan: Natural Environment and Assets

Strategy, policy and engagement

Action No.	Action	Justification	Possible delivery organisation(s)	Possible example partner(s)	Possible example funder(s)	Timescales for implement	Resource Intensity	Priority
17	Ensure that climate change adaptation forms a key part of the emerging Local Nature Recovery Strategy (LNRS) for Herefordshire, and is embedded into any other biodiversity/ ecological focused strategy. This should include consideration of the role of Biodiversity Net Gain (BNG) (see below) and Environmental Net Gain and the role that the re-introduction of keystone species can have on (e.g.) water management.	Nature is struggling in no small part due to climate change. It will not recover unless the recovery options consider how nature may fare in a future climate. It is also a huge opportunity to use LNRSs to allow nature to become a significant part of the adaptation solution, by ensuring that new nature creation/ enhancement programmes help to reduce the impacts from climate change.	HC, Biodiversity/ ecology	EA HWT NE RSPB FC NT/HE	-	Short-term	L	VH
18	Integrate adaptation into the criteria for the selection of sites chosen for BNG.	HC has a role to play in achieving BNG of development projects by supporting developers to identify and prioritise mitigation sites. In addition to focusing on habitat connectivity and quality, additional criteria around climate adaptation could be included in the site selection process to strategically provide benefit through (e.g.) natural flood management approaches.	HC Biodiversity/ ecology	EA Defra NE HWT	-	Short-term	L	H
19	Embed climate adaptation into any natural environment/ natural capital working groups operating county-wide.	This will enable a more joined-up approach to ensure that climate adaptation is one of the main reasons for implementing any project or programme across the county, and that measurable outcomes are achievable.	HC, Biodiversity/ ecology	EA HWT NE FC RSPB	-	Short-term	L	H
20	Ensure that engagement takes place with organisations leading on wider catchment-based schemes, e.g. the River Severn Partnership, to ensure that activities taking place in nearby counties or tributaries consider the impact on Herefordshire.	Activities happening outside of Herefordshire that are taking place on rivers that flow through Herefordshire, such as the Wye and Lugg, could affect the water levels and river flows in Herefordshire and lead to consequential impacts such as a greater flood risk. Herefordshire's partners need to be around the table when key decisions are made in other areas to ensure the potential impacts on the county are considered.	HC, Economy & Environment EA	LEP HWT NE WW Others involved in River Severn Partnership	EA	Long-term, on-going	L/M	VH

Action No.	Action	Justification	Possible delivery organisation(s)	Possible example partner(s)	Possible example funder(s)	Timescales for implement	Resource Intensity	Priority
21	Lobby for, apply to and, if possible, establish long-term funding options for natural environment restoration programmes, such as examples listed I this Plan, that will result in a more joined up approach to projects, where county-wide partners can work collaboratively. Utilise existing public and private funding options that currently focus on other areas, e.g. carbon, catchment and nature markets to integrate adaptation activity where feasible. Ensure that funding conditions include evidence that projects will include climate adaptation measures.	It is recognised that funding will be key to implementing many of these activities. Ideally, funds will be set up nationally and allow for joint/cross-boundary bids to reduce the risk of fragmentation in responses. Local organisations and support bodies should lobby Government for this emphasising the objectives of the 25 Year Environment Plan.	Various local partners working collaboratively	Various local partners working collaboratively	LEP (local) Defra, EA, NE (national) Post-EU funding options / SPF	Medium-term	M	VH

Practical nature-based projects to help enhance adaptation

Action No.	Action	Justification	Possible delivery organisation(s)	Possible example partner(s)	Possible example funder(s)	Timescales for implement	Resource Intensity	Priority
22	Capitalise on the rollout of local tree-planting programmes by ensuring that all schemes contribute to climate adaptation objectives, e.g. that they help to reduce flood risk, contribute to urban cooling etc, continuing to adhere to the 'right tree, right place' concept. Utilise the Forestry Commission's Woodland Creation Offer, where climate resilience is a key objective, and consult the 'Managing England's woodlands in a climate emergency' publication to support informed decisions on projects.	Most new tree planting schemes have the primary aims of meeting Net Zero targets or biodiversity benefits in mind, but by planting the right trees in the right place, all future schemes could also have positive impacts on helping alleviate the impacts of climate change too. Ensuring the new trees are also likely to be resilient to a future climate would also be beneficial.	HC, Biodiversity/ ecology	HWT FC EA NE Defra NT/HE Nurseries should also be consulted to ensure demand can be met locally	HWT FC EA NE Defra	Short-term, on-going	L/M	VH

Action No.	Action	Justification	Possible delivery organisation(s)	Possible example partner(s)	Possible example funder(s)	Timescales for implement	Resource Intensity	Priority
23	Use lessons learnt from urban greening programmes, such as the Sunrise project in Stoke, to establish equivalent programmes in urban areas where species are at greatest risk, and ensure core objectives of these programmes include climate adaptation, e.g. flood alleviation, urban cooling etc. This could also link with urban tree planting initiatives (see above). Lessons can also be learned from the Manchester Ignition Project.	Urban greening has multiple benefits, from protecting urban species to improving health and wellbeing, to climate mitigation and adaptation. Rolling out programmes similar to Sunrise could result in a huge boost to urban areas, especially those at risk of flooding, and link to other key outcomes around wellbeing and local economic growth.	HC, Biodiversity/ ecology GWWM	HWT FC EA NE RSPB C&RT	LEP Defra EA NE	Long-term	M/H	H
24	Assess the resilience of Herefordshire's urban parks and green spaces, considering both the biodiversity of the park and its users. Integrate adaptation measures where appropriate, such as strategic tree planting, water meadows, changing mowing regimes, installing drinking water fountains, planting more drought-resistant species etc.	Our parks have become ever more important in our society, especially since the impact of Covid-19, for both urban wildlife and users. Ensuring they are fit for a future climate is hugely important and will help to contribute to a range of objectives around biodiversity, health and wellbeing and alleviation of air pollution. This is especially important, given that green spaces may be used more in future if summer conditions become more favourable.	HC, Biodiversity/ ecology BBLP GWWM	Community groups HWT RSPB NE NT/HE	LEP Defra NE	Medium-term	M	H
25	Assess those areas that may be most prone to outdoor fires and provide signage and guidance at these sites encouraging users not to exacerbate the risk, e.g. by having barbecues, campfires etc. Access the Wildfire Risk Map stated in the Forestry Commission's ARP report as a starting point, if possible.	Many local stakeholders are concerned about the future risk of fire in Herefordshire due to its rurality and evidence of increases in fires in recent hot years. Many fires are started by people, therefore simple messaging to encourage people not to provide an ignition in prone areas is a simple starting point.	HC, Biodiversity/ ecology Fire Service	HWT FC NT/HE AONB	Defra NE LEP	Short-term	M	H

Action No.	Action	Justification	Possible delivery organisation(s)	Possible example partner(s)	Possible example funder(s)	Timescales for implement	Resource Intensity	Priority
26	Continue the implementation of Nature Based Solutions and Natural Flood Management (NFM) projects (such as floodplain woodlands, river restoration projects etc.) in areas where they would be of most benefit. Continue to learn lessons from previous successes (e.g. NFM pilot project, Yazor Brooks restoration project), and ensure all partners are engaged in scoping and projects are logged on relevant databases (see Action 15).	NFM projects can provide multiple benefits alongside flood alleviation, including biodiversity improvements and reducing pollution. These should continue as the most nature-friendly way of alleviating flood risk, but could be done more collaboratively for quicker gains on a greater scale.	EA HC, Biodiversity/ ecology, flood risk	All of the partners listed here that in some way look after the natural environment	EA NE Defra	Short-term, on-going	M/H	VH-I
27	Possibly as part of the new Wye Adapt to Climate Change Programme, undertake a risk assessment that looks at the key species and locations within the boundary of the AONB to determine how climate change may affect them, and produce a climate change adaptation plan for the AONB area, collaborating with key partners to ensure other activities that are taking place within the AONB's boundary are considered and joined up.	The AONB is a hugely valuable asset for the county and rich in vulnerable species. Protecting this from the worst impacts of climate change will not only locally help mitigate the ecological crisis, but ensure the economic pull that the AONB provides by way of tourism is maintained for future generations to enjoy.	AONB HWT HC and other councils	All of the partners listed here that in some way look after the natural environment	Defra EA Councils working together	Short-term	M	H
28	Identify, through research and mapping, those species that are less mobile and that may not be able to migrate to more favourable locations as climatic changes occur. Involve community groups and volunteers in this process.	Less mobile species, i.e. those species that cannot easily relocate to areas that are more favourable climatically, could be lost due to climate change, greatly affecting the ecosystems that they a part of. Identifying those species most likely to be at risk, and where they are, represents a first step in ensuring their protection so that actions can be considered for their safe relocation.	HC, Biodiversity/ ecology HWT	EA Defra NE FC RSPB	Defra NE LEP	Short-term	M	H

Action No.	Action	Justification	Possible delivery organisation(s)	Possible example partner(s)	Possible example funder(s)	Timescales for implement	Resource Intensity	Priority
29	Build on existing work and use existing evidence, research, surveys and mapping to identify which of Herefordshire's habitats, species and crops could be most at risk of the negative impacts of new pests, pathogens or invasive, non-native species which are more likely to establish themselves as a result of climate change. If possible, obtain data from the Forestry Commission's TreeAlert system to aid this identification.	Given the high urgency of this risk, such an exercise would represent a first step to help prepare for an increase in pests, pathogens and non-native, invasive species to protect ecosystems from their most negative consequences, and potentially benefit from opportunities new species may bring. Following this, more targeted measures could be identified. Organisations (e.g. NT, AONB) have been assessing this risk on their own sites, so initially a coordinated and consistent approach could be established across the county to ensure everywhere is covered.	HC, Biodiversity/ ecology HWT FC	EA Defra NE RSPB NT/HE AONB	Defra NE FC	Short-term	M/H	VH
30	Alongside the above, set up community-led groups who routinely monitor the areas identified as potentially being most vulnerable to pests and diseases and utilise the TreeAlert system for more systematic logging of observed impacts.	Utilising community groups and volunteers for this exercise will encourage local people to help protect their nearby woods and forests, and monitoring on a more routine basis will ensure diseases are picked up early.	HC, Biodiversity/ ecology HC, Talk Community HWT, FC Local community groups	EA Defra NE RSPB NT/HE	Defra NE FC	Medium-term	M/H	VH
31	Also linking to the wider action on pests and diseases above, establish resources and people to the issue of the spread of mistletoe in orchard environments, driven in part by warmer, wetter winters.	This problem has already established itself in Herefordshire and could lead to ecological and economic issues related to the county's orchards. Funding and resource to support pro-active mistletoe management and training and equipping of people and/or volunteers is required, especially given that climate change is likely to exacerbate warmer and wetter winters even further.	HC, Biodiversity/ ecology HC, Talk Community HWT, FC Local community groups	EA Defra NE RSPB NT/HE	Defra NE FC	Short-term	M	H
32	Monitor the colonisation of new species to determine which complement native habitats most favourably and have a positive impact on the county's ecosystems and that may be able to better withstand future climatic conditions.	Climate change will lead to new species colonies in terrestrial and freshwater environments. While some colonisations may lead to negative impacts, some may benefit the native ecosystems and landscape and boost biodiversity. Analysis and monitoring of such species will allow for better maintenance and a more resilient ecosystem.	HC, Biodiversity/ ecology HWT, FC Local community groups	EA Defra NE RSPB NT/HE	Defra NE FC	Medi-um-term	M	M

Action No.	Action	Justification	Possible delivery organisation(s)	Possible example partner(s)	Possible example funder(s)	Timescales for implement	Resource Intensity	Priority
33	Possibly as part of the Wye Adapt to Climate Change Programme, undertake detailed modelling of rivers and catchments in Herefordshire to determine their likely behaviour against a range of future climate scenarios, including the influence of sea level rise, to obtain a clearer picture of future water management practices that may need to take place to reduce both flood and drought impacts.	The impact climate change could have on the river system in Herefordshire (especially the River Wye) could have significant consequences on the whole county in terms of both flood and drought risk. Potentially linking with the work of the River Severn Partnership, undertaking future scenario modelling of river behaviour may help to identify key risks that may arise, and locations and sectors that may be most affected, should climate change alter this behaviour in a significant way.	EA HC Flood risk HWT/AONB Technical consultancies	IDBS WW/STW Others involved in River Severn Partnership	EA	Short-term, on-going	M/H	VH-I

