Department
for Environment
Food & Rural Affairs

Understanding intense rainfall:

Implications for the future of flood risk management policy in England.

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Key points

How could a better understanding of intense rainfall support policy-makers them to manage flood risk and adapt to climate change?

What are the mechanisms for translating this knowledge into policy and practice?

The problem

Currently **3 million** properties in England are estimated to be at some risk from surface run-off with 800,000 properties having a 1 in 100 or higher chance of flooding in any given year (1% annual chance). These figures were updated in December 2013 from a previous estimate of 3.8m properties, following improvements in mapping.

In practice: Canvey Island, July 2014

The conclusion of this report is that the primary cause of the widespread flooding experienced on 20th July 2014 was the **exceptional intensity and volume of the rainfall.** The magnitude of rainfall experienced was **unprecedented and well beyond the national standards for design capacity** of sewers and surface water drainage systems, causing the system to be overwhelmed in multiple locations.

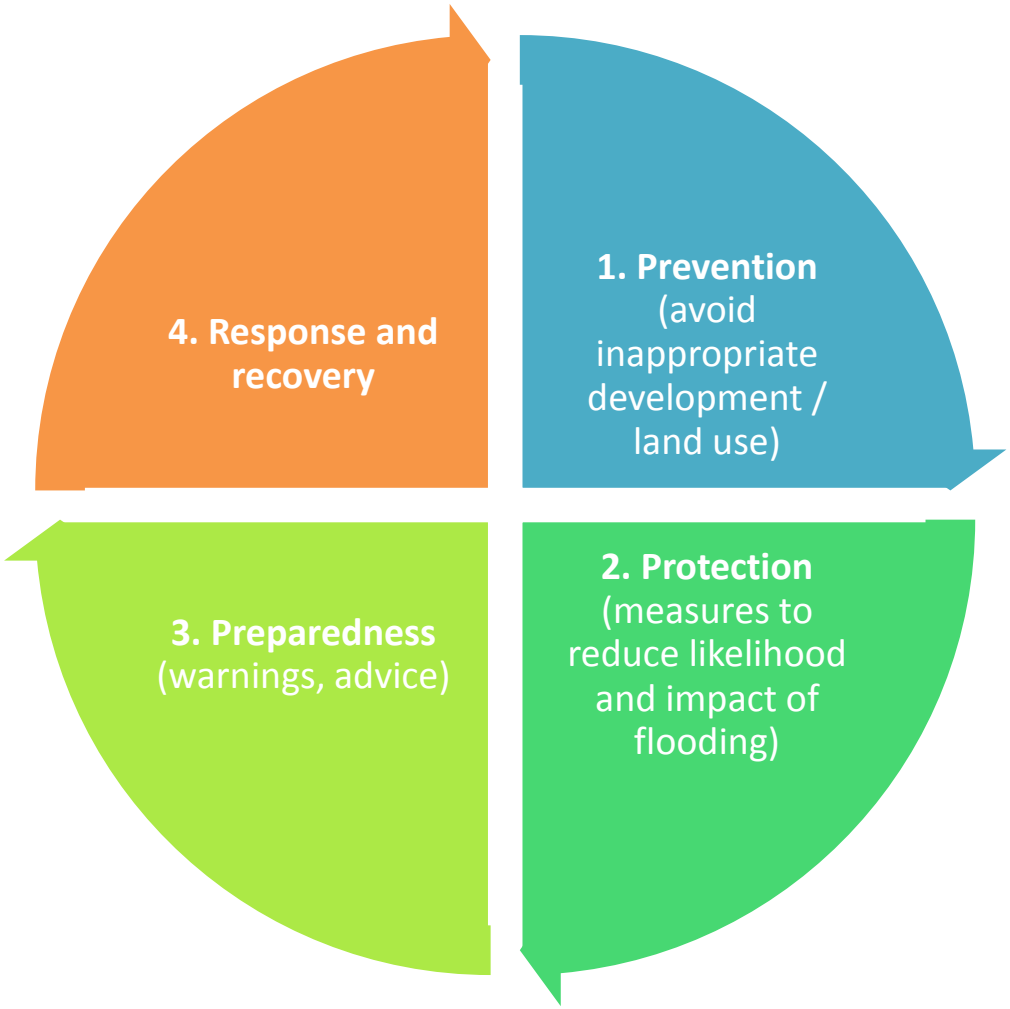
Essex County Council

Who does what?

Risk Management Authority	Role (non-exhaustive!)
Government (C.O., Defra, DCLG)	Develops national policy
Environment Agency	• Strategic planning • Incident management • Mapping and modelling • Advice on planning
Lead Local Flood Authorities	• Coordinate local flood risk management (surface water flooding) • Emergency planning and recovery
Water Companies	• Flooding from water and foul or combined sewer systems
Highways authorities	• Highway and roadside drainage
Local Planning Authority	• Produces Strategic Flood Risk Assessment, allocates land, decides on planning applications

+ IDBs, district authorities

Cycle of flood risk planning



Understanding the risk – the big picture (CCRA 1&2)

