

Implementation of the Flood Risk Management (Scotland) Act 2009

Report to the Scottish Parliament - 2019

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Ministerial Foreword



This report to Parliament outlines the progress made within 2019 in implementing the Flood Risk Management (Scotland) Act 2009.

2019 marked ten years since the publication of the Act, which introduced a more sustainable and modern approach to managing flood risk in Scotland. Since its introduction, a great deal of work has been completed and our understanding of the scale of the climate challenge has grown with improved science.

The Scottish Government has, since 2008, committed to managing flood risk by making at least £42 million available each year to help reduce flood risk for communities. This has

provided funding for a range of actions, including 40 Flood Protection Schemes (FPS) that are being taken forward within the current flood risk management cycle.

I am pleased to say that the interim reports published in 2019 show that significant progress has been made across Scotland in this cycle to implement the actions set out in the local plans. In 2019 three flood protection schemes were completed, the White Cart Water FPS Phase 3, Broxburn FPS and Camlachie Burn Biggar Street works. As well as delivering measures in the first cycle, an array of new actions have been prepared which will soon be prioritised by SEPA for the second cycle. This proves that our risk-based and plan-led approach outlined within the Act is producing and delivering an ambitious and consistent pipeline of projects and actions to protect communities across Scotland.

Whilst we have achieved incredible progress over the last ten years, it is imperative to continue to improve our understanding of flood risk and to take forward sustainable, integrated actions now to ensure our communities, economy and natural environment are resilient to the changing climate and increased flood risk. Alongside progressing engineered flood protection schemes, Strategic Drainage Partnership projects have established a more sustainable, integrated approach to surface water management and we have committed to increasing understanding of adaptation and resilience to flood risk by developing Scotland's Living with Flooding Action Plan. In Menstrie, at the launch of the plan, I saw first-hand the work that communities are undertaking to proactively adapt their homes to increase their resilience to flood risk.

Our 2020 Programme for Government outlines a range of measures to drive our green recovery and end Scotland's contribution to climate change. We have committed an extra £150 million to flood risk management actions, £12 million to coastal adaptation and are continuing to work towards our commitment of becoming a net-zero society by 2045. As we move into the next ten years, it is essential that we continue to develop strategies within flood risk management that drive Scotland's green recovery, adapt to our changing climate and continue the great work that has been undertaken since the publication of the Act.

Roseanna Cunningham

Introduction and Background

Flooding is a natural occurrence which can have devastating consequences on individuals, businesses and communities across Scotland. While flooding is sometimes unavoidable, steps can be taken to reduce the likelihood of a flood event occurring, to minimise its impact and to help those affected by flood events.

This report outlines the progress of work being carried out by a number of partnership organisations throughout Scotland through the implementation of the Flood Risk Management (Scotland) Act 2009 (“the Act”).

The Act creates a framework for coordination and cooperation at a national and local level, and clearly sets out the roles and responsibilities of the key agencies involved in flood risk management, notably the Scottish Environment Protection Agency (SEPA) and responsible authorities such as local authorities and Scottish Water.

The coordination and cooperation of these agencies, alongside work to engage and empower communities at risk of flooding, underpins a sustainable approach to evaluating and managing flood risk across Scotland. This risk based and plan led approach aims to achieve the following 6 outcomes:

- 1. A reduction in the number of people, homes and property at risk of flooding as a result of public funds being invested in actions that protect the most vulnerable and those areas at greatest risk of flooding.**
- 2. Rural and urban landscapes with space to store water and slow down the progress of floods.**
- 3. Sustainable surface water management that decreases burdens on our sewer systems while also delivering reduced flood risk and an improved water environment.**
- 4. Coasts and estuaries managed in a way which aims to reduce flooding, respects the changing nature of the coast and takes into account potential impacts of interventions on flooding and erosion in adjacent areas.**
- 5. A well informed public who understands flood risk and takes actions to protect themselves, their property or their businesses.**
- 6. Flood management actions being undertaken that will stand the test of time and be adaptable to future changes in the climate.**

2019 Flood Events of Note

Over the 2019 summer, there was a succession of thundery showers, giving very high rainfall totals and associated impacts in isolated locations, affecting in particular transport infrastructure.

One of the most notable events occurred on 24 June with heavy, very localised downpours and flash flooding in parts of Edinburgh, Fife and Stirling. The impacts

from surface water and overwhelmed drainage systems affected transport (roads, railways and tramlines) and business. In Stirling, impacts observed included flooding of roads, leisure facilities, commercial properties, university buildings and a supermarket. Evacuations also took place with the fire service called to rescue 14 people from a rugby club.

Another notable event happened on 10-12 August, affecting Ayrshire and areas of the Central Belt in particular. In Ayrshire, the Prestwick Airport car park was flooded and the River Irvine burst its banks in Kilmarnock, with people evacuated from a supermarket and cinema complex. The advanced warning provided by SEPA enabled a multi-agency response with the deployment of sandbags and pumps minimising the impacts. The railway line between Edinburgh and Glasgow was also disrupted with flooding of the Winchburgh tunnel.

The North East of Scotland was affected by flooding on 28 September, with flash flooding in Aberdeenshire severely damaging seven bridges between Banff and Turrif and many roads closed.

One Planet Prosperity – SEPA’s Regulatory Flood Strategy

In response to the climate emergency, SEPA is refocussing the delivery of its flooding services, set out in its draft Flood Strategy. It has developed the draft Flood Strategy around the ambition that Scotland’s people and places are resilient to flooding. It is focussed on four themes:

- Future flood risk – improved understanding and communication of future flood risk faced by Scotland enables action now to adapt to climate change
- Place – we enable the creation of successful and sustainable places
- Communities – we work together with people and communities, particularly in consideration of social equality and justice
- Partnerships – we work with current, and develop new, partners to plan for the long term but act now

The draft Flood Strategy has been informed by partner and stakeholder engagement, including Scottish Government. SEPA plan to publish the Strategy in 2021.

1. Understanding Flood Risk

Flood risk is a measure of the likelihood that a flood event will happen and of its potential adverse consequences. The long-term aim of the Scottish Government and its partners is to reduce this risk.

Robust and reliable information on the causes and consequences of flooding are needed to promote well-informed decisions on how to tackle flood risk.