Adaptation Action Plan: Infrastucture

Highways and travel

Action No.	Action	Justification	Possible delivery organisation(s)	Possible example partner(s)	Possible example funder(s)	Timescales for implement	Resource Intensity	Priority
34	Undertake an assessment/ mapping exercise on the local road network (i.e. those not managed by National Highways) to determine which are most likely to be at risk from failing in future climatic conditions, including the potential implications this has on allocated diversionary routes. This should include areas most vulnerable to flood risk, slope failure, drainage pressure/ inundation and damage caused by storms or overheating, coupled with the strategic importance of the road and popular bus routes. Learn from National Highways approach on adaptation to identify potentially suitable responses and work with them given the required connectivity of the Strategic Road Network and local roads.	National Highways are invited to report on adaptation as part of the ARP but local authorities that manage local roads are not. Therefore, all such roads in the county need to be assessed for their likely ability to cope in a future climate to ensure connectivity is maintained.	HC Highways BBLP	HC flood risk NH DfT EA WW	LEP DfT EA	Medium-term	M/H	VH

Action No.	Action	Justification	Possible delivery organisation(s)	Possible example partner(s)	Possible example funder(s)	Timescales for implement	Resource Intensity	Priority
35	Utilise telemetry and warning systems to provide alerts and notifications of issues on the road network caused by severe weather events (e.g. flooding) in key locations to enable more rapid response.	If alerts are set up to operate in locations where the road network is most relied upon, this could help improve the response and rapidity in which roads can reopen following a severe weather event.	HC Highways BBLP	HC flood risk EA Met Office	-	Short-term	L	H
36	Prioritise adaptation measures, such as improved drainage, green infrastructure integration and 'cooling stations,' such as water fountains and shaded benches, on the most popular walking and cycling routes across the county.	There is a need to prioritise and expand walking and cycling opportunities as part of the county's Net Zero commitments, and one way to do this will be to ensure the most used routes are as resilient to climate change impacts as possible, to ensure they are 'reliable' routes for users.	HC Highways BBLP	Sustrans Living Streets	LEP	Medium-term	M/H	H
37	Ensure the highways biodiversity improvements as specified in the council's 'Zero Carbon and nature rich: Herefordshire's Action Plan for Transport' are considering their resilience to climate change impacts, and whether areas prioritised for improving verges etc. are done so also with adaptation in mind.	For any project where the aim is to improve biodiversity, consideration should be given to whether the species planted are fit for purpose, and whether cutting and maintenance regimes need to change. There could also be an opportunity to prioritise biodiversity improvements around roads that are most vulnerable to (e.g.) flooding, and whether 'rewilding' such areas can lead to a reduction in climate risk.	HC Highways BBLP	HC Landscape/ ecology	LEP NE EA	Short-term	L	H
38	Undertake an inspection of all council-owned bridges and structures (e.g. those outside the jurisdiction of Network Rail, National Highways etc.) to check their viability in a future climate, and their potential likelihood for erosion, and prioritise maintenance and adaptation measures on the most vulnerable coupled with the strategic importance of the bridge.	Bridges have been identified as being especially vulnerable to climate change due to their fragile structure and that they often enable connections over water bodies which are likely to flood more often. An assessment of those owned by the council, alongside an analysis of other critical structures, should be taken to prevent the risk of failure, damage and subsequent connectivity issues.	HC Highways BBLP	HE NR DfT EA WW C&RT	LEP	Medium-term	M/H	H

Action No.	Action	Justification	Possible delivery organisation(s)	Possible example partner(s)	Possible example funder(s)	Timescales for implement	Resource Intensity	Priority
39	Ensure new local buses and trains are fitted with air cooling devices to minimise the risk of passenger overheating.	Bus and train use will continue to be a priority to help meet the county's Net Zero targets. There is an opportunity to take advantage of the rollout of new electric/ hydrogen buses and trains to ensure they are also fitted with air conditioning or equivalent technology to ensure they are cool in summer, to maintain passenger numbers.	HC transport Bus operators such as First, Yeoman's etc.	DfT	Bus operators LEP	Medium-term, on-going	M/H	M
40	Ensure climate adaptation is integrated into the design and planning for new infrastructure assets (new roads, sub-stations, drainage etc.). Ensure climate change and its impacts are addressed consistently across the county to support this approach.	Such standards will ensure any new infrastructure will stand the test of time, preventing damage and saving money in the long-term, while keeping the county connected.	All infrastructure providers HC	-	-	Short-term	M	VH

Water and waste management

Action No.	Action	Justification	Possible delivery organisation(s)	Possible example partner(s)	Possible example funder(s)	Timescales for implement	Resource Intensity	Priority
41	Continue the funding and rollout of strategic flood management schemes and ensure that any properties (residential or commercial) that are not protected by such schemes, but remain vulnerable to flooding, are considered for property/site-level flood resilience measures.	Flood risk is increasing and will continue to do so and it is unfortunately the case that some areas of Herefordshire will be impacted more often by more severe flooding in the future. Work to identify where existing interventions will largely prevent flooding versus those areas where flooding is still likely to occur should take place, prioritising the latter for property/site-level flood resilience measures.	EA HC flood risk	WW STW NFF LRF	EA Defra	Long-term, on-going	H	VH
42	Ensure that all new flood management schemes, be they 'hard engineering' schemes or nature-based schemes, continue to consider future flood risk as a result of climate change. Also, analyse existing schemes to ensure they remain fit for purpose in future.	Flood schemes, especially those that use harder engineering techniques, require significant investment and, if they are not considering future flood risk, could be a waste of money if they begin to fail in a few years' time. Similarly, existing projects may be at greater risk of failing in future. All projects should be assessed to determine their effectiveness in a future climate, and continuously monitored as the climate changes over time, using an adaptive pathways approach.	HC flood risk EA Technical consultancies	WW Various partners involved in nature-based schemes	HC EA	Short-term, on-going	M	VH

Action No.	Action	Justification	Possible delivery organisation(s)	Possible example partner(s)	Possible example funder(s)	Timescales for implement	Resource Intensity	Priority
43	A Climate Change Adaptation Plan and risk assessment needs to be developed by Welsh Water, covering resilience of assets, supply, and operations. Build on existing activity, such as linking to the Incident Response Manual and other strategies, and projects such as increasing bottled water when required, rolling out standby generators and water saving programmes (see below).	Most water companies in England (including Severn Trent) produce adaptation plans, using the ARP mechanism as motivation. There is no evidence that WW have produced a plan, and this is a critical first step to ensuring it is as prepared as possible for the impact climate change could have on the county's water supply and management.	WW	HC flood risk	Welsh Govt	Short-term	M	VH
44	Build on existing water saving programmes and new Government measures and expand to all Herefordshire households and businesses to raise awareness of simple, cost-effective measures that all residents and employees can take to reduce their water usage. Establish a consistent message across the whole county (i.e. ensure Severn Trent and Welsh Water collaborate).	Supply will become more constrained in future as a result of drier summers and an increasing population. If all residents and businesses saved a small quantity of water each year it could result in a significant cumulative saving, reducing pressure on our water supplies. It will also help support any existing resilience plans being implemented by Welsh Water.	WW	STW HC Public Health HC Talk Community Housing Associations	-	Short-term	L/M	H
45	Ensure waste management practices, storage and treatment facilities are robust to withstand future climatic conditions, including flooding and heatwaves. Currently, new waste and other activities subject to environmental permitting (such as minerals, agriculture and chemical plants) need to undertake a climate change risk assessment if active for five years or more, according to EA guidance.	The impact of flooding and extreme heat on waste that is left untreated could be consequential from a public health and environmental perspective. Along with continued efforts to reduce, re-use and recycle, we need to ensure that any waste we do treat is done so with a future climate in mind. Landfill, incineration and waste handling, treatment and recycling operations need to be resilient to climate change and extreme weather events, and specifically assess the risk of pollution incidents from flooding.	HC Waste Mgt Waste contractors/ operators	Defra Wrap Technical consultancies West Midlands Resource Technical Advisory Body	Waste contractors EA Defra	Medium-term	M/H	H
46	Ensure all other sectors and businesses which require environmental permits, such as for activities involving potentially harmful substances, cement works, petrol stations etc. assess all impacts of climate change on their operations.	As with waste management sites above, it is important that risk assessments and adaptations are thoroughly conducted on all sites where environmental permits are required, given the disruption of operations and potentially harmful impacts these sites could have on the surrounding area (e.g. contamination of flood water).	HC Technical consultancies	Defra Industry	EA Defra	Medium-term	M	H

Action No.	Action	Justification	Possible delivery organisation(s)	Possible example partner(s)	Possible example funder(s)	Timescales for implement	Resource Intensity	Priority
47	Minerals extraction, a practice which is also subject to environmental permits, frequently involves water abstraction and, therefore, should be subject to consideration for climate adaptation given pressures on water availability in the environment. The restoration of mineral sites also offers wide ranging climate adaptation opportunities including flood alleviation, water resources and green infrastructure.	Operations could be disrupted if future climate scenarios are not borne in mind. Moreover, there are opportunities for adaptation during the restoration of minerals sites which should be considered in appropriate locations and potentially on a strategic level at a river catchment scale.	HC Technical consultancies and operators	Defra Minerals industry Landowners/ NFU Wildlife and environmental organisations	EA Defra Minerals industry	Medium-term	M	H

Adaptation Action Plan: Health, Communities and the Built Environment

Health

Action No.	Action	Justification	Possible delivery organisation(s)	Possible example partner(s)	Possible example funder(s)	Timescales for implement	Resource Intensity	Priority
48	Conduct an assessment of all hospitals, care homes and other health centres that support physically and mentally vulnerable people in Herefordshire to identify which are most at risk of overheating and identify the most suitable measures to reduce overheating risk, such as implementing green infrastructure, better ventilation etc, and how these could link with potential measures to achieve Net Zero.	Such locations contain some of the county's most vulnerable people, especially if they are elderly and have underlying physical or mental health conditions. All such properties are likely to overheat more often in future if they have not been constructed with climate change in mind, meaning that there is a greater likelihood of mortality as a consequence of extreme heatwave conditions. An assessment of where this risk is greatest, and subsequent measures, will help to prioritise action.	HC Community wellbeing NHS Technical consultancies	UKHSA Other health bodies BRE HC Public Health	DHSC UKHSA NHS	Medium-term	H	VH-I
49	Alongside the above, ensure all healthcare settings are aware of the Heatwave Plan for England (updated annually), disseminate this guidance and apply it to their own settings where relevant.	This is a quick win as the heatwave plan already exists and it should be used by all healthcare settings in the county when a heatwave occurs to ensure staff and residents are as protected as possible.	HC Community wellbeing NHS	UKHSA DHSC Other health bodies	-	Short-term	L	M

