



Llywodraeth Cymru
Welsh Government

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Preparing for a changing climate

Part 1: Starting

Statutory Guidance under the Climate Change Act 2008

Acknowledgements

In preparing this Guidance, we have been influenced by existing non-statutory guidance, primarily [Adapting to climate change: Workbook for public sector organisations](#) (Adaptation Scotland, 2011). That document in turn recognises its debt to other guidance, including that by the [UK Climate Impacts Partnership](#) (UKCIP) and [International Council for Local Environmental Initiatives](#) (ICLEI) Canada.

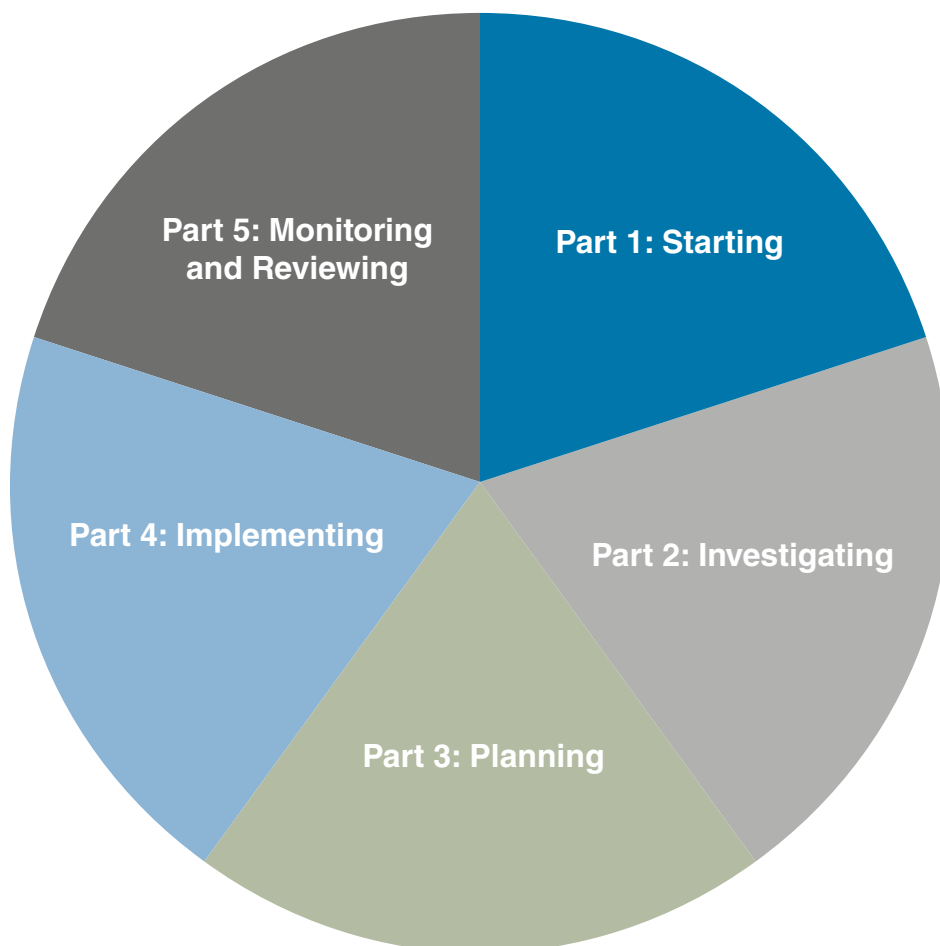
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Part 1: Starting

Part 1 starts by setting out what we mean by ‘preparing for a changing climate’, and showing why it’s important and worthwhile. It highlights some linkages with other work, for example with sustainable development, and suggests what good preparation might look like.

It also involves learning about how the climate has already changed, how your organisation has been affected by weather in the past, and what you are already doing that counts as preparing for climate change (adaptation).

Part 1 helps you understand how to communicate key messages about adaptation, develop partnerships and a network of contacts who can help with your adaptation work, and gain support from senior management.

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Introduction

Emissions of greenhouse gases are already having an impact on our weather and climate, and this is expected to become more significant in the years to come. Preparing for a changing climate involves investigating and planning for these impacts and their consequences.

Acting on/Preparing for climate change is also referred to as adaptation.

Climate change is not a purely environmental issue, but one that equality poses difficult questions for the future of society and the economy. It presents a risk to established operations and processes and could lead to significant costs. More extreme conditions, such as heat waves and heavy rainfall will have a significant impact on society, especially on the most vulnerable.¹ Preparing for a changing climate is therefore a key aspect of planning to ensure service continuity.

It is likely that many organisations are already adapting to climate change if they deal with weather-related risks. Learning to live better with current weather events will go some way to dealing with future climate change.

The challenge is to embed consideration of climate change impacts and possible responses into every organisation's decision-making.

Well-informed decisions taken by the right people at the right time can avoid costs further down the line.

How to start preparing for a changing climate

In one sense, climate change is simply another risk that successful organisations will manage. A paper produced by the UK Climate Impacts Programme (UKCIP) finds that most of the activities (e.g. disaster risk management, coastal management, spatial planning, public health, agricultural management) and methods (e.g. risk assessment, vulnerability assessment, impact modelling) applied to adaptation are not new and are drawn from existing and usually well-established fields.² However, the paper also explores the characteristics of adaptation that make it a particularly challenging area of work, including long timescales, uncertainty, complexity, irreversibility, and the potential for very significant consequences.

¹ Differential Social Impacts of Climate Change in the UK, SNIFFER (2009)

² Managing adaptation: linking theory and practice (UKCIP, January 2011)

UKCIP has found it useful to distinguish between two aspects of adaptation:

1. Building Adaptive Capacity
2. Delivering Adaptation Actions

It is anticipated that organisations will enact a moderate, proportionate response in the first instance, focussing on building understanding and awareness of adaptation throughout the workforce. Parts 1 and 2 of this Guidance are relevant here. This sets the foundation for adaptation planning and delivering adaptation actions that will follow in Parts 3, 4 and 5.

Preparing for climate change is a cyclical, iterative process. This Guidance offers a framework for embedding it into your organisation. It is for you to determine at what scale and level of detail to undertake the work in the first instance. You may wish to begin with a high-level, relatively quick exploration of your climate change risks and possible (and actual) responses; future iterations of the process may then lead you to more detailed, lower level work. Or you may choose to work closely with one part of your organisation that is particularly engaged with - or vulnerable to - climate change, and then use the outcomes to engage more widely across your organisation.

Why is this important?

Climate change will affect our society, economy and environment. **It will have an impact on the operations and resilience of organisations across Wales.** It is anticipated that the changing climate will affect:

- the health of our people, both directly and indirectly;
- attempts to conserve and enhance our natural spaces;
- the inequality gap;
- the safety and security of our people;
- the viability of business and security of employment.

Preparing for these changes now should lessen their impact, as well as allowing us to capitalise on any opportunities arising from a changing climate.

