

“What can be done to minimise future economic and social harm caused by flooding and improve resilience”

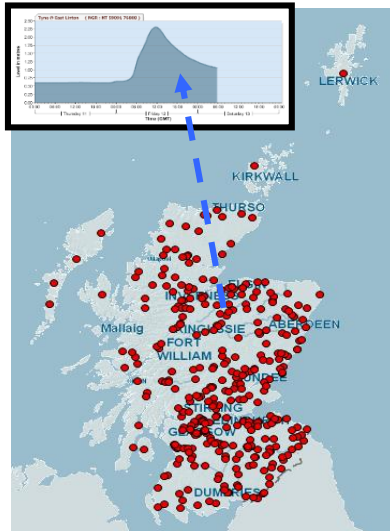
Flood Warning and Informing

Marc Becker – SEPA Flood Risk Manager (Hydrology)

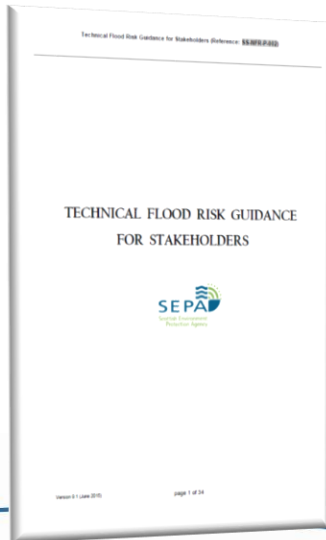
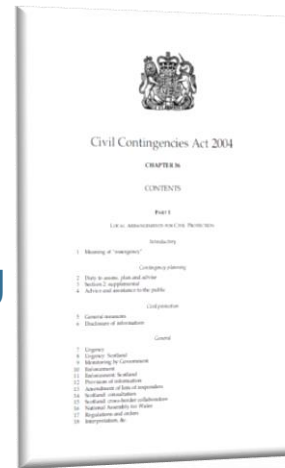
16th September 2016

The Insurance Institute of Perth and Dundee
Aviva, Perth

SEPA's Role

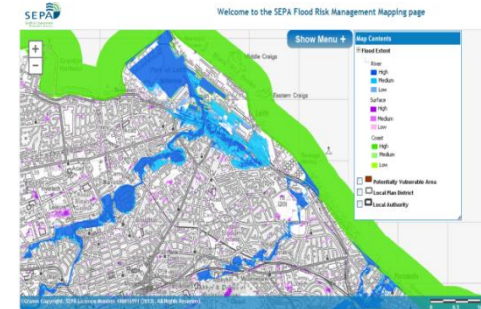


- Operate network of gauging stations for:
 - Rainfall
 - River flow
 - Groundwater
 - Loch and tide levels
- Advice about flooding and land use planning
- **Flood warning**
- Civil contingency Cat 1 responder



Flood Risk Management (Scotland) Act 2009:

- Co-ordinating / strategic role in FRM
- Data, maps and models
- Flood risk management strategies
- Flood warning authority
- Flood advice to the land use planning system



Flood Risk Management Strategies

*Every 6
years*

Improved
understanding
of flooding

Agreed
objectives

Targeted and
prioritised
actions

Flood Risk in Scotland

	2016	2080
Properties at flood risk*	108,000	168,000
Residential properties at flood risk	79,000	126,000
Non-residential properties at flood risk	29,000	42,000
Annual Average Damages	£252m	£TBC



