

SOUTH EAST ENGLAND PARTNERSHIP BOARD DRAFT REGIONAL CLIMATE CHANGE VULNERABILITY ASSESSMENT

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Annex 1

Initial Overview of Existing Climate Change related Data/Information and Sources

European

- White Paper – Living with Climate Change in Europe – European Commission (2009) – includes call for development of indicators to better monitor the impact of climate change, including vulnerability impacts, and progress on adaptation by 2011
- Impacts of Europe's Changing Climate – European Environment Agency (2008) – indicator-based assessment of a wide range of climate impacts
- ESPACE (Interreg III B project, 2008) – includes amongst other projects an outline of a strategic vulnerability analysis and the FloodRanger tool (Environment Agency), the modelling of climate change impacts in a river Catchment and economic consequences (Bavarian Environment Agency). – The former Regional Assembly was a partner in this project.
- BRANCH (Interreg IIIB project, 2008) – includes investigation of climate change impacts on species, habitat networks and coasts (Universities of Wageningen, Southampton and Oxford).
- RESPONSE (LIFE project, 2006) – explores the process of assessing current and future hazard and risk at the coast through maps (Centre for Coastal Environment, Isle of Wight)
- GRaBS (Interreg IVC project, started in 2008) – includes collaborative development of an assessment tool to demonstrate climate change impacts on urban areas (Manchester University)
- Future Cities (Interreg IVB project, started in 2008) – includes the development of a climate change assessment checklist to climate proof cities. The Partnership Board is a sub-partner in this project.

National

- Stern Report – the Economics of Climate Change (2006) - PART II covers the Impacts of Climate Change on Growth and Development
- UK Climate Impacts Programme (UKCIP) tools:
 - UKCIP09 Climate Change Projections – provide scenarios of how the climate of the UK might evolve over this century, they are more detailed in terms of data resolution and consideration of uncertainty than previous projections
 - Local Climate Impacts Profile (LCLIP) – tool helping to identify past severe weather events and local responses as well as to assemble information about future weather events, tool was piloted in

Oxfordshire and work is also complete or underway in many parts of the region

- Business Areas Climate Impacts Assessment Tool (BACLIAT) – checklist for organisations to assess the potential climate change impact on their business
- Costing the Impacts of Climate Change in the UK - 2004
- National Climate Change Risk Assessment (CCRA) Scoping and Literature Review (2009) – will inform the first UK-wide assessment of climate risks (publication due in January 2012)
- Adaptation and Resilience in Cities: Analysis and Decision making using Integrated Assessment (ARCADIA) – aims to provide an understanding of the inter-relationships between climate impacts, the urban economy, land use, transport and the built environment. It will among other tasks explore the processes by which climate impacts influence urban systems, the vulnerability and resilience of urban (London's) economy and provide a land use simulator of the spatial evolution of cities for the analysis of vulnerability and adaptability
- ARCC-Water: Water System Resilience – aims to develop new methods and tools to assess the risk of climate change impacts on water infrastructure systems and improve the performance of the water supply/demand system under future extreme events that will drive system failure (floods, droughts, heat waves)
- Community Resilience to Extreme Weather (CREW) - focus on understanding the probability of future extreme weather events and their likely socio-economic impacts and investigate the vulnerability and determinants of adaptive capacity in communities associated with coping with extreme weather events.
- Future Resilient Transport Networks (FUTURENET) – aims to identify failure of transport systems and asset deterioration due to changes in climate and extreme climatic events.
- Adaptation Strategies for Climate Change in the Urban Environment (ASCCUE) – focus on building integrity, human comfort (external) and urban greenspace (especially tree cover) as well as socio-economic impacts
- Adaptable Urban Drainage - Addressing Change in Intensity, Occurrence and Uncertainty of Stormwater (AUDACIOUS)
- A generic process for assessing climate change impacts on the electricity supply industry and utilities (GENESIS)
- Modelling Natural Resource Responses to Climate Change (MONARCH) - Phase 3 – Oxford University (2007) - models the potential for changes in the ranges of 120 species selected for nature conservation action in the UK Biodiversity Action Plan
- Foresight Future Flooding Report (2004) – investigated impacts of climate change on future flooding – updated as part of the Michael Pitt report - Learning the Lessons from the 2007 Floods (2008)
- Coastal Simulator – Tyndall Centre – development of models that will allow exploration of how the future coastline may evolve under a range of scenarios of sea-level rise, wave climate changes, socio-economic development and coastal management options.

