

# Flood Warning Development Framework

2017–2021



# Foreword



As Scotland's national flood forecasting, flood warning and strategic flood risk management authority, reducing flood risk and its impact throughout Scotland is one of the Scottish Environment Protection Agency (SEPA)'s top priorities. Our flood forecasting and warning services enable people, businesses and communities to take action to protect themselves. We also advise all civil contingency responders<sup>1</sup>, in particular through the Regional and Local Resilience Partnerships, in advance of, and during, flood events as part of Scotland's multi-agency emergency planning and incident response.

This framework sets out how we intend to deliver and develop our service over the next five years.

Since our Flood Warning Strategy was published in 2012, considerable work has been undertaken to improve our flood warning services. We have improved the accessibility and uptake of public facing services such as Floodline, and extended the reach and uptake of our daily flood guidance statement which is issued to all civil contingency responders in Scotland. In partnership with the Met Office, we have developed our forecasting technology and improved our understanding of flood risk. We have invested in seven new flood warning schemes, including new large coastal schemes around the Moray, Solway, and firths of Forth and Tay.

This document outlines how, with continuing support from the Scottish Government, we will continue to maintain, improve and broaden our service over the next five years. It provides details of 14 additional flood warning schemes<sup>2</sup>, new public products we plan to introduce, and how we will better use our own, and others', information to better understand and communicate risk.

In doing this, we will work in partnership, listening to those who use our services both locally and nationally. Through these actions we aim to play our part in helping Scotland's communities become more resilient, while supporting the delivery of health and well-being benefits and sustainable economic growth.

David Pirie, Executive Director

SEPA

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<sup>1</sup> Civil contingency responders include Category 1 responders at the core of the preparation and emergency response (Police Scotland, Scottish Fire and Rescue, local authorities, NHS Scotland, Maritime and Coastguard Agency, SEPA) and Category 2 responders (transport and utility companies, Health and Safety Executive).

<sup>2</sup> A flood warning scheme describes the provision of the service around a specific river catchment or length of coastline and is generally based on one river catchment (or one coastal) forecasting model; it may include several Flood Warning Areas, which are communities at risk within the catchment or the length of coastline.

# 1. Introduction - *Why the framework?*

Flooding is a frequent natural hazard in Scotland which can have devastating impacts on people, our activities and our natural and built environment. Flood forecasting and warning is one of SEPA's flood risk management and civil contingency responsibilities and this delivery framework explains to our partners and stakeholders how we will maintain, develop and improve our existing services over the next five years.

Our flood forecasting and warning services include:

- Floodline which provides direct warnings and advice to the public online through our websites ([www.sepa.org.uk/flooding](http://www.sepa.org.uk/flooding) and [www.floodlinescotland.org.uk](http://www.floodlinescotland.org.uk)) and through a national helpline (0345 988 1188);
- a flood advisory service to civil contingency responders including resilience partnerships, emergency responders, local authorities and national infrastructure operators, to whom we issue a daily Flood Guidance Statement about the risk of flooding 5 days ahead.

These 24/7 services are underpinned by the Scottish Flood Forecasting Service, a strong partnership between the Met Office and SEPA.

This Flood Warning Development Framework covers the period 2017 to 2021 and is aligned with Scotland flood risk management planning cycle. It explains how we will maintain and develop our flood warning service; this includes the addition of 14 new flood warning schemes, representing a 15% increase in the coverage of our community based flood warnings (by comparison, we delivered seven new schemes in the previous period 2012-2016).

In summary, this document sets out how we will develop our flood forecasting and warning services over the next five years – a key contribution to SEPA's outcomes and to building a more resilient Scotland.



***This Framework provides a strategic direction for maintaining and developing our flood forecasting and warning services over the next five years.***

***By implementing the actions identified in this Framework, SEPA will continue to deliver a valued and sustainable flood warning service across Scotland to help reduce the impact of flooding.***

***Our services help the public, businesses and civil contingency responders prepare for, and respond to, flood events.***

***Effective action based on accurate forecasts and timely warnings can result in a significant reduction in risk to life, social impacts, property damage, business and infrastructure disruption and timely removal of livestock.***

## 2. Framework

Our Vision – Everyone is aware of their flood risk and we give enough time for people to take action and reduce the impact of flooding.

