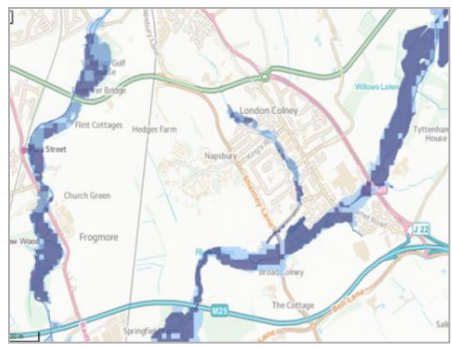


The Future of Flood and Coastal Risk Management

Jonathan Day
Deputy Director, Investment & Portfolio
Flood & Coastal Risk Management

Our role in Flood Risk Management



HOME, SWEET HOME?



**FLOODS DESTROY
BE PREPARED**

Environment Agency

Making a flood plan could help protect your family and home from flooding

www.gov.uk/floodsdestroy

Floodline 0345 988 1188 / 0845 988 1188



Responding to the 2015/16 Winter floods

North of England floods: 5 December 2015 to 6 January 2016



December was the wettest month ever recorded*



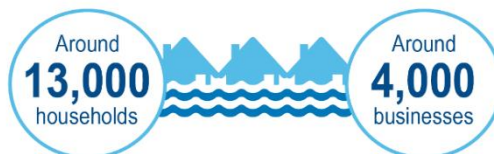
Highest 24 hour rainfall - Honister Pass, Cumbria



Catchments experienced their highest ever river flow



Properties protected during storms Desmond and Eva



Properties flooded**



Communities visited by flood support officers



Severe Flood Warnings issued



Metres of temporary barriers used to protect communities



Flood risk assets needing repair

Properties flooded in Winter 2015/16 flood events

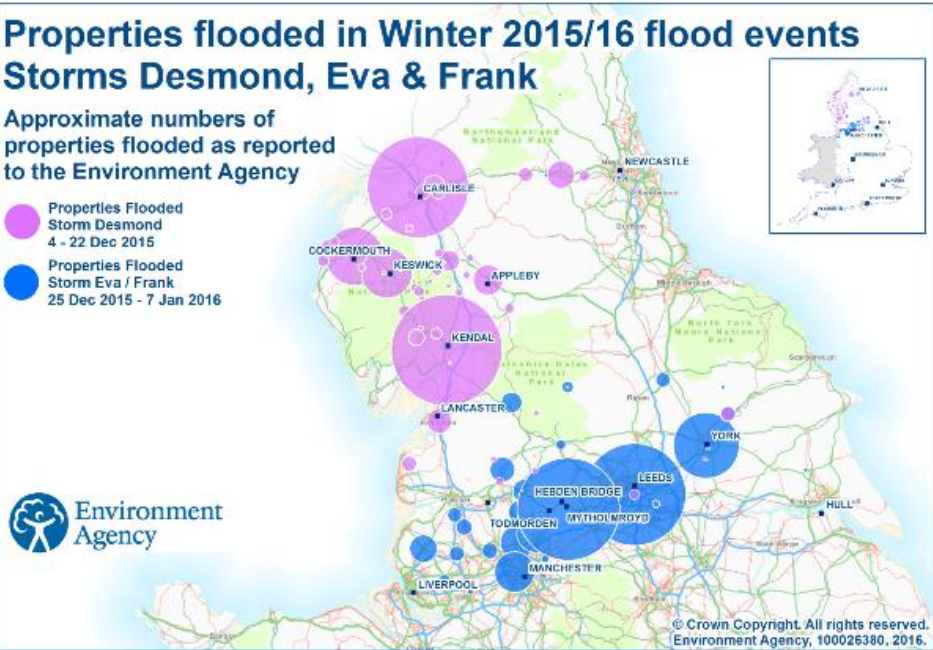
Storms Desmond, Eva & Frank

Approximate numbers of properties flooded as reported to the Environment Agency

- Properties Flooded Storm Desmond
4 - 22 Dec 2015
- Properties Flooded Storm Eva / Frank
25 Dec 2015 - 7 Jan 2016



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Environment Agency, 100026380, 2016.



