Flood Risk Management Strategy

Tay

SEPA

Scottish Environment Protection Agency

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Foreword

Flooding can affect us all. The risk of flooding and its impacts can't be removed entirely from our lives but it can be managed. This strategy takes our knowledge and understanding of flooding and turns it into a set of actions that are planned, prioritised and co-ordinated to tackle flooding in the areas where it affects us the most.

Approximately 2,500 residential and 1,400 non-residential properties are at risk of flooding in the Tay Local Plan District. Perth, Comrie and Dunkeld are just some of the areas where the greatest impacts of flooding can be found. The annual damages across the region are estimated to be £12 million, largely from river flooding. Across Scotland we now estimate 108,000 properties to be at risk, with the expected annual flood damage being in the region of £252 million.

We can expect these numbers to increase. Changes to the climate, how we live and how we use the land bring more and more people and property into flood risk.

Although the risk of flooding will never be removed entirely, this strategy describes the ambition for managing flooding and the priorities for action. A Local Flood Risk Management Plan co-ordinated by Perth and Kinross Council provides additional detail on the responsibility for delivery, funding and coordination of actions across the Local Plan District. Taken together, these documents describe the commitment of public bodies to address flooding.

This Flood Risk Management Strategy is published by SEPA and has been approved by Scottish Ministers. It has been produced with the support and collaboration of Perth and Kinross Council, Angus Council, Fife Council, Stirling Council, Scottish Water, Loch Lomond and Trossachs National Park and others with an interest in flood management. SEPA took account of the views received through two public consultations carried out during the development of the strategy and its supporting information.

How we plan for and manage our flood risk has far reaching consequences for Scotland's communities. As well as targeting action and resources in the areas where they can achieve most, the strategies also help to increase awareness of flood risk and improve understanding of how it can affect us.

Terry A'Hearn

Chief Executive Officer
SEPA

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1 Flood risk management in Scotland

1.1 What is a Flood Risk Management Strategy?

Flood Risk Management Strategies have been developed to reduce the devastating and costly impact of flooding in Scotland. They coordinate the efforts of all organisations that tackle flooding, be it in our cities or rural areas and be it from rivers, the sea or from surface water. The strategies concentrate the work of these organisations to where the risk of flooding and benefits of investment are greatest.

By publishing these strategies, we are giving individuals, communities and businesses the information to better manage their own responsibilities. Everyone can take action with the confidence of knowing what others are doing and when they are doing it.

Flood Risk Management Strategies set out the short to long term ambition for flood risk management in Scotland. The strategies state the objectives, as agreed by responsible authorities, for tackling floods in high risk areas. Actions that will then deliver these objectives are described and prioritised in six-year planning cycles. The decisions are based on the best evidence available on the causes and consequences of flooding. Through this risk-based and plan-led approach, flood management will improve for individuals, communities and businesses at risk in Scotland.

Each strategy should be read alongside its Local Flood Risk Management Plan. The Local Flood Risk Management Plans have been developed by local authorities and provide additional local detail on the funding and delivery timetable for actions between 2016 and 2021. The publication date of the Local Flood Risk Management Plans is June 2016. Both the Flood Risk Management Strategy and Local Flood Risk Management Plan will be updated every six years.

These Flood Risk Management Strategies are approved by Scottish Ministers and published by SEPA, Scotland's strategic flood risk management authority. They have been prepared in collaboration with all 32 local authorities, Scottish Water and other organisations with a responsibility or interest in managing flooding. They are required under the Flood Risk Management (Scotland) Act 2009 and the European Commission's Floods Directive. The actions proposed to manage flood risk in high risk areas have been developed using the best available information at the time. The number of actions that are actually delivered over the six years set out in the strategy will depend on a number of factors including funding availability, and community engagement issues such as potential objections to a particular flood protection scheme.

1.2 How to read this Strategy

Each Flood Risk Management Strategy has three sections:

Section 1 contains background information on the approach taken in Scotland to manage flooding. It explains the duties and aims of organisations involved in tackling flooding, including how they work together and how flood risk management planning is linked to other government policies and initiatives.

Section 2 is the most important section for those individuals and communities seeking to understand their flood risk and its management. For priority areas (called Potentially Vulnerable Areas) there is a short description of the causes and consequences of flooding. The agreed objectives are clearly set out. And, most importantly, the actions that will deliver these objectives are prioritised and described.

Section 3 includes supporting information on the sources of flooding in wider river catchments and coastal areas. A glossary is also provided.

1.3 Managing flooding in Scotland

Flood risk management in Scotland aims to manage flooding in a sustainable way. Sustainable flood risk management considers where floods are likely to occur in the future and takes action to reduce their impact without moving the problem elsewhere. It considers all sources of flooding, whether from rivers, the sea or from surface water. It delivers actions that will meet the needs of present and future generations whilst also protecting and enhancing the environment.

The sustainable approach to managing flood risk works on a six year planning cycle, progressing through the key stages outlined below.

Identifying priority areas at significant flood risk

The first step to delivering a risk-based, sustainable and plan-led approach to flood risk management was SEPA's **National Flood Risk Assessment**, which was published in 2011. The assessment considered the likelihood of flooding from rivers, groundwater and the sea, as well as flooding caused when heavy rainfall is unable to enter drainage systems or the river network. The likelihood of flooding was examined alongside the estimated impact on people, the economy, cultural heritage and the environment. It significantly improved our understanding of the causes and consequences of flooding, and identified areas most vulnerable to floods.

Based on the National Flood Risk Assessment, SEPA identified areas where flooding was considered to be nationally significant. These areas are based on catchment units as it is within the context of the wider catchment that flooding can be best understood and managed. These nationally significant catchments are referred to as **Potentially Vulnerable Areas**. In Scotland, 243 Potentially Vulnerable Areas were identified. They are estimated to contain 92% of the total number of properties at risk.

A small number of Candidate Potentially Vulnerable Areas were identified after the National Flood Risk Assessment in light of new information that warranted further assessment and appraisal. They are included in the flood risk management planning process. The National Flood Risk Assessment will be updated to inform each subsequent planning cycle.

Improving the understanding of flooding

SEPA developed **flood hazard and flood risk maps** between 2012 and 2014. These maps improved our understanding of flooding and helped inform the subsequent selection of actions to manage flood risk in Potentially Vulnerable Areas. The flood hazard maps show information such as the extent of flooding, water level, as well as depth and velocity where appropriate. The flood risk maps provide detail on the impacts on people, the economy, cultural heritage and the environment.

In 2012 SEPA also developed an **assessment of the potential for natural flood management**. The assessment produced the first national source of information on where natural flood management actions would be most effective within Scotland.

Flood hazard and flood risk maps and the assessment of the potential for natural flood management can be viewed on the SEPA website www.sepa.org.uk.

Identifying objectives and selecting actions

The objectives and actions to manage flooding will provide the long-term vision and practical steps for delivering flood risk management in Scotland.

Working collaboratively with local partnerships, SEPA has agreed the objectives for addressing the main flooding impacts. Actions that could deliver these agreed objectives have been appraised for their costs and benefits to ensure the right combinations are identified and prioritised. The actions considered in the development of this strategy include structural actions (such as building floodwalls, restoring flood plains, or clearance and repair works to rivers) and non-structural actions (such as flood warning, land use planning or improving our emergency response). Structural and non-structural actions should be used together to manage flood risk effectively.

An assessment of the potential for natural flood management was used to help identify opportunities for using the land and coast to slow down and store water. Natural flood management actions were recommended in areas where they could contribute to the management of flood risk. In such instances these actions were put forward as part of flood protection or natural flood management studies.

Climate change and future flood risk

The UK Climate Projections (UKCP09) report predicts that climate change may lead to warmer and drier summers, warmer and wetter winters with less snow, and more extreme temperature and rainfall events. The predicted increase in rainfall is expected to variably increase the potential for river and surface water flooding, and similarly, there is expected to be a rise in sea levels that will vary around the coastline.

The predicted increases in flood risk described in Section 3 are solely based on the impact of a changing climate on the magnitude of flooding; they do not take into account any potential increase due to population change, development pressures or urban creep, nor do they take into account any mitigation as a result of actions contained in this or future Flood Risk Management Strategies.

Flood Risk Management Strategies and Local Flood Risk Management Plans

For flood risk management purposes, Scotland has been divided into 14 **Local Plan Districts**. Each Local Plan District will have a set of complementary plans: Flood Risk Management Strategies produced by SEPA, and Local Flood Risk Management Plans produced by a lead local authority. Flood Risk Management Strategies and Local Flood Risk Management Plans aim to make a strong and lasting contribution to sustainable flood risk management, and will be at the heart of efforts to tackle flooding in Scotland. They will help to target and maximise the benefit of public investment.

1.4 How the Flood Risk Management Strategy was developed

Partnership working

Many organisations and individuals are involved in helping to improve flood management in Scotland. A piecemeal approach to tackle flooding does not work.

Flooding is too complex, and the causes and impacts too complicated for any single organisation to address alone. Flooding disregards local authority boundaries and cuts across the responsibilities of organisations such as SEPA, Scottish Water and emergency responders. To be successful, flood management requires coordination among organisations as set out in this strategy. A willingness to collaborate by those responsible for flood management is essential.

This strategy has been developed in partnership by:

- Perth and Kinross Council (lead local authority), Angus Council, Fife Council and Stirling Council;
- Loch Lomond and Trossachs National Park Authority and Cairngorms National Park Authority;
- Scottish Water; and,
- SEPA.

These organisations are working more closely together than ever before. In local partnerships, here and throughout Scotland, SEPA has provided the technical analysis and ensured a consistent national approach is taken. It has provided the evidence upon which to make sensible, informed decisions. Local authorities, National Park Authorities and Scottish Water have made sure that local knowledge and expertise has informed the decision-making.

Consultation, engagement and advice

SEPA has been keen to hear from the people and communities that live under the threat of flooding to ensure that our technical analysis of the risks is accurate and that efforts to manage flooding are targeted to where most can be achieved. SEPA held two public consultations during the development of the Flood Risk Management Strategies. The first was on the general approach to flood risk management planning and the identification of priority areas (2011); the second, held jointly with local authorities, was on the understanding of flooding in these priority areas and on the objectives and actions to manage flooding (2015).

Further advice has been sought from relevant organisations at key stages. The strategies have benefited from Local Advisory Groups, providing important community and area-based knowledge on both the causes and consequences of flooding and on the appropriate actions for future management. Local Advisory Groups have been especially helpful in considering flood risk management planning in the context of wider plans and initiatives. The Tay Local Advisory Group includes representatives from a range of sectors, including government agencies, National Park Authorities, local authorities, non-government organisations, utility companies and land and asset managers.

In producing the Flood Risk Management Strategy, SEPA has also taken advice from a National Flood Management Advisory Group. Over 50 member organisations, reflecting the national importance and impact of flooding on our communities, economy, environment and cultural heritage, have been invited at key stages to provide comment and input.

Some of the work carried out by SEPA has been complex and technical in nature for which we have sought professional advice. Through membership of the Scottish Advisory and Implementation Forum for Flooding (SAIFF), we have received assistance from local authorities, Scottish Water, Forestry Commission Scotland, the National Park Authorities and other key interested organisations. We have also developed some of our methods by working with other organisations with similar

responsibilities within the UK and Europe. We have specifically worked with the Environment Agency and English local authorities in the cross border areas.

SEPA's chief statutory function in flood risk management planning is to prioritise future actions across Scotland. To do this, SEPA made a technical, risk-based assessment of the costs and impacts of actions. This independent assessment was used alongside information from partner organisations to jointly agree priorities and identify indicative delivery dates for actions. A National Prioritisation Advisory Group, with representatives from the Scottish Government, COSLA, Scottish Water and local authorities, was established to provide guidance to SEPA on the priority of flood risk management actions, having considered both the technical ranking prepared by SEPA and issues of local priority.

Strategic Environmental Assessment and Habitats Regulation Appraisal

SEPA undertook a strategic environmental assessment to assess the significant environmental effects of the Flood Risk Management Strategies. Our assessment was published in an environmental report, and we consulted the public on our findings. We have published a post-adoption statement, which describes how we have taken account of the environmental assessment and the consultation responses, and how we will monitor any significant environmental effects of the Flood Risk Management Strategies.

We also undertook a Habitats Regulations Appraisal to ensure that the Flood Risk Management Strategies will not adversely affect the integrity of Special Areas of Conservation and Special Protection Areas. We consulted Scottish Natural Heritage and Natural England on our appraisal method and took their views into account. We have applied mitigation measures where required.

1.5 Roles and responsibilities for flood risk management planning

Individuals have a personal responsibility to protect themselves and their property from flooding. However, public bodies have responsibilities too and are working together to reduce the impacts of flooding in Scotland. Responsibility for flood risk management planning falls primarily to SEPA, local authorities and Scottish Water. Some of the key roles are outlined below and more information is available from the SEPA website.

Your responsibilities

Organisations and individuals have responsibilities to protect themselves from flooding. Being prepared by knowing what to do and who to contact if flooding happens can help you reduce the damage and disruption flooding can have on your life.

The first step to being prepared is signing up to Floodline so you can receive messages to let you know where and when flooding is likely to happen. Other useful tools and advice on how to be prepared are available on the Floodline website, including a quick guide to who to contact in the event of a flood. For more information visit: www.floodlinescotland.org.uk. You can also check how your area could be affected by flooding by looking at SEPA's flood maps.

SEPA

SEPA is Scotland's national flood forecasting, flood warning and strategic flood risk management authority. We have a statutory duty to produce Scotland's Flood Risk

Management Strategies. As described above, we work closely with other organisations responsible for managing flood risk through a network of partnerships and stakeholder groups to ensure that a nationally consistent approach to flood risk management is adopted.

SEPA also has a responsibility to identify where in Scotland there is the potential for natural flood management techniques to be introduced. Natural flood management uses the natural features of the land to store and slow down the flow of water.

In running Floodline, we provide direct warnings, live flooding information and advice on how to prepare for or cope with the impacts of flooding 24 hours a day, seven days a week. To help us forecast for flooding we work in partnership with the Met Office through the Scottish Flood Forecasting Service. SEPA has piloted surface water flood forecasting to help urban areas improve their resilience to and preparedness for flooding. The development and wider roll-out of this service is being considered alongside the technical, resource and communication challenges associated with providing surface water flooding guidance.

To raise awareness of flooding at a national level SEPA runs education initiatives, community engagement programmes and an annual campaign to promote the useful advice and information available through Floodline. We work in partnership with local authorities, Neighbourhood Watch Scotland, Ready Scotland and others to share our resources and help to promote preparedness and understanding of how flood risk is managed.

Local authorities and lead local authorities

Local authorities work together for flood risk management planning purposes through a lead local authority. The lead local authority must perform several important functions over and above the general flood-related duties and powers given to local authorities. Most significantly, the lead local authority, having contributed with other local authorities to the production of the Flood Risk Management Strategy, must prepare a Local Flood Risk Management Plan. Although the lead local authority is responsible for the production of the plan, its content will be drawn from and agreed by all relevant local authorities, other responsible authorities and SEPA. Local authorities have been working collaboratively in the manner described above to develop these Local Flood Risk Management Plans.

It is the responsibility of your local authority to implement its flood protection actions agreed within the Flood Risk Management Strategy, including new schemes or engineering works and their statutory requirements to monitor, clear and maintain watercourses. You can help your local authority to manage flooding by letting them know if debris is blocking watercourses or if flood defences have been tampered with.

During severe flooding, local authorities will work with the emergency services and coordinate shelter for people evacuated from their homes.

Scottish Water

Scottish Water is a responsible authority for flood risk management and is working closely with SEPA, local authorities and others to coordinate plans to manage flood risk.

Scottish Water has the public drainage duty and is responsible for foul drainage and the drainage of rainwater run-off from roofs and any paved ground surface from the boundary of properties. Additionally, Scottish Water helps to protect homes from

flooding caused by sewers either overflowing or becoming blocked. Scottish Water is not responsible for private pipework or guttering within the property boundary.

National parks

The two National Park Authorities, Loch Lomond and Trossachs National Park and Cairngorms National Park, were designated as responsible authorities for flood risk management purposes in 2012. Both have worked with SEPA, local authorities and Scottish Water to help develop Flood Risk Management Strategies and Local Flood Risk Management Plans. They also fulfil an important role in land use planning, carrying out or granting permission for activities that can play a key role in managing and reducing flood risk.

Other organisations

- The **Scottish Government** oversees the implementation of the Flood Risk Management (Scotland) Act 2009, which requires the production of Flood Risk Management Strategies and Local Flood Risk Management Plans. Scottish Ministers are responsible for setting the policy framework for how organisations collectively manage flooding in Scotland. Scottish Ministers have also approved this Flood Risk Management Strategy.

- **Scottish Natural Heritage** has provided general and local advice in the development of this Flood Risk Management Strategy. Flooding is seen as natural process that can maintain the features of interest at many designated environmental sites, so Scottish Natural Heritage helps to ensure that any changes to patterns of flooding do not adversely affect the natural environment. Scottish Natural Heritage also provides advice on the impacts of Flood Protection Schemes and other land use development on designated sites and species.

- **Forestry Commission Scotland** was designated in 2012 as a responsible authority for flood risk management planning purposes and has engaged in the development of the Flood Risk Management Strategies through national and Local Advisory Groups. This reflects the widely held view that forestry can play a significant role in managing flooding.

- During the preparation of the flood risk management plans **Network Rail** and **Transport Scotland** have undertaken works to address flooding at a number of frequently flooded sites. Further engagement is planned with SEPA and local authorities to identify areas of future work. There is the opportunity for further works to be undertaken during the first flood risk management planning cycle although locations for these works are yet to be confirmed.

- **Utility companies** have undertaken site specific flood risk studies for their primary assets and have management plans in place to mitigate the effects of flooding to their assets and also minimise the impacts on customers.

- The **Met Office** provides a wide range of scientific support, forecasts and weather warnings. SEPA and the Met Office work together through our partnership the Scottish Flood Forecasting Service.

- The **emergency services** provide emergency support when flooding occurs and can coordinate evacuations. You should call the emergency services on 999 if you are concerned about your safety or the safety of others and act immediately on any advice provided.

- **Historic Environment Scotland** considers flooding as part of its regular assessments of historic sites. As such, flooding is considered as one of the many factors which inform the development and delivery of its management and maintenance programmes.

1.6 Links with other plans and policies

River basin management planning

River basin management aims to protect and improve the condition of our rivers, lochs, estuaries and coastal waters. Taking action to reduce flood risk in Scotland provides an opportunity to connect with plans to improve the quality of Scotland's water environment at the same time. For example, coordination between river basin management and flood risk management can reduce flood risk, whilst improving water quality and biodiversity.

SEPA is leading the delivery of River Basin Management Plans and Flood Risk Management Strategies and has worked to ensure that there is integration and coordination between them. This coordination, particularly in regard to consultation and engagement, will be important for stakeholders many of whom have an interest in the objectives of both plans.

Land use and spatial planning

Land use planning decisions are one of the most powerful tools available to manage flood risk. The alignment of flood risk management and land use planning policy is pivotal to achieving sustainable flood risk management. Decisions relating to flood risk management can have significant implications for the location of development and, likewise, decisions relating to the location of development can impact on flood risk. Land use planning has the potential to contribute to sustainable flood risk management through the location, use and design of new development and the redevelopment of existing areas. Actions that deliver national level land use planning policies are summarised in Annex 2.

SEPA is a statutory consultee providing advice on planning applications with regards to flood risk. Guidance aims to minimise flood risk to development and ensure no adverse effects occur elsewhere.

Land use planning objectives and actions have been agreed with responsible authorities, which will ensure that flood risk is adequately taken into account throughout the planning process.

Emergency planning and response

Emergency plans are prepared under the Civil Contingencies Act 2004. They are in place across Scotland and are prepared by Category 1 and 2 Responders, such as Police Scotland and the Scottish Ambulance Service. Emergency plans ensure the effective management of response to emergencies. Emergency plans can either be generic and deal with all emergencies or specific to deal with, for example, flooding. The information contained in the Flood Risk Management Strategies can be used to inform wider emergency response plans for flooding.

Many organisations have specific roles and responsibilities during an emergency response to a flood for example, local authorities, the Scottish Fire and Rescue Services, Police Scotland and SEPA. In many cases, this response is augmented by the work of voluntary organisations, communities and individuals. During an

emergency, the response by these agencies will be co-ordinated through regional and local resilience partnerships.

Scottish Water investment plans

There is a close relationship between Flood Risk Management Strategies and Scottish Water's investment plans. Sewer flooding is not considered in detail in this strategy although it remains a high priority for Scottish Water and its customers. Scottish Water's close involvement in flood risk management planning aims to ensure that there is strong coordination between the management of sewer and surface water flooding and the actions to be taken forward by local authorities.

1.7 Supporting information

Sources of flooding described in this strategy

The Flood Risk Management Strategy addresses the risk of flooding from rivers, the coast and surface water. The risk of flooding from rivers is usually due to rainfall causing a river to rise above bank level spreading out and inundating adjacent areas. Coastal flooding is where the risk is from the sea. Sea levels can change in response to tidal cycles or atmospheric conditions. Over the longer term sea levels and coastal flood risk may change due to climate change. Surface water flooding happens when rainwater does not drain away through the normal drainage systems or soak into the ground, but lies on or flows over the ground instead. There can be interactions between these sources of flooding, but for the purposes of this strategy they are dealt with independently.

The following aspects of flooding have not been incorporated into this strategy:

- **Groundwater** is generally a contributing factor to flooding rather than the primary source. It is caused by water rising up from underlying rocks or flowing from springs.

- **Reservoir breaches** have been assessed under separate legislation (Reservoirs (Scotland) Act 2011). Further information and maps can be found on SEPA's website.

- The Flood Risk Management (Scotland) Act 2009 does not require SEPA or responsible authorities to assess or manage **coastal erosion**. However, SEPA has included consideration of erosion in the Flood Risk Management Strategies by identifying areas that are likely to be susceptible to erosion and where erosion can exacerbate flood risk. As part of considering where actions might deliver multiple benefits, we have looked to see where the focus of coastal flood risk management studies coincides with areas of high susceptibility to coastal erosion. Subsequent detailed studies and scheme design will need to consider coastal erosion in these areas.

- **Coastal flood modelling.** The information on coastal flooding used to set objectives and identify actions is based on SEPA modelling using simplified coastal processes and flooding mechanisms at work during a storm. Wave overtopping cannot be accurately modelled at a national scale due to the importance of local factors such as prevailing wind conditions, the depth and profile of the near-shore sea bed or the influence of any existing defences or management structures. As a result, coastal flood risk may be underestimated in some areas. Conversely, in locations with wide and flat floodplains, the modelling may overestimate flood risk. To address this, in a number of locations where

more detailed local models were available they have been incorporated into the development of the Flood Risk Management Strategies. Where wave overtopping has been specifically identified as a concern – but where no further detailed modelling is available – particular compensation has been made in the selecting actions to address coastal flood risk.

Commonly used terms

Below are explanatory notes for commonly used terms in this strategy. A glossary of terms is also available.

- **Reference to flood risk.** During the development of this strategy flood risk has been assessed over a range of likelihoods. For consistency in reporting information within the strategies, unless otherwise stated, all references to properties or other receptors being 'at risk of flooding' refer to a medium likelihood flood (up to a 1 in 200 chance of flooding in any given year). By exception, references will be made to high or low risk flooding, which should be taken to mean a 1 in 10 chance/likelihood or 1 in 1000 chance/likelihood of flooding in any given year respectively.

Chance / likelihood of flooding	
High	1 in 10 year
Medium	1 in 200 year
Low	1 in 1000 year

- **Annual Average Damages** have been used to assess the potential economic impact of flooding within an area. Depending on its size or severity each flood will cause a different amount of damage to a given area. Annual Average Damages are the theoretical average economic damages caused by flooding when considered over a very long period of time. It does not mean that damage will occur every year: in many years there will be no damages, in some years minor damages and in a few years major damages may occur.
  High likelihood events, which occur more regularly, contribute proportionally more to Annual Average Damages than rarer events. Within the Flood Risk Management Strategies Annual Average Damages incorporate economic damages to the following receptors: residential properties, non-residential properties, vehicles, emergency services, agriculture and roads. They have been calculated based on the principles set out in the Flood Hazard Research Centre Multi-Coloured Handbook (2010).

- **History of flooding.** The history of flooding sections of this document report floods that have occurred up to July 2015.

1.8 Next steps and monitoring progress

Flood risk management planning has progressed significantly in recent years. Scotland now has the most advanced nationally consistent and locally informed understanding of the causes and consequences of flooding that it has ever had. SEPA is committed to improving this knowledge and understanding during subsequent planning cycles, accepting that these first Flood Risk Management Strategies are based on the best available current knowledge and data.

SEPA has prioritised actions based on funding assumptions provided by Scottish Government and the capacity of local authorities to deliver within the next six years. Lead local authorities will provide an interim report on the progress of delivering all

actions in the Local Flood Risk Management Plan not earlier than two years and not later than three years from its publication. A final report will also be prepared at the end of the first planning cycle.

A second set of Flood Risk Management Strategies and Local Flood Risk Management Plans will be published in December 2021 and June 2022 respectively.

Licensing acknowledgements

Full data licensing acknowledgements can be found in Annex 3 of this strategy.

Flood Risk Management Strategy

Tay Local Plan District

This section is the most relevant for individuals, communities and businesses seeking to understand their local flood risk and its management. There is an overview of the Local Plan District, as well as further detail for every Potentially Vulnerable Area. For each Potentially Vulnerable Area, there is a short description of the causes and consequences of flooding. The agreed objectives are clearly set out and, most importantly, the actions that will deliver these objectives are prioritised and described.

Section 2: Understanding and managing flooding

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2.1 Summary of flooding in the Tay Local Plan District

The Tay Local Plan District is 6,061km^2 with a population of approximately 160,000. The Local Plan District contains five local authorities and 17 Potentially Vulnerable Areas.

Flood risk in the Tay

There are approximately 2,500 residential and 1,400 non-residential properties at risk of flooding within the Local Plan District. This equates to approximately 4% of all properties at risk of flooding nationally. Within the Local Plan District, approximately 3.5% of all residential and 10% of all non-residential properties are at risk and it is estimated that 79% of these properties are located within the Potentially Vulnerable Areas. The Annual Average Damages (see glossary) from flooding are approximately £12 million.

River flooding is the main source of flood risk. The Annual Average Damages caused by river flooding are £10 million, those caused by surface water flooding are £2.0 million and damages caused by coastal flooding are £550,000 (Figure 1).

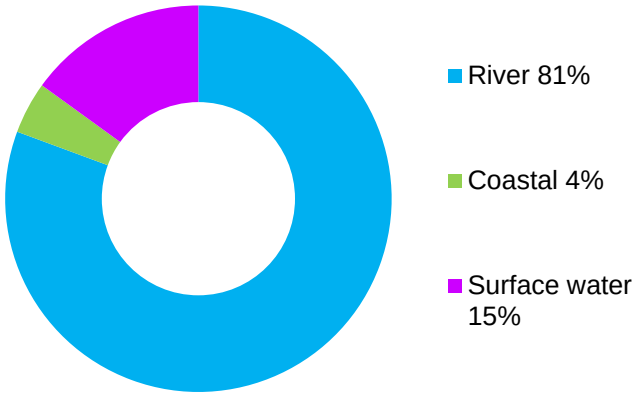


Figure 1: Annual Average Damages by flood source

Table 1 and Figure 3 show the number of properties at risk and the Annual Average Damages caused by flooding in the main towns and cities within the Local Plan District. This includes damages to residential properties, non-residential properties, transport and agriculture. Please note that economic damages to airports and rail infrastructure were not assessed, as information on damages at this scale is not available.