* All properties at 0.5% Annual Exceedance Probability

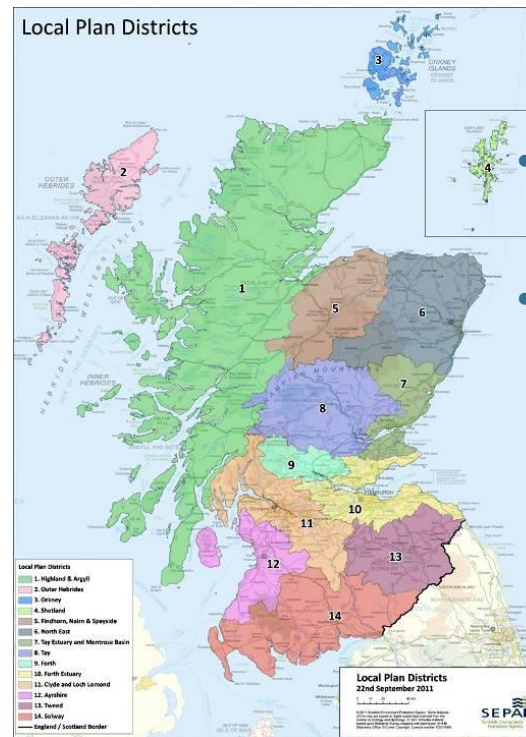
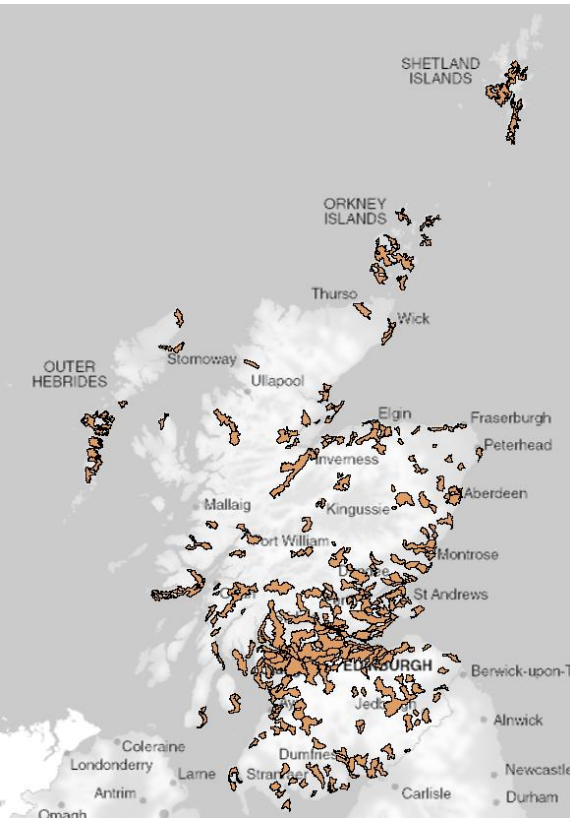
Wider impacts

- 33% of residential properties at risk have High or Very High social flood vulnerability
 - 2,000km road network impacted
 - 500km railway
 - Over 300 community facilities
 - Over 2,000 utility assets (individual sites not assessed)
 - Over 200,000 hectares of agricultural land



Delivery Plan 2016 - 2021

- 243 Potentially Vulnerable Areas
- Covering 90% of flooding impacts across Scotland



• 14 Local Plan Districts

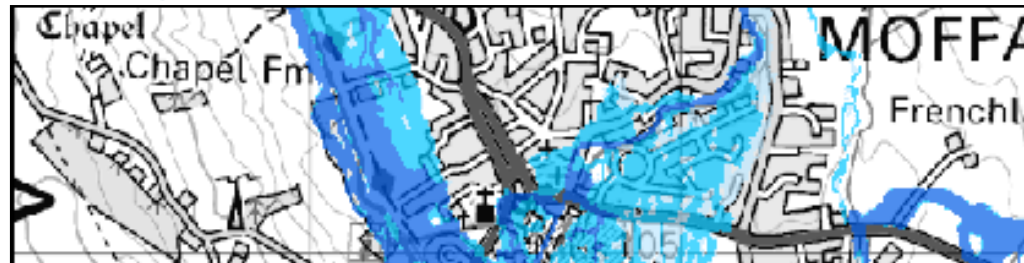
- Each LPD requires:
 - FRM Strategy
 - Local FRM Plan

