

# LOCAL CLIMATE IMPACTS PROFILE

## Project Report

October 2006

### Executive Summary:

Over the past 10 years Oxfordshire County Council has been affected by over 260 weather related incidents, ranging from the effects of flooding on our road networks and properties, to 'standing crop' fires exacerbated by high summer temperatures.

The estimated cost of these incidents stands at over £16.4 million, accounting for emergency provisions, repairs to damaged infrastructure and third-party insurance claims (this does not include the cost of an estimated 20,000 man hours spent responding to these incidents).

Some £6.4 million of this has been claimed back via government and emergency funds, however these funds may not always be available. These figures, and the qualitative results behind them, emphasise the importance of assessing our vulnerabilities to weather today and using these to plan ahead in order to minimise the expense and damage of future climate change.

### INTRODUCTION

*"[The midweek floods were] a tough time for our highways workers, some of our schools and libraries staff and many other people who work for the County Council...It is certainly a sobering thought these kinds of torrential downpours seem to be hitting Britain with increasing frequency"*

Keith Mitchell, Leader of Oxfordshire County Council, 14<sup>th</sup> October 2006, in the aftermath of a flash flood [Oxford Mail]

Extreme local weather events are perhaps the best examples of the consequences we might experience of a changing climate. Research indicates that the UK will face

- higher average temperatures with higher more frequent extremes
- more rainfall through the winter but less through summer and increasingly falling in short high intensity events
- more frequent winter storms

These changes bring both threats, for example the water shortages caused by the recent drought, and opportunities, such as increased domestic tourism. If the county is to withstand these threats and realise the opportunities it is vital for the Council to understand the nature of these consequences and then make the necessary changes and preparations. Sir Nicholas Stern in his Review of the 'Economics of Climate Change' described this activity known as adaptation as "crucial in reducing vulnerability to climate change and is the only way to cope with the impacts that are inevitable over the next few decades"

October 2006

Although climate scientists have created scenarios predicting the nature of future changes, they acknowledge that these cannot be forecast with absolute certainty. This mirrors our day-to-day uncertainty about weather, and the ways we adapt ourselves to this, i.e. by taking precautions and making preparations 'for a rainy day'.

In partnership with the UK Climate Impacts Programme, Oxfordshire County Council is now starting to assess why and how the organisation should adapt itself to future changes in weather; both as a service provider, a large corporate body and a community leader.

### Local Climate Impact Profile / Impacts Mapping

The Local Climate Impacts Profile is a pioneering project through which past experiences of incidents related to weather events over the last 10 years in Oxfordshire have been examined in order to gauge the Council's vulnerability to weather events.

Incidents were researched both through local press archives and through interviewing key council staff in affected services. The intention was to collect both qualitative and quantitative data about what effects weather related 'impacts' have had on our services

### Identifiable Outcomes

Outcome	Reference
Web pages dedicated to explaining climate change and climate change adaptation in Oxfordshire.	<a href="http://www.oxfordshire.gov.uk/climatechange">www.oxfordshire.gov.uk/climatechange</a>
Spreadsheet showing detailed information on weather related incidents.	Incidents_master.xls
Spreadsheet showing the aggregate effect of these incidents.	Impacts.xls
Written summaries of interviews showing: key impacts, responses, adaptations and vulnerabilities, for each Directorate.	Climate Related Incidents.doc(s)

### CLIMATE RELATED IMPACTS & INCIDENTS

For the purposes of the Local Climate Impacts Profile (LCIP) an incident is a weather event that has had a discernable effect on council **services**, **properties**, **staff** or **strategic goals** (see Case Study and flow chart below).

**Case Study:**

**Weather event: Heat wave and drought July 2006**

Causal Weather Variables:

High temperatures = Temperature of 37.5°C recorded in July, compared to the 1961-1990 average maximum of 29 °C.

Low rainfall= July rainfall of 28mm compared to the 1961-1990 average of 46mm

Climate Impacts:

Extreme internal temperatures, (temperature-related) fires, heat-related discomfort, heat stress, water shortages, increased outdoor activities

Incidents:

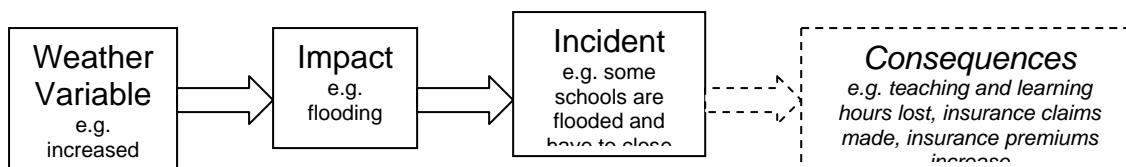
Schools closures, crops lost in fires, fire fighters and members of the public suffer from heat stroke, road surfaces become sticky, rivers become de-oxygenated, there is an increase in theft through open windows, a schoolchild drowns in a river, increased attendance of outdoor attractions.