	Residential and non-residential properties at risk of flooding[1]	Annual Average Damages
Perth	600	£1.9 million
Comrie	420	£1.2 million
Dunkeld and Birnam[2]	270	£300,000
Almondbank	240	£1.2 million
Forfar	190	£610,000
Pitlochry	170	£690,000
Aberfeldy	160	£410,000
Bankfoot	110	£290,000
Blairgowrie and Rattray	100	£92,000
Scone	80	£190,000

Table 1: Main areas with a risk of flooding

Background information on the Tay Local Plan District

The extent of the Tay Local Plan District and the location of the Potentially Vulnerable Areas are shown in Figure 2.

The Tay Local Plan District contains the River Tay and River Earn catchments and includes the urban areas of Perth, Forfar, Blairgowrie, Crieff, Auchterarder, Aberfeldy and Pitlochry.

The River Tay is the longest river in Scotland (190km) and has the largest catchment covering an area of around 5,000km^2. More water flows through the River Tay than any other river in the UK. The main tributaries include the River Garry, River Tummel, River Lyon, River Braan, River Isla and River Almond. The largest lochs in the Tay catchment include Loch Ericht, Loch Rannoch and Loch Tay. Many of the lochs and rivers in the Tay catchment are managed to produce hydropower.

The River Earn catchment covers an area of 973km^2. The main watercourses within the catchment are the River Earn, Water of Ruchill, Machanay Water and River Farg.

The Tay Local Plan District includes a 74km stretch of the inner Firth of Tay, where the River Tay and the River Earn meet the Firth of Tay.

Further details of flood risk from distinct sources can be found in the river, coastal and surface water chapters in Section 3 of this report.

[1] Properties not included if protected by a formal flood protection scheme with a 1 in 200 years standard of protection.
[2] The numbers presented in this report are derived from SEPA data assessed at a strategic level. Perth and Kinross Council have estimated that there is substantially lower numbers of residential properties at risk from river flooding in Dunkeld and Birnam.

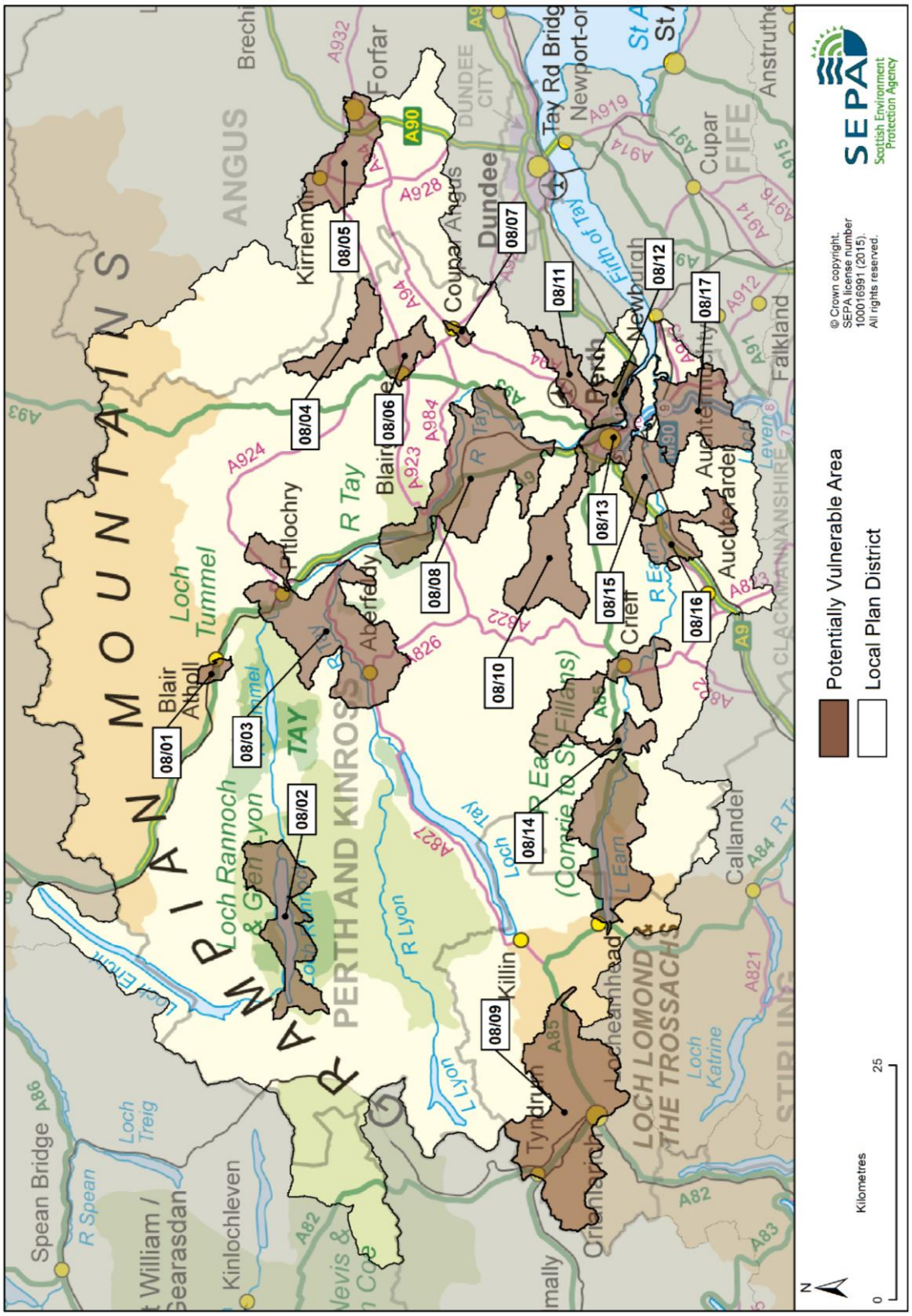


Figure 2: The Tay Local Plan District with Potentially Vulnerable Areas identified

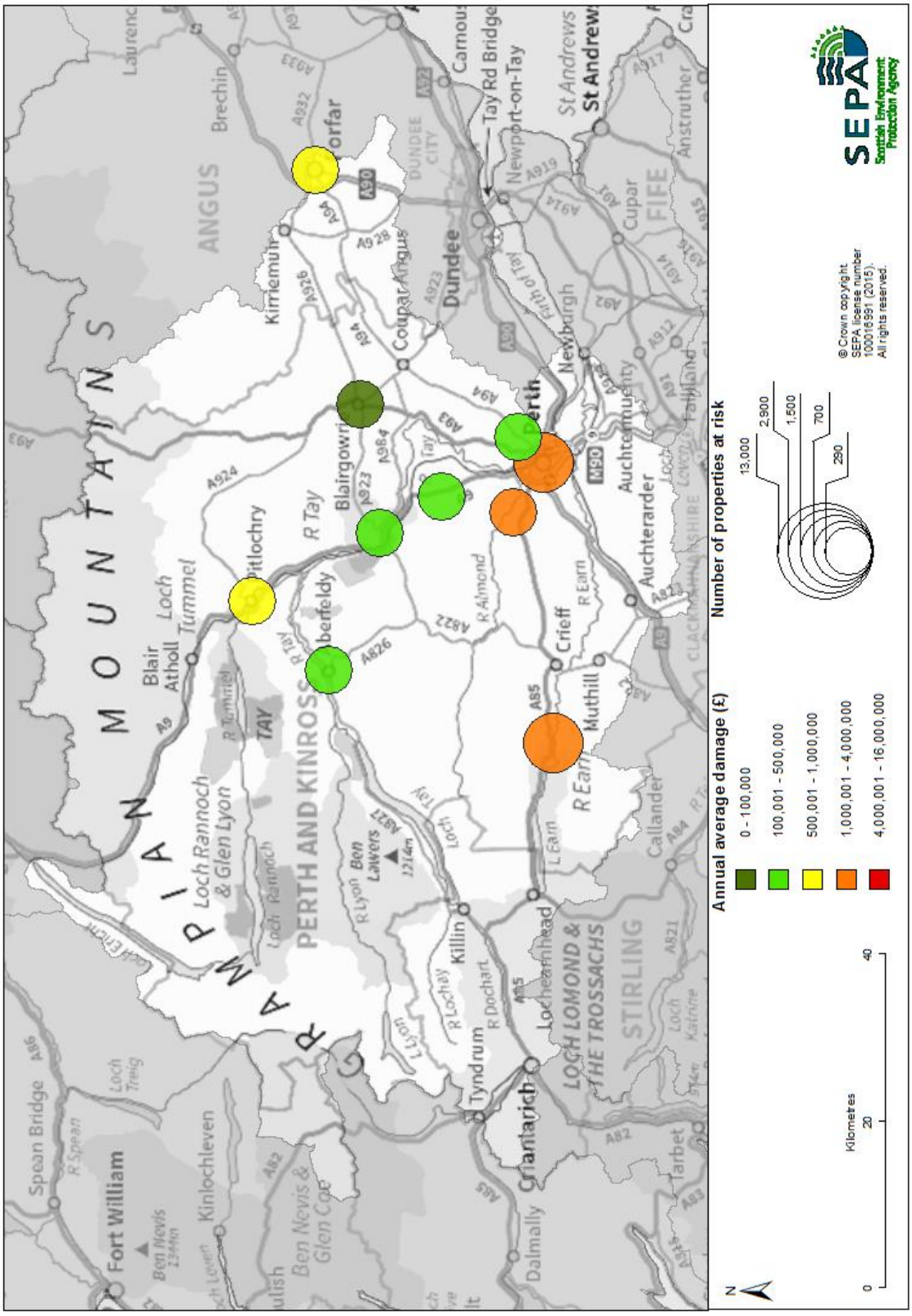


Figure 3: The Tay Local Plan District showing areas with most properties at risk of flooding and associated damages

Objectives and actions in the Tay Local Plan District

The objectives are the shared aims for managing flooding. Actions describe where and how flood risk will be managed. Objectives and actions have been set by SEPA and agreed by flood risk management responsible authorities following consultation.

Some flood risk management objectives and actions apply to all areas, whether designated as a Potentially Vulnerable Area or not. For example, flood risk can be managed through national planning policy or as part of ongoing statutory duties for local authorities. The focus of this Flood Risk Management Strategy is to manage flood risk in Potentially Vulnerable Areas where specific actions apply in addition to the generic actions listed below. Further detail on specific actions can be found in the relevant Potentially Vulnerable Area chapter. Local authorities may have further information on how they manage flooding across their area.

Target area	Objective(s)	ID	Indicators
Applies across Tay Local Plan District	Avoid an overall increase in flood risk	8001	• 2,500 residential properties • 1,400 non-residential properties • 5,500 people
Applies across Tay Local Plan District	Reduce overall flood risk	8041	• 2,500 residential properties • 1,400 non-residential properties • 5,500 people

Action (ID):	**FLOOD FORECASTING** (80410009)		
Objective (ID):	**Reduce overall flood risk** (8041)		
Delivery lead:	SEPA		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	The Scottish Flood Forecasting Service is a joint initiative between SEPA and the Met Office that produces daily, national flood guidance statements which are issued to Category 1 and 2 responders. The service also provides information which allows SEPA to issue flood warnings, giving people a better chance of reducing the impact of flooding on their home or business. For more information please visit SEPA's website.		

Action (ID):	**SELF HELP** (80410011)		
Objective (ID):	**Reduce overall flood risk** (8041)		
Delivery lead:	–		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Everyone is responsible for protecting themselves and their property from flooding. Property and business owners can take simple steps to reduce damage and disruption to their homes and businesses should flooding happen. This includes preparing a flood plan and flood kit, installing property level protection, signing up to Floodline and the Resilient Communities Initiative, and ensuring that properties and businesses are insured against flood damage.		

Action (ID):	**AWARENESS RAISING** (80410013)		
Objective (ID):	**Reduce overall flood risk** (8041)		
Delivery lead:	Responsible authorities		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	SEPA and the responsible authorities have a duty to raise public awareness of flood risk. Improved awareness of flood risk and actions that prepare individuals, homes and businesses for flooding can reduce the overall impact. Local authorities will be undertaking additional awareness raising activities, further details will be set out in the Local FRM Plans.		

Action (ID):	**MAINTENANCE** (80410007)		
Objective (ID):	**Reduce overall flood risk** (8041)		
Delivery lead:	Local authority, asset / land managers		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Local authorities have a duty to assess watercourses and carry out clearance and repair works where such works would substantially reduce flood risk. The local authorities produce schedules of clearance and repair works and make these available for public inspection. Scottish Water undertake inspection and repair on the public sewer network. Asset owners and riparian landowners are responsible for the maintenance and management of their own assets including those which help to reduce flood risk.		

Action (ID):	**EMERGENCY PLANS / RESPONSE** (80410014)		
Objective (ID):	**Reduce overall flood risk** (8041)		
Delivery lead:	Category 1 and 2 Responders		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Providing an emergency response to flooding is the responsibility of many organisations, including local authorities, the emergency services and SEPA. Effective management of an emergency response relies on emergency plans that are prepared under the Civil Contingencies Act 2004 by Category 1 and 2 Responders. The emergency response by these organisations is co-ordinated through regional and local resilience partnerships. This response may be supported by the work of voluntary organisations.		

Action (ID):	**PLANNING POLICIES** (80010001)		
Objective (ID):	**Avoid an overall increase in flood risk** (8001) **Reduce overall flood risk** (8041)		
Delivery lead:	Planning authority		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Scottish Planning Policy and accompanying Planning Advice Notes set out Scottish Ministers' priorities for the operation of the planning system and for the development and use of land. In terms of flood risk management, the policy supports a catchment-scale approach to sustainable flood risk management and aims to build the resilience of our cities and towns, encourage sustainable land management in our rural areas, and to address the long-term vulnerability of parts of our coasts and islands. Under this approach, new development in areas with medium to high likelihood of flooding should be avoided. For further information on the application of national planning policies see Annex 2.		

2.2 Potentially Vulnerable Areas

The table below summarises the actions to manage flood risk in the Potentially Vulnerable Areas of this Local Plan District. Further detail is provided in each Potentially Vulnerable Area.

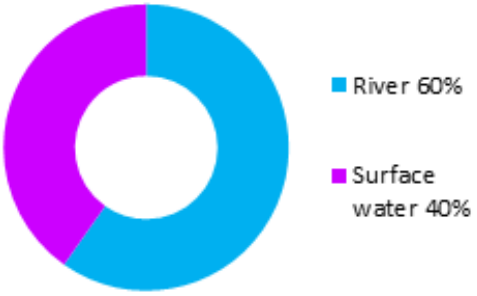
PVA	Flood protection scheme/ works	Natural flood management works	New flood warning	Flood protection study	Natural flood management study	Surface water plan/study	Strategic mapping and modelling	Maintain flood protection scheme*	Maintain flood warning*	Flood forecasting	Property level protection scheme	Community flood action groups	Self help	Awareness raising	Maintenance	Site protection plans	Emergency plans/ response	Planning policies
08/01	✓						✓	N/A	N/A	✓		✓	✓	✓	✓		✓	✓
08/02								N/A	N/A	✓			✓	✓	✓		✓	✓
08/03	✓			✓			✓	✓	✓	✓		✓	✓	✓	✓		✓	✓
08/04			✓		✓		✓	N/A	N/A	✓			✓	✓	✓		✓	✓
08/05				✓		✓	✓	✓	N/A	✓			✓	✓	✓		✓	✓
08/06						✓	✓	N/A	✓	✓			✓	✓	✓		✓	✓
08/07			✓				✓	N/A	N/A	✓			✓	✓	✓		✓	✓
08/08	✓			✓			✓	N/A	✓	✓			✓	✓	✓		✓	✓
08/09							✓	N/A	N/A	✓			✓	✓	✓		✓	✓
08/10	✓						✓	✓	✓	✓			✓	✓	✓		✓	✓
08/11	✓			✓		✓	✓	N/A	N/A	✓			✓	✓	✓		✓	✓
08/12	✓					✓	✓	✓	✓	✓			✓	✓	✓		✓	✓
08/13				✓		✓	✓	✓	✓	✓		✓	✓	✓	✓		✓	✓
08/14	✓						✓	✓	✓	✓		✓	✓	✓	✓		✓	✓
08/15							✓	N/A	✓	✓			✓	✓	✓		✓	✓
08/16							✓	N/A	✓	✓			✓	✓	✓		✓	✓
08/17							✓	✓	✓	✓		✓	✓	✓	✓		✓	✓

*Note: N/A is used where there is no formal Flood Protection Scheme or flood warning scheme present.

Blair Atholl (Potentially Vulnerable Area 08/01)

Local Plan District	Local authority	Main catchment
Tay	Perth and Kinross Council	River Garry (River Tay)

Summary of flooding impacts



At risk of flooding

- <10 residential properties
- <10 non-residential properties
- £14,000 Annual Average Damages

(damages by flood source shown left)

Summary of objectives to manage flooding

Objectives have been set by SEPA and agreed with flood risk management authorities. These are the aims for managing local flood risk. The objectives have been grouped in three main ways: by reducing risk, avoiding increasing risk or accepting risk by maintaining current levels of management.

Many organisations, such as Scottish Water and energy companies, actively maintain and manage their own assets including their risk from flooding. Where known, these actions are described here. Scottish Natural Heritage and Historic Environment Scotland work with site owners to manage flooding where appropriate at designated environmental and/or cultural heritage sites. These actions are not detailed further in the Flood Risk Management Strategies.

Summary of actions to manage flooding

The actions below have been selected to manage flood risk.

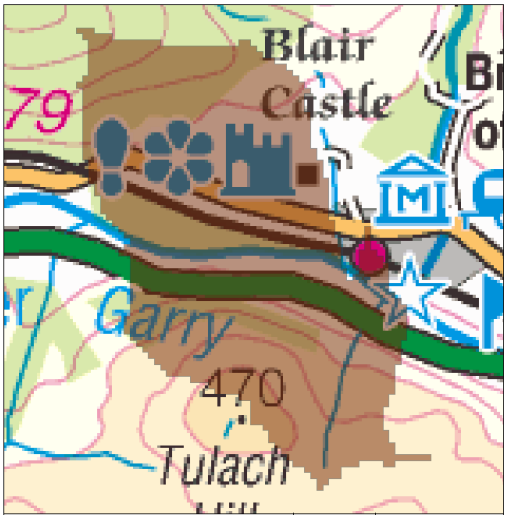
Flood protection scheme/works	*Natural flood management works*	*New flood warning*	Community flood action groups	*Property level protection scheme*	*Site protection plans*
Flood protection study	*Natural flood management study*	*Maintain flood warning*	Awareness raising	*Surface water plan/study*	Emergency plans/response
Maintain flood protection scheme	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

Blair Atholl (Potentially Vulnerable Area 08/01)

Local Plan District	Local authority	Main catchment
Tay	Perth and Kinross Council	River Garry (River Tay)

Background

This Potentially Vulnerable Area is 6km^2 and is situated in the upper reaches of the River Tay catchment. It includes Blair Atholl and the main watercourse is the River Garry.



The majority of flood damages are caused by river flooding, followed by surface water flooding.

There are fewer than 10 residential and non-residential properties at risk of flooding. The Annual Average Damages from flooding are approximately £14,000.

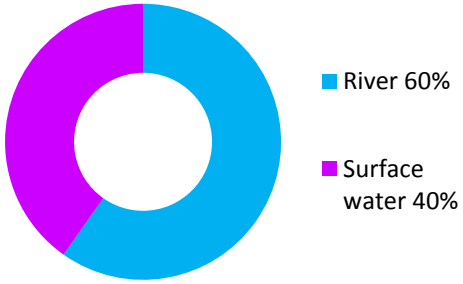


Figure 1: Annual Average Damages by flood source

Summary of flooding impacts

In the Blair Atholl area there is relatively lower confidence in the river flood hazard maps due to limitations arising from the data used and techniques applied in the national modelling. The number of properties at risk of flooding in the Blair Atholl area is likely to be underestimated.

Blair Atholl is at risk of flooding from the Garry Burn and from surface water. The risk of flooding to people, property, as well as to community facilities, utilities, the transport network, designated sites and agricultural land is summarised in Table 1.

The damages associated with floods of different likelihood are shown in Figure 2. Surface water damages may be under-represented in Figure 2 due to limitations in the available modelling output. For this Potentially Vulnerable Area the highest damages are to non-residential properties. The location of the impacts of flooding is shown in Figure 3.

The figures presented for Annual Average Damages include damages to residential properties, non-residential properties, transport and agriculture.

	1 in 10	1 in 200	1 in 1000
	High likelihood	Medium likelihood	Low likelihood
Residential properties (total 80)	<10	<10	<10
Non-residential properties (total 30)	<10	<10	<10
People	<10	<10	10
Community facilities	0	0	0
Utilities assets	<10	<10	<10
Transport links (excluding minor roads)	1 A road, 1 B road at 4 locations	1 A road, 1 B road at 6 locations 1 Railway route at 1 location: Perth to Inverness	1 A road, 1 B road at 6 locations 1 Railway route at 1 location: Perth to Inverness
Environmental designated areas (km^2)	0	0	0
Designated cultural heritage sites	1	1	1
Agricultural land (km^2)	< 0.1	0.2	0.2

Table 1: Summary of flooding impacts

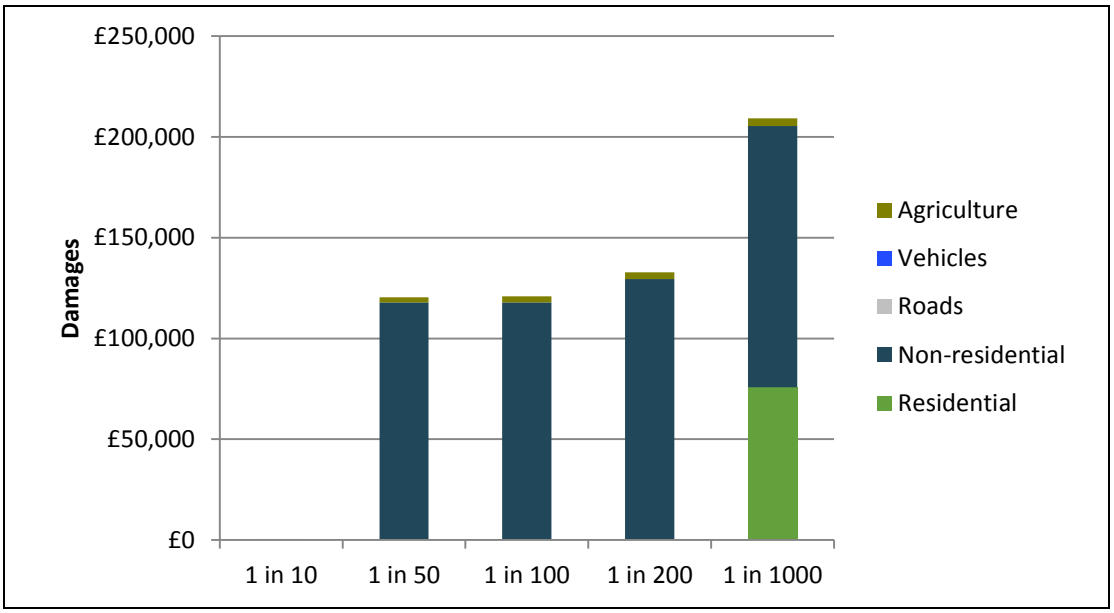


Figure 2: Damages by flood likelihood

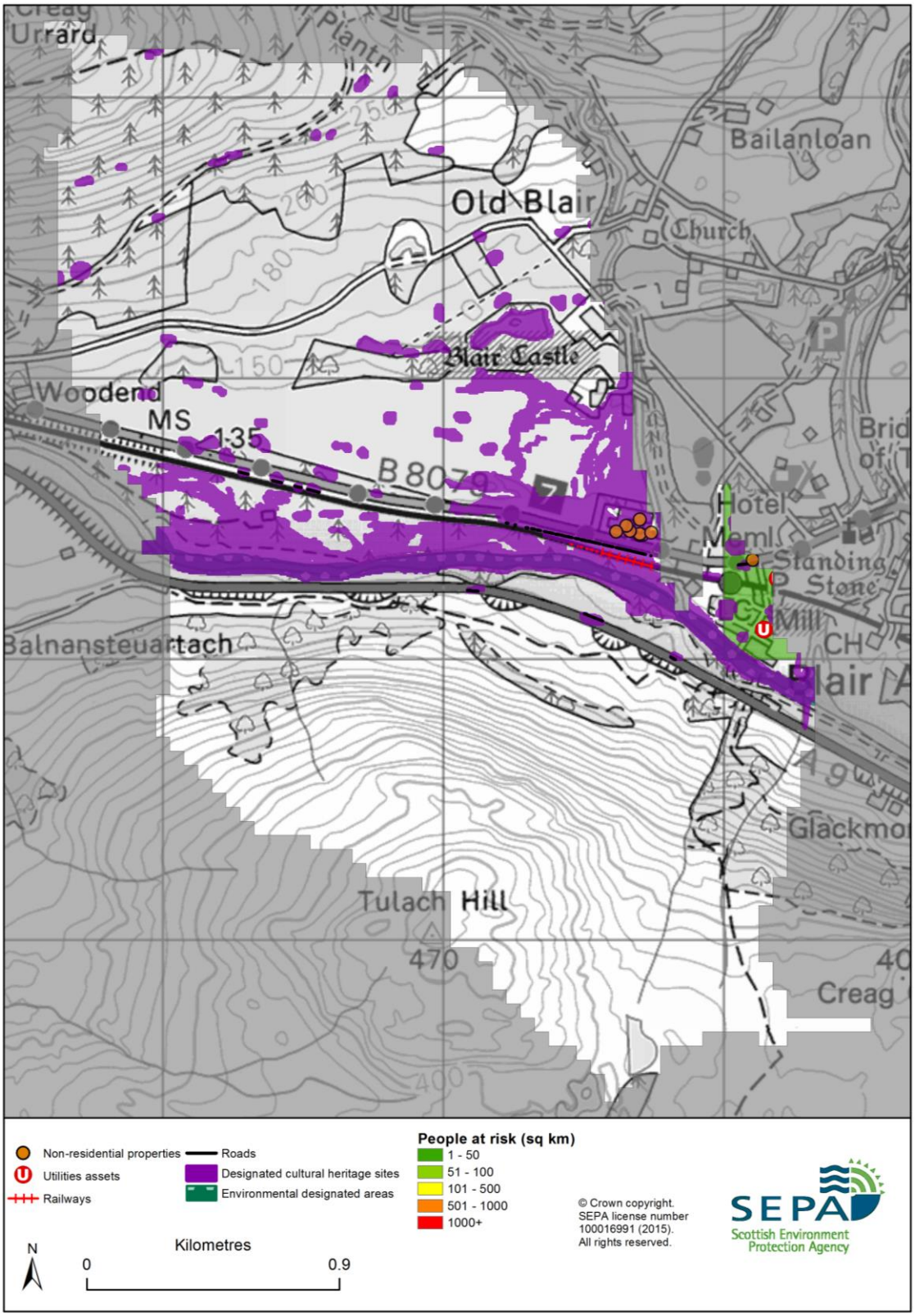


Figure 3: Impacts of flooding

History of flooding

A number of river floods have been recorded in this area. These include:

- 13 June 1931: Evacuation was required as River Garry flooded near Blair Atholl, the railway was also affected.
- July 1916: Evacuation was required as River Garry flooded near Blair Atholl, the railway was also flooded.

Objectives to manage flooding in Potentially Vulnerable Area 08/01

Objectives provide a common goal and shared ambition for managing floods. These objectives have been set by SEPA and agreed with flood risk management authorities following consultation. They were identified through an assessment of the underlying evidence of the causes and impacts of flooding. Target areas have been set to focus actions; they do not necessarily correspond to areas at risk in SEPA's flood map. The objectives below have been set for Blair Atholl Potentially Vulnerable Area.