Properties protected in Winter 2015/16 flood events

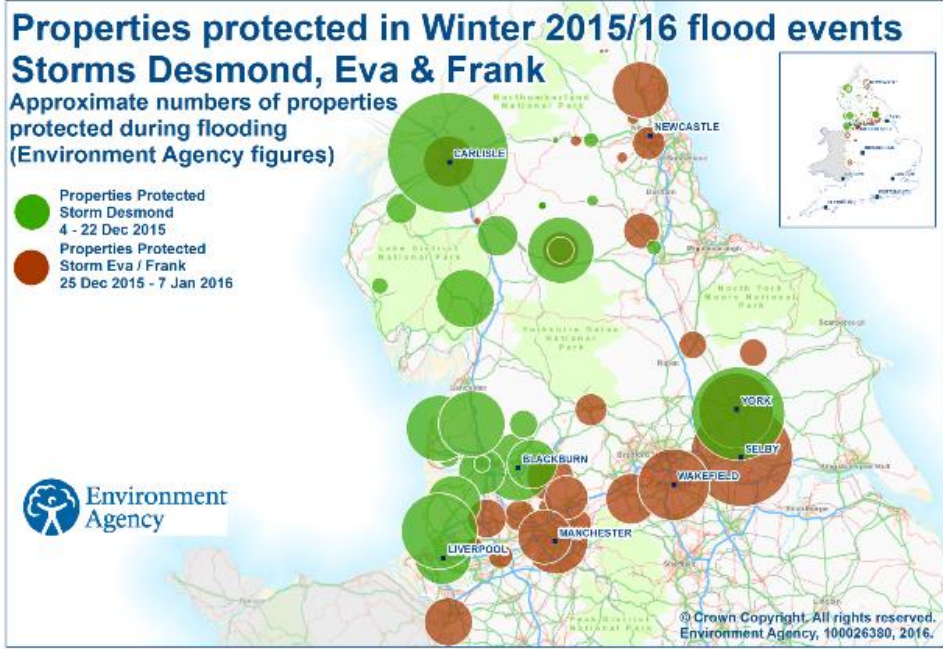
Storms Desmond, Eva & Frank

Approximate numbers of properties protected during flooding (Environment Agency figures)

- Properties Protected Storm Desmond
4 - 22 Dec 2015
- Properties Protected Storm Eva / Frank
25 Dec 2015 - 7 Jan 2016