Action No.	Action	Justification	Possible delivery organisation(s)	Possible example partner(s)	Possible example funder(s)	Timescales for implement	Resource Intensity	Priority
50	Ensure Wye Valley NHS Trust, with support from the Integrated Care System (ICS), takes the opportunity of the requirement to develop 'Green Plans' by integrating effective adaptation measures into these plans to help ensure hospitals and other NHS health settings are protected from the impacts of a future climate. Use SWM's forthcoming adaptation guidance for the NHS to assist with this and, if necessary, produce a separate adaptation plan.	The 'Green Plans' largely focus on ensuring the NHS meets Net Zero targets, although there is a section for adaptation. Also, many actions that can be taken to achieve Net Zero could also help to adapt to a future climate, such as improving building ventilation and green infrastructure. Integrating adaptation into these plans across Herefordshire will ensure the NHS Trusts are better prepared for future climatic conditions.	HC Community wellbeing NHS	Greener NHS SWM	-	Short-term	L/M	VH
51	Work with all relevant partners to ensure that climate risks are addressed and considered in the commissioning and provision of all new health and social care services and assets, referring to the NPPF for details on new developments and climate change.	The impacts of climate change will affect the most vulnerable in society the most, so it is critical that climate risk planning is embedded into all aspects of the social care system and that people who need greater support during heatwaves, flood events etc are provided with it.	HC Community wellbeing UKHSA NHS	GPs HC Public Health	UKHSA	Short-term	M	VH
52	Ensure climate risks to health, buildings and infrastructure that affect hospitals, care homes, GPs and other health and care settings are embedded into corporate risk / business continuity plans.	This will ensure such risks can be considered more routinely and discussed and monitored by risk professionals within the heart of the health and social care sector.	NHS, GPs HC EP Other health and care providers	LRF UKHSA	-	Short-term	L	VH-I
53	Take advantage of longer, drier summers by encouraging flexible lifestyle choices to enhance physical and mental health and wellbeing. This could include changes to working patterns, promotion of use of outdoor spaces or encouraging uptake of outdoor past-times to boost local tourism and economic opportunities.	One potential benefit of climate change is that we will see more favourable summer conditions for outdoor recreation. There is the potential to improve health and wellbeing of communities by undertaking and encouraging more outdoor activities and adopting of an outdoor lifestyle synonymous with warmer countries overseas. This, alongside subtle changes to existing lifestyles, could allow for more opportunities to improve health outcomes.	Visit Herefordshire HC Economic Development Community groups	GWWM HWT RSPB NE	LEP Defra NE	Medium-term	L	M

Communities and engagement

Action No.	Action	Justification	Possible delivery organisation(s)	Possible example partner(s)	Possible example funder(s)	Timescales for implement	Resource Intensity	Priority
54	Support and strengthen early warning systems and communications of weather thresholds which trigger identified climate impacts and responses. Learn from existing local flood warning systems that some Herefordshire communities already use and determine whether they are fit for purpose in other areas.	The Met Office already provide an early warning system when severe weather events are due to take place. However, as a result of climate change, a review should be undertaken around the communication of warnings to the most vulnerable communities, households, businesses, and other organisations and identify areas for strengthening or additional communication channels, as technology and media rapidly develop.	HC EP LRF	HC Sustainability & Climate Change Met Office	-	Short-term	L	H
55	Establish community resilience programmes in areas where climate risks and demographic vulnerabilities intersect (see Annex 1), to ensure these areas are better prepared for more frequent and intense extreme weather events (flooding, heatwaves and storms), and can respond and recover more effectively. This could also include an analysis of the impacts on homeless people, and interventions to help protect them from extreme conditions. Work with Flood Groups and expand on the community resilience plan templates to produce a climate adaptation/ severe weather plan for vulnerable and isolated locations/ parishes that are at risk of being cut off during periods of (e.g.) extreme flooding.	Through existing mapping and tools such as Climate Just, there is good evidence that shows the Herefordshire communities that would struggle to cope in the event of an extreme weather incident; this could be due to the demographic of the residents, their rural isolation or being in (e.g.) a flood risk area (and also see Annex 1). Such communities will need better protection and support to prevent issues such as displacement or health implications.	HC EP, Flood risk, Talk Community EA LRF	NFF Local community organisations Parish councils	EA Defra MHCLG LEP NLCF	Short-term, on-going	M	VH-I
56	Utilise 'The Great Collaboration' toolkit, developed to support local communities and residents to help them take action to reduce carbon, and develop this to promote and suggest actions that may also help improve climate resilience.	This is an excellent, simple to use tool and is an established mechanism that one could use to help communities adapt to climate change, by integrating adaptation benefits into existing measures (e.g. promoting the benefits of shading when planting a tree) or developing a selection of new measures into the toolkit.	HGN HC	Local community organisations	-	Short-term	L	M

Action No.	Action	Justification	Possible delivery organisation(s)	Possible example partner(s)	Possible example funder(s)	Timescales for implement	Resource Intensity	Priority
57	Linking with the above two actions, investigate how climate resilience can be embedded into Parish Council neighbourhood and emergency plans; these could be adapted to form the basis of a more specific severe weather plan for their local area.	Parish councils could have a significant role to play in enhancing community resilience, and embedment into their existing plans is a good way to strengthen local resilience, especially if done side-by-side with engagement schemes (see action 55).	HC, Talk Community HC, Neighbourhood Planning Parish Councils	Other local community organisations	-	Medium-term	L/M	H
58	Rollout advice and guidance on what residents should do if they are affected by an extreme weather event (e.g. flood, heatwave etc.), and provide resilience kits to homes, prioritising communities such as those outlined above (see Annex 1), so that they can respond quicker in the event of extreme weather. Consider alternative support for homeless people who may be unable to find shelter during periods of extreme weather.	This will enable householders and communities to be better prepared for a greater frequency and intensity of extreme weather events and reduce strain on local emergency services and health centres.	HC EP, Flooding, Housing Fire Service Housing Associations	SHAP Parish councils Local community organisations	MHCLG EA NLCF	Medium-term	M/H	H
59	Expand on the Talk Community 'warm spaces' initiative to also provide details of 'cool spaces,' where people can go during hot summer weather to cool off, especially if their home is prone to overheating, they are homeless, or they have an underlying health condition that could make them more at risk of complications.	This will enable vulnerable residents to be able to access (indoor or outdoor) places that are cooler than their homes during the daytime, to minimise the risk of any health issues occurring and reduce the pressure on hospitals and other healthcare settings. Having the warm spaces programme in place should allow for easier implementation of an equivalent for hot weather.	HC, Talk Community	Housing Associations Parish councils NHS	UKHSA NHS	Short-term	M	H

Planning, retrofit and design

Action No.	Action	Justification	Possible delivery organisation(s)	Possible example partner(s)	Possible example funder(s)	Timescales for implement	Resource Intensity	Priority
60	Ensure planning decisions adhere to the National Planning Policy Framework (NPPF), which states that new developments avoid flood risk in accordance with the sequential test in the NPPF and inappropriate development is directed away from areas of existing or future flood risk. New developments should not cause flooding elsewhere and be resilient to the impacts of climate change.	New developments that are not likely to be protected by strategic flood defences but that are allocated to flood risk areas should be moved elsewhere, as stated by the NPPF, given the upheaval that the flooding of homes causes. This should also include how the current flood risk could change due to climate change, ensuring all developments are fit for future scenarios.	HC Planning Developers	EA NFF	EA MHCLG LEP	Short-term, on-going	L	VH
61	Ensure the new Core Strategy includes the requirement to assess all new developments for their resilience to climate change, including overheating, and includes a strategy to safeguard areas from development that can (e.g.) help to reduce flood risk, e.g. water meadows. Develop a new/updated SPD to support the rollout of adaptation measures (SUDS, rainwater harvesting, overheating prevention measures etc.) and that these adhered are to by developers. Build on the existing Herefordshire Future Homes Standard advice.	The Core Strategy is now quite old and SPDs are required to flow from these. As the new Core Strategy is developed, there is an opportunity to ensure that adaptation forms an integral part of this and, subsequently, SPDs can be produced that can then provide more detailed guidance on how developers can consider the integration of adaptation measures into new developments.	HC Planning Developers	EA TCPA	EA MHCLG	Medium-term, on-going	L/M	VH
62	Ensure climate adaptation standards are considered when building new homes to high Net Zero standards, i.e., use the progress on Net Zero design to integrate adaptation measures that also help to reduce carbon. This could include natural ventilation to improve thermal performance and comfort during heatwaves, natural greening, roof reflectivity, and rainwater harvesting and water storage to reduce freshwater use. Design guidelines should be produced for large capital investment projects, which set out how to use locally specific climate projections and adaptation options.	People's health is at risk from climate change impacts, and it is the case that many new developments are not prepared for future conditions, potentially exacerbating these health concerns. There is the opportunity to ensure all new builds consider adaptation measures from the outset to make homes resilient for decades to come.	HC Planning Developers	BRE	EA MHCLG LEP	Medium-term	M	VH

Action No.	Action	Justification	Possible delivery organisation(s)	Possible example partner(s)	Possible example funder(s)	Timescales for implement	Resource Intensity	Priority
63	Ensure all existing and new SUDS schemes are subject to a regular monitoring and maintenance procedures to ensure continued, long-term effectiveness.	SUDS will be critical to the flood alleviation of developments and flood prone locations, and ensuring a rigorous and frequent monitoring and maintenance regime will be crucial to ensure they remain fit for purpose.	HC Planning Developers	EA NFF	EA MHCLG LEP	Short-term (existing), medium-term (new)	M	H
64	Ensure climate adaptation actions are incorporated into the council's 'climate checklist for planning applications,' e.g. water efficiency measures, shading options, better ventilation to reduce the overheating risk, green roofs, greywater recycling etc.	This checklist is already established and little work would be needed to ensure that adaptation forms a key a part of it, giving developers options on how to ensure new housing developments are resilient for a future climate.	HC Planning, Sustainability	Developers EA	-	Short-term	L	H
65	Review planning regulations for farmers to (e.g.) allow them to construct appropriate infrastructure to be better able to store rainwater to prevent flooding and for use during periods of water scarcity.	Given the importance of agriculture to the local economy, and the critical role it plays in maintaining food supply for the UK, it is important that flexibility is given to enable farmers to do more to ensure there is a more stable water supply available to them throughout the year, even during periods of water scarcity. Reviewing planning regulations which may stifle innovation is the first step.	HC Planning NFU Defra	EA WW	Defra	Medium-term	L/M	H
66	Ensure home retrofit programmes that are required alongside the delivery of Net Zero targets integrate adaptation measures where possible, such as installation of water efficiency measures, shading options, better ventilation to reduce the overheating risk and to improve indoor air quality, etc.	Retrofitting existing homes is always a challenge but is necessary if we are to achieve our Net Zero ambitions. Given the council's commitment to retrofit, adaptation measures should be considered alongside as homes will become increasingly unable to deal with future climatic conditions as they age, leading to health, displacement and financial issues for occupants.	HC Planning Developers	BRE	EA MHCLG LEP	Medi-um-term	M/H	VH

Assessment, research and monitoring

Action No.	Action	Justification	Possible delivery organisation(s)	Possible example partner(s)	Possible example funder(s)	Timescales for implement	Resource Intensity	Priority
67	Conduct an assessment of all schools in Herefordshire, prioritising specialist schools where the most vulnerable children attend, to identify which are most at risk of flooding and overheating and identify the most suitable measures for adaptation, such as site-level flood resilience, green infrastructure/SUDS, water efficiency measures etc.	Most schools are likely to overheat more often in future and be at greater risk of flooding if they have not been constructed with climate change in mind, meaning that conditions for education will become more challenging and repair costs will become greater. An assessment of where these risks are greatest, and subsequent measures, will help to prioritise action.				Medium-term	H	H
68	Build on the National Trusts' existing work to ascertain which heritage-sensitive areas in the county are most at risk of negative impacts from climate change and set out options for adaptation in the form of a plan. Align discussions with Historic England's approach to adaptation under their ARP requirement.	Herefordshire is home to a range of significant heritage assets, bringing economic and environmental benefits to the area. Given their historic sensitivity and often remote locations, many of these properties and landscapes are likely to be a high risk of the impacts of climate change. A first step will be to prioritise which assets are of greatest risk and outline options to deal with these.	NT HE	HC Biodiversity FC NE	NLHF Defra NE	Medium-term	M	H
69	Monitor changes in vector-borne diseases as a result of climate change to provide more accurate advice on where and when the likely hotspots in the county will be, and what to do if affected.	Vector-borne diseases from insects such as ticks and mosquitos are likely to increase due to climate change. These can cause serious diseases in humans and need to be monitored closely over time.	UKHSA Defra	DHSC NE	UKHSA Defra	Medium-term, on-going	M	H
70	Ensure monitoring of food safety and security as a result of climate change, especially hotter conditions, is taking place (see also Action 85).	This has been identified as a significant risk in the UK CCRA, and it is as yet unclear what activity on this is taking place nationally. Herefordshire needs to ensure work is going on to ensure a safe and secure food supply, by working with the agriculture industry.	FSA Defra	NFU	FSA Defra	Medium-term	M	M