Target area	Objective	ID	Indicators within PVA
Blair Atholl	Reduce the physical risk, or disruption risk, related to areas of the A9 at risk of flooding	8300	• 120m of road at one location on the A9
Applies across Tay Local Plan District	Avoid an overall increase in flood risk	8001	• <10 residential properties • £14,000 Annual Average Damages
Applies across Tay Local Plan District	Reduce overall flood risk	8041	• <10 residential properties • £14,000 Annual Average Damages
Applies across Tay Local Plan District	Organisations such as Scottish Water, energy companies and Historic Environment Scotland actively maintain and manage their own assets, including the risk of flooding. These actions are not detailed further in the Flood Risk Management Strategies.		

Actions to manage flooding in Potentially Vulnerable Area 08/01

Actions describe where and how flood risk will be managed. These actions have been set by SEPA and agreed with flood risk management authorities following consultation. Selection of actions to deliver the agreed objectives was based on a detailed assessment and comparison of economic, social and environmental criteria. The actions shaded and then described below have been selected as the most appropriate for Blair Atholl Potentially Vulnerable Area.

Selected actions					
Flood protection scheme/works	*Natural flood management works*	*New flood warning*	Community flood action groups	*Property level protection scheme*	*Site protection plans*
Flood protection study	*Natural flood management study*	*Maintain flood warning*	Awareness raising	*Surface water plan/study*	Emergency plans/response
Maintain flood protection scheme	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

Action (ID):	**FLOOD PROTECTION SCHEME/WORKS** (8300021)		
Objective (ID):	Reduce the physical risk, or disruption risk, related to areas of the A9 at risk of flooding (8300)		
Delivery lead:	Transport Scotland		
Status:	**Under development**	Indicative delivery:	**2022-2027**
Description:	Transport Scotland will carry out civil engineering work which will reduce the risk of flooding on identified sections of the trunk road.		

Action (ID):	**STRATEGIC MAPPING AND MODELLING** (80410016)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	SEPA		
Status:	**Not started**	Indicative delivery:	**2016-2021**
Description:	SEPA will seek to develop flood mapping in the River Garry area to improve understanding of flood risk. The extent and timing of improvements will depend on detailed scoping and data availability.		

Action (ID):	**FLOOD FORECASTING** (80410009)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	SEPA		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	The Scottish Flood Forecasting Service is a joint initiative between SEPA and the Met Office that produces daily, national flood guidance statements which are issued to Category 1 and 2 Responders. The service also provides information which allows SEPA to issue flood warnings, giving people a better chance of reducing the impact of flooding on their home or business. For more information please visit SEPA's website.		

Action (ID):	**COMMUNITY FLOOD ACTION GROUPS** (80020012)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Community		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Blair Atholl Community Council operates in this area. The community council is currently in the process of developing a community resilience plan which includes plans to mitigate the impact of flooding.		

Action (ID):	**SELF HELP** (80410011)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	—		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Everyone is responsible for protecting themselves and their property from flooding. Property and business owners can take simple steps to reduce damage and disruption to their homes and businesses should flooding happen. This includes preparing a flood plan and flood kit, installing property level protection, signing up to Floodline and Resilient Communities initiatives, and ensuring that properties and businesses are insured against flood damage.		

Action (ID):	**AWARENESS RAISING** (80410013)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Responsible authorities		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	SEPA and the responsible authorities have a duty to raise public awareness of flood risk. Improved awareness of flood risk and actions that prepare individuals, homes and businesses for flooding can reduce the overall impact. SEPA will undertake flood risk education and awareness raising activities. In addition, SEPA will engage with community resilience groups and participate in property level protection events delivered by the Scottish Flood Forum where possible. Local authorities will be undertaking additional awareness raising activities. Further details will be set out in the Local FRM Plan.		

Action (ID):	**MAINTENANCE** (80410007)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Perth and Kinross Council, asset / land managers		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Local authorities have a duty to assess watercourses and carry out clearance and repair works where such works would substantially reduce flood risk. They produce schedules of clearance and repair works and make these available for public inspection. Scottish Water undertake inspection and repair on the public sewer network. Asset owners and riparian landowners are responsible for the maintenance and management of their own assets including those which help to reduce flood risk.		

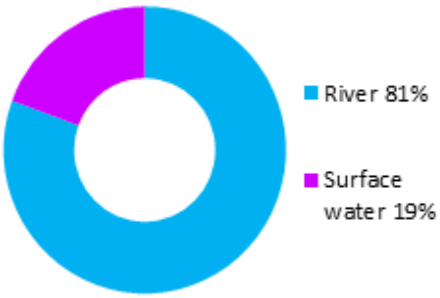
Action (ID):	**EMERGENCY PLANS/RESPONSE** (80410014)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Category 1 and 2 Responders		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Providing an emergency response to flooding is the responsibility of many organisations, including local authorities, the emergency services and SEPA. Effective management of an emergency response relies on emergency plans that are prepared under the Civil Contingencies Act 2004 by Category 1 and 2 Responders. The emergency response by these organisations is co-ordinated through regional and local resilience partnerships. This response may be supported by the work of voluntary organisations.		

Action (ID):	**PLANNING POLICIES** (80010001)		
Objective (ID):	Avoid an overall increase in flood risk (8001) Reduce overall flood risk (8041)		
Delivery lead:	Planning authority		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Scottish Planning Policy and accompanying Planning Advice Notes set out Scottish Ministers' priorities for the operation of the planning system and for the development and use of land. In terms of flood risk management, the policy supports a catchment-scale approach to sustainable flood risk management and aims to build the resilience of our cities and towns, encourage sustainable land management in our rural areas, and to address the long-term vulnerability of parts of our coasts and islands. Under this approach, new development in areas with medium to high likelihood of flooding should be avoided. For further information on the application of national planning policies see Annex 2.		

Kinloch Rannoch (Potentially Vulnerable Area 08/02)

Local Plan District	Local authority	Main catchment
Tay	Perth and Kinross Council	Loch Rannoch (River Tay)

Summary of flooding impacts



At risk of flooding

- 30 residential properties
- 20 non-residential properties
- £94,000 Annual Average Damages

(damages by flood source shown left)

Summary of objectives to manage flooding

Objectives have been set by SEPA and agreed with flood risk management authorities. These are the aims for managing local flood risk. The objectives have been grouped in three main ways: by reducing risk, avoiding increasing risk or accepting risk by maintaining current levels of management.

Many organisations, such as Scottish Water and energy companies, actively maintain and manage their own assets including their risk from flooding. Where known, these actions are described here. Scottish Natural Heritage and Historic Environment Scotland work with site owners to manage flooding where appropriate at designated environmental and/or cultural heritage sites. These actions are not detailed further in the Flood Risk Management Strategies.

Summary of actions to manage flooding

The actions below have been selected to manage flood risk.

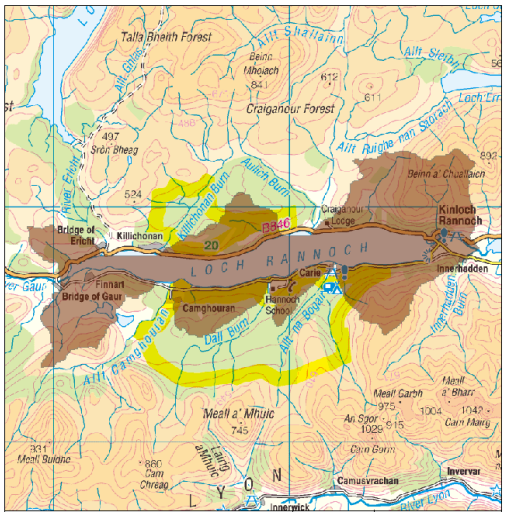
Flood protection scheme/works	*Natural flood management works*	*New flood warning*	*Community flood action groups*	*Property level protection scheme*	*Site protection plans*
Flood protection study	*Natural flood management study*	*Maintain flood warning*	Awareness raising	*Surface water plan/study*	Emergency plans/response
Maintain flood protection scheme	*Strategic mapping and modelling*	Flood forecasting	Self help	Maintenance	Planning policies

Kinloch Rannoch (Potentially Vulnerable Area 08/02)

Local Plan District	Local authority	Main catchment
Tay	Perth and Kinross Council	Loch Rannoch (River Tay)

Background

This Potentially Vulnerable Area is 77km^2 (shown below). It is situated in the upper reaches of the River Tay catchment and includes Kinloch Rannoch. It includes Loch Rannoch and the many burns that drain into it. The main watercourse is the River Tummel.



The area has a risk of river and surface water flooding. The majority of damages are caused by river flooding.

There are approximately 30 residential properties and 20 non-residential properties at risk of flooding. The Annual Average Damages are approximately £94,000.

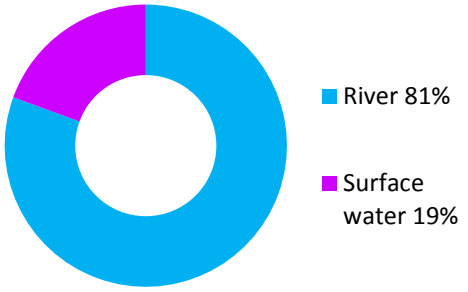


Figure 1: Annual Average Damages by flood source

Summary of flooding impacts

Work carried out since the National Flood Risk Assessment in 2011 has concluded that the risk of flooding in this Potentially Vulnerable Area is now relatively low. The designation of this Potentially Vulnerable Area will be reviewed in the next flood risk management planning cycle.

The main area at risk of flooding is Kinloch Rannoch which is at risk from Loch Rannoch and the River Tummel. Otherwise, flood risk is low and widely dispersed across the area.

The risk of flooding to people, property, as well as to community facilities, utilities, the transport network, designated sites and agricultural land is summarised in Table 1. The damages associated with floods of different likelihood are shown in Figure 2. For this Potentially Vulnerable Area the highest damages are to residential properties followed by damages to non-residential properties. The location of the impacts of flooding is shown in Figure 3.

The figures presented for Annual Average Damages include damages to residential properties, non-residential properties, transport and agriculture.

	1 in 10 High likelihood	1 in 200 Medium likelihood	1 in 1000 Low likelihood
Residential properties (total 220)	10	30	30
Non-residential properties (total 160)	<10	20	20
People	20	60	70
Community facilities	0	0	<10
Utilities assets	<10	<10	<10
Transport links (excluding minor roads)	1 B road at 19 locations	1 B road at 22 locations	1 B road at 23 locations
Environmental designated areas (km^2)	18.6	18.7	18.7
Designated cultural heritage sites	0	0	0
Agricultural land (km^2)	0.7	1.0	1.0

Table 1: Summary of flooding impacts

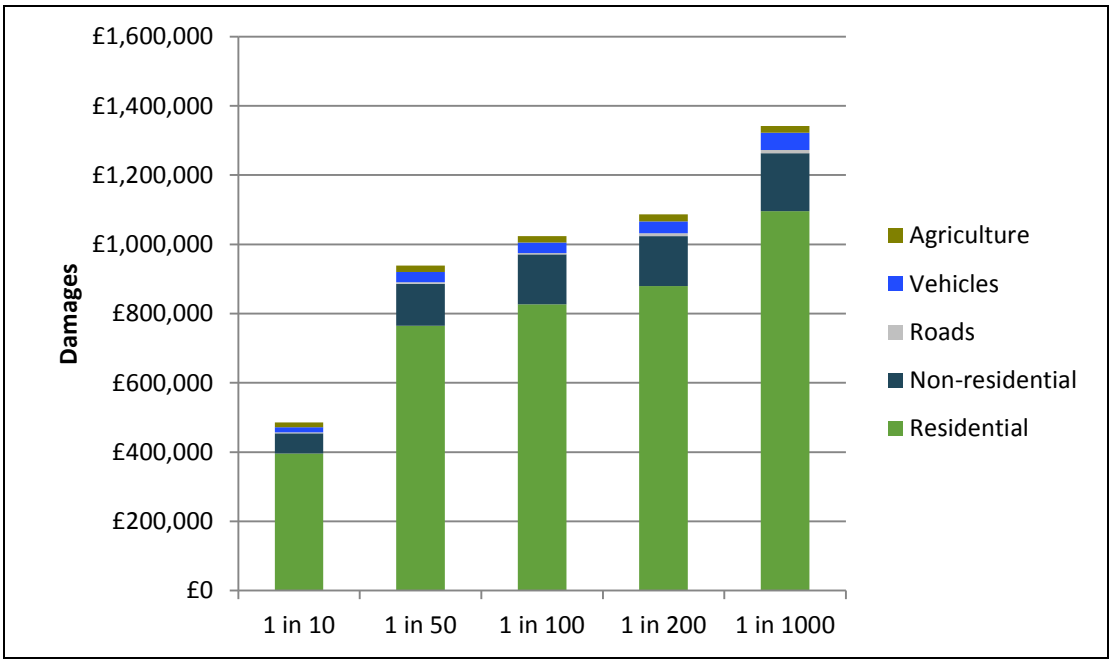


Figure 2: Damages by flood likelihood

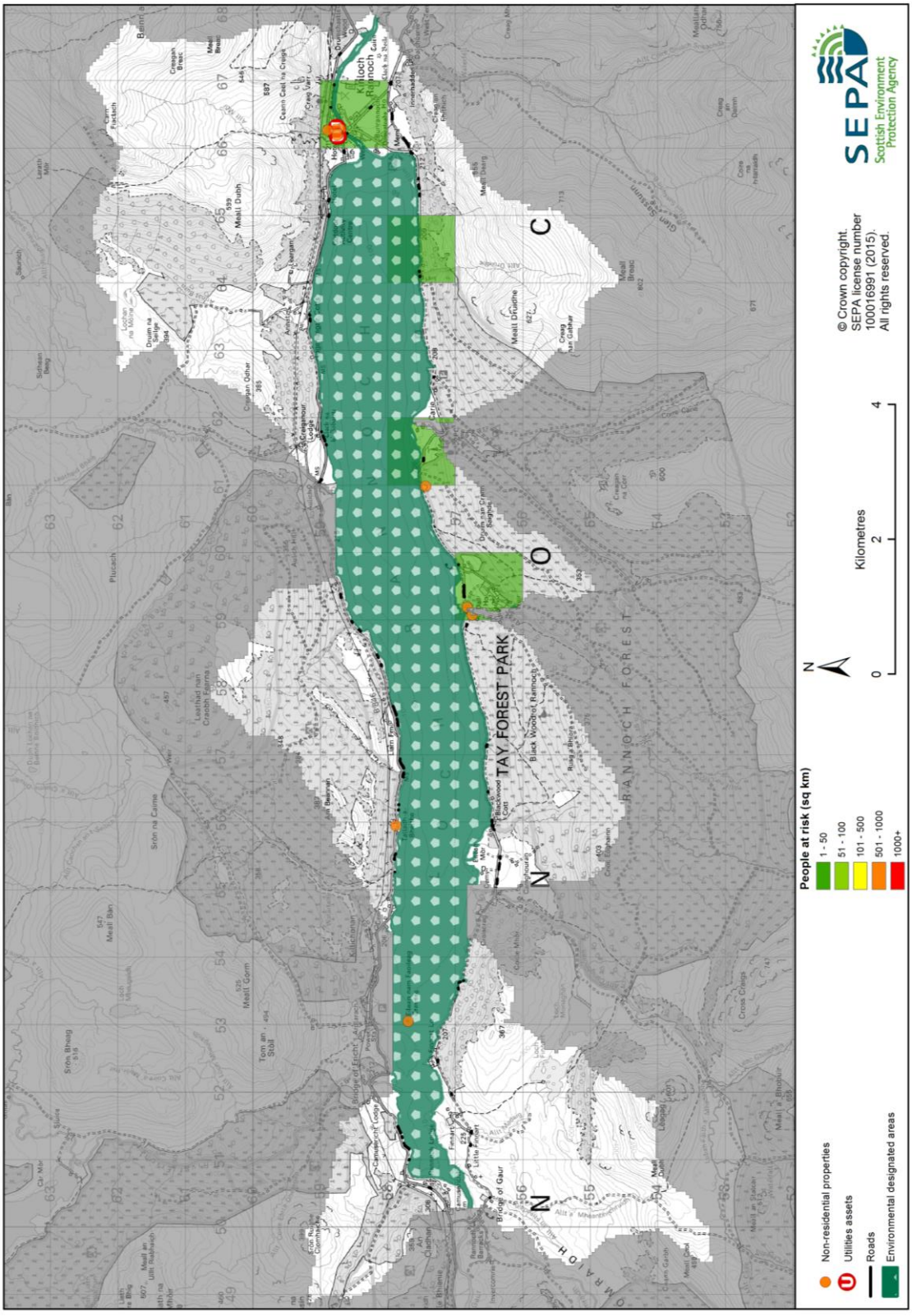


Figure 3: Impacts of flooding

History of flooding

No significant floods have been recorded in this Potentially Vulnerable Area.

Objectives to manage flooding in Potentially Vulnerable Area 08/02

Objectives provide a common goal and shared ambition for managing floods. These objectives have been set by SEPA and agreed with flood risk management authorities following consultation. They were identified through an assessment of the underlying evidence of the causes and impacts of flooding. Target areas have been set to focus actions; they do not necessarily correspond to areas at risk in SEPA's flood map. The objectives below have been set for Kinloch Rannoch Potentially Vulnerable Area.

Target area	Objective	ID	Indicators within PVA
Applies across Tay Local Plan District	Avoid an overall increase in flood risk	8001	• 30 residential properties • £94,000 Annual Average Damages
Applies across Tay Local Plan District	Reduce overall flood risk	8041	• 30 residential properties • £94,000 Annual Average Damages
Applies across Tay Local Plan District	Organisations such as Scottish Water, energy companies and Historic Environment Scotland actively maintain and manage their own assets, including the risk of flooding. These actions are not detailed further in the Flood Risk Management Strategies.		

Actions to manage flooding in Potentially Vulnerable Area 08/02

Actions describe where and how flood risk will be managed. These actions have been set by SEPA and agreed with flood risk management authorities following consultation. Selection of actions to deliver the agreed objectives was based on a detailed assessment and comparison of economic, social and environmental criteria. The actions shaded and then described below have been selected as the most appropriate for Kinloch Rannoch Potentially Vulnerable Area.

Selected actions					
Flood protection scheme/works	*Natural flood management works*	*New flood warning*	*Community flood action groups*	*Property level protection scheme*	*Site protection plans*
Flood protection study	*Natural flood management study*	*Maintain flood warning*	Awareness raising	*Surface water plan/study*	Emergency plans/response
Maintain flood protection scheme	*Strategic mapping and modelling*	Flood forecasting	Self help	Maintenance	Planning policies

Action (ID):	**FLOOD FORECASTING** (80410009)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	SEPA		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	The Scottish Flood Forecasting Service is a joint initiative between SEPA and the Met Office that produces daily, national flood guidance statements which are issued to Category 1 and 2 Responders. The service also provides information which allows SEPA to issue flood warnings, giving people a better chance of reducing the impact of flooding on their home or business. For more information please visit SEPA's website.		

Action (ID):	**SELF HELP** (80410011)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	—		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Everyone is responsible for protecting themselves and their property from flooding. Property and business owners can take simple steps to reduce damage and disruption to their homes and businesses should flooding happen. This includes preparing a flood plan and flood kit, installing property level protection, signing up to Floodline and Resilient Communities initiatives, and ensuring that properties and businesses are insured against flood damage.		

Action (ID):	**AWARENESS RAISING** (80410013)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Responsible authorities		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	SEPA and the responsible authorities have a duty to raise public awareness of flood risk. Improved awareness of flood risk and actions that prepare individuals, homes and businesses for flooding can reduce the overall impact. From 2016 SEPA will engage with the community through local participation in national initiatives, including partnership working with Neighbourhood Watch Scotland. Local authorities will be undertaking additional awareness raising activities. Further details will be set out in the Local FRM Plan.		

Action (ID):	**MAINTENANCE** (80410007)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Perth and Kinross Council, asset / land managers		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Local authorities have a duty to assess watercourses and carry out clearance and repair works where such works would substantially reduce flood risk. They produce schedules of clearance and repair works and make these available for public inspection. Scottish Water undertake inspection and repair on the public sewer network. Asset owners and riparian landowners are responsible for the maintenance and management of their own assets including those which help to reduce flood risk.		

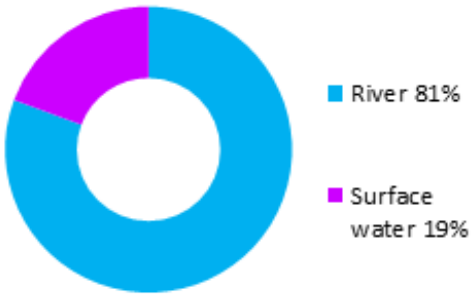
Action (ID):	**EMERGENCY PLANS/RESPONSE** (80410014)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Category 1 and 2 Responders		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Providing an emergency response to flooding is the responsibility of many organisations, including local authorities, the emergency services and SEPA. Effective management of an emergency response relies on emergency plans that are prepared under the Civil Contingencies Act 2004 by Category 1 and 2 Responders. The emergency response by these organisations is co-ordinated through regional and local resilience partnerships. This response may be supported by the work of voluntary organisations.		

Action (ID):	**PLANNING POLICIES** (80010001)		
Objective (ID):	Avoid an overall increase in flood risk (8001) Reduce overall flood risk (8041)		
Delivery lead:	Planning authority		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Scottish Planning Policy and accompanying Planning Advice Notes set out Scottish Ministers' priorities for the operation of the planning system and for the development and use of land. In terms of flood risk management, the policy supports a catchment-scale approach to sustainable flood risk management and aims to build the resilience of our cities and towns, encourage sustainable land management in our rural areas, and to address the long-term vulnerability of parts of our coasts and islands. Under this approach, new development in areas with medium to high likelihood of flooding should be avoided. For further information on the application of national planning policies see Annex 2.		

Aberfeldy and Pitlochry (Potentially Vulnerable Area 08/03)

Local Plan District	Local authority	Main catchment
Tay	Perth and Kinross Council	River Tay

Summary of flooding impacts



At risk of flooding

- 240 residential properties
- 130 non-residential properties
- £1.2 million Annual Average Damages

(damages by flood source shown left)

Summary of objectives to manage flooding

Objectives have been set by SEPA and agreed with flood risk management authorities. These are the aims for managing local flood risk. The objectives have been grouped in three main ways: by reducing risk, avoiding increasing risk or accepting risk by maintaining current levels of management.

Many organisations, such as Scottish Water and energy companies, actively maintain and manage their own assets including their risk from flooding. Where known, these actions are described here. Scottish Natural Heritage and Historic Environment Scotland work with site owners to manage flooding where appropriate at designated environmental and/or cultural heritage sites. These actions are not detailed further in the Flood Risk Management Strategies.

Summary of actions to manage flooding

The actions below have been selected to manage flood risk.

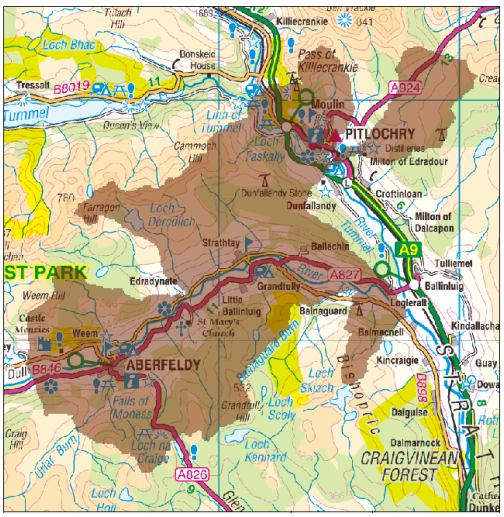
Flood protection scheme/works	*Natural flood management works*	*New flood warning*	Community flood action groups	*Property level protection scheme*	*Site protection plans*
Flood protection study	*Natural flood management study*	Maintain flood warning	Awareness raising	*Surface water plan/study*	Emergency plans/response
Maintain flood protection scheme	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

Aberfeldy and Pitlochry (Potentially Vulnerable Area 08/03)

Local Plan District	Local authority	Main catchment
Tay	Perth and Kinross Council	River Tay

Background

This Potentially Vulnerable Area is 140km^2 (shown below). It is situated in the middle reaches of the River Tay catchment and includes Aberfeldy and Pitlochry. The main watercourses are the River Tay and the River Tummel.



The area has a risk of river and surface water flooding. The majority of damages are caused by river flooding.

There are approximately 240 residential properties and 130 non-residential properties at risk of flooding. The Annual Average Damages are approximately £1.2 million.

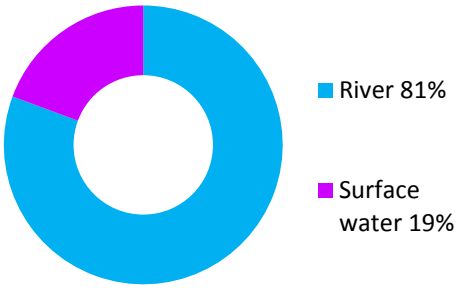


Figure 1: Annual Average Damages by flood source

Summary of flooding impacts

The highest risk of flooding is in Pitlochry from the River Tummel and smaller watercourses, and in Aberfeldy from the River Tay and Moness Burn.

The risk of flooding to people, property, as well as to community facilities, utilities, the transport network, designated sites and agricultural land is summarised in Table 1. The damages associated with floods of different likelihood are shown in Figure 2. For this Potentially Vulnerable Area the highest damages are to residential properties followed by damages to non-residential properties.

The location of the impacts of flooding is shown in Figure 3.

The figures presented for Annual Average Damages include damages to residential properties, non-residential properties, transport and agriculture.

