Adaptation Scotland

supporting climate change resilience

City Halls and Old Fruitmarket

24th June 2015

Adaptation Learning Exchange

Workshop 1: Defining the challenge

Sophie Turner

Joseph Hagg

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Overview – a.m.

10:00 – 10:15	**Introductions**
10:15 – 10:30	**The ALE introductory programme**
10:30 – 10:50	**Learnings from the ALE Network**
10:50 – 11:10	**Introducing adaptation**
11:10 – 11:25	BREAK
11:25 – 12:00	**ALE introductory programme members**

Overview – p.m.

12:00 – 12:45	**Setting aims and objectives**
12:45 – 13:35	LUNCH
13:35 – 14:15	**Building the business case**
14:15 – 15:15	**Adaptation visuals**
15:15 – 15:30	**Reflections and 'Do one thing'**
15:30	HOME TIME!

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10:00

Welcome and Introductions

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Adaptation Scotland and the ALE Introductory Programme

Adaptation Scotland – Project Co-ordinator

Sophie Turner

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Adaptation Scotland

- A programme funded by the Scottish Government
- Delivered by Sniffer
- Provides advice and support to help ensure that Scotland is prepared for, and resilient to, the impacts of climate change by…
  - providing information on recent and future climate trends;
  - providing information on how future climate change will affect organisations and communities; and
  - supporting the development of a planned approach to adaptation.

The Adaptation Learning Exchange (ALE)

- Consists of a Network and an Introductory programme.
- Runs from June to December
- Provides support for your organisation with adaptation planning by
  - collectively building skills and knowledge,
  - sharing ideas, lessons learnt and highlighting good practice, and
  - increasing networking opportunities to promote further work on climate change adaptation.

Aims of the ALE

- Progress with the adaptation process
- Co-create solutions
- Continuously learn
- Share lessons across the public sector
- Build a peer support network that lasts beyond this programme and ALE.

This course has received the approval of The Chartered Institution of Water and Environmental Management

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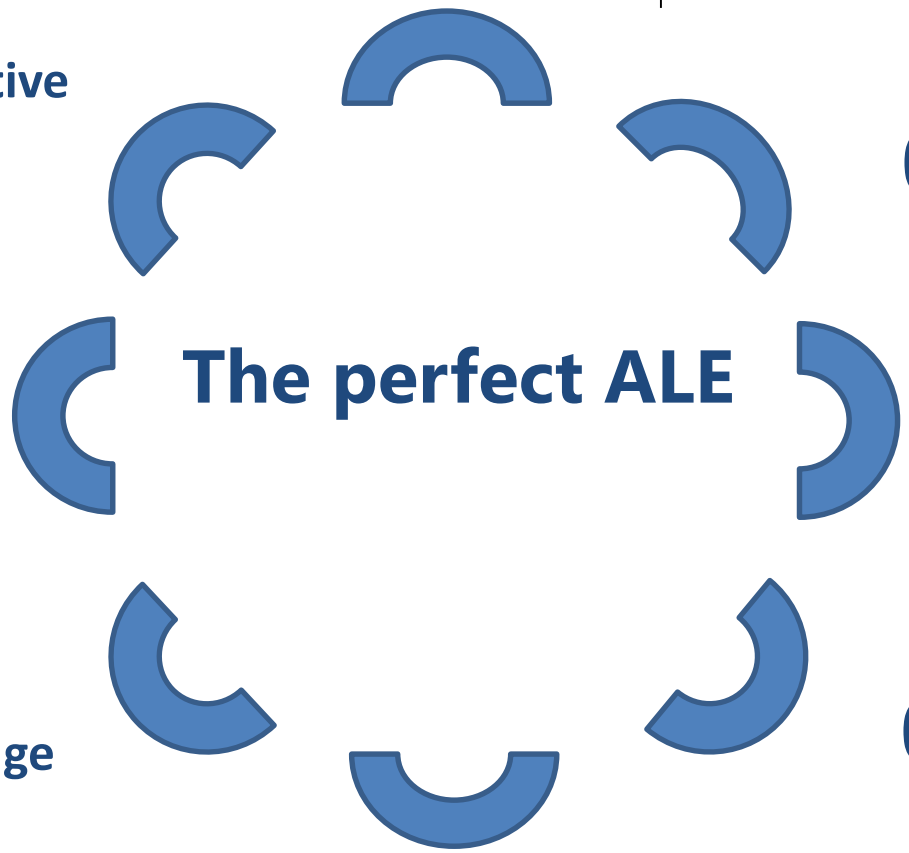
The perfect ALE



01 Vision

02 Reputation

03 Governance

04 Membership

05 Funding

06 Information and Knowledge Exchange

07 Peer support network

08 Deliver collaborative projects

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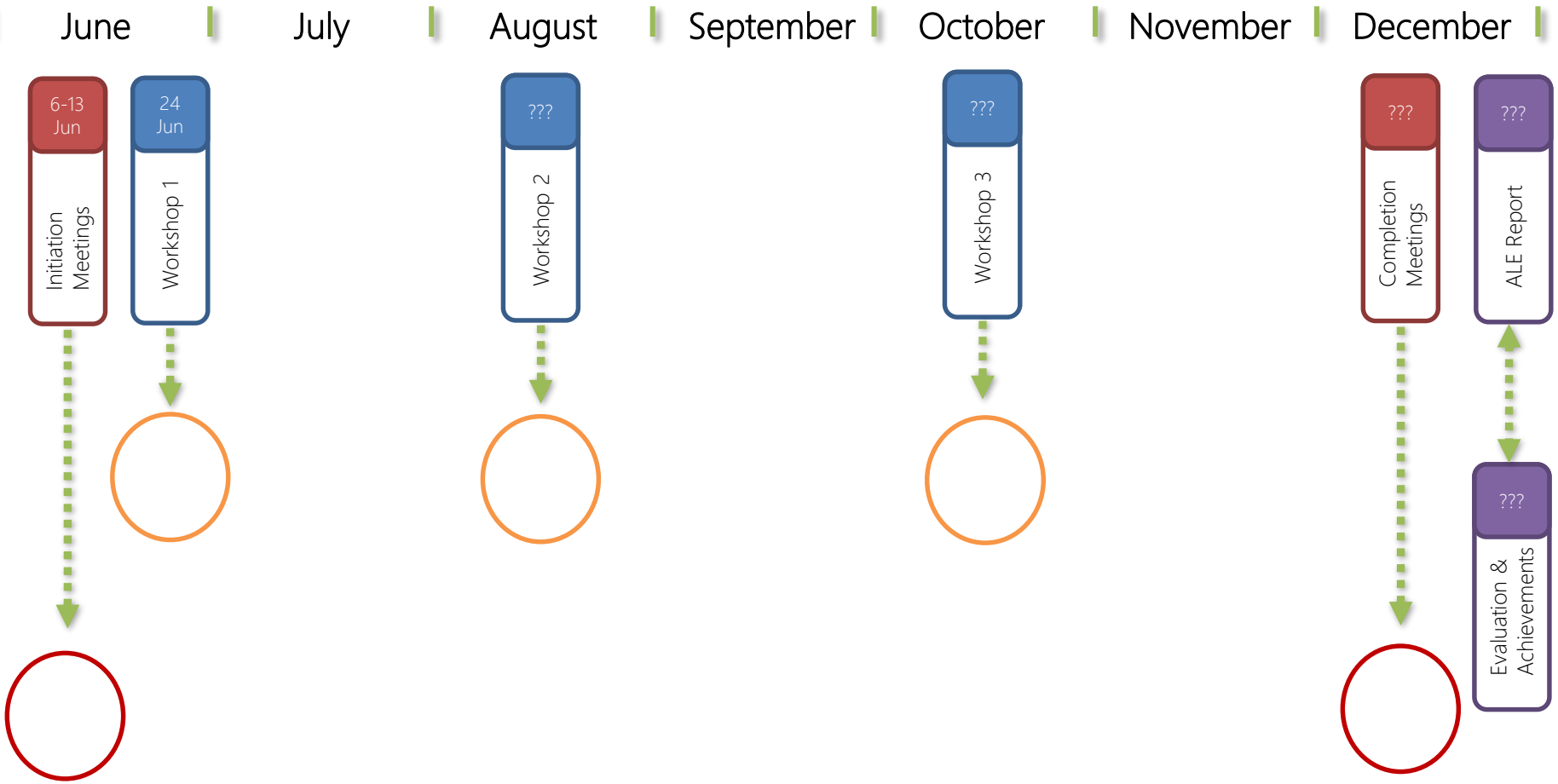

Adaptation Learning Exchange

Synthesis & Feedback

Expectations & Evaluation

Workshops

1) Setting aims and objectives and building the business case
2) Communications and values
3) How to measure progress on adaptation and monitor and evaluate.

Workshop 1: Defining the challenge

Getting started with adaptation planning involves:

- Obtaining senior management support
- Assembling your team
- Understanding what adaptation is
- Setting aims and objectives
- Building a business case
- Communicating better on adaptation

Ground rules

Be open and willing to contribute

- Share your experiences, knowledge and new ideas
- Respect the views of others
- Make the most of the opportunity to work together and learn from each other
- Give constructive feedback – workshops are stakeholder-led

Ground rules

Be honest and open

- Forum for honest and open discussion
- Draft workshop reports will be circulated for comment before being published.

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10:30

Learnings from the ALE Network

Stirling Council

Angela Heaney and David Bright

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Climate change adaptation: the new corporate risk

David Bright
Resilience and Risk Manager, Stirling Council

Climate Change Adaptation - Issues and Drivers

- Severe weather events are already impacting on the Council and its communities

Issues and Drivers

- Climate change will result in significant impacts on the built, natural, and social environments within local authority areas
- Adapting to climate change includes planning to reduce the risks while identifying and capturing opportunities.
- Corporate – it affects every part of the organisation
- External and Internal Drivers

Stirling Council - Adaptation Strategy

‘As a strategic planning authority and community leader, Stirling Council has an important role to play by ensuring a climate focus is built into policy, land use decisions, capital improvement projects, and funding priorities in order to ensure a more climate resilient future for the area’

Risk Based Approach

- Climate change adaptation is considered as a strategic risk
- Impact of failure to adapt is quantified and rated
- Adaptation strategy as control
- Strategy Implementation action plan as treatment actions
- Progress towards implementation of strategy action plan managed as part of risk management structure

Risk Based Approach - Benefits

- Council Management Team scrutiny gives adaptation a profile.
- Progress monitored by Resilience and Risk (part of Governance)
- Assists with embedding adaptation
- Adaptation is considered corporately and ensures that policies, plans and procedures will not be maladaptive or constrain future adaptation measures
- Links to other strategic risks are identified

Challenges

- Obtaining buy-in within organisation
- Adaptation is a ‘hard sell’ in current economic climate
- Multi – agency participation.
- Community involvement

Learning from Experience

- Adaptation task group
- Establish what you are already doing
- Awareness Raising
- Adaptation as part of other projects
- See what others have done \ are doing
- ‘No regret’ measures

Stirling Council's Adaptation Journey... the story so far

Angela Heaney
Sustainable Development Co-ordinator

Why important to Stirling Council?

- Sustainable Development Strategy, 2006, Objective 1:

"The Council will work to reduce the cause and effects of Climate Change in line with national targets"

- Simplified the Public Bodies Duties language to a "requirement to take action on adaptation"
- Developed a Weather Impacts Profile 2000-2010
- Council emissions ca 2% of the area's; UK emissions ca 2% of the world's
- Increasingly likely to overshoot the international target to keep global average temperature rise at 2ºC or less
- Recent senior management focus on SD as a key priority

Gaining Corporate Management buy-in

- Ongoing – need to tackle on a number of fronts & push at any open doors
- Inclusion in Corporate Risk register
- Participation in EU Cities Adapt Project
- Flag up existing work - don’t need to badge as ‘adaptation’
- Emphasise local benefits

What have we achieved?

- SD Strategy Objective (2006) & developed a Weather Impacts Profile (2000 – 2010)
- Participated in EU Cities Adapt project Sept 2012 to June 2013
- Adopted our first Climate Adaptation Strategy, September 2014
- Council agreed to sign up to the Covenant of Mayors' Initiative on Adaptation to Climate Change (i.e. EU Mayors' Adapt) & Provost signed the Commitment document in October 2014.
- Working with Community Councils to develop Community Emergency Plans
- Signed up to Climate UK's Severe Weather Impact Monitoring System (SWIMS)

What are we planning?

- Carry out risk assessment workshop with Service Managers
- Train service reps on use of SWIMS
- Investigate development of a Climate change park
- Integrate climate change issues into infrastructure
- Investigate resilient community concept
- Awareness-raising still a huge job…

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10:50

Introducing Adaptation

Adaptation Scotland – Science Officer

Dr Joseph Hagg

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introducing climate change adaptation

What is adaptation?

How is our climate changing?

We usually cover this in an introductory presentation (10-20 minutes)

This varies depending on the audience and purpose – although we often include some generic aspects.

We usually deliver in the context of a workshop – and hold sessions to draw this information from participants.

What impact will it have?

How can we respond?

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introducing

climate change adaptation

inform overload explain engage

comprehensive concise

generic specific

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an example presentation…

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What is adaptation?

Adaptation: The adjustment in economic, social or natural systems in response to actual or expected climatic change, to limit harmful consequences and exploit beneficial opportunities.

Scottish Climate Change Adaptation Programme (2014)

Change is constant.

environmental

social

legal

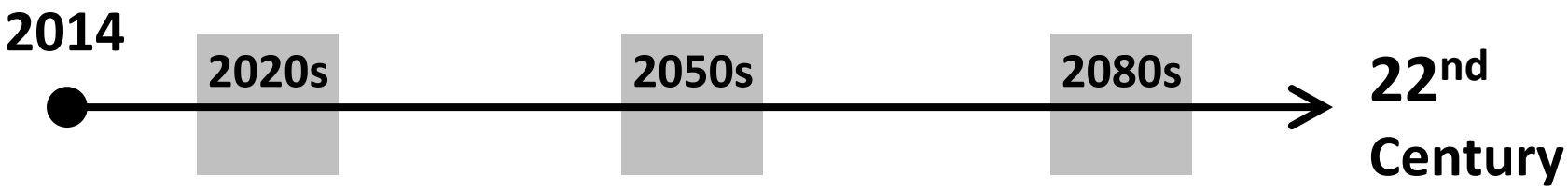
climate

political

technological

economic

The future? What timescale?