Economic & Strategic Consequences:

Teaching hours lost, lost farming income and increased insurance claims, costs of social care & emergency treatment for heat stroke, short-term treatment and long-term repairs to road surfaces, damage to eco-system and biodiversity.

Services Affected:

Properties (Schools, Social & Community, Council Offices), Fire & Rescue, Emergency Planning, Transport, Countryside, Home Support, Fire & Rescue Risk Reduction



Therefore a major climate impact, such as flooding, can generate a number of **different sorts of incidents**. These affected different Council Services over varying time scales. For example extreme heat, cold, rainfall or wind can generate the following consequences:

Area	Examples	Directorate(s) Affected
Logistics	Roads, transport networks or power supplies disrupted	Environment & Economy (Transport) Resources (Property)
People	General public (especially vulnerable & elderly groups) physically (or mentally) affected or endangered	Community Safety (Fire & Rescue, Emergency Planning) Social & Community Services (Home Support)

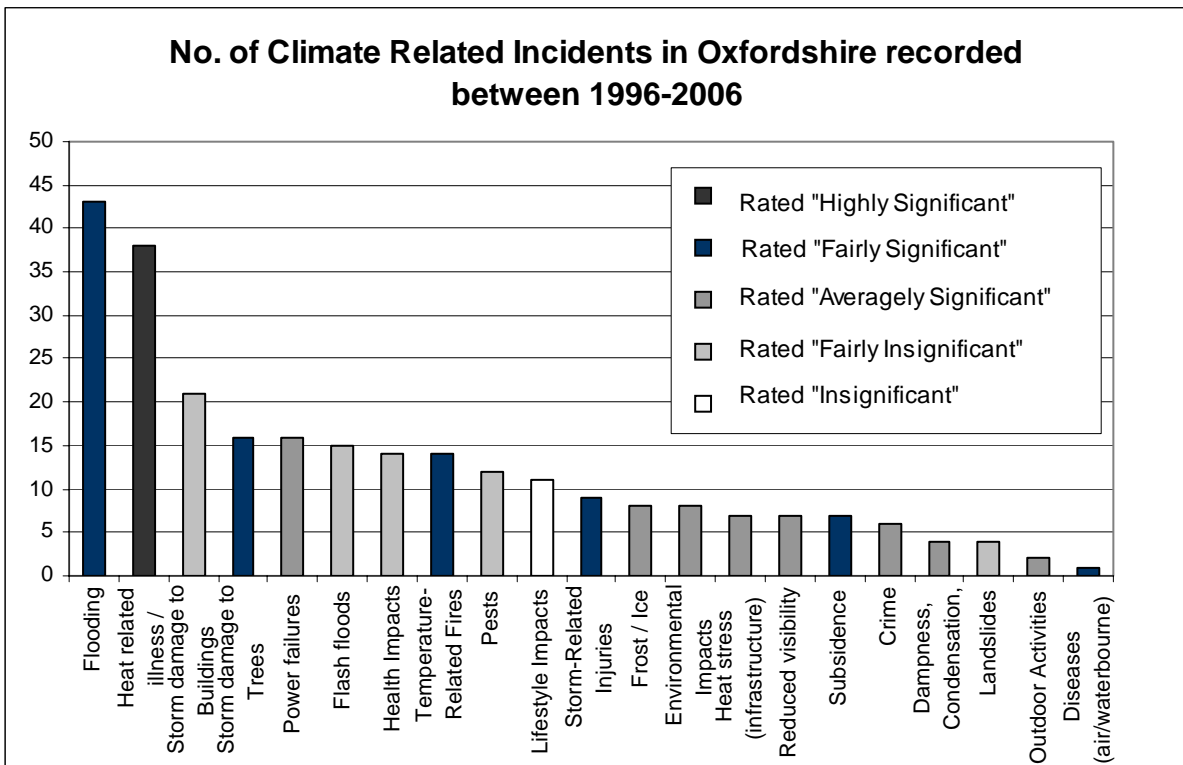
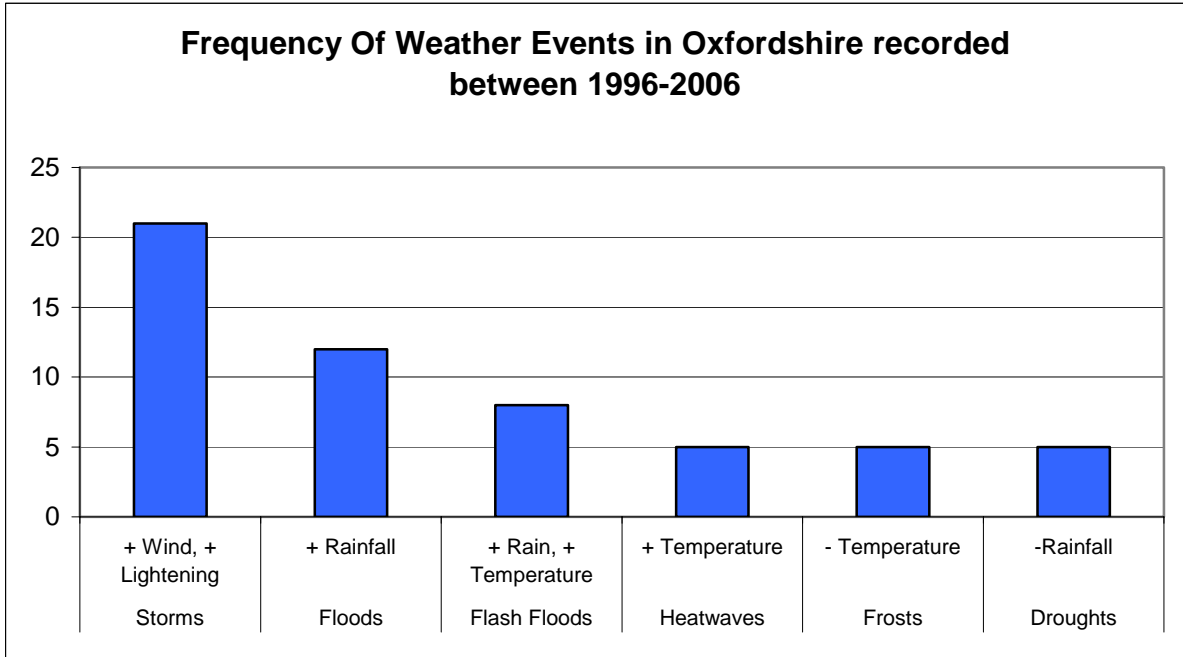
Premises	Council & non-council owned damaged or un-useable.	Resources (Property) Children Young People & Families (Schools) Social & Community Services (Properties) Environment & Economy (Strategic Planning)
Finance	Increased insurance claims, business losses or service provision disruption.	Environment & Economy (Economic Development) Resources (Insurance) All Directorates (Business Continuity)

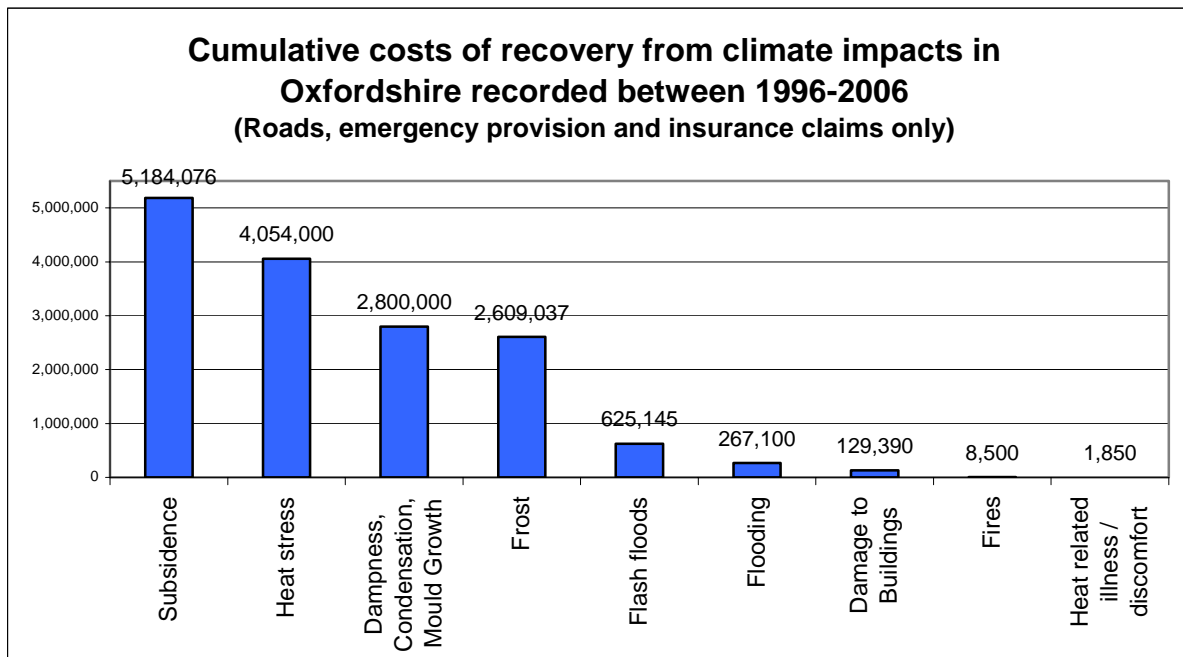
## RESULTS

- The *quantitative* results findings (such as number of events, incidents and costs) are presented in the tables and charts below.
- The *qualitative* information, on the responses, processes and attitudes gathered from interviews, is summarised in the bullet points below.
- Potential vulnerabilities and remaining issues found are then stated.

Variable	Example(s)	Result
Number of Different Types of Impact	<i>Storm damage, subsidence...</i>	32
Number of Major Weather Events	<i>Easter 1998 Floods...</i>	36
Total Number of Recorded Incidents	<i>Damage to council property...</i>	263
Aggregate Cost of Incidents	<i>Repairs, third party claims...</i>	£16,413,000 <sup>1</sup>
Aggregate Man Hour Cost of Incidents	<i>Fire &amp; rescue man hours...</i>	19,870

<sup>1</sup> Does not include man-hour costs. 6.4m has been claimed back from via Emergency Funds or other Government funding, £5.1m in insurable losses (£1.4m damage to property, £3.8m third party claims).





## Interviews

### Response capacity

**Summary: Council service responses to common weather impacts are well defined and implemented. However impacts that are new or infrequent are often not responded to in a formal or timely way, in some cases there is no response at all.**

- i) Most services have, in the past, acted on a reactive rather than proactive basis.
- ii) Services that are used to dealing with emergencies e.g. Fire & Rescue, Emergency Planning & Transport Area Offices seem to have the best quality responses to a range of weather related incidents.
- iii) The response to new or infrequent weather events was in most cases informal 'learning-by-doing'.

### Monitoring

**Summary: Monitoring of weather variables and/or their costs is patchy or non-existent.**

- i) Weather monitoring procedures do exist within affected council services but few of them are formalised and none (with the exception of Insurance) record costs or effects of weather events.
- ii) Only one service (Transport) does any independent monitoring<sup>2</sup>, all others rely on Met Office or Environment Agency Warnings.
- iii) There is at present no monitoring of the long-term effects of weather for health & economy, in regard to the Councils strategic goals, e.g. long-term housing, education and social strategies.

<sup>2</sup> The Ice Alert System, which can only be accessed during winter months.

## Attitudes

**Summary: The possibility of climate change was seen as a genuine concern to the majority of interviewees, many claimed to have witnessed first-hand (either personally or professionally) evidence of changes in weather patterns.**

- i) In general there is a good working knowledge of how weather has affected services in the past. This appears to be mostly informal, rather than formally passed-down, knowledge.
- ii) Concern about vulnerability to weather was expressed by interviewees in all directorates, though not at all levels; those dealing with operational, rather than strategic or contractual issues, were generally more concerned.
- iii) Many interviewees expressed an interest in the effects and direction of climate change.
- iv) Some participants stressed that cooperation would be dependent on there being “identifiable outcomes” from the project.
- v) A number cited anecdotal evidence, on a personal or professional level, of events they thought to be increasing.

## **Potential Vulnerabilities**

### Corporate Management

**Summary: We are currently vulnerable to high temperatures in our buildings, rising insurance costs and potential cuts in funding from central government.**

- A number of council properties (schools, offices and social care) are vulnerable to high temperatures. This could have effects for service delivery, ability to let properties to sub-contractors and possibly (e.g. in the case of schools) affect long-term strategic goals.
- There is a level of uncertainty about responsibility for protective and preventative measures (such as flood defenses) in jointly operated /leased buildings.
- Both the number of insurance claims and the costs of premiums have risen significantly over the last 6 years; the council's premium has increased by 60%. There is also a risk of policies becoming invalidated due to preventative measures specified by insurers not being fully completed.
- In the past the cost of some weather related damage (for example some transport infrastructure repairs) have been covered by centrally awarded ‘emergency funds’. There is a belief that there will be a move towards local authorities covering some of these costs, especially if events become more frequent in future.
- There is evidence also of significant non-cash costs to the council. These are costs to health, education, quality of work and home life and other elements.

## Service Provision

**Summary: Our services are vulnerable to large-scale and un-forecast weather events. Our business continuity plans are, at present, incomplete or un-publicised.**

- Few services have official procedures concerning receipt of weather warnings.
- The major flooding in Kidlington in Easter 1998 was not fully predicted either by the Met Office or the Environment Agency. This implies that our current reliance on external sources for weather information/warnings is not 100% robust.
- At present council-wide business continuity strategies are incomplete. There is also uncertainty within some directorates about who is responsible for business continuity and what plans exist.
- Certain external partners are required to have business continuity strategies; these are at present un-checked.

## Community Leadership

**Summary: Lack of guidance and advice to the general public and businesses could result in serious social and economic problems for the county, as well as potentially damaging the council's reputation.**

- There is anecdotal evidence that some sectors of the community are not aware of flood and other weather related risks. Some may actively avoid receiving flood warnings in order to keep insurance premiums low. There is also a belief that, as the population ages, some elderly or vulnerable groups will not be able to afford to keep up insurance payments.
- There have been communication issues both within and between services, and between the Council and the general public. This may be connected to the lack of formal procedures concerning receiving weather warnings and communicating weather related incidents.
- There is at present no responsibility for looking at the economic costs of weather incidents and no guidance for businesses about how to reduce these costs. For example the effects of flooding on the transport network and on their factory, cost BMW an estimated £1.6m in lost turnover in 2005. If frequent this sort of incident could result in businesses moving out of Oxfordshire in order to minimise these disruptions.

## **REMAINING ISSUES**

We can make only limited conclusions from the above data because:

- i) Some of the effects of weather related incidents are at present un-quantifiable<sup>3</sup>.

---

<sup>3</sup> E.g. economic costs, drops in employee productivity due to high temperatures, social costs of a major flooding event.

- ii) Impacts that do not fall under the remit of a particular Council service or department are likely to be under represented.
- iii) Existing data on man-hour and other costs is incomplete or based on estimates.
- iv) Some of the impacts studied may actually become less frequent in future.
- v) Incidents are not 'proof' of climate change, but indicate our current vulnerability to weather.

## **NEXT STEPS TOWARDS ADAPTATION**

The Local Climate Impacts Profile will provide a foundation on which to develop an effective climate change adaptation strategy. Whilst the profile and the strategy will be reviewed and updated regularly it will provide an ongoing framework by which adaptation can be integrated into all future projects and visions for corporate management, service provision and community leadership.

*However* it is important to not to view adaptation in isolation, as it is likely to have implications for our mitigation (carbon reduction) agenda; the focus instead should be on projects that complement both strategies<sup>4</sup>.

### **Future projects**

#### Corporate Management

- Work with external partners such as UKCIP and Oxford University to map trends in, and costs of, weather-related incidents, plus the likely impacts of predicted changes on council assets.<sup>5</sup>
- Work to develop and encourage independent monitoring of weather effects, and costs, by affected services<sup>6</sup>.

#### Service Provision

- Work with Research and Intelligence to make the findings of the LCIP accessible to relevant council services.<sup>7</sup>
- Compare risks using quantitative information about impacts<sup>8</sup> and climate change scenarios 'levels of certainty' to plot the likelihood of the change against the significance of its impact.
- Research levels of preparedness, and knowledge of business continuity plans, within council departments.

<sup>4</sup> E.g. improved insulation in properties saves energy in winter and reduces over-heating in summer.

<sup>5</sup> The Transport Asset Management Team is currently working with UKCIP to identify a Transport-focused research project for Oxford University.

<sup>6</sup> Use interview summaries ['Climate Related Incidents'. docs] as a guide to help identify services with potential.

<sup>7</sup> This could be in the form of an online database, based on UKCIP's 'Adaptation Action' database.

<sup>8</sup> E.g. level of significance, man hours, costs, etc. from Impacts.xls

### Community Leadership

- Work with Media & Communications and Citizens Panel to research opinions on climate change and private 'adaptations' and preparations<sup>9</sup>. This could incorporate research into levels of insurance and flood risk warning coverage.
- Publicise these results (along with selected data from the LCIP) as a means of engaging the public with the adaptation message.

Author: Charlie Morris-Marsham

Date: October 2006

---

<sup>9</sup> Recent Ipsos MORI research shows opinions about the reality of climate change are changing; un-prompted 48% of those surveyed believed climate change or global warming to be the 'most serious threat to the well-being of the world', 68% agreed that they had personally seen evidence of climate change. [John Leaman, Ipsos MORI]

October 2006