	1 in 10 High likelihood	1 in 200 Medium likelihood	1 in 1000 Low likelihood
Residential properties (total 3,000)	150	240	340
Non-residential properties (total 1,200)	70	130	170
People	330	530	750
Community facilities	<10 Educational buildings	<10 Educational buildings	<10 Educational buildings
Utilities assets	<10	<10	<10
Transport links (excluding minor roads)	4 A roads and 3 B roads at 70 locations 1 Railway route at 11 locations: Perth to Inverness	4 A roads and 3 B roads at 112 locations 1 Railway route at 12 locations: Perth to Inverness	4 A roads and 3 B roads at 123 locations 1 Railway route at 14 locations: Perth to Inverness
Environmental designated areas (km^2)	2.7	2.8	2.8
Designated cultural heritage sites	17	21	31
Agricultural land (km^2)	5.2	6.4	6

Table 1: Summary of flooding impacts

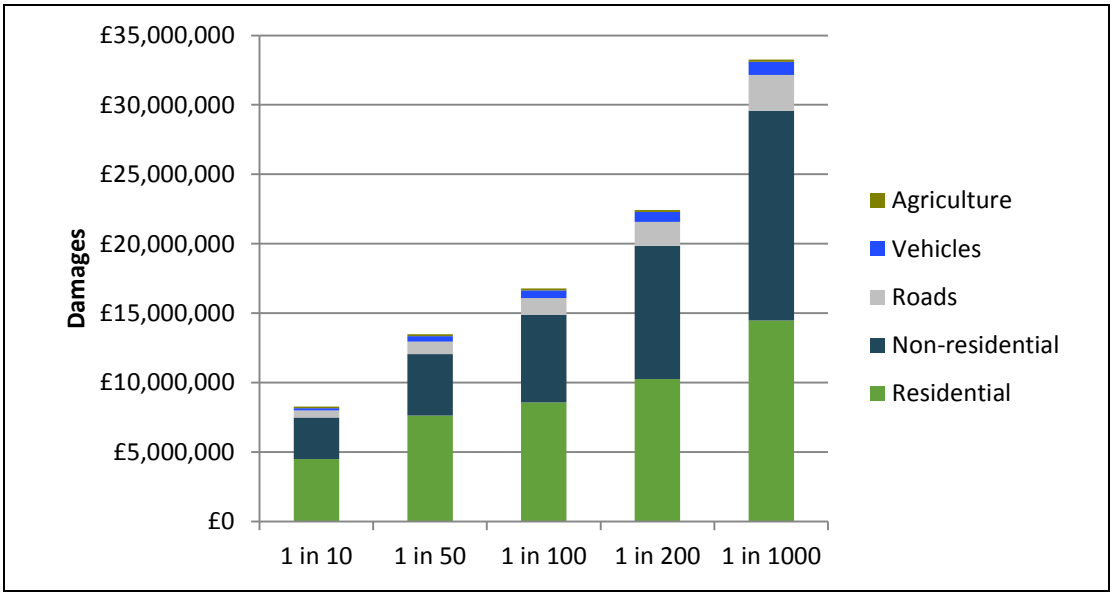


Figure 2: Damages by flood likelihood

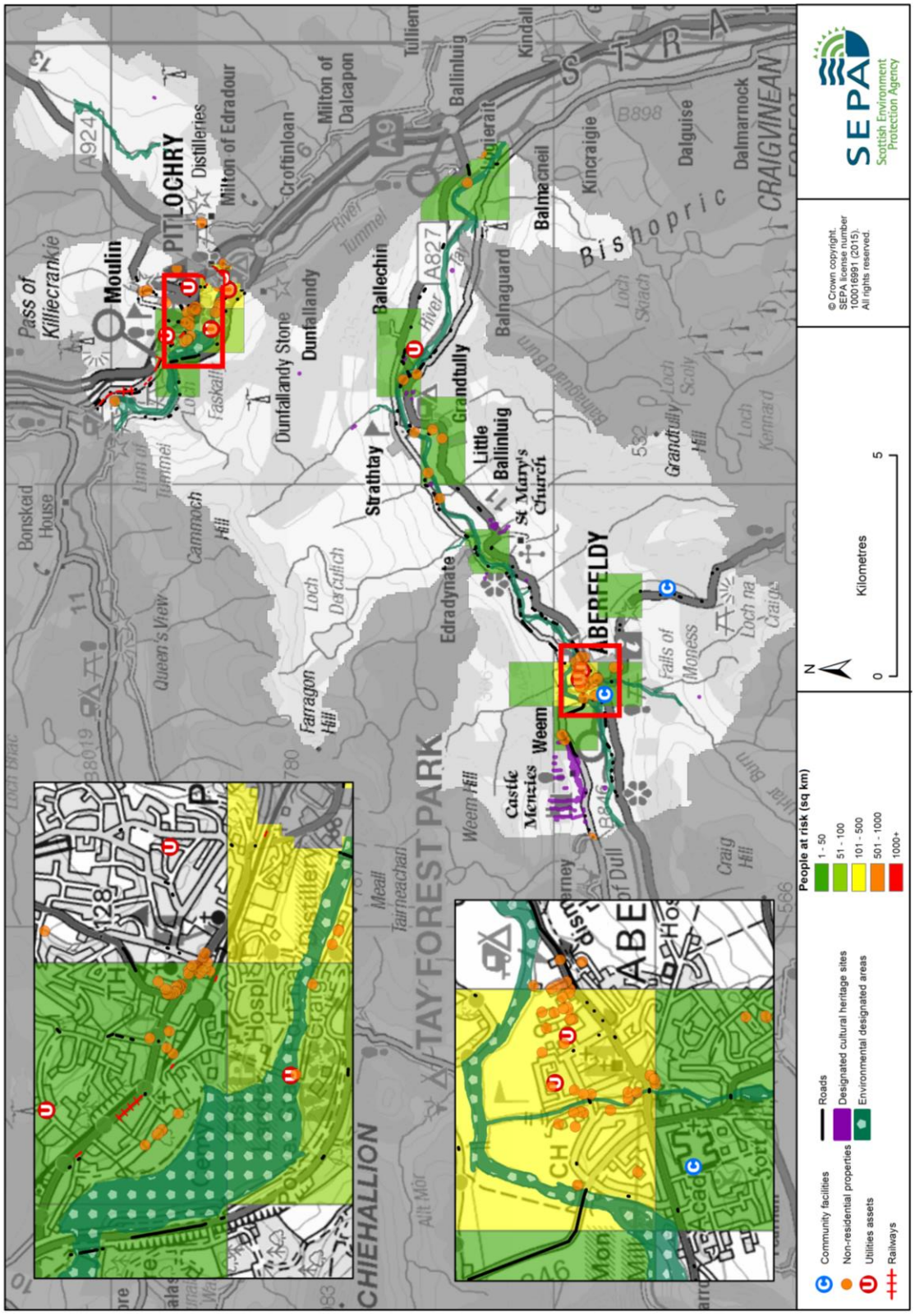


Figure 3: Impacts of flooding

History of flooding

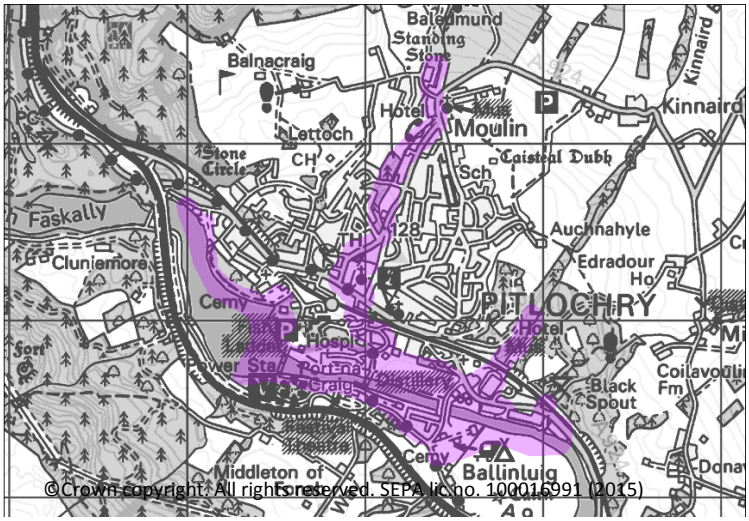
The River Tay has a long history of flooding. The following significant river floods have been recorded:

- 13 December 2006: River Tay flooded, affecting numerous houses in Aberfeldy, Logierait and isolated rural properties.
- 16 January 1993: Widespread flooding across the Tay catchment resulted in over £20 million of damage. The flood event is known to have affected Aberfeldy, Logierait and Pitlochry.
- 7 February 1990: Communication networks were disrupted as a result of flooding in the Tay and Earn Valleys. Properties, roads and railways were also damaged.
- 17 February 1950: Communication networks were disrupted and properties and several roads were flooded within the upper Tay. The flood is known to have affected a large part of Perth and Kinross.
- 22 January 1928: At the time, this was the wettest January on record and resulted in flooding from the River Tay across Perth and Kinross including Aberfeldy, Pitlochry and Logierait. The River Tay reached 5.77m above normal levels at Smeaton's Bridge in Perth.

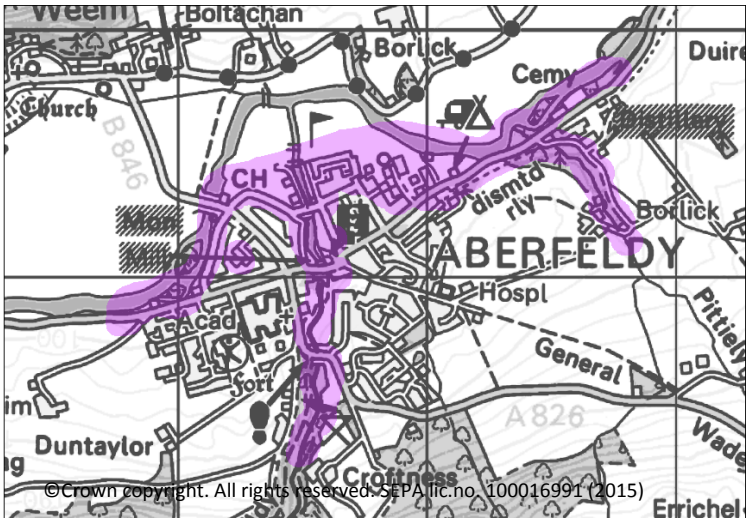
Objectives to manage flooding in Potentially Vulnerable Area 08/03

Objectives provide a common goal and shared ambition for managing floods. These objectives have been set by SEPA and agreed with flood risk management authorities following consultation. They were identified through an assessment of the underlying evidence of the causes and impacts of flooding. Target areas have been set to focus actions; they do not necessarily correspond to areas at risk in SEPA's flood map. The objectives below have been set for Aberfeldy and Pitlochry Potentially Vulnerable Area.

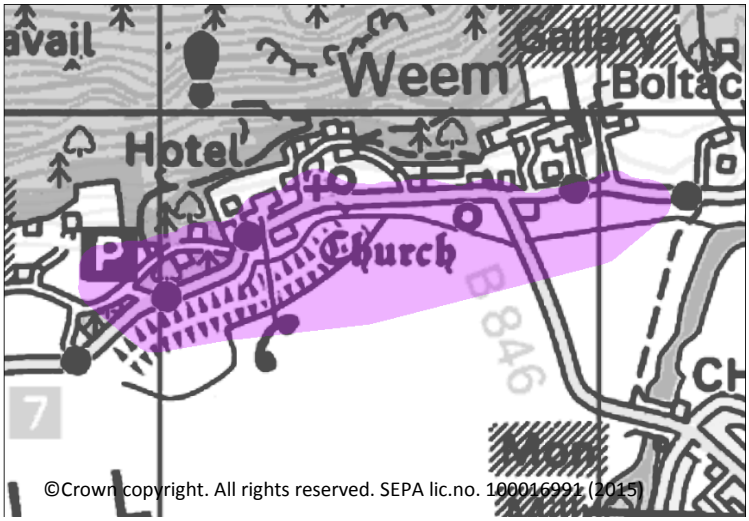
Reduce economic damages to residential and non-residential properties in Pitlochry from the River Tummel and small watercourses

Indicators:	Target area:
• £400,000 Annual Average Damages from residential properties • £120,000 Annual Average Damages from non-residential properties	
Objective ID: 8004	

Reduce economic damages to residential and non-residential properties in Aberfeldy from the River Tay and Moness Burn

Indicators:	Target area:
• £200,000 Annual Average Damages from residential properties • £140,000 Annual Average Damages from non-residential properties	
Objective ID: 8005	

Accept that significant flood risk in Weem is managed appropriately. Maintain existing actions that reduce flood risk in Weem caused by flooding from the River Tay and the surrounding minor watercourses.

Indicators:	Target area:
• Six residential properties protected (100 year event) • £620,000 damages avoided	
Objective ID: 8006	

Target area	Objective	ID	Indicators within PVA
Pitlochry	Reduce the physical risk, or disruption risk, related to areas of the A9 at risk of flooding	8301	• 60m of road at two locations on the A9
Applies across Tay Local Plan District	Avoid an overall increase in flood risk	8001	• 240 residential properties • £1.2 million Annual Average Damages
Applies across Tay Local Plan District	Reduce overall flood risk	8041	• 240 residential properties • £1.2 million Annual Average Damages
Applies across Tay Local Plan District	Organisations such as Scottish Water, energy companies and Historic Environment Scotland actively maintain and manage their own assets, including the risk of flooding. These actions are not detailed further in the Flood Risk Management Strategies.		

Actions to manage flooding in Potentially Vulnerable Area 08/03

Actions describe where and how flood risk will be managed. These actions have been set by SEPA and agreed with flood risk management authorities following consultation. Selection of actions to deliver the agreed objectives was based on a detailed assessment and comparison of economic, social and environmental criteria. The actions shaded and then described below have been selected as the most appropriate for Aberfeldy and Pitlochry Potentially Vulnerable Area.

Selected actions					
Flood protection scheme/works	*Natural flood management works*	*New flood warning*	Community flood action groups	*Property level protection scheme*	*Site protection plans*
Flood protection study	*Natural flood management study*	Maintain flood warning	Awareness raising	*Surface water plan/study*	Emergency plans/response
Maintain flood protection scheme	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

Action (ID):	**FLOOD PROTECTION SCHEME/WORKS** (8301021)		
Objective (ID):	Reduce the physical risk, or disruption risk, related to areas of the A9 at risk of flooding (8301)		
Delivery lead:	Transport Scotland		
Status:	**Under development**	Indicative delivery:	**2022-2027**
Description:	Transport Scotland will carry out civil engineering work which will reduce the risk of flooding on identified sections of the trunk road.		

Action (ID):	**FLOOD PROTECTION STUDY** (80040005)		
Objective (ID):	Reduce economic damages to residential and non-residential properties in Pitlochry from the River Tummel and small watercourses (8004)		
Delivery lead:	Perth and Kinross Council		
Priority:	National:	Within local authority:	
	25 of 168	**1 of 6**	
Status:	**Not started**	Indicative delivery:	**2016-2021**
Description:	A flood protection study has been recommended for Pitlochry to assess whether flood storage, sediment management, modification of conveyance and installation/ modification of fluvial control structures could reduce flood risk. The study should also consider property relocation. The study should build on the previous study carried out by Perth and Kinross Council in 2007 and consider		

	flooding from small watercourses as well as the main river. The study should take a catchment approach and consider the potential benefits and disbenefits and interaction between actions upstream and downstream.
Potential impacts	
Economic:	The study could benefit 121 residential properties and 47 non-residential properties at risk of flooding in this location, with potential damages avoided of up to £19 million.
Social:	Social impacts will depend on the outcome of the study and recommended actions. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community.
Environmental:	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment and designated sites. Where possible opportunities to enhance and restore the environment should be sought, for example through natural flood management. To be in accord with the FRM Strategy, the responsible authority should seek to ensure as part of the study that the action will not have an adverse effect on the integrity of the River Tay Special Area of Conservation, Shingle Islands Special Area of Conservation and Black Wood of Rannoch Special Area of Conservation. Conservation areas, National Scenic Areas, scheduled monuments, listed buildings, Sites of Special Scientific Interest and ancient woodlands are also present in the study area and could be positively or negatively impacted.

Action (ID):	**FLOOD PROTECTION STUDY** (80050005)		
Objective (ID):	Reduce economic damages to residential and non-residential properties in Aberfeldy from the River Tay and Moness Burn (8005)		
Delivery lead:	Perth and Kinross Council		
Priority:	National:		Within local authority:
	41 of 168		**2 of 6**
Status:	**Not started**	Indicative delivery:	**2016-2021**
Description:	A flood protection study has been recommended for Aberfeldy to assess whether installation/ modification of fluvial control structures, direct flood defences and sediment management could reduce flood risk. The study should take a catchment approach and consider the potential benefits and disbenefits and interaction between actions upstream and downstream.		
Potential impacts			
Economic:	The study could benefit 104 residential properties and 44 non-residential properties at risk of flooding in this location, with potential damages avoided of up to £8.7 million.		
Social:	Social impacts will depend on the outcome of the study and recommended actions. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community. In addition the study could benefit two utilities and one road located within the study area.		
Environmental:	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the		

Environmental:	environment and designated sites. Where possible opportunities to enhance and restore the environment should be sought, for example through natural flood management. To be in accord with the FRM Strategy, the responsible authority should seek to ensure as part of the study that the action will not have an adverse effect on the integrity of the River Tay Special Area of Conservation. Conservation areas and listed buildings are also present in the study area and could be positively or negatively impacted.

Action (ID):	**STRATEGIC MAPPING AND MODELLING** (80410016)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	SEPA		
Status:	**Not started**	Indicative delivery:	**2016-2021**
Description:	SEPA will seek to develop flood mapping in the River Tummel and River Tay areas to improve understanding of flood risk. The extent and timing of improvements will depend on detailed scoping and data availability. Where this work coincides with local authority studies, SEPA will work collaboratively to ensure consistent modelling approaches are applied.		

Action (ID):	**STRATEGIC MAPPING AND MODELLING** (80410019)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Scottish Water		
Status:	**Not started**	Indicative delivery:	**2016-2021**
Description:	Scottish Water will carry out an assessment of flood risk within the highest risk sewer catchments to improve knowledge and understanding of surface water flood risk.		

Action (ID):	**MAINTAIN FLOOD PROTECTION SCHEME** (80060017)		
Objective (ID):	Accept that significant flood risk in Weem is managed appropriately. Maintain existing actions that reduce flood risk in Weem caused by flooding from the River Tay and the surrounding minor watercourses. (8006)		
Delivery lead:	Perth and Kinross Council		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Continue to maintain the existing Weem Flood Protection Scheme. The scheme was completed in 2006 and includes a drain diversion and the construction of flood defences. The scheme has a design standard of protection of 1 in 100 years.		

Action (ID):	**MAINTAIN FLOOD WARNING** (80410030)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	SEPA		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Continue to maintain the Aberfeldy, Ballinluig to Logierait, Logierait to Victoria Bridge, Pitlochry to Ballinluig, River Tummel in Pitlochry and the Upper Tay (from Taymouth Castle to Logierait) flood warning areas which are part of the Tay river flood warning scheme.		

Action (ID):	**FLOOD FORECASTING** (80410009)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	SEPA		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	The Scottish Flood Forecasting Service is a joint initiative between SEPA and the Met Office that produces daily, national flood guidance statements which are issued to Category 1 and 2 Responders. The service also provides information which allows SEPA to issue flood warnings, giving people a better chance of reducing the impact of flooding on their home or business. For more information please visit SEPA's website.		

Action (ID):	**COMMUNITY FLOOD ACTION GROUPS** (80040012)		
Objective (ID):	Reduce economic damages to residential and non-residential properties in Pitlochry from the River Tummel and small watercourses (8004)		
Delivery lead:	Community		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Pitlochry Community Council operates in this area. The community council is in the process of developing a community resilience plan which includes mitigating the impact of flooding.		

Action (ID):	**COMMUNITY FLOOD ACTION GROUPS** (80050012)		
Objective (ID):	Reduce economic damages to residential and non-residential properties in Aberfeldy from the River Tay and Moness Burn (8005)		
Delivery lead:	Community		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Aberfeldy Resilience Group operates in this area. Membership of the group includes Perth and Kinross Council, SEPA, Tayside Fire and Rescue and the Scottish Flood Forum. The group aims to help reduce flooding to businesses and communities within the Aberfeldy area, improve joint working before, during and after flooding and increase community resilience.		

Action (ID):	**SELF HELP** (80410011)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	—		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Everyone is responsible for protecting themselves and their property from flooding. Property and business owners can take simple steps to reduce damage and disruption to their homes and businesses should flooding happen. This includes preparing a flood plan and flood kit, installing property level protection, signing up to Floodline and Resilient Communities initiatives, and ensuring that properties and businesses are insured against flood damage. Perth and Kinross Council is piloting a project for flood protection products for properties in flood risk areas.		

Action (ID):	**AWARENESS RAISING** (80410013)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Responsible authorities		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	SEPA and the responsible authorities have a duty to raise public awareness of flood risk. Improved awareness of flood risk and actions that prepare individuals, homes and businesses for flooding can reduce the overall impact. From 2016 SEPA will undertake flood risk education and awareness raising activities. In addition, SEPA will engage with community resilience groups and participate in property level protection events delivered by the Scottish Flood Forum where possible. Local authorities will be undertaking additional awareness raising activities. Further details will be set out in the Local FRM Plan.		

Action (ID):	**MAINTENANCE** (80410007)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Perth and Kinross Council, asset / land managers		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Local authorities have a duty to assess watercourses and carry out clearance and repair works where such works would substantially reduce flood risk. They produce schedules of clearance and repair works and make these available for public inspection. Scottish Water undertake inspection and repair on the public sewer network. Asset owners and riparian landowners are responsible for the maintenance and management of their own assets including those which help to reduce flood risk.		

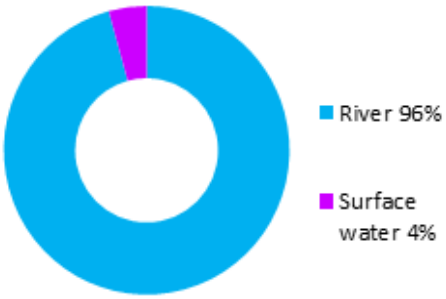
Action (ID):	**EMERGENCY PLANS/RESPONSE** (80410014)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Category 1 and 2 Responders		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Providing an emergency response to flooding is the responsibility of many organisations, including local authorities, the emergency services and SEPA. Effective management of an emergency response relies on emergency plans that are prepared under the Civil Contingencies Act 2004 by Category 1 and 2 Responders. The emergency response by these organisations is co-ordinated through regional and local resilience partnerships. This response may be supported by the work of voluntary organisations.		

Action (ID):	**PLANNING POLICIES** (80010001)		
Objective (ID):	Avoid an overall increase in flood risk (8001) Reduce overall flood risk (8041)		
Delivery lead:	Planning authority		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Scottish Planning Policy and accompanying Planning Advice Notes set out Scottish Ministers' priorities for the operation of the planning system and for the development and use of land. In terms of flood risk management, the policy supports a catchment-scale approach to sustainable flood risk management and aims to build the resilience of our cities and towns, encourage sustainable land management in our rural areas, and to address the long-term vulnerability of parts of our coasts and islands. Under this approach, new development in areas with medium to high likelihood of flooding should be avoided. For further information on the application of national planning policies see Annex 2.		

Alyth (Potentially Vulnerable Area 08/04)

Local Plan District	Local authority	Main catchment
Tay	Perth and Kinross Council	Alyth Burn (River Tay)

Summary of flooding impacts



At risk of flooding

- 50 residential properties
- 20 non-residential properties
- £160,000 Annual Average Damages

(damages by flood source shown left)

Summary of objectives to manage flooding

Objectives have been set by SEPA and agreed with flood risk management authorities. These are the aims for managing local flood risk. The objectives have been grouped in three main ways: by reducing risk, avoiding increasing risk or accepting risk by maintaining current levels of management.

Many organisations, such as Scottish Water and energy companies, actively maintain and manage their own assets including their risk from flooding. Where known, these actions are described here. Scottish Natural Heritage and Historic Environment Scotland work with site owners to manage flooding where appropriate at designated environmental and/or cultural heritage sites. These actions are not detailed further in the Flood Risk Management Strategies.

Summary of actions to manage flooding

The actions below have been selected to manage flood risk.

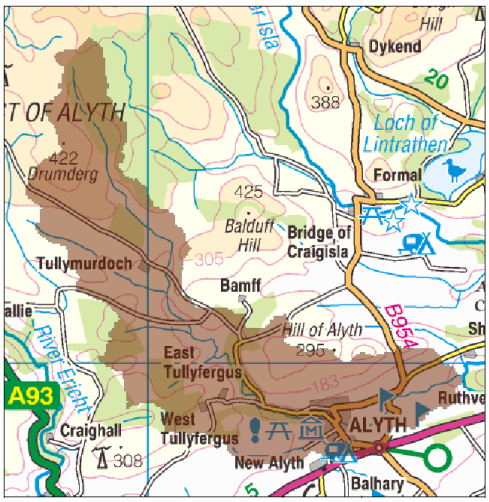
Flood protection scheme/works	*Natural flood management works*	New flood warning	*Community flood action groups*	*Property level protection scheme*	*Site protection plans*
Flood protection study	Natural flood management study	*Maintain flood warning*	Awareness raising	*Surface water plan/study*	Emergency plans/response
Maintain flood protection scheme	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

Alyth (Potentially Vulnerable Area 08/04)

Local Plan District	Local authority	Main catchment
Tay	Perth and Kinross Council	Alyth Burn (River Tay)

Background

This Potentially Vulnerable Area is 36km^2 (shown below). It is situated in the middle reaches of the River Tay catchment and includes Alyth. The main watercourse is the Alyth Burn.



The area has a risk of river and surface water flooding. The majority of flood damages are caused by river flooding.

There are approximately 50 residential properties and 20 non-residential properties at risk of flooding. The Annual Average Damages are approximately £160,000.

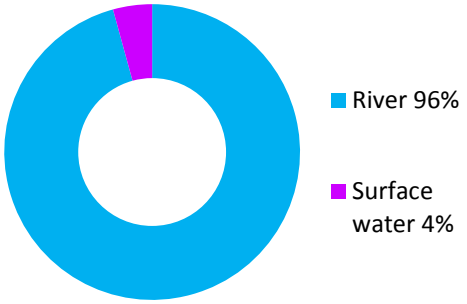


Figure 1: Annual Average Damages by flood source

Summary of flooding impacts

The highest risk of flooding is in Alyth from the Alyth Burn.

The risk of flooding to people, property, as well as to community facilities, utilities, the transport network, designated sites and agricultural land is summarised in Table 1.

The damages associated with floods of different likelihood are shown in Figure 2. For this Potentially Vulnerable Area the highest damages are to residential properties followed by damages to non-residential properties.

The location of the impacts of flooding is shown in Figure 3.

The figures presented for Annual Average Damages include damages to residential properties, non-residential properties, transport and agriculture.