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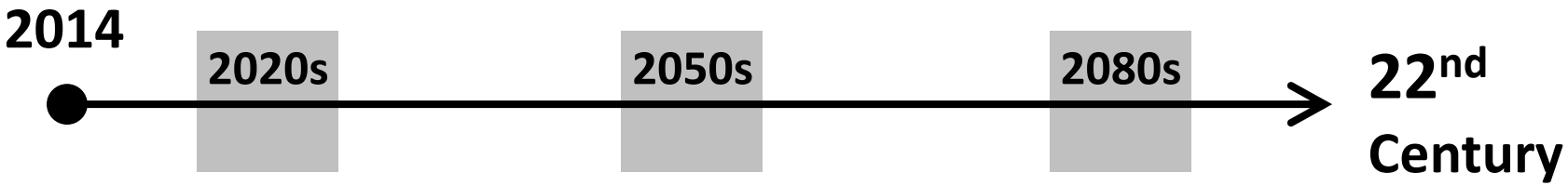

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Clean Air (Scotland) Act 1956

Google 1998

1999

facebook 2004

2014

1930s | **1960s** | **1990s** | **2020s**

NHS SCOTLAND 1948


1994 - 2004

1927	1960	1974	1987	1999	2012
2 Billion	**3 Billion**	**4 Billion**	**5 Billion**	**6 Billion**	**7 Billion**

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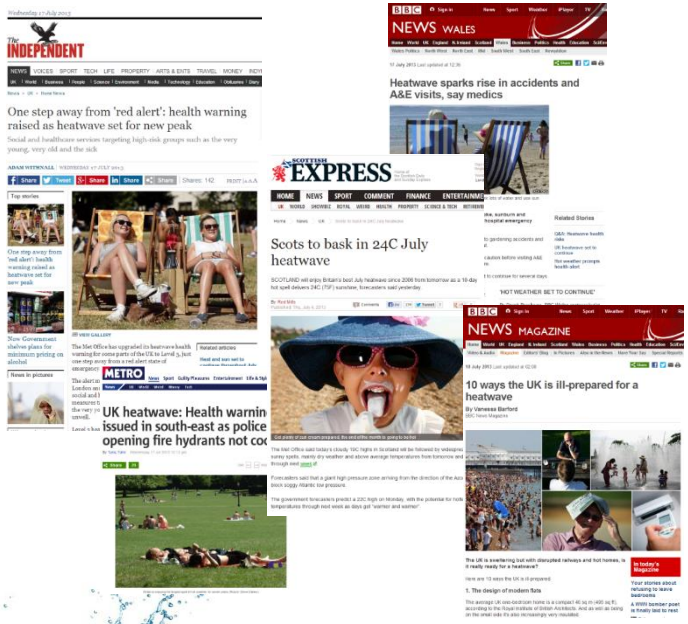
How is our climate changing?

Weather affects us.



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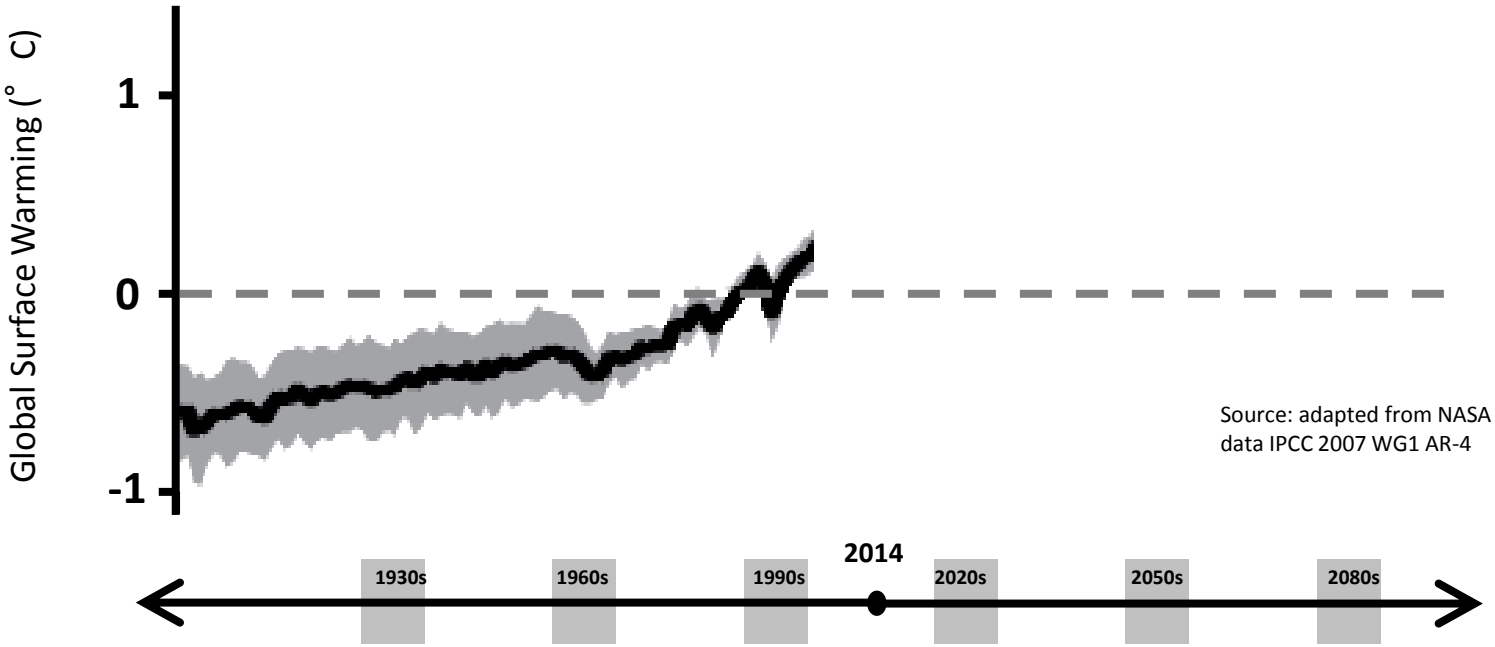
Climate Information:

The climate has been changing.

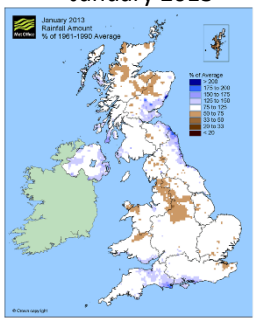


Source: adapted from NASA Earth Observatory data IPCC 2007 WG1 AR-4

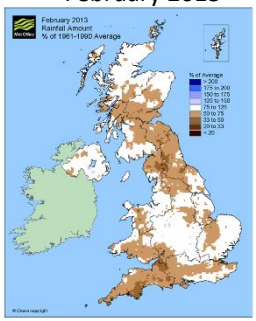
Our climate is highly variable.

2013 Rainfall:

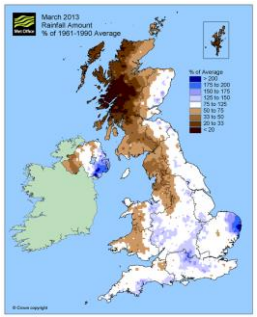
January 2013



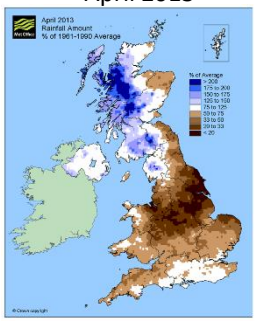
February 2013



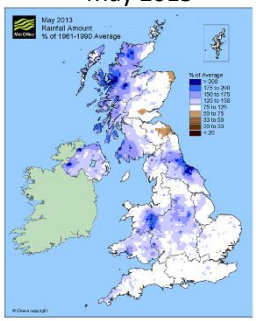
March 2013



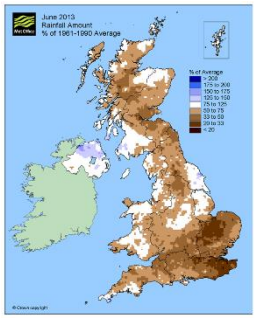
April 2013



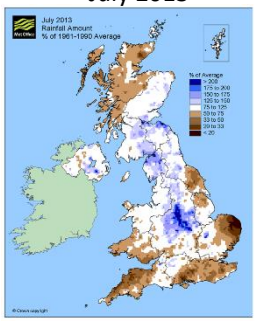
May 2013



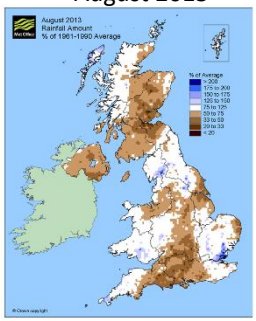
June 2013



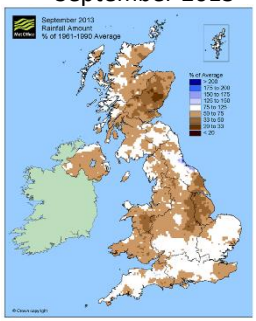
July 2013



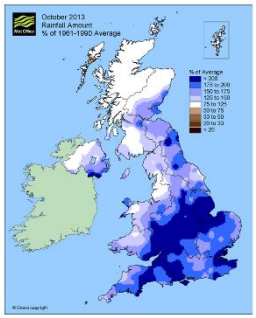
August 2013



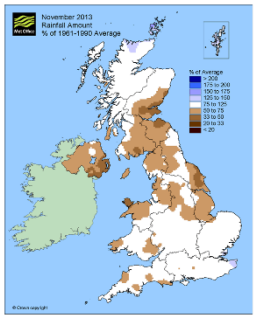
September 2013



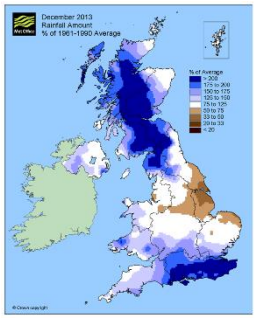
October 2013



November 2013



December 2013



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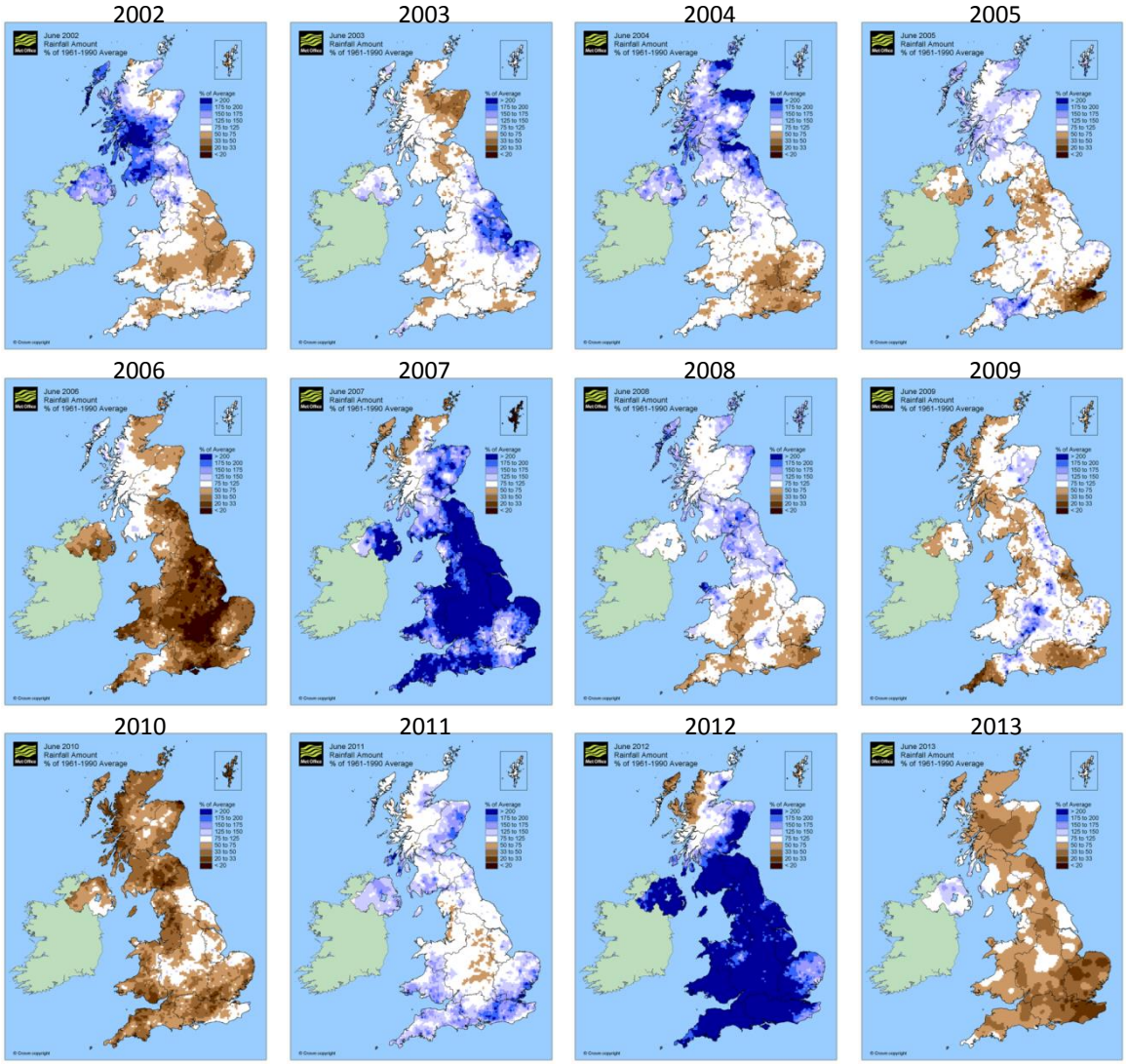
Our climate is highly variable.