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National Recovery Programme

Compiled: 19 October 2016

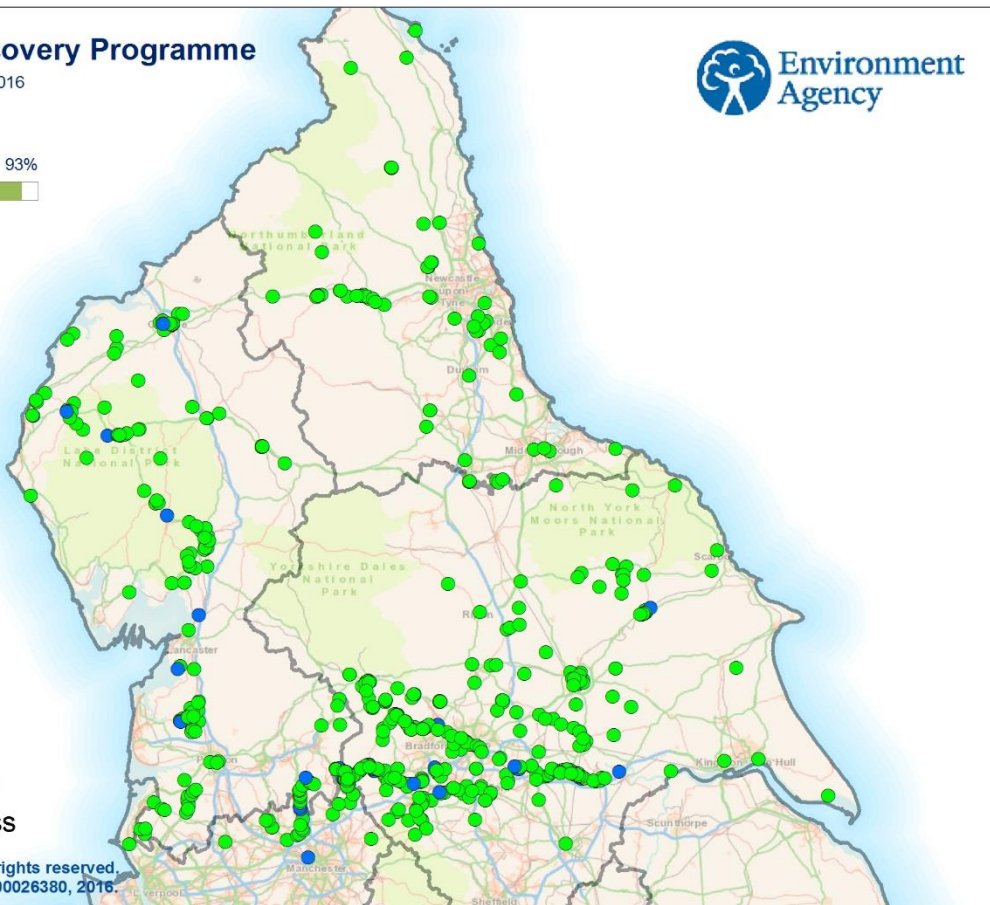
612

Complete 93%



Environment
Agency

- Complete
- In progress



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Environment Agency, 100026380, 2016.



Environment
Agency

Reducing flood risk from source to sea

First steps toward an integrated catchment plan
for Cumbria

Initial key actions across the **Eden** catchment



Strengthening defences

- Up to £25 million for new flood defences and flood storage in and upstream of Carlisle. Full business case completed by September 2017.
- £6.5 million of investment allocated to Appleby, Eamont Bridge, Warton, Poolay Bridge, Rickaby Park and Gablesby providing protection to over 500 homes.



Upstream management

- Hold a flood risk modelling competition by autumn 2016 to encourage development of integrated solutions to managing risk from source to sea.
- Install woody debris dams, reduce soil compactions and identify locations for additional storage of floodwater upstream of the villages of Gablesby, Cumrux and Stockdalewath.
- Complete planting of trees in ghylls and wet areas at Mallerstang, upstream of Appleby.
- Launch community-led flood and land management pilot projects in Pattensdale, Glenridding and Stockdalewath by summer of 2016.
- Scope an investigation by end of July 2016 into using Haweswater and Wet Sleddale reservoirs to reduce flooding downstream.



Maintenance

- Remove gravel and debris in Carlisle by the end of August 2016.



Resilience

- Carlisle City Council and local flood action groups to develop a Carlisle flood plan.
- Produce a strategic flood risk assessment for the development area of Carlisle South by early 2017.



Water Level Management Boards

- Continue work to develop proposals and re-consult on a new Waver/Wampool/WLMB by spring 2017.