	1 in 10 High likelihood	1 in 200 Medium likelihood	1 in 1000 Low likelihood
Residential properties (total 1,200)	30	50	80
Non-residential properties (total 260)	10	20	30
People	70	100	170
Community facilities	0	0	0
Utilities assets	<10	<10	<10
Transport links (excluding minor roads)	2 B roads at 8 locations	2 B roads at 8 locations	2 B roads at 8 locations
Environmental designated areas (km^2)	0.1	0.1	0.1
Designated cultural heritage sites	1	1	1
Agricultural land (km^2)	0.4	0.5	0.6

Table 1: Summary of flooding impacts

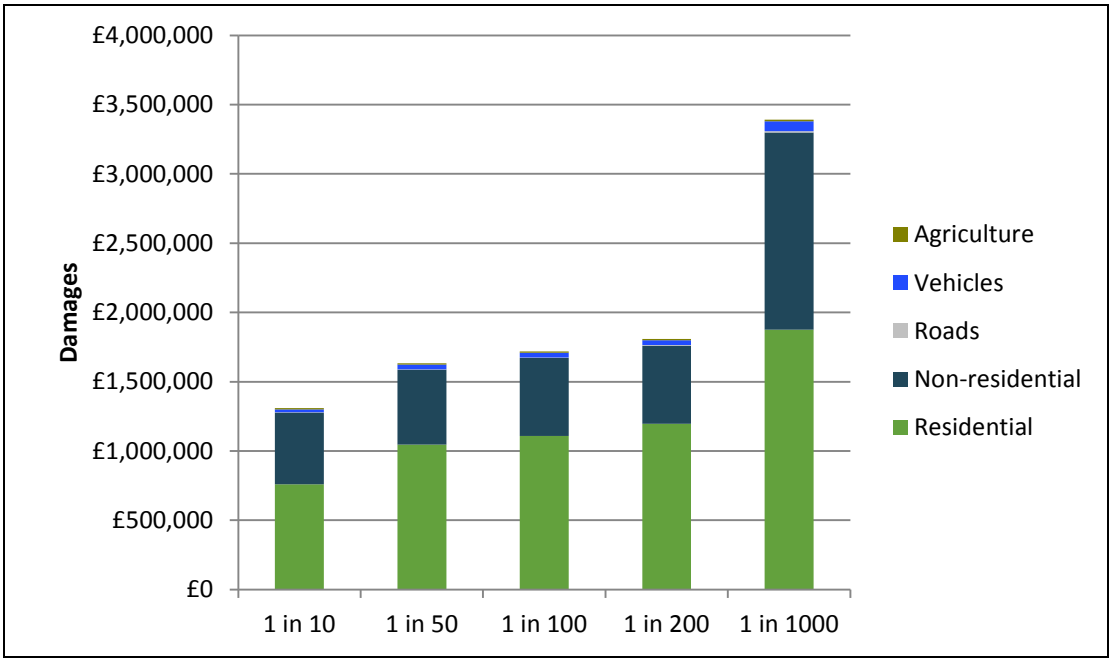


Figure 2: Damages by flood likelihood

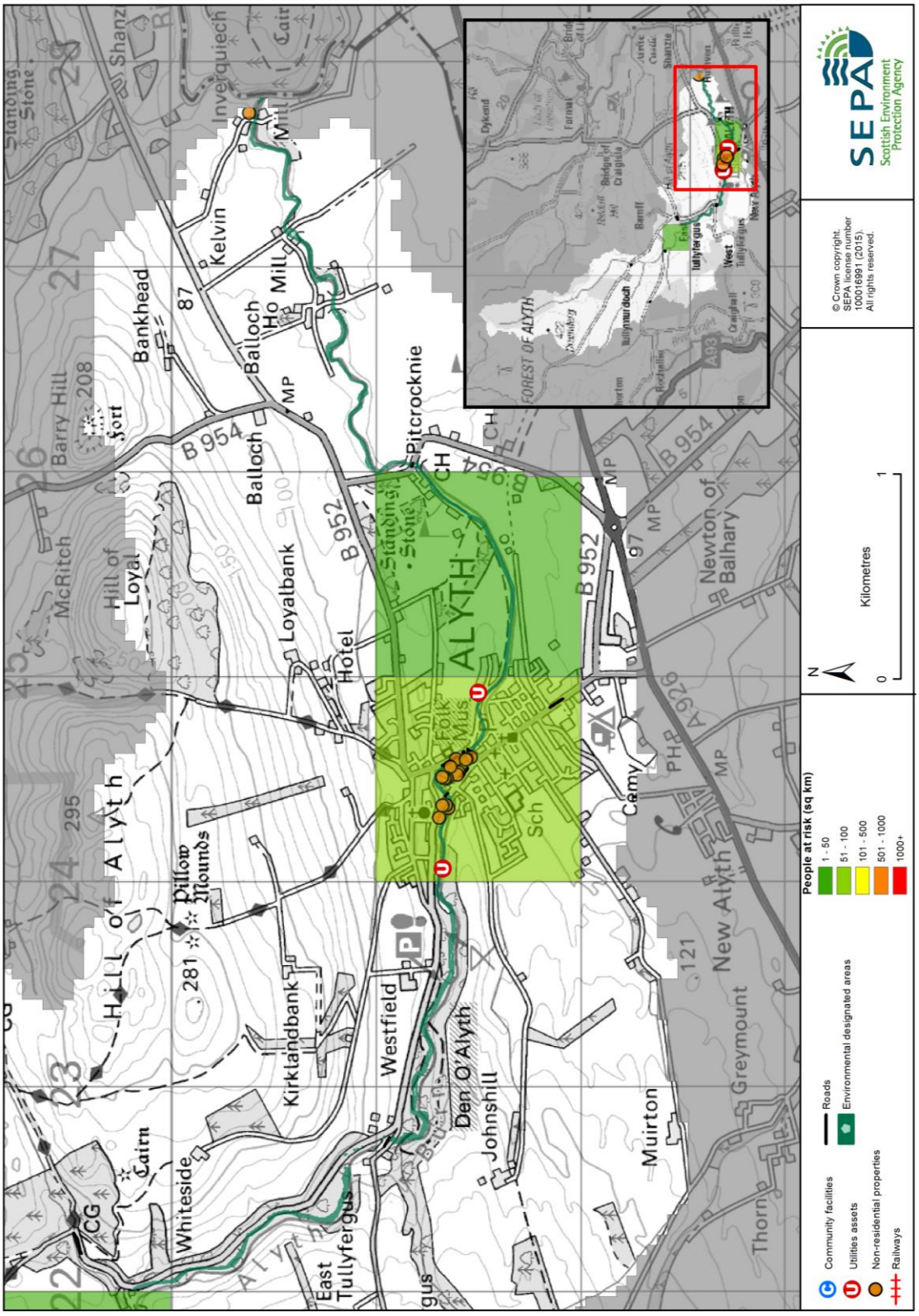


Figure 3: Impacts of flooding

History of flooding

The following floods have been recorded in Alyth from the Alyth Burn:

- 17 July 2015: Heavy rain and floods swept through Alyth. Commercial and residential properties were affected along with two electrical substations, which resulted in around 700 properties being left without power. Flooding affected properties in Springbank Road, Market Square and adjacent areas. Four footbridges were washed away by the flood waters and a number of roads and bridges were damaged. Scottish Fire and Rescue Service were involved in multiple evacuations. A refuge centre was set up at Alyth Hall.
- 1 September 1998: Intense rainfall resulted in the Alyth Burn overflowing and flooding properties in Alyth.
- 16 January 1993: Widespread flooding across the Perth and Kinross Council area resulted in an estimated £20 million of damage. The flooding is known to have affected Alyth.
- August 1956: An intense rainfall storm resulted in the Alyth Burn overtopping and flooding properties in Alyth.
- Flooding in Alyth from the Alyth Burn was also recorded in January/February 1928, August 1924, August 1884 and November 1876.

Objectives to manage flooding in Potentially Vulnerable Area 08/04

Objectives provide a common goal and shared ambition for managing floods. These objectives have been set by SEPA and agreed with flood risk management authorities following consultation. They were identified through an assessment of the underlying evidence of the causes and impacts of flooding. Target areas have been set to focus actions; they do not necessarily correspond to areas at risk in SEPA's flood map. The objectives below have been set for Alyth Potentially Vulnerable Area.

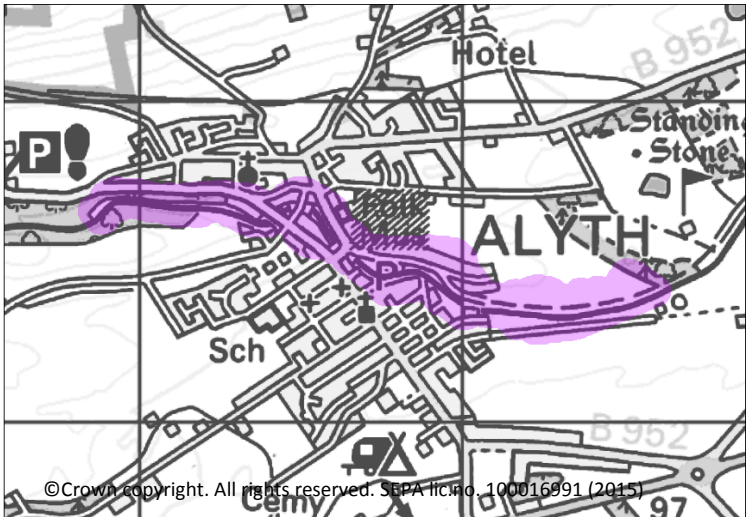
Reduce economic damages to residential and non-residential properties in Alyth from the Alyth Burn

Indicators:

- £84,000 Annual Average Damages from residential properties
- £51,000 Annual Average Damages from non-residential properties

Objective ID: 8007

Target area:



Target area	Objective	ID	Indicators within PVA
Applies across Tay Local Plan District	Avoid an overall increase in flood risk	8001	• 50 residential properties • £160,000 Annual Average Damages
Applies across Tay Local Plan District	Reduce overall flood risk	8041	• 50 residential properties • £160,000 Annual Average Damages
Applies across Tay Local Plan District	Organisations such as Scottish Water, energy companies and Historic Environment Scotland actively maintain and manage their own assets, including the risk of flooding. These actions are not detailed further in the Flood Risk Management Strategies.		

Actions to manage flooding in Potentially Vulnerable Area 08/04

Actions describe where and how flood risk will be managed. These actions have been set by SEPA and agreed with flood risk management authorities following consultation. Selection of actions to deliver the agreed objectives was based on a detailed assessment and comparison of economic, social and environmental criteria. The actions shaded and then described below have been selected as the most appropriate for Alyth Potentially Vulnerable Area.

Selected actions					
Flood protection scheme/works	*Natural flood management works*	New flood warning	*Community flood action groups*	*Property level protection scheme*	*Site protection plans*
Flood protection study	Natural flood management study	*Maintain flood warning*	Awareness raising	*Surface water plan/study*	Emergency plans/response
Maintain flood protection scheme	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

Action (ID):	**NEW FLOOD WARNING** (80410010)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	SEPA		
Status:	**Not started**	Indicative delivery:	**post 2021**
Description:	Flood warning is required for properties in Alyth affected by flooding from the Alyth Burn. Further feasibility assessment will be required to assess the potential for delivery and subsequent to that appropriate timescales for delivery.		

Action (ID):	**NATURAL FLOOD MANAGEMENT STUDY** (80070003)		
Objective (ID):	Reduce economic damages to residential and non-residential properties in Alyth from the Alyth Burn (8007)		
Delivery lead:	Perth and Kinross Council		
Status:	**Not started**	Indicative delivery:	**2016-2021**
Description:	A natural flood management study has been recommended for Alyth to assess whether river/ floodplain restoration and sediment management could help reduce flood risk. The study should take a catchment approach and consider the potential benefits and disbenefits and interaction between actions upstream and downstream.		
Potential impacts			
Economic:	The economic impact of natural flood management actions is difficult to define. However, these actions can reduce flood risk for high		

Economic:	likelihood events. Thirty-nine residential and non-residential properties could potentially benefit from natural flood management actions in this location.
Social:	Social impacts will depend on the outcome of the study and recommended actions. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community. Natural flood management actions can restore and enhance natural environments and create opportunities for recreation and tourism.
Environmental:	Natural flood management actions can have a positive impact on the ecological quality of the environment by restoring and enhancing natural habitats. To be in accord with the FRM Strategy, the responsible authority should seek to ensure as part of the study that the action will not have an adverse effect on the integrity of the River Tay Special Area of Conservation. Scheduled monuments, Sites of Special Scientific Interest and ancient woodlands are also present in the study area and could be positively or negatively impacted.

Action (ID):	**STRATEGIC MAPPING AND MODELLING** (80410016)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	SEPA		
Status:	**Not started**	Indicative delivery:	**2016-2021**
Description:	SEPA will seek to incorporate additional surface water data into the flood maps to improve understanding of flood risk. Approximately 900km² of improved surface water data is currently available within this Local Plan District.		

Action (ID):	**STRATEGIC MAPPING AND MODELLING** (80410019)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Scottish Water		
Status:	**Not started**	Indicative delivery:	**2016-2021**
Description:	Scottish Water will carry out an assessment of flood risk within the highest risk sewer catchments to improve knowledge and understanding of surface water flood risk.		

Action (ID):	**FLOOD FORECASTING** (80410009)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	SEPA		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	The Scottish Flood Forecasting Service is a joint initiative between SEPA and the Met Office that produces daily, national flood guidance statements which are issued to Category 1 and 2 Responders. The service also provides information which allows SEPA to issue flood warnings, giving people a better chance of reducing the impact of flooding on their home or business. For more information please visit SEPA's website.		

Action (ID):	**SELF HELP** (80410011)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	—		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Everyone is responsible for protecting themselves and their property from flooding. Property and business owners can take simple steps to reduce damage and disruption to their homes and businesses should flooding happen. This includes preparing a flood plan and flood kit, installing property level protection, signing up to Floodline and Resilient Communities initiatives, and ensuring that properties and businesses are insured against flood damage. Perth and Kinross Council is piloting a project for flood protection products for properties in flood risk areas.		

Action (ID):	**AWARENESS RAISING** (80410013)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Responsible authorities		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	SEPA and the responsible authorities have a duty to raise public awareness of flood risk. Improved awareness of flood risk and actions that prepare individuals, homes and businesses for flooding can reduce the overall impact. SEPA will undertake flood risk education and awareness raising activities. In addition, SEPA will engage with community resilience groups and participate in property level protection events delivered by the Scottish Flood Forum where possible. Local authorities will be undertaking additional awareness raising activities. Further details will be set out in the Local FRM Plan.		

Action (ID):	**MAINTENANCE** (80410007)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Perth and Kinross Council, asset / land managers		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Local authorities have a duty to assess watercourses and carry out clearance and repair works where such works would substantially reduce flood risk. They produce schedules of clearance and repair works and make these available for public inspection. Scottish Water undertake inspection and repair on the public sewer network. Asset owners and riparian landowners are responsible for the maintenance and management of their own assets including those which help to reduce flood risk.		

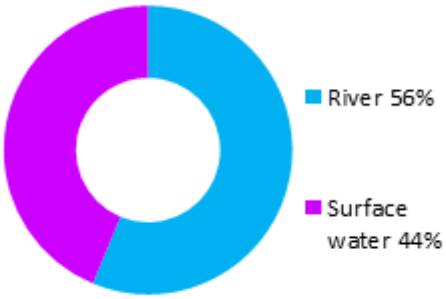
Action (ID):	**EMERGENCY PLANS/RESPONSE** (80410014)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Category 1 and 2 Responders		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Providing an emergency response to flooding is the responsibility of many organisations, including local authorities, the emergency services and SEPA. Effective management of an emergency response relies on emergency plans that are prepared under the Civil Contingencies Act 2004 by Category 1 and 2 Responders. The emergency response by these organisations is co-ordinated through regional and local resilience partnerships. This response may be supported by the work of voluntary organisations.		

Action (ID):	**PLANNING POLICIES** (80010001)		
Objective (ID):	Avoid an overall increase in flood risk (8001) Reduce overall flood risk (8041)		
Delivery lead:	Planning authority		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Scottish Planning Policy and accompanying Planning Advice Notes set out Scottish Ministers' priorities for the operation of the planning system and for the development and use of land. In terms of flood risk management, the policy supports a catchment-scale approach to sustainable flood risk management and aims to build the resilience of our cities and towns, encourage sustainable land management in our rural areas, and to address the long-term vulnerability of parts of our coasts and islands. Under this approach, new development in areas with medium to high likelihood of flooding should be avoided. For further information on the application of national planning policies see Annex 2.		

Kirriemuir and Forfar (Potentially Vulnerable Area 08/05)

Local Plan District	Local authority	Main catchment
Tay	Angus Council	River Tay

Summary of flooding impacts



At risk of flooding

- 150 residential properties
- 80 non-residential properties
- £950,000 Annual Average Damages

(damages by flood source shown left)

Summary of objectives to manage flooding

Objectives have been set by SEPA and agreed with flood risk management authorities. These are the aims for managing local flood risk. The objectives have been grouped in three main ways: by reducing risk, avoiding increasing risk or accepting risk by maintaining current levels of management.

Many organisations, such as Scottish Water and energy companies, actively maintain and manage their own assets including their risk from flooding. Where known, these actions are described here. Scottish Natural Heritage and Historic Environment Scotland work with site owners to manage flooding where appropriate at designated environmental and/or cultural heritage sites. These actions are not detailed further in the Flood Risk Management Strategies.

Summary of actions to manage flooding

The actions below have been selected to manage flood risk.

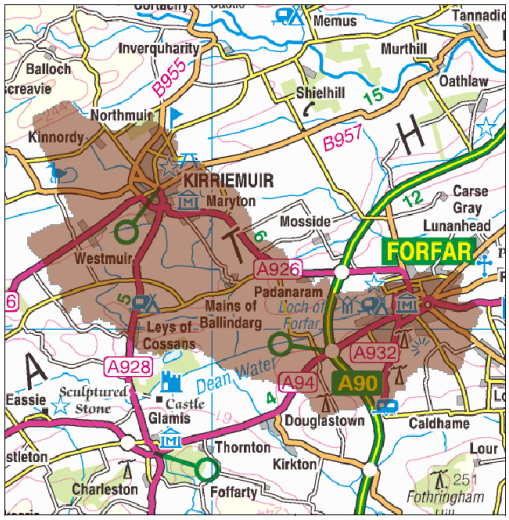
Flood protection scheme/works	*Natural flood management works*	*New flood warning*	*Community flood action groups*	*Property level protection scheme*	*Site protection plans*
Flood protection study	*Natural flood management study*	*Maintain flood warning*	Awareness raising	Surface water plan/study	Emergency plans/response
Maintain flood protection scheme	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

Kirriemuir and Forfar (Potentially Vulnerable Area 08/05)

Local Plan District	Local authority	Main catchment
Tay	Angus Council	River Tay

Background

This Potentially Vulnerable Area is 53km^2 (shown below). It is situated in the upper reaches of the River Tay catchment and includes Forfar and Kirriemuir. The main watercourses are Dean Water and its tributary the Ballindarg Burn (Gairie Burn).



The area has a risk of river and surface water flooding. The majority of flood damages are caused by river flooding.

There are approximately 150 residential properties and 80 non-residential properties at risk of flooding. The Annual Average Damages are approximately £950,000.

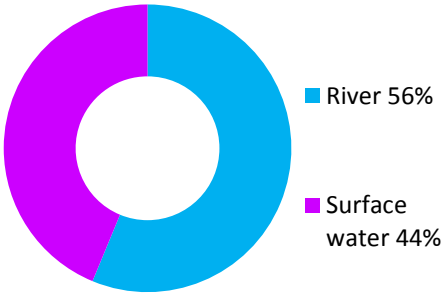


Figure 1: Annual Average Damages by flood source

Summary of flooding impacts

The highest risk of flooding is to Forfar from the Dean Water and from surface water. Kirriemuir has a risk of flooding from the Gairie Burn.

The risk of flooding to people, property, as well as to community facilities, utilities, the transport network, designated sites and agricultural land is summarised in Table 1. The damages associated with floods of different likelihood are shown in Figure 2. For this Potentially Vulnerable Area the highest damages are to roads, notably the A90 and A932, and residential and non-residential properties.

The location of the impacts of flooding is shown in Figure 3.

The figures presented for Annual Average Damages include damages to residential properties, non-residential properties, transport and agriculture.

	1 in 10 High likelihood	1 in 200 Medium likelihood	1 in 1000 Low likelihood
Residential properties (total 10,000)	70	150	160
Non-residential properties (total 960)	50	80	90
People	140	320	350
Community facilities	0	0	<10 Includes: educational buildings and emergency services
Utilities assets	<10	<10	<10
Transport links (excluding minor roads)	5 A roads, 6 B roads at 75 locations	5 A roads, 7 B roads at 101 locations	5 A roads, 7 B roads at 125 locations
Environmental designated areas (km^2)	0.1	0.1	0.1
Designated cultural heritage sites	3	5	6
Agricultural land (km^2)	3.7	4.1	4.3

Table 1: Summary of flooding impacts

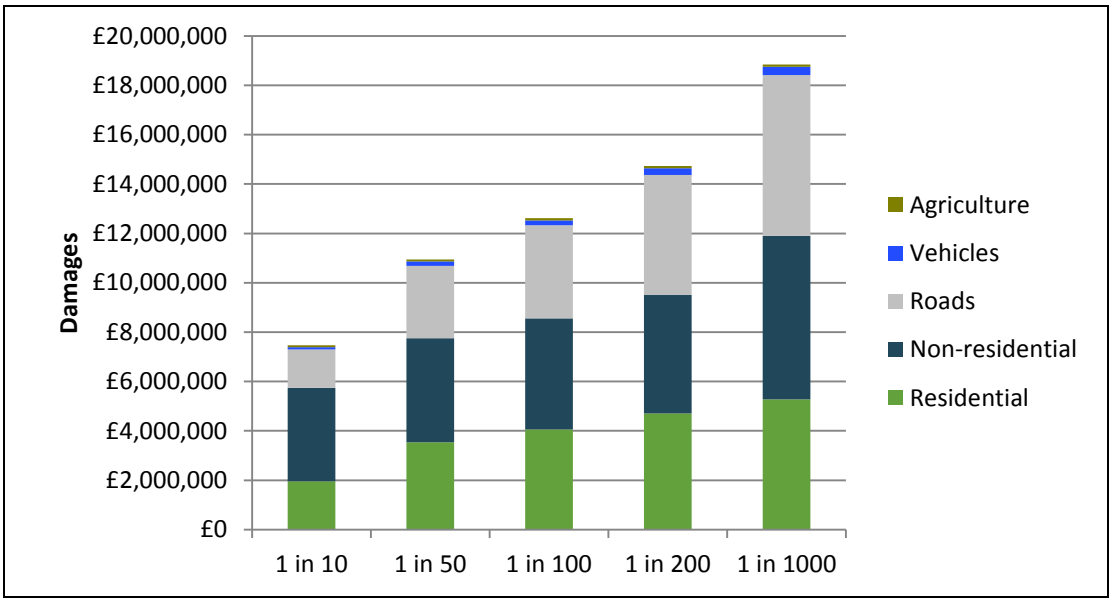


Figure 2: Damages by flood likelihood

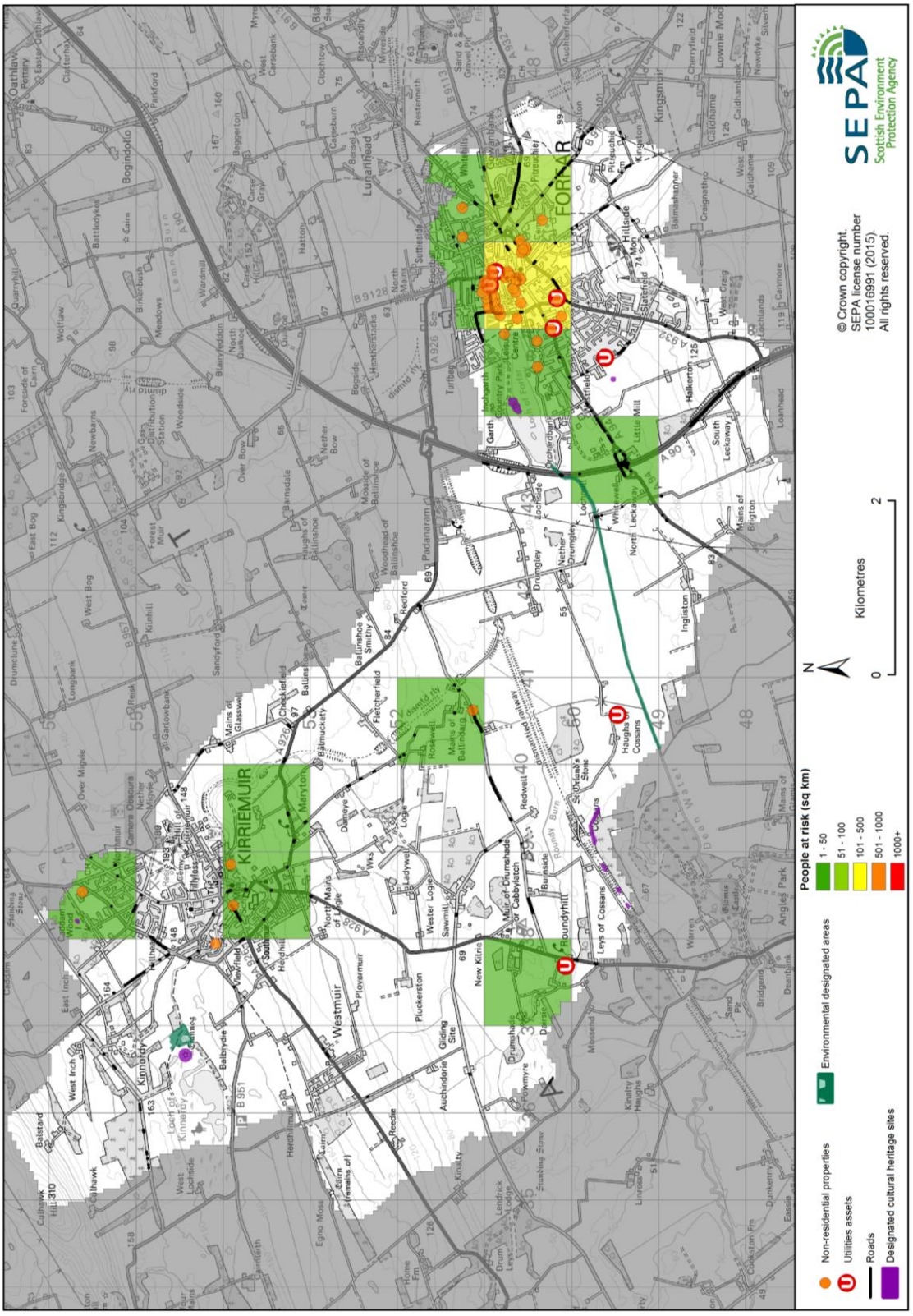


Figure 3: Impacts of flooding

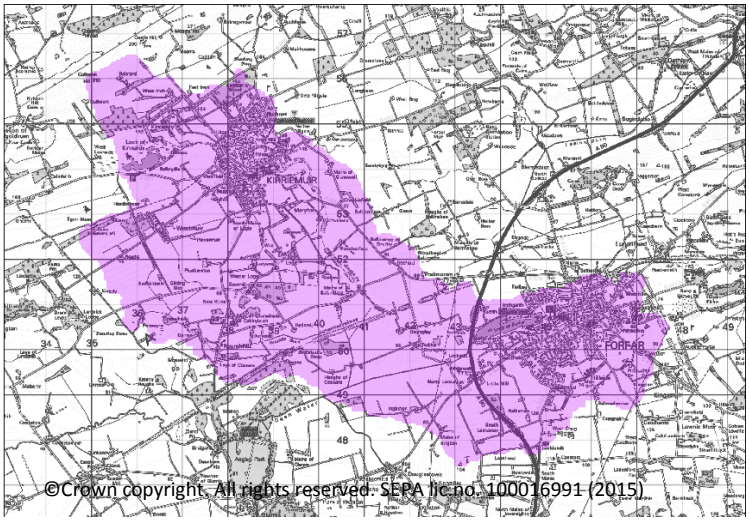
History of flooding

In August 1887, it was recorded that properties were flooded in Forfar. Localised surface water flooding has since been recorded in summer 2007, September 2009, December 2012 and January 2013.

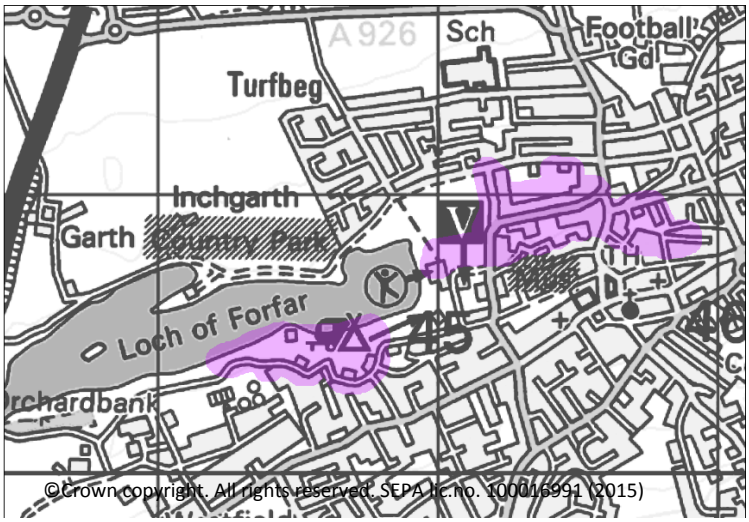
Objectives to manage flooding in Potentially Vulnerable Area 08/05

Objectives provide a common goal and shared ambition for managing floods. These objectives have been set by SEPA and agreed with flood risk management authorities following consultation. They were identified through an assessment of the underlying evidence of the causes and impacts of flooding. Target areas have been set to focus actions; they do not necessarily correspond to areas at risk in SEPA's flood map. The objectives below have been set for Kirriemuir and Forfar Potentially Vulnerable Area.

Reduce economic damages to residential and non-residential properties in the Kirriemuir and Forfar Potentially Vulnerable Area caused by river flooding

Indicators:	Target area:
• £160,000 Annual Average Damages from residential properties • £330,000 Annual Average Damages from non-residential properties	
Objective ID: 8010	

Reduce risk to people in Forfar from river flooding

Indicators:	Target area:
• 130 people	
Objective ID: 8011	

Target area	Objective	ID	Indicators within PVA
Forfar	Reduce economic damages and number of residential properties at risk of surface water flooding in Forfar where practical	8008	* See note below
Applies across Tay Local Plan District	Avoid an overall increase in flood risk	8001	• 150 residential properties • £950,000 Annual Average Damages
Applies across Tay Local Plan District	Reduce overall flood risk	8041	• 150 residential properties • £950,000 Annual Average Damages
Applies across Tay Local Plan District	Organisations such as Scottish Water, energy companies and Historic Environment Scotland actively maintain and manage their own assets, including the risk of flooding. These actions are not detailed further in the Flood Risk Management Strategies.		