The Welsh Government Policy Statement: Preparing for a changing climate sets out the challenge we face and the Government's response.³ The response entails:

- an Adaptation Framework, that aims to build our evidence base, embed adaptation into decision-making, and share information and good practice;⁴
- an Adaptation Delivery Plan;⁵
- a Knowledge Transfer Programme;
- use of the power to direct certain organisations to produce a report detailing the risks they face from climate change and their plans for addressing those risks;⁶
- this Guidance.

Structure of this Guidance

We have designed a workbook, consisting of spreadsheet templates that can be used to record your evidence and findings as you work through all five parts of this guidance.

1. Starting

Part 1 starts by setting out what we mean by 'preparing for a changing climate', and showing why it's important and worthwhile. It highlights some linkages with other work, for example with sustainable development, and suggests what good preparation might look like. It also involves learning about how the climate has already changed, how your organisation has been affected by weather in the past, and what you are already doing that counts as preparing for climate change.

Part 1 helps you understand how to communicate key messages about adaptation, develop partnerships and a network of contacts who can help with your adaptation work, and gain support from senior management.

2. Investigating

Part 2 involves refining your climate change impacts identified in Part 1, and identifying levels of sensitivity and adaptive capacity. It also includes a climate change risk assessment that explores the likelihood and consequence of each impact and provides your organisation with a list of prioritised impacts to develop actions for in Part 3.

³ Available at <http://www.wales.gov.uk/climatechange>

⁴ The Framework was published within the Climate Change Strategy for Wales (2010), available at <http://www.wales.gov.uk/climatechange>

⁵ The Delivery Plan was published alongside the Climate Change Strategy for Wales (2010), available at <http://www.wales.gov.uk/climatechange>

⁶ Power provided under Part 4 of the Climate Change Act 2008. These organisations, referred to as 'reporting authorities' in the Act, include persons or bodies with functions of a public nature and a person who is or is deemed to be a statutory undertaker. Welsh Ministers will not be issuing directions in the first instance.

3. Planning

Part 3 leads to an adaptation plan using information generated by your investigations carried out in Part 2. It includes setting aims and objectives, identifying and prioritising adaptation options, and establishing baseline data and indicators, which help with monitoring and reviewing in Part 5.

4. Implementing

Part 4 discusses implementation of the adaptation plan produced in Part 3. It also addresses the need to build the adaptive capacity of the organisation and partners through training and communication, as well as delivering and managing adaptation actions.

5. Monitoring and reviewing

The principal goal of Part 5 is to determine whether the aims and objectives set out in your adaptation plan are being achieved. Reviewing allows for new climate information and any lessons learned to be captured and fed into the process, which should be seen as ongoing.

Preparing for a changing climate: Policy context

Sustainable development

In Wales, sustainable development is the process by which we enhance the economic, social and environmental wellbeing of people and communities, achieving a better quality of life for our own and future generations in ways that:

- promote social justice and equality of opportunity; and
- enhance the natural and cultural environment and respect its limits - using only our fair share of the earth's resources and sustaining our cultural legacy.⁷

In preparing successfully for a changing climate we are acting for the long term and providing a foundation for the future wellbeing of Wales. It will enable us to put future generations in a stronger position to cope with the effects of climate change that are anticipated to become more severe.

Emission reduction

Preparing for a changing climate through adaptation can be thought of as one side of the climate change coin; the other side is emission reduction. Emission reduction reduces the likelihood and impact of severe weather events and their consequences in the longer term. Efforts in Wales to reduce emissions will have global benefits, while efforts in Wales to prepare for climate change will have local benefits.

⁷ One Wales, One Planet - The Sustainable Development Scheme of the Welsh Assembly Government (2009), available from <http://wales.gov.uk/sustainabledevelopment>

Some actions deliver on both emission reduction and adaptation, including:⁸

- **Use water more efficiently:** Reduces our emissions as less energy is required for treating and transporting water; prepares us for climate change as more water is available during more frequent and severe droughts.
- **Develop healthy forests and natural open space:** Increases carbon sequestration; prepares us for climate change by reducing vulnerability to flooding.

However, there are also actions that are not complementary - actions to prepare for climate change that increase greenhouse gas emissions, and actions to reduce emissions that increase climate-related risk. Any activity to prepare for a changing climate needs to consider where it can deliver multiple benefits to emission reduction and adaptation goals and avoid contradiction with other objectives.

Civil contingencies

The National Risk Register includes several risks that are projected to become more frequent and more severe in the future: 'Severe weather', 'Coastal flooding' and 'Inland flooding'. As such, there is therefore a clear overlap between civil contingencies work and preparing for climate change.

Community Risk Registers present risks for a sub-national area. They are approved and published by Local Resilience Forums (LRFs), of which there are four in Wales.⁹

Principles of good preparation

Wherever possible, actions to prepare for a changing climate should aim to be:¹⁰

Effective

The actions should reduce the risks from climate change and not introduce perverse effects. They should be context-specific, implementable, and enforceable.

Effective measures will incorporate flexibility to adjust in the future to cope with a range of climate scenarios, as well as socio-economic, technical and other changes. Given that the future is uncertain, you should be able to explain and justify any actions that lock your organisation into one particular pathway.

⁸ Taken from The Mitigation-Adaptation Connection: Milestones, Synergies and Contradictions (ICLEI USA)

⁹ North Wales, Dyfed-Powys, South Wales and Gwent. See <http://www.walesprepared.org/>

¹⁰ HM Treasury's Green Book guidance explores these in more detail.

Efficient

The expected reduction in social, economic and environmental damage from climate change should justify the costs of implementing the measure. Actions should be timed appropriately.

Activities that are flexible or renewed and changed often can adapt over time to changes in climate, while climate change should be incorporated into the design of activities with long lead times and lifetimes. Not considering the changing climate could lead to costs through poor performance, need for retrofitting, or early abandonment.

Equitable

Some of the groups that are most vulnerable to the effects of climate change may also be least able to prepare for the effects of climate change.

It will not be possible to avoid all of the costs imposed by climate change. The distributional consequences of different options should be considered to ensure that individuals or groups do not bear a disproportionate share of those costs.

While recognising the difficulty in defining a particular action as being good or successful, the UK Climate Impacts Programme has developed a set of principles for preparing for a changing climate:¹¹

- Work in partnership: identify and engage your community and ensure they are well informed.
- Understand risks and thresholds, including associated uncertainties.
- Frame and communicate SMART¹² objectives/outcomes before starting out.
- Manage climate and non-climate risks using a balanced approach: assess and implement your approach in the context of overall sustainability and development objectives that includes managing climate and non-climate risks.
- Focus on actions to manage priority climate risks: identify key climate risks and opportunities and focus on actions to manage these.
- Address risks associated with today's climate variability and extremes as a starting point towards taking anticipatory actions to address risks and opportunities associated with longer-term climate change.