June Rainfall:
(2002-2013)



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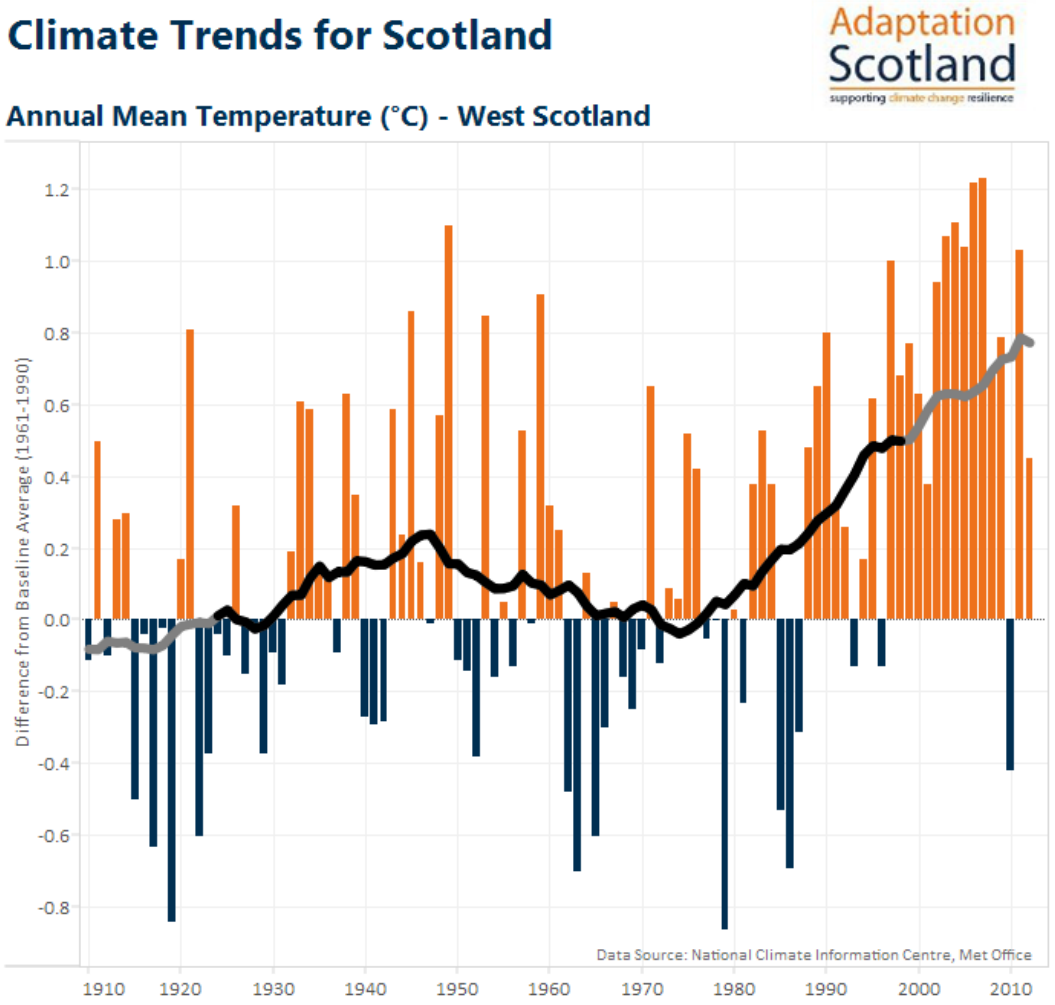
Long term trends in Scotland



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Long term trends in Scotland

Climate Trends for Scotland

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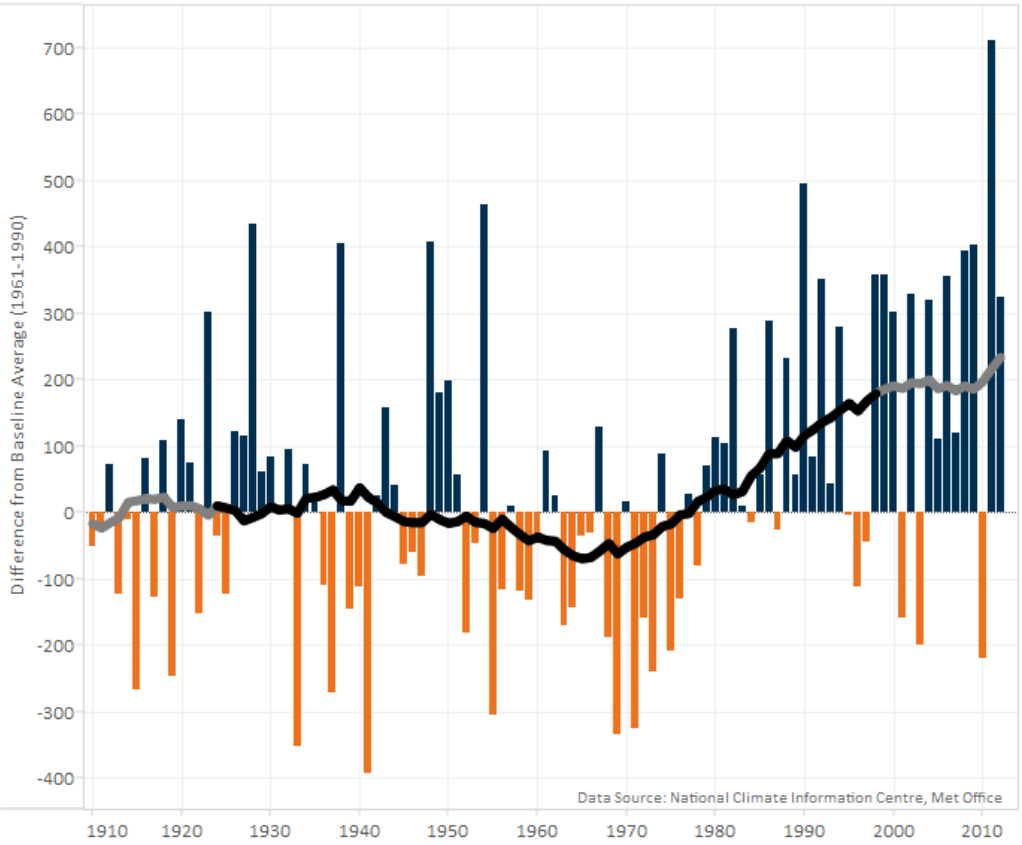
Annual Rainfall (mm) - West Scotland



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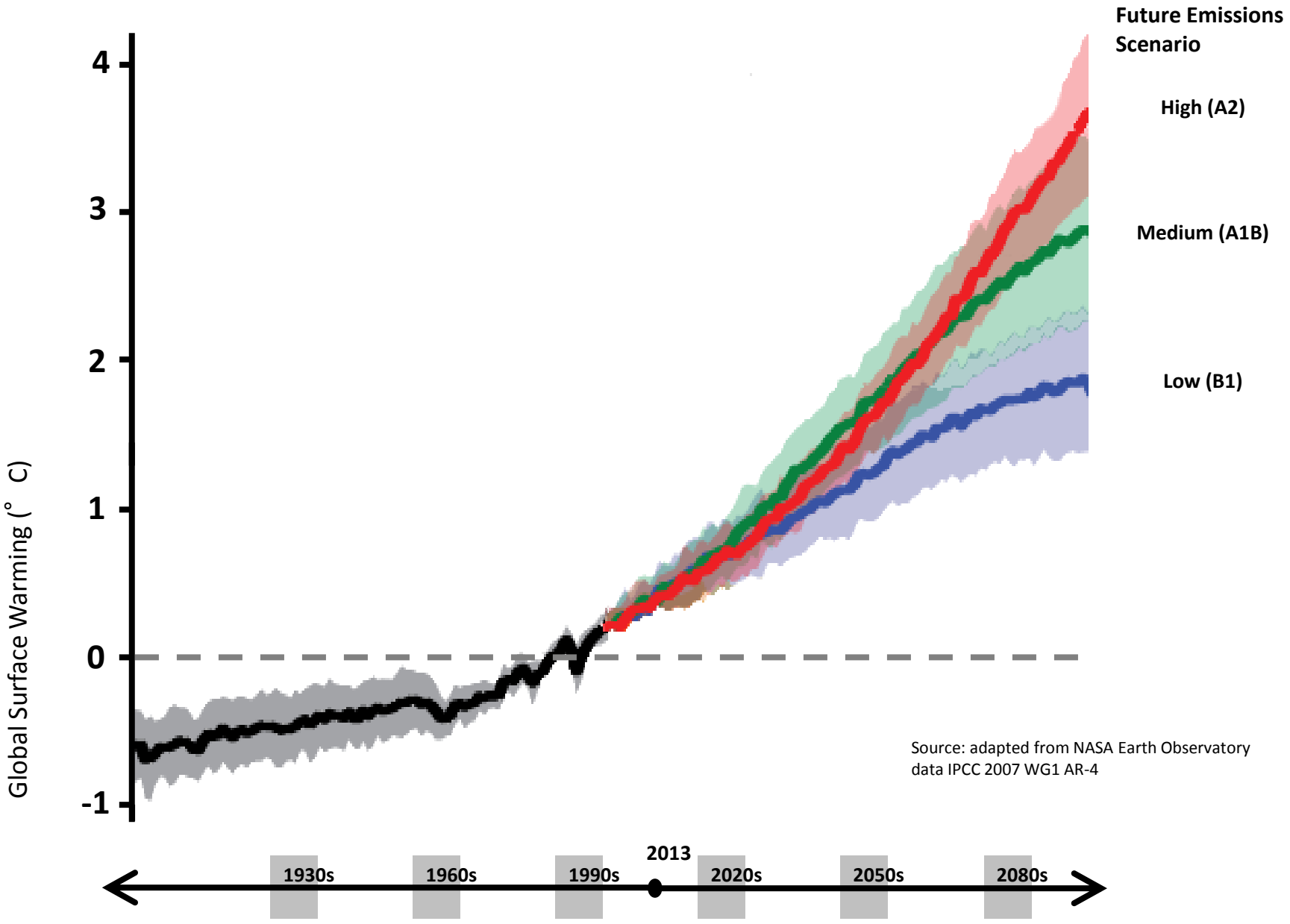
Are we ‘adapted’ to today’s climate?

We need adaptation to present weather and climate.

But what about adaptation to future climate change?


Future Emissions Scenario
High (A2)
Medium (A1B)
Low (B1)
Global Surface Warming (° C)
4
3
2
1
0
-1
1930s
1960s
1990s
2013
2020s
2050s
2080s
Source: adapted from NASA Earth Observatory data IPCC 2007 WG1 AR-4

What do we know about Scotland's future climate?

Over the last few decades we have seen remarkable progress in our understanding of climate – and how humans are changing it…

… and we continue to improve on this.

Scotland has access to world leading information – the UK Climate Projections - about how our climate is likely to change over this century.

http://ukclimateprojections.defra.gov.uk/

The key long-term climate change trends for Scotland are:

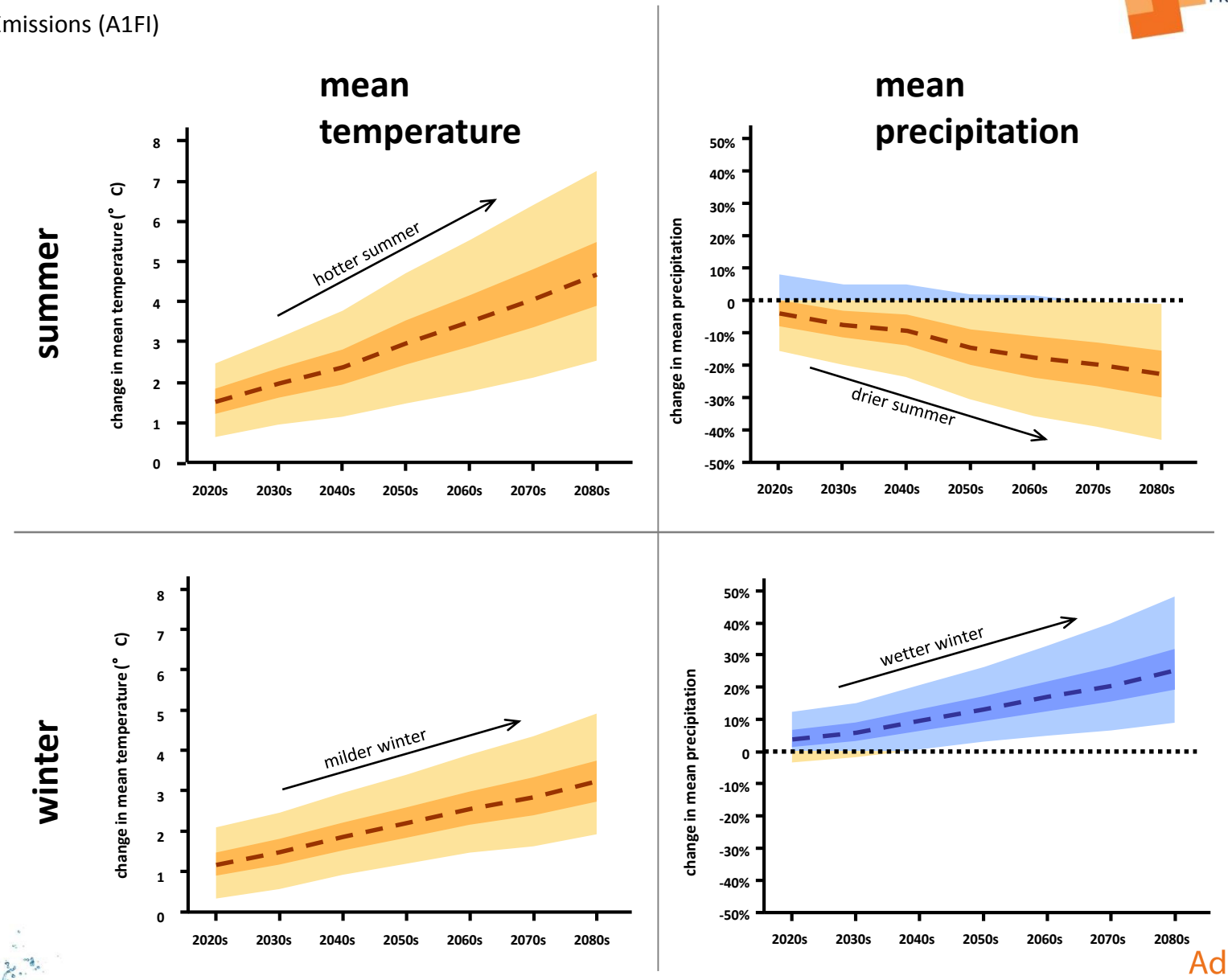
- Weather will remain variable, it may become more variable
- Typical summer is hotter and drier
- Typical winter / autumn is milder and wetter

We can also expect to see:

- Increase in summer heat waves, extreme temperatures and drought
- Increased frequency and intensity of extreme precipitation events
- Reduced occurrence of frost and snowfall
- Sea level rise

Forth River Basin

High Emissions (A1FI)