There were a number of advances and improvements in 2019 in our knowledge of flood risk and vulnerability in areas including:

- Flood mapping
- Flood forecasting and warning
- Social vulnerability

1.1 National Flood Maps

SEPA continues to develop Scotland's flood mapping with ongoing advances in:

- Flood map method development
- Improved survey data
- Flood modelling improvements
- Map updates

A range of local updates across Scotland have been prepared for publication in 2020. These updates are mainly focussed on updates to SEPA's river flood maps. Further development of coastal flood maps is progressing with the outputs of the North East Coastal Study, which is the first phase of updating SEPA's Coastal Flood Hazard Maps to include wave action as a source of coastal flooding. In response to new science and data, SEPA are also preparing the project specification for a wholesale update of the surface water maps by 2023/24.

SEPA is committed to opening flood map data to wider use. In this regard, it is progressing the development of its licenses and moving towards open data. In further support of improved accessibility, the current flood map viewer is being redesigned in response to public requirements. Further developments are planned to support improved partner and stakeholder access to flood map data.

SEPA has also continued to engage with insurance industry groups as part of its focus on providing improved access and use of flood map data to support homeowners.

1.2 Flood Forecasting and Warning

There are around 300 flood warning areas across Scotland, where vulnerable communities benefit from SEPA's local early warning service. Receiving a flood warning allows people to take action including moving cars, moving possessions upstairs or installing property level protection.

The Scottish Government has invested significantly in improving, and supporting the continued development of Scotland's flood warning service. This includes funding to help SEPA and the Met Office operate a [Scottish Flood Forecasting Service](#). This service ensures flood forecasting and warning information is made available to the public and emergency responders throughout Scotland. For example;

- A daily Flood Guidance Statement is issued to over 800 emergency responder contacts. This provides shared understanding of current and forthcoming flood risk levels and locations, and advance notice of potential flooding situations to aid planning and coordination of appropriate emergency response.
- [Floodline's](#) direct warning service is freely available to members of the public and sends a notification to registered customers when a regional Flood Alert or local Flood Warning is issued to help them take action and protect themselves and their property. The number of registrations to Floodline has continued to increase and reached almost 30,000 customers at the end of 2019; however many more benefit from the service through accessing regional Flood Alerts and local Warnings online and through social media.
- The [Flood Warning Development Framework \(2017-2021\)](#) sets out plans to enhance the coverage and delivery of flood warning, including 14 new flood warning schemes that have been strategically identified, and prioritised, as part of the first round of flood risk management strategies.

These services, and the new developments and improvements that underpin them, are critical elements of SEPA's role in warning and informing responders and the public of flood risk, and the need to take action to prepare for flooding.

No new flood warning schemes were launched in 2019; however preparation work for new schemes to be launched in 2020 was progressed including the River Ayr and Annick Water flood warning schemes (Ayrshire), Eilean Siar coastal flood warning scheme (Western Isles) and Aberfoyle flood warning scheme (Stirlingshire). A major upgrade of the River Findhorn and Lossie flood warning schemes (Moray) was completed to take account of recent changes in these areas following the completion of Flood Protection Schemes.

The forecasting and warning systems are in constant development to expand and improve the service. Developing a new public flood forecast product for Scotland is one of the commitments in SEPA's Flood Warning Development Framework 2017-2021. Research undertaken with the help of CREW highlighted that Floodline customers find the current regional Flood Alerts too generic and confusing. Customers would like to receive further advance notice if flooding is forecast. To address this, a project has been set up to develop a new product jointly with the Met Office and SEPA under the Scottish Flood Forecasting Service partnership arrangements.



The project team is following the Scottish Government Service Design approach to develop this product based on customer feedback. In 2019, this has involved 1-2-1 interviews and workshops with emergency responders, SEPA and Met Office staff. Further engagement with the public and community flood groups at a later stage will ensure that the service is used and fully valued by the public. The aim is to launch this new service in 2021.

1.3 Understanding the Social Impacts of Flooding

The three year research project commissioned by Scottish Government, through CREW (Centre of Expertise for Waters), to better understand the long term impacts of flooding entered its third year in 2019. The outputs will help us better understand what types of support and advice people and communities need at different stages of a long-term recovery from flooding.

The University of Aberdeen and the James Hutton Institute conducted surveys and repeated face to face interviews in 3 consecutive years (2017, 2018, 2019) with residents in Ballater and Garioch who were affected by the widespread flooding in the winter of 2015/16.

The surveys and interviews show that:

- two thirds of respondents from flooded homes were unable to return to their own homes for more than six months after the flooding
- more than half of the respondents who used temporary accommodation moved more than once
- the number of temporary residents increased with the length of time respondents were unable to return to their own home.
- Some people moved residence 5 times
- 60% of respondents reported a deterioration in physical health.

The final report is to be published in early 2020, alongside a summary report.

2. Understanding and Working with Catchments and Coasts

2.1 Background

Actions that affect one part of a river, coast or estuary can have consequences elsewhere. This means that flood management actions are most effective when they are planned and coordinated within catchments and along coasts in a way that is uninhibited by administrative boundaries.

Adopting a catchment approach to flood risk management requires an appreciation of catchment and coastal processes, and an understanding of how best to manage the sources and pathways of flood water. This includes looking at how the timing, magnitude and duration of a flood can be managed, e.g. by creating, restoring and enhancing natural features and characteristics of the landscape, including wetlands, woodlands, vegetation, functional flood plains, saltmarshes, beaches and dunes.

2.2 Flooding and Land-Use Planning

Scotland applies a precautionary approach to managing flood risk.

SEPA is a statutory consultee in the land-use planning process and provide advice, evidence and support to help planning authorities meet their statutory FRM and land-use planning duties through appropriate development. This ensures that core flood risk management principles such as avoidance are carried through into sustainable place making and included at the heart of the land-use planning decision making process.

The Planning (Scotland) Act 2019 was passed in June 2019. A refresh of the National Planning Framework and Scottish Planning Policy is now under way and will consider how planning can effectively reduce both current and future flood risk.