Actions 2016 - 2021

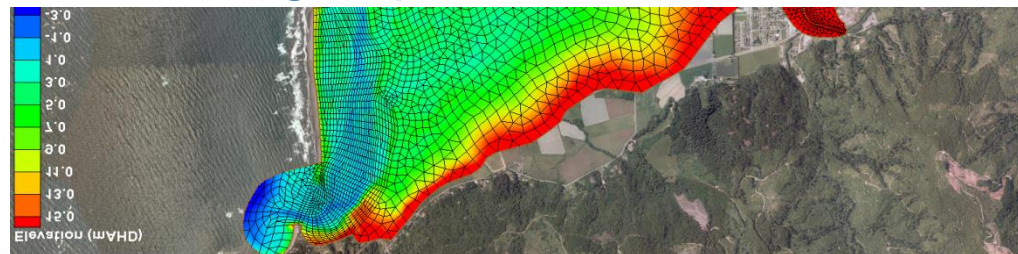
- 42 Flood Protection Schemes



- 134 Flood Protection Studies



- 113 Mapping and Modelling Improvements



- 109 Surface Water Management Plans

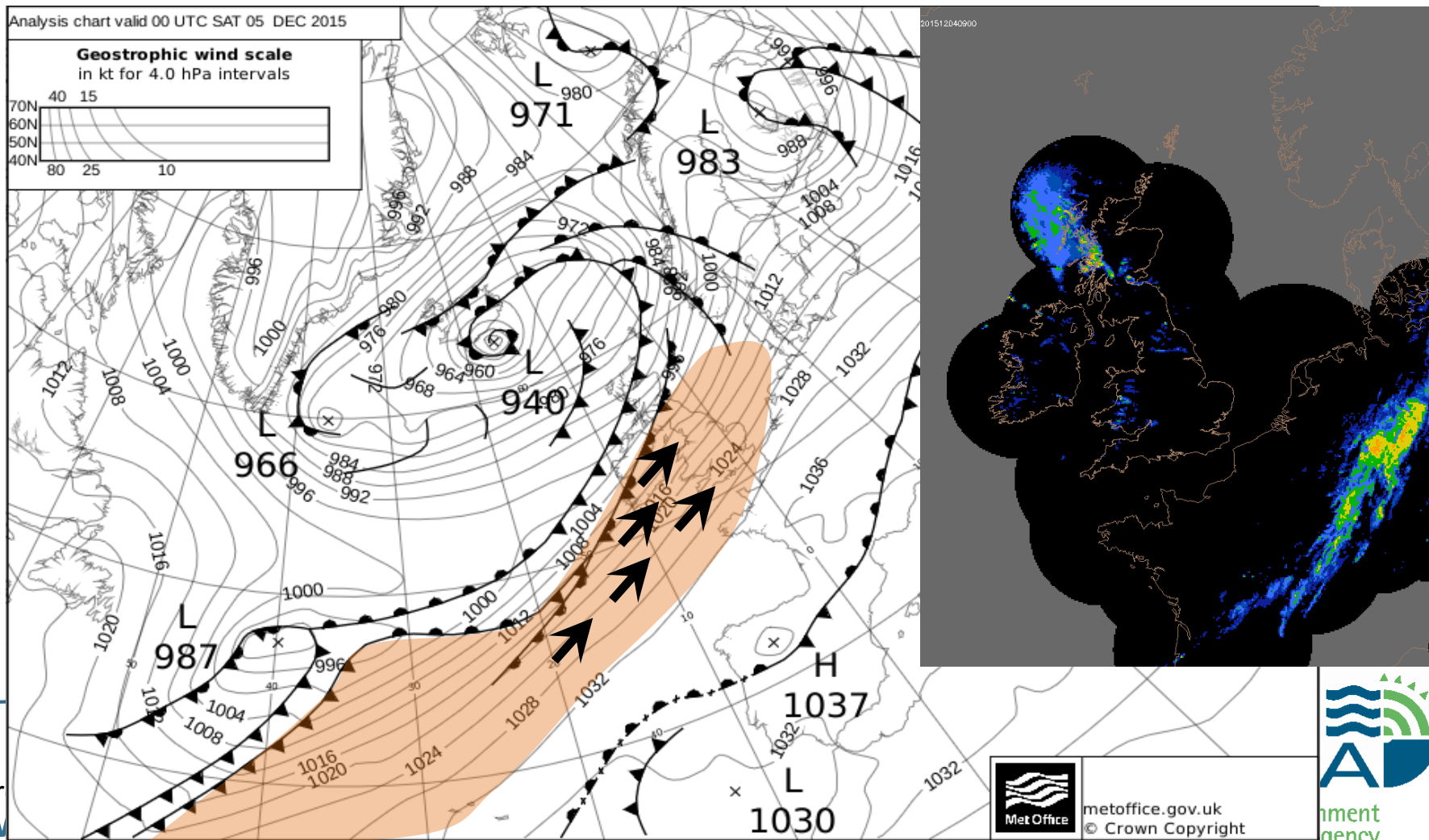
Actions

Flood Warning Scheme 2016-2021

Potentially Vulnerable Areas*	254	%
Number of new planned flood warning schemes	14	-
Potentially Vulnerable Areas with flood warning	133	50%
Potentially Vulnerable Areas with new flood warning	38	13%
Potentially Vulnerable Areas with flood warning (2021)	159	63%