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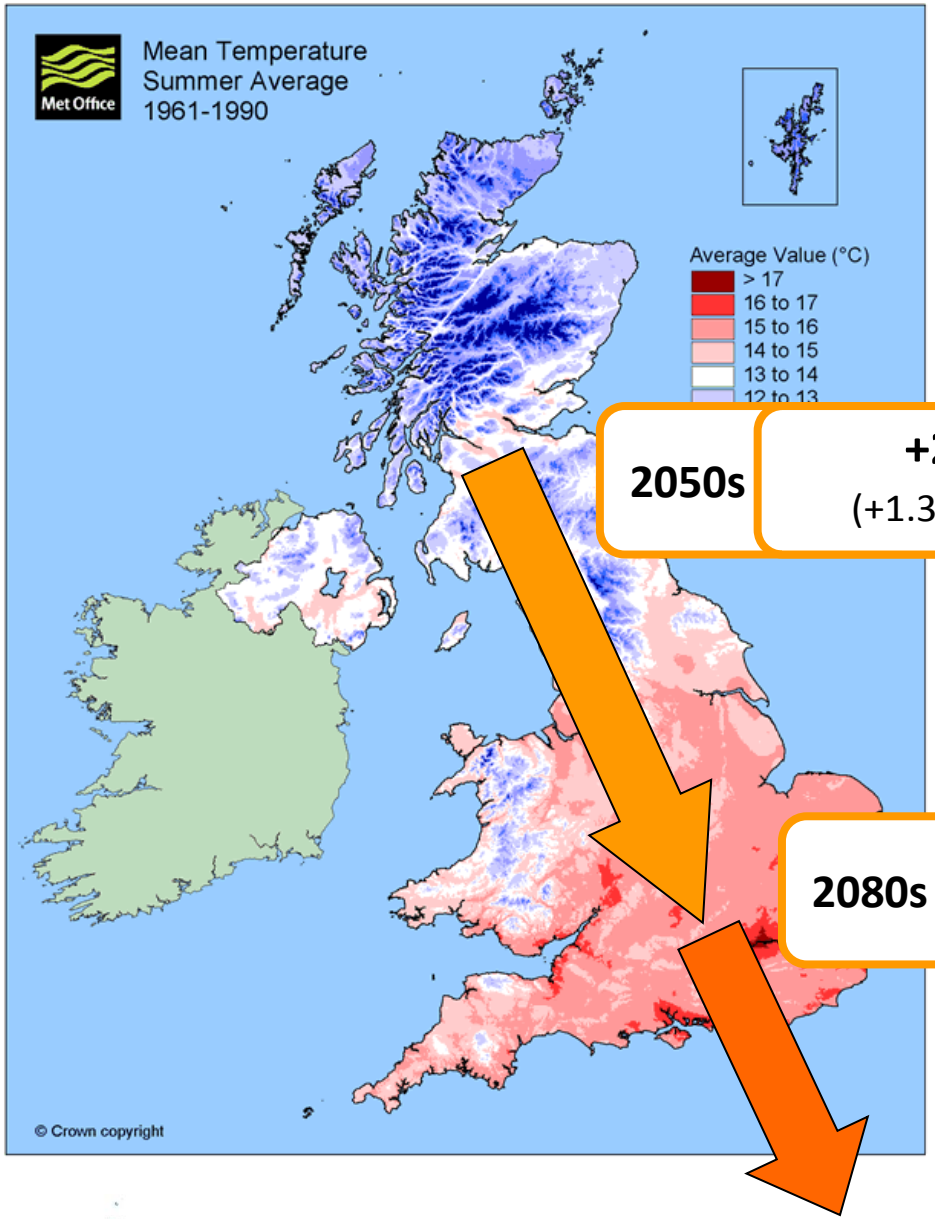

What difference do a few degrees make?

London was 3.0° C warmer than Glasgow
(in baseline 1961-1990)

2050s **+2.8°C** (+1.3 to 4.4°C)

So summer temperatures may be more similar to those in south of England by the 2050s…

2080s **+4.3°C** (+2.4 to 6.8°C)

… and potentially more like those currently experienced in Southern Europe (>4° C)

*The projected values are for summer mean temperature under high emissions scenario

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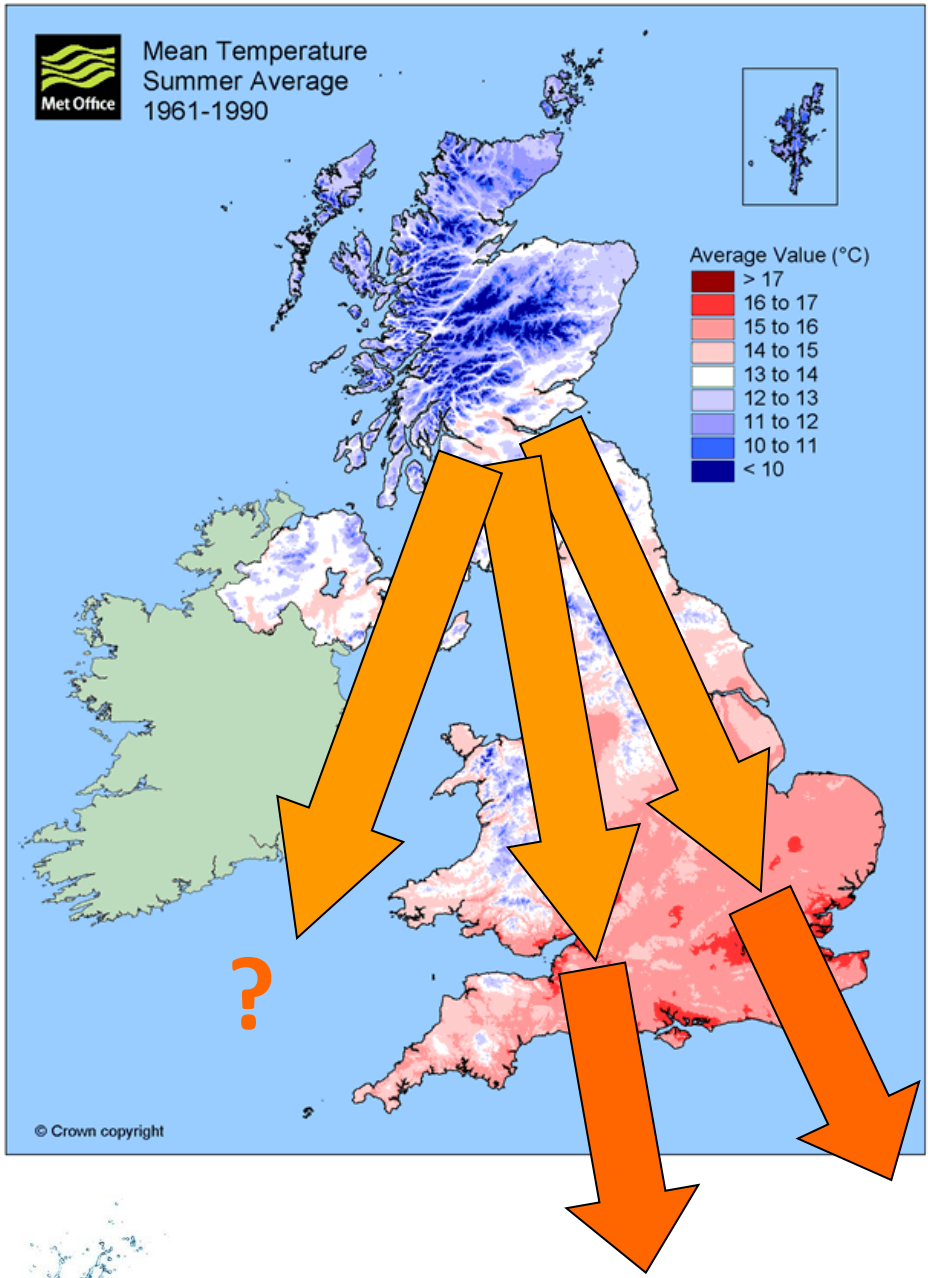
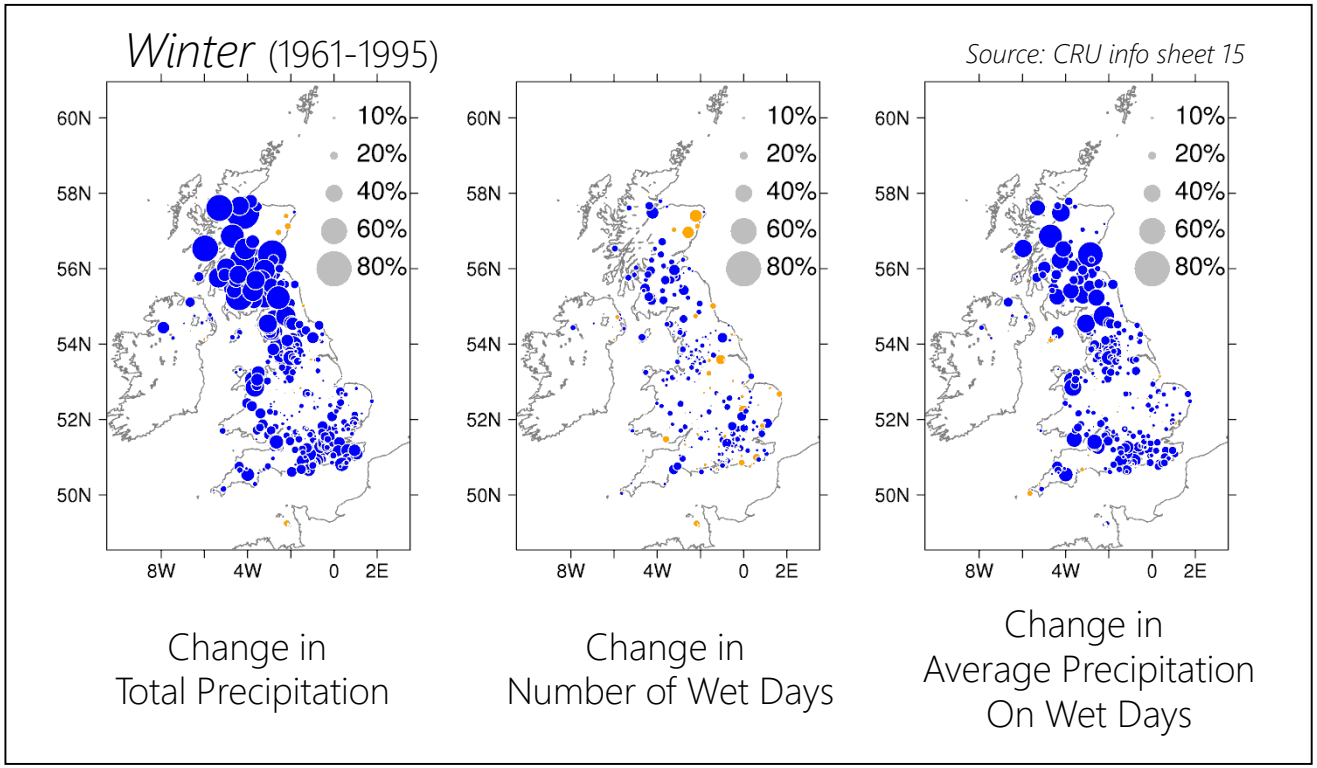


A word of caution: finding a analogous climate location isn't simple – we'd need to consider rainfall and many other climate variables.

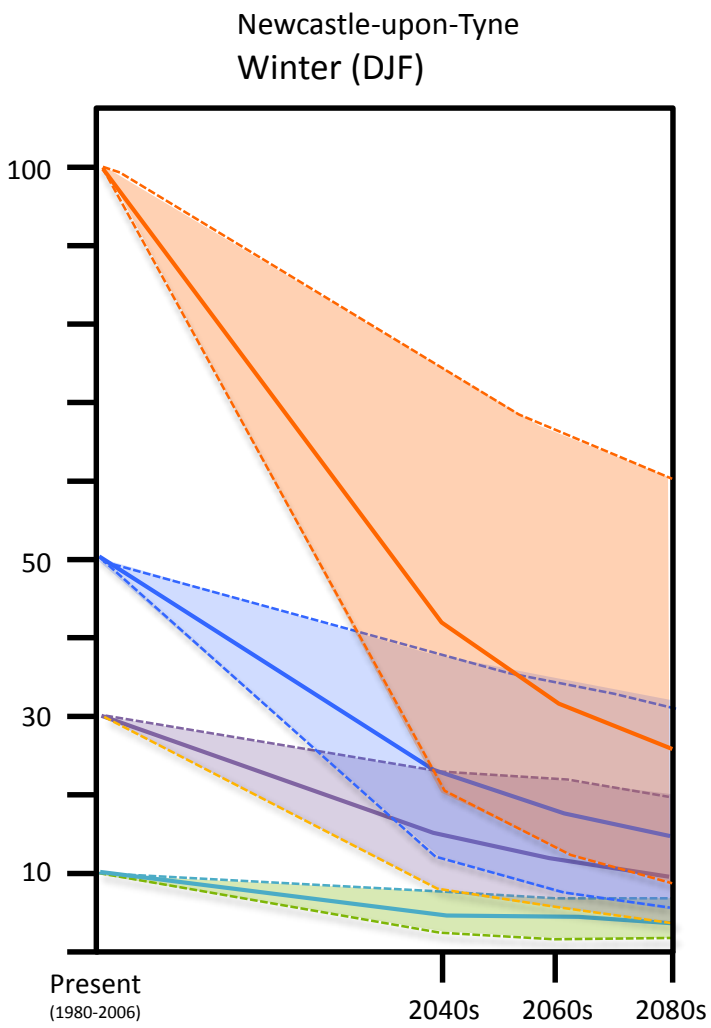
THE CHALLENGE

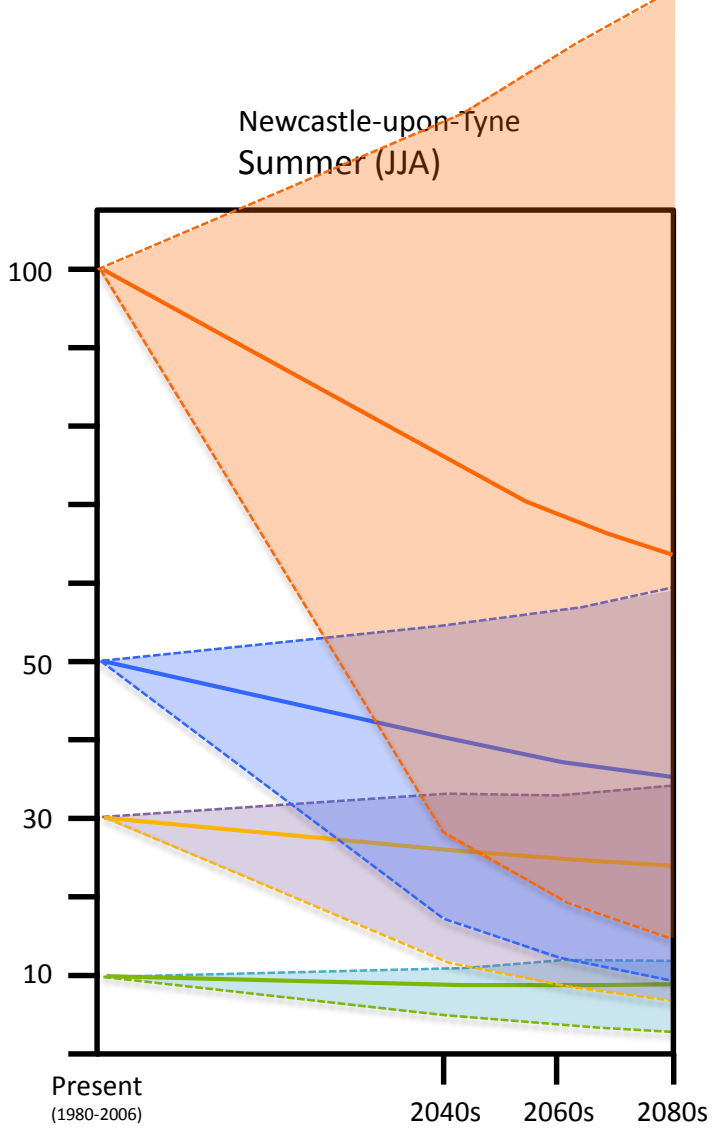
Rainfall has increased over the last 50 years… This increase is mostly due to heavier rainfall on wet days (rather than more wet days)



In London extreme rainfall events occurred once every 30 years before 1960 - and once every 6 years since then…

source: Lloyds (2010)





Met Office

Sanderson (2010) Changes in the frequency of extreme rainfall events for selected towns and cities

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Are we loading the ‘climate dice’ for extreme weather events?