Adaptation Action Plan: Business and Industry, including Agriculture

Business resilience

Action No.	Action	Justification	Possible delivery organisation(s)	Possible example partner(s)	Possible example funder(s)	Timescales for implement	Resource Intensity	Priority
71	Run an engagement programme with SMEs to encourage them to prepare for a future with more flooding, water scarcity and overheating. Utilise SWM and the EA's Weathering the Storm guidance to assist with this.	Such engagement, combined with more general business continuity planning and sharing good practice, will enable businesses to protect themselves from losses and supply chain disruption due to future weather shocks.	HC Econ Dev HC EP SWM	BITC FSB Chambers LEP	DB&T LEP EA	Short-term	L/M	H
72	Provide advice and guidance to businesses on how to operate in heatwave conditions. Priority should be on employee health and wellbeing, especially in businesses that require manual labour and outdoor working, with guidance extended to include dress code and working at home options.	As summers become hotter, more business premises will overheat and become difficult for workers to concentrate and potentially lead to negative health impacts, leading to reduced productivity. Businesses need to be flexible during such conditions, but also provide advice so that employees can keep themselves as cool as possible.	DB&T UKHSA	FSB BITC Chambers	DB&T UKHSA LEP	Short-term	L	H
73	Ensure as many businesses as possible, especially those in flood vulnerable areas, sign up to the EA flood warnings service.	This will allow businesses to prepare more effectively for flooding when it is likely to occur, minimising the potential costs as a result.	EA	SWM BITC FSB Chambers LEP HC Econ Dev HC EP	EA	Short-term	L	H
74	Promote and encourage uptake of ISO 14090:2019 that will allow businesses to commit to and demonstrate progress on adaptation. Integrate this with the development of a new business pledge, similar to that of the West Midlands Net Zero Business Pledge, but instead for adaptation.	This approach would give businesses a framework and incentive for action and provide the opportunity for businesses to share learning and progress with each other on adaptation. Ultimately, it would result in a greater number of businesses more prepared for climate change impacts.	HC Econ Dev LEP Chamber	SWM BITC FSB	DB&T	Short-term	L/M	H

Planning, retrofit and design

Action No.	Action	Justification	Possible delivery organisation(s)	Possible example partner(s)	Possible example funder(s)	Timescales for implement	Resource Intensity	Priority
75	Ensure adaptation measures are considered during the upgrade, refurbishment or retrofit of any public or private sector building, e.g. rather than just consider upgrading fabric or ventilation for carbon reduction purposes, consider the impact on thermal comfort, especially during heatwaves. Integrate adaptation into the retrofit strategy to ensure measures are considered consistently.	There is significant funding for retrofitting (especially) public buildings at present. HC has been successful in accessing some of this, however, there is no stipulation to consider the impact the upgrade works will have on adaptation. This must be factored in to ensure that upgrades consider future climate risks, especially overheating, and whether other opportunities could be integrated into a building refurbishment, e.g. installation of greywater recycling.	HC – Sustainability & Climate Change HC Property Services Any public and private body in receipt of retrofit funding	DESNZ Innovate UK BRE	DESNZ Innovate UK	Medium-term	H	H
76	Ensure there is a requirement for all new commercial developments to include SUDS. Ensure the guidance builds on existing resources, is based on best practice and includes case studies (also see Action 61).	SUDS are an effective way of reducing flood risk in and around commercial developments and prevent the need for high cost, 'hard' flood defences. They can also provide other benefits such as to local wildlife. At present, implementation of SUDS within new developments is fragmented and not always based on best practice, therefore implementing guidance that must be consulted for all new developments is critical to maximising their effectiveness.	HC Planning	Developers	DB&T LEP EA	Medium-term	M	H
77	Ensure that conversion of brownfield sites across the county integrate adaptation measures, such as natural flood alleviation, SUDS and greening initiatives that benefit climate adaptation, and ensuring all new builds contain rigorous climate resilient standards. Where such sites are not suitable for development, consider appropriate site greening options (urban forests, parks, wetlands etc, such as the Essex Arms site).	Such sites, regardless of what their overarching use will be when they are complete, have the potential to represent exemplar 'resilient communities' by implementing adaptation measures, meaning that they can grow and thrive for decades to come.	HC LEP Technical consultancies	EA NE HWT	LEP	Long-term	H	H

Economic growth

Action No.	Action	Justification	Possible delivery organisation(s)	Possible example partner(s)	Possible example funder(s)	Timescales for implement	Resource Intensity	Priority
78	Ensure climate adaptation and resilience is embedded into refreshes of the LEP's Strategic Economic Plan or equivalent documents specifically for Herefordshire that set out local investment plans, demonstrating integration of adaptation solutions into new investment projects.	Future investment needs to be resilient to a changing climate, otherwise new projects could fail before they begin. Ensuring that investment strategies include adaptation as a core principle will ensure all funded projects are as resilient to a changing climate as they can be.	LEP HC Econ Dev	Technical consultancies DB&T Defra EA	-	Short-term	L/M	H
79	Use the Shared Prosperity Fund (SPF) and other funding sources as an opportunity to improve business resilience (including farming); e.g. rather than the Clean Growth Fund focusing solely on carbon reduction measures, use programmes such as this to enable businesses to (e.g.) install water saving measures or improve their thermal ventilation systems.	These funds and programmes provide a great opportunity to enable businesses to improve the resilience of their company by being able to install appropriate measures alongside carbon reduction activities, and future proof them for climate risks.	HC, Sustainability & Climate Change, Economic Dev	LEP	DB&T	Medium-term	L/M	H
80	Provide funding and acceleration opportunities for SMEs (including farmers) to develop adaptation solutions (technologies or processes) that could be used to help with climate adaptation responses, in a similar way to opportunities that are provided to SMEs for developing Net Zero innovations. This could be carried out in line with an analysis of the local adaptation sector and where there may be opportunities for growth and development of skillsets.	This will have the dual benefits of being able to harness the ideas and innovative solutions of SMEs and farmers to the climate crisis, while strengthening the local economy. We learnt from the Covid-19 pandemic how responsive and flexible SMEs can be; let's use this to our advantage.	LEP HC Econ Dev	SWM IAWM BITC FSB	DB&T Innovate UK	Medium-term	H	H
81	Enhance more sustainable procurement practices being considered by public sector bodies for the purposes of Net Zero to ensure that these practices are also building in a greater resilience to climate change.	This will help to diversify the SME (and agricultural) supply chain and reduce reliability on potentially vulnerable sources, especially if businesses rely on a supply chain that comes from a country abroad where climate change is likely to have an even greater impact.	LEP HC Procurement	Universities NHS All public sector	LEP DLUHC	Medium-term	M	H

Agriculture

Action No.	Action	Justification	Possible delivery organisation(s)	Possible example partner(s)	Possible example funder(s)	Timescales for implement	Resource Intensity	Priority
82	Expand on the existing Farm Carbon Audits to ensure adaptation is included in the audit process.	This mechanism has a great potential to embed adaptation measures (water management, nature-based solutions, shading, improving airflow in farm buildings etc) into advice provided by the carbon audits. It is recommended that there is one audit that includes both mitigation and adaptation, given the intersection between the two.	HC Sustainability & Climate Change	NFU HC, Landscape/ ecology AONB Rural Network	Defra	Short-term, on-going	L/M	H
83	Rollout and extensively promote the Weathering the Storm guidance documents for SMEs and Agriculture/ Land Managers respectively.	These documents aim to improve SME and land manager resilience to climate change, providing practical actions and solutions. They are resources designed for use by businesses and farmers across the country, including Herefordshire, and an easy win will be to extensively promote them across business and farming networks across Herefordshire.	SWM HC, Econ Dev NFU HGN Chamber	Various potential partners could assist with rollout	-	Short-term	L	H
84	Possibly as part of the Wye Adapt to Climate Change Programme, establish a programme of engagement on how farmers can effectively adapt both their business activities (e.g. crop types etc.) to climate change and contribute positively to local land management to help flood alleviation, especially in flood prone areas, through soil management techniques. Use the forthcoming SWM Weathering the Storm for Agriculture guidance (see above) to assist with this.	Farming represents such a high proportion of the Herefordshire landscape that adopting new land management practices to help alleviate flood risk could positively affect many local communities, and the farm itself. It could also help to address the issue of phosphate (and other forms of) pollution, a prominent problem in Herefordshire. Climate change also poses risks to the types of crops we can grow in the county, therefore raising awareness of alternatives or ways to protect existing crops would also be beneficial from a food security and economic perspective.	HC Sustainability & Climate Change HWT/AONB HC NFM Defra EA NFU Food Alliance Farm Herefordshire	NE WW NT/HE HWT	Defra EA	Medium-term	M	VH-I
85	Capitalise on local food and growing initiatives to reduce the need to import food from countries where there may be an increase in food safety, availability and quality due to climate change (see also Action 70).	Growing food locally has strong environmental and economic benefits, but can also help to reduce the need for the county to import food from other countries where supply and food safety may be compromised due to the impacts of climate change abroad.	HCNPB Local businesses and farmers Local community groups	Defra FSA	Defra LEP	Short-term, on-going	L	M

6 Case studies

Case study 1: River Wye and Lugg Natural Flood Management (NFM) Pilot Project

Herefordshire Council, working with partner organisations, delivered a NFM pilot project to reduce the risk of downstream flooding to Herefordshire communities and educate a range of people on the benefits of NFM. This pilot project was part of a £15m fund from Defra. Using further funding from the Flood Defence Grant in Aid and local levies is enabling the next stage of this project to continue to at least 2027.

Between 2018 and 2021, free advice on NFM recommending natural solutions and land management practices that would reduce flood risk was given to over 140 landowners and farmers, as well as signposting to funding opportunities and supporting landowners with funding applications around these practices, including the Natural Flood Management Construction Grant Scheme, administered by Herefordshire Council. 'Catchment Community Groups' provided an overview of the project's progress and allowed the Council and partners to learn from local knowledge on flooding. Two educational videos were produced, aimed at Key Stage 2 and Year 7 pupils, to share the benefits of land management and the impacts of different farming practices.

NFM techniques increase the ability of the land to hold water and slow the flow of water into watercourses, reducing the risk of flooding during heavy rainfall events. Other benefits include improving water quality, biodiversity and increasing the amount of good quality green and blue spaces publicly available. Some NFM techniques carried out as a result of this project include contour ploughing, planting cover crop between harvests, creating leaky dams with logs across watercourses or floodplains, creating new wetland areas and attenuation basins, managing existing ponds and wetland areas and planting trees and hedgerows.

Improving soil quality involves adopting practices which increase soil organic matter content and change soil structure e.g. planting deep rooted crops or using different land management techniques. Healthier soil increases the amount of water that soaks into soils and decreases the rate it flows through ('infiltrates') which, like features such as leaky dams, delays rainfall and water run-off reaching watercourses, preventing water levels getting high enough to flood. Wetland areas and attenuation basins allow water to be temporarily stored and the better these environments are managed, the more water they store, helping reduce water levels downstream.

A monitoring programme collected evidence on the multiple benefits that can be achieved through NFM. This includes river and rainfall monitoring, measuring moisture content in soils and determining soil health by analysing the soil's structure, organic matter content, worm count and infiltration rate.

Source: Natural Flood Management – Herefordshire Council
Image: Flooding in Herefordshire, © Herefordshire Council

Case study 2: Housing Retrofit for Adaptation

Connexus are a housing association working across Herefordshire and Shropshire with a particular focus on rural housing. They took over Herefordshire Council's housing stock in 2001.

In 2022, Connexus started a programme of retrofit works to improve the energy efficiency of over 230 properties across Herefordshire and Shropshire.

One completed site involves six blocks of Prefab flats near Putson Avenue in Hereford, significant for their 'Cornish Unit' style with distinctive sloping tiled roofs. An original proposal was put in to demolish all six blocks to build new apartments, but Connexus instead decided to carry out a retrofit project to improve the efficiency of the homes and the appearance of the blocks which are in a prime location overlooking the River Wye.

Funded by the Social Housing Decarbonisation Fund (SHDF), the Local Authority Delivery Scheme (LAD2) and the European Regional Development Fund (ERDF), this project included:

- Upgrading heating controls and providing new heating systems for 102 homes
- Replacing costly and inefficient oil heating systems
- Improving air tightness around windows and doors
- Fitting thermostatic showers
- Creating 'Cornish-style' tiled roofs with external insulation on flats

As well as improving the carbon footprint of the homes and reducing energy costs, this project will make these homes more resilient to increasing temperatures and severe weather such as storms and heatwaves, due to improvements made in ventilation, air flow and using enhanced materials.