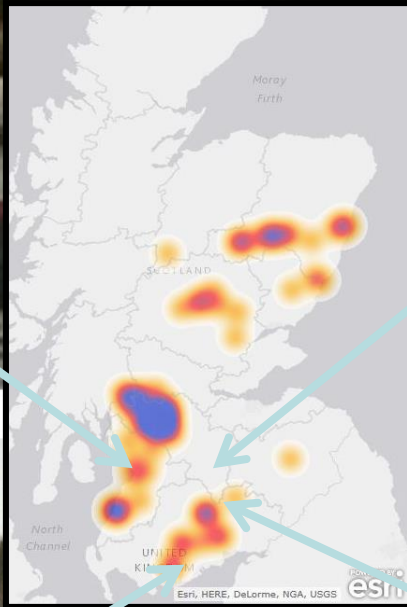


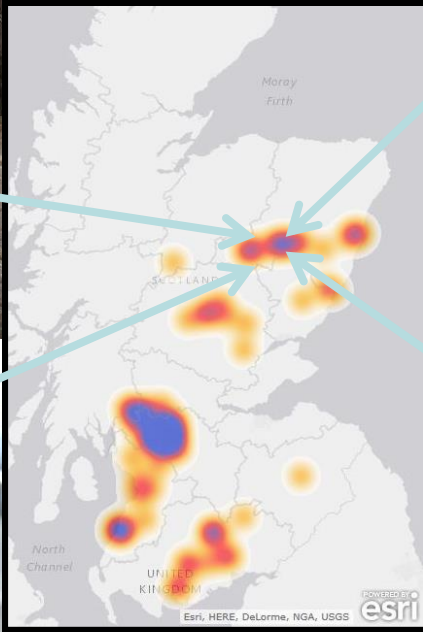
Storm Desmond – 5 Dec 2015





Bus caught in water in Dailly. Nicola Stewart





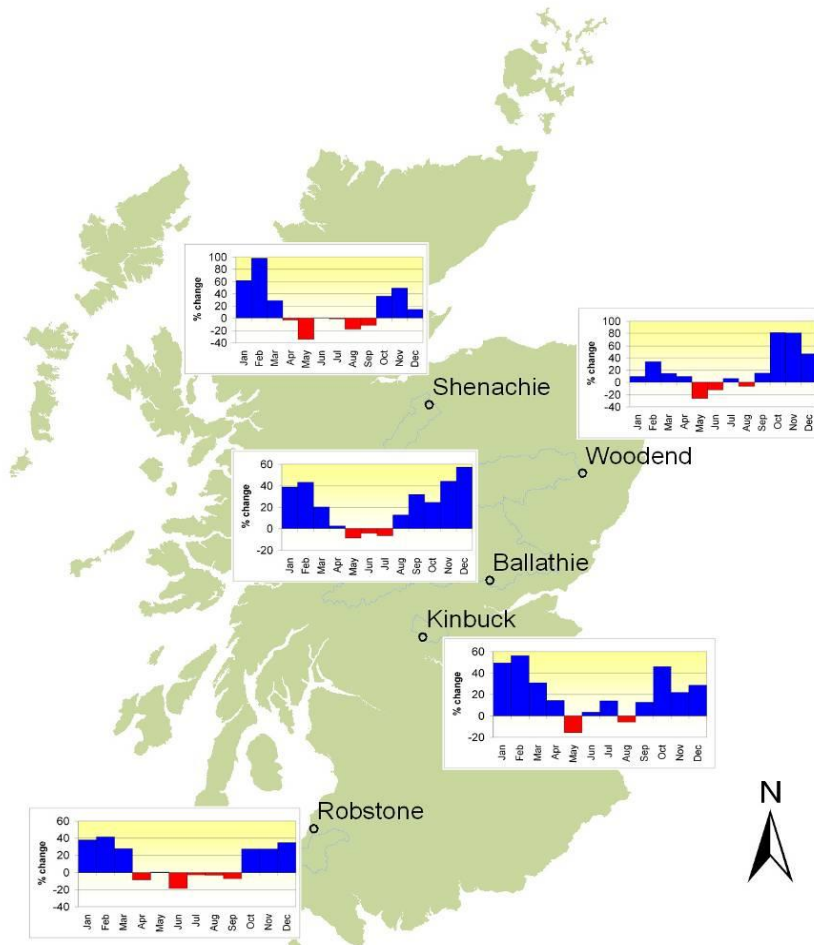
Climate Change

Extreme precipitation events over most of the mid-latitude land masses (...) will very likely become more intense and more frequent by the end of this century.