The key long-term climate change trends for Scotland are:

- Weather will remain variable, it may become more variable
- Typical summer is hotter and drier
- Typical winter / autumn is milder and wetter

We can also expect to see:

- Increase in summer heat waves, extreme temperatures and drought
- Increased frequency and intensity of extreme precipitation events
- Reduced occurrence of frost and snowfall
- Sea level rise

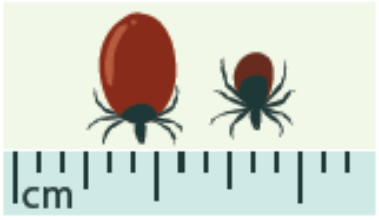
What impact will it have?

What does this mean for Scotland?

from Scottish Climate Change Adaptation Programme (2014)

The occurrence of pests and disease

As our climate changes, it will create new conditions that may allow existing pests and disease to spread and new threats to become established in Scotland. This may impact on the health of our people, animals, plants and ecosystems if risks are not properly managed.



The productivity of our agriculture and forests

A warming climate has the potential to improve growing conditions in Scotland and increase the productivity of our agriculture and forestry. However, climate change will also pose a number of threats, from more variable and extreme weather to the spread of pests and diseases, which may limit this potential.

The occurrence of pests and disease

As our climate changes, it will create new conditions that may allow existing pests and disease to spread and new threats to become established in Scotland. This may impact on the health of our people, animals, plants and ecosystems if risks are not properly managed.

The security of our food supply

Climate change may have an impact on global food production. Although Scotland may be able to grow more food, this will not offset the impact global disruption has on us. The effects of increased volatility in the global commodity marketdue to exposure to extreme climatic events has an impact on supply and cost of food.

The availability and quality of water

As our climate warms and rainfall patterns change, there may be increased competition for water between households, agriculture, industry and the needs of the natural environment. Summer droughts may become more frequent and more severe causing problems for water quality and supply.

The increased risk of flooding

Flooding can already have a devastating effect on those affected. With climate change likely to alter rainfall patterns and bring more heavy downpours, we expect flood risk to increase in the future. This could impact on properties and infrastructure – with serious consequences for our people, heritage, businesses and communities.

The change at our coast

Sea level rise is already having a widespread impact on parts of Scotland's coast. With this set to accelerate over the coming decades, we can expect to see more coastal flooding, erosion and coastline retreat – with consequences for our coastal communities and supporting infrastructure.

The security and efficiency of our energy supply

Climate change may influence Scotland's capacity to generate weather-dependent renewable energy. For example, varying water availability will affect hydro generation schemes. Climate change can also impact power distribution, with impacts ranging from damage caused by extreme weather events, to reduced transmission efficiency occurring as a result of temperature fluctuations. Impacts on global energy markets may also affect energy supplies in Scotland and consequently our overall energy security.

The performance of our buildings

The built environment is made up of existing and newly constructed buildings. Climate change will have an impact on the design, construction, management and use of these buildings and surroundings including the man-made surroundings such as green and blue spaces. Our buildings are largely constructed to cope with the extremes of weather conditions found across Scotland, but most of them will need to continue functioning throughout this century under a significantly different climate. Whether retrofitting existing or building new, it is likely that there will be issues with water management (in flood and drought), weather resistance and overheating.

The health and wellbeing of our people

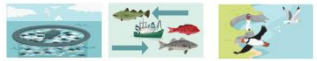
A warming climate may provide more opportunity to be outdoors and enjoy a healthy and active lifestyle, while reducing mortality in winter. However, it could affect patterns of disease and other health issues. Climate change and associated extreme weather may disrupt the lives of individuals and communities, limiting access to vital services and impacting on people's physical and mental health.

Our cultural heritage and Identity

The changing climate is already altering our unique Scottish landscape and threatening our historic environment through coastal erosion, flooding and wetter, warmer conditions. The increased pace of climate change presents challenges to all those involved in the care, protection and promotion of the historic environment.

The health of our marine environment

Our marine ecosystems – from plankton through to fish, mammals and seabirds – are already being affected by climate change alongside other pressures, particularly fishing. Changes will continue, with rising temperatures likely to change species and their distributions. The changes will present both threats and opportunities to our commercial fisheries and aquaculture.



The resilience of our businesses

Climate change and associated extreme weather may disrupt transport, energy and communication networks in Scotland and around the world. This could impact on markets, affect supply chains and raise insurance costs.

The quality of our soils

We rely on soils to sustain biodiversity, support agriculture and forestry, regulate the water cycle, have historic environmental and archaeological value, and store carbon. Soils and vegetation may be altered by changes to rainfall patterns and increased temperatures - as well as the way we use the land.

The health of our natural environment

Climate change may affect the delicate balance of Scotland's ecosystems and transform Scotland's habitats and biodiversity, adding to existing pressures. Some distinctive Scottish species may struggle and could be lost, invasive non-native species may thrive, while a degraded environment may not be able to sustain productive land or water supply.

Infrastructure - Network Connectivity and Interdependencies

Our energy, transport, water, and ICT networks support services are vital to our health and wellbeing and economy prosperity. The effect of climate change on these infrastructure systems will be varied. They are likely to be impacted by an increase in disruptive events such as flooding, landslides, drought, and heatwaves. Our infrastructure is closely inter-linked and failure in any area can lead to wider disruption across these networks.

Adaptation Scotland
supporting climate change resilience

How will climate change affect Scotland's public sector?

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

Building performance will be challenged by a changing climate. Buildings will need to cope with overheating, intense rainfall events and possible changes in wind and storm patterns. This will require appropriate planning, design and building standards, but also retrofitting existing building stock.

Effective land use and development planning has a critical role in adapting to climate change.

Planning can help ensure that new and existing developments, infrastructure and communities are resilient to climate change. Resilient features include using sustainable urban drainage systems, green infrastructure and avoiding development in areas vulnerable to flood risk, coastal erosion and rising sea levels.

Rising seas threaten Scotland's coastal communities and infrastructure.

Sea level rise is already having a widespread impact on Scotland's coast. With this set to accelerate over the coming decades, we can expect more coastal flooding, erosion and coastline retreat with consequences for coastal communities and supporting infrastructure. Coastal management which addresses these impacts will be necessary to reduce risk.

Demands on emergency and rescue services will change.

In a changing climate emergency services may need to respond to an increased number of floods, landslides and wildfires. There may also be changes in social and recreational behaviour that present new challenges to emergency and rescue services. Emergency services need to consider how these changes may impact procedures, premises, staff and equipment.

Climate change will affect the health and wellbeing of individuals and communities.

A warmer climate may provide opportunities to enjoy a healthy, active outdoor lifestyle as well as reducing winter mortality. However, more disruptive weather events will have consequences for people's physical and mental health. Changes to climate could also alter patterns of disease and exacerbate respiratory illness.

The productivity of our agriculture and forests will change.

A warming climate has the potential to improve growing conditions and increase the productivity of agriculture and forestry. However, changes in the natural environment may contribute to degraded ecosystems less able to sustain productive agriculture and forestry. More variable and extreme weather may limit the potential for improved conditions, making effective land and water management more important.

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

Climate change will transform Scotland's habitats and biodiversity, adding to existing pressures. Some Scottish species could be lost and invasive species (including pests and disease) may thrive. We need action to protect the ecosystem services which support the economy and contribute to quality of life in Scotland, for example through use of green networks with space for natural flood management and wildlife corridors.

Climate change may damage and disrupt national infrastructure

The potential for increased flooding, landslides, drought, heat waves and rising sea levels – particularly when combined with storms – may damage national infrastructure. Disruption to energy, transport, water and ICT networks could affect business continuity. Failure of key infrastructure hubs in one area can affect large parts of the network. Organisations need to consider how this may affect delivery of vital services.

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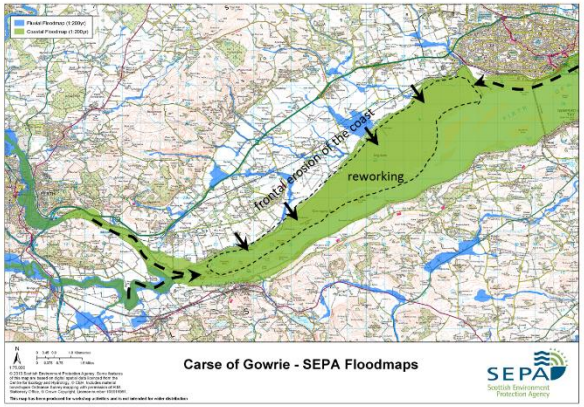
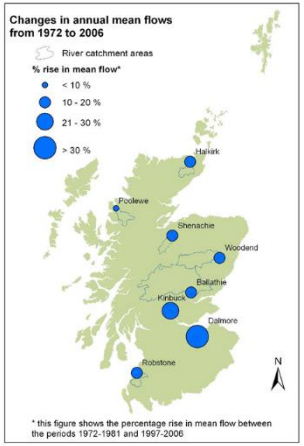
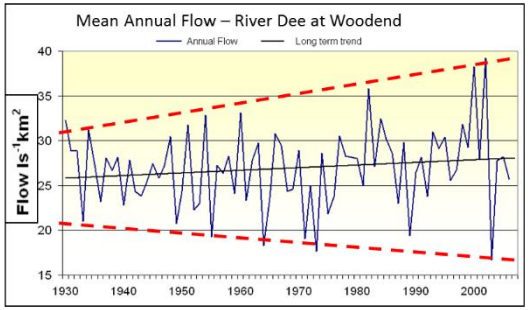
Detailed local information







SEPA
Scottish Environment Protection Agency

- Natural Variation or Trend?
- Clear Signals Emerging!

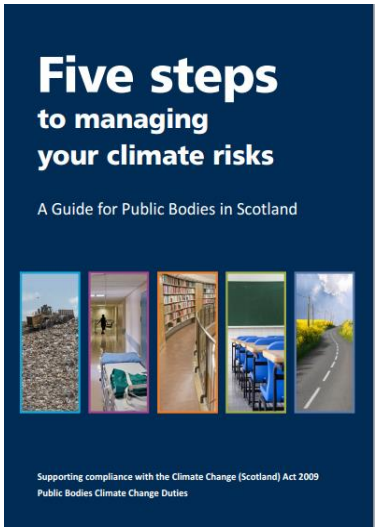
How can we respond?

Managing risk.

Risk assessment examples - current and future risk

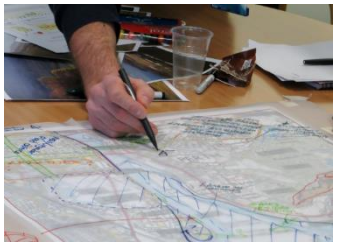
Hazard Type	Impact	Consequence	2012 Inherent Risk: Likelihood	2012 Inherent Risk: Consequence	2012 Inherent Risk: Risk Rating	Mitigants & Controls	2012 Residual Risk: Likelihood	2012 Residual Risk: Consequence	2012 Residual Risk: Risk Rating	2050's Inherent Risk: Likelihood	2050's Inherent Risk: Consequence	2050's Inherent Risk: Risk Rating	M's & C's	2050's Residual Risk: Likelihood	2050's Residual Risk: Consequence	2050's Residual Risk: Risk Rating
Severe weather event	Loss of buildings, personal property and businesses	Damage to council assets and buildings. Damage to resident's property and businesses.	3	4	12	Emergency Plans, Mass Absence Plans, School Business Continuity Plans, Evacuation Plans, Scottish Ambulance Services	2	3	6	4	4	16		3	3	9
Reduced summer rainfall	Water shortage during summer	Less rainfall results in a decrease in agriculture and whisky industry productivity. Increased population due to summer tourist season adds extra pressure to overstretched water supplies. Drought orders introduced.	2	3	6	Business Continuity Plans, Emergency Plans, Public Awareness Campaign	1	3	3	2	4	8		1	4	4
Heatwaves/ long term temp increase/ reduced	Forest fires	Extreme drought dries out the land and plants, making them "tinder" causing them to ignite easily which aids the speed and spread of forest fires which are a threat to life and property.	1	4	4	Business Continuity Plans and Emergency Plans.	1	3	3	2	4	8		1	4	4
Long term increase in precipitation	Landslides	Increased wetness and water retention makes the land easily saturated which leads to landslides in the steep regions.	3	4	12	Scottish funding provided to assess areas that are prone to Landslides. Emergency Plans. Business Continuity Plans. Evacuation Plans are in place.	3	4	12	3	4	12		3	4	12

THE ADAPTATION GAP

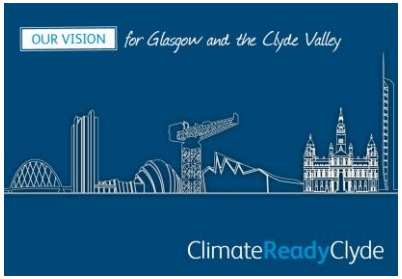


Adaptation Scotland
supporting climate change resilience

Creating a vision



The groups Vision for 2050 was illustrated visually on the map with a key and included:
- Urban drainage and SUDS
- POW maintenance
- Building maintenance / retrofit little new development, so emphasis should be on existing buildings
- New and expanded reservoirs for summer irrigation
- Enhanced drainage for extreme rainfall events and increased winter precipitation
- Managed retreat of coastal fringe
- Green networks and buffer strips
- Cultural / built heritage / setting policies required to protect identify of the area.
- National cycle network increased tourism
- Protection of the railway and a new station low carbon travel
- Potential development with zero carbon generating technology potential for biofuel crops and associated industrial infrastructure (located on former airfield?)
- Renewable energy / solar farms
- Building maintenance to increase resilience
- Reuse of buildings in the town and restricted infill development new development restricted to historic settlements with existing infrastructure (drainage, sewerage etc.) and often on highest ground.