Reducing flood risk from source to sea 9

Cumbria Flood Partnership

The National Flood Resilience Review



Pilot for innovative flood defence and urban development in core cities



Flood risk communication



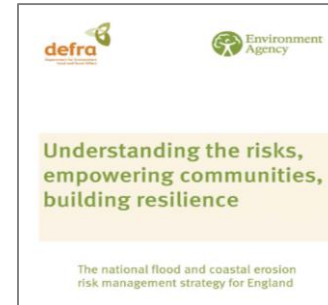
Improving the resilience of local infrastructure



Surface water flooding



Rolling programme of long-term modelling improvements



Long term (post 2021) strategy



Supporting 2016/17 Winter Readiness



temporary flood barrier to support communities at risk



principal depots with 8-12 hour* deployment anywhere in England



sandbags at our depots



mobile pumps 4 inch and over to flood fight and assist with recovery



enabling works at over 30 locations



incident command vehicles with real time video streaming



Around operational plans for barrier and high volume pump deployment



trained and ready site deployment leads



over £12m investment to support the National Flood Resilience Review

* Interim arrangement in place until £4.6M Phase 2 funding is available in 2017/18. Pumps are 4 inch and over.

Investment in flood risk management



Flood and coastal erosion risk management in England

Investment programme 2015 to 2021



£1.5 billion
in benefits to the
agriculture sector
through flood risk
reduction

**£2.3 billion of Defra
capital grant invested
over the next 6 years**

Investing in built schemes
and improving critical
services - flood warnings,
forecasting, mapping and
telemetry

One in six
homes in England
is at risk of
flooding

£23.1 billion
in benefits through
damages avoided
from **300,000**
households being
better protected

Total additional
benefits to the value
of **£30.3 billion**
through flood
damages avoided
and long term gains

£5.1 billion
long term benefits
to transport,
infrastructure,
commerce and
industry

45% spent on
coastal flood
and erosion risk
management and
55% on inland
flood risk
management

300,000 households
with reduced risk
of flooding

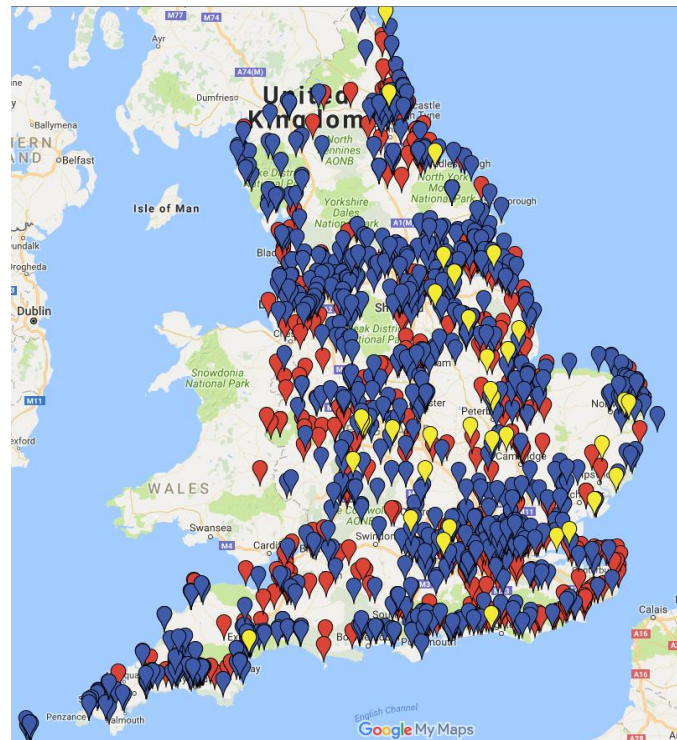
5% reduction
in expected annual
economic damages
from flooding by
2021

£600 million
benefits through
improved
biodiversity
and local
environments

Attracting over
£345 million
in additional
funding through
partnership
contributions

Investment programme

- ➔ Evolving programme
- ➔ 10% efficiency target
- ➔ At least 15% secured through partnership funding
- ➔ Delivered by all risk management authorities; not just the Environment Agency
- ➔ Close alignment with maintenance programme