¹¹ 'Identifying adaptation options', (UKCIP). Some of these principles are consistent with good participatory decision-making and thus apply more widely than just adaptation decision-making processes. As such good adaptation is dependent on general good quality decision-making or good management.

¹² SMART objectives are specific, measurable, achievable, results-oriented, and time-bound.

- Use adaptive management to cope with uncertainty: recognise the value of a phased approach to cope with uncertainty. Recognise the value of no/low regrets and win-win adaptation options in terms of cost-effectiveness and multiple benefits.
- Avoid actions that foreclose or limit future action or restrict the actions of others.
- Review the continued effectiveness of decisions by adopting a continuous improvement approach that also includes monitoring and re-evaluations of risks.

Benefits of preparing for climate change

From an organisational perspective, taking early action to prepare for a changing climate can help you to:¹³

- identify cost-effective actions that build resilience in response to the consequences of climate change;
- consider and plan for the long-term financial implications of managing the risks associated with the consequences of climate change;
- exploit opportunities that may emerge as a result of changes in climate;
- ensure that climate change impacts are properly considered as part of business continuity and emergency planning;
- play a leading role in improving the capacity of stakeholders including partner organisations, businesses, communities and individuals to adapt to the future impacts of climate change;
- maintain your reputation and vital public services despite the challenge of climate change.

Other examples of potential benefits include:

- less disruption in the event of flooding;
- less thermal discomfort indoors in summer;
- increased revenues from exploiting new business opportunities e.g. longer growing season;
- less disruption of public services, including schools and hospitals;
- less likelihood of restrictions on water supply.

¹³ Adapted from [Adapting to climate change: Workbook for public sector organisations](#) (Scottish Climate Impacts Partnership, 2011)

Background reading

- [Climate change: its impacts for Wales](#) (Welsh Government 2009).
- Chapters 14 and 15 of the [Climate Change Strategy for Wales](#) (Welsh Government 2010) and the [first annual Report on the Climate Change Strategy for Wales](#) (Welsh Government 2012).
- [Climate change: A summary of the science](#) (The Royal Society, 2010).
- [Attributes of well-adapting organisations](#) (UK Climate Impacts Programme, 2010), particularly Section 4: Key attributes of adaptive capacity.
- [Adapting institutions to climate change](#) (The Royal Commission on Environmental Pollution, 2010), including an indicative list of ten questions on adaptation to “stimulate those who have not yet begun to face [the] challenge of adapting to climate change to do so”.
- [Adaptation reports](#) submitted to the Secretary of State e.g. National Grid Gas Plc, Network Rail, Trinity House.¹⁴
- [How well prepared is the UK for climate change?](#) (Adaptation Sub Committee, 2010).
- [White Paper on adapting to climate change](#) (EU, 2009).
- [Part 4 of the Climate Change Act 2008](#).

¹⁴ The Environment Agency submitted its report to Welsh Ministers and the Secretary of State.

Chapter 1: Understanding and Communicating Climate Change Impacts and Preparation

Purpose	To develop a basic understanding of climate change trends and impacts, to identify work you are already doing that is relevant, and to build capacity for communicating the issues.
Contents	<ul style="list-style-type: none"> • An introduction to past changes in climate, both globally and in Wales. • An introduction to projected future changes in climate in Wales. • Identifying existing work that is relevant to this agenda. • Key statements for communicating the impacts of climate change. • Producing a presentation.

Although some organisations have taken steps to prepare for changes in our climate, this remains a new area of work for many. This chapter provides a starting point for organisations with little or no knowledge of climate change impacts and preparation.

The difference between climate and weather

“Climate is what you expect, weather is what you get”

Robert A. Heinlein

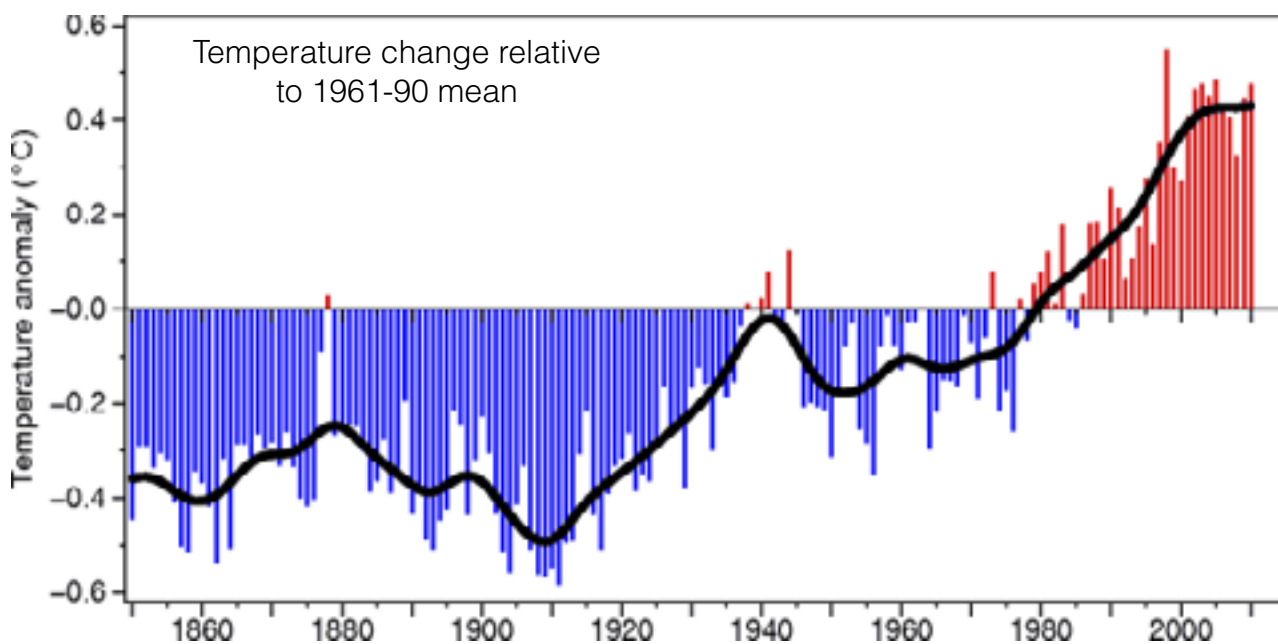
‘Climate’ is a long-term average of weather (usually over 30 years) and trends in these average conditions are ‘climate change’.

‘Weather’ is what we experience day-to-day, or even year-to-year, and some people may perceive it as being at odds with climate change (for example, recent cold winters). However, we can expect weather to be highly variable over these daily/monthly/annual timescales, especially with our maritime climate.

How the global climate has changed

The Intergovernmental Panel on Climate Change concluded that the “scientific evidence for warming of the climate system is unequivocal” (IPCC AR4, 2007). All major reconstructions of global surface temperatures show the warming trend over the last century, with most warming occurring since the 1970s and the ten warmest years on record after 1998 (NASA).