Source: Connexus website and Hereford Times Article

Image: Retrofitted Prefab Cornish style block of flats found near Putson Avenue in Hereford, © picture courtesy of Connexus

Case study 3: 'Love Your River' Yazor Brooks Restoration Project

The Yazor Brooks (including Yazor, Widemarsh and Eign) run from a rural catchment into and through the city of Hereford. The 'Love Your River' initiative works to protect and improve the environment to make a better-flowing watercourse that supports wildlife, encourages communities to take custodianship over and enjoy green and blue spaces, and reduce impacts during flooding events.

'Love Your River' is coordinated by a community group including a core team of ecologists, geographers, a wildlife author, policy and public health professionals and documentary makers. The projects along these waterways are carried out by a partnership of the local community, the Wildlife Trust, Council, Environment Agency and groups such as Bugs and Beasties and the Wye and Usk Foundation.

Climate Adaptation
The group clear waterways, remove invasive species, manage the existing plants, and work with farmers upstream in Natural Flood Management (see case study 1). This all improves water flow and allows the brook and connected waterways to hold more water, both of which help prevent flooding. Blue spaces and the green spaces surrounding them help cool the area, reducing the overheating effect on people and wildlife during heatwaves.

Health and Community
Many of the projects involve the local community, including litter picking and wildlife surveys, and events are sometimes hosted along the brook to raise awareness and allow people to enjoy the space. This type of engagement can help people develop strong communities and spend more time in nature as users but also custodians, all of which has positive impacts on people's health and wellbeing.

Tackling Pollution
The project works with businesses along the brook to reduce runoff, abstraction and overdevelopment to help improve the water quality. Businesses are also encouraged to create spaces for wildlife to contribute to the wildlife corridor which can help their sense of corporate social value as well as benefitting the project.

Evidence for Nature Based Solutions
The teams carry out wildlife surveys, analyse water quality throughout the brook, and document their progress, building a strong evidence base for the benefits of waterway restoration for wildlife and biodiversity, climate resilience and public health.

Source: Herefordshire Wildlife Trust Website and visit this interactive map for ongoing updates
Image: Yazor Brook, © Anne Cottringer

Case study 4: Sustainable Urban Drainage Systems and enhanced water management

Mains water in Herefordshire is predominantly supplied by Welsh Water (with a small area covered by Severn Trent). Welsh Water are implementing a range of adaptation measures to ensure as little disruption to people's water supply as possible all year round. Examples of these measures include:

- Infrastructure solutions such as flood barriers
- Stand-by generators and alternative water stations to prevent disruption due to power outages or water system damages
- Increased emergency water reserves such as static water tanks and bottled water
- Emergency preparedness training such as for power outages at treatment works
- Reviewing past weather events to guide future interventions e.g., prioritising certain areas of facilities as 'pinch-points'
- Working with other flood risk management authorities such as the Environment Agency and Herefordshire Council to identify assets needing protection and to consider joint investment in these investigations and work
- More thorough risk assessment governance, embedding emergency preparedness and adaptation in decisions all the way up to Managing Director level

One particular project around adapting infrastructure to be more resilient to extreme weather was the Rainscape project. Completed in 2020 with approximately £80m spent by Welsh Water, this project aimed to reduce surface water flood risk by incorporating SUDS measures into traditional piped drainage systems.

Projects were carried out in a few different areas of Herefordshire where properties suffer from ongoing problems with flooding, including:

- Kings Acre, Hereford (significant works on the sewerage system)
- Bromyard (improvements to the existing sewerage network and the sewage pumping station)
- Lea (sealing manholes and repairing defects on the foul sewer in order to prevent the ingress of surface water)

Source: Herefordshire Strategic Flood Risk Assessment 2019
Image: River Wye near Symonds Yat © Pixabay

7 Strengthening the delivery of the County Plan

In developing this Plan, it is easy for us to focus purely on the need to adapt to climate change in light of there being a climate emergency, rather than consider the bigger picture. However, we understand that Herefordshire has very specific priorities that need to be taken forward, and we need to consider these priorities in this Adaptation Plan, which we have tried to do throughout the process.

We would like to demonstrate this by setting out our arguments about how climate adaptation can aid the delivery of the key success measures detailed in the Herefordshire County Plan 2020-2024. This is essentially the county's delivery manual and, in the council leader's own words 'shapes the future of Herefordshire and aims to encourage and strengthen our vibrant communities, create a thriving local economy and protect and enhance our environment to ensure Herefordshire remains a great place to live, visit, work, learn and do business.'

The table below lists these success measures and how we feel that a Herefordshire more adapted and resilient to climate change can help strengthen and/or accelerate the delivery of them, or how the success measures can help ensure the county is resilient to climate change.

County plan theme: Environment

Success measure given in County Plan	How adapting to climate change could aid delivery, or visa-versa
Increase flood resilience and reduce levels of phosphate pollution in the county's river	This Plan centres around improving flood resilience, and measures to do this will, in turn, help to alleviate the phosphate pollution issues.
Reduce the council's carbon emissions Work in partnership with others to reduce county carbon emissions	Many of the actions listed in this Plan will help to expand on the county's Net Zero activity; adaptation and carbon reduction need to go hand in hand, and nature-based projects, retrofit programmes and water saving initiatives are some examples of how this can happen.
Improve the air quality within Herefordshire	Similarly to reducing carbon, adaptation measures can help to improve air quality, which could worsen if summer heatwaves take hold more often. Again, improvements to ventilation in buildings and greening our urban areas can help mitigate both risks.
Improve residents' access to green space in Herefordshire	This Plan demonstrates various ways that we need to enhance our natural environment to ensure it is resilient to a future climate, including parks and larger areas such as the AONB. These areas are hugely vulnerable, but by enhancing maintenance they can be made resilient and more accessible in future.
Improve energy efficiency of homes and build standards for new housing	This can go hand in hand with improvements to homes with respect to overheating. By improving ventilation of poorly insulated homes, this will help to improve efficiency and the risk of overheating. It can also improve thermal comfort in winter.

County plan theme: Community

Success measure given in County Plan	How adapting to climate change could aid delivery, or visa-versa
Improve Herefordshire's house affordability ratio, making accommodation more affordable to local people	Resilient housing can result in more affordable housing if it is reliable and stands up to the elements. This consideration should be borne in mind to ensure climate change does not mean that the only housing that can cope with more extremes are those only afforded to wealthier people.
Increase the proportion of adults requiring formal care services who are supported in their own homes	All forms of social care could be disrupted by more extremes of weather. Adapting the services and the homes people live in will ensure this priority can be fulfilled with minimal disruption in future.
Improve the life chances of disadvantaged children in Herefordshire, meaning that they have a better chance of doing well at school, getting good jobs and secure housing (measured by the social mobility index)	Climate change will disproportionately affect those most disadvantaged. Improving the resilience of communities to climate change, prioritising those where the most disadvantaged live, will not only make them more resilient to climate change but other factors too. Our Plan proposes the rollout of a county-wide community resilience programme.
Reduce the number of children living with poverty, tooth decay or obesity	The above programme will, again, help to improve the resilience of those more disadvantaged. Improving the quality and resilience of green spaces, such as parks, will also encourage more children to go outdoors into more pleasant areas which are less likely to fall into decline due to climate change.
Reduce the number of children requiring formal social care interventions (measured by the number of children in need)	Again, by targeting resilience programmes in the right places, this will help improve the lives of all residents, including children, in these locations.
Increase the number of children that are assessed as 'ready for school'; for both children with and without free school meal status	As above. In addition, ensuring our schools are fit for a future climate is also important, as schools that (e.g.) overheat will affect the most vulnerable children the most from a health point of view.
Improve community resilience in Herefordshire	See above; this is one of the aspects at the heart of the Adaptation Plan.
Reduce the number of people admitted to hospital for unplanned events	At present, the NHS is not prepared for climate change. Reducing admissions would mean patients would not have to go into hospitals during (e.g.) flooding events or heatwaves, further putting their lives at risk. However, this will only be effective if the residents' homes are also fit for a future climate, as outlined under the 'environment' priority.
Improve the mental wellbeing of Herefordshire residents	There is a link between climate change and mental wellbeing; those in mental distress cannot necessarily look after themselves during extreme weather events, leaving them more vulnerable to then developing physical health issues. Improving mental wellbeing combined with the rollout of adaptation measures can help accelerate this priority.

Success measure given in County Plan	How adapting to climate change could aid delivery, or visa-versa
Reduce the number of people in Herefordshire identified as homeless	Homeless people are at greater risk of the impacts of climate change, as they are often in poor health and are either in temporary accommodation or required to brave the elements outdoors. They should be prioritised for resilience measures otherwise climate change could disproportionately enhance their vulnerability.
Reduce the number of households living in fuel poverty	As outlined under the 'environment' priority, improvements to the efficiency and resilience of homes should improve this. There also needs to be recognition that overheating may begin to create as big a problem for those in fuel poverty in homes that are not well adapted.

County plan theme: Economy

Success measure given in County Plan	How adapting to climate change could aid delivery, or visa-versa
Increase the average workplace earnings in Herefordshire Grow jobs and keep unemployment rates low in all areas of the county	Part of this Plan focuses on requiring a resilient economy; if transport links are disrupted, or homes are being flooded more often for example, fewer people will choose to work in Herefordshire and it will become more difficult for the economy to grow. There may also be opportunities to grow the adaptation and resilience sector, to identify where local jobs could be created to help with the overall climate adaptation response.
Improve educational attainment and widen further and higher education opportunities	See 'communities' priority for the importance of improving school resilience to minimise the risk of closure or disruption. Climate change also presents an opportunity for job creation, as more young people will be required to help with new roles such as flood modelling and alleviation, and building adaptations; there are opportunities here to build these skills into early learning.
Increase the number of short distance trips being done by sustainable modes of travel – walking, cycling, public transport Increase road safety in the county and improve the overall condition of the road network	One of the actions in this Plan is to adapt key cycle and walking routes to climate change, thereby making these links more reliable and, thus, encouraging more people to use them. Improvements to highways resilience will also help to keep bus services running even during periods of extreme weather.
Increase local wealth creation (measured by the Gross Values Added per head of population)	A more climate resilient county should lead to a more economically resilient county, as a result of fewer disruptions, business shutdowns or costs. This will in turn mean greater potential for business growth and more wealth coming into the county.
Extend superfast and ultrafast broadband network	One of the risks of climate change is to underground cables and pipes, due to a likely increase in landslips and damage to soils caused by more extreme conditions. Improving the resilience of this will help to ensure rollout of broadband can happen without fear of future disruption.

This analysis shows that, to varying degrees, creating a more climate resilient Herefordshire is commensurate with the priorities of the County Plan and, in many cases, can help to make those priorities more achievable and deliverable, if adaptation is carried out with consideration, thought and effectiveness.

As the County Plan expires next year (2024), it is important the future iterations consider climate change adaptation throughout their development, and that strengthening climate resilience forms a key part of future county priorities.

8 Next steps and initial recommendations

This Action Plan, and the engagement that informed it, is just the first step in ensuring that Herefordshire's people, places and businesses can adapt to climate change. SWM can support with the actions included, especially in a catalysing role to ensure action takes place, but cannot enforce the actions or resource them.

It is, therefore, hugely important that authorities and organisations that are able to take forward these actions do so now, either by providing the necessary resourcing, working collaboratively or sourcing funding from elsewhere. The re-commitment of the local climate and ecological emergency declarations in July 2023 is an ideal opportunity to take initiate ambitious actions as identified in the Plan.

As such, SWM recommends that the next steps and principles towards successful implementation of this Plan are as follows.

Water-stressed grass at Blackfriars Rose Gardens
© Herefordshire Council

- Identify and implement the quick wins included in this Action Plan. Many of the suggested actions are likely to take little time or resource to implement; these are indicated by the 'L' or 'L/M' in the Resource Intensity column. Implementing these actions while groundwork is prepared to tackle the others would be a good start.