Future strategy and investment



Department
for Environment
Food & Rural Affairs

An Introduction to the Government's 25 Year Plan for the Environment



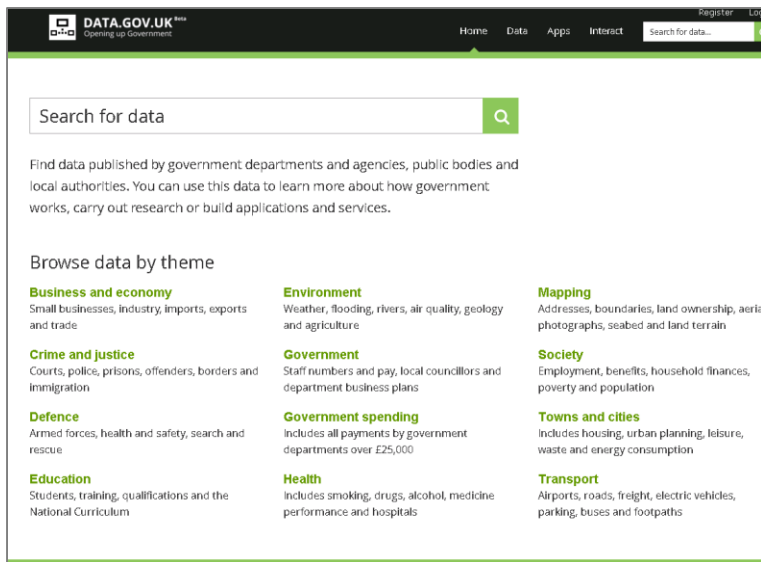
Flooding in England:

A National Assessment of Flood Risk



omes that are at threat from damage. Critical infrastructure such as water treatment works and power stations are often close to
ure. It is neither technically feasible nor economically affordable to prevent all properties from flooding. We therefore take a risk
ations for new building or development in flood and coastal risk areas. Our interventions help control development and prevent
act of flooding can reduce if we continue to invest in flood warnings and public information campaigns. They help households

Updating our National Assessment of Flood risk: NaFRA 2

A screenshot of the DATA.GOV.UK website. The header includes the logo, navigation links (Home, Data, Apps, Interact), and a search bar. Below the header is a large search bar with a magnifying glass icon. The main content area features a section titled 'Browse data by theme' with a grid of categories: Business and economy, Crime and justice, Defence, Education, Environment, Government, Government spending, Health, Mapping, Society, Towns and cities, and Transport. Each category has a brief description of the data it covers.

DATA.GOV.UK
Opening up Government

Home Data Apps Interact Search for data...

Search for data

Find data published by government departments and agencies, public bodies and local authorities. You can use this data to learn more about how government works, carry out research or build applications and services.

Browse data by theme

Business and economy Small businesses, industry, imports, exports and trade	Environment Weather, flooding, rivers, air quality, geology and agriculture	Mapping Addresses, boundaries, land ownership, aerial photographs, seabed and land terrain
Crime and justice Courts, police, prisons, offenders, borders and immigration	Government Staff numbers and pay, local councillors and department business plans	Society Employment, benefits, household finances, poverty and population
Defence Armed forces, health and safety, search and rescue	Government spending Includes all payments by government departments over £25,000	Towns and cities Includes housing, urban planning, leisure, waste and energy consumption
Education Students, training, qualifications and the National Curriculum	Health Includes smoking, drugs, alcohol, medicine performance and hospitals	Transport Airports, roads, freight, electric vehicles, parking, buses and footpaths



THE PROPERTY FLOOD RESILIENCE ACTION PLAN

An action plan to enable better uptake of resilience measures for properties at high flood risk



Department
for Environment
Food & Rural Affairs

Dr Peter Bonfield OBE FREng
Chairman
September 2016

Natural Flood Management



The flood campaign will reduce the cost of flooding to the UK economy by ensuring people know when they are at risk from flooding and what actions to take as a result