Figure 1: Global average temperature change 1850-2010¹⁵



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The World Meteorological Organisation has ranked 2010 as the warmest year on record (alongside 2005 and 1998), despite northern Europe being significantly cooler than average. The year was exceptionally warm in Africa, southern and western Asia, and in Greenland and Arctic Canada, with many parts of these regions having their hottest years on record. It was also characterised by a high number of extreme weather events, including the heat wave in Russia and the devastating monsoonal floods in Pakistan (Source: World Meteorological Organisation, 2011).

How the Welsh climate has changed

The last century has been a period of rapid climate change across Wales. Key changes are summarised in Table 1.

¹⁵ <http://www.cru.uea.ac.uk/cru/info/warming/>

Table 1: Observed changes in Wales' climate (1914-2006)¹⁶

	Observed changes in Wales' climate (1914-2006)
Temperature	The annual daily mean temperature has increased by 0.70°C. The daily mean temperature has increased in all seasons, from 0.47°C in winter to 0.99°C in autumn.
Rainfall	Total annual precipitation has declined by 0.9%. This masks significant seasonal changes - a 12.8% increase in spring and a 24% decrease in summer, for example.
Sea level	Sea level around the UK rose by about 1mm/yr in the 20th century, corrected for land movement. The rate for the 1990s and 2000s has been higher than this.

How the Welsh climate is projected to change

The [UK Climate Projections \(UKCP09\)](#) provide us with information about how our climate might change in the future. They are based on state-of-the-art climate modelling undertaken by the Met Office Hadley Centre, UK Climate Impacts Programme (UKCIP) and over thirty partner organisations.

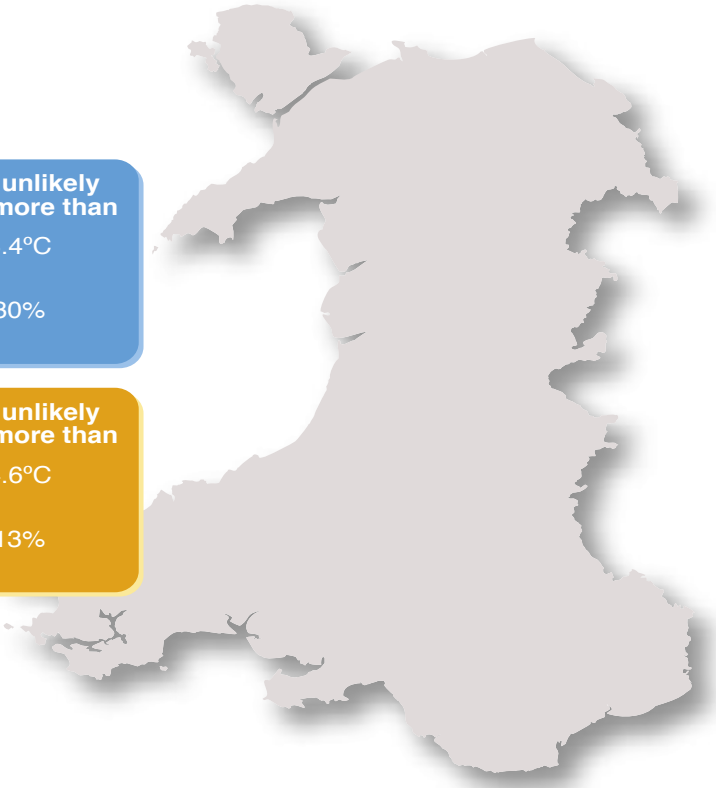
From UKCP09, the key messages for Wales are we will experience more extreme weather events such as:

- More intense rainfall events
- More flooding of low-lying coastal areas
- Hotter, drier summers.
- More extremely warm days.
- Milder, wetter winters.
- Less snowfall and frost.
- Lower groundwater levels.

It is important to note that the projections are not predictions or forecasts as they do not suggest which emissions scenario and future climate is most likely. They are also findings for Wales as a whole and there may be considerable variation at a local scale across the country.

¹⁶ Data taken from 'The climate of the United Kingdom and recent trends' (2009), available at <http://ukclimateprojections.defra.gov.uk>

Figure 2: Projected changes in summer and winter temperature and precipitation for Wales (2050s - Medium emissions scenario)



Winter	Central Estimate	Very unlikely to be less than	Very unlikely to be more than
Mean temperature change	+2.0°C	0.8°C	3.4°C
Mean precipitation change	+14%	-1%	30%

Summer	Central Estimate	Very unlikely to be less than	Very unlikely to be more than
Mean temperature change	+2.5°C	1°C	4.6°C
Mean precipitation change	-17%	-38%	13%

In Figure 2 the central estimate means that there is a 50% likelihood of that amount of change occurring; it is as likely to occur as not. 'Very unlikely to be less than' means that there is a 10% likelihood that the change will be less than the figure stated. 'Very unlikely to be more than' means that there is a 10% likelihood that the change will be greater than the figure stated.

Regarding sea level rise with respect to 1990 levels, the central estimate for Cardiff under the medium emissions scenario is as follows:

- 2020: +9.7cm
- 2050: +21.8cm
- 2080: +36.2cm

UKCP09 acknowledges the uncertainty involved in projecting future climate change and uses different emissions scenarios to provide a picture of how the future climate might look. UKCP09 therefore provides a range of possible future climate models that vary depending on the relative level of greenhouse gas emissions in the future.

UKCP09 shows that the level of climate change we can expect between now and 2050 is largely consistent across the three emissions scenarios (low, medium and high). This is because of past emissions of greenhouse gases; even if we were to cut greenhouse gas emissions to zero tomorrow, the lag in the climate system means that we would still have to deal with the effects of past emissions for the next 30-40 years.

In some cases (e.g. summer precipitation) it is worth noting that the direction of change may be ambiguous when the probability range is examined: there is a chance we may experience wetter summers. Nor do the projections rule out extreme cold weather events like the winters of 2009-10 and 2010-11. The natural variability in the climate means that events of this kind remain possible, even under a High emissions scenario.

The models used to calculate the projections are not perfect. While there is much that we do know about our climate system, there is much still to learn and such knowledge will enhance the reliability of any future set of climate projections. The key to successful adaptation is to devise actions that are as far as possible “win-whatever” - actions that will enhance resilience to a range of possible climatic outcomes, and may benefit other areas too.

UKCP09 contains a real wealth of climate change information. It is important to recognise what is most relevant to your organisation given your current needs for decision-making. It is easy to become overwhelmed by the amount and detail of information in UKCP09.

It is usually best to take a stepped approach:

- An understanding of the key messages for Wales, high-level projections, and related impacts is likely to be sufficient when developing your organisation’s response in the first instance.
- Explore the more detailed information in UKCP09 when your organisation needs to make decisions about investments or assets whose expected lifespans mean that they will be exposed to the projected changes in climate.