- Health Effects of Climate Change in the UK 2008 – Department of Health – includes potential on health of vulnerable groups from heat stress and other climate change effects
- Air Quality and Climate Change – a UK Perspective – Air Quality Expert Group (2007) – Chapter 4 covers the impacts of climate change on air quality
- Guidance Notes for NI 188 – Local and Regional Partnership Board (2008) - requires the assessment of current vulnerability and future climate risks to achieve certain performance levels
- National Risk Register – Cabinet Office – includes sections on severe weather, flooding and pollution

Regional

- Rising to the Challenge – UKCIP (1999) – describes a wide range of climate change impacts in the South East
- South East Climate Threats and Opportunities Research Study (SECTORS) – South East Climate Change Partnership (2004)
- Climate Change Resilience Indicators – TRL for SEERA (2008) – a concept for the consideration of resilience in regional monitoring
- Regional Flood Risk Appraisal (RFRA) – SEERA (Oct 2008) – provides flood risk indicators for areas where high growth and high flood risk coincide
- Regional Water Resource Model – Environment Agency (publication due shortly) – models required water supply schemes to meet future demand based on different scenarios for growth, water consumption and environmental conditions, builds on model indicating the supply-demand balance across the region
- Assessment of options to maintain water quality in South East in the light of future growth – Environment Agency (publication due shortly) – explored initially potential capacity limits for 15 water treatment catchments where concerns was raised in previous research, further work is underway to review impacts of draft River Basin Management Plans on many additional priority water treatment catchments
- Regional Risk Register (hosted by GOSE)

Sub-regional and Local

- LCLIPs, local Adaptation Strategies, etc.
- Catchment Abstraction Management Strategies (CAMS) – Environment Agency – six-year plans assessing the extent to which individual catchments have water for abstraction available
- Draft Water Resource Management Plans (WRMPs) and Business Plans – Water Companies (2008) – set out proposed investments by water companies
- Water Cycle Studies – some completed/underway, in particular in growth areas, addressing water resource/quality and flood risk
- Strategic Flood Risk Assessment
- Shoreline Management Plans, Thames Estuary 2100 and Catchment Flood Management Plans
- Community Risk Registers – based on the five Policy Force areas within the region

Good Practice Assessments from Elsewhere

UK

- Vulnerability Mapping to extreme weather events within the South West – Scott Wilson (completion due shortly) – covers wide range of vulnerability topics
- London Climate Change Adaptation Strategy – Mayor of London - Consultation Draft – covers health, environment, economy and infrastructure
- Yorkshire and Humber Regional Adaptation Study – Weathering the Storm (2008) – addresses flooding, erosion, groundwater, economy, public services, infrastructure, biodiversity and public health providing a regional, a sub-regional and a local dimension
- North East Climate Change Adaptation Study (2008) - addresses flooding, erosion, groundwater, industry/business, public services, transport/utilities and heritage/leisure/tourism providing a regional, a sub-regional and a local dimension
- Climate risk assessment: Business clusters - Advantage West Midlands (2006) – covers rail, building technologies, environmental technologies, tourism/leisure
- Regional Climate Change Impact Response Studies in East Anglia and North West England (REGIS) – DEFRA/UKCIP (2002/2003) – covers flooding, agriculture, water, biodiversity, Phase 2 (2003) includes a Regional Impact Simulator

North West Europe

- National Vulnerability study for the Netherlands (VROM, under development)
- German Adaptation Strategy (2008) – outlines variations in the vulnerability of broad landscape character areas and considers policy options for a wide range of sector (spatial planning as cross-cutting sector)
- Spatial Planning Strategies on Adaptation – Scoping of a Pilotstudie (in German) – German Office for Building and Regional Planning (2008)
- Climate Change in Germany – Vulnerability and Adaption Strategies of Climate-Sensitive Systems (in German) – German Ministry for the Environment (2005)
- Adapting to climate change – a strategy for North Rhine Westphalia (2009) – addresses impacts and policy options on a wide range of sectors and divides the region into broad landscape character areas
- Sweden facing Climate Change – Swedish Government (2007)

Annex 2

Potential Additional Issues/Indicators under Consideration

This draft and in particular the vulnerability issues and indicators (in brackets) used require further development. The following list includes issues/indicators where we do not have the necessary indicator data yet but have identified potential sources or are still considering the assumptions underlying it and have not identified the data sources yet. The numbers [1-5] provide the link to the following five key climatic changes in the region:

1. Gradually increasing mean temperatures: + 3.9°C (but up to + 6.5°C possible) in summer (+ 3.0°C in winter)
2. More intense heat (heat waves): + 5.3°C daily maximum temperature (but up to + 9.2°C possible)
3. Longer periods without rain (drought): - 23% in summer mean precipitation (but up to - 48% possible)
4. More intense rain: + 22% in winter mean precipitation (but up to + 51% possible)
5. Sea level rise + 36.3 cm (for London on 1990 basis)

Population

- Prevalence of topographic characteristics that trap pollution, flood water [2/4/5] (urban areas within valleys, with high density and/or high-rise buildings)
- Fatalities/casualties due to extreme heat [2] (NHS Observatories' fatalities on heat-wave days)
- Diseases due to heat/sun [1,2] (pests)
- Heat wave 'hotspots' [2] – (Urban locations with highest temperatures on recent heat wave days – Met Office)
- Fatalities/casualties due to flooding [4/5] (Catchment Flood Management Plans and Environment Agency reports on specific flood events)

Natural Resources

- High water consumption [3] (per capita consumption in different areas – Environment Agency)
- High sensitivity of water supply [3] (dependency on surface water supply (more sensitive to drought in the short term) – Environment Agency)
- Droughts experienced in the region [3] (drought orders – Environment Agency)
- Sewer flooding [4] (Environment Agency reports on specific flood events and clean-up operations)
- Weather/climate sensitive habitats and species [1/3/4/5] (location of certain wetlands, grasslands, heathlands, and certain woodlands such as beech and yew – Natural England, Forestry Commission)
- Unfavorable condition of designated areas [1/3/4/5] (unfavourable condition of SSSIs partly due to climatic impacts – Natural England)
- Significant losses/migration of species [1/3/4/5] (losses of species through sea-level rise – Environment Agency, BRANCH project)

- Significant damage through grassland/heathland/moorland fires [2/3] (location of fires – Fire and Rescue Services?)
- Weather/climate sensitive woodland [2/3/4] (productivity changes of certain woodland types – Forestry Commission)
- Comparatively low food security [1/2/3/4] (low proportion of agricultural land, high soil quality; areas with high proportion of water-sensitive crops)
- Heritage at risk of flooding [4] (Heritage at risk additionally in Flood Zone 2; National Trust sites in Flood Zone 2)
- Coastline at risk of damage [4/5] (Shoreline Management Plans - Coastal Groups)
- Landscapes at risk of damage [4] (National Association for AONBs?)
- Heritage damaged through flooding [4] (English Heritage/National Trust?)
- Deteriorating coastline and landscapes [4/5] (incidences of cliff/beach erosion – Coastal Groups, Natural England)

Built Environment

- High proportion of properties/area at risk of erosion [4/5] (developed areas at risk of erosion – Shoreline Management Plans)
- Prevalence of topographic characteristics prone to flooding [4/5] (steep narrow valleys, estuaries)
- Lack of insurance to enable recovery [4/5] (Share of population without Building or Content Insurance)
- High proportion of properties which are difficult to insure due to flood/erosion risk [4/5] (Uninsurable properties and very high premiums)
- Damage to properties due to subsidence, erosion and flooding [4/5] (Emergency Service data about rescue operations; evacuations/use of rest centres; distribution of sandbags)

Infrastructure

- Strategic transport network, utility plants and services at risk of severe weather [2/3/4/5] (infrastructure/services at risk of erosion – Shoreline Management Plans)
- Flood defences at risk of flooding/erosion [4/5] (Areas where funding of required flood defences is particularly uncertain – Environment Agency?)
- Lack of emergency service provision [2/4/5] (number of Emergency Service staff – counties)
- Disruption/cost due to severe weather [2/3/4/5] (School closures, Highway Service road closures, costs for council services)

Economic Development

- High proportion of the most vulnerable/beneficial business sector(s) (weather dependent, high water consumption) contributing towards the economy of an

area [2/3/4/5] (proportion of tourism/leisure, agriculture/forestry/fisheries, logistics(?), retail (?))

- Employees at risk of over-heating [2] (high concentration of employees in urban centres?)
- Assets damaged due to flooding, erosion, heat [2/4/5] (value, costs, insurance claims?)
- Heat wave 'hotspots' [2] – (Urban locations with highest temperatures on recent heat wave days – Met Office)