In 2019, the Scottish Government and SEPA commissioned [ClimateXChange](#) to undertake [research](#) to help understand the causes and impacts of piecemeal floodplain loss in Scotland. There are a number of reasons for loss, including historical planning permissions, the cumulative effect of small scale developments and householder and agricultural permitted developments. The study was a first step in identifying the potential impact that incremental and piecemeal functional floodplain loss could have on flood risk to downstream communities and local receptors.

The Centre for Expertise in Water (CREW), which is funded by the Scottish Government, also published a report quantifying rates of urban creep in Scotland. https://www.crew.ac.uk/publication/quantifying_rates_urban_creep_scotland. This allowed the first city-wide estimates of urban creep to be produced for Scotland. The project also quantified urban expansion, which is the conversion of new land to urban areas, for example by building housing estates on farmland. The findings of this report will help develop the Scottish Government's thinking and approach to managing surface water in urban areas.

2.3 Dynamic Coast – Scotland's National Coastal Change Assessments

We continue to work with partners and stakeholders to plan, mitigate and adapt in advance of greater impacts along the coast and improve our understanding of coastal erosion. This requires cross sector and integrated adaptation and mitigation planning.

In 2017 Dynamic Coast 1 found that one-fifth of our coastline (over 400kms) is 'soft' and therefore susceptible to erosion. It assessed that erosion rates were increasing and that this will progressively impact Scotland's coastline, its assets and communities. At present 'natural defences' such as beaches and dunes protect £13bn of assets, some of these are eroding and £400m of assets will be threatened by 2050, if erosion continue.

Dynamic Coast continued in 2019 and considered how projected sea level rises of up to 0.9m by 2100 might further increase and accelerate erosion rates. Focussing on sites, including Montrose and St Andrews, the Dynamic Coast team are working with local stakeholders to develop adaptation plans that take account of the impacts of sea level rise.

Dynamic Coast projects 1 and 2 were commissioned by the Scottish Government through CREW. The research was carried out by the University of Glasgow and managed by NatureScot.

In February 2019 the Dynamic Coast Team won the 'Spotlight' award at the annual Scottish Knowledge Exchange Awards. The award was chosen from all the applications received for all the categories.

The Dynamic Coast Team was also a worthy runner-up in the 'Best Research Project of the Year Award' at the Herald Higher Education Awards 2019.

The Team continue to work with SEPA as coastal erosion and flooding are interlinked.



2.4 Natural Flood Management

The Scottish Government, SEPA, local authorities and other partners continue to work together to deliver natural flood management (NFM) in Scotland.

SEPA's NFM opportunity maps are currently being reviewed with a view to updating existing maps and producing new maps to further assist in the targeting of NFM. SEPA has also undertaken analysis of where features such as embankments and sea walls are providing flood protection. This forms part of the ongoing work to identify where existing artificial and natural features help with flood risk mitigation and should be protected and/or restored. SEPA has also worked with Scottish Forestry and Forestry and Land Scotland (FLS) to identify areas of the national forest estate where forestry management may influence flood risk. This information is now used in support of the Land Management Plans produced by FLS. SEPA continue to support the responsible authorities in delivering over 100 actions with an NFM component identified in the 2015 FRM Strategies and 2016-22 Local FRM Plans.

In addition to flood risk mitigation, NFM frequently delivers other benefits. Opportunities to integrate NFM delivery with other drivers has been examined, with many local authorities assessing River Basin Management Planning (RBMP) and NFM opportunities within their flood studies.

2.4.1 Scottish Government Rural Payments [Agri-Environment Climate \(AEC\) Scheme](#)

This scheme promotes land management practices which protect and enhance Scotland's environment, improve water quality, manage flood risk and mitigate and adapt to climate change. The Scheme now compensates land managers for implementing measures on their land that can help increase storage of flood waters. This includes capital items and management options such as embankment removal. The scheme is delivered jointly by Scottish Government and NatureScot and a total of 472 businesses benefitted from the 2019 round of Agri-Environment Climate Scheme funding, with £34 million being awarded.

2.4.2 CIRIA Natural Flood Management Guidance

For natural flood management to have any significant impact, schemes need to be technically robust. However, there is a lack of suitable guidance around on the ground delivery. To address this gap, CIRIA commissioned work in late 2019 to develop a 'NFM Manual'. This guidance will present case studies, develop a design philosophy, design objectives and criteria to ensure the right outcomes are delivered. The guidance will also signpost how designing for multiple benefits can unlock different funding sources. SEPA are part funders of this work and are supporting its delivery.

2.4.3 Natural Flood Management Network

Following the launch of the [NFM Network Scotland](#) in 2018, membership has grown throughout 2019. The dedicated online resource on NFM brings together practitioners, researchers and communities from around the world to share knowledge and best practice on NFM. The network provides information on relevant news and events, Scottish case studies, and NFM resources.

2.5 International Best Practice Event, Edinburgh, May 2019

In May 2019 Edinburgh played host to an International Best Practice event on working with nature to manage flood risk. Over five days 100 experts from 15 countries around the world discussed the challenges and opportunities of designing, implementing, and maintaining nature-based features in conjunction with flood risk reduction measures. This included representatives from the following projects/working groups:

- Natural and Nature Based Features International Guidelines - <https://ewn.el.erdc.dren.mil/nbnf.html>
- LAND4FLOOD - <http://www.land4flood.eu>
- Interreg North Sea Region Building with Nature - <https://northsearegion.eu/building-with-nature/>

Roseanna Cunningham, the Cabinet Secretary for Environment, Climate Change and Land Reform met with project partners and gave a keynote speech and the Scottish Government hosted a reception for all the delegates.



2.6 EU Interreg North Sea Region Building with Nature project

In 2019 Scottish Government, Tweed Forum and SEPA continued their engagement with partners in the [EU Interreg Building with Nature project](#). The Building with Nature project aims to demonstrate how measures that work with natural processes can manage flood and coastal erosion risks whilst enhancing ecosystem services.

The lack of robust evidence for NFM measures means that uptake across the North Sea Region and Scotland is limited. Between 2016-2020, Scotland will receive up to 400,000 € for the Eddleston Water project; this will be matched by Scottish Government.

In 2019 we visited projects and held meetings in Sweden, Norway, the Netherlands and Flanders to learn more about international practices in natural flood management.