More detailed information about UKCP09 can be found in the Briefing report.¹⁷

The Welsh Government has produced Guidance on using the UKCP09 projections called Investigating and Planning for Climate Risks.¹⁸

¹⁷ The Briefing report and full UKCP09 data (including maps and graphs) can be accessed at <http://ukclimateprojections.defra.gov.uk>

¹⁸ <http://wales.gov.uk/topics/environmentcountryside/climatechange/preparing/how/guidance/?lang=en>

Impacts of climate change for Wales

Some of the potential impacts arising from climate change are:

- increased risk of flooding;
- more severe erosion of our coastline;
- more low flows in streams and rivers in summer;
- more heatwaves.

The impacts lead to a range of possible consequences, including:

- flood damage to property;
- more flood-related insurance claims and higher premiums;
- a range of health issues, including fewer temperature-related illnesses and deaths in winter but more in summer;
- greater pressure on drainage systems;
- increased demand for water in summer - when supply is at its lowest;
- loss of many important habitats for wildlife;
- more disruption to infrastructure, including transport, energy and ICT;
- migration or loss of climate-sensitive species such as the Snowdon lily;
- buildings becoming uncomfortably hot in summer;
- more people wanting to holiday in Wales;
- more wildfires;
- new pests and diseases affecting agriculture and forestry;
- less cold weather-related transport disruption;
- more water shortages in summer;
- longer growing season for certain crops and potential to grow new ones.

Climate change in other parts of the world will also have an effect on life in Wales; the Foresight International Dimensions of Climate Change report 2011 identifies threats, challenges, and some broad areas of opportunity for the UK as a result of climate change elsewhere in the world.¹⁹

The Climate Change Risk Assessment for Wales was produced as part of the UK Climate Change Risk Assessment (CCRA) and presents a national assessment of potential risks and opportunities from climate change facing Wales for the period to 2100. The CCRA for Wales can be found on the Welsh Government website.²⁰

¹⁹ The report is available at <http://www.bis.gov.uk/foresight>

²⁰ <http://wales.gov.uk/topics/environmentcountryside/climatechange/preparing/impacts/impacts/ccra/?lang=en>

How preparing for a changing climate features in your organisation's work

Many of the policies, plans, strategies and procedures in place within, and outside of, your organisation will be relevant to preparing for a changing climate. It is important to identify these elements of work as a starting point to build on as this will help you and your colleagues and partners to identify which existing activities can be developed to accommodate climate change and where there is a need for more action. Such an audit will also provide a useful baseline against which to evaluate future progress.

The 'Organisation' sheet of the [Guidance Workbook Spreadsheet](#) lists examples of organisational and partnership plans. You may find it helpful to use the spreadsheet to record existing direct or indirect references to preparing for a changing climate, and how it might be linked to this plan or policy in the future. This will provide you with a checklist of plans and policies with which to engage, and will help to identify senior decision-makers and key stakeholders (see Chapter 3).

Communicating key information about the impacts of climate change

Providing information about the impacts of climate change on different sectors and services will also be important in encouraging stakeholders to participate in activities such as those suggested in Chapters 2 and 3.

Key statements for communicating the impacts of climate change²¹

- **Buildings need to be fit-for-purpose in a future climate**

Building performance will be challenged by a changing climate, needing to cope with more extreme summer temperatures, intense rainfall events and potential changes in wind and storm patterns. This will require appropriate design and building standards, but also adaptation of existing building stock.

- **Climate change will affect the health and wellbeing of individuals and communities**

As the climate changes so will the challenges to the health and well-being of individuals and communities. In particular, climate change may lead to more disruptive flooding events and an increased occurrence of related impacts. Increased temperatures in summer and prolonged spells of sustained heat may increase mortality and morbidity.

²¹ The statements have been developed by the Adaptation Scotland using climate information and knowledge of the ways that some key service areas and infrastructure are likely to be affected by changes in climate. You may find it useful to use some of these statements as part of presentations and briefing notes.

- **Climate change may damage infrastructure and disrupt transport networks**

The potential for increased flooding, erosion and landslides, storms and wind, and rising sea levels may damage the transport infrastructure and lead to disruption and delays for a large number of users. Increased temperatures in summer may affect road surfaces and increase the frequency with which railway tracks buckle. Organisations need to consider how this might affect the delivery of vital services.

- **Water resources management will become more complex**

Increases in the variability of river flows, intensity of rainfall events, surface water flooding, sea level rise, seasonality of rainfall and intervals of drought will present numerous and complex challenges for the sector.

- **Rising seas threaten coastal communities and infrastructure**

Sea level rise is already having a widespread impact on the coast and, with the rate of sea level rise set to accelerate over the coming decades, we can expect to see increased occurrence of coastal flooding and erosion.

- **The natural environment has a critical role in responding to the challenges of climate change**

In a changing climate, action is required to secure the ecosystem services that support the economy and contribute to our quality of life, as well as to reduce vulnerability to the impacts of climate change. Local initiatives include the promotion of green networks which include space for natural flood management and wildlife corridors. There are often shared benefits of such actions across a range of agendas that enhance the budgetary efficiency of actions (e.g. meeting obligations under the Natural Environment Rural Communities Act).

- **The demands on emergency and rescue services will change**

In a changing climate emergency services may need to respond to an increased frequency and severity of flooding, landslide and wildfire events. There may also be changes in social and recreational behaviour that present new challenges to emergency and rescue services. Organisations need to consider whether planning, staff, equipment and resources can respond to changing pressures.

Developing a presentation

The Welsh Government has developed a sample presentation that can be altered for your specific needs and used to introduce stakeholders to preparing for a changing climate. Download the sample presentation from the [Welsh Government website](#).

Talking to people who are not convinced that climate change requires any action

Despite the overwhelming scientific consensus about the existence and causes of climate change, some people remain unconvinced. The [WWF website](#)²² has a list of the most common arguments against climate change, along with useful responses.

²² http://wwf.panda.org/about_our_earth/aboutcc/cause/climate_sceptics/

Chapter 2: A First Look at How Weather and Climate Change Affects your Organisation

Purpose	To help you understand your organisation's current vulnerability to weather, and how climate change may affect this in future.
Contents	<ul style="list-style-type: none"> • Exploring how past weather events have affected your organisation. • Exploring the future impacts on your organisation of extreme weather under climate change.

Taking a first look at the impacts of climate change involves two aspects of work:

1. Exploring how past weather events have affected your organisation

Understanding how the weather is already affecting your organisation should help to:

- get a feel for current vulnerability to weather;
- begin thinking about the effects of future climate change;
- attract management support for work in this area.

The Local Climate Impacts Profile (LCLIP) is a tool developed by the UK Climate Impacts Programme (UKCIP) to help organisations explore the impacts and consequences of past weather events. You may find it useful to produce an LCLIP for your organisation.²³

The LCLIP process involves reviewing local media reports and interviewing key stakeholders in order to identify local impacts and consequences of extreme weather events for your organisation. The information generated by the media review and interviews is then collated into a report, a series of briefing notes and/or presentations and used to raise awareness of climate change impacts among key stakeholders.