- Following this, other actions in the Plan should be prioritised depending on the urgency of action; we have suggested this in the Priority column alongside any actions we feel should be commenced with immediacy. The resource requirements and the number of partners that would need to be engaged should also be borne in mind; this has been factored into the priority rating. However Herefordshire Council may have a better feel for the resourcing requirements and availability for specific actions which should be considered first.

- General areas of high urgency in Herefordshire, based on the Impact Assessment, risk assessment, stakeholder engagement and future climate projections analysis, and therefore areas that may be beneficial to prioritise are:

  - The impact climate change could have on agriculture, and the role agriculture can play in helping adapt to climate change.
  - Flooding across the county and the various activities that can help alleviate the risk, especially nature based solutions.
  - The impact of climate change on biodiversity in the county, considering its rurality and the opportunities to reverse biodiversity loss.
  - Community isolation and the risk of people being 'cut-off' during extreme weather.
  - Adapting healthcare assets and hospitals to ensure they are resilient to an increase in extreme weather, especially overheating.

- In all cases, taking an adaptation pathways approach is recommended, as this will help to build flexibility into adaptation actions, which can help to manage the long-term and uncertain nature of climate change impacts.

- To ensure actions are driven forward, an immediate priority should be for Herefordshire Council to appoint a Climate Change Adaptation Officer. While embedment of this Action Plan across a range of council teams and external organisations is critical, this cannot happen without an individual tasked with providing the necessary support, guidance and monitoring. This also means that the implementation of some of the more governance-related actions (e.g. 2, 3, 5, 6, 8, 12, 13, 14) can commence quickly.

- Further, another immediate priority should be in the establishment of a Herefordshire Climate Adaptation Working Group to identify actions that require collaboration, and to influence policy and decision makers accordingly. Working in collaboration is crucial to this Plan being successfully implemented and setting up the Working Group would represent a good start.

- Engaging with key decision makers, such as Councillors and senior leaders, needs to happen quickly to reflect the urgency of the need to adapt and to establish buy-in.

- There also needs to be engagement with key enablers of these actions, such as technical consultancies, national Government departments, the Local Resilience Forum and other bodies who influence health, natural environment and resilient infrastructure outcomes. Suggestions of ways to do this are included in the Plan and SWM can support this process through our myriad of connections.

- A robust monitoring and evaluation process needs to be developed alongside this Plan, to ensure the actions are having the desired impact. This should sit alongside a process for reporting and led by the newly appointed council Officer role.

- The county is progressing well on the implementation of Net Zero projects and activities. Wherever possible, adaptation measures should be integrated into these activities to double the impact of the activity whilst minimising resource requirements. This would also ensure adaptation actions do not threaten to contradict Net Zero targets, or visa-versa. The same principle applies to natural environment improvement projects. Many are suggested in this Plan, but there may be others to explore.

- Funding opportunities will be crucial to the successful implementation of some of these actions. Mapping of funding opportunities and lobbying of central Government funding needs to take place hand-in-hand, to encourage appropriate investment. There also needs to be strategic use of public sector funds to lever in appropriate private sector investment. SWM has some intelligence around funding streams and can assist with this initial identification.

- A final initial and quick step is to peruse the resources included in the next section to enable those less familiar with climate adaptation and resilience to become more informed.

9 Further information sources

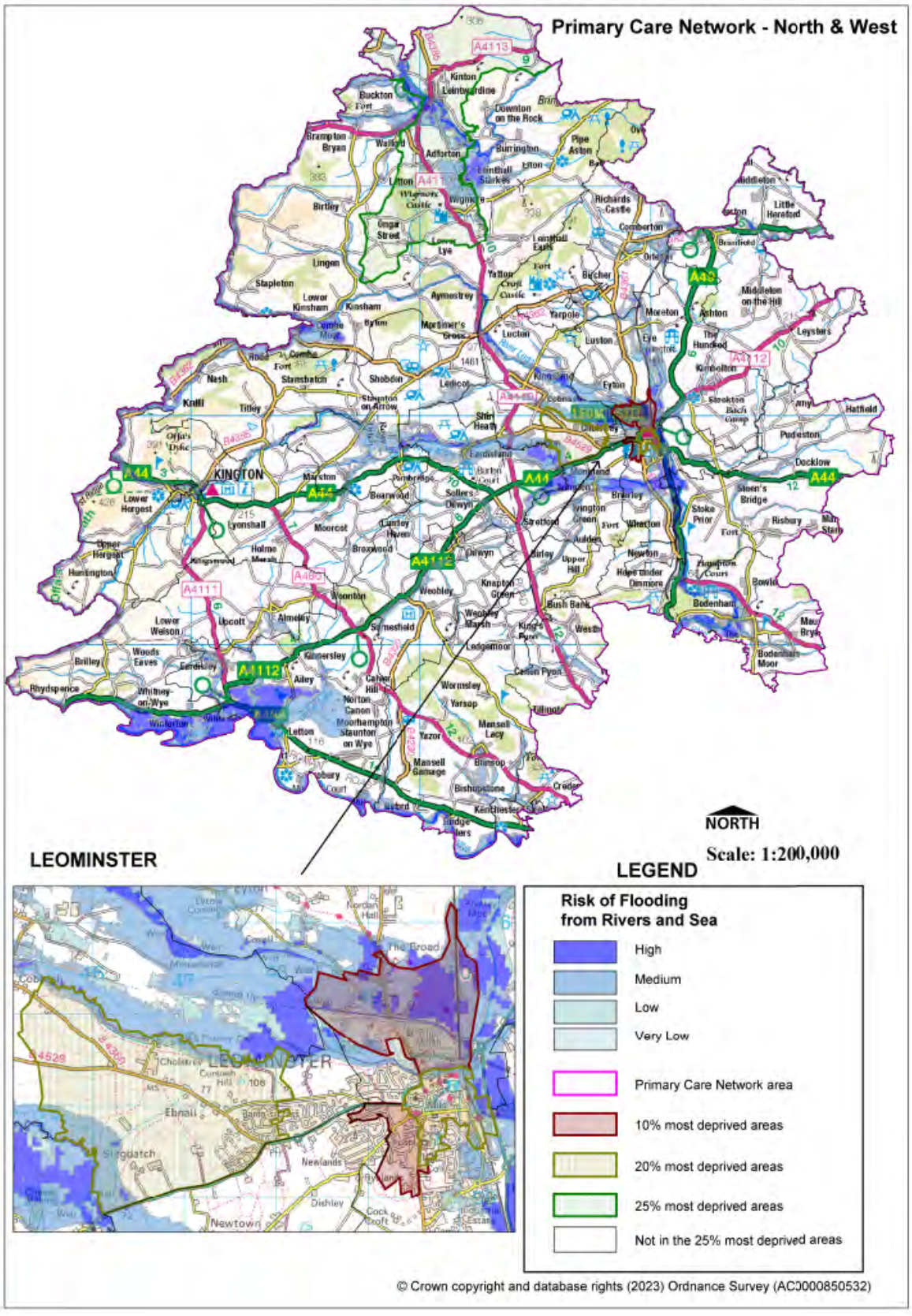
- Climate Change Adaptation Reporting Power reports
- Climate Change Allowances for flood risk schemes
- Climate Change Committee adaptation progress report
- Defra: A Green Future: Our 25 Year Plan to Improve the Environment
- Environment Agency flood risk mapping
- EU adaptation definition
- Government Climate Services for a Net Zero Resilient World research project
- Intergovernmental Panel on Climate Change (IPCC)
- Living better with a changing climate (Environment Agency report, October 2021)
- Local Partnerships climate change adaptation pages and toolkit
- Met Office weather warnings alert service
- National Adaptation Programme (NAP)
- National Flood and Coastal Erosion Risk Management Strategy for England
- National Framework for Water Resources
- Natural Flood Management Programme: initial findings
- Sign up for flood warnings service
- SWM's Sustainability Roadmap to 2030 adaptation priority
- TCPA: 20-Minute Neighbourhoods: Creating Healthier, Active, Prosperous Communities
- TCPA: The Climate Crisis – a guide for local authorities on planning for climate change
- UK Climate Change Risk Assessment 2022
- UK Climate Resilience Programme
- UK Climate Risk
- UK Climate Projections 2018

Annex 1: Flooding and deprivation maps

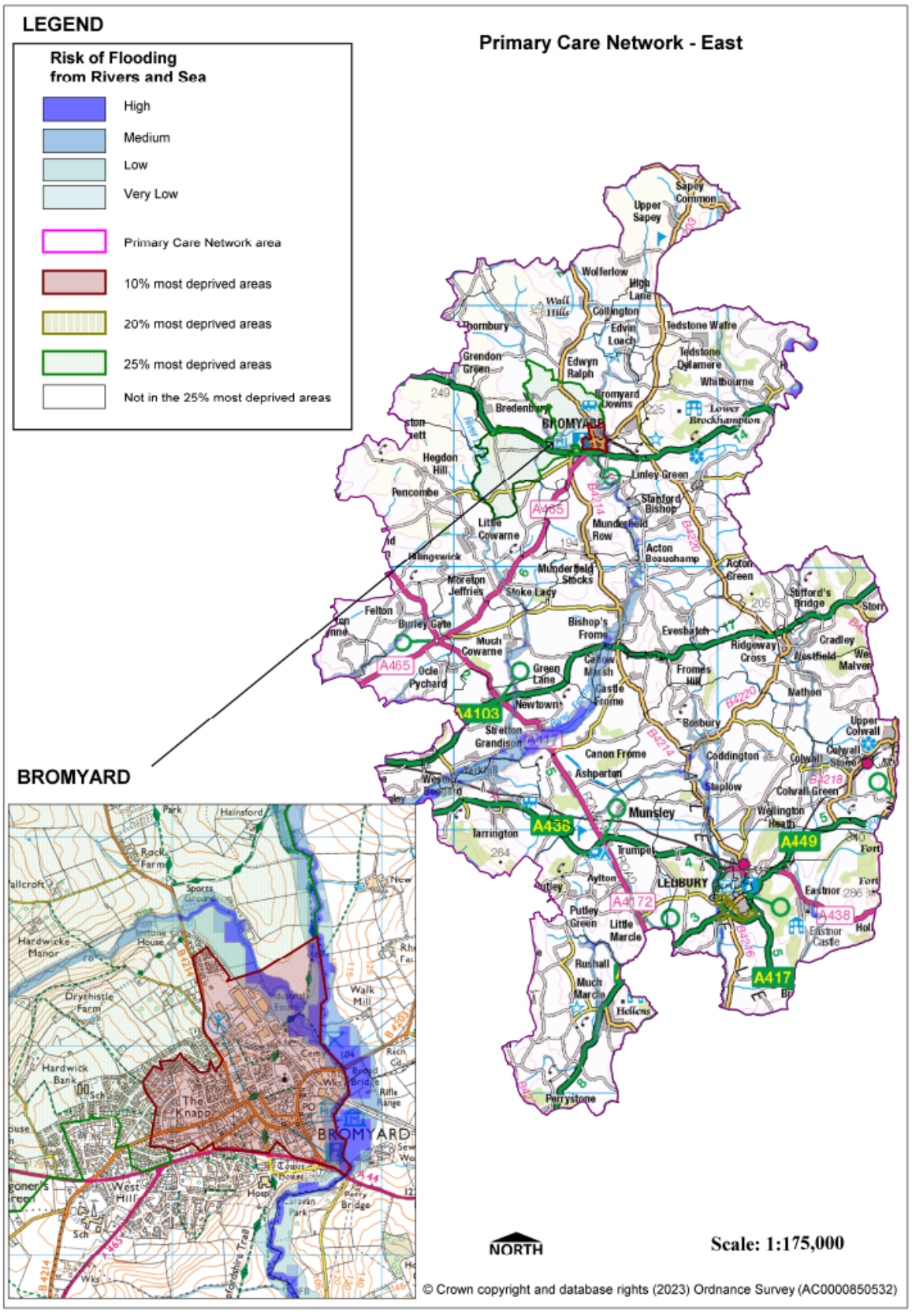
The following pages include maps showing different quarters of Herefordshire, with details of flood risk zones overlain with areas of deprivation. These maps are included to emphasise the key message that that severe weather and climate change impacts on those most vulnerable in society more than others. Work should be undertaken to determine who these vulnerable people are, and how adaptation actions can be modified and prioritised to benefit them (e.g. actions 55 and 57 given in the Action Plan (section 5)).

