

# Adapting to Climate Change

## NI188 and Warwickshire

### Local Climate Impact Profile

LILI FU  
Warwick Business School



# How Prepared Are We?

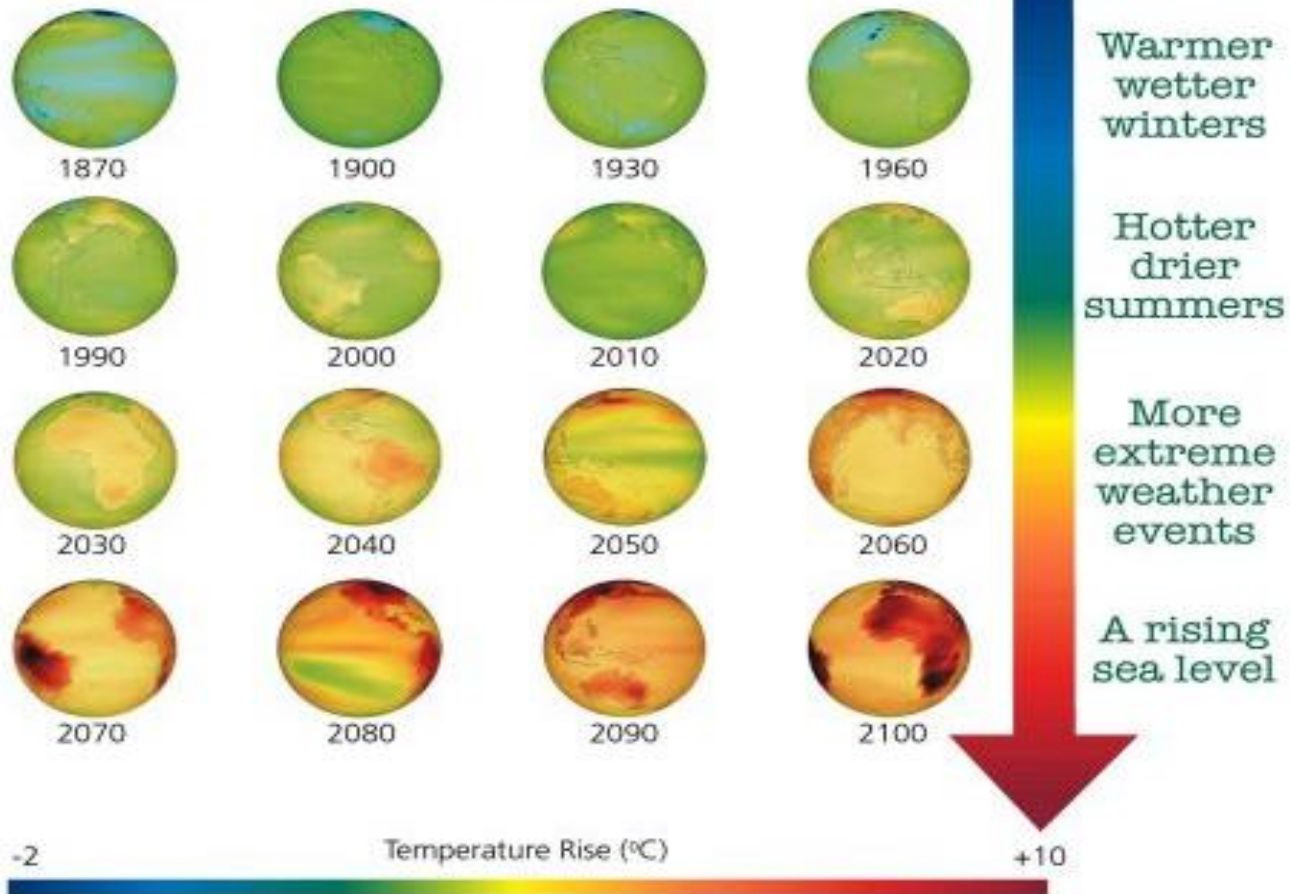


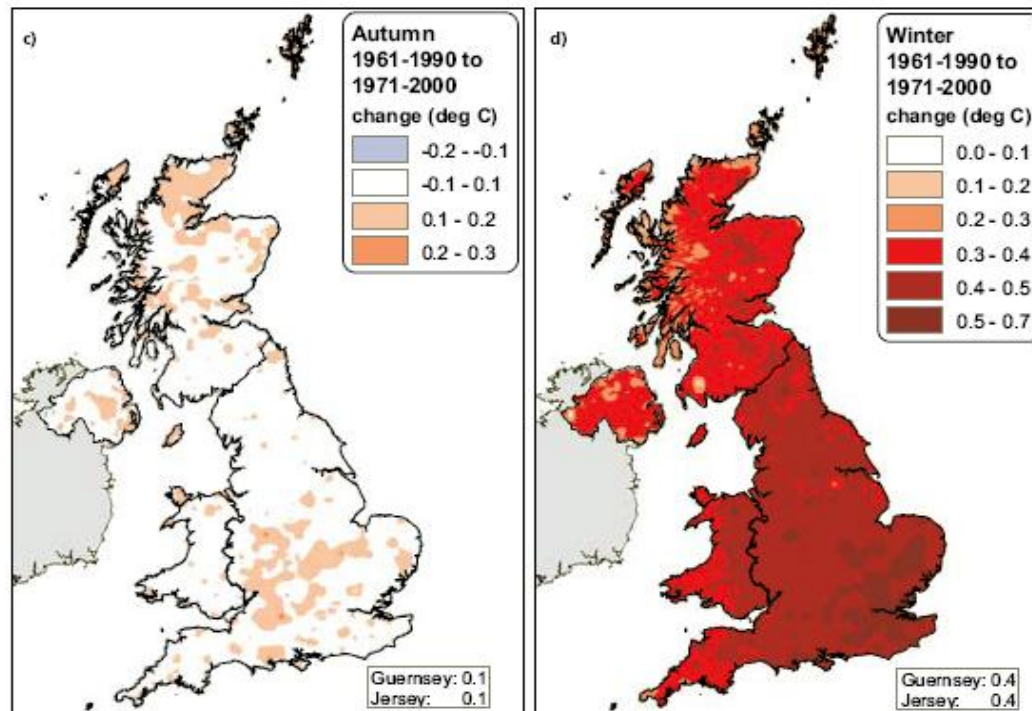
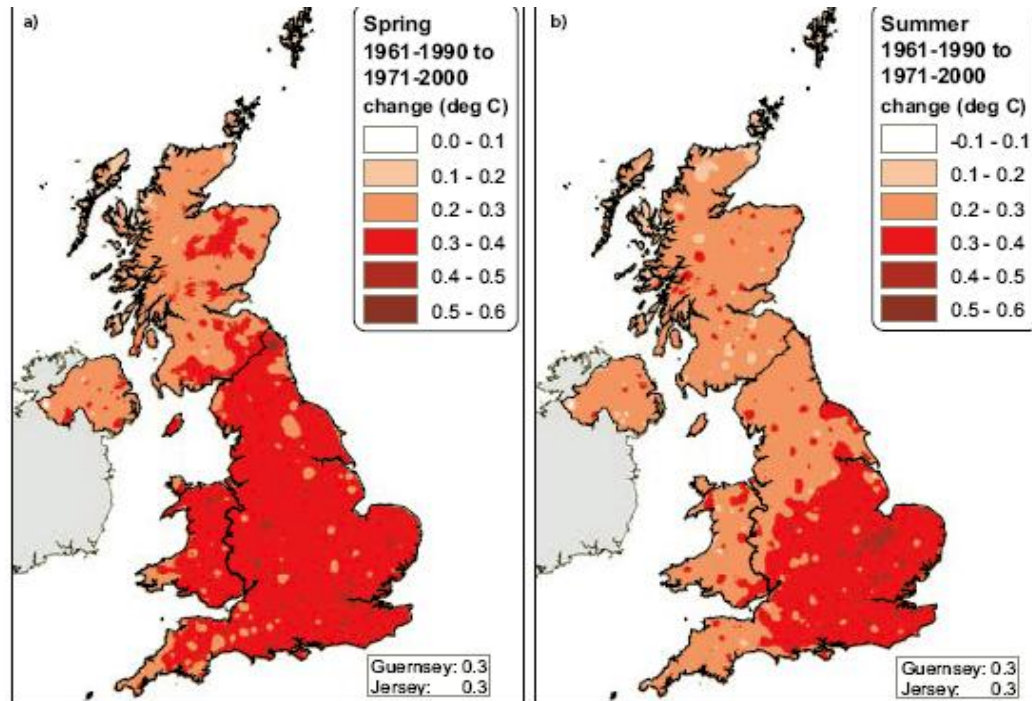
# Outline