Think

People know that they are at risk from flooding



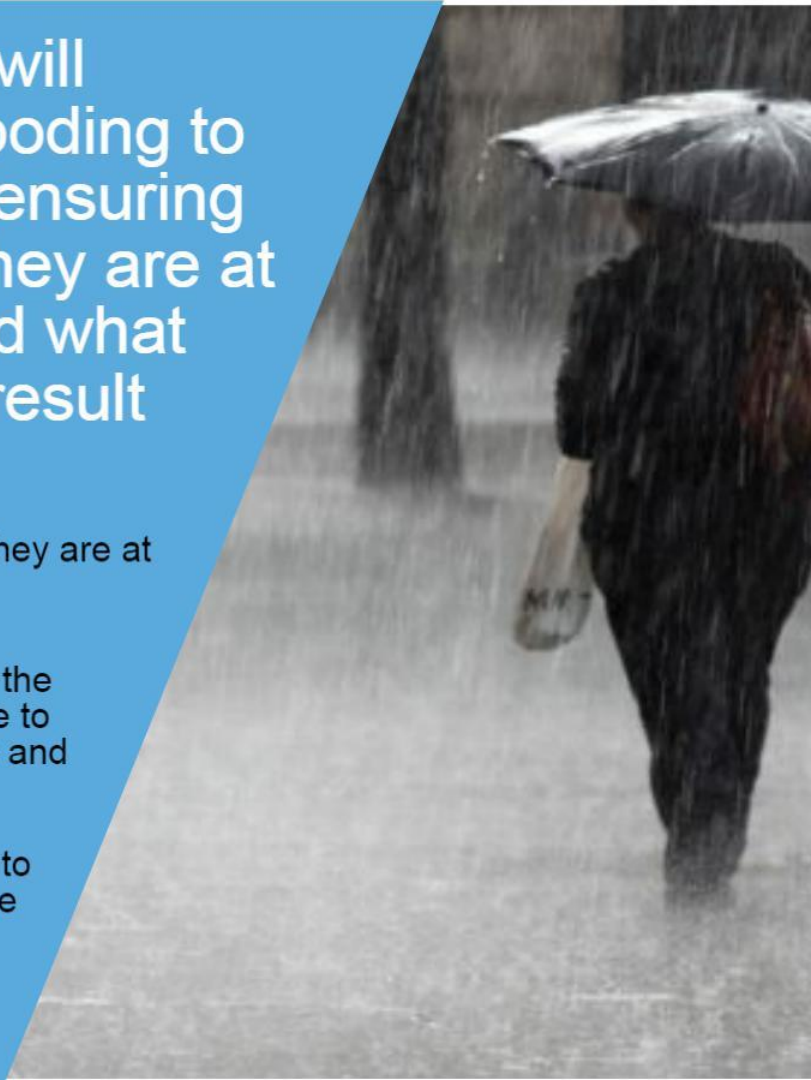
Feel

People understand the action they can take to protect their homes and businesses



Do

People take action to protect lives, reduce risk and increase resilience



Long term investment scenarios (LTIS)



FLOOD TECHNOLOGY Innovations over the years



Huge advances in flood technology mean that we're highly-skilled at not only detecting and forecasting floods but also warning and informing. Here's a look at seven of the reasons why...



Flood defence innovations

We're using unusual defences, such as self-closing barriers at Cockermouth, Cumbria




The Flood Forecasting Centre

We've set up a nerve centre to help us forecast natural forms of flooding




Flood warnings direct

More than 1 million properties have registered for our flood warning service



Aerial LIDAR
(Light detection and ranging)

We use aeroplanes to collect data to use in our flood mapping and monitoring




Social media

We use this to warn and inform during floods. We pioneered the use of Twitter Alerts



ARC boats
(Acoustic remote-controlled)

Nimble remote-controlled boats help us monitor river flows and collect river data



Telemetry

Our river level monitoring service covers over 36,000km of rivers in England

**FLOODS
DESTROY
BE PREPARED**

*Figures are correct as at December 2014.

www.gov.uk/floodsdestroy

[#floodaware](https://twitter.com/floodaware)



Thank you

Jonathan Day
Deputy Director, Investment & Portfolio
Flood & Coastal Risk Management