Please note that higher quality PDF copies of each map are available on request.

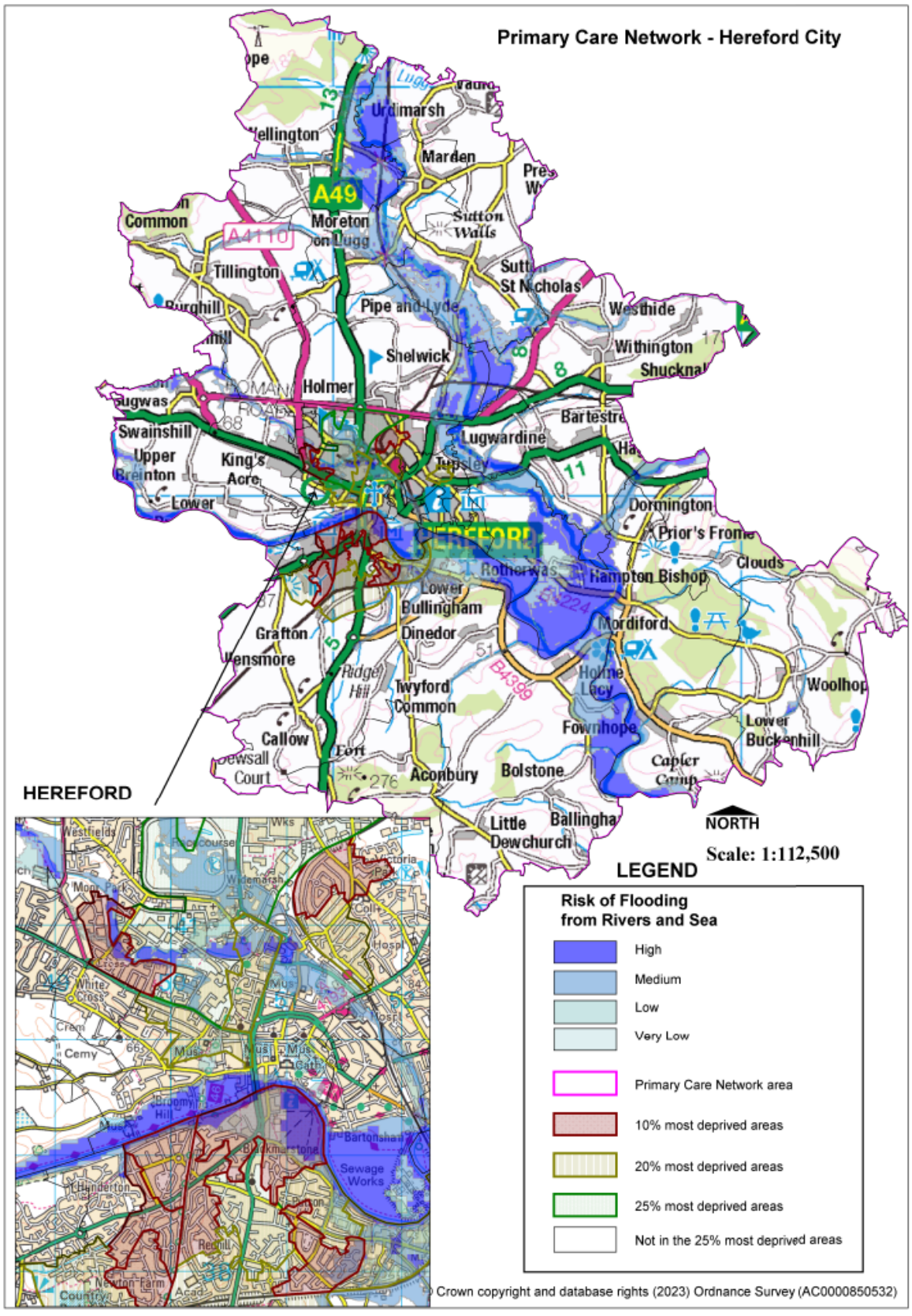
Map 1: Flood risk zones overlain with areas of deprivation in NW Herefordshire and Leominster



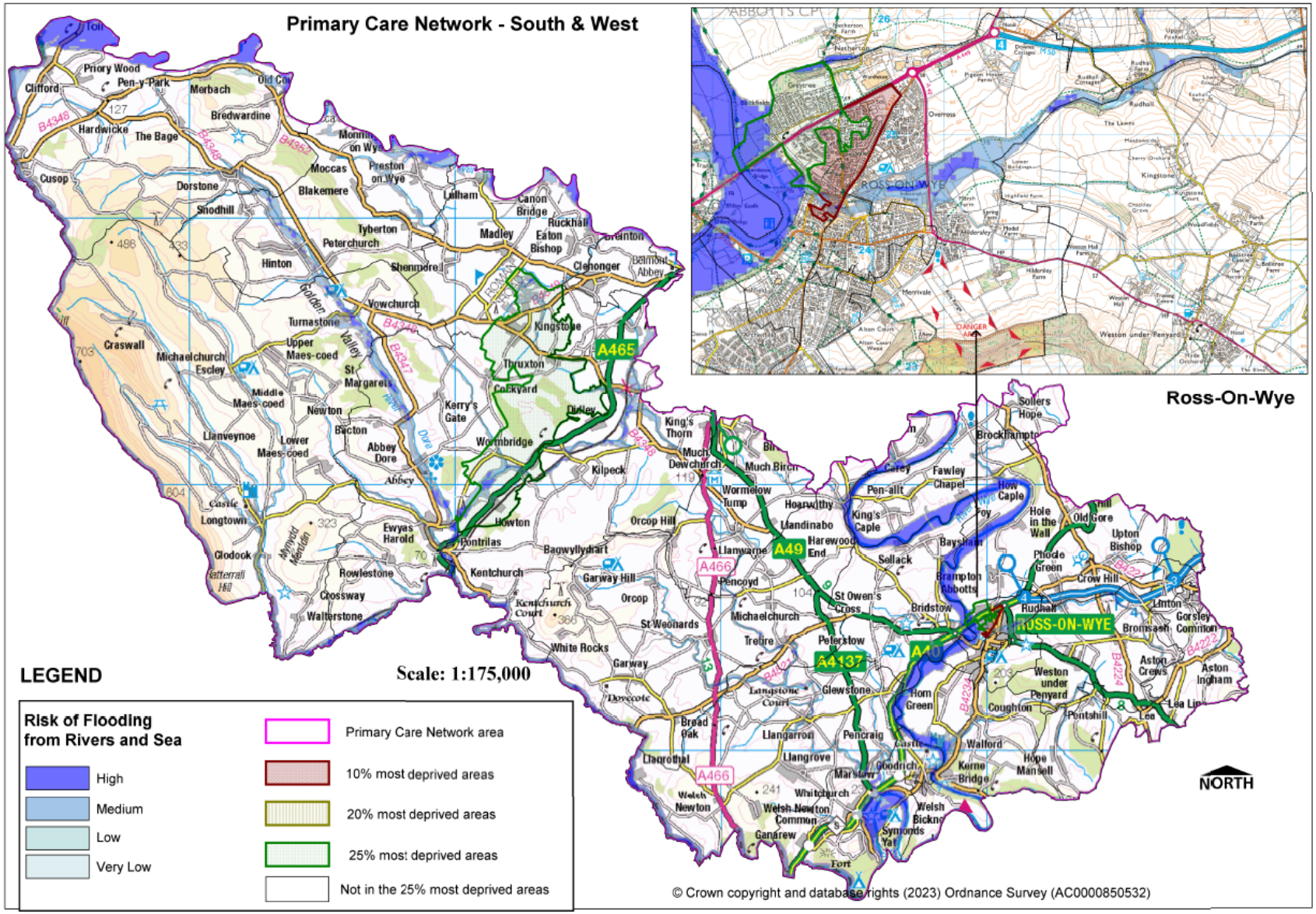
Map 2: Flood risk zones overlain with areas of deprivation in East Herefordshire and Bromyard



Map 3: Flood risk zones overlain with areas of deprivation in Hereford



Map 4: Flood risk zones overlain with areas of deprivation in SW Herefordshire and Ross-on-Wye



Annex 2: Detailed methodology

This annex outlines the methodology used to compile the Herefordshire Climate Change Risk Assessment and Adaptation Plan.

Step one: Preliminary research

Upon commencing the project, our first task was to establish a baseline that reflects projects that have already been delivered and how adaptation is being integrated in wider sustainability, nature and Net Zero related activities, to help influence what is referred to in this Plan, and to identify any existing activity. To do this, we:

- Accessed and read key council strategies, such as the County Plan, the Strategic Flood Risk Assessment (SFRA), the Local Flood Risk Management Strategy, Herefordshire Council's Carbon Management Action Plan, and the County Climate Action Plans.
- Consulted with key council staff (e.g. sustainability, ecology and flood risk officers) to obtain a current list of relevant activities that may not be reflected in the above documents.
- Consulted the council's last local authority sustainability benchmark return, to identify any noted good practice and emerging opportunities.
- Read relevant organisations' latest ARP submission reports (National Highways, Network Rail, Cadent Gas, National Grid) to ensure there are no activities included that may directly impact on Herefordshire.

In particular, we were looking to identify any projects already being undertaken that contribute to improving the county's resilience to climate change, or that have the potential to contribute to improving the county's resilience to climate change should they be slightly modified or adapted. This gave us a good base of knowledge to help ensure these projects are reflected and captured in the plan where appropriate modification, scaling-up and replication could be beneficial.

Step two: Impact Assessment

In order to determine how Herefordshire has been affected by, and responded to, extreme weather events, we analysed events that have occurred across the county over the past 15 years (2008-2022), building on a previous similar assessment undertaken for the period 1998-2008. This gave us a clearer picture regarding how the county's services and responders have dealt with the impacts of these events, helping us to inform our recommendations and actions for improvements in future.

The full methodology and results of the Impact Assessment are presented in a separate report and are summarised in an early section of this Adaptation Plan.

Step three: Climate projections analysis

Using the Met Office's latest UK Climate Projections published in 2018 (UKCP18), we were also able to determine what the potential changes in climate are likely to be up to the end of this century. This allows us to identify what additional pressures are likely to manifest in Herefordshire, by way of (e.g.) more intensive heatwaves and more frequent flooding. With both this and the Impact Assessment, we can get a better feel for how past events that have occurred in Herefordshire could intensify or increase in frequency in future.

The full methodology and results of the projections analysis are presented in a separate technical report and are summarised in an early section of this Adaptation Plan.

Step four: Stakeholder engagement

As mentioned above, key to ensuring that this Adaptation Plan is accurate, realistic and fit for purpose was effective and in-depth engagement with stakeholders. As experts on matters in the county, it was critical to speak to those working day-to-day in the county to find out how severe weather and climate change is affecting them.

Identifying stakeholders

We worked with Herefordshire Council to undertake a stakeholder mapping exercise to identify a range of stakeholders from both within and external to the council, which included a series of local and national contacts gained from years of working in this area. The list below outlines who we engaged with and how, with further details forthcoming on the nature of the type of engagement. In the first column, HC refers to Herefordshire Council, followed by the relevant team/ department.

Organisation engaged with	Workshop attendee	1-2-1 meeting	Survey respondent
Avara			Yes
Environment Agency	Yes		
HC, Economic Development	Yes		
HC, Education	Yes	Yes	
HC, Emergency Planning	Yes	Yes	
HC, Flood Risk	Yes	Yes	
HC, Highways	Yes	Yes	
HC, Landscape/ Ecology	Yes	Yes	
HC, Planning	Yes	Yes	
HC, Property	Yes		
HC, Public Health	Yes	Yes	
HC, Talk Community	Yes	Yes	
HC, Transport	Yes		
Hereford & Worcester Fire and Rescue Service	Yes		
Herefordshire Green Network		Yes	
Herefordshire Internal Drainage Board		Yes	
Herefordshire Wildlife Trust			Yes
Midlands Net Zero Hub	Yes		
National Farmers Union	Yes	Yes	
National Trust		Yes	
New Model Institute for Technology & Engineering (NMITE)	Yes		
Welsh Water	Yes	Yes	
West Mercia Police	Yes		
Wye Valley AONB	Yes	Yes	
Wye Valley NHS Trust	Yes	Yes	

There were four other organisations that we attempted to engage with but who did not respond to our correspondence.