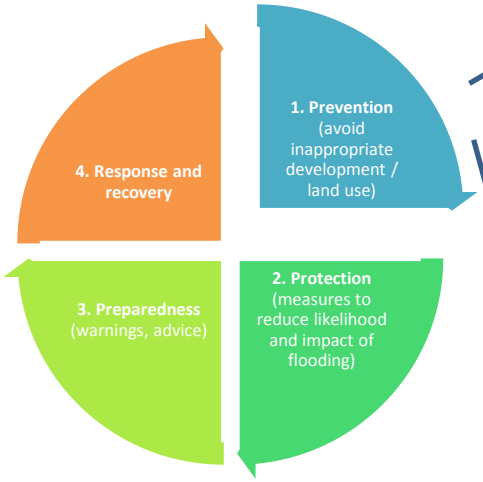
- **CCRA1** (2012) identified increasing risks of **flooding** and to **water availability** associated with changing quantity, intensity and patterns of **rainfall** due to climate change.
  - Risks include increase of **river and surface water flooding**, pressure on **water supplies**, reduction in **water quality** and increases in **sewer flooding and spills** when carrying capacity of combined sewers is exceeded by heavy rainfall.

- **CCRA2** (2017) will probe risks further based on new evidence and examine cross-cutting & cumulative effects.
  - Research projects underway will provide **updated projections of future flood risk and water availability** for the UK and develop **high-end scenarios for droughts and floods**.

Climate Change Risk Assessment 3

- We foresee **CCRA 3** (2022) being a major exercise, underpinned by **updated UK climate projections** (UKCPNext)
  - Size and scope of updates to UK Climate Predictions 2009 (UKCP09) are currently in planning stage.
  - Ideally, as well as new projections at large regional scales, UKCPNext may make use of **results from CONVEX** and include a downscaled ensemble of a high resolution configuration of the climate model, making use of latest developments from the CONVEX project relating to modelling extreme precipitation.
  - …but plans are yet to be finalised.

1. Prevention – understanding the risk



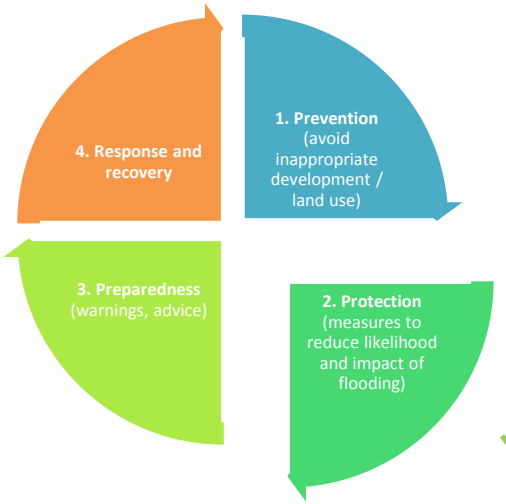
***Potential* impact of better predictions**

- Improve siting of new development
- Understand required capacity of sewerage and drainage infrastructure
- Design SuDS to meet current and future needs

Making it happen (policy tools)

- Climate change allowances for land-use and flood risk planners (based on UK CP)
- EA standing advice for planners
- Updated Preliminary Flood Risk Assessments (Floods Directive, 2018) and Strategic Flood Risk Assessments (District Councisls)
- National SuDS standards (Defra)
- Standards for drains / sewers (OFWAT)
- Resources for LLFAs (e.g. EA-developed e-learning)

2. Protection – mitigating the risk



Potential impact of better predictions

- More targeted investment
- Better value for money
- More surface water schemes developed by Local Authorities
- More people better protected
- Reduced insurance premiums

Making it happen (policy tools)

- Long-Term Investment Strategy (2014 LTIS highlights need to improve evidence base for surface water for future)
- Flood defence appraisal guidance

3. Preparedness – dealing with the risk

Potential impact of better predictions

- Better warnings = people and property better prepared, less vulnerable
- Flood damages to households and businesses reduced
- Social and economic costs to communities reduced
- More efficient use of limited LA resources
- Boost to market in property-level protection (more viable if you know what's coming)

Making it happen (policy tools)

- Flood warnings (Flood Forecasting Centre / Met Office / EA / LLFA)

In practice: back to Canvey Island

Recommendation 5 - The Met Office and the Centre for Ecology and Hydrology should review the likelihood and impact of extreme weather events looking into the future, and provide a clear approach to understanding the probabilities of specific types of events taking place and communicating that to the public.

It is clear that Canvey Island is not the only part of the country that is likely to be susceptible to flooding of this kind, specifically after a short but very intense period of rain. Lessons can be learned not only for local implementation, but potentially applied where necessary around the country.

Recommendation 6 - The Environment Agency along with relevant agencies should provide an overview of areas where extreme rainfall events may result in significant local impact, in order to review safeguards in those places.

Recommendation 7 -The Natural Hazards Partnership should use the Canvey Island event as a case study in the surface water Hazard Impact Modelling initiative to enhance the development of more effective future alerting.

References

- *Canvey Island Section 19 Investigation Report: Peer Review*, Government Office for Science, 2014: http://www.essex.gov.uk/Environment%20Planning/Environmental-Issues/local-environment/flooding/Documents/CanveyIslandreport-july2014.pdf
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- UK National Adaptation Programme 2013: https://www.gov.uk/government/publications/adapting-to-climate-change-national-adaptation-programme