Identifying and prioritising actions

Adaptation Scotland

supporting climate change resilience

11:30 – 11:45

Coffee break

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Adaptation Scotland

supporting climate change resilience

11:45

Introductions from the ALE Introductory programme members

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Falkirk Council

Malcolm and Jackie

Civil Contingences Co-Ordinator

and

Climate Change Officer

A.L.E. what can we achieve?

- Reassurance!
- Understanding of what works well
- Training opportunities
- Ideas on engaging local business

Falkirk Council

Adaptation: work to date

- Step 3 of 5
- Interviewing Service area representatives
- Behaviour change ‘Giesaleaffor lesso’thegrief’

Climate Change Adaptation

“We can’t direct the wind, but we can adjust the sails”

Falkirk: change in weather patterns

- Squally high winds
- Sudden downpours
- “Deep depressions”
- Coastal flooding

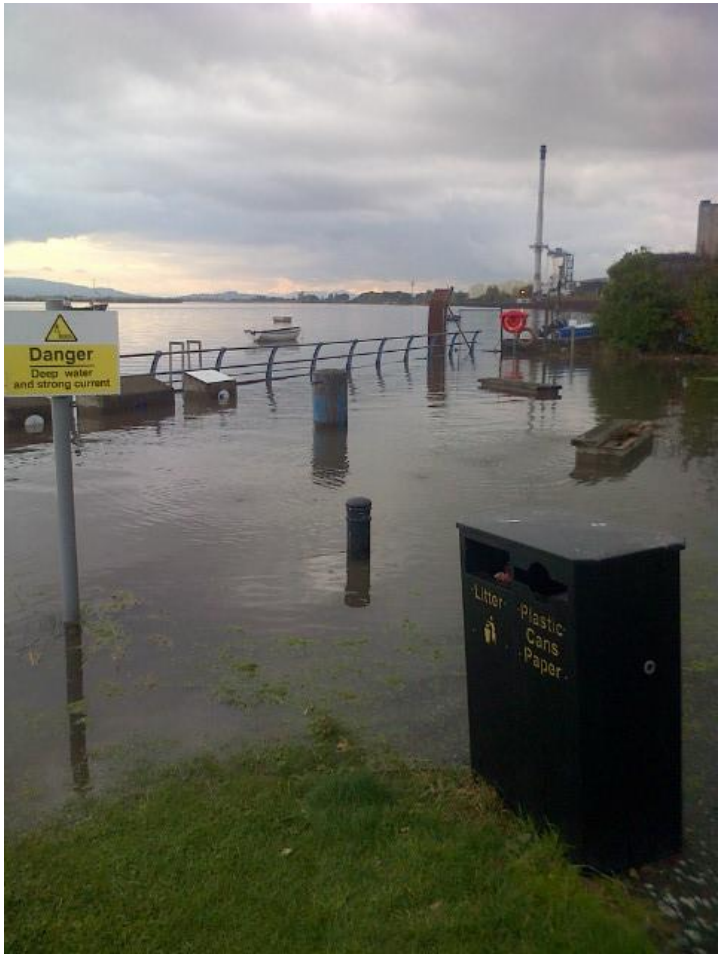
Falkirk Council

Falkirk: consequences

- Warnings and Alerts
- Utility disruption
- Transport disruption
- Communications disruption
- Vulnerable communities and people

Falkirk Council

Christmas and New Year Weather 2014



Falkirk: consequences

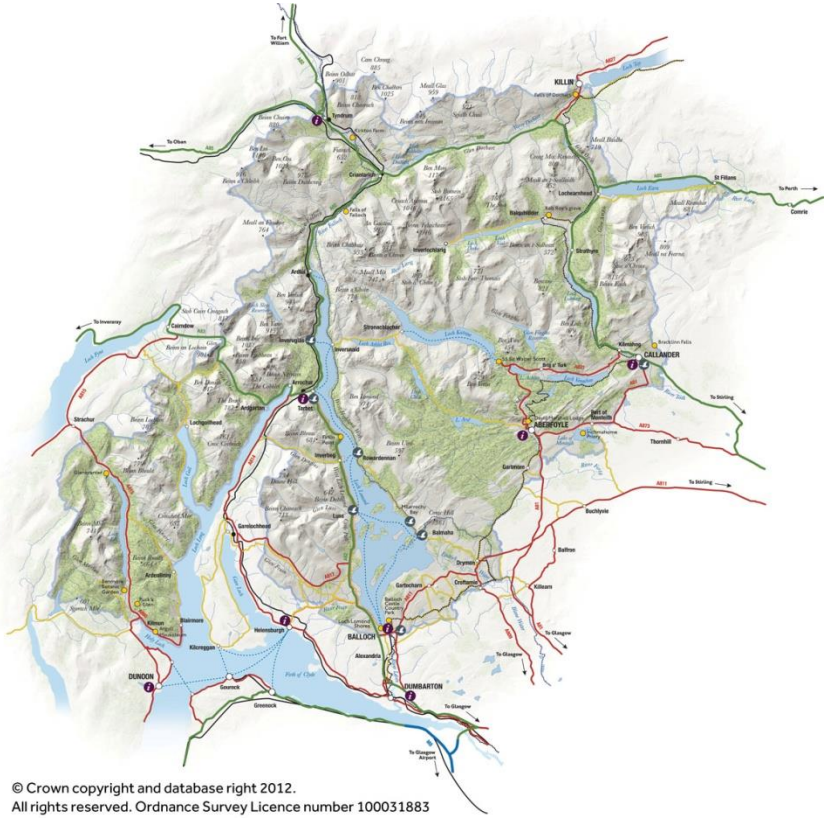
- High Tides and “surges”
- Flood Prevention
- Flood response

Falkirk Council

Falkirk: consequences?


LOCH
LOMOND
& THE TROSSACHS
NATIONAL PARK
Conservation,
Visitor Experience,
Rural Development

Some Facts & Figures



- **Extent:**
  1,865 km^2
- **Land Use:**
  64% agriculture
  28% woodland & forestry
  7% water
- **Land Ownership:**
  56% private
  38% public
  5% charities/NGO's

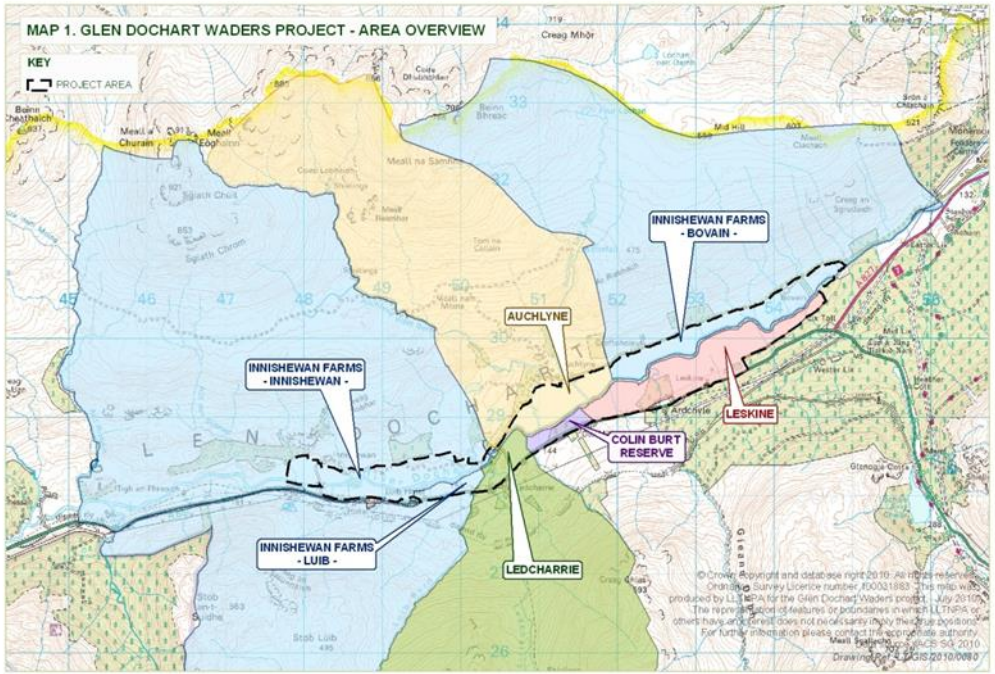
Strategic aims for the Park

- Conserve and enhance the **natural and cultural** heritage of the area
- Promote sustainable use of **natural resources** in the area
- Promote public **understanding** and **enjoyment** (including enjoyment in the form of recreation) of the special qualities of area
- Promote sustainable **economic** and **social** development of the area's communities
- Loch Lomond & The Trossachs **National Park Authority** is the organisation charged with ensuring that these aims are met
- The National Park Authority produces a **Park Partnership Plan** to set the vision for the Park

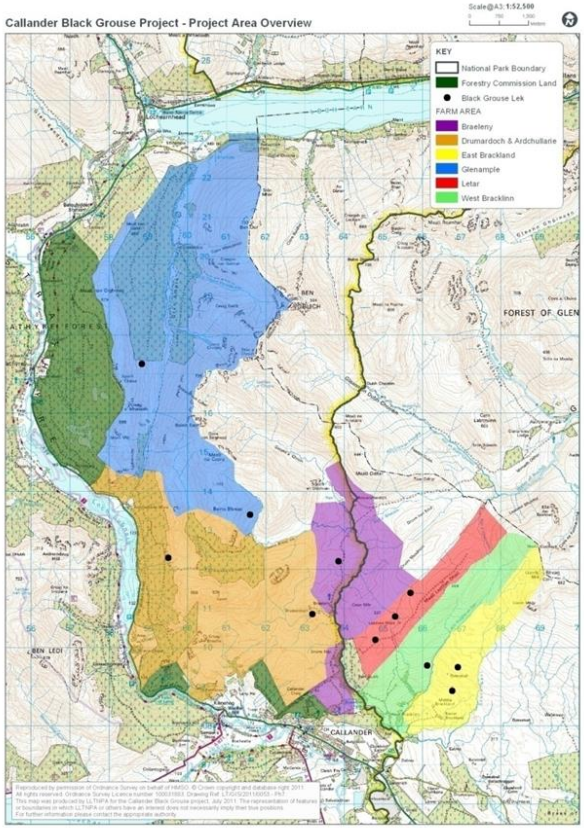
What Have We Got?

- 13 Paths
- 14 Buildings (Toilets, Visitor Centres, HQ, Area Offices)
- 13 Car Parks
- 2 Bridges
- 3 Slipways
- 3 Woodlands
- 1 Pond
- 1 Island – Inchcailloch NNR
- 1 Foreshore
- 2 Picnic Areas
- 2 Grasslands
- 1 Pier

Glen Dochart Waders



Black Grouse

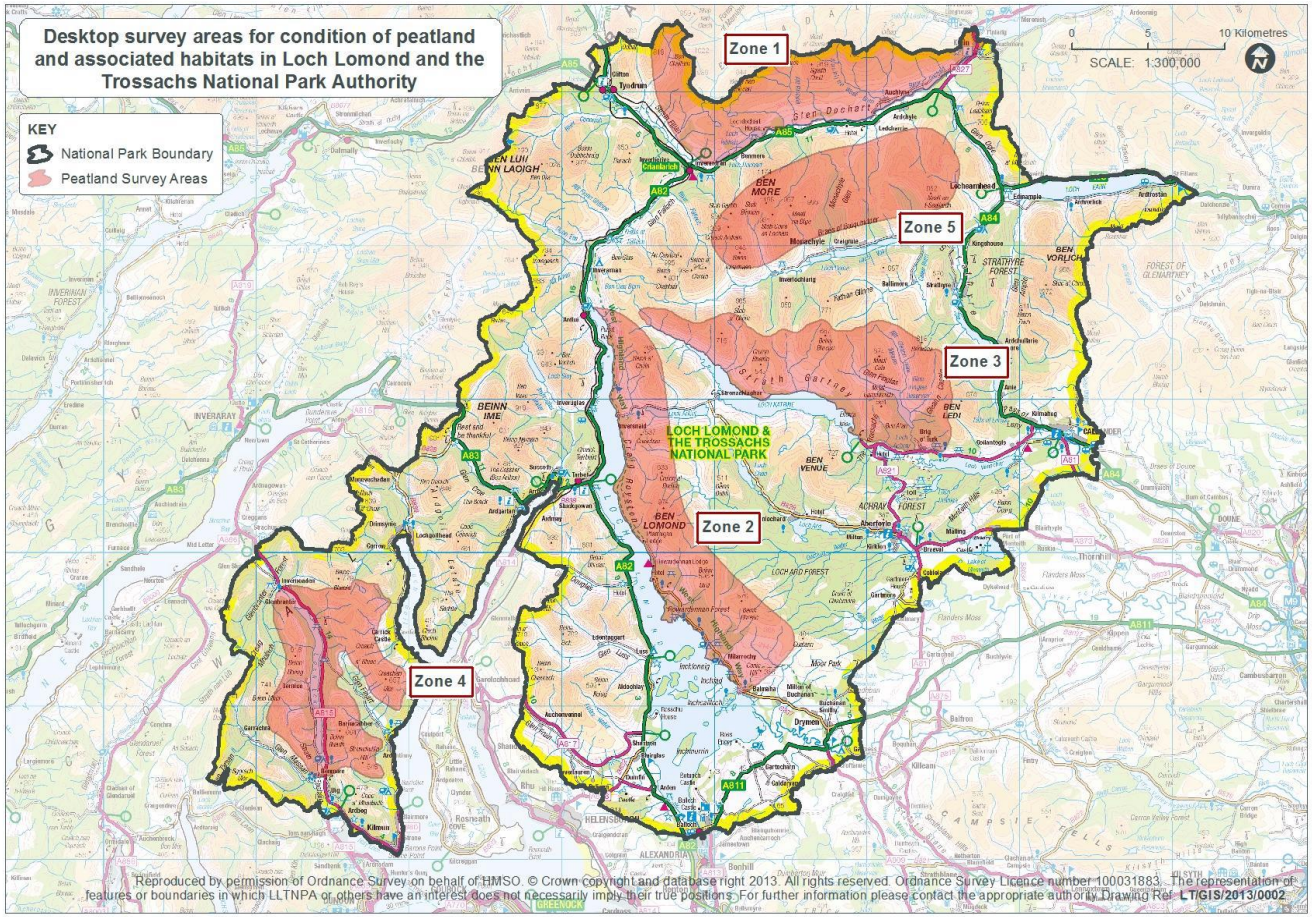


Whole Farm & Estate Plans

Challenges and threats to traditional agriculture and estate management

Opportunities: tourism, renewable energy, PES...