Stakeholder engagement programme

We wanted to provide a range of ways to engage with the development of this Adaptation Plan. As such, we provided a flexible and varied approach to stakeholder engagement that was realistic in the timeframe available, as follows.

Method of engagement	Purpose	Date(s)
Workshop	• Introduce climate change adaptation as a concept and its importance • Identify how severe weather has affected Herefordshire and its services/ organisations in recent years • Provide real-life examples of both severe weather impacts and climate change adaptation	03 July 2023
1-2-1 online meetings	• Gain a more in depth understanding on how each organisation/ service has been impacted by severe weather in the past 15 years • Ascertain any existing activity that has taken place to adapt the county to climate change impacts	From mid-July to end of August 2023
Survey	• As above, to mop up any further responses from stakeholders who did not attend the workshop and/or were not interviewed	From mid-July to 06 September 2023
Communities webinar	• To extract the views of local communities on how they have been affected by severe weather impacts, and what they are doing about it	08 September 2023
Workshop for Councillors	• To enable them time to comment on the draft Adaptation Plan and share their views on important issues to include	03 October 2023
Agenda item at Climate and Nature Board	• To gain their expert views and comments on the draft Adaptation Plan	17 October 2023

Workshop structure (03 July 2023)

The workshop was the first opportunity to engage with a range of individuals about the importance of climate change adaptation and why it needs to be embedded into all aspects of work. The agenda below sets out the running order for the session and shows that it included two case studies of activity, opportunities for engagement and information on the background to climate adaptation.

13:15 **Arrival and networking**

13:30 **Welcome and opening address**
Anna Bright, Chair, SWM
Councillor Elissa Swinglehurst, Cabinet Member for the Environment

13:40 **What is climate change risk and adaptation and why can't we just reduce carbon?**
Alan Carr, SWM

13:55 **Discussion: Your experiences of dealing with extreme weather**

14:10 **Case study 1: Dealing with fire risk in Herefordshire**
Craig Newman, Hereford & Worcester Fire and Rescue Service

14:25 **Why and how we need to prepare for climate change**
Alan Carr, SWM

14:40 **Comfort break**

14:55 **Case study 2: Nature Based Solutions to Flooding**
Richard Fishbourne, Project Manager, Yazor Brook Restoration Project

15:10 **Workshop: Ideas and examples**

- What has our service area/organisation already done to adapt to extreme weather impacts?
- Are there any 'quick wins' that you can identify that your service area/organisation could implement to better adapt to extreme weather impacts?
- Who do we need to work with, both internally and externally, in order to effectively adapt to extreme weather impacts?
- What further guidance or support do you feel you need to adequately prepare your service area/organisation to extreme weather impacts?

15:55 **Next steps**
Anna Bright, SWM

16:00 **Close**

For the workshop session at 15:10, we broke people into four smaller groups of around seven people, and each group took turns to focus on one of the four bullet points listed. They wrote their ideas, suggestions and opinions on post-its which we then collated and gathered together to help inform this Plan. It provided an initial mosaic of delegate knowledge and interest in the climate adaptation agenda, and helped us tailor the subsequent interviews.

Overall, we were pleased with the turnout at this workshop, especially given workloads and pressures on people's time. Approximately 30 people (including facilitators) attended, which represented the majority of those that were invited.

1-2-1 meetings and survey (July – September 2023)

It was not possible to go too in-depth with any individual at the workshop, and as such it was important to follow up with a significant majority of the participants to discuss how severe weather has impacted on them and the service they are responsible for, and to discuss whether they are considering adapting to climate change, and what actions may have already taken place.

We developed pro-formas for each 1-2-1 meeting so that we could fill in answers to the questions during an online call. We asked similar questions at each meeting, but there were some specific questions that focused on the area of expertise of each stakeholder. The survey, created on Microsoft Forms, mirrored the generic questions that were used at each meeting, and below is a list of questions we asked all stakeholders, and the questions that were presented to those who filled in the survey.

- Can you tell us in broad terms how extreme weather events have impacted your organisation/service over the past few years?
- Do you quantitatively measure the financial/economic impact, or the impact on people/communities, that extreme weather events have on your organisation/service?
- Can you tell us which organisations you have worked with when preparing for, or responding to, the impact of an extreme weather event?
- How prepared do you feel your organisation/service is when it comes to dealing with extreme weather events? Please rate your perceived preparedness from 1 (not prepared at all) to 4 (very prepared).
- Has your organisation/service already done anything to improve its resilience to extreme weather impacts?
- What more do you feel your organisation/service needs to do to better respond to the impacts of extreme weather events?
- What help do you need to do this?
- Are you concerned about how the overall impact of climate change could affect your organisation/service? Please rate your concern from 1 (not concerned) to 4 (highly concerned).
- Which likely consequence of climate change concerns you the most with respect to how it may impact on your organisation, and why?

  Choose one from:

  - More frequent and extensive flooding
  - More frequent and intensive heatwaves
  - More frequent and prolonged droughts
  - More frequent and severe storms
  - More frequent and unpredictable outbreaks of wildfire
- Is your organisation/service in the process of developing any new strategies/action plans which adapting to climate change could influence, or be influenced by?
- Do you have any other comments you'd like to make, or good practice you'd like to share?
- Are you happy if SWM and/or the Sustainability Team at the council keep you informed about the work on climate change adaptation going forwards? Yes or No.

It was the responses to these questions, and the bespoke questions for each stakeholder, that provided the most useful information to inform this Plan and ensure that it was as accurate and stakeholder-led as possible.

Communities webinar (08 September 2023)

Working with the Talk Community team, we ran a session for representatives of community groups in Herefordshire to obtain their views on the development of the Adaptation Plan. We asked them for their experiences of dealing with severe weather events, how resilient they are (both perception and reality) and what they feel needs to take place to improve their resilience.

Seven individuals from five different community groups were in attendance, and they provided some very useful feedback which we have considered in the above Plan. The council also sent an online survey to them, and other community group representatives, to complete. This was filled in by three individuals.

Workshop for Councillors (03 October 2023)

This session took place in person and its primary objective was to obtain feedback on the draft Adaptation Plan from elected council members. SWM delivered a presentation on the purpose of the project and the 'very high' priority actions given in this Plan, before inviting feedback via a semi-structured workshop.

During the workshop, notes were taken by SWM and Herefordshire Council officers and feedback was positive and constructive, with many useful ideas generated by the attendees. These have been factored into this Plan where appropriate.

Fifteen Councillors attended the workshop which represented a very strong turnout. Of these, eight represented the Conservative Party, five the Green Party and two the Liberal Democrats.

Agenda item at Climate and Nature Board (17 October 2023)

The final session coincided with the closing date of the consultation for this Plan, which was sent to all individuals involved in the above engagement. Members of the Herefordshire Climate and Nature Board, in place to help drive forward Herefordshire's overall response to the climate and ecological emergency, had sight of this Plan a few weeks in advance and at this Board meeting, the objective was for members to provide verbal feedback on the Plan's content and structure. Various comments were made which SWM noted and, again, these have been factored into the content of this Plan where appropriate.

In addition to SWM and Herefordshire Council, the following organisations were in attendance: Herefordshire Wildlife Trust, Farm Herefordshire, Herefordshire Green Network, Herefordshire Food Alliance, Courtyard Theatre and Caplor Energy.

Step five: Development of a Climate Change Risk Assessment for Herefordshire

SWM has been involved in the development of the third UK Climate Change Risk Assessment (CCRA3), the intelligence and evidence from which helped to develop the recently published third National Adaptation Programme (NAP3) for England. These outputs are statutory as part of the Climate Change Act 2008. Section 1.2 of this document provides more details.

SWM was directly responsible for producing the England summary of CCRA3 and overseeing the completion of the sector briefings. The former of these outputs included the list of climate related risks that are projected to affect England, along with their urgency, magnitude and confidence, as put together by the Climate Change Committee and other academic and consultancy experts. We were, therefore, able to use this as a basis for the West Midlands risk assessment, which we published within the West Midlands Climate Change Adaptation Plan in 2021.

As a result of this, we were then able to utilise the West Midlands risk assessment as a basis for the risk assessment for Herefordshire. Many of the risks to the West Midlands as a whole will be similar to the risks in Herefordshire and this is why using this as a foundation to build from, bearing in mind the original England-wide version was co-developed by as myriad of climate scientists and experts, is a credible approach to summarising the key climate risks in the county.

It should be noted that the marine and coastal related risks that were identified by the CCRA England risk assessment were omitted from the West Midlands risk assessment, and this also applies to Herefordshire. Listed below are the risks that do not apply directly to Herefordshire.

Natural environment and assets

Risk or Opportunity	Receptor	Nature of risk/opportunity	Urgency score
RISK	Aquifers and agricultural land	Sea level rise leading to saltwater intrusion	Further investigation
RISK	Marine species, habitats and fisheries	Changing climatic conditions, including ocean acidification and higher water temperatures	More action needed
RISK	Marine species and habitats	Pests, pathogens and invasive species as a result of climatic changes	More action needed
RISK & OPPORTUNITY	Coastal species and habitats	Greater incidence of coastal flooding, erosion and climate factors	More action needed
OPPORTUNITY	Marine species, habitats and fisheries	Benefits resulting from changing climatic conditions	Further investigation

Infrastructure

Risk or Opportunity	Receptor	Nature of risk/opportunity	Urgency score
RISK	Infrastructure services	More frequent and extensive coastal flooding and erosion	More action needed
RISK	Offshore infrastructure	More intense storms and high waves	Sustain current action

Health, communities and the built environment

Risk or Opportunity	Receptor	Nature of risk/opportunity	Urgency score
RISK	Viability of coastal communities	Sea level rise leading to a greater risk of flooding and erosion in coastal areas	More action needed

Business and Industry

Risk or Opportunity	Receptor	Nature of risk/opportunity	Urgency score
RISK	Coastal business locations and infrastructure	Greater incidence of coastal flooding, extreme weather, erosion and sea level rise	More action needed

One may argue that there could be a knock-on effect of these risks to Herefordshire over time. For example, regarding coastal risks to businesses, if businesses re-located as a result of more coastal erosion or sea level rise, they could choose to re-locate to Herefordshire, which could have a positive or negative effect on the county's business base and economy. However, such indirect risks are more speculative in nature and would require further research to qualify, and this is outside the scope of this piece of work.

Following this filtering exercise, SWM utilised a combination of the above resources to inform the Herefordshire risk assessment, primarily by engaging with the stakeholders listed above to ascertain their experiences of dealing with extreme weather events to date, and to identify existing or planned climate change adaptation activity, and how this may affect the level of risk. The Impact Assessment also helped us do this, by determining if Herefordshire is at greater or lesser risk than the national status quo. Any changes/ additions to the risks set out in the risk assessment are specified in Section 4 of this document.

Step six: Development of this Adaptation Plan

The previous five steps were all necessary to create as accurate, detailed and comprehensive an Adaptation Plan as possible. Learning from the county's response to what it has experienced in the past from a severe weather perspective, to how this may change in future, and extracting a range of stakeholder views throughout the process was fundamental to ensuring that the actions presented in the main part of this Plan are as relevant as possible, realistic in their delivery and tailored to and reflective of the county of Herefordshire.

In addition, over the duration of the research and engagement period, we received a range of other ideas for adaptation actions, and suggestions as to how we can integrate adaptation into other activities, which we captured and have fed into this Plan.

The Plan uses the same structure and template as the West Midlands Climate Change Adaptation Plan published by SWM in collaboration with the Environment Agency in 2021. The West Midlands action plan is structured and themed around the UK CCRA, and includes actions that respond to the risks presented by the CCRA and subsequently tailored to the West Midlands. Many of the actions included in here also apply to Herefordshire, either exactly or with slight modifications; this is especially true of fairly broad actions where little action is taking place nationally, such as reviewing overheating risk in hospitals, which is an issue anywhere in the country to varying degrees. However, the above steps and extra analysis has allowed us to ensure that there are additional responses and actions when compared to the West Midlands plan, and that we have included a more specific range of actions to take forward that are applicable to the county of Herefordshire.

-END-