2.6.1 The Eddleston Water Project

The Eddleston Water project started in 2010 and aims to reduce flood risk and restore the river for the benefit of the local community and wildlife. The project is a partnership initiative led by [Tweed Forum](#), with support from Scottish Government, SEPA, and the Scottish Borders Council. In 2019 monitoring was provided by the University of Dundee and the British Geological Survey.



Tweed Forum has worked with land managers on 17 farms to introduce subtle changes to current land management practices in order to slow water flow from the hills, create floodwater storage areas and reconnect the river with its floodplain. This includes creating riparian woodland, planting native trees, re-meandering 2 river channel, removing flood embankments, and more recently installing ponds and 'high flow restrictors'.

The Eddleston catchment is comprehensively monitored so that the effect of restoration measures can be fully understood. The detailed monitoring programme is funded by the Scottish Government.

Tweed Forum continues to work with responsible authorities and other stakeholders, including at risk communities, to promote awareness of how integrated catchment management can help manage flood risk and deliver multiple benefits for the environment and communities. At the opening of the Tweed Forum's new offices in 2019, they had the opportunity to demonstrate the natural flood management catchment model to HRH Prince Charles.



3. An Integrated Approach to Flood Risk Management

3.1 Background

Flood risk management is the process of assessing, organising and implementing actions to deal with flood risk. The main outcome of the flood risk management planning process should be a set of sustainable actions being taken to reduce overall flood risk across Scotland.

Multiple organisations are involved in managing flood risk. It is therefore essential that an integrated approach, that balances national consistency and strategic decisions with local knowledge and accountability, is adopted.

3.2 National Flood Risk Assessment

The 2018 National Flood Risk Assessment (NFRA) has provided Scotland with the knowledge and tools to assess the causes and consequences of river, coastal and surface water flooding, taking into account the effects of climate change. It considers the potential impact of flooding on human health, economic activity, the environment and cultural heritage and is based on the most up to date data available.

We now understand there are around 284,000 homes, businesses and services across Scotland at risk of flooding from rivers, surface water and the sea. A further 110,000 properties may be at risk due to climate change by the 2080s under a high emissions scenario.

3.3 Flood Risk Management Planning

For the purposes of Flood Risk Management Planning, Scotland is divided up into 14 [Local Plan Districts](#) (LPD), with a lead local authority assigned to each. For each LPD a flood risk management strategy and a local flood risk management plan have been published.

[Flood Risk Management Strategies](#), prepared by SEPA, in collaboration with relevant responsible authorities set out a long-term vision for the overall reduction of flood risk. They contain a summary of flood risk in each Local Plan District together with information on catchment characteristics and a summary of objectives and measures for Potentially Vulnerable Areas.

[Local Flood Risk Management Plans](#) are developed by lead local authorities and take these objectives and set out what actions will be taken and how they will be funded.

3.4 Progress on Actions in Cycle One

Local authorities continue to progress the actions identified in the first cycle of flood risk management strategies and local flood risk management plans. These actions range from helping to raise awareness, encouraging property owners to take action to help themselves, to flood warning schemes and flood protection works.

As required by the Act, the 14 Lead Local Authorities published their interim reports in 2019, detailing the progress made in delivering the actions within their Local Flood Risk Management Plan. Within the interim reports, progress of actions were outlined

using a Red-Amber-Green reporting system, with 83% of all actions shown to be at “Green” status, indicating no issues, for delivery within the FRM cycle timeframes.

Within these actions, 42 flood protection schemes were identified and three were completed in 2019; the White Cart Water FPS Phase 3, Broxburn FPS and Camlachie Burn Biggar Street works. Many schemes are making good progress and have been confirmed by the relevant Councils with construction work due to be completed or started during 2020.

4. Surface Water Management

4.1 Background

Urbanisation has altered the natural drainage process. Rain falls everywhere so all features of our urban landscape, by design or otherwise, influence surface water run-off and flooding. Surface water flooding is often a complex interaction of many sources of flooding, including flooding from piped systems when their capacity is exceeded, small urban watercourses and direct inundation from surface water run-off.

It is widely recognised that sustainable surface water management ensures that above and below ground sections of the drainage system can work in unison to deliver benefits for flood risk management, people, the water environment and biodiversity, while also making our urban areas more adaptable to future changes and more resilient to climate change.

4.2 Surface Water Management

Great progress has been made since the introduction of the Flood Risk Management (Scotland) Act 2009 in understanding the impact of surface water flooding in Scotland, where our priorities lie and how we can work together to manage the impacts of floods on our communities.

In 2015 the first FRM Strategies set out a clear framework for the management of surface water flood risk requiring local authorities to lead on the development and implementation of surface water management plans in those areas with the greatest risk of surface water flooding.

The FRM Strategies found that surface water flooding accounts for 23% of annual flood damages in Scotland. The Strategies also identified 113 towns and cities that require a surface water management plan (SWMP). SEPA, Scottish Water (and other responsible authorities) are working in partnership with local authorities to support the production of the SWMP's.

The second National Flood Risk Assessment was completed in 2018 using improved surface water modelling and mapping techniques. It identifies approximately 210,000 homes, businesses and services at risk from surface water and estimates that this will increase to 270,000 by 2080 through climate change.

Recognising the size and complexity of this challenge and the call from the Scottish Advisory and Implementation Forum for Flooding (SAIFF) for “a transformation in the way we handle surface water”, Scottish Government’s Programme for Government 2019-20 makes commitments to work together to increase Scotland’s use of blue-green infrastructure for drainage and flood management and to review our approach to blue-green cities and bring forward proposals by the end of 2020.

4.3 Integrated Catchment Studies

Scottish Water is leading on a number of Integrated Catchment Studies in partnership with 20 local authorities across Scotland. These studies aim to create a detailed understanding of the above and below ground drainage systems – combined sewer network, culverted and open watercourses and surface water sewers for example. They aim to understand the interactions of the drainage network and

identify the sources and mechanisms of flooding in these urban areas. These studies were commissioned in two batches and are currently at varying stages of development.

In 2019, five of these studies have progressed to the Optioneering phase of work, which will identify the most sustainable solutions for managing flood risk in areas that have been identified as joint priority needs areas for Scottish Water and the local authorities. The Optioneering phase is due for completion during FRM cycle 1.