Peatland Restoration



- Condition survey to look at peat depths within five key zones
- Desk-based
- Potential future restoration work

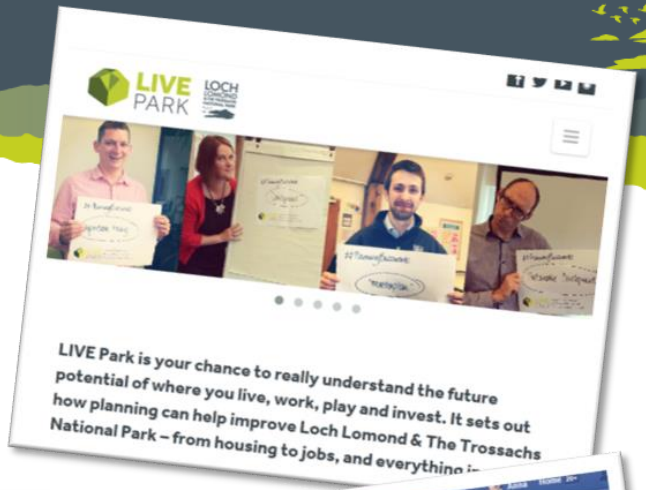
Visitor Pressures

Seasonal issues

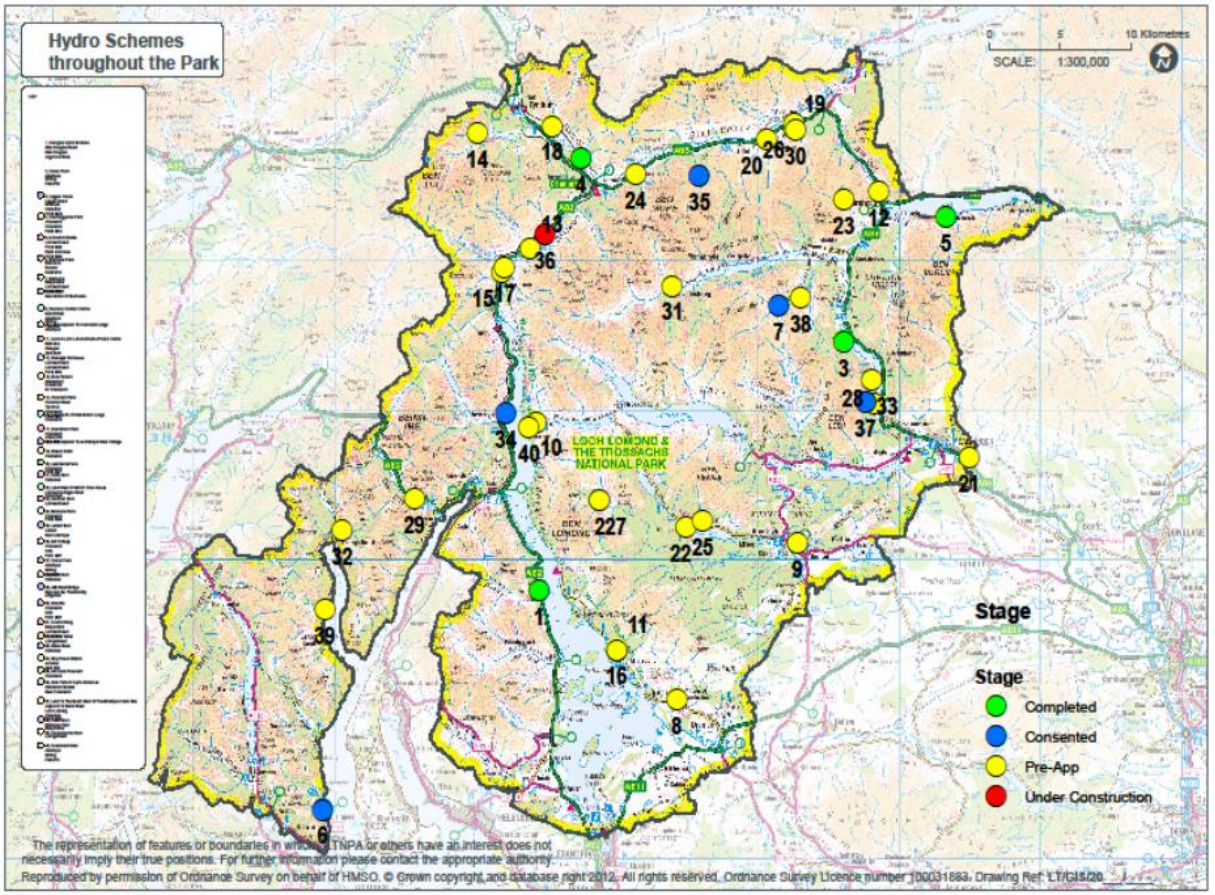
LIVE Park – Local Development Plan

LOCH LOMOND & THE TROSSACHS NATIONAL PARK

LIVE PARK



Communities



Paths work

Presentation to ALE: Glasgow City Council's journey to adaptation planning

Sonia Milne

Sustainable Glasgow

Glasgow City Council

Glasgow and climate adaptation planning

- Glasgow aims to be one of the most sustainable cities in Europe over the next twenty years
- Sustainable Glasgow is our partnership for achieving that – delivering on environmental, social and economic aspects
- Climate adaptation planning and climate ready placemaking is one of the biggest challenges facing our city in the next decades

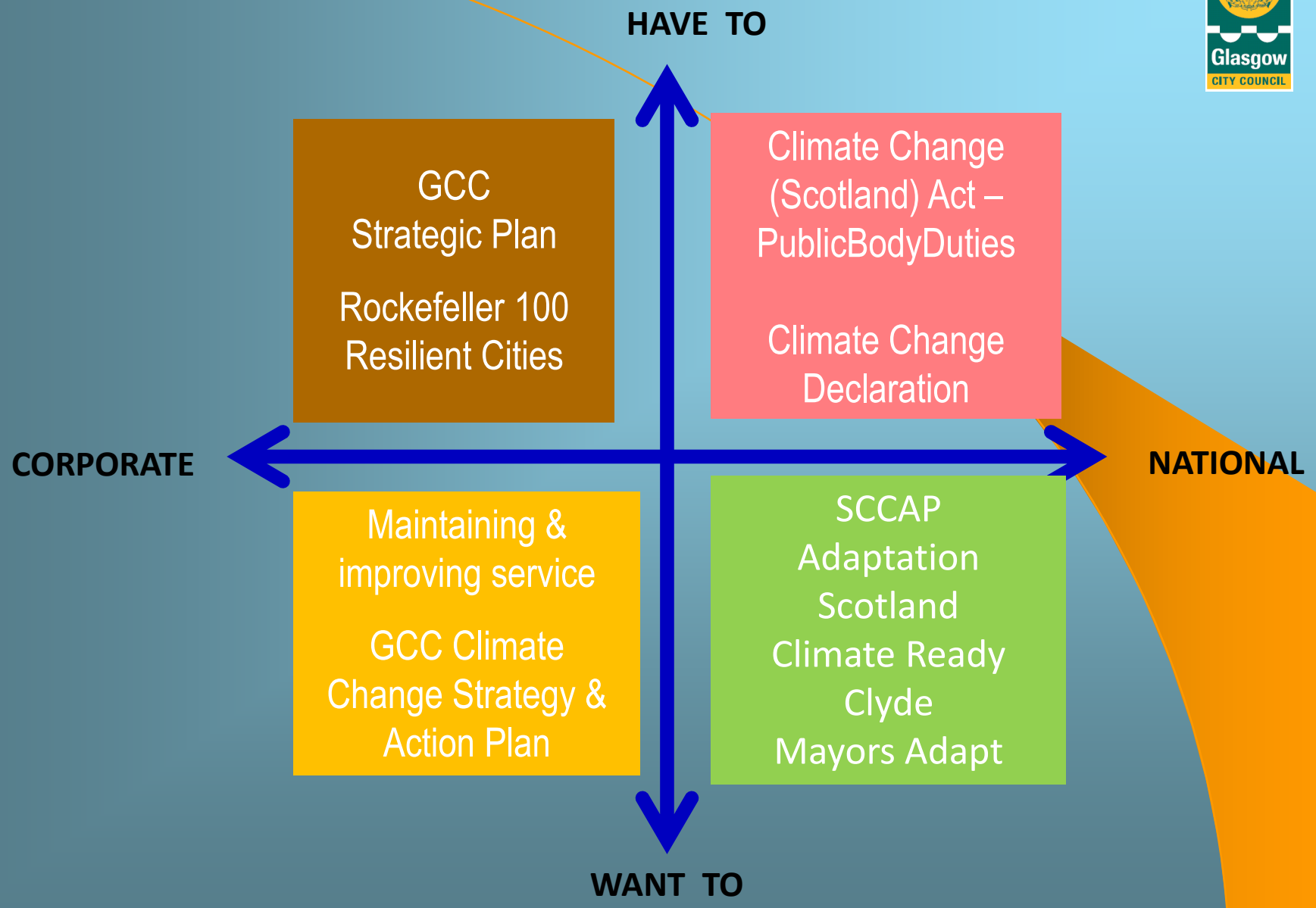
The journey so far

Glasgow's Local Climate Impact Profile

Type of Impact	Number	Percentage
Damage to Infrastructure	94	50.5%
Damage to Buildings	22	11.8%
Flooding / Surface Flooding	17	9.1%
Positive Impact	9	4.8%
Injury / Crime	7	3.8%
Power Failure / Cut	3	1.6%
Change in Lifestyle / Working Conditions / Change in Processes	13	7.0%
Damage to environment / changes in biodiversity / vegetation	9	4.8%
Damage to Health / Vulnerable groups	5	2.7%
Other	7	3.8%
Total	186	100.0%

– Number of impacts resulting from different types of severe weather events r
1999 – 2009

Why join ALE?


HAVE TO
GCC
Strategic Plan
Rockefeller 100
Resilient Cities
Climate Change
(Scotland) Act –
PublicBodyDuties
Climate Change
Declaration
CORPORATE
NATIONAL
Maintaining &
improving service
GCC Climate
Change Strategy &
Action Plan
SCCAP
Adaptation
Scotland
Climate Ready
Clyde
Mayors Adapt
WANT TO

What we would like to achieve

Now…

- Internal commitment to climate adaptation – Business Case
- Climate Change Risk Register
- Climate Adaptation Plan

In the Future…

- A greener and more climate resilient city (and region)

CLIMATE CHANGE ADAPTATION

FLOOD RISK MANAGEMENT

- **Local Flood Risk Management Plan** for the Tay Estuary currently in preparation with Angus, Aberdeenshire, PKC, Scottish water and SEPA. To be published in 2016 and reviewed every 5yrs.
- **Integrated Catchment Model** developed to assist above which models combined sewer and surface water systems within Dundee and Tayside. Led by Scottish Water and completed up to Optioneering stage.
- **Dundee Coastal Study Stage 2** – commenced in 2009 and completed in 2013. Identified risk of coastal flooding with Central Dundee, Broughty Ferry, Riverside Drive and Dundee Airport. Full economic appraisal carried out to demonstrate justification for upgrading flood defences. From this, 4 schemes underway:

Dundee City Council www.dundeecity.gov.uk CHANGING FOR THE FUTURE

- **Broughty Ferry 1** – construction of rock armour revertment works currently underway (funded from capital plan).
- **Broughty Ferry 2** – progressing design works on soft flood protection measures utilising and extending existing sand dunes.
- **Central Waterfront** – works to raise height of sea wall to start Summer 2015 as part of V&A development (funded from capital plan).
- **City Quay and Riverside** – design works utilising set back walls and flood gates. Consultation carried out in Jan 2015. (est. £6.1m)
- Broughty Ferry – est. costs of £9.9m. Identified as SEPA National Priority Cat No.1. Design options to commence.