UKCIP has also produced the Business Areas Climate Assessment Tool (BACLIAT). It is a series of workshops for business, the first of which “draws on employee experiences and recollections to generate a catalogue of recent past weather consequences”. You may wish to use the BACLIAT template to run a workshop, although you may need to edit the contents to make it suitable for your organisation.

The ‘Exploring’ sheet of the [Guidance Spreadsheet in the workbook](#) may be helpful in recording your findings.

²³ The LCLIP is a substantial piece of work and one that is well-suited to delegating to a research student or volunteer, perhaps on a work experience placement.

There are resources to help organisations explore the impacts and consequences of past weather events. The Countryside Council for Wales has produced [a spreadsheet of weather-related news stories](#) that includes a summary of the weather event, the date, who or what was affected, which local authority the event occurred in, and what the consequences were.

Other resources include:

- [A media-based assessment of climate impacts in Wales](#) (Countryside Council for Wales report, 2010).
- [NCLIP - a media based assessment of news stories in Wales](#).
- [LCLIP project findings for four Welsh Councils in the Changing Climate, Changing Places project](#).
- [An LCLIP how to guide and resource pack produced by UKCIP](#).

Critical thresholds

As well as recording the consequences of recent weather events it is also useful if you can identify any critical thresholds that had been exceeded e.g. the temperature at which the road started to melt, or the amount of rain that caused a flooding event. Over time a changing climate could mean that these thresholds are exceeded more frequently, which means you will have to assess what level of risk you are prepared to tolerate before acting.

Critical thresholds can be natural (e.g. a temperature threshold that machinery can not operate in) or socially constructed based on attitude to risk (e.g. the number of flood events that a business will tolerate before they decide to move premises) and can also be used for opportunities (e.g. at certain temperatures people are likely to buy more ice cream) as well as risks.

For more information on critical thresholds see UKCIPs report²⁴ on Climate adaptation: Risk, uncertainty and decision-making.

2. Gathering initial views as to how changes in climate may have an impact on your organisation in the future

At this stage it can be useful ask for feedback as to how stakeholders think their areas of work may be affected by the changes in climate that are projected for this century. It may be helpful to provide basic information about the changes (see chapter 1). The emphasis here should be on capturing all views about the potential future impacts of climate change; the impacts can be refined and analysed in more detail at a later stage (e.g. in Chapter 4).

The outputs of this work, coupled with findings from exploring past weather events, should provide you with information that can be used to help stakeholders, including senior managers, better understand the need for the organisation to prepare for and respond to changes in the climate.

A meeting or workshop to brainstorm how future changes in climate may affect your organisation encourages all participants to raise issues and demonstrate their existing understanding of climate change impacts. The second BACLIAT workshop may provide a useful template here, with the same caveat as before regarding making it suitable for your organisation.

Consider involving operational staff who may have a greater understanding of how weather affects the organisation's operations.

Think about how extreme weather, such as heavy rainfall, snow and ice, flooding, droughts, very hot days and storms has affected your organisation, such as the hot summers of 2003 and 2006, or the snow and subsequent ice melt in early 2010 and 2011. Make sure that you also consider the impact of gradual changes in climatic conditions. Findings from exploring past weather events may be helpful in starting this conversation.

You may also want to consider what your organisation might look like in the future as this may affect your future vulnerability to changes in the climate.

Questions that you may wish to ask participants include:

- What extreme weather events have we, or the communities that we work in, already experienced?
- What were the impacts of those events?
- How well prepared are we if such an event occurs again, especially if such an event becomes more frequent or severe as a result of climate change?
- What are our organisational objectives and how will they be affected by a changing climate and extreme weather events?
- Based on your existing knowledge, what climatic changes are most likely to have an impact on us?
- What might our organisation look like in the 2020s, 2050s etc if the climate changes as the projections suggest?
- What socio-economic changes might affect us over that time?
- Are there any opportunities associated with climate change that could arise for us?

Any findings may be entered into the 'Exploring' sheet of the Guidance Spreadsheet to give a more complete picture of climate change impacts - both past and future - for your organisation.

Chapter 3: Building Support and Partnerships for your Work

Purpose	To identify key stakeholders, build a network and generate support for your work.
Contents	<ul style="list-style-type: none"> • Developing a briefing note. • Information about building a network of contacts. • Information about engaging senior decision-makers and drivers for action. • Engaging senior decision-makers. • Identifying partners and building partnerships. • Identifying stakeholders and their involvement in the planning process.

If you are to successfully embed climate change impacts and preparation across your organisation, you will need to build awareness of and support for your work at all levels. You may face many obstacles to action, including a lack of financial resources, a lack of expertise, management apathy and ignorance, and temporal and spatial distancing (“it won’t happen in my lifetime” and “it won’t really affect Wales”).

The presentation in Chapter 1 and work in Chapter 2 will help you start to communicate the issue and the need for action. This chapter builds on that work by developing a briefing note to further engage colleagues and managers, and considering who to engage and how.

Developing a briefing note on climate change adaptation

Developing and adopting a high-level policy statement or statement of intent is a useful signal of corporate commitment and a foundation for developing work in this area. It can help you to engage senior decision-makers, colleagues and partners to persuade them of the need to prepare for climate change, and to build the case for investing resources in the planning process.

There is a template available on the [Welsh Government website](#) that you may wish to adapt for your local context.

Developing a network of contacts

Developing a response to the impacts of climate change may seem daunting. However, there are likely to be people within your organisation and in partner organisations who are already working on it in some way. This can include work that people may not necessarily think of as being relevant.

Identifying and contacting these people will help you establish a network with whom you can share information and start to work. Some of these people may be fully aware of the issues; others are likely to benefit from information provided in the briefing note and presentation. Your network will be something to nurture and add to throughout the planning process. The Welsh Government Climate Resilience and Extreme Weather (CREW) group's Knowledge Hub will also help you to access a network of people who are working in similar sectors. The CREW group can be accessed from the UK Knowledge Hub web site: <https://knowledgehub.local.gov.uk/>

Key partners who have already made a commitment to prepare for climate change include:

- Local authorities;
- National Parks;
- Fire and Rescue Services;²⁵
- Countryside Council for Wales;²⁶
- Environment Agency Wales;²⁷
- Forestry Commission Wales;²⁸
- Cadw;²⁹
- Public Health Wales/NHS.³⁰

²⁵ All 22 local authorities, the National Parks and the Fire and Rescue Services signed the [Welsh Commitment to Address Climate Change](#) in 2006.

²⁶ The Countryside Council for Wales issued a climate change position statement, [Responding to a changing climate](#), in 2010.

²⁷ Environment Agency Wales issued a position statement, [Limiting and adapting to climate change](#), in 2009.