The Framework has been structured around three aims:

1. **Aim 1:** Maintenance of existing and delivery of new flood warning schemes.
2. **Aim 2:** Development and innovation.
3. **Aim 3:** Engagement with partners and customers.

Under each aim, we have identified and prioritised our aspirations and actions to take our flood forecasting and warning services forward over the next five years.

### What success will look like:



\*PVAs are Potential Vulnerable Areas, identified through Scotland's National Flood Risk Assessment in 2011 as those with the greatest potential impact of flooding. There are 243 PVAs in total across Scotland. See further details at: <http://apps.sepa.org.uk/FRMStrategies>

### Measuring key success factors

The test of our success of the Framework will be shown in a number of ways, including:

- Timely delivery of new flood warning schemes.
- Annual customer survey and customer feedback analysis.
- Analysis of lessons learnt from significant flood events and exercises.

# Aim 1: Maintenance of existing and delivery of new flood warning schemes

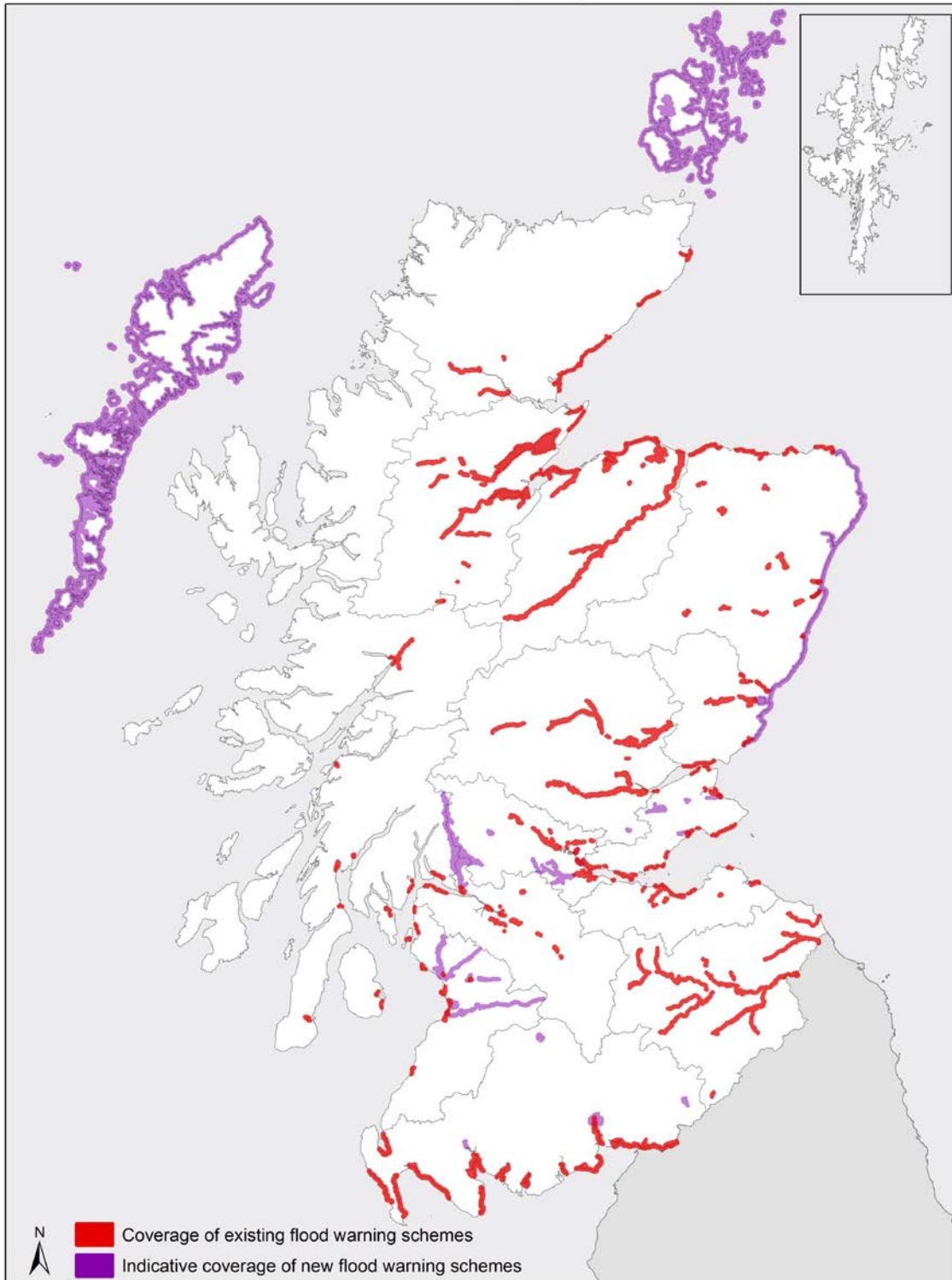
With the publication of the first Flood Risk Management Strategies in December 2015 and Flood Risk Management Plans in June 2016, SEPA committed to maintain and develop our existing flood forecasting and warning services, including the addition of 14 new flood warning schemes identified for operational delivery by 2021. These new schemes will increase the number of communities that can benefit from flood warning, enabling them to reduce the impact of flooding.