Global mean sea level rise for 2081–2100 relative to 1986–2005 will likely be in the ranges of 0.26 to (...) 0.82 m.



Changes in mean monthly flows from 1964 to 2006*



* this figure shows the percentage rise in mean monthly flow between the periods 1964-1973 and 1997-2006

Seasonal Changes in Flow

- Wetter Winters
- Drier Summers
- Less Snow
- Lower Spring Flows

The SEPA Flood Warning Service

www.sepa.org.uk/flooding



Flood Warning – how ?

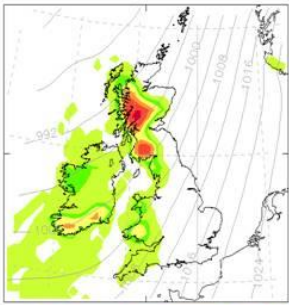
Real time data



Post event data collection



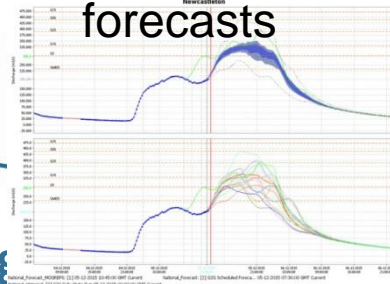
MOCREPS (Global) Probability map for 24HourPrecipUK > 50.0mm
MOGREPS CT 18Z on Sat 26/12/2015 VT 18Z on Wed 30/12/2015 lead time 96h
(Ensemble Mean PMSL plotted as faint background)



Met Office forecasts



SEPA flood forecasts



Public and partner dissemination

FLOOD WARNING

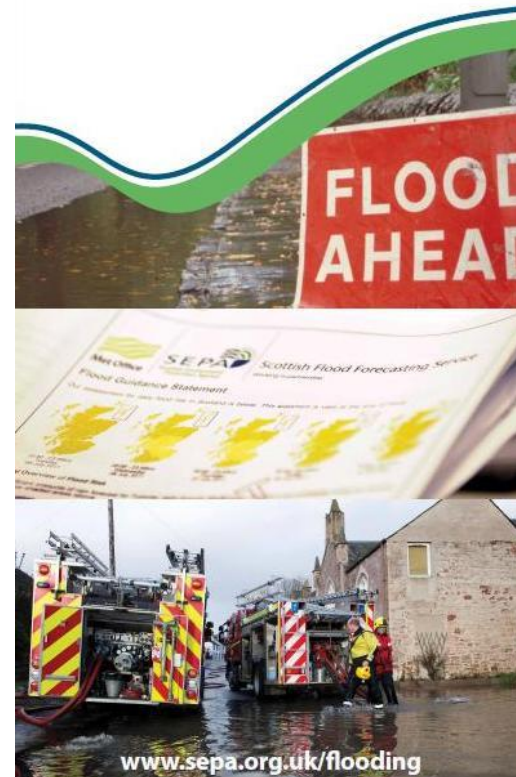
FLOODING IS EXPECTED. IMMEDIATE ACTION REQUIRED.

www.sepa.org.uk/flooding

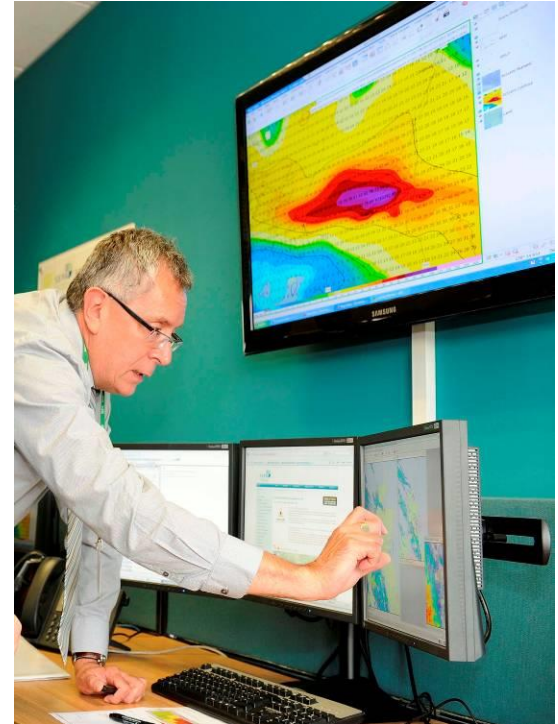


SEPA Flood warning service: key customers

- *Strategic Partners*
 - Police, Fire & Rescue, Local Authorities
- *'Critical National Infrastructure'*
 - Energy, Water, Transport and Telecoms +
- *Individual property owner/occupiers*
 - Householders, Businesses
- *Media*
 - Broadcast, Online +