Twelve studies are continuing through the model build and verification stages. These will then be taken forward to undertake a catchment flooding assessment which will identify the sources, mechanisms and impacts of flooding. Six of these twelve studies have completed this stage in 2019, with the final six due for completion in 2020. Dependent on the outcomes of this phase of the studies, it is possible that some of these areas will continue to an Optioneering phase.

4.4 Section 16 Assessment of Flood Risk from the Sewer Systems

Scottish Water is progressing on schedule with the program to undertake modelling to assess flood risk from the sewers systems across 201 catchments by the end of the first FRM cycle. As of December 2019, 177 assessments have been completed. All other Section 16 assessments are on programme for completion within the first FRM cycle. On completion, the outputs are provided to SEPA for use in the NFRA2 and the continued development of their pluvial mapping. The outputs are also provided to the appropriate local authorities as part of their Surface Water Management Planning Process.

4.5 A Place-based Approach to Surface Water Management

Our urban areas in particular face mounting challenges with surface water drainage and related flooding. Despite considerable capital investment, the continued densification of our towns and cities is adding to the pressure on drainage systems that are already at capacity and the “total asset” that needs to be flood resilient continues to increase.

Overcoming this by taking an integrated place-based approach focused on blue-green infrastructure has the potential to deliver multiple benefits for our communities. The long established Metropolitan Glasgow Strategic Drainage Partnership has demonstrated the many advantages of this approach.

2019 saw the establishment of the Edinburgh and Lothians Strategic Drainage Partnership which seeks to ensure that the area’s prosperity is enhanced by taking a holistic approach to water management and climate adaptation.

In the Aberdeen area the Sustainable Growth Agreement between SEPA and Scottish Water is working with Aberdeen City Council to drive innovation in managing rainwater and waste water drainage. These innovations aim to significantly reduce flows to the combined sewer, increase resilience and contribute to place.

5. Selecting and Implementing Sustainable Actions

5.1 Background

The main output of the flood risk management planning process is a set of sustainable actions being taken to reduce overall flood risk across Scotland.

The flood risk management strategies and local flood risk management plans incorporate a wide spectrum of actions, ranging from national policies to flood protection schemes to awareness raising activities. Options are identified and considered within a structured appraisal process. This ensures that options are considered in a consistent way, with alternative options properly considered and investment decisions justified. Sustainable solutions are likely to be a combination of actions.

Published in 2016, Scottish Government's [Appraisal Guidance](#) provides guidance for SEPA and the responsible authorities on the economic, social and environmental aspects of options appraisal for actions promoted under the Flood Risk Management (Scotland) Act 2009. It identifies methods for identifying and assessing positive and negative impacts and recommends a decision framework, based on the principles of sustainable flood risk management. The guidance is consistent with the HM Treasury Green Book and the Scottish Government guidance on appraisal and evaluation, part of the Scottish Public Finance Manual.

5.2 Appraisal and Prioritisation for Cycle Two

In 2019, SEPA continued to progress plans for the development of the 2021 FRM Strategies for the second FRM Cycle. The Scottish Government and local authorities are working with SEPA to develop an appraisal and prioritisation method that includes the opportunities, ambitions, and challenges presented by the second cycle.

5.3 Funding

Since 2008, the Scottish Government has made available funding of £42 million per year to enable Local Authorities to deliver appropriate flood protection measures.

In 2016 agreement was reached between Scottish Ministers and COSLA on a new strategic funding plan for flood protection schemes. The agreement guarantees that the level of flooding capital grant within the local government settlement is set at a minimum of £42m per annum, for ten years. This gives local authorities the certainty they need to deliver the actions set out in their Local Flood Risk Management Plans to help protect individuals, business and communities from the danger of flooding. The funding will help to deliver 40 new flood protection schemes and works within the current FRM cycle.

It has been agreed that from 2016/17 onwards, the flooding capital grant should be allocated on the basis of a hybrid model whereby 80% of the grant is allocated to large scale projects and distributed according to the prioritisation of flood schemes set out in the 14 Flood Risk Management Strategies published in December 2015. 20% is allocated to all 32 councils to contribute to the other elements contained in the Strategies.

6. Engaging With the Public

Public awareness, participation and community engagement are essential components of sustainable flood risk management. Public participation can raise awareness of flood risk, inform decisions that contribute to the successful implementation of actions and ensure that the public know what actions they can take themselves.

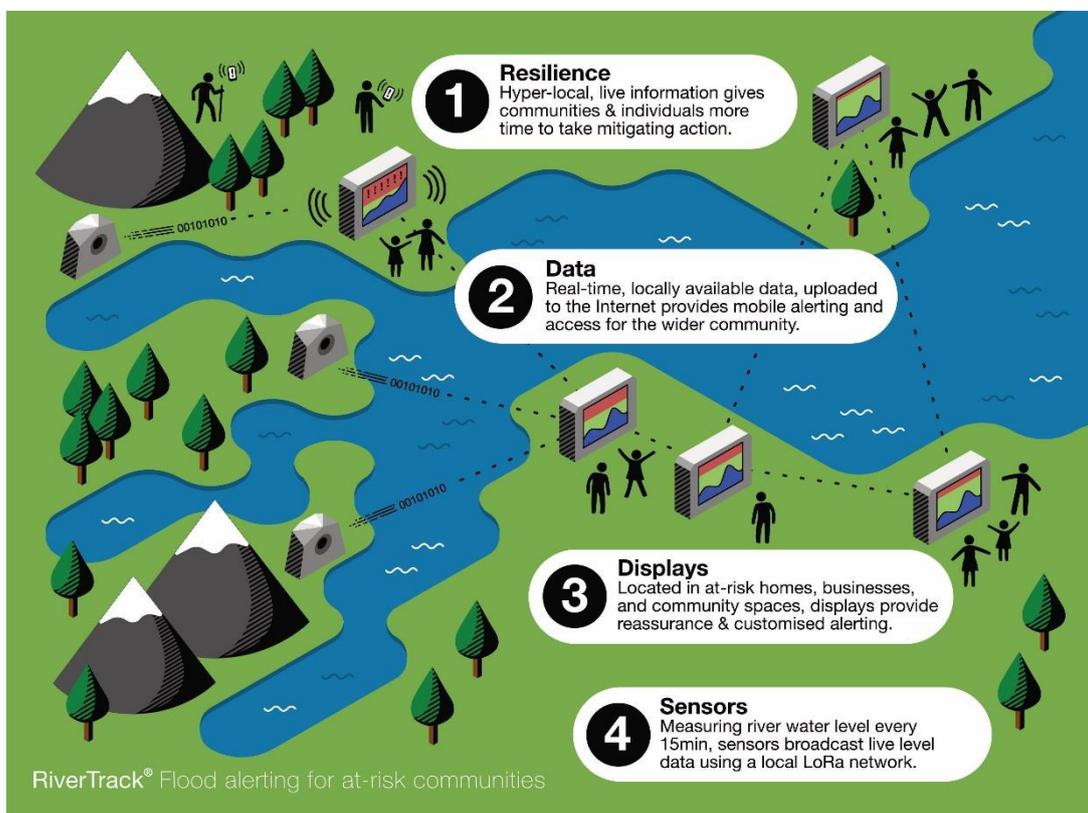
Land and property owners are primarily responsible for protecting their properties from flooding. Individuals, businesses and communities can play an important local role in flood management by acting as their own first line of defence against flooding. These actions can play an important role in complementing and supporting the work undertaken by SEPA and the responsible authorities.