CLIMATE CHANGE ADAPTATION

POLICY

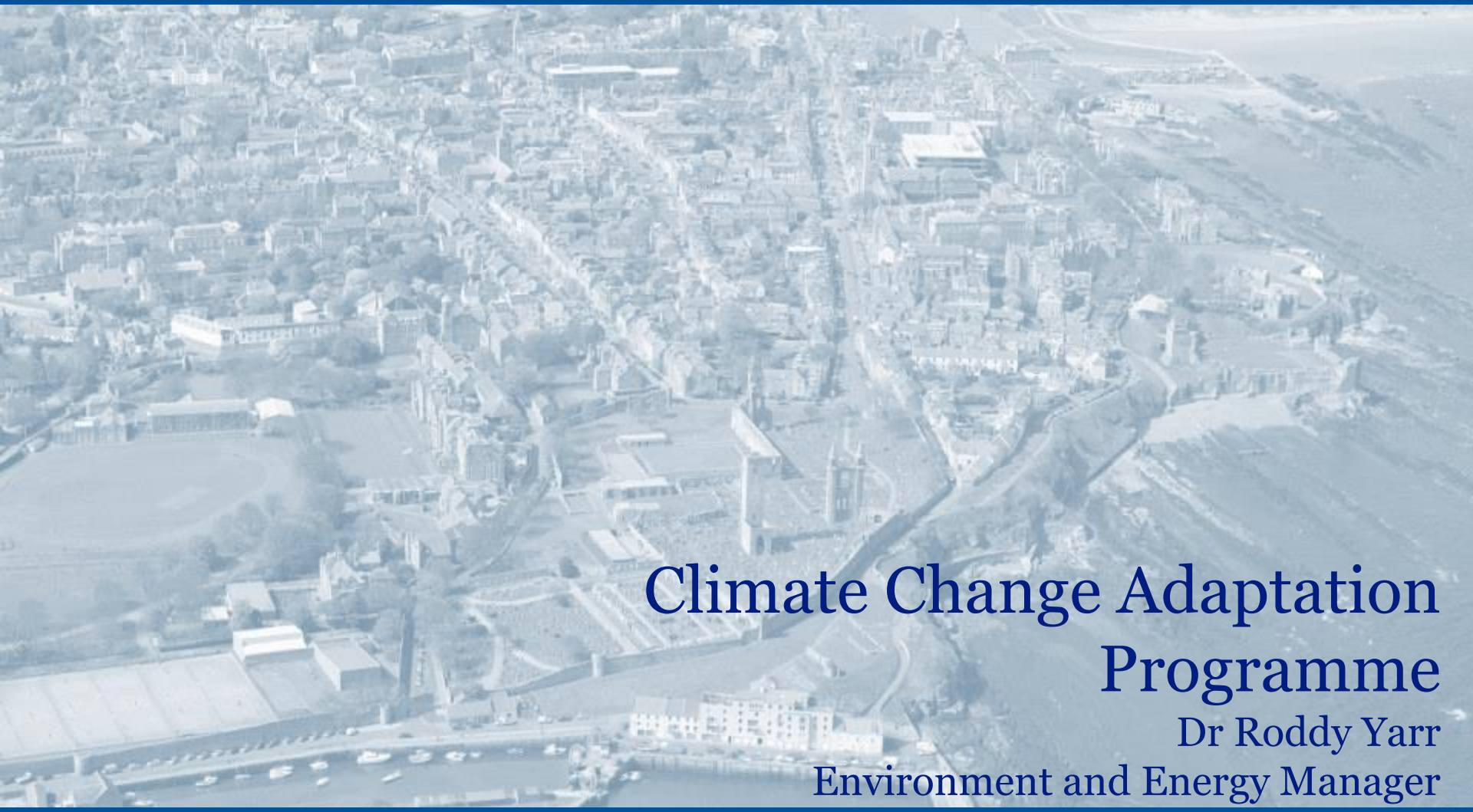
- **Local Development Plan** – Policy 29 requires low and zero carbon technology in new development; Policy 41 recognises the implications of climate change and sea level rise and there is a presumption against development in areas vulnerable to coastal erosion, flood risk and rising sea levels.
- Feb/Apr 2013 – two **adaptation workshops** held with planners based within the TAYplan region to discuss climate change impacts and how planning policy can deliver adaptation at all levels of the planning system.
- **Low Carbon and Climate Change Adaptation Opportunity Assessment** published in Feb 2015 which provides a high level indicative assessment of the economic risks of potential adaptation impacts at the city level.
- All Council strategies, plans and programmes continue to undergo **Strategic Environmental Assessment** (SEA) to assess their environmental impact including climate change adaptation risk and opportunities.

CLIMATE CHANGE ADAPTATION

FUTURE PRIORITIES

- Identify wider risks and opportunities from a changing climate.
- Develop business case for planned approach to climate change adaptation.
- Prepare a corporate adaptation plan.
- Ensure adaptation embedded into corporate risk register.
- Strengthen policies relating to cc adaptation within the new Local Development Plan.

University of St Andrews | FOUNDED 1413



Climate Change Adaptation Programme

Dr Roddy Yarr
Environment and Energy Manager

Adaptation Actions To Date

Flood risk assessments of key assets

- North Haugh area
- Guardbridge
- East Sands area

Understanding climate impacts

- Carbon footprint (including travel)

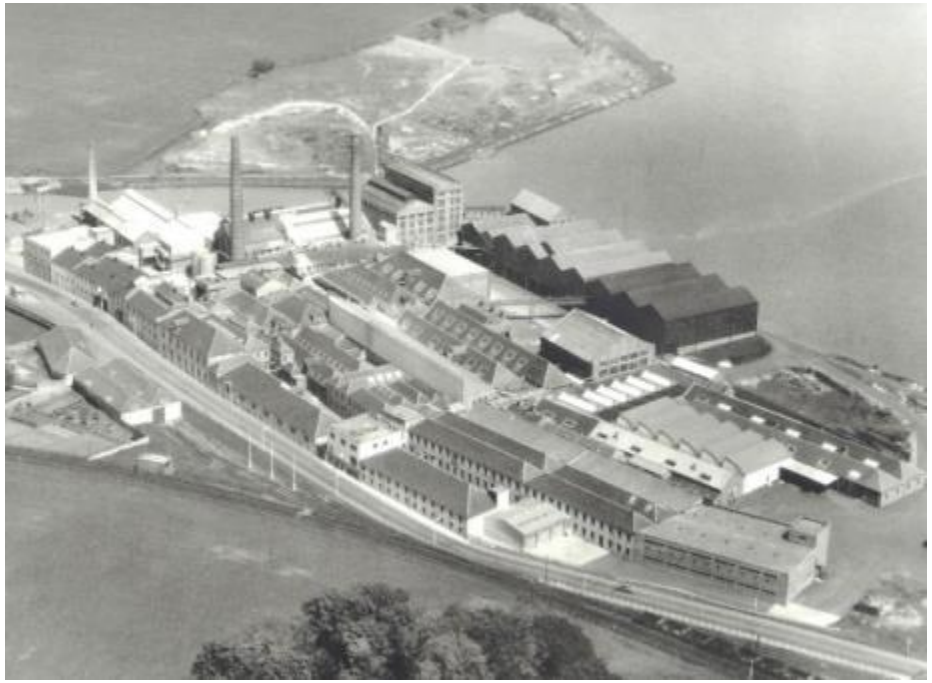
St Andrews Town

North Haugh

St Andrews Town

East Sands

Guardbridge



- Sea wall is part of the Fife Coastal Protection Programme
- University's Scottish Oceans Institute research interest in estuary and climate science

Adaptation Aims

1. Identify future climate vulnerability
2. Identify adaptation priorities
3. Respond to Climate Change Reporting Duties

NHS Lanarkshire
Climate Change Adaptation

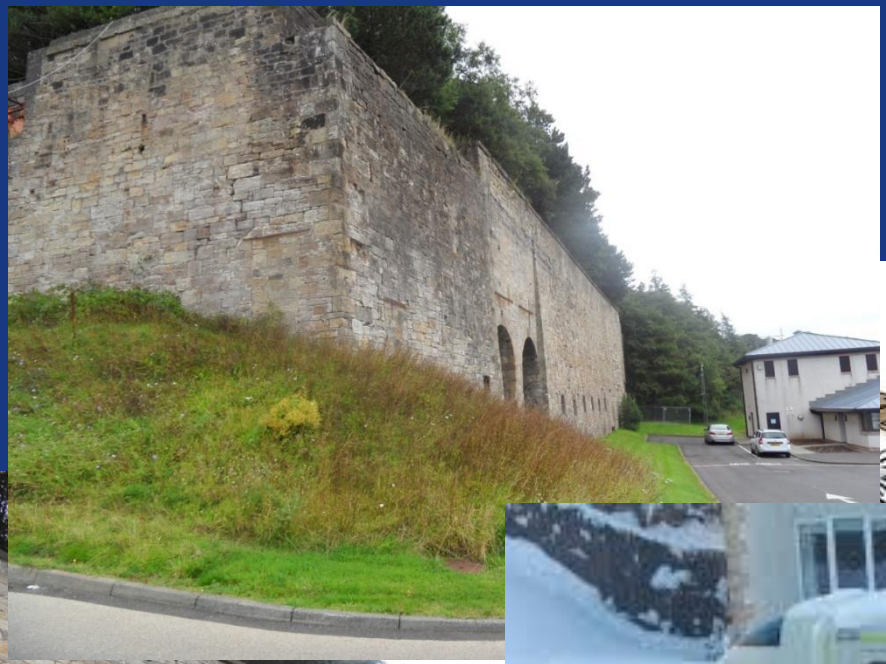
Marie Porteous
Head of Sustainability & Environment Manager

NHS Lanarkshire

- Over 11,000 Staff
- 650,000 people in North and South Lanarkshire
    - Living Longer
    - Falling Birth Rate
- 3 Acute Hospitals
- 2 CHPs
    - 8 Community Hospitals
    - Over 60 HCs and Clinics
    - Offices
    - Dedicated Laundry

Impact

- Travel Disruption
- Service Disruption
  - Patient Meals
  - Laundry
  - Specimen Collection
- Damage to Person and Property
- Potential for Litigation




TRANSPORT SCOTLAND
M74
Maintained by
Amey
0800
028 1414


AMBULANCE

CALEDON TREE CONSULTANTS LTD — TREE SURVEY SCHEDULE

Client: NHS Lanarkshire Site: Cleland Hospital Date of Survey: 15 September 2014 Weather: Cloudy; Winds F0-1

Arboricultural Consultant/ Surveyor: Survey Tags: Green

Tree Ref Number	Species, *Taxa*	Age Class	Physio Condition	Structural condition	Condition Notes	Recommendations: H&S Requirements	Recommendations: Mitigation of Damage to Property	Recommendations: Promotion of Specimen Welfare and Visual Integrity	Estimated Remaining Contribution (years)	BS5837 Category Grading	Priority	2014 Re-inspection Notes	2014 Re-inspection Recommendations
AREA A													
8008	Common Lime, *Tilia x europaea*	M	G	F-G	Previously pollarded at 3.5m; partially-cropped basal epicormic growths	Remove basal epicormic growths and re-inspect	None	None	30-40	B		Epicormic growths regenerated	Remove basal epicormic growths and re-inspect structural condition
8009	Norway Maple, *Acer platanoide*	M	G	F-G	Previously pollarded at 2.5m; slightly over-dense crown structure;	None	None	None	20-30	B			
8011	Common Lime, *Tilia x europaea*	M	G	F-G	Previously pollarded at 4.0m; rough lopping of lower branches	None	None	None	30-40	B			
8012	Horse Chestnut, *Aesculus hippocastanum*	M	F-G	F-P	Bifurcates at 3.5m; previously pollarded at 3.0m; major bole cavity from ground level to point of bifurcation; large fractured/hanging branch at 5.0m,	Re-pollard	None	None	0-10	C		Specimen removed	
8013	Common Lime, *Tilia x europaea*	M	G	F-G	Bifurcates at 4.5m; dense Ivy infestation	Remove Ivy and re-inspect	None	None	20-30	B		Ivy severed; structural condition appears to be adequate	
8014	Norway Maple	M	F	F	Progressive dieback throughout; large fractured/hanging branch at 5.0m, South-West; dense Ivy infestation	Remove hanging branch and monitor condition annually	None	None	0-10	C		Works carried out per 2012 specification; multiple deadwoods; ivy infestation	Sever Ivy and re-inspect structural condition; monitor condition

Mitigation

- Major Incident Plan
  - Site / Service Business Continuity Plans
- Water Emergency Plans
- EAMS – Backlog Maintenance
- Sustainability & Environment Group

This Year

- Raise the Profile
  - Link with Public Health / Clinical Strategy.
- Climate Change risks to be more identifiable in Business Continuity Plans.
- A plan / strategy to identify and prioritise climate change impacts.

Adaptation Scotland

supporting climate change resilience

12:15

Setting aims and objectives

Adaptation Scotland – Project Co-ordinator

Sophie Turner

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Aims and objectives

- Work through the adaptation stage of the CCAT Tool.
- Look into SWIMS to record data on weather related events
- Complete step 1 of UKCIP's Adaptation Notepad.
- Populate a weather impacts table OR undertake a Local Climate Impacts Profile (LCLIP) to understand your current vulnerability to climate impacts.
- Define your adaptation-related risk and embed on your Corporate Risk Register
- Undertake training on climate projections
- Issue a screening questionnaire to Service Managers
- Assess current and future climate threats and opportunities by completing Table 3 - SWOT analysis.
- Discuss the idea of developing an adaptation case study

What do you want to achieve?

What is a ‘nice to do’?

What is realistic?

What is a tangible output?

A closer look at…

1. Defining the challenge/Getting started

2a. Understanding weather impacts

2b. Climate impact assessment

3a. Climate risk assessment

3b-5. Action plan, report and implement, monitor and review

Other – CCAT and other ideas?

** 8-10 minutes on each table with an alarm*

Adaptation Scotland

supporting climate change resilience

12:45 – 13:35

Lunch

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Adaptation Scotland

supporting climate change resilience

13:35

Building the business case

Adaptation Scotland – Project Co-ordinator

Sophie Turner

Adaptation Scotland is a programme funded by the Scottish Government and delivered by Sniffer

Why do a business case?

- Raise awareness of adaptation
- Engage colleagues

"Adaptation represents an opportunity for environment and sustainability professionals to engage positively with other key managers, such as those within risk, facilities, or business continuity management functions".

How or where do you start?

- Understand your organisation
- Engage widely across your organisation
- See if there are examples of business cases for other areas of the organisation
- Look for opportunities on the back of other projects
- Use recent and future weather impacts as an early opportunity for business response
- Look for early mover opportunities to make a start (i.e. the Adaptation Learning Exchange!)

Blyth, N., 2013. Climate change adaptation. Building the business case. Guidance for Environment and Sustainability Practitioners, IEMA.

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What should be included?

- Purpose of report
- The policy context
- Why is it important?
  - The risks and opportunities
- Climate projections
- The impacts of weather and climate
- Why take a planned approach?
- Costing adaptation measures
- Recommendations

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14:15

Adaptation visuals

Adaptation Scotland – Science Officer

Dr Joseph Hagg

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15:15

Reflections and 'Do one thing'

Adaptation Scotland – Project Co-ordinator

Sophie Turner

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Actions to take away

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Do one thing

- Identify **one thing** that you are going to go away and do before the next meeting.

Research shows that we are much (76.7%) more likely to do actions that we write down and are accountable to others for!

- Please write down one thing (and only one) that you are going to do before the next workshop.

Reflections

"What was new?"

"What was challenging?"

"What will you take away?'

"What was the most important point to you?"

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