Scottish Flood Forecasting Service



SCOTTISH
FLOOD
FORECASTING
SERVICE
Working in partnership

National flood vigilance

Met Office **SEPA** **Scottish Flood Forecasting Service**
Working in partnership

Flood Guidance Statement 10:30hrs Friday 03 January 2014

Our assessment for daily flood risk in Scotland is below. This statement is valid at the time of issue.

10:30 - 23:59hrs
Friday 03 January 2014
Saturday 04 January 2014
Sunday 05 January 2014
Monday 06 January 2014
Tuesday 07 January 2014

General Overview of Flood Risk

The overall flood risk is **MEDIUM** on Friday for regions bordering the Solway coast and the Firth of Clyde. The residual risk carries over into a **LOW** risk on Saturday.

The flood risk is **LOW** on Friday for the other areas of the north and west from coastal sources.

The flood risk is **LOW** on Saturday for coastal areas around the Firth of Forth.

On Sunday and Monday there is a **LOW** coastal flood risk in the Firth of Clyde area.

The risk is **LOW** for Central, Tayside, the Scottish Borders, and Dumfries and Galloway from river flooding.

Please note the Area of Concern map below. Note that this contains information on the coastal risk but not the river flooding risk.

Weather Summary

Persistent rain clearing Shetland by late Friday morning, then scattered heavy showers, but some more prolonged rain over the Western Isles will extend east across Scotland this morning with snow on mountains. Some significant totals over much of south and west Scotland including Tayside Central Argyll, Lochaber D&G and SW Borders. Also strong to gale S to SW winds which will be severe at times around coasts and high ground.

The more prolonged rain and hill snow will turn more showery again on Friday night and on Saturday turning to snow down to lower levels, with a chance of significant snowfalls in south and east.

Wintery showers dying overnight to leave a dry start to Sunday. Then another area of rain will spread north across Scotland from late morning, this preceded by a short spell of snow on high ground then a thaw. Then blustery showers on Monday and Tuesday, with strong to gale S to SW winds.

Warnings and Alerts in force in Scotland at 10:30

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Specific areas of concern

Friday 3 and Saturday 4 January 2014

In the coastal Areas A there is a **MEDIUM** likelihood of **SIGNIFICANT** impacts from a combination of high tide, large surge and large waves on Friday. The high tides of concern are early afternoon for the Solway and Firth of Clyde in Oban. They are around 1800.

In the coastal Areas B there is a **MEDIUM** likelihood of **LOW** impacts from a combination of high tide on Friday, with large surge and large waves caused by south westerly gales. High water is expected on the northern side around midday and midnight on Saturday.

In the coastal Areas C there is a **MEDIUM** likelihood of **LOW** impacts on Friday from a combination of high tide, large surge and large waves caused by south westerly gales. High water is expected in the northern side around midday and midnight on Saturday.

In the coastal Areas D in the Firth of Forth there is a **MEDIUM** likelihood of **LOW** impacts on Saturday from a combination of high tide, large surge and large waves caused by south westerly gales. High water is expected at 1800 at 1800.

Next statement Due: 16:00 Saturday 04 January 2014
Contact details: SEPA Communications Centre - 01698 830030
All times are local.

Flood Risk Matrix
(river, sea/coastal & surface water flooding)

	Minimal	Minor	Significant	Severe
High	Green	Yellow	Orange	Red
Medium	Green	Yellow	Orange	Red
Low	Green	Yellow	Orange	Red
Very Low	Green	Yellow	Orange	Red

Overall Flood Risk

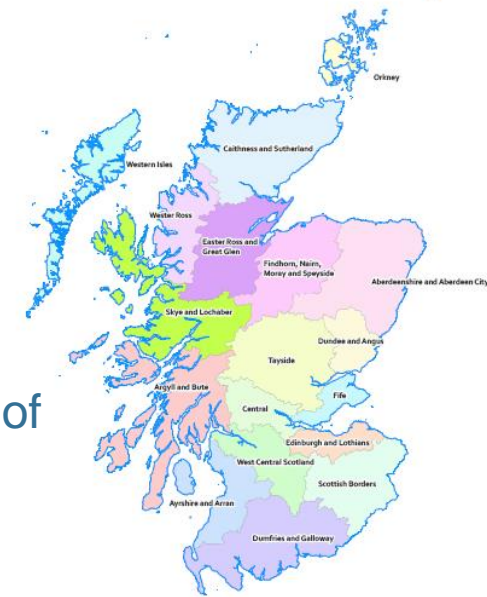
High	Red
Medium	Yellow
Low	Orange
Very Low	Green