The Scottish Government, SEPA, local authorities and other partners support a number of initiatives that help to improve community engagement and increase community resilience.

Whilst not specifically highlighted here, local authorities engage with communities through a wide variety of local initiatives, as well as direct engagement as part of delivering the objectives and actions set out in the Local Flood Risk Management Plans.

6.1 Community Engagement and Flood Risk Awareness Raising Initiatives

[RiverTrack](#) is a good example of public sector expertise and private sector creativity working together to solve real problems. RiverTrack gives people in flood risk areas a local flood alerting tool. The system uses low-cost sensors to send accurate time



sensitive information to individuals about water levels in their local watercourse. It was developed through Scottish Government's Digital Directorate CivTech programme.

Pilot community engagement projects were funded by SEPA and delivered in partnership by Scottish Flood Forum (SFF). The SFF have continued to engage flood risk communities in 2019 with RiverTrack community flood alerting projects. Successful projects were developed with local communities, SEPA and Local Authorities by building a list of candidate sites suitable for locally controlled community flood alerting. The candidate list criteria includes previous flooding in memory, consideration of actions within local flood risk management plans and consideration of flood disadvantage, amongst others.

In 2019 the SFF and RiverTrack built new community flood alerting projects in Blair Atholl, Fintry and with Capability Scotland in Perth with funding from the SSEN Resilient Communities Fund. For further details and good practice points, please see [SFF's community flood alerting case study, "Building Resilience with Community Flood Alerting"](#).

The use of RiverTrack continues to help the SFF engage flood risk communities and provides a solid platform from which to build better resilience to flooding.

6.2 Community Flooding Volunteers

The Scottish Government continues to financially support [The Conservation Volunteers Scotland](#) (TCVS) who bring a citizen science approach to local community groups to develop activities that help manage flood risk in their area. TCVS is working with Clackmannanshire Council, Stirling Council and SFF to deliver the Citizen Science Community Monitoring project. These projects help raise awareness of flood risk and get local communities involved in recording useful information about local burns.

In Clackmannanshire, TCVS provides training, guidance and support for the volunteers and the Council has selected three burns for volunteers to monitor river levels, sediment chokes and blockages from key vantage points. Through the project local communities and volunteers are actively recording data and taking photographs to monitor how sediments can move within burns and how this can influence flood management techniques.

6.3 Promoting Flood Resilient Properties

6.3.1 Flood Re and Flood Resilience

Flood Re is a flood reinsurance scheme that ensures that flood insurance remains affordable to those who need it. Stakeholders from across Scotland have worked with the insurance industry to develop the scheme to ensure the voices of Scotland's communities at risk of flooding are heard. Flood Re was launched in April 2016 and will be in place until 2039.

Flood Re helps to enable home insurance and associated premiums to remain affordable in areas at risk of flooding. Those benefiting from Flood Re should become more aware of their flood risk and, if possible, take action to reduce their risk by making flood resilient property repairs and installing property level protection.

6.3.2 Flood Resilient Properties Delivery Group and Action Plan

Property level protection and resilience measures are an essential and cost effective part of a sustainable and proactive approach to flood risk management. However, these measures are not being widely taken up in Scotland even though they can speed up the drying out and cleaning up processes after a flood. In some cases it can mean that, post-flood event, residents do not need to move out of their homes and businesses can reopen the next day.

With evidence to support the physical and emotional impacts of living in temporary accommodation after an flood event, the Scottish Government set up the Property Flood Resilience Delivery Group to discuss what support home and business owners might need to make their properties flood resilient. Flood Re and the Association of British Insurers are members of the group.

Scottish Government recognises the importance of flood resilience and in the 2019 Programme for Government included a commitment to publish an action plan to promote and support property flood resilience actions.

The delivery group, overseen by a Chair from the insurance industry and led by a dedicated Project Manager employed by the SFF, produced the action plan, "[Living with Flooding: Action Plan](#)". This plan was launched in November 2019 by Ms Cunningham, the Cabinet Secretary for Environment, Climate Change and Land Reform and recommends actions to help promote the use of property flood resilience measures within Scotland.

The Scottish Government continues to work with Defra and the devolved administrations to help residents and business owners take actions to protect their property.

6.3.3 CIRIA Flood Resilient Properties Code of Practice

The Construction Industry Research and Information Association (CIRIA) has worked with a range of stakeholders across the UK, including the Scottish Government, Environment Agency and insurance industry, to develop the "Code of practice for property flood resilience" for resilient flood repairs and property level protection. The project will also develop guidance documents to provide an integrated and authoritative framework that supports good practice and enables property owners, managers and built environment professionals to competently and confidently specify and deliver property flood resilience. The interim Code of Practice was published in 2019. Further guidance will be available in 2021.

6.4 The Scottish Flood Forum

The [Scottish Flood Forum](#) (SFF) is an independent Scottish Charity that supports individuals and communities at risk of flooding, including immediate support in the event of flooding as part of its flood recovery programme, and flood resilience and awareness raising.