## What we will do:

1. We will build on the success of the Scottish Flood Forecasting Service (SFFS), our partnership with the Met Office to:
  - maintain flood vigilance and preparedness amongst the civil contingency responder community of Scotland (in particular local authorities), by producing and issuing a daily Flood Guidance Statement, 365 days of the year.
  - maintain and build upon our community-based flood warning service which currently serves 269 Flood Warning Areas or communities (as of January 2017).
  - maintain and where appropriate develop, monitoring, flood forecasting and message dissemination systems.
2. We will design and implement the following new schemes, which have been prioritised in the Flood Risk Management Strategies and Plans published in December 2015 and June 2016 respectively:



We will complete the internal review of our flood warning service initiated after the flood events of the last two winters. The aims are to improve our service and make it more resilient by consolidating our structure, resources and 24/7 incident management arrangements and to allow the service to accommodate an increasing demand.



**Location of existing and new flood warning schemes (as prioritised in the Flood Risk Management Strategies and Plans published in December 2015 and June 2016).**

## Aim 2: Development and innovation

Ensuring that we continue to innovate and develop the tools and products underpinning our service is essential to deliver an efficient and flexible service capitalising on new data and technological developments. Our objective is to use the best data available, feeding into a state-of-the-art flood forecasting system, so we can provide reliable and timely flood warning information to our customers. We wish to communicate our warnings in an accessible format and develop our products to meet our customers' needs.

### What we will do:

#### Science & technology development

1. We will build on our partnership with the Met Office to identify the benefits of new data sources. This will include understanding and exploring how to communicate uncertainty in our forecasts through the use of *ensemble*<sup>3</sup> forecasts and extending forecast lead times.
2. Working with the Met Office and other agencies, we will seek to improve our short range forecasts for river, surface water and coastal flooding. For example, we will contribute to UK assessments and developments combining real-time radar data and data from our rain gauge network.
3. Forecasting surface water flooding is one of the biggest challenges in flood risk management. In consultation with partners, we will continue to explore and trial innovative approaches in this area, considering the potential benefits for our customers.
4. Snow can be an important contributor to flooding in Scotland. We will work in partnership with others, to identify opportunities to improve our knowledge of the depth, density and distribution of snow, so that our forecasting models can better represent the effect of snowmelt.
5. Following the development of new hazard maps by SEPA to help inform the Flood Risk Management Strategies and Plans, we will explore the benefits of real time flood mapping to support decision making during flood events. We will also explore industry best practices for real time visualisation and communication of flooding.

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<sup>3</sup> Ensemble forecasting is a method used in weather prediction. Instead of making a single forecast of the most likely weather, a set (or ensemble) of forecasts are produced to account for the sources of uncertainty in forecast models. (see additional details at <http://research.metoffice.gov.uk/research/nwp/ensemble/index.html>)

## Tools & products development

1. Through the Scottish Flood Forecasting Service, we will explore how best to enhance the content and presentation of the existing daily Flood Guidance Statement issued to all civil contingency responders. We will also develop a new public version of this to improve the awareness of flood risk to all communities in Scotland.
2. We will review our approach to regional Flood Alerts and community based Flood Warnings to continue to deliver our service efficiently. We will also develop plans to undertake regular quality control to ensure we provide timely and informative messages to our customers.
3. To make it easier for people to understand flood risk in their area, we will continue to improve existing digital products, including our Flood Warning, River Level and Rainfall webpages. We will also consider how to make better use of social media and digital products so we can engage with a wider audience.
4. We will continue to develop our national flood forecasting system (FEWS Scotland), ensuring it remains founded on international best practice in flood forecasting and makes best use of recent technological advances, such as probabilistic forecasting. We will also review ways to increase its resilience and capacity to meet growing user requirements.
5. We will assess how best to reinforce the resilience and quality of our hydrometric monitoring network and systems, including telemetry communication, high flow rating quality and our 24/7 support arrangements where required.
6. We will review options to maintain and enhance the performance of our existing forecasting models. They require both post event quality control and regular updates to reflect natural and land use changes.
7. Our current contract for the supply of a Flood Warning Dissemination (FWD) system ends in 2020. We will review the benefits of existing as well as possible alternative systems and develop a business case for a new contract.
8. We will support the development of new local technologies, in order to enhance the response and resilience of small communities or individuals not currently served by SEPA's flood warning service.





## Skills development

1. We will reinforce and continue to develop our training programme for all staff who support the flood warning service.

This will include regular internal exercises and accreditation through our existing QCF Qualification for Flood Forecasting Hydrologists.

2. To ensure we can meet future service requirements, we will support the development of our Hydrometeorology Trainees.
3. We will share knowledge and experience with partner organisations, including Regional and Local Resilience Partnerships, so we can all benefit from mutual learning.

*The staff who support our forecasting and warning services are key to their success.*

*It is important that they have the right knowledge, skills and experience to help deliver world class services for Scotland.*

*By investing in training and support for our staff, we will have a team which is always ready for the next big flood.*



## Aim 3: Engagement with partners and customers

We will work with partners, communities and the public to improve understanding and use of our flood warning products and services. Everyone will know what action they can take in advance of and during flood events.

### What we will do:

1. Working in partnership with other responsible authorities including local authorities and Scottish Water, we will conduct active flood risk awareness campaigns to inform communities, business and individuals at risk from flooding. This will include prioritised promotion of SEPA's Floodline service in areas with new and existing Flood Warning Areas, as per the timeline in Aim 1.
2. We will provide and use clear and accessible materials and services to help people understand risks and take action. This will include working with other flood risk management and community organisations like the Scottish Flood Forum and equalities groups to review, streamline and improve our publications
3. We will forge strategic partnerships to help increase the reach and understanding of our services. This will include developing our work with Neighbourhood Watch Scotland, Citizens Advice Scotland and other organisations with shared aims.
4. We will continue work on shared service development and partner training with organisations like local authorities, Police Scotland, the Met Office, Scottish Fire and Rescue and the flooding agencies of other UK nations.
5. Our flooding education programme will support the Scottish Government's education and community resilience aims through participation in Safer Communities events, Ready Scotland education and other partnership opportunities.
6. We will engage and work with media content providers like the BBC to help raise awareness, inform and help before, during and after floods.
7. Floodline customer surveys, research and stakeholder engagement will be used to monitor and drive improvement of our services.
8. Our engagement, education and awareness activities will actively support all Flood Risk Management Strategies and local Plans.