For more information about the Flood Guidance Statement [click here](#)

© Crown, Met Office and SEPA 2014

- Daily Flood Guidance Statement
- Promoting flood vigilance
- 5 day forecast
- Actively disseminated daily to Cat 1 and 2 responders only
- Risk-based approach (based on impact matrix and likelihood)

Regional Flood Alerts



- Raise early awareness of potential flooding where the impact of impending weather may cause river, coastal or surface water flooding.
- Flood Alert stage to warn the public (inc businesses) of the possibility of flooding and encourage them to be alert, stay vigilant and make early preparation for flooding.



FLOOD ALERT

FLOODING IS POSSIBLE. BE PREPARED.

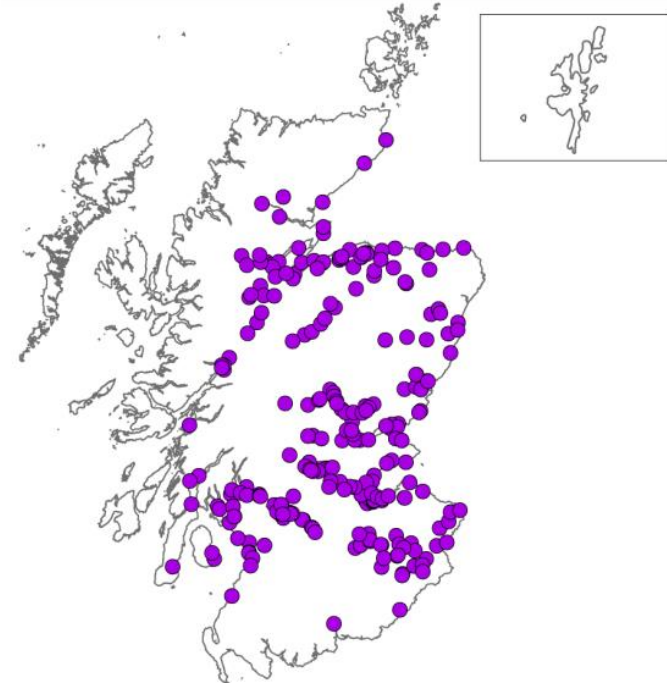
Flood warning



FLOOD WARNING

FLOODING IS EXPECTED. IMMEDIATE ACTION REQUIRED.

- Advise people that flooding is expected
- Only available where we have designated schemes
- Flood type specific – river or coastal
- Flood Warning to advise people that action needs to be taken to protect themselves and their property from the effects of flooding.





SEVERE FLOOD WARNING

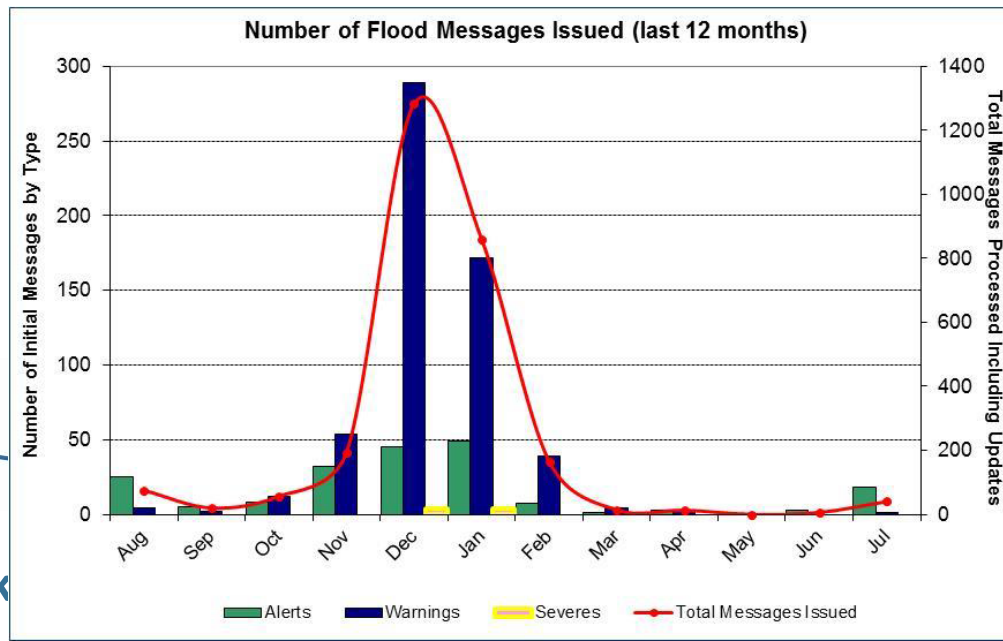
Significant risk to life means that death or serious injury is a **likely** risk for people in the area, rather than just a possible risk, as is always present with flooding. Potential for significant disruption to essential services.