- ❖ Climate change
- ❖ UK Climate trends
- ❖ Warwickshire climate trends
- ❖ Local Climate Impact Profile (LCLIP)
- ❖ Conclusion and summary

# Changing Climate

## Climate change timeline



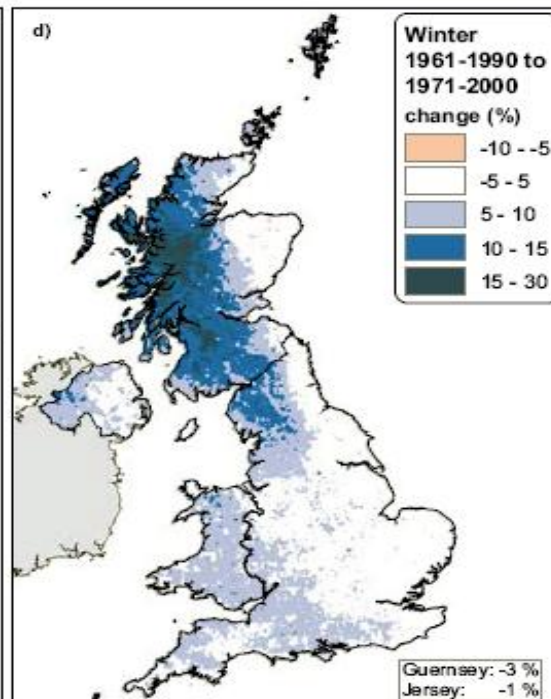
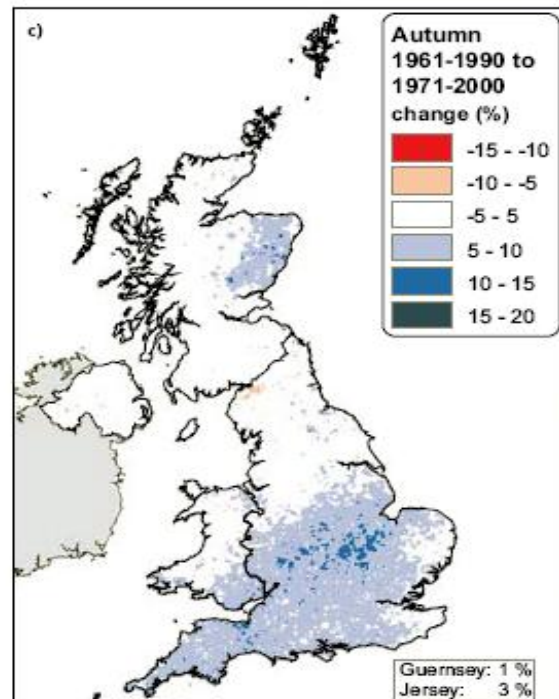
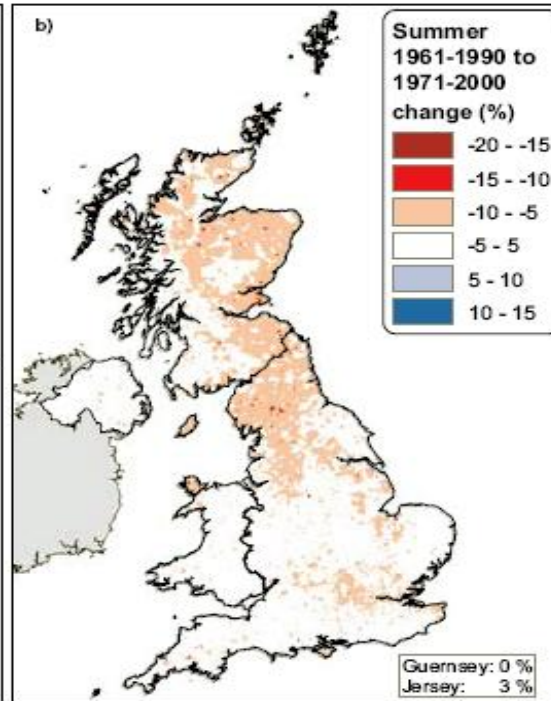
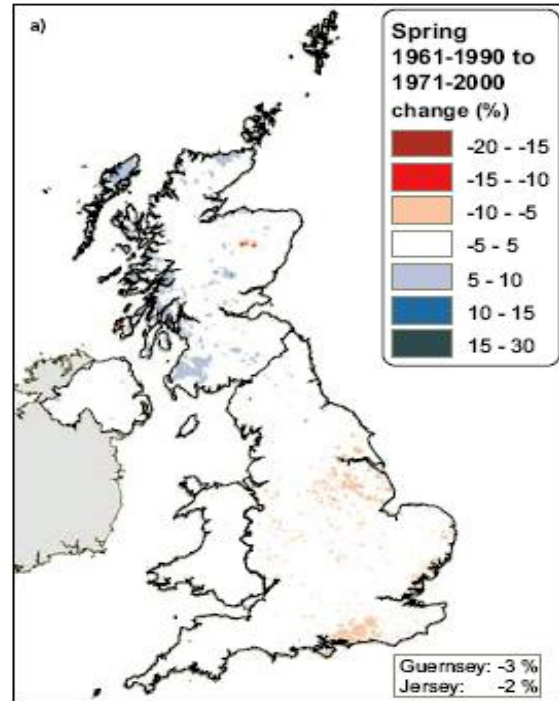


## Mean Temperature Change

- UKCIP09 will give new UK Climate trends
- Most areas in UK have been affected in Spring and Winter
- Highest changes in Winter: 0.5 to 0.7 deg C

Source from: UKCIP08 ([www.UKCIP08.net](http://www.UKCIP08.net))

## Mean Precipitation Change



- Drier summer
- Wetter winter in North West England and West part of Scotland
- Wetter Autumn in Midlands?

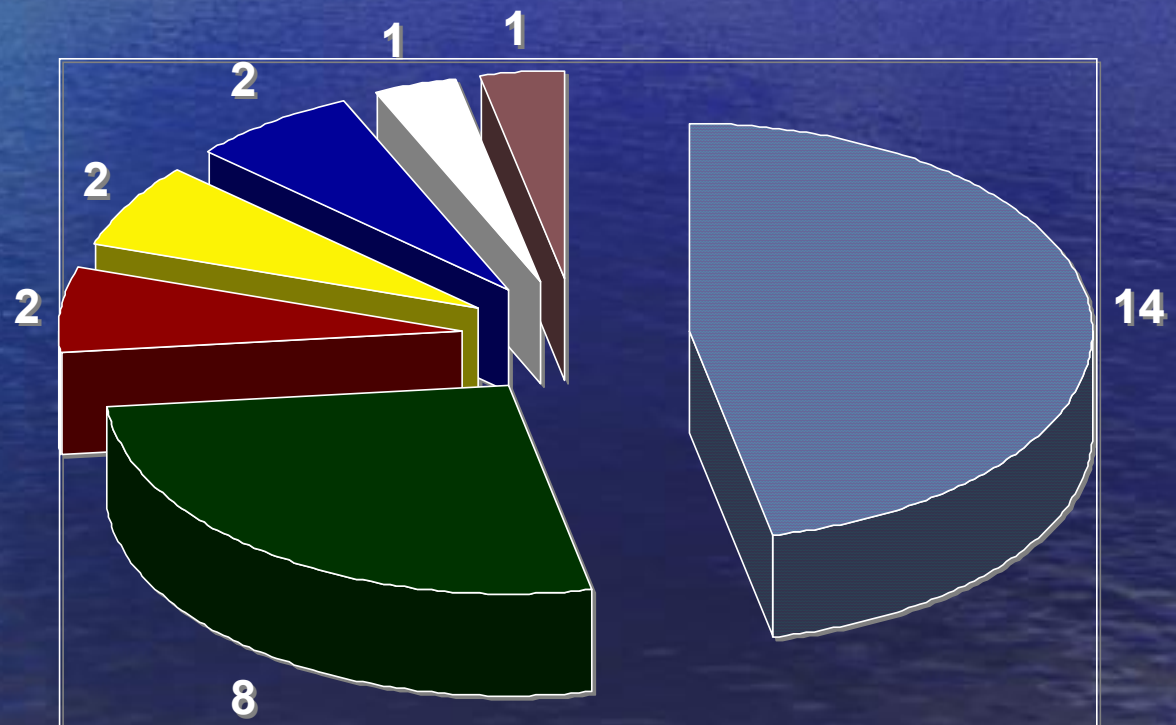
# Warwickshire Local Climate Impact Profile (LCLIP)

- Aim and context of LCLIP
- Relationship with NI188
- Process
- Limitations and gaps in information
- Affected sectors
- Case studies

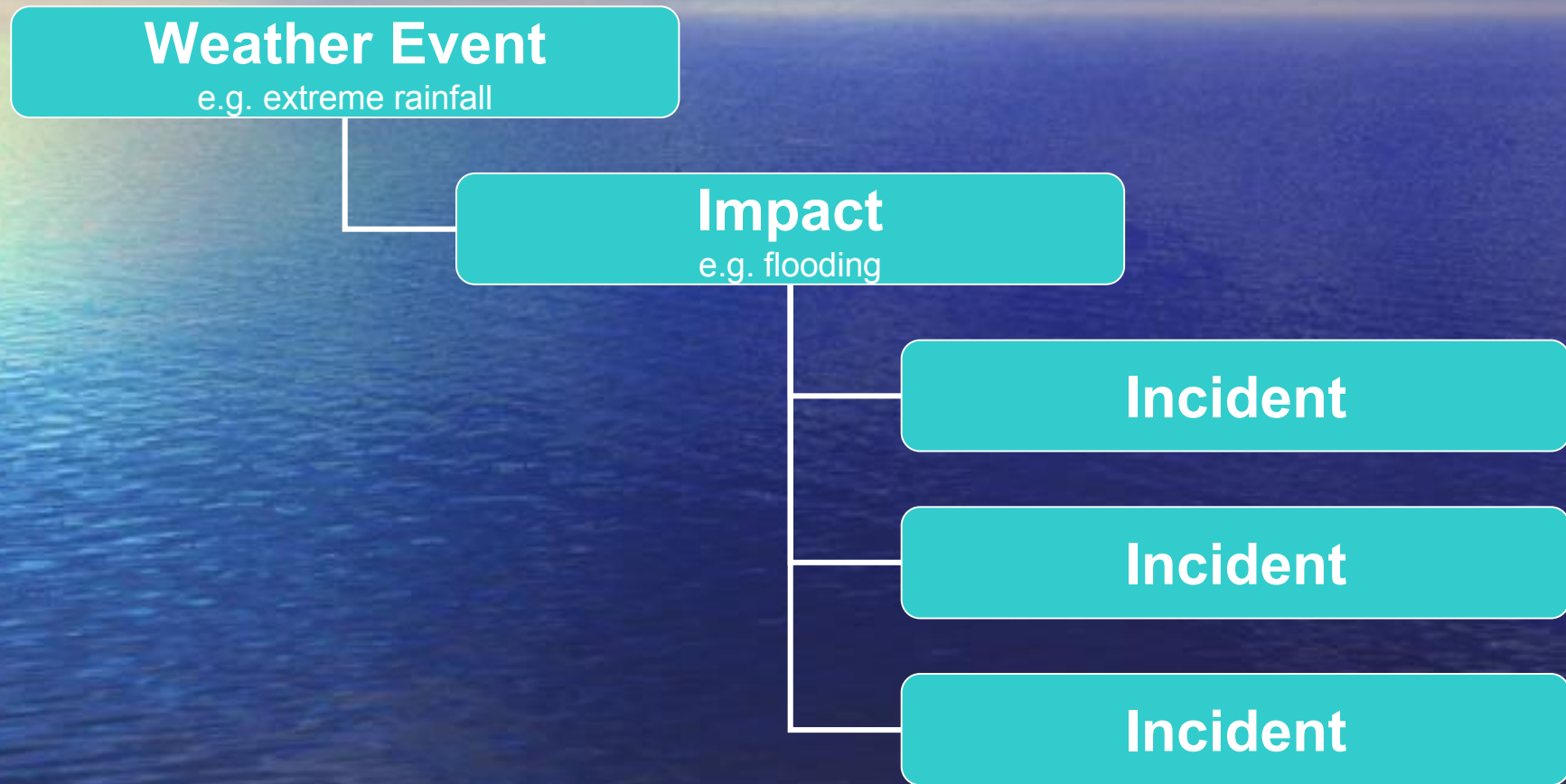
# Media Trawl – extreme weather events

- 46% are heavy rainfall
- 27% belong to high speed winds
- 2 events involved both heavy rainfall and high speed winds
- 1 event involved heavy rainfall, snow and high speed winds

□ Heavy Rainfall      ■ High-speed Winds      ■ Heavy Snow  
■ Lightning            ■ Heatwave            ■ Hailstorm  
■ Dramatic Cold Snap



# Terms



# Potentially Affected Services








# Extreme Weather Impacts

- Storms – Wind, Lightning
- Rain – Flooding
- Sun – Heat
- Snow & Ice

# Storms

☺ How do we classify winds

Beaufort Wind Scale	Wind Mph	Land conditions	Frequency in past 65 months (09/2002-05/2008)
Strong Breeze	25-31.9	Large branches in motion. Whistling heard in overhead wires. Umbrella use becomes difficult.	11
Moderate Gale	32-38.9	Whole trees in motion. Effort needed to walk against the wind.	29
Fresh Gale	39-46.9		18
Strong gale	47-54.9	Larger branches break off trees, construction/temporary signs and barricades blown over, damage to circus tents and canopies.	3
Whole gale (storm)	55-63.9	Trees broken off or uprooted, saplings bent and/or deformed, poorly attached asphalt shingles and shingles in poor condition peel off roofs.	4
 			  
<b>Total</b>			<b>65</b>

# Storms

## ❖ Past 20 years data analysis (1987-2007)\*

- January is the most windy month.
- Average maximum windy day is 8th of January: 19.9mph, it also has the highest record wind speed at 60.3 in 2005
- 10th of January is the most windy day out of last 20 years. 9 out 20 years are moderate gales day
- Year 2002 had a record of 8 days maximum gust speed over 32mph continuously

# Weather impacts

## ❖ Loss of Power

- ❖ More than 1000 homes in Coventry and Warwickshire, were blacked out when gale force winds brought down power and phone lines in two past incidents.

## ❖ Fallen Trees – Leisure

- ❖ No data available, but has potential damage to road, power lines, drivers and pedestrians

## ❖ Outside Events – Tourism and Economy

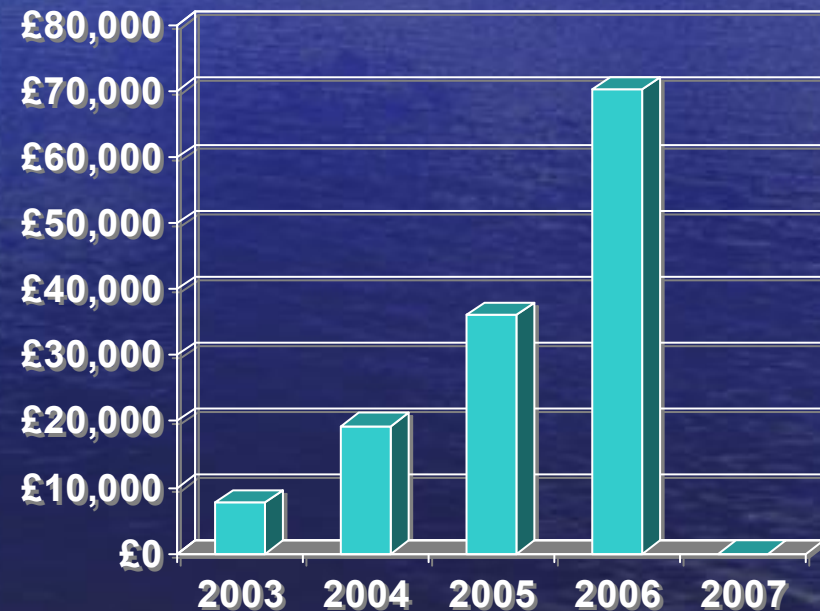
- Nuneaton Historical Market had to be cancelled due to adverse weather
- £2,900 + £1000 man hours to council
- £10,000 to £15,000 estimated loss to market traders in that day and uncounted loss to town businesses

# Weather impacts

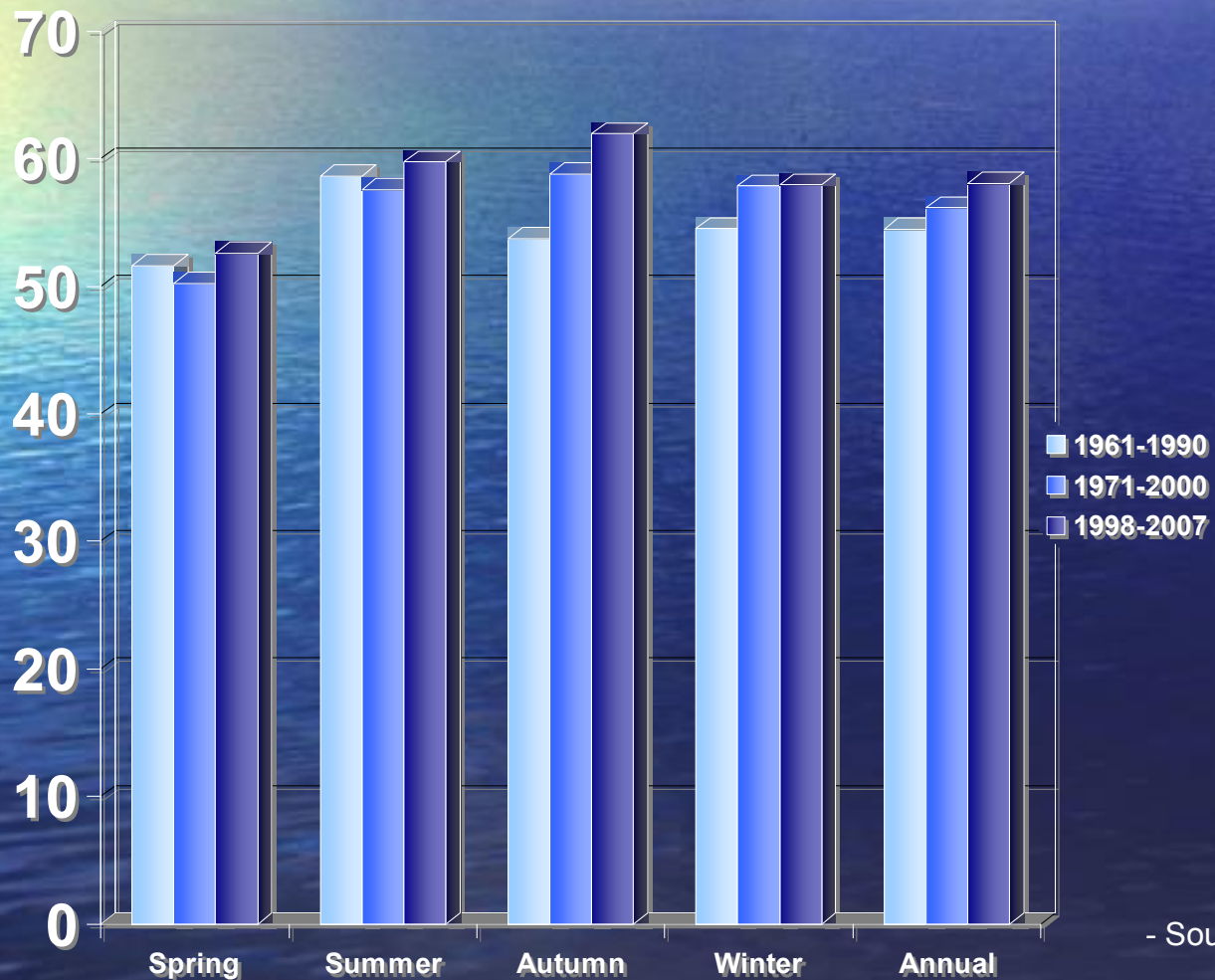
## ❖ Damage to Infrastructure

- Property Services
  - 21 reports from schools, some schools claimed more than two times in past 5 years.
  - 4 reports from council's properties
- Insurance Claims
  - Soaring up around 50% each year from 2003 to 2006
  - Total insurance claims are over £133,000 in total

Storm claims 2003-2007



# Warwickshire Local Rainfall Record

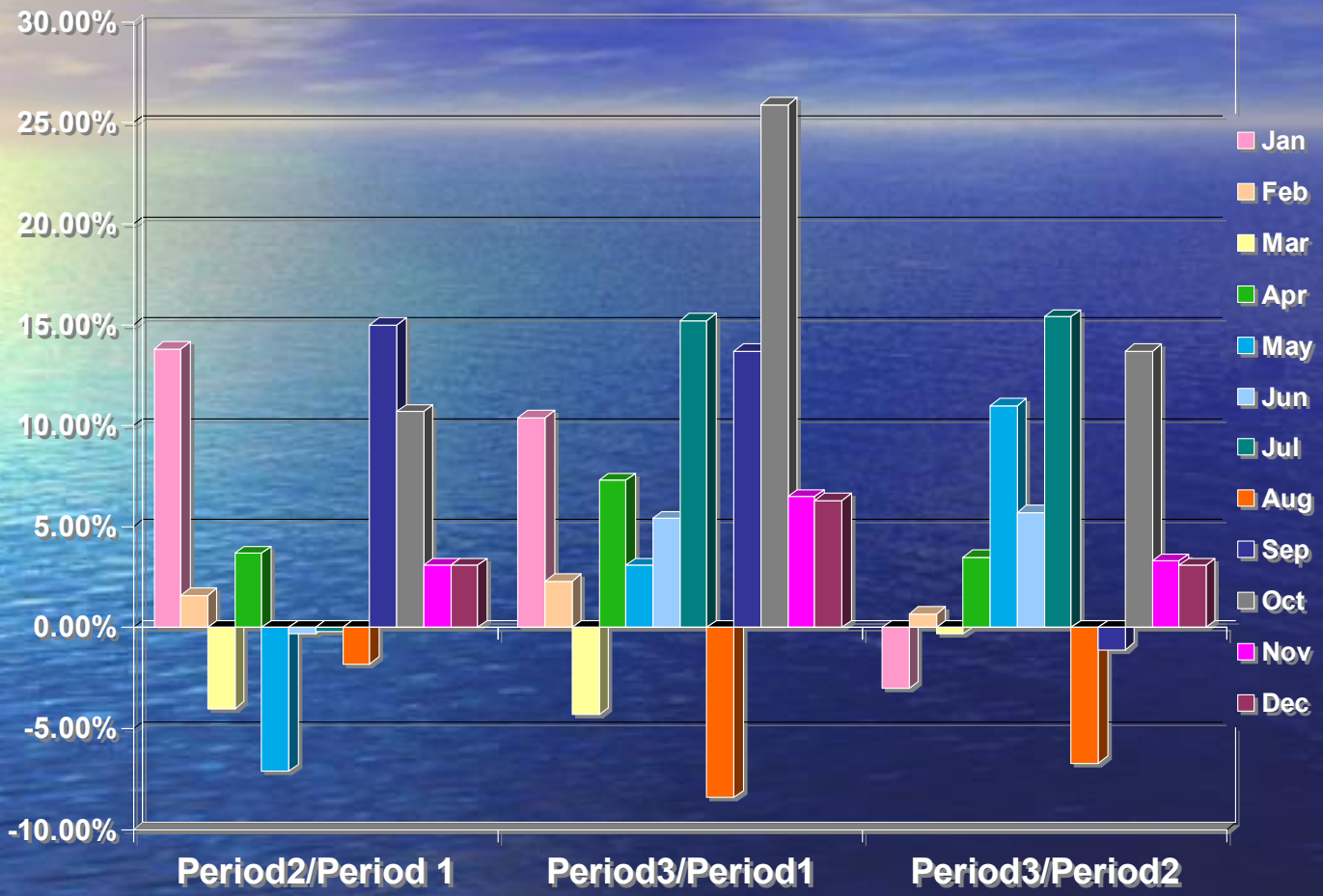


➤ Seasonal precipitation average over three 30-year periods

• Overall seasonal average rainfall similar

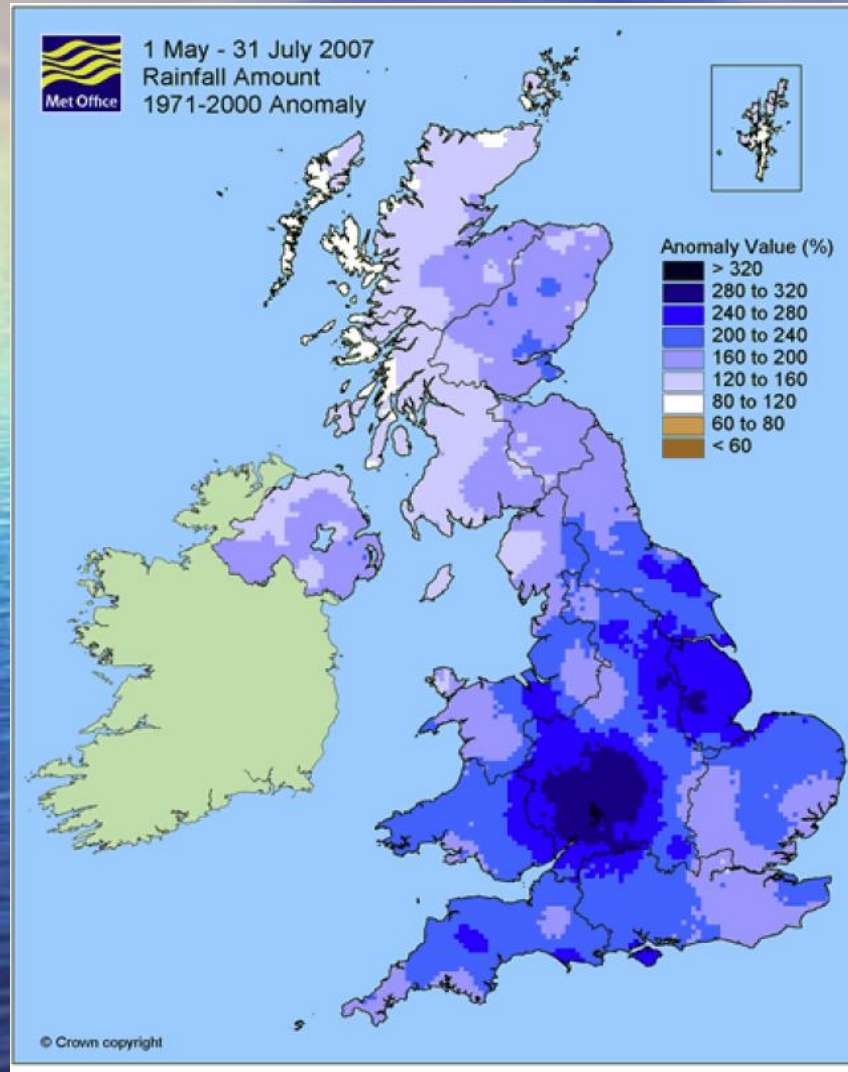
- Source from Bablake Weather Station

➤ Monthly precipitation comparisons over three 30-year periods

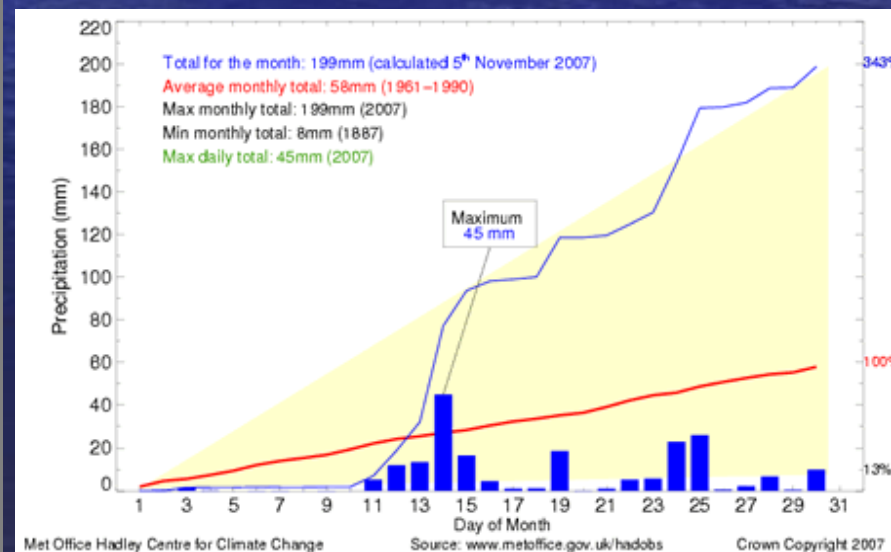


- Source from Bablake Weather Station

# Flood - What happened in summer 2007?



	2007		30 years average	100 years average
May	114.1 mm	Approx. 2 times	56.4 mm	54.7 mm
Jun	175.0 mm	Approx. 3 times	60.1 mm	52.2 mm
Jul	139.7 mm	Approx. 2.5 times	57.1 mm	60.0 mm



\* Source from Met Office and Bablake weather station

# 2007 summer flood

	Financial cost	Man hours	Reputation	Long term goal affected
Health and Social Care	£350,000	3-4months	Positive	No
Kingsbury water park	£37,000	5 weeks	not greatly affected	Yes
Warwick Mesuem	£100	few hours	no affected	No
Biodiversity	£184	3-4 hours from record	No impact	Yes
Bridge	£300,000	2-3 weeks	No or positive impact	Yes
highways	£500,000		Negative	Yes
Planning and waste	n/a		Unjustly negative effect	No
Emergency services	n/a		Negative	Yes
Achaeologist	n/a		No impact	No
Tourism	n/a		Negative	Yes
insurance (shools)	£500,000		Negative	

# Weather Impacts

## ❖ Tourism

- Kingsbury Water Park
  - Closed business for a weekend plus several months recovering,
  - Total financial costs = £37,000 + Man hours
- Warwick Museum
  - Low attendance even with keeping business as usual. £100 revenue lost.

### Threat:

- Revenue reduction due to the loss of customers is the most direct impact to tourism.

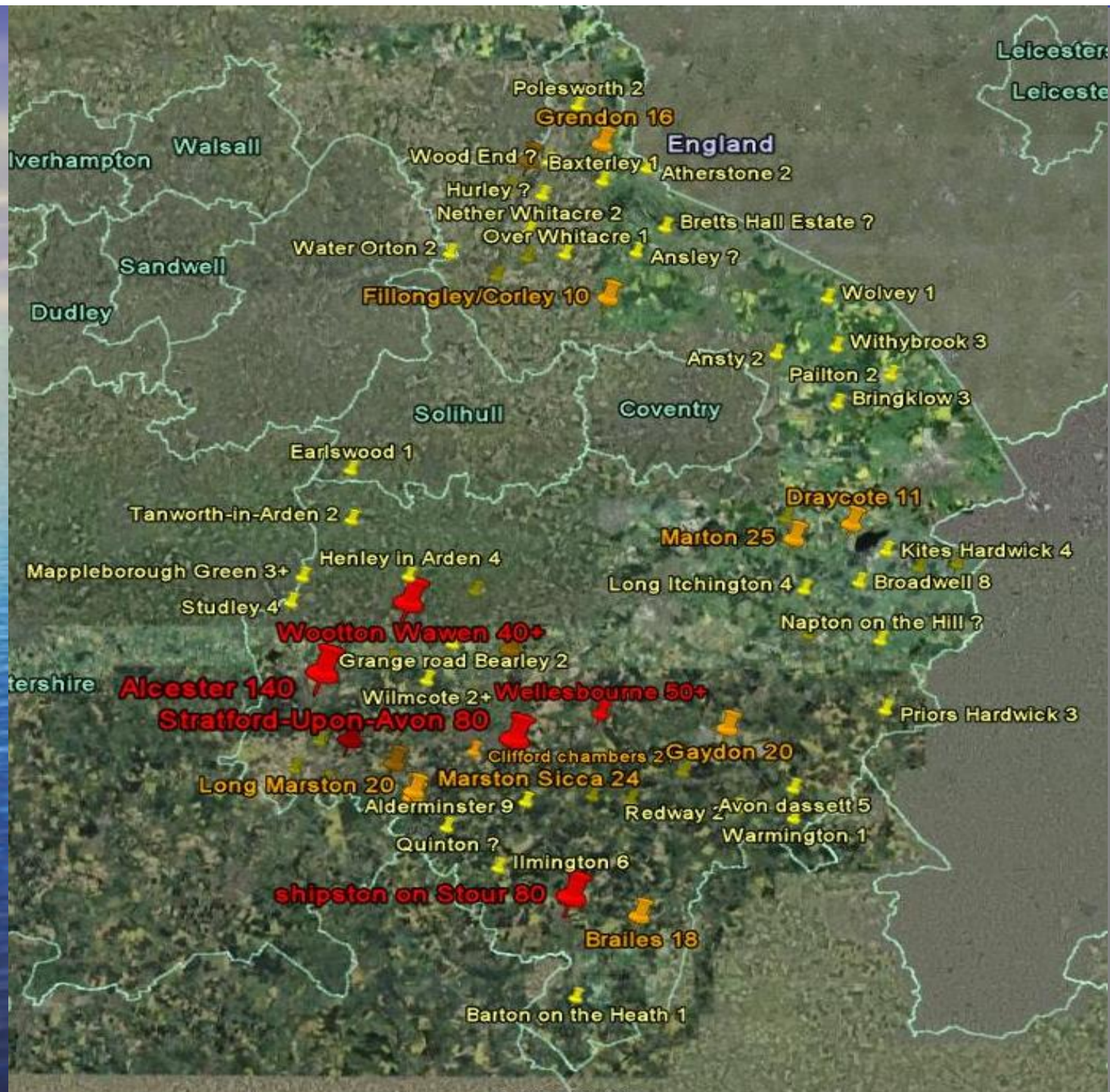
### Adaptation:

- Additional drainage work
- Raise floor level of offices and depots
- Give out business information relating to weather on website
- Promotion of business after the event – Gold offers campaign

# Weather Impacts

## ❖ Emergency Planning Unit

- 1,300 phone calls in total (includes Emergency Centre, Fire and Rescue and Police) within 48 hours
- all partners worked together to ensure the public were safe and those who were stranded could find shelter for the night



# Weather Impacts

## Threats:

- Identify vulnerable people and possible location?
- Sandbags preparation? too many places provide sandbags which may reduce efficiency
- Utilities plants safety?
- Lack of consistency in policies with emergency planning partners

## Adaptations:

- Utility plant's flood plan
- Wider delivery of key information to vulnerable groups
- General public awareness of self-help
- New more comprehensive emergency plan currently a work in progress
- Work with Met office closely

# Weather Impacts

## ❖ Adult, Health and Community Services

### ➤ Impact:

- The direct and indirect financial costs were at least £350,000
- Indirect costs such as Mayfair security:£3766 as a mobile security for public during the period
- Home in Nuneaton closed 4 nights, and used temporary heating system for 12 weeks
- Transferred few hundred people to residential centre in Stratford and south Warwickshire.

### ➤ Guidance:

- County emergency plan from Warwickshire county council
- Directorate plan that contains more details on how to deal with emergency situation for Adult, Health and Community Service
- WCC also follows the guidance set by LGA

# Weather Impacts

## ➤ Current and/or future adaptations:

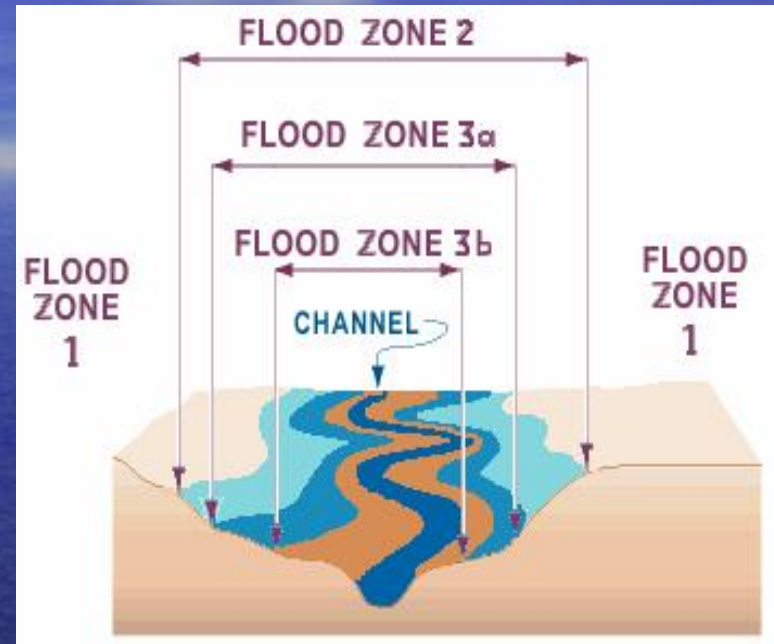
- Reviews on flooding in Nuneaton
- New directory has been made after the reviews
- Made a more robust staff lists
- Training courses for staff in order to set a more standardised emergency plan
- Extra equipment available
- Extra emergency exercises

# Weather Impacts

## ❖ Planning & waste

- PPS 25-Development and Flood Risk  
(Planning Policy Statement)
- Warwickshire level 1 SFRA

- Old houses which have only one drainage system are more vulnerable to flooding
- Environment Agency is planning to combine new development and flood prevention of old buildings together



# • Archaeology and Heritage

## • Impacts:

- Damage to Halford Bridge, a medieval bridge designated as a Scheduled Ancient Monument, where the parapet was swept away. Repairs have not yet been undertaken
- impact is primarily upon the Historic Environment rather than upon our own service delivery
- Flooding of the National Trust property at Coughton Court, near Alcester
- Staff assisted in providing advice and recovering artefacts which had been moved and damaged by the floods

## • Threats:

- Increased maintenance costs
- Owners of historic assets are only likely to inform service when they feel that there is something the council can do to help.
- No systematic way of collecting data on the impact of specific events.

## • Adaptation:

- English Heritage website

## ● County Highways:

### ● Impacts:

- Over 60 roads closed during the flood
- Repairs completed and all roads open to traffic within 48 hours after flood water going down
- £60,000 immediate cost on road close preparing
- £120,000 staff time
- 700 phone calls -Customer complaints on service delivery
- £130,000 on clearing blocked drains
- Total £500,000 pounds

### ● Threats:

- Drainage systems are not fully mapped
- Not much improvement since 1998 and 2002 floods
- Lack of mid/long term plan

## • Adaptations:

- Severe Weather plan for County Highways and Carillion – additional documents for former Winter Maintenance Plan to reflect large scale gales, snow and flood situations
- Warwickshire Strategic Flood forum
- Review on recent major flood
- Ongoing programme of gulley emptying and jetting network
- Medium – long term at the maintenance and improvement of the drainage infrastructure
- Additional depth gauge and flood warning signs to river and other water courses
- Supply ROAD CLOSED signs to local police/Town Councils to facilitate quicker closure of roads in severe flood.
- Work with Severn Trent Water company to tackle drainage problems
- Additional funding from WCC

## ➤ Biodiversity

### • Impacts on services:

- Lost few man hours
- But the impact is long-term rather than immediate

### • Threats:

- Some species and habitats may be lost
- Local extinction of species that migrate away from nature reserves

### • Adaptations:

- Working closely with EA
- Developing biodiversity strategy includes emergency planning
- New 'Landscapes for Living' Prospectus - against the pressures of **climate change**.

# Bridge

- **Impacts:**

- Construction contracts stopped
- 2-3 weeks man hours lost
- £260,000 plus staff cost = £300,000

- **Threats:**

- Flood damages

- **Adaptations:**

- Bridge flood protection plan
- Divert flood water with EA

# Weather Impacts

## ❖ Insurance Claims

- Over half million on last year's claim.
- 30 times more than past average

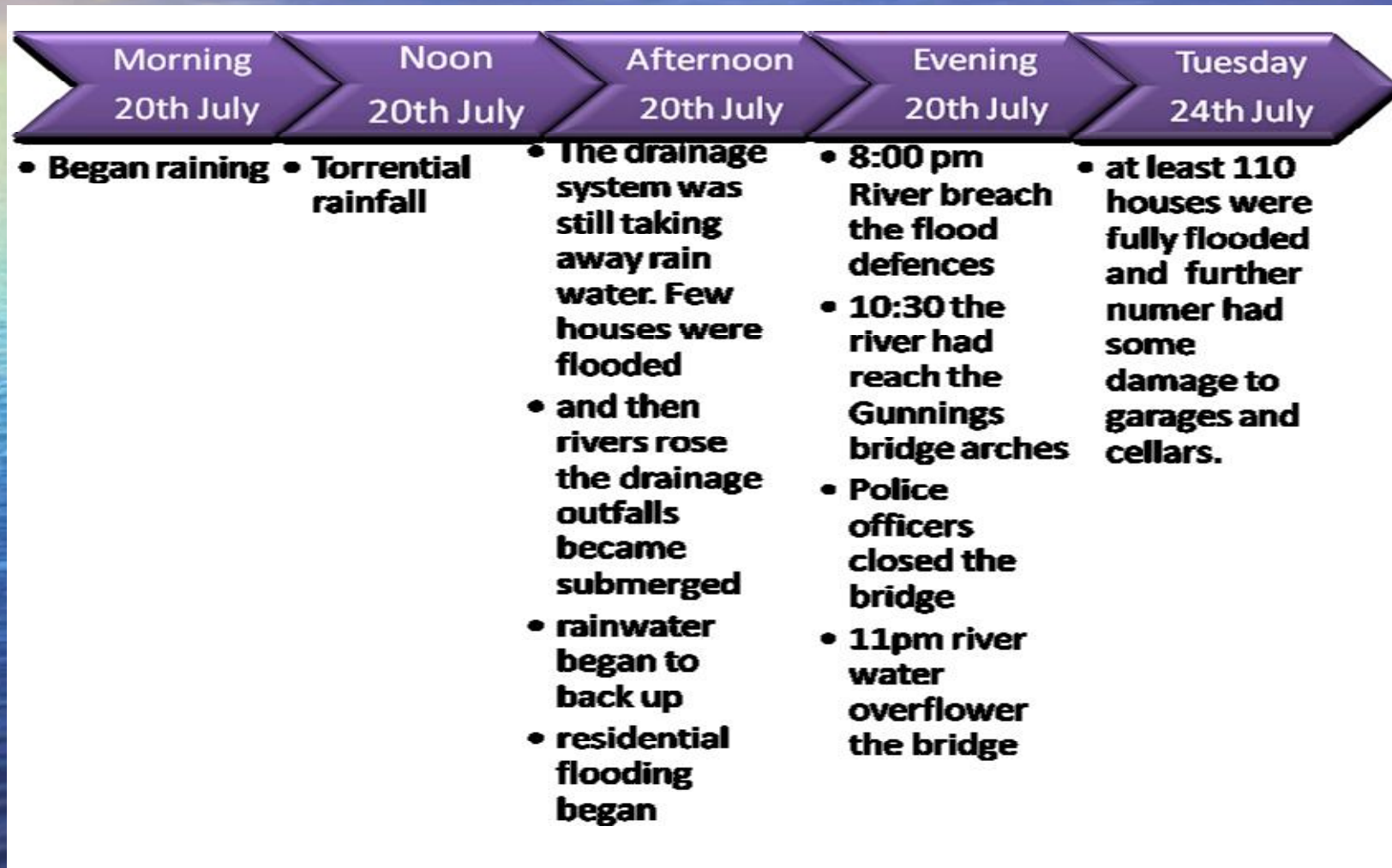
Flood claims 2003-2007



# Case Study: Alcester



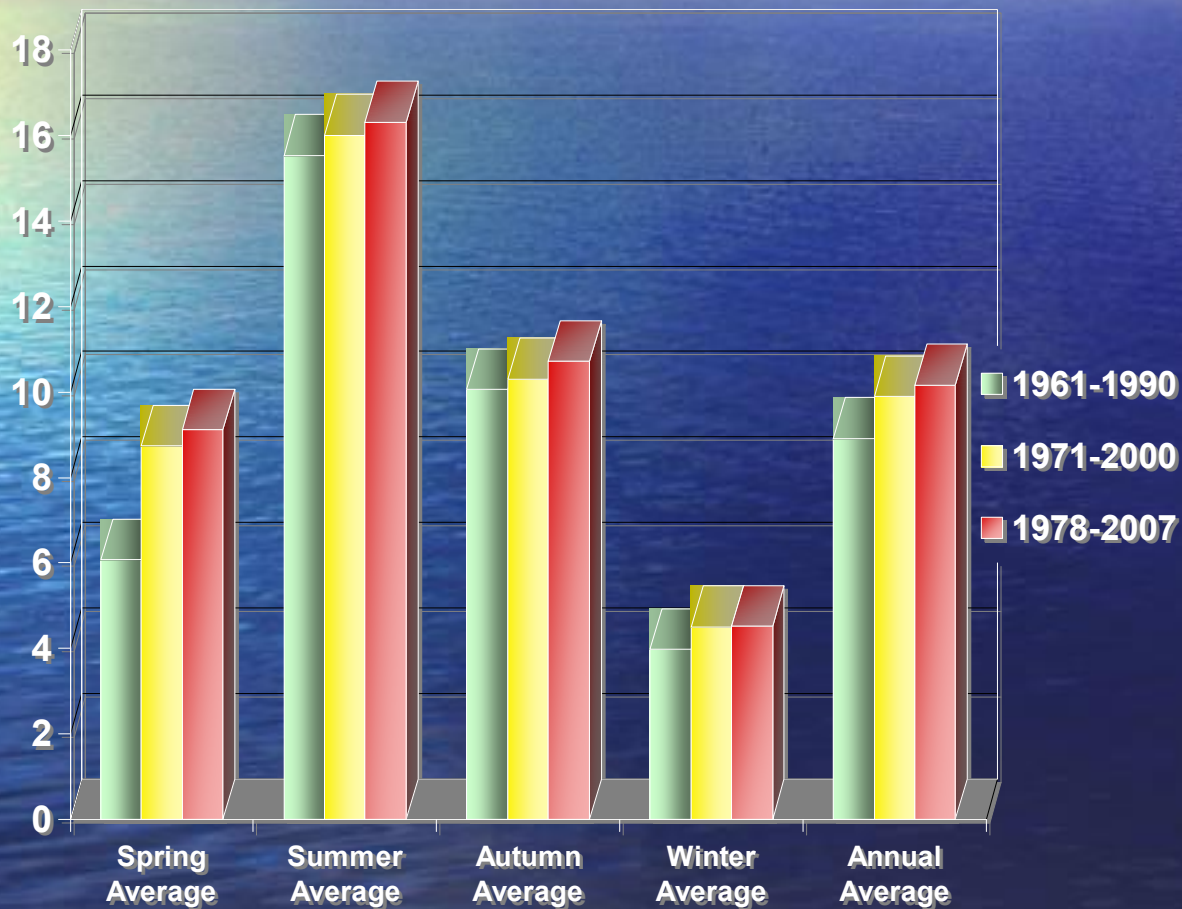
# Case Study: Alcester



# Case study: Nuneaton market



# Warwickshire local Temperature Record



➤ Seasonal Average  
temperatures in degrees  
Celsius

- Source from Bablake Weather Station

# Sun/Heat

- Road Damage – 1 million pounds cost
- Subsidence – Not insured
- Anti Social Behaviour & Crime
- Nuisance Complaints – Health issues
- Internal Cooling – All Services
- School Closure
- - no records available
- Green Spaces Tree's & Water Use

# Sun/Heat

- Reduced Garden Waste – Contract Services/Recycling
- Increased Visitor Number – Leisure
- Impacts to Biodiversity - Wetlands

# Snow & Ice

- Health issue
- County Highway

# Action plan tools

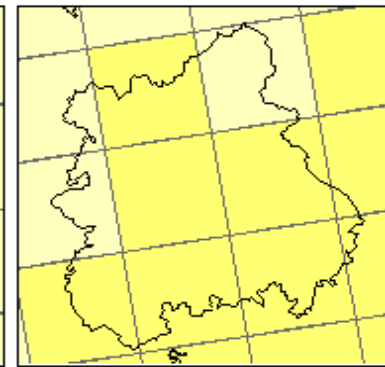
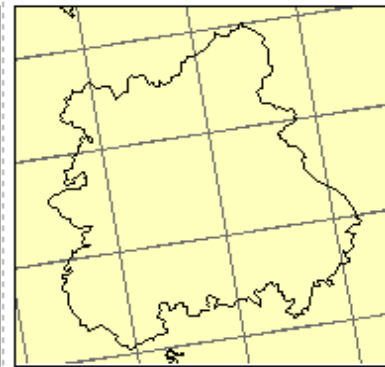
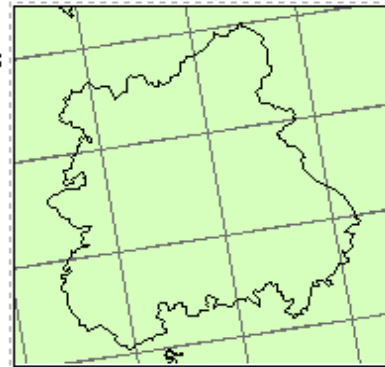
- UKCIP02

## West Midlands

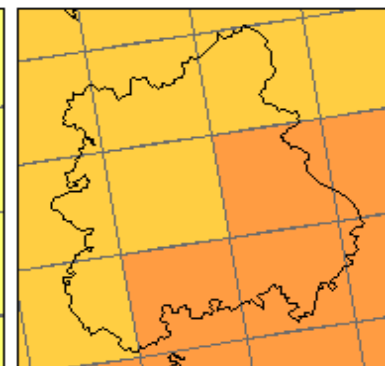
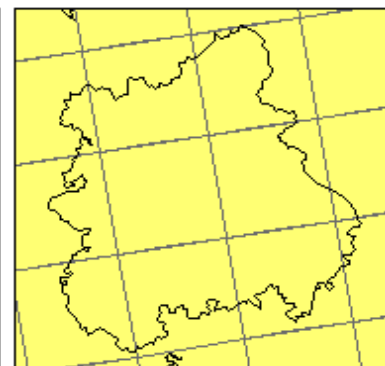
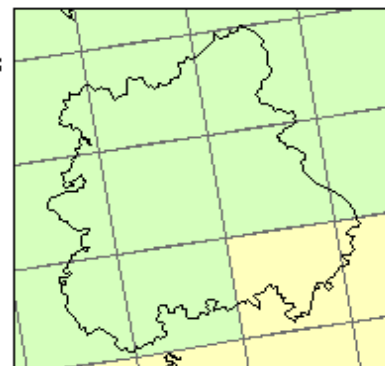
Source: UKCIP02 Climate Change Scenarios (funded by Defra, produced by Tyndall and Hadley Centres for UKCIP)

### Change in annual average daily temperature

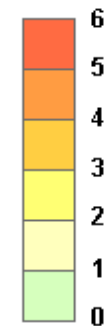
Low Emissions scenario



High Emissions scenario



change in deg C



2020s

2050s

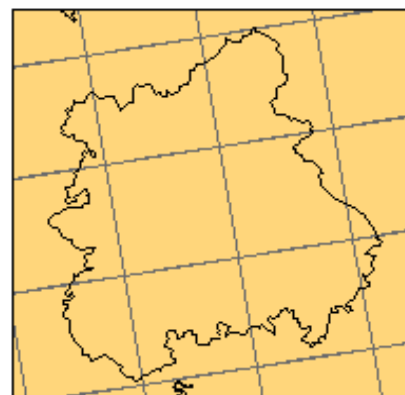
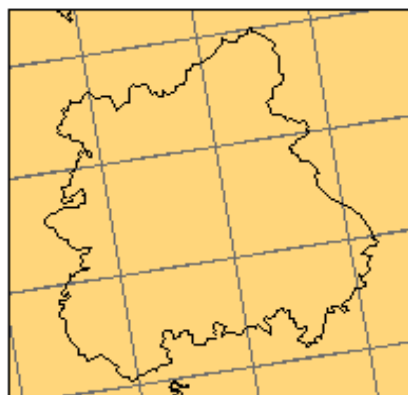
2080s

# West Midlands

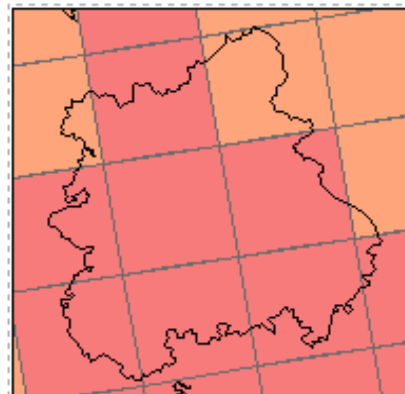
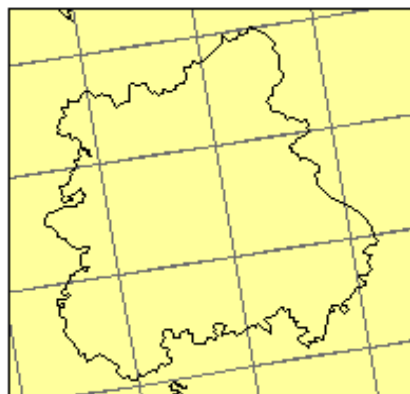
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## Percentage change in summer precipitation

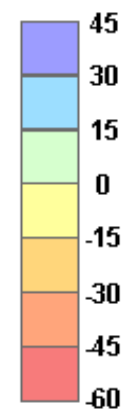
Low Emissions scenario



High Emissions scenario



per cent change



2020s

2050s

2080s

# Action plan tools

## ➤ UKCIP08

- Launch in November 2008 – delayed till 2009
- More accurate climate change scenarios
- Contains greater detail than UKCIP02
- Be created with input from its users
- More user friendly

# Questions?