²⁸ 'Responding to climate change' is one of four strategic themes in [Woodlands for Wales - Strategy for Woodlands and Trees \(2009\)](#)

²⁹ [The Welsh Historic Environment Strategic Statement: Action Plan](#) (Cadw, 2010) includes an action to aid monitoring/ understanding the impacts of climate change on the historic environment and produce priorities for action to mitigate consequences of climate change.

³⁰ Public Health Wales and the NHS are members of the Climate Change and Health Working Group, which has produced a report, [Tackling the health effects of climate change \(2010\)](#), that details the direct and indirect impacts of climate change on health, and includes a list of adaptation priorities and objectives for action.

The table below suggests some of examples of related work and contacts that you might wish to make.

Corporate	Policy	Delivery
Business planning	Policy making	Regulation
Risk management and business continuity	Decision-making	Spatial planning
Finance	Influencing/consultation	Community/stakeholder engagement
Procurement	Education	Education/advice/awareness
Staff management		Grants/funding/subsidies
Property and estate management		Research
		Transport engineers
		Police officers
		Health care providers
		Education providers
		Recreation
		Emergency management

Case Study

Senior management commitment to adaptation - Outcome Agreements

Ceredigion, Denbighshire, Gwynedd, and Powys County Councils and Rhondda Cynon Taff County Borough Council have all included adaptation outcomes within their Outcome Agreements 2010-2013. These can be found at: <http://wales.gov.uk/topics/environmentcountryside/climatechange/publications/caseforaction/?lang=en>

Understanding the drivers for action

Amongst the common motivations or drivers for taking action to prepare for a changing climate are:

- Exposure to a recent extreme weather event, such as a flood or heat wave, can be a very powerful driver for taking action as it heightens sensitivity to the issue and may raise concerns that climate change could exacerbate important risks (e.g. reputation, health and safety, finance, operations).
- Opportunities for making financial savings on the future costs of damage and disruption and for leveraging funding.
- A responsibility for infrastructure and business areas that are sensitive to changes in climate.
- A requirement from government or a client.³¹
- A requirement to improve or maintain environmental, social or economic resilience.
- A desire to identify positive opportunities and gain an 'early mover' advantage over competitors.
- Many organisations seeking to prepare for climate change have made good progress on emission reduction and are looking to address preparation as a next step.
- A desire to enhance the organisation's reputation and be seen as a market leader.
- A need to manage risks.
- A need to maintain business continuity as a matter of strategic importance.
- A need to reduce insurance premiums.
- A need to make decisions with long-term consequences (decades or longer) for land-use, built assets or population groups.
- Having an individual with the relevant skills, knowledge, motivation and leadership to engage their organisation on the issue and move it forward.

It may be useful to look at the Welsh Government's Business cases for action on climate change. The example business cases set out a clear rationale for action, written in language that is meaningful to each sector. They include links to a range of resources to help organisations develop business cases for their chosen actions.

³¹ The Welsh Ministers have powers under the [Climate Change Act](#) to direct certain organisations to produce a report detailing the risks they face from climate change and their plans for addressing those risks. Following [consultation](#), it is the intention not to issue directions in the first instance, but Ministers reserve the power to do so where organisations are found to not be taking adequate action to address the impacts of climate change.

Engaging senior decision-makers

It is important to secure senior management support. You may already have needed senior management/political approval for spending the time to use this Guidance.

In order to be truly effective, senior management support must extend beyond raising awareness of climate change. It must also include the establishment of clear reporting lines and a commitment to ensuring that planning is properly resourced and implemented.

Senior decision-makers may include:

- Politicians;
- Local Service Board partners;
- Service/Department managers;
- Board members;
- Directors or steering groups who sponsor, influence or drive key areas of work, or
- Specific staff or departments who will be more directly affected by this work; for example, those involved in planning, operations, transport and finance.

There are different ways in which you can engage senior decision-makers, such as through:

- One-to-one discussions;
- Written policy briefings/papers;
- Reports to committees;
- Presentations (see Chapter 1).
- Through peer to peer engagement. Identify senior members of your organisation who are engaged in the issues and see if they can influence other senior decision makers.

Case Study

Involving decision makers - Better Choices Better Places DVD.

The Welsh Government has produced a short film showing why adaptation is important from the perspective of a local authority chief executive. The film shows how Flintshire Council is looking at how the impacts of climate change is essential to their long term planning.³²

Developing a partnership approach

Co-ordinating action on climate change helps to deliver efficiencies. Working with other organisations to develop a joint approach to preparing for a changing climate can provide opportunities for sharing knowledge, skills and resources. The Welsh Government encourages public bodies to work together. This chapter suggests some steps to help you identify other organisations to work with and build a partnership approach.

³² <http://www.walescarbonfootprint.gov.uk/publicsector/betterchoices/?lang=en>

Identifying partners

Local Service Boards may already have a sustainable development or climate change working group in place, which you could get involved with. Local Resilience Forums may be an ideal place to raise the issue of climate change impacts and preparation.

Examples of the types of organisations you could work with, both through, and outside of, the Local Service Board include:

- Environmental agencies and regulators;
- Community and third sector groups organisations;
- Emergency responders;
- Chambers of Commerce;
- Utility companies;
- Non-Governmental Organisations;
- Local businesses;
- Suppliers;
- Land use resource managers;
- Port Authorities;
- Coastguard;
- Local colleges/Universities and other research institutions.

Some stakeholders will have a good understanding of what is meant by “preparing for a changing climate” and what you are trying to achieve and may already be planning for climate change, while others may know very little and may not consider the issue of any relevance to them.

It is important to identify all the stakeholders you can think of and prioritise them according to importance, influence and communication need. This information can be captured during a stakeholder mapping exercise, which can also help to establish the key messages for each group and the most appropriate channel of communication. You might decide that it is not necessary to communicate directly with all the stakeholders on your list, but that there are a group of three or four key stakeholders who should be the focus of your attention.

There may be organisations or individuals who share your organisation’s concerns, or who are obvious partners for developing joint projects with. There may be a wider group of organisations who you could involve in specific aspects of the adaptation process, and an even wider group

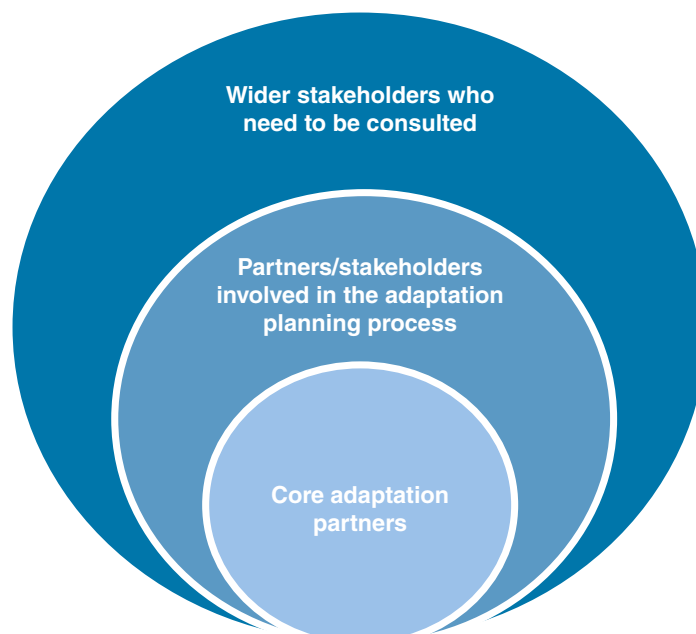
“Joint working is vital to deliver public services of top quality: they must be responsive to the needs of the individuals and communities, delivered efficiently and driven by a commitment to equality and social justice.”