Winter 2015/16



SEVERE FLOOD WARNING

- 5th December - Severe Warnings issued for Hawick & Newcastleton
- 30th December – Severe Warnings issued for the Tweed in Peebles & Whitesands, Dumfries
- 7th January 2016 – Severe Warnings issued for Inverurie & Kintore



Floodline

- Floodline (0845 988 1188 / 0345 988 1188)
 - UK service provided by the Environment Agency in England and Wales and by SEPA in Scotland.
 - Common flood warning codes
 - Messages delivered direct to registered customers' phones and via SEPA website, a recorded messaging system and call centre agents

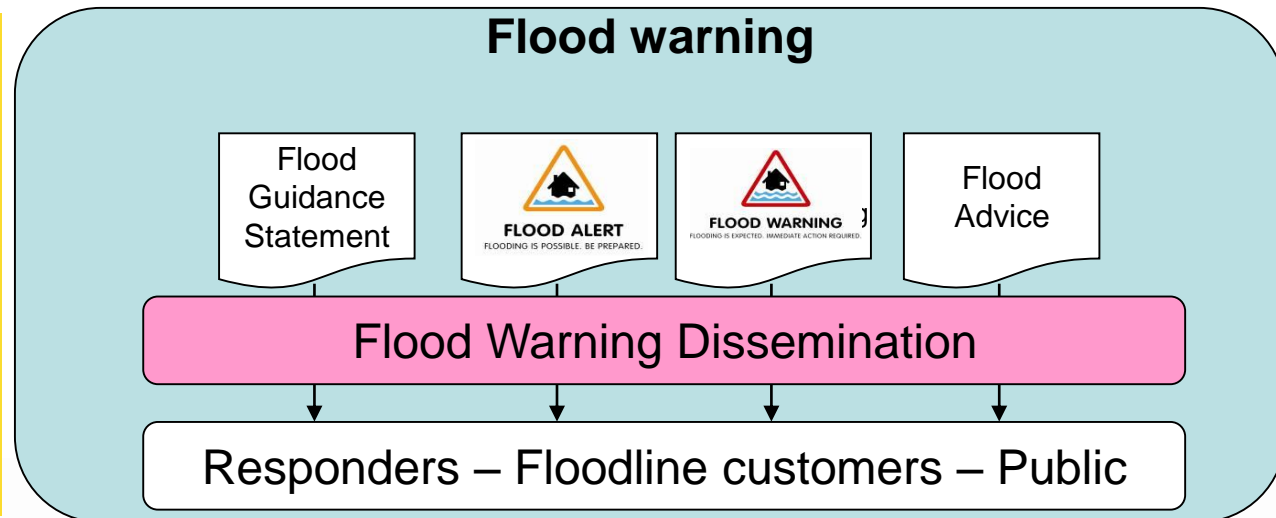


Floodline NEW PHONE NUMBER AND MOBILE WEBSITE NOW AVAILABLE

0345 988 1188
FOR ADVANCE FLOOD WARNINGS
www.floodlinescotland.mobi/

You can also use 0845 988 1188, which may be cheaper depending on your service provider.

24 HRS A DAY
7 DAYS A WEEK



Strategic Liaison / Coordination

- Represented at Scottish Government Resilience Room (SGoRR)
- SGoRR Ministerial Meetings
- UK CoBRA
- Local and Regional Resilience Partnerships
- Local Emergency Responders
- Media (TV, Radio, Print, On-line, Social Media)



Further information

www.sepa.org.uk/flooding

Floodline 0345 988 1188

Live flood alerts & warnings

Flooding publications

advice & guidance