The Scottish Government has grant funded the SFF since 2009. Since 2019 the SFF have taken on the new role of coordinating the Property Flood Resilience Delivery Group and funding was increased to £189,000 to enable delivery of this additional activity.

6.4.1 Flood Recovery

The SFF recovery programme provides an Integrated Recovery Framework in which both the community and local authorities work in partnership towards a common goal of rebuilding and reuniting the community. This provides a means of responding to the many complex and social needs within the affected community.

SFF support a large number of communities affected by localised flooding, much of it caused by extreme surface water events. Many localised flooding incidents were not widely reported but numerous households impacted required the SFF's recovery support. Due to the nature of the flooding, on a number of occasions, the SFF worked closely with both relevant local authority and Scottish Water staff.

Further detail on SFF's community support is available in Annex A.

"The Scottish Flood Forum provide a reliable, professional and empathetic service to residents and communities at flood risk - during and post the events. That independent, listening ear in times of trauma is invaluable to residents and those agencies that are also trying to support."

Aberdeenshire Council, 2019

6.4.2 Flood Resilience and Awareness Raising

The SFF now supports over 40 community flood groups, directly and indirectly, at various stages of development across Scotland and in 2019 has supported the development of new groups in Perth and Kinross, Fife, Argyll and Bute and Stirling council areas, amongst others.

SFF partnered with Flood Re to deliver three regional community events in Perth, Aberdeen and Glasgow. These events enabled attendees from flood risk communities to discuss and agree the key requirements for, and barriers to, becoming a resilient community and to discuss ongoing insurance issues with Flood Re staff. The SFF continue to raise awareness of the barriers identified and held a further peer-to-peer networking event to allow attendees to hear input from Scottish Water, SEPA and local authority representatives.

The SFF raised awareness of the support available to flood risk communities at flood warning launches in Forres and Elgin and at a number of flood scheme and study consultation events across Scotland. The SFF supported volunteer groups by attending community led resilience days with their Resilience vehicle "Flo".

The SFF has also started to build a strong partnership with The Conservation Volunteers (TCV), using complementary skill sets to build community resilience, in particular in 2019 in Tillicoultry and Menstrie.



The Scottish Government requested that the SFF, alongside community members, present their approach on building community resilience in Menstrie to a visiting US

trade delegation. This resulted in ongoing engagement with US professionals with an interest in resilience.

6.5 SEPA: Awareness Raising and Community Engagement

6.5.1 Floodline

Since 2011, SEPA has delivered live flooding information direct to the public through their [Floodline](#) service. Registered customers have increased to nearly 30,000, with around 400 messages issued every year.

Every year hundreds of thousands of people access SEPA information digitally and they continue to develop communications for specific weather situations to ensure customers understand their services, for example for heavy thunderstorms as experienced during the summer of 2019.

6.5.2 Information Sharing Tools – Webcam observations of flooding impacts

In May 2019, SEPA launched a pilot project using webcams to capture the impacts of flooding in 4 remote coastal locations along the Solway Firth - Kingholm Quay, Carsethorn, Isle of Whithorn and Port Logan. These communities have been selected to provide a variety of water level and wave impacts, large and small communities, and communities in remote sections of the Solway Firth.

SEPA are working in collaboration with Farson Digital Watercams for this pilot project. Their webcams provide awareness of coastal flooding conditions and provide live visual footage. The information will help with the ongoing calibration of SEPA's forecasting models, including events where no flooding impacts are witnessed. The images are hosted on Farson's website, offering full access for the local community. SEPA has direct remote access to allow live streaming of data when required.

The use of webcams along the Solway coast allows SEPA to:

- Verify flood events and coastal conditions remotely
- Increase confidence in flood warnings
- Gather flood impacts in small and remote locations
- Assist recalibration of coastal forecasting models
- Build relationships with rural communities at risk of flooding



6.5.3 Responsibilities Campaigns

In November 2019, SEPA ran a six-week public campaign to promote the individual's flooding roles and responsibilities. The video-based campaign used stories from individuals and community groups who have been flooded in the past to help explain what an individual can and should do to prepare for a flood.

The videos were advertised on Facebook, Instagram and YouTube, promoted during Resilience week and shared across SEPA's social media and their partner channels.

The campaign was viewed over 1,000,000 times across digital channels during the campaign period and can be viewed on the Floodline Scotland website, <https://www.floodlinescotland.org.uk/your-flood-responsibilities/>.

6.5.4 Flood Warning Public Communications

Flood warning public communications work was undertaken for the improved flood warning schemes along the River Findhorn and River Lossie (Moray). Marketing and communications activities to promote the improvement to the schemes included:

- Postcards sent to properties within the flood risk areas with details about the Flood Warning schemes and how to register to Floodline
- Public and partner community information events
- Advertising, media and publicity campaigns
- Digital and social media messaging, including by partners.

6.5.5 Community Safety

To include flooding within community safety, SEPA regularly join forces with the emergency services, local industries and voluntary organisations to help deliver 'Safe' events and education in Perth & Kinross, Tayside, Orkney Islands, Edinburgh & the Lothians and Highlands & Islands, where 75% of all schools are engaged.

The events deliver important flood safety and flood preparedness messages through a fun, interactive and informative activity. They now help over 10,000 primary seven pupils per year deal with and avoid a range of hazards including flooding.

7. Delivering Responsibilities Collectively

Responsibilities for flood risk management are divided between different organisations. Strong partnerships, founded on common aspirations, are needed to deliver coordinated or joint actions, aligned investment planning and efficient use of resources. Finding new ways to share skills, expertise and services is important to delivering partnership working. A summary of the partnership groups contributing towards flood risk management is outlined in Annex B.

7.1 Co-design and Co-delivery

SEPA have undertaken a number of partnership projects to support consumers, including community engagement and information initiatives, training packages and briefings including

Neighbourhood Watch Scotland (NWS)	Citizen's Advice Scotland	Association of British Insurers and other Representative Bodies
<ul style="list-style-type: none">•Featuring the Floodline service and flooding advice in Scotland's re-issued Scotland's Community Safety Booklet; and•Working with NWS to help improve local engagement and promote community understanding and uptake of the Floodline service e.g. use of neighbourhood alert to disseminate flood warning advice and information to communities.	<ul style="list-style-type: none">•Development and ongoing relationship for a flooding assistance training package for advisors in Scotland's Citizen Advice Scotland, to better reach those potentially at greater flooding disadvantage.	<ul style="list-style-type: none">•Briefings for membership on topics such as use of the SEPA flood maps and other sources of information they can access including the Scottish Flood Defence Asset Database (SFDAD).•Briefings, presentations and membership engagement on flood warning services with the Road Hauliers Association.