* This objective will be monitored using surface water flood risk across the Potentially Vulnerable Area. For 08/05 there are 90 residential properties at risk and Annual Average Damages of £410,000.

Actions to manage flooding in Potentially Vulnerable Area 08/05

Actions describe where and how flood risk will be managed. These actions have been set by SEPA and agreed with flood risk management authorities following consultation. Selection of actions to deliver the agreed objectives was based on a detailed assessment and comparison of economic, social and environmental criteria. The actions shaded and then described below have been selected as the most appropriate for Kirriemuir and Forfar Potentially Vulnerable Area.

Selected actions					
Flood protection scheme/works	*Natural flood management works*	*New flood warning*	*Community flood action groups*	*Property level protection scheme*	*Site protection plans*
Flood protection study	*Natural flood management study*	*Maintain flood warning*	Awareness raising	Surface water plan/study	Emergency plans/response
Maintain flood protection scheme	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

Action (ID):	**FLOOD PROTECTION STUDY** (80110005)		
Objective (ID):	Reduce risk to people in Forfar from river flooding (8011) Reduce economic damages and number of residential properties at risk of surface water flooding in Forfar where practical (8008)		
Delivery lead:	Angus Council		
Priority:	National:	Within local authority:	
	21 of 168	**1 of 6**	
Status:	**Ongoing**	Indicative delivery:	**2016-2021**
Description:	The flood protection study to address flooding from combined sources (river and surface water) has been recommended for Forfar. The study should assess whether flood storage, modification of conveyance, direct flood defences, sediment management and natural flood management could reduce flood risk. Natural flood management options that should be considered include river/ floodplain restoration and sediment management. The study should also investigate the viability of property level protection. The study should include surface water investigations and should be taken forward in partnership with Scottish Water. It should take a catchment approach and consider the potential benefits and disbenefits and interaction between actions upstream and downstream.		
Potential impacts			
Economic:	The study could benefit 45 residential properties and 28 non-residential properties at risk of flooding in this location, with potential damages avoided of up to £13 million.		
Social:	Social impacts will depend on the outcome of the study and recommended actions. A reduction in flood risk would have a positive		

Social:	benefit to the health and wellbeing of the community and socially vulnerable people located within the flood protection study area. In addition the study could benefit two utilities and one railway line located within the study area. Natural flood management actions can restore and enhance natural environments and create opportunities for recreation and tourism.
Environmental:	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment and designated sites. Where possible opportunities to enhance and restore the environment should be sought, for example through natural flood management. Dean Water (water body ID 6556) is located within the study area and the physical condition of this river is identified by SEPA to be at less than good status. Opportunities to improve the condition of the river should be considered by coordinating with river basin management planning. To be in accord with the FRM Strategy, the responsible authority should seek to ensure as part of the study that the action will not have an adverse effect on the integrity of the River Tay Special Area of Conservation. Conservation areas and scheduled monuments are also present in the study area and could be positively or negatively impacted.

Action (ID):	**FLOOD PROTECTION STUDY** (80100005)		
Objective (ID):	Reduce economic damages to residential and non-residential properties in the Kirriemuir and Forfar Potentially Vulnerable Area caused by river flooding (8010)		
Delivery lead:	Angus Council		
Priority:	National:		Within local authority:
	127 of 168		**6 of 6**
Status:	**Not started**	Indicative delivery:	**2016-2021**
Description:	A flood protection study has been recommended for Kirriemuir to assess whether flood storage, sediment management, modification of conveyance, direct flood defences and natural flood management could reduce flood risk. Natural flood management options that should be considered include floodplain restoration and sediment management. The study should also consider the viability of property level protection and property relocation. The study should take a catchment approach and consider the potential benefits and disbenefits and interaction between actions upstream and downstream.		
Potential impacts			
Economic:	The study could benefit 15 residential properties at risk of flooding in this location, with potential damages avoided of up to £1.2 million.		
Social:	Social impacts will depend on the outcome of the study and recommended actions. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community and socially vulnerable people located within the flood protection study area. In addition the study could benefit two utilities and one railway line located within the study area. Natural flood management actions can restore and enhance natural environments and create opportunities for recreation and tourism.		

Environmental:	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment and designated sites. Where possible opportunities to enhance and restore the environment should be sought, for example through natural flood management. Dean Water and Gairie Burn (water body IDs 6556 and 6563) are located within the study area and the physical condition of these rivers is identified by SEPA to be at less than good status. Opportunities to improve the condition of the river should be considered by coordinating with river basin management planning. To be in accord with the FRM Strategy, the responsible authority should seek to ensure as part of the study that the action will not have an adverse effect on the integrity of the River Tay Special Area of Conservation and Loch of Kinnordy Special Protection Area. Conservation areas and scheduled monuments are also present in the study area and could be positively or negatively impacted.

Action (ID):	**SURFACE WATER PLAN/STUDY** (80080018)		
Objective (ID):	Reduce economic damages and number of residential properties at risk of surface water flooding in Forfar where practical (8008)		
Delivery lead:	Angus Council		
Status:	**Ongoing**	Indicative delivery:	**2016-2021**
Description:	The area must be covered by a surface water management plan or plans that set objectives for the management of surface water flood risk and identify the most sustainable actions to achieve the objectives. This surface water management plan will be delivered by the local authority as part of a flood protection study.		

Action (ID):	**STRATEGIC MAPPING AND MODELLING** (80410016)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	SEPA		
Status:	**Not started**	Indicative delivery:	**2016-2021**
Description:	SEPA will seek to develop flood mapping in the Dean Water and Gairie Burn areas to improve understanding of flood risk. The extent and timing of improvements will depend on detailed scoping and data availability. Where this work coincides with local authority studies, SEPA will work collaboratively to ensure consistent modelling approaches are applied.		

Action (ID):	**STRATEGIC MAPPING AND MODELLING** (80410019)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Scottish Water		
Status:	**Not started**	Indicative delivery:	**2016-2021**
Description:	Scottish Water will review the assessment of flood risk within the highest risk sewer catchments to improve knowledge and understanding of surface water flood risk.		

Action (ID):	**MAINTAIN FLOOD PROTECTION SCHEME** (80100017)		
Objective (ID):	Reduce economic damages to residential and non-residential properties in the Kirriemuir and Forfar Potentially Vulnerable Area caused by river flooding (8010)		
Delivery lead:	Angus Council		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Continue to maintain the existing Kirriemuir Flood Protection Scheme that provides protection to Kirriemuir from the Gairie Burn.		

Action (ID):	**FLOOD FORECASTING** (80410009)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	SEPA		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	The Scottish Flood Forecasting Service is a joint initiative between SEPA and the Met Office that produces daily, national flood guidance statements which are issued to Category 1 and 2 Responders. The service also provides information which allows SEPA to issue flood warnings, giving people a better chance of reducing the impact of flooding on their home or business. For more information please visit SEPA's website.		

Action (ID):	**SELF HELP** (80410011)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	—		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Everyone is responsible for protecting themselves and their property from flooding. Property and business owners can take simple steps to reduce damage and disruption to their homes and businesses should flooding happen. This includes preparing a flood plan and flood kit, installing property level protection, signing up to Floodline and Resilient Communities initiatives, and ensuring that properties and businesses are insured against flood damage.		

Action (ID):	**AWARENESS RAISING** (80410013)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Responsible authorities		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	SEPA and the responsible authorities have a duty to raise public awareness of flood risk. Improved awareness of flood risk and actions that prepare individuals, homes and businesses for flooding can reduce the overall impact. From 2016 SEPA will engage with the community through local participation in national initiatives, including partnership working with Neighbourhood Watch Scotland. In addition, SEPA will engage with local authorities and community resilience groups where possible. Local authorities will be undertaking additional awareness raising activities. Further details will be set out in the Local FRM Plan.		

Action (ID):	**MAINTENANCE** (80410007)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Angus Council, asset / land managers		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Local authorities have a duty to assess watercourses and carry out clearance and repair works where such works would substantially reduce flood risk. They produce schedules of clearance and repair works and make these available for public inspection. Scottish Water undertake inspection and repair on the public sewer network. Asset owners and riparian landowners are responsible for the maintenance and management of their own assets including those which help to reduce flood risk.		

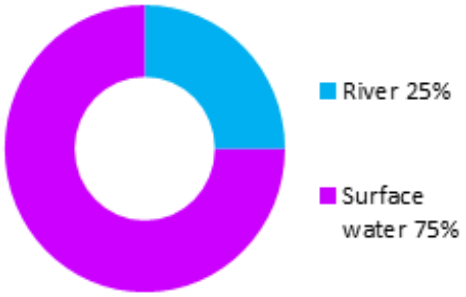
Action (ID):	**EMERGENCY PLANS/RESPONSE** (80410014)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Category 1 and 2 Responders		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Providing an emergency response to flooding is the responsibility of many organisations, including local authorities, the emergency services and SEPA. Effective management of an emergency response relies on emergency plans that are prepared under the Civil Contingencies Act 2004 by Category 1 and 2 Responders. The emergency response by these organisations is co-ordinated through regional and local resilience partnerships. This response may be supported by the work of voluntary organisations. Angus Council operates an emergency response plan in areas of high flood risk.		

Action (ID):	**PLANNING POLICIES** (80010001)		
Objective (ID):	Avoid an overall increase in flood risk (8001) Reduce overall flood risk (8041)		
Delivery lead:	Planning authority		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Scottish Planning Policy and accompanying Planning Advice Notes set out Scottish Ministers' priorities for the operation of the planning system and for the development and use of land. In terms of flood risk management, the policy supports a catchment-scale approach to sustainable flood risk management and aims to build the resilience of our cities and towns, encourage sustainable land management in our rural areas, and to address the long-term vulnerability of parts of our coasts and islands. Under this approach, new development in areas with medium to high likelihood of flooding should be avoided. For further information on the application of national planning policies see Annex 2.		

Blairgowrie (Potentially Vulnerable Area 08/06)

Local Plan District	Local authority	Main catchment
Tay	Perth and Kinross Council	River Ericht (River Tay)

Summary of flooding impacts



At risk of flooding

- 30 residential properties
- 60 non-residential properties
- £120,000 Annual Average Damages

(damages by flood source shown left)

Summary of objectives to manage flooding

Objectives have been set by SEPA and agreed with flood risk management authorities. These are the aims for managing local flood risk. The objectives have been grouped in three main ways: by reducing risk, avoiding increasing risk or accepting risk by maintaining current levels of management.

Many organisations, such as Scottish Water and energy companies, actively maintain and manage their own assets including their risk from flooding. Where known, these actions are described here. Scottish Natural Heritage and Historic Environment Scotland work with site owners to manage flooding where appropriate at designated environmental and/or cultural heritage sites. These actions are not detailed further in the Flood Risk Management Strategies.

Summary of actions to manage flooding

The actions below have been selected to manage flood risk.

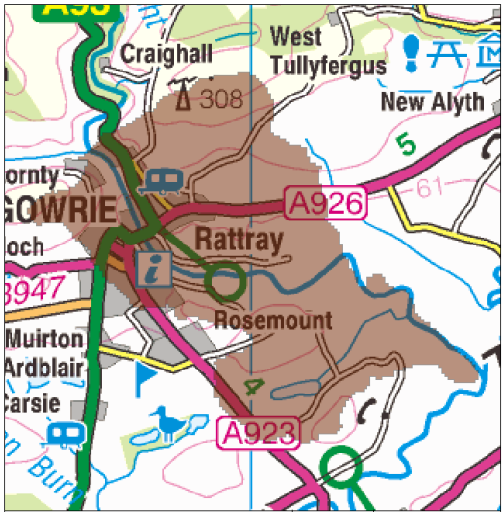
Flood protection scheme/works	*Natural flood management works*	*New flood warning*	*Community flood action groups*	*Property level protection scheme*	*Site protection plans*
Flood protection study	*Natural flood management study*	Maintain flood warning	Awareness raising	Surface water plan/study	Emergency plans/response
Maintain flood protection scheme	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

Blairgowrie (Potentially Vulnerable Area 08/06)

Local Plan District	Local authority	Main catchment
Tay	Perth and Kinross Council	River Ericht (River Tay)

Background

This Potentially Vulnerable Area is 20km² (shown below). It is situated in the upper reaches of the River Tay catchment and includes Blairgowrie. The main watercourse is the River Ericht.



The area has a risk of surface water and river flooding. The majority of damages are caused by surface water flooding.

There are approximately 30 residential properties and 60 non-residential properties at risk of flooding. The Annual Average Damages are approximately £120,000.

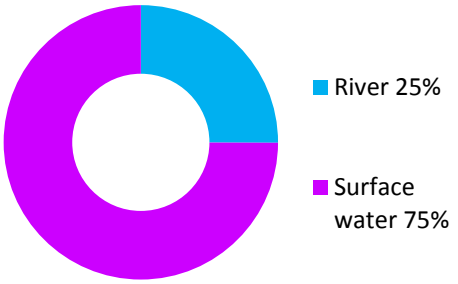


Figure 1: Annual Average Damages by flood source

Summary of flooding impacts

The greatest risk of flooding in this area is to Rattray (Blairgowrie) from surface water.

The risk of flooding to people, property, as well as to community facilities, utilities, the transport network, designated sites and agricultural land is summarised in Table 1. The damages associated with floods of different likelihood are shown in Figure 2. For this Potentially Vulnerable Area the highest damages are to residential properties followed by damages to non-residential properties.

The location of the impacts of flooding is shown in Figure 3.

The figures presented for Annual Average Damages include damages to residential properties, non-residential properties, transport and agriculture.

	1 in 10 High likelihood	1 in 200 Medium likelihood	1 in 1000 Low likelihood
Residential properties (total 3,300)	<10	30	100
Non-residential properties (total 700)	20	60	80
People	20	70	210
Community facilities	0	<10 Emergency services	<10 Emergency services
Utilities assets	<10	<10	<10
Transport links (excluding minor roads)	2 A roads, 1 B road at 10 locations	3 A roads, 1 B road at 17 locations	3 A roads, 1 B road at 20 locations
Environmental designated areas (km^2)	0.5	0.5	0.5
Designated cultural heritage sites	6	9	9
Agricultural land (km^2)	1.4	2.3	2.7

Table 1: Summary of flooding impacts

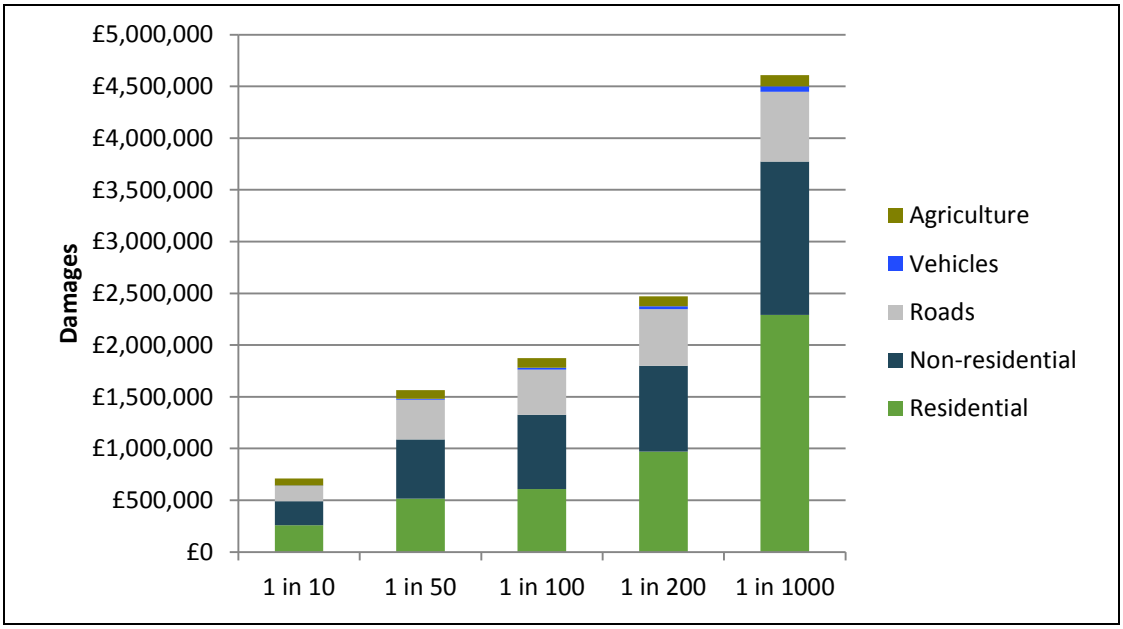


Figure 2: Damages by flood likelihood

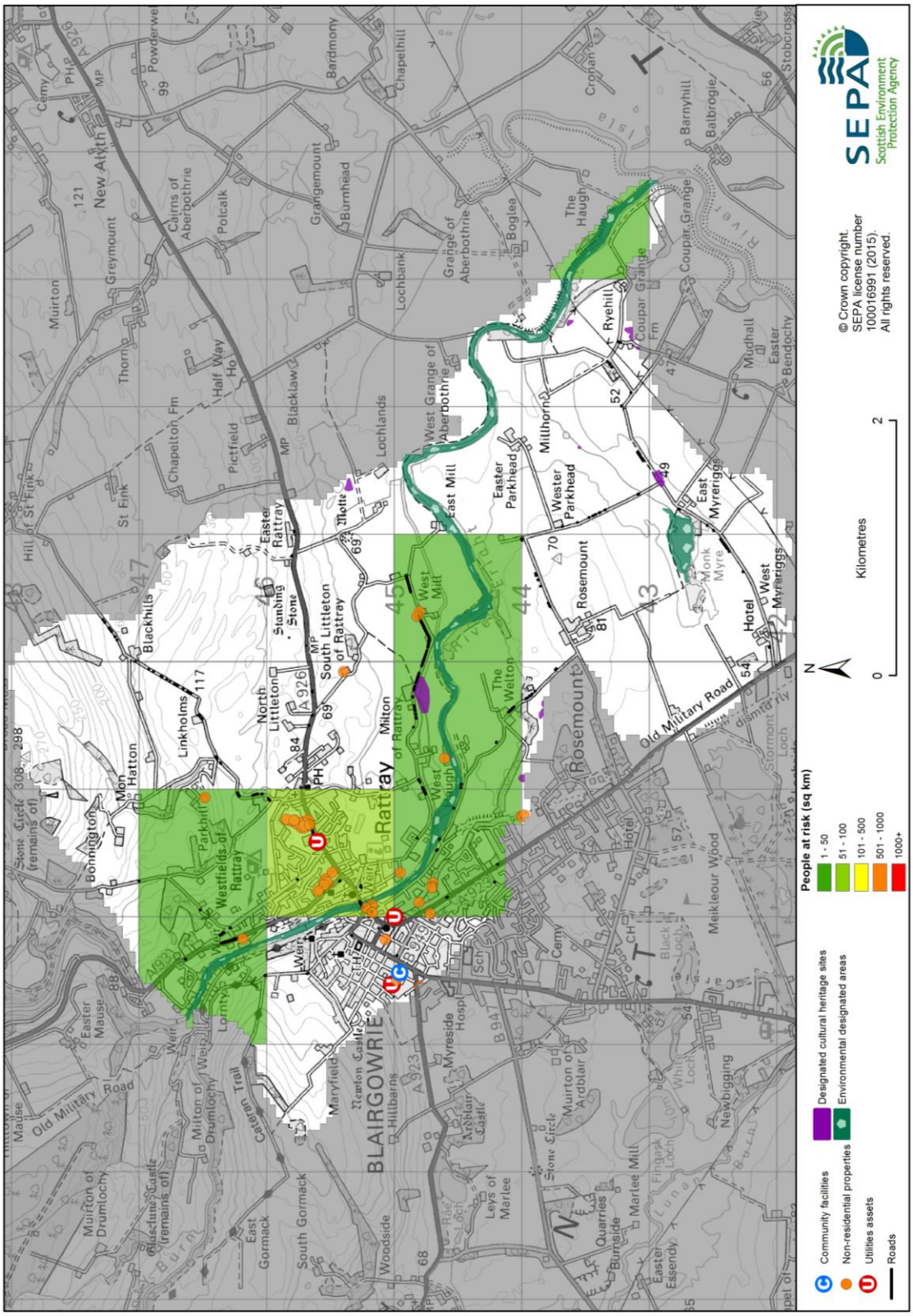


Figure 3: Impacts of flooding

History of flooding

On 22 January 1928 there was extensive flooding from the River Tay across Perth and Kinross including Blairgowrie. The River Tay reached 5.77m above normal levels at Smeaton's Bridge in Perth.

Objectives to manage flooding in Potentially Vulnerable Area 08/06

Objectives provide a common goal and shared ambition for managing floods. These objectives have been set by SEPA and agreed with flood risk management authorities following consultation. They were identified through an assessment of the underlying evidence of the causes and impacts of flooding. Target areas have been set to focus actions; they do not necessarily correspond to areas at risk in SEPA's flood map. The objectives below have been set for Blairgowrie Potentially Vulnerable Area.

Target area	Objective	ID	Indicators within PVA
Blairgowrie and Rattray	Reduce economic damages and number of residential properties at risk of surface water flooding in Blairgowrie and Rattray where practical	8012	* See note below
Applies across Tay Local Plan District	Avoid an overall increase in flood risk	8001	• 30 residential properties • £120,000 Annual Average Damages
Applies across Tay Local Plan District	Reduce overall flood risk	8041	• 30 residential properties • £120,000 Annual Average Damages
Applies across Tay Local Plan District	Organisations such as Scottish Water, energy companies and Historic Environment Scotland actively maintain and manage their own assets, including the risk of flooding. These actions are not detailed further in the Flood Risk Management Strategies.		

* This objective will be monitored using surface water flood risk across the Potentially Vulnerable Area. For 08/06 there are 20 residential properties at risk and Annual Average Damages of £91,000.

Actions to manage flooding in Potentially Vulnerable Area 08/06

Actions describe where and how flood risk will be managed. These actions have been set by SEPA and agreed with flood risk management authorities following consultation. Selection of actions to deliver the agreed objectives was based on a detailed assessment and comparison of economic, social and environmental criteria. The actions shaded and then described below have been selected as the most appropriate for Blairgowrie Potentially Vulnerable Area.

Selected actions					
Flood protection scheme/works	*Natural flood management works*	*New flood warning*	*Community flood action groups*	*Property level protection scheme*	*Site protection plans*
Flood protection study	*Natural flood management study*	Maintain flood warning	Awareness raising	Surface water plan/study	Emergency plans/response
Maintain flood protection scheme	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

Action (ID):	**SURFACE WATER PLAN/STUDY** (80120018)		
Objective (ID):	Reduce economic damages and number of residential properties at risk of surface water flooding in Blairgowrie and Rattray where practical (8012)		
Delivery lead:	Perth and Kinross Council		
Status:	**Not started**	Indicative delivery:	**2016-2021**
Description:	The area must be covered by a surface water management plan or plans that set objectives for the management of surface water flood risk and identify the most sustainable actions to achieve the objectives.		

Action (ID):	**STRATEGIC MAPPING AND MODELLING** (80410019)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Scottish Water		
Status:	**Not started**	Indicative delivery:	**2016-2021**
Description:	Scottish Water will carry out an assessment of flood risk within the highest risk sewer catchments to improve knowledge and understanding of surface water flood risk.		

Action (ID):	**MAINTAIN FLOOD WARNING** (80410030)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	SEPA		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Continue to maintain the Blairgowrie to the River Isla flood warning area which is part of the Ericht river flood warning scheme.		

Action (ID):	**FLOOD FORECASTING** (80410009)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	SEPA		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	The Scottish Flood Forecasting Service is a joint initiative between SEPA and the Met Office that produces daily, national flood guidance statements which are issued to Category 1 and 2 Responders. The service also provides information which allows SEPA to issue flood warnings, giving people a better chance of reducing the impact of flooding on their home or business. For more information please visit SEPA's website.		

Action (ID):	**SELF HELP** (80410011)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	—		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Everyone is responsible for protecting themselves and their property from flooding. Property and business owners can take simple steps to reduce damage and disruption to their homes and businesses should flooding happen. This includes preparing a flood plan and flood kit, installing property level protection, signing up to Floodline and Resilient Communities initiatives, and ensuring that properties and businesses are insured against flood damage.		

Action (ID):	**AWARENESS RAISING** (80410013)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Responsible authorities		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	SEPA and the responsible authorities have a duty to raise public awareness of flood risk. Improved awareness of flood risk and actions that prepare individuals, homes and businesses for flooding can reduce the overall impact. From 2016 SEPA will engage with the community through local participation in national initiatives, including partnership working with Neighbourhood Watch Scotland. In addition, SEPA will engage with local authorities and community resilience groups where possible. Local authorities will be undertaking additional awareness raising activities. Further details will be set out in the Local FRM Plan.		

Action (ID):	**MAINTENANCE** (80410007)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Perth and Kinross Council, asset / land managers		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Local authorities have a duty to assess watercourses and carry out clearance and repair works where such works would substantially reduce flood risk. They produce schedules of clearance and repair works and make these available for public inspection. Scottish Water undertake inspection and repair on the public sewer network. Asset owners and riparian landowners are responsible for the maintenance and management of their own assets including those which help to reduce flood risk.		

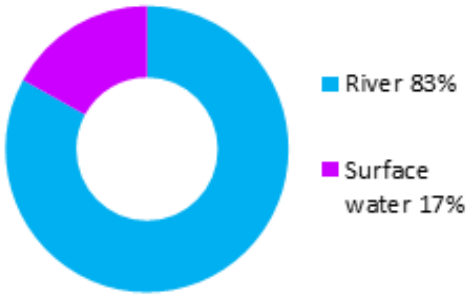
Action (ID):	**EMERGENCY PLANS/RESPONSE** (80410014)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Category 1 and 2 Responders		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Providing an emergency response to flooding is the responsibility of many organisations, including local authorities, the emergency services and SEPA. Effective management of an emergency response relies on emergency plans that are prepared under the Civil Contingencies Act 2004 by Category 1 and 2 Responders. The emergency response by these organisations is co-ordinated through regional and local resilience partnerships. This response may be supported by the work of voluntary organisations.		

Action (ID):	**PLANNING POLICIES** (80010001)		
Objective (ID):	Avoid an overall increase in flood risk (8001) Reduce overall flood risk (8041)		
Delivery lead:	Planning authority		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Scottish Planning Policy and accompanying Planning Advice Notes set out Scottish Ministers' priorities for the operation of the planning system and for the development and use of land. In terms of flood risk management, the policy supports a catchment-scale approach to sustainable flood risk management and aims to build the resilience of our cities and towns, encourage sustainable land management in our rural areas, and to address the long-term vulnerability of parts of our coasts and islands. Under this approach, new development in areas with medium to high likelihood of flooding should be avoided. For further information on the application of national planning policies see Annex 2.		

Coupar Angus (Potentially Vulnerable Area 08/07)

Local Plan District	Local authority	Main catchment
Tay	Perth and Kinross Council	Coupar Burn (River Tay)

Summary of flooding impacts



At risk of flooding

- 10 residential properties
- <10 non-residential properties
- £30,000 Annual Average Damages

(damages by flood source shown left)

Summary of objectives to manage flooding

Objectives have been set by SEPA and agreed with flood risk management authorities. These are the aims for managing local flood risk. The objectives have been grouped in three main ways: by reducing risk, avoiding increasing risk or accepting risk by maintaining current levels of management.

Many organisations, such as Scottish Water and energy companies, actively maintain and manage their own assets including their risk from flooding. Where known, these actions are described here. Scottish Natural Heritage and Historic Environment Scotland work with site owners to manage flooding where appropriate at designated environmental and/or cultural heritage sites. These actions are not detailed further in the Flood Risk Management Strategies.

Summary of actions to manage flooding

The actions below have been selected to manage flood risk.

Flood protection scheme/works	*Natural flood management works*	New flood warning	*Community flood action groups*	*Property level protection scheme*	*Site protection plans*
Flood protection study	*Natural flood management study*	*Maintain flood warning*	Awareness raising	*Surface water plan/study*	Emergency plans/response
Maintain flood protection scheme	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

Coupar Angus (Potentially Vulnerable Area 08/07)

Local Plan District	Local authority	Main catchment
Tay	Perth and Kinross Council	Coupar Burn (River Tay)

Background

This Potentially Vulnerable Area is 4km^2 (shown below). It is situated in the lower reaches of the River Tay catchment and includes Coupar Angus. The main watercourse is the Coupar Burn that flows into the River Isla.

The area has a risk of surface water and river flooding. The majority of flood damages are caused by river flooding.

There are approximately 10 residential properties and fewer than 10 non-residential properties at risk of flooding. The Annual Average Damages are approximately £26,000.

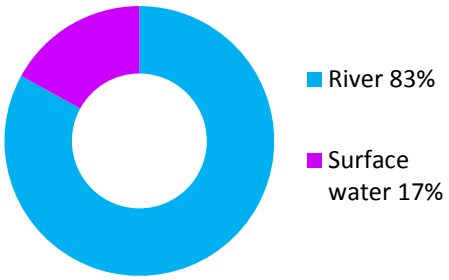


Figure 1: Annual Average Damages by flood source

Summary of flooding impacts

The highest risk of flooding is in Coupar Angus from the Coupar Burn.

The risk of flooding to people and property, as well as to community facilities, utilities, the transport network, designated sites and agricultural land is summarised in Table 1. The damages associated with floods of different likelihood are shown in Figure 2. For this Potentially Vulnerable Area the highest damages are to residential properties.

The location of the impacts of flooding is shown in Figure 3.

The figures presented for Annual Average Damages include damages to residential properties, non-residential properties, transport and agriculture.

In Coupar Angus, the local authority has undertaken a more detailed study. The study indicates that the number of residential properties at risk may be higher than the information provided in this report. SEPA and Perth and Kinross Council will work together to further improve our understanding of flood risk in this area.

	1 in 10 High likelihood	1 in 200 Medium likelihood	1 in 1000 Low likelihood
Residential properties (total 280)	<10	10	60
Non-residential properties (total 70)	<10	<10	10
People	<10	20	130
Community facilities	0	0	0
Utilities assets	<10	<10	<10
Transport links (excluding minor roads)	2 A roads at 3 locations	2 A roads at 5 locations	2 A roads at 7 locations
Environmental designated areas (km^2)	0	0	0
Designated cultural heritage sites	1	1	1
Agricultural land (km^2)	0.7	1.3	1.4

Table 1: Summary of flooding impacts

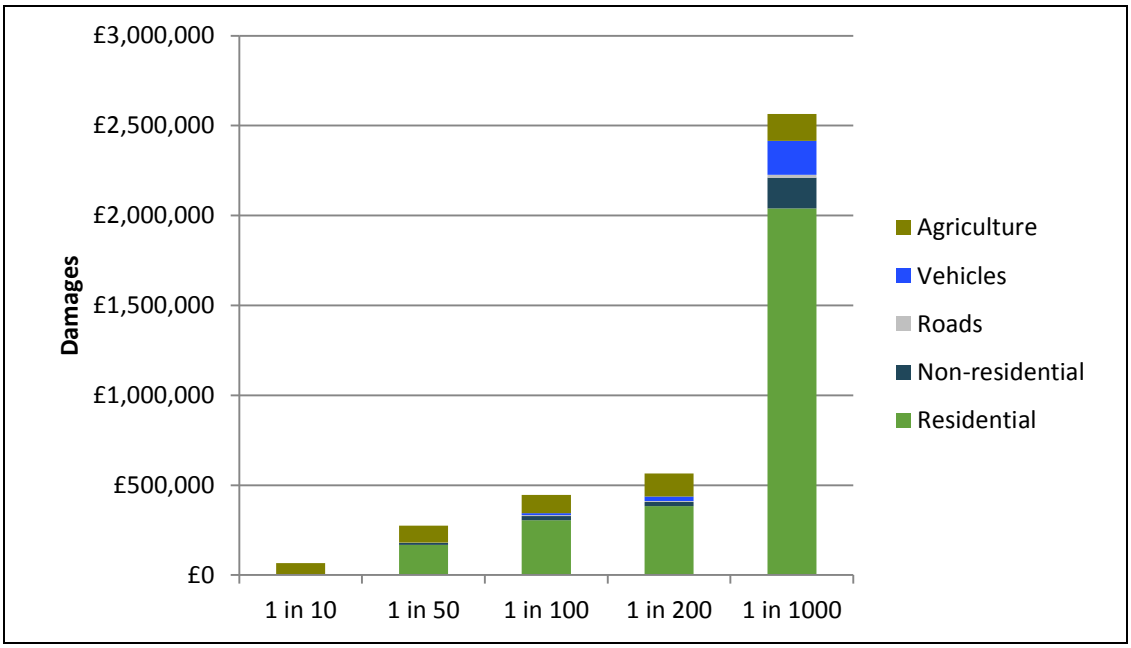


Figure 2: Damages by flood likelihood

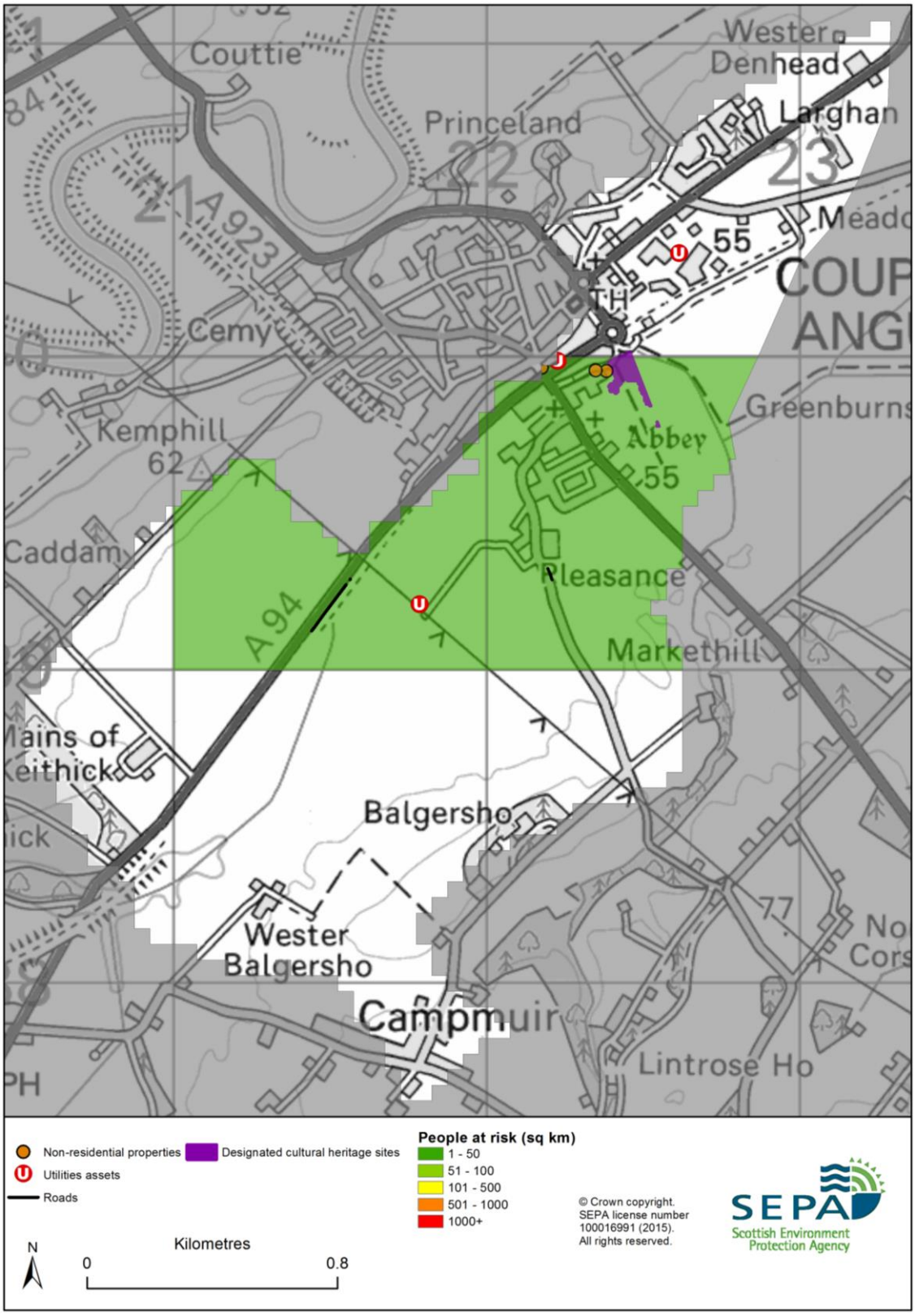


Figure 3: Impacts of flooding

History of flooding

The following significant river floods have been recorded:

- December 2012: Flooding from the Coupar Burn affected properties in George Street in Coupar Angus.
- August 2004: Flooding from the Coupar Burn affected properties in George Street in Coupar Angus. At least six houses were directly affected, including two requiring evacuation.

Objectives to manage flooding in Potentially Vulnerable Area 08/07

Objectives provide a common goal and shared ambition for managing floods. These objectives have been set by SEPA and agreed with flood risk management authorities following consultation. They were identified through an assessment of the underlying evidence of the causes and impacts of flooding. Target areas have been set to focus actions; they do not necessarily correspond to areas at risk in SEPA's flood map. The objectives below have been set for Coupar Angus Potentially Vulnerable Area.

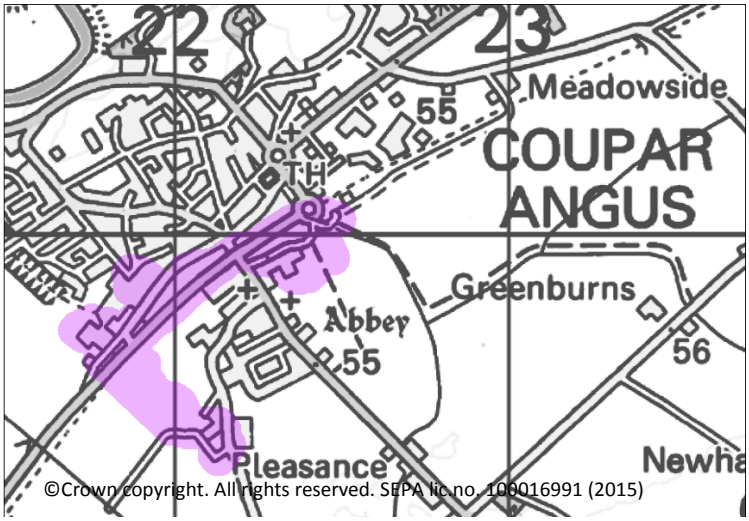
Reduce economic damages to residential and non-residential properties in Coupar Angus from the Coupar Burn

Indicators:

- £15,000 Annual Average Damages from residential properties
- £940 Annual Average Damages from non-residential properties

Objective ID: 8014

Target area:



Target area	Objective	ID	Indicators within PVA
Applies across Tay Local Plan District	Avoid an overall increase in flood risk	8001	• 10 residential properties • £26,000 Annual Average Damages
Applies across Tay Local Plan District	Reduce overall flood risk	8041	• 10 residential properties • £26,000 Annual Average Damages
Applies across Tay Local Plan District	Organisations such as Scottish Water, energy companies and Historic Environment Scotland actively maintain and manage their own assets, including the risk of flooding. These actions are not detailed further in the Flood Risk Management Strategies.		

Actions to manage flooding in Potentially Vulnerable Area 08/07

Actions describe where and how flood risk will be managed. These actions have been set by SEPA and agreed with flood risk management authorities following consultation. Selection of actions to deliver the agreed objectives was based on a detailed assessment and comparison of economic, social and environmental criteria. The actions shaded and then described below have been selected as the most appropriate for Coupar Angus Potentially Vulnerable Area.

Selected actions					
Flood protection scheme/works	*Natural flood management works*	New flood warning	*Community flood action groups*	*Property level protection scheme*	*Site protection plans*
Flood protection study	*Natural flood management study*	*Maintain flood warning*	Awareness raising	*Surface water plan/study*	Emergency plans/response
Maintain flood protection scheme	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

Action (ID):	**NEW FLOOD WARNING** (80410010)		
Objective (ID):	Reduce overall flood risk (8041) Reduce economic damages to residential and non-residential properties in Coupar Angus from the Coupar Burn (8014)		
Delivery lead:	SEPA		
Status:	**Not started**	Indicative delivery:	**post 2021**
Description:	Flood warning is required for properties in Coupar Angus affected by flooding from the Coupar Burn. Further feasibility assessment will be required to assess the potential for delivery and subsequent to that appropriate timescales for delivery.		

Action (ID):	**STRATEGIC MAPPING AND MODELLING** (80410016)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	SEPA		
Status:	**Not started**	Indicative delivery:	**2016-2021**
Description:	SEPA will seek to develop flood mapping in the Burrleton Burn area to improve understanding of flood risk. The extent and timing of improvements will depend on detailed scoping and data availability.		

Action (ID):	**STRATEGIC MAPPING AND MODELLING** (80410019)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Scottish Water		
Status:	**Not started**	Indicative delivery:	**2016-2021**
Description:	Scottish Water will carry out an assessment of flood risk within the highest risk sewer catchments to improve knowledge and understanding of surface water flood risk.		

Action (ID):	**FLOOD FORECASTING** (80410009)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	SEPA		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	The Scottish Flood Forecasting Service is a joint initiative between SEPA and the Met Office that produces daily, national flood guidance statements which are issued to Category 1 and 2 Responders. The service also provides information which allows SEPA to issue flood warnings, giving people a better chance of reducing the impact of flooding on their home or business. For more information please visit SEPA's website.		

Action (ID):	**SELF HELP** (80410011)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	—		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Everyone is responsible for protecting themselves and their property from flooding. Property and business owners can take simple steps to reduce damage and disruption to their homes and businesses should flooding happen. This includes preparing a flood plan and flood kit, installing property level protection, signing up to Floodline and Resilient Communities initiatives, and ensuring that properties and businesses are insured against flood damage.		

Action (ID):	**AWARENESS RAISING** (80410013)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Responsible authorities		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	SEPA and the responsible authorities have a duty to raise public awareness of flood risk. Improved awareness of flood risk and actions that prepare individuals, homes and businesses for flooding can reduce the overall impact. From 2016 SEPA will engage with the community through local participation in national initiatives, including partnership working with Neighbourhood Watch Scotland. In addition, SEPA will engage with local authorities and community resilience groups where possible. Local authorities will be undertaking additional awareness raising activities. Further details will be set out in the Local FRM Plan.		

Action (ID):	**MAINTENANCE** (80410007)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Perth and Kinross Council, asset / land managers		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Local authorities have a duty to assess watercourses and carry out clearance and repair works where such works would substantially reduce flood risk. They produce schedules of clearance and repair works and make these available for public inspection. Scottish Water undertake inspection and repair on the public sewer network. Asset owners and riparian landowners are responsible for the maintenance and management of their own assets including those which help to reduce flood risk.		

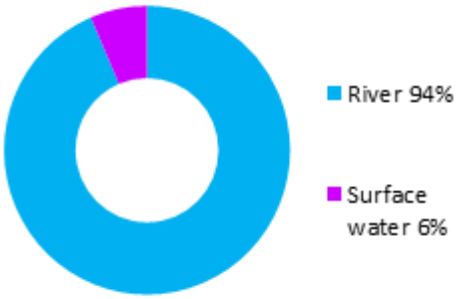
Action (ID):	**EMERGENCY PLANS/RESPONSE** (80410014)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Category 1 and 2 Responders		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Providing an emergency response to flooding is the responsibility of many organisations, including local authorities, the emergency services and SEPA. Effective management of an emergency response relies on emergency plans that are prepared under the Civil Contingencies Act 2004 by Category 1 and 2 Responders. The emergency response by these organisations is co-ordinated through regional and local resilience partnerships. This response may be supported by the work of voluntary organisations.		

Action (ID):	**PLANNING POLICIES** (80010001)		
Objective (ID):	Avoid an overall increase in flood risk (8001) Reduce overall flood risk (8041)		
Delivery lead:	Planning authority		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Scottish Planning Policy and accompanying Planning Advice Notes set out Scottish Ministers' priorities for the operation of the planning system and for the development and use of land. In terms of flood risk management, the policy supports a catchment-scale approach to sustainable flood risk management and aims to build the resilience of our cities and towns, encourage sustainable land management in our rural areas, and to address the long-term vulnerability of parts of our coasts and islands. Under this approach, new development in areas with medium to high likelihood of flooding should be avoided. For further information on the application of national planning policies see Annex 2.		

Luncarty, Stanley, Bankfoot, Dunkeld and Birnam (Potentially Vulnerable Area 08/08)

Local Plan District	Local authority	Main catchment
Tay	Perth and Kinross Council	River Tay

Summary of flooding impacts



At risk of flooding

- 360 residential properties
- 130 non-residential properties
- £740,000 Annual Average Damages

(damages by flood source shown left)

Summary of objectives to manage flooding

Objectives have been set by SEPA and agreed with flood risk management authorities. These are the aims for managing local flood risk. The objectives have been grouped in three main ways: by reducing risk, avoiding increasing risk or accepting risk by maintaining current levels of management.

Many organisations, such as Scottish Water and energy companies, actively maintain and manage their own assets including their risk from flooding. Where known, these actions are described here. Scottish Natural Heritage and Historic Environment Scotland work with site owners to manage flooding where appropriate at designated environmental and/or cultural heritage sites. These actions are not detailed further in the Flood Risk Management Strategies.

Summary of actions to manage flooding

The actions below have been selected to manage flood risk.

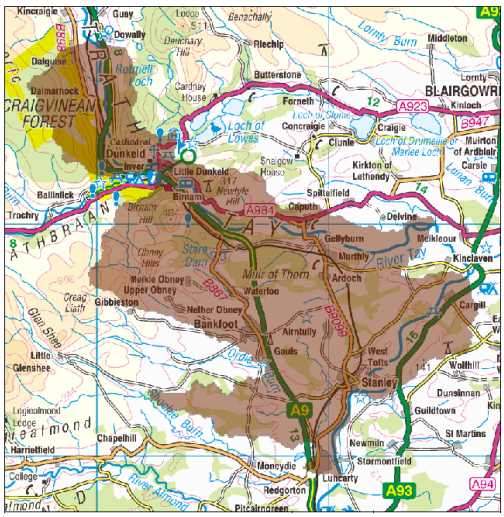
Flood protection scheme/works	*Natural flood management works*	*New flood warning*	*Community flood action groups*	*Property level protection scheme*	*Site protection plans*
Flood protection study	*Natural flood management study*	Maintain flood warning	Awareness raising	*Surface water plan/study*	Emergency plans/response
Maintain flood protection scheme	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

Luncarty, Stanley, Bankfoot, Dunkeld and Birnam (Potentially Vulnerable Area 08/08)

Local Plan District	Local authority	Main catchment
Tay	Perth and Kinross Council	River Tay

Background

This Potentially Vulnerable Area is 141km^2. It is situated in the lower reaches of the River Tay catchment and includes Dunkeld, Birnam, Bankfoot, Stanley and Luncarty. The main watercourse is the River Tay.



The area has a risk of surface water and river flooding. The majority of flood damages are caused by river flooding.

There are approximately 360 residential properties and 130 non-residential properties at risk of flooding. The Annual Average Damages from flooding are approximately £740,000.

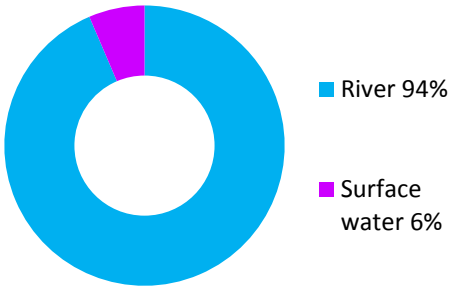


Figure 1: Annual Average Damages by flood source

Summary of flooding impacts

The highest risk of flooding is in Dunkeld from the River Tay and River Braan, and in Bankfoot from the Garry Burn and Glenshauch Burn.

The risk of flooding to people, property, as well as to community facilities, utilities, the transport network, designated sites and agricultural land is summarised in Table 1.

The damages associated with floods of different likelihood are shown in Figure 2. For this Potentially Vulnerable Area the highest damages are to residential properties followed by damages to non-residential properties. The Perth to Inverness railway line is also notably impacted. The location of the impacts of flooding is shown in Figure 3.

The figures presented for Annual Average Damages include damages to residential properties, non-residential properties, transport and agriculture.

	1 in 10 High likelihood	1 in 200 Medium likelihood	1 in 1000 Low likelihood
Residential properties (total 3,400)	80	360	500
Non-residential properties (total 750)	30	130	170
People	180	790	1,100
Community facilities	0	<10 Educational buildings	<10 Educational buildings
Utilities assets	<10	<10	<10
Transport links (excluding minor roads)	3 A roads, 3 B roads at 62 locations 1 Railway route at 32 locations: Perth to Inverness	3 A roads, 3 B roads at 81 locations 1 Railway route at 33 locations: Perth to Inverness	3 A roads, 3 B roads at 85 locations 1 Railway route at 33 locations: Perth to Inverness
Environmental designated areas (km^2)	4.9	5.5	5.6
Designated cultural heritage sites	11	14	17
Agricultural land (km^2)	3.1	8.0	9.5

Table 1: Summary of flooding impacts

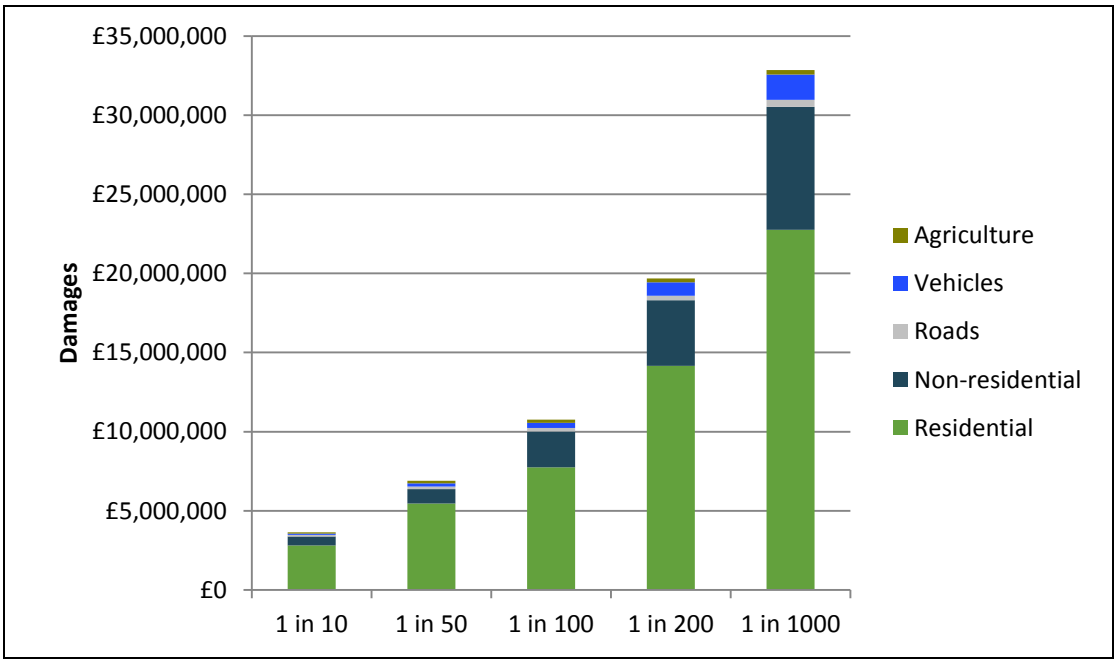


Figure 2: Damages by flood likelihood

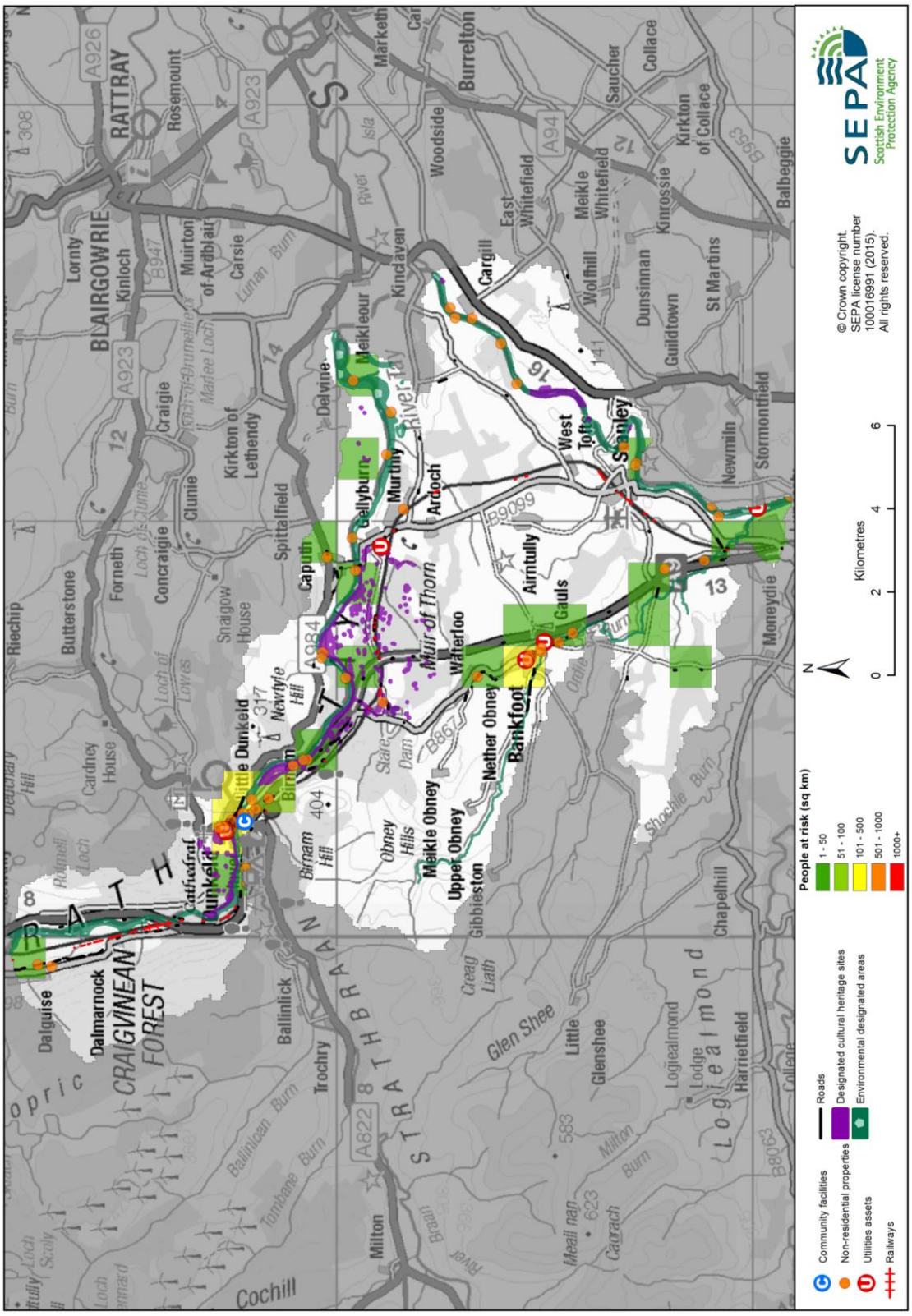


Figure 3: Impacts of flooding

History of flooding

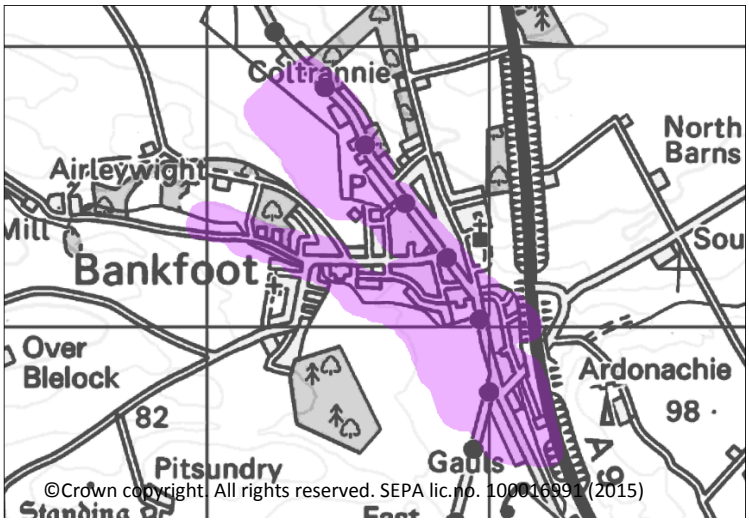
This area has a long history of flooding from the River Tay and its tributaries. The following floods have been recorded:

- 17 July 2015: Heavy rain caused serious flooding in parts of Scotland, including Bankfoot. It has been reported that 20 properties were affected by flooding from the Garry Burn.
- 11 August 2004: 50 people evacuated in Bankfoot due to flooding from the Garry Burn. Properties were flooded on Prieston Road and the boundary wall at Church Hall on Church Lane was destroyed. In Dunkeld, flooding from the Spoutwell Burn and an associated tributary caused flooding to approximately 8-10 properties in the town centre.
- December 1996: Four properties affected in Dalguise due to flooding from the River Tay and extensive damage was caused to the Perth to Inverness railway line.
- 16 January 1993: Widespread flooding across the Tay catchment resulted in over £20 million of damage. The flood is known to have affected Bankfoot and Dalguise. Peak flow at Ballathie Gauging Station was recorded at 2269 m^3/s during this flood event.
- 7 February 1990: Communication networks were disrupted as a result of flooding in the Tay and Earn valleys. Properties, roads and railways were also damaged.
- 24 May 1984: Localised flooding in Bankfoot caused by very heavy hail and rapid thaw. Approximately 5-10 properties flooded on Main Street and Tulliebelton Place.
- 27 January 1961: Heavy overnight rain and quick thaw of lying snow caused flooding along the Garry Burn in Bankfoot. The local primary school and some local farm cottages were affected.
- 17 February 1950: Communication networks were disrupted and properties and several roads were flooded within the Upper Tay. The flood affected a large part of Perth and Kinross.

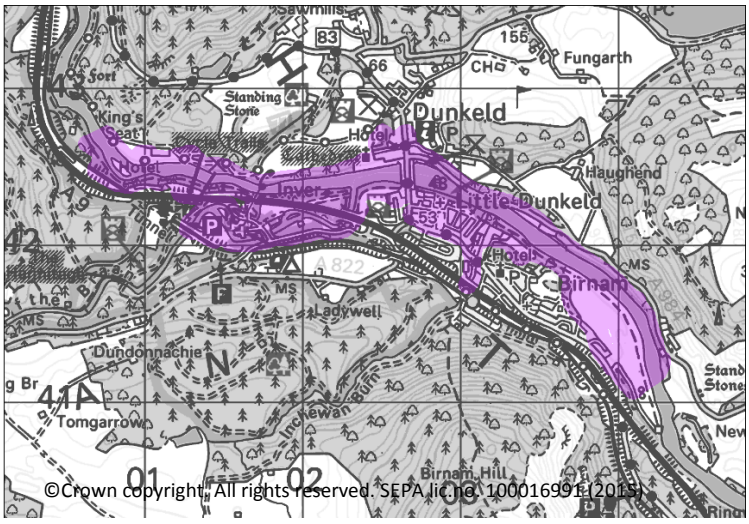
Objectives to manage flooding in Potentially Vulnerable Area 08/08

Objectives provide a common goal and shared ambition for managing floods. These objectives have been set by SEPA and agreed with flood risk management authorities following consultation. They were identified through an assessment of the underlying evidence of the causes and impacts of flooding. Target areas have been set to focus actions; they do not necessarily correspond to areas at risk in SEPA's flood map. The objectives below have been set for Luncarty, Stanley, Bankfoot, Dunkeld and Birnam Potentially Vulnerable Area.

Reduce economic damages to residential and non-residential properties in Bankfoot from the Garry Burn and Glenshauch Burn

Indicators:	Target area:
• £240,000 Annual Average Damages from residential properties • £17,000 Annual Average Damages from non-residential properties	
Objective ID: 8016	

Reduce economic damages to residential and non-residential properties in Dunkeld from River Tay and River Braan

Indicators:	Target area:
• £190,000 Annual Average Damages from residential properties • £50,000 Annual Average Damages from non-residential properties	
Objective ID: 8017	

Target area	Objective	ID	Indicators within PVA
Dunkeld, Luncarty and Bankfoot	Reduce the physical risk, or disruption risk, related to areas of the A9 at risk of flooding	8302	• 750m of road at 21 locations on the A9
Applies across Tay Local Plan District	Avoid an overall increase in flood risk	8001	• 360 residential properties • £740,000 Annual Average Damages
Applies across Tay Local Plan District	Reduce overall flood risk	8041	• 360 residential properties • £740,000 Annual Average Damages
Applies across Tay Local Plan District	Organisations such as Scottish Water, energy companies and Historic Environment Scotland actively maintain and manage their own assets, including the risk of flooding. These actions are not detailed further in the Flood Risk Management Strategies.		

Actions to manage flooding in Potentially Vulnerable Area 08/08

Actions describe where and how flood risk will be managed. These actions have been set by SEPA and agreed with flood risk management authorities following consultation. Selection of actions to deliver the agreed objectives was based on a detailed assessment and comparison of economic, social and environmental criteria. The actions shaded and then described below have been selected as the most appropriate for Luncarty, Stanley, Bankfoot, Dunkeld and Birnam Potentially Vulnerable Area.

Selected actions					
Flood protection scheme/works	*Natural flood management works*	*New flood warning*	*Community flood action groups*	*Property level protection scheme*	*Site protection plans*
Flood protection study	*Natural flood management study*	Maintain flood warning	Awareness raising	*Surface water plan/study*	Emergency plans/response
Maintain flood protection scheme	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

Action (ID):	**FLOOD PROTECTION SCHEME/WORKS** (8302021)		
Objective (ID):	Reduce the physical risk, or disruption risk, related to areas of the A9 at risk of flooding (8302)		
Delivery lead:	Transport Scotland		
Status:	**Under development**	Indicative delivery:	**2022-2027**
Description:	Transport Scotland will carry out civil engineering work which will reduce the risk of flooding on identified sections of the trunk road.		

Action (ID):	**FLOOD PROTECTION STUDY** (80170005)		
Objective (ID):	Reduce economic damages to residential and non-residential properties in Dunkeld from River Tay and River Braan (8017)		
Delivery lead:	Perth and Kinross Council		
Priority:	National:	Within local authority:	
	67 of 168	**4 of 6**	
Status:	**Not started**	Indicative delivery:	**2016-2021**
Description:	A flood protection study has been recommended for Dunkeld to assess whether modification of conveyance, direct flood defences and sediment management could reduce flood risk. The study should build on previous studies and take a staged approach to allow collaboration with SEPA on strategic mapping and modelling for the Tay. The study should take a catchment approach and consider the potential benefits and disbenefits and interaction between actions		

	upstream and downstream.
Potential impacts	
Economic:	The study could benefit 179 residential properties and 74 non-residential properties at risk of flooding in this location, with potential damages avoided of up to £5.8 million.
Social:	Social impacts will depend on the outcome of the study and recommended actions. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community. In addition there is one educational building located within the study area.
Environmental:	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment and designated sites. Where possible opportunities to enhance and restore the environment should be sought, for example through natural flood management. To be in accord with the FRM Strategy, the responsible authority should seek to ensure as part of the study that the action will not have an adverse effect on the integrity of the River Tay Special Area of Conservation. Conservation areas, National Scenic Areas, scheduled monuments, Gardens and designed landscapes, listed buildings and ancient woodlands are also present in the study area and could be positively or negatively impacted.

Action (ID):	**STRATEGIC MAPPING AND MODELLING** (80410016)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	SEPA		
Status:	**Not started**	Indicative delivery:	**2016-2021**
Description:	SEPA will seek to develop flood mapping in the River Tay area to improve understanding of flood risk. The extent and timing of improvements will depend on detailed scoping and data availability. Where this work coincides with local authority studies, SEPA will work collaboratively to ensure consistent modelling approaches are applied.		

Action (ID):	**STRATEGIC MAPPING AND MODELLING** (80410019)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Scottish Water		
Status:	**Not started**	Indicative delivery:	**2016-2021**
Description:	Scottish Water will review the assessment of flood risk within the highest risk sewer catchments to improve knowledge and understanding of surface water flood risk.		

Action (ID):	**MAINTAIN FLOOD WARNING** (80410030)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	SEPA		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Continue to maintain the Boat of Murthly, Caputh to Kinclaven, Dalguise, Dunkeld and Burnmouth Road, Logierait to Victoria Bridge and the Stanley Mills flood warning areas which are part of the Tay river flood warning scheme.		

Action (ID):	**FLOOD FORECASTING** (80410009)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	SEPA		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	The Scottish Flood Forecasting Service is a joint initiative between SEPA and the Met Office that produces daily, national flood guidance statements which are issued to Category 1 and 2 Responders. The service also provides information which allows SEPA to issue flood warnings, giving people a better chance of reducing the impact of flooding on their home or business. For more information please visit SEPA's website.		

Action (ID):	**SELF HELP** (80410011)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	—		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Everyone is responsible for protecting themselves and their property from flooding. Property and business owners can take simple steps to reduce damage and disruption to their homes and businesses should flooding happen. This includes preparing a flood plan and flood kit, installing property level protection, signing up to Floodline and Resilient Communities initiatives, and ensuring that properties and businesses are insured against flood damage. Perth and Kinross Council is piloting a project for flood protection products for properties in flood risk areas.		

Action (ID):	**AWARENESS RAISING** (80410013)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Responsible authorities		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	SEPA and the responsible authorities have a duty to raise public awareness of flood risk. Improved awareness of flood risk and actions that prepare individuals, homes and businesses for flooding can reduce the overall impact. From 2016 SEPA will engage with the community through local participation in national initiatives, including partnership working with Neighbourhood Watch Scotland. In addition, SEPA will engage with local authorities and community resilience groups where possible. Local authorities will be undertaking additional awareness raising activities. Further details will be set out in the Local FRM Plan.		

Action (ID):	**MAINTENANCE** (80410007)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Perth and Kinross Council, asset / land managers		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Local authorities have a duty to assess watercourses and carry out clearance and repair works where such works would substantially reduce flood risk. They produce schedules of clearance and repair works and make these available for public inspection. Scottish Water undertake inspection and repair on the public sewer network. Asset owners and riparian landowners are responsible for the maintenance and management of their own assets including those which help to reduce flood risk.		

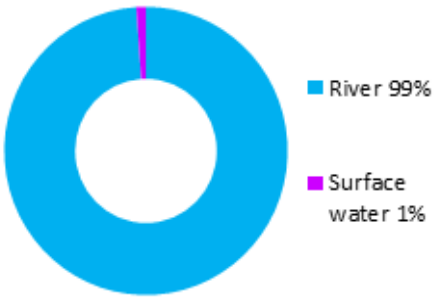
Action (ID):	**EMERGENCY PLANS/RESPONSE** (80410014)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Category 1 and 2 Responders		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Providing an emergency response to flooding is the responsibility of many organisations, including local authorities, the emergency services and SEPA. Effective management of an emergency response relies on emergency plans that are prepared under the Civil Contingencies Act 2004 by Category 1 and 2 Responders. The emergency response by these organisations is co-ordinated through regional and local resilience partnerships. This response may be supported by the work of voluntary organisations.		

Action (ID):	**PLANNING POLICIES** (80010001)		
Objective (ID):	Avoid an overall increase in flood risk (8001) Reduce overall flood risk (8041)		
Delivery lead:	Planning authority		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Scottish Planning Policy and accompanying Planning Advice Notes set out Scottish Ministers' priorities for the operation of the planning system and for the development and use of land. In terms of flood risk management, the policy supports a catchment-scale approach to sustainable flood risk management and aims to build the resilience of our cities and towns, encourage sustainable land management in our rural areas, and to address the long-term vulnerability of parts of our coasts and islands. Under this approach, new development in areas with medium to high likelihood of flooding should be avoided. For further information on the application of national planning policies see Annex 2.		

Tyndrum and Crianlarich (Potentially Vulnerable Area 08/09)

Local Plan District	Local authority	Main catchment
Tay	Stirling Council	River Tay

Summary of flooding impacts



At risk of flooding

- 20 residential properties
- 10 non-residential properties
- £160,000 Annual Average Damages

(damages by flood source shown left)

Summary of objectives to manage flooding

Objectives have been set by SEPA and agreed with flood risk management authorities. These are the aims for managing local flood risk. The objectives have been grouped in three main ways: by reducing risk, avoiding increasing risk or accepting risk by maintaining current levels of management.

Many organisations, such as Scottish Water and energy companies, actively maintain and manage their own assets including their risk from flooding. Where known, these actions are described here. Scottish Natural Heritage and Historic Environment Scotland work with site owners to manage flooding where appropriate at designated environmental and/or cultural heritage sites. These actions are not detailed further in the Flood Risk Management Strategies.

Summary of actions to manage flooding

The actions below have been selected to manage flood risk.

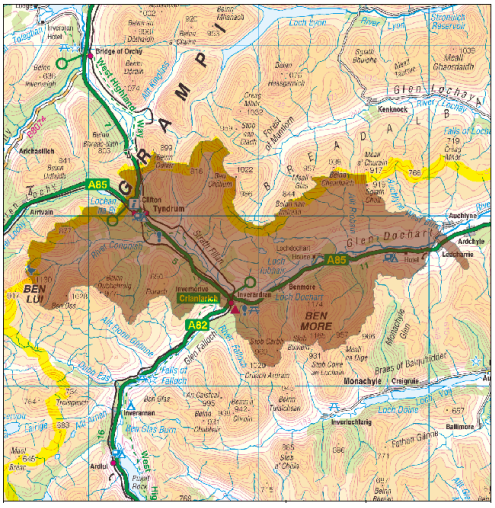
Flood protection scheme/works	*Natural flood management works*	*New flood warning*	*Community flood action groups*	*Property level protection scheme*	*Site protection plans*
Flood protection study	*Natural flood management study*	*Maintain flood warning*	Awareness raising	*Surface water plan/study*	Emergency plans/response
Maintain flood protection scheme	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

Tyndrum and Crianlarich (Potentially Vulnerable Area 08/09)

Local Plan District	Local authority	Main catchment
Tay	Stirling Council	River Tay

Background

This Potentially Vulnerable Area is 166km² (shown below). It is situated in the upper reaches of the River Tay catchment and includes Tyndrum and Crianlarich. The main watercourses are the River Fillan and River Dochart, and it also includes Loch Dochart and Loch Lubhair.



There are approximately 20 residential properties and 10 non-residential properties at risk of flooding. The Annual Average Damages are approximately £160,000.

The majority of flood damages are caused by river flooding.

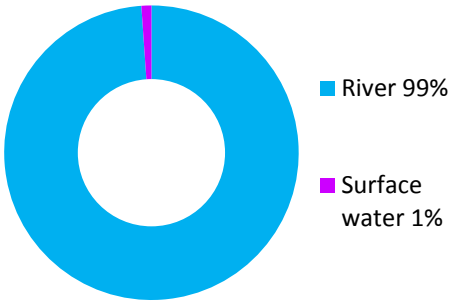


Figure 1: Annual Average Damages by flood source

Summary of flooding impacts

The majority of flood risk in this area is dispersed between Crianlarich, from the River Fillan, and Tyndrum, from small watercourses.

The risk of flooding to people, property, as well as to community facilities, utilities, the transport network, designated sites and agricultural land is summarised in Table 1. The damages associated with floods of different likelihood are shown in Figure 2. For this Potentially Vulnerable Area the highest damages are to residential and non-residential properties.

The location of the impacts of flooding is shown in Figure 3.

The figures presented for Annual Average Damages include damages to residential properties, non-residential properties, transport and agriculture.

	1 in 10 High likelihood	1 in 200 Medium likelihood	1 in 1000 Low likelihood
Residential properties (total 170)	20	20	30
Non-residential properties (total 70)	<10	10	10
People	40	50	70
Community facilities	0	0	0
Utilities assets	<10	<10	<10
Transport links (excluding minor roads)	2 A roads at 25 locations 2 Railway routes at 29 locations: Glasgow Queen Street to Oban Glasgow Queen Street to Mallaig	2 A roads at 34 locations 2 Railway routes at 29 locations: Glasgow Queen Street to Oban Glasgow Queen Street to Mallaig	2 A roads at 34 locations 2 Railway routes at 37 locations: Glasgow Queen Street to Oban Glasgow Queen Street to Mallaig
Environmental designated areas (km^2)	2.4	2.5	2.6
Designated cultural heritage sites	2	2	2
Agricultural land (km^2)	3.7	4.7	5.1

Table 1: Summary of flooding impacts

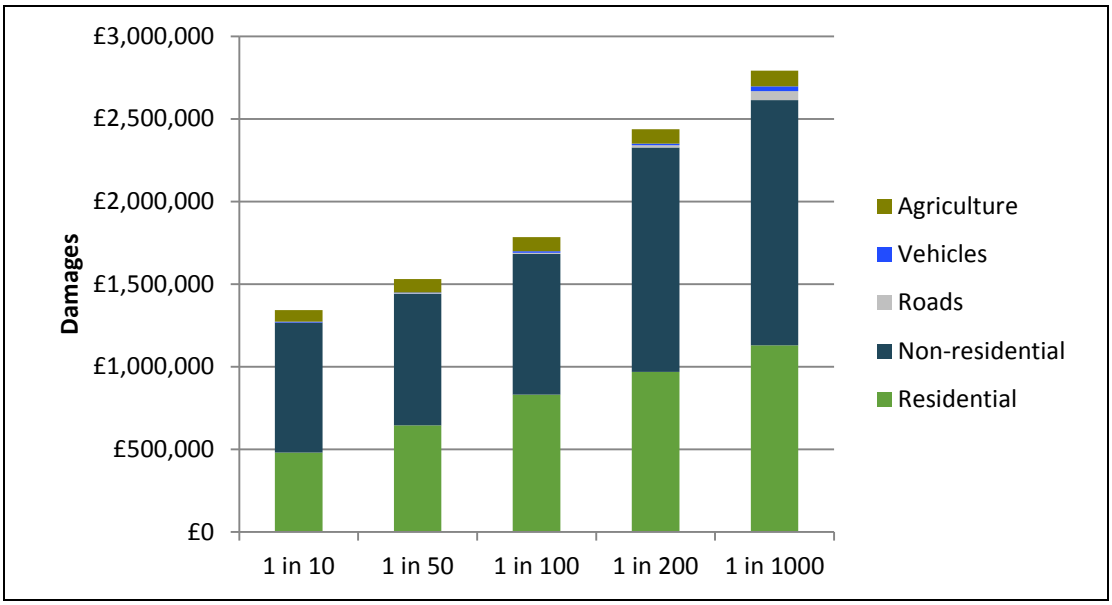


Figure 2: Damages by flood likelihood

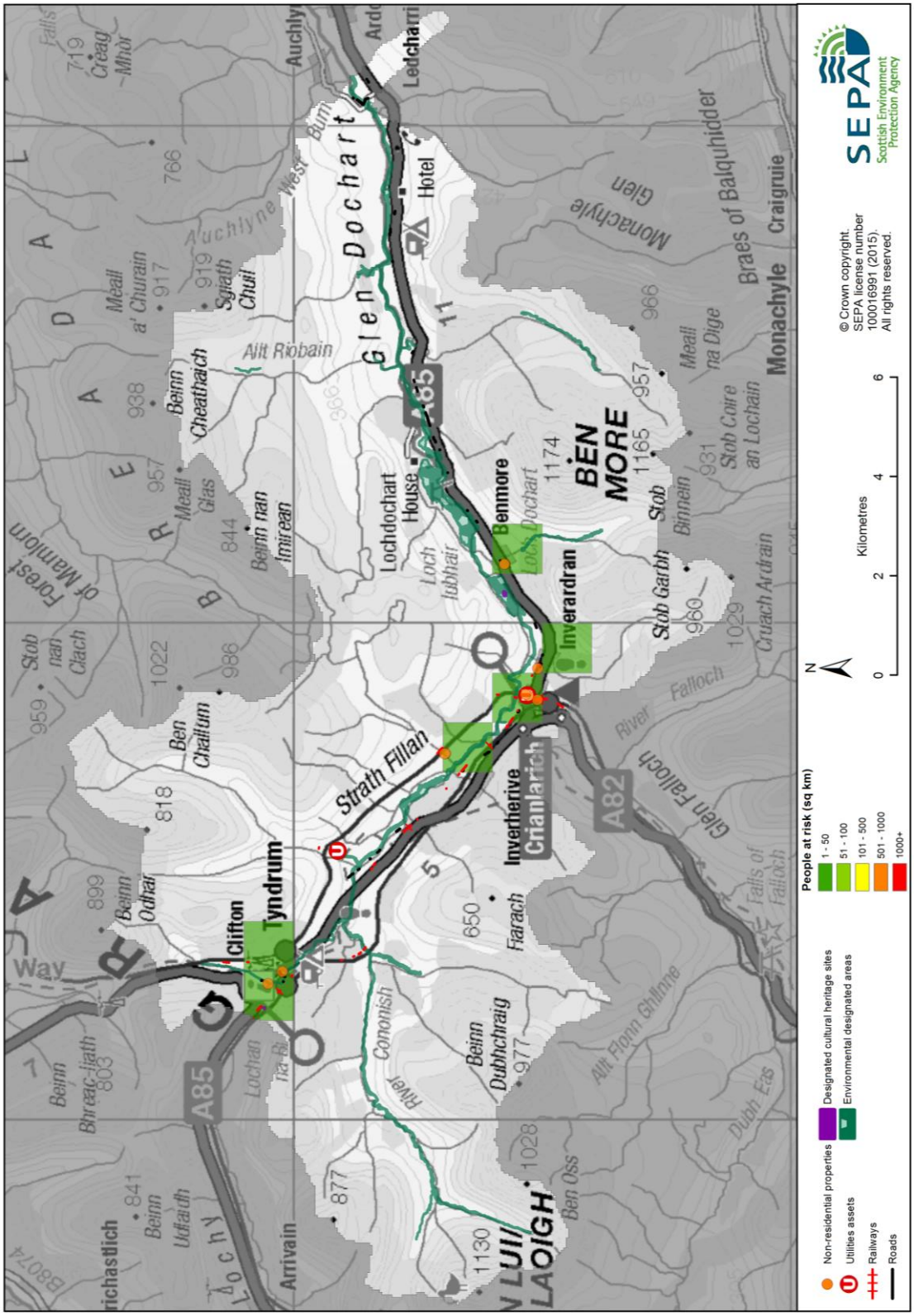


Figure 3: Impacts of flooding

History of flooding

No significant floods have been recorded in this Potentially Vulnerable Area.

Objectives to manage flooding in Potentially Vulnerable Area 08/09

Objectives provide a common goal and shared ambition for managing floods. These objectives have been set by SEPA and agreed with flood risk management authorities following consultation. They were identified through an assessment of the underlying evidence of the causes and impacts of flooding. Target areas have been set to focus actions; they do not necessarily correspond to areas at risk in SEPA's flood map. The objectives below have been set for Tyndrum and Crianlarich Potentially Vulnerable Area.

Target area	Objective	ID	Indicators within PVA
Applies across Tay Local Plan District	Avoid an overall increase in flood risk	8001	• 20 residential properties • £160,000 Annual Average Damages
Applies across Tay Local Plan District	Reduce overall flood risk	8041	• 20 residential properties • £160,000 Annual Average Damages
Applies across Tay Local Plan District	Organisations such as Scottish Water, energy companies and Historic Environment Scotland actively maintain and manage their own assets, including the risk of flooding. These actions are not detailed further in the Flood Risk Management Strategies.		

Actions to manage flooding in Potentially Vulnerable Area 08/09

Actions describe where and how flood risk will be managed. These actions have been set by SEPA and agreed with flood risk management authorities following consultation. Selection of actions to deliver the agreed objectives was based on a detailed assessment and comparison of economic, social and environmental criteria. The actions shaded and then described below have been selected as the most appropriate for Tyndrum and Crianlarich Potentially Vulnerable Area.

Selected actions					
Flood protection scheme/works	*Natural flood management works*	*New flood warning*	*Community flood action groups*	*Property level protection scheme*	*Site protection plans*
Flood protection study	*Natural flood management study*	*Maintain flood warning*	Awareness raising	*Surface water plan/study*	Emergency plans/response
Maintain flood protection scheme	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

Action (ID):	**STRATEGIC MAPPING AND MODELLING** (80410016)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	SEPA		
Status:	**Not started**	Indicative delivery:	**2016-2021**
Description:	SEPA will seek to develop flood mapping in the River Fillian area to improve understanding of flood risk. The extent and timing of improvements will depend on detailed scoping and data availability.		

Action (ID):	**FLOOD FORECASTING** (80410009)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	SEPA		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	The Scottish Flood Forecasting Service is a joint initiative between SEPA and the Met Office that produces daily, national flood guidance statements which are issued to Category 1 and 2 Responders. The service also provides information which allows SEPA to issue flood warnings, giving people a better chance of reducing the impact of flooding on their home or business. For more information please visit SEPA's website.		

Action (ID):	**SELF HELP** (80410011)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	—		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Everyone is responsible for protecting themselves and their property from flooding. Property and business owners can take simple steps to reduce damage and disruption to their homes and businesses should flooding happen. This includes preparing a flood plan and flood kit, installing property level protection, signing up to Floodline and Resilient Communities initiatives, and ensuring that properties and businesses are insured against flood damage.		

Action (ID):	**AWARENESS RAISING** (80410013)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Responsible authorities		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	SEPA and the responsible authorities have a duty to raise public awareness of flood risk. Improved awareness of flood risk and actions that prepare individuals, homes and businesses for flooding can reduce the overall impact. From 2016 SEPA will engage with the community through local participation in national initiatives, including partnership working with Neighbourhood Watch Scotland. In addition, SEPA will engage with local authorities and community resilience groups where possible. Local authorities will be undertaking additional awareness raising activities. Further details will be set out in the Local FRM Plan.		

Action (ID):	**MAINTENANCE** (80410007)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Stirling Council, asset / land managers		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Local authorities have a duty to assess watercourses and carry out clearance and repair works where such works would substantially reduce flood risk. They produce schedules of clearance and repair works and make these available for public inspection. Scottish Water undertake inspection and repair on the public sewer network. Asset owners and riparian landowners are responsible for the maintenance and management of their own assets including those which help to reduce flood risk.		