Making the Connections: delivering better public services for Wales (2004)

that you will need to consult. You may wish to consider incorporating climate change risks into your local Community Risk Register.³³

When identifying partners, you may find it helpful to use the 'onion' diagram below.

- (i) Start in the centre and identify those organisations/individuals who will be **core partners** (this includes contacts who have been closely involved with your work to date) and with whom you envisage working closely. These may be organisations/individuals who already have a strong commitment to preparing for a changing climate, or who share your organisation's concerns and priorities. They are likely to be fully involved in the process you are undertaking, which may involve substantial time and resources on their part.
- (ii) Identify those organisations/individuals who you could involve in key steps of the process. These may be organisations/individuals who you will need to involve at key stages (e.g. identifying risks and adaptation responses) as they have a major influence on the risks to your organisation, and/or have a major role in addressing those risks. They are likely to be involved for relatively short periods throughout the process, while the core group (identified above) will help you to co-ordinate the overarching process.
- (iii) Finally, identify those organisations/individuals who may not be directly involved in the process, but will need to be consulted about the integration of actions across the organisations and/or the development and approval of a bespoke strategy and action plan.



³³ See <http://www.walesprepared.org>

Building a partnership approach

A first step may be to identify shared concerns with different stakeholders, for example by:

- preparing a briefing and/or making a presentation to the Local Service Board (LSB) meeting or other relevant stakeholder group;
- liaising with climate change/sustainable development champions of relevant partner organisations;³⁴
- identifying shared concerns amongst stakeholders, which will help to find ways of engaging stakeholders and establish a common purpose, shared aims and objectives for a future planned approach.

This initial step will help you to identify those organisations and individuals who are best placed to help drive a multi-organisational approach, and work with you to prepare for a changing climate. It will be important to provide stakeholders with a clear idea of how you expect to involve them, and your expectations of the time and resources that they will need to input.

Case Study

Partnership working - Climate Change and Health Working Group

The Climate Change and Health Working Group was established in 2007 with the aim of co-ordinating the response to climate change across the public health sector in its widest sense.

Members are drawn from:

- Welsh Government
- Public Health Wales NHS Trust
- Welsh Health Estates
- Environment Agency Wales
- Welsh Local Government Association
- The Met Office

The group acts as the forum through which partner agencies can discuss climate change-related issues and facilitate and support a collaborative approach to preparing for a changing climate.

The group has produced a report, 'Tackling the Public Health Effects of Climate Change', designed for use by public health stakeholders. This document identifies the key climate change-related effects and how they may impact on public health and wellbeing in Wales, and also provides a framework for effective collaborative and evidence-based action.

³⁴ For example, [Sustainable Development Co-ordinators Cymru](#) is the forum for officers responsible for co-ordinating sustainable development and environmental strategies in the 22 local (unitary) authorities and 3 National Parks in Wales.

Glossary³⁵

- **Adaptation:** activity to reduce the effect of the climate on human activity and the natural world that supports us.
- **Adaptive capacity:** the ability of a system to adjust to climate change, to moderate potential damages, to take advantage of opportunities, or to cope with the consequences.
- **Building Adaptive Capacity and Delivering Adaptation Actions (BAC & DAA):** developing your organisation's capacity to respond effectively to climate change and taking practical actions to either reduce vulnerability to climate risks, or to exploit positive opportunities and may range from simple low-tech solutions to large scale infrastructure projects. (See chapter 8)
- **Climate:** can be thought of as 'average weather' - usually over a period of 30 years. It includes temperature, wind and rainfall patterns.
- **Climate change:** refers to any change in climate over time (usually decades or longer), whether due to natural variability or as a result of human activity.
- **Climate projections:** use different emissions scenarios to provide a picture of how the future climate might look. They are not predictions or forecasts, rather they provide a range of possible outcomes across the emissions scenarios. The UK Climate Projections 2009 are the most up-to-date projections available.
- **Emission scenarios:** describe possible future levels of greenhouse gases in the atmosphere and are used in climate projections. They might incorporate different futures in technological and economic growth. They are not predictions or forecasts as these indicate which outcomes are most likely.
- **Exposure:** relates to the stimuli impacting upon a system and represents the background climate conditions within a system and any changes in those conditions.
- **Extreme weather:** weather phenomena that are at the extremes of the historical distribution, especially severe or unseasonal weather.
- **Greenhouse effect:** the natural process that traps some of the Sun's energy in the atmosphere, providing enough light and heat to support life.
- **Greenhouse gases:** gases within the atmosphere which absorb and emit energy radiated by the Earth. Carbon dioxide (CO₂) is the most important greenhouse gas being emitted by humans.
- **Impact:** a specific change in a system caused by its exposure to climate change. Impacts may be harmful (threat) or beneficial (opportunity).

³⁵ Definitions in large part drawn from the UK Climate Impacts Programme Glossary (available in full at <http://www.ukcip.org.uk/glossary/>) and How well prepared is the UK for climate change?, first report of the Adaptation Sub-Committee (2010).

- **Likelihood:** the assessment of an outcome or result which has occurred or will occur in the future.
- **Magnitude of consequences:** the end result or effect caused by an event or action.
- **Maladaptation:** an action or investment that enhances vulnerability to climate change impacts rather than reducing it.
- **Mitigation:** activity to reduce the effect of human activity on the climate, including by emitting fewer greenhouse gases or creating carbon sinks. Also referred to as 'Emission reduction'.
- **Resilience:** the ability of a social or natural system to absorb disturbances while retaining the same basic structure and ways of functioning, the capacity of self-organisation and the capacity to adapt to stress and change.
- **Risk:** a function of likelihood and magnitude of consequences.
- **Sensitivity:** the degree to which a system is affected, either adversely or beneficially, by climate-related stimuli.
- **System:** a group of interacting, interrelated or interdependent components forming a complex whole.
- **Uncertainty:** refers to an expression of the degree to which a value or projection is not precisely known and can result from a lack of information or from disagreement about what is known or even knowable.
- **Vulnerability:** the extent to which a system is susceptible to, and unable to cope with, adverse effects of climate change.
- **Weather:** the state of the atmosphere at a given time in a given place, with regard to temperature, rainfall, wind and other meteorological conditions.