7.2 Sharing Best Practice

The Scottish Government continues to fund an annual two day [conference](#) to bring Scotland's flood risk management community together. This is a platform to exchange knowledge, share best practice and explore issues common to those with duties in flooding risk management. The general theme for the 2019 Conference was "Ten years of the Flood Risk Management Act – moving forward together". It looked at achievements and the way forward, linking policy to on the ground experiences. Sub-themes during the conference included community engagement and adapting to climate change with a view to future planning cycles.

During 2019 the Scottish Government also provided funding to SNIFFER to allow them to run knowledge exchange workshops on flood risk management. In June, workshops were held on "[Climate Change Allowance for flood risk assessment in Land Use Planning](#)", in September a workshop was held on "[Developing and](#)

[Implementing Flood Studies](#)” and in December a workshop was held on “[Accessing Funding for Flood Risk Management](#)”.

Scottish stakeholders regularly organise and attend knowledge sharing events across the UK and beyond. For example, the SFF have forged close links with both the National Flood Forum in England, and the Irish National Flood Forum.

The Tweed Forum played host to a range of international practitioners, academics and politicians who visited the Eddleston Water project sites to see the NFM measures and learn about the monitoring. This included Mairi Gougeon MSP, Minister for Rural Affairs and the Natural Environment, representatives of the Powys Moorland Partnership, a group of local, regional water managers from South East Norway and HRH Prince Charles, who opened their new offices.

7.3 Joint Training and Exercises

SEPA delivers a flood forecasting and warning module in Scottish Fire and Rescue incident management and Police Scotland emergency procedures advisors national training. They also participate in many joint training initiatives and exercises, to test and improve information sharing, procedures and activities between flooding responders.

This includes playing an active role in Scottish Government’s Winter Preparedness multi agency briefings and its Voluntary Sector Resilience Partnership, working to increase knowledge and use of flood forecasting and warning information by community responder organisations like the Royal National Lifeboat Institution (RNLI) and British Red Cross.

Annex A – Scottish Flood Forum’s Community Support

Summary of Scottish Flood Forum actions in 2019

Scottish Flood Forum supported a number of households and communities, undertaking numerous community visits and surgeries. In comparison to previous years, there was an increased number of households supported, Property Level Protection (PLP) visits undertaken and enquiries dealt with. Key information is summarised below;

Recovery programme – large scale events

- 88 Recovery Surgeries
- 41 PLP exhibitions
- 984 PLP visits to flooded properties

Requests for Information

- 338 Information line calls
- >2000 Enquiry emails

Small scale, localised flooding support

- 216 households supported

Emerging Community Resilience Groups

The SFF continues to support 42 established resilience groups throughout Scotland and;

- 4 groups supported to start
- 12 groups supported still emerging from recovery

Mediation Requests

- 104 Clients requests
- 34 Local Authority requests
- 4 MSP requests

List of communities supported by the Scottish Flood Forum in reporting period:

2019

Aberdeenshire – Stonehaven, Banff (Aberdeen), Inch

Moray – Elgin, Lossiemouth, Portknockie

Fife – Cupar, Dairsie, Blebo Crags, Pitscottie, Rosyth, Inverkeithing, Kennoway

Glasgow – Bishopbriggs, Bearsden, Milngavie, Kirkintilloch

Edinburgh – Water of Leith, Dalkeith

North Lanarkshire – Cumbernauld, Wishaw, Kilsyth

South Lanarkshire – Biggar, East Kilbride

Dumfries and Galloway – Challoch, Newtown Stewart, Moffat, Creetown, Wallaceaton, Kirtlebridge, Stranraer

Argyll & Bute – Isle of Bute, Tarbet, Rothesay, Oban

Highlands & Islands – Dingwall, Inverness
Scottish Borders – Hawick, Peebles
Perth & Kinross – Crook of Devon, Aberfeldy, Errol
Dundee City Council - Dundee
Stirlingshire – Stirling, Blanefield, Blairlogie
Falkirk – Linlithgow
Clackmannanshire –Tillicoultry
East Ayrshire – Kilmarnock
North Ayrshire – Irvine, Dreghorn
East Renfrewshire – Newton Mearns
West Dunbartonshire – Dumbarton

Annex B – Partnership Groups in flood risk management

- The Scottish Advisory and Information Forum for Flooding (SAIFF) – SAIFF comprises of a series of working groups known as Task and Finish Groups. These groups are convened to develop specific guidance or undertake analysis of technical issues. Membership comprises of policy and technical experts.
- Policy Management Group (PMG) - The PMG provides oversight and coordination across all working areas, its principal purpose is to give strategic oversight and to provide a co-ordination role in relation to the other SAIFF groups. This involves establishing Task and Finish Groups, monitoring their progress against their objectives, signing off completed work such as guidance documents. Membership consists of representatives from the Scottish Government, Scottish Water, the Society of Chief Officers of Transportation in Scotland, Heads of Planning Scotland, COSLA, SEPA, and the Chair of the Lead Local Authority Forum.
- Lead Local Authority Forum (LLAF) - The LLAF shares good practice, exchanges information and addresses common issues arising through the work of the Local Partnerships in Scotland. Membership includes Lead Local Authorities, Scottish Water, Scottish Government and SEPA.
- Society of Chief Officers of Transportation in Scotland (SCOTS) Flood Risk Group - The group enables sharing of good practice, development of guidance, partnership working and dissemination of information relating to flood risk management in Scotland. Membership includes Local Authorities, Scottish Government, COSLA, Scottish Water, SEPA, Emergency Resilience and Heads of Planning Scotland (HOPS)
- National Flood Management Advisory Group (NFMAG) – NFMAG brings together a number of key organisations to consider the progress that is being made to implement flood management protocol and strategies.

Annex C – Acknowledgements

The Scottish Government would like to thank all those who have provided material to aid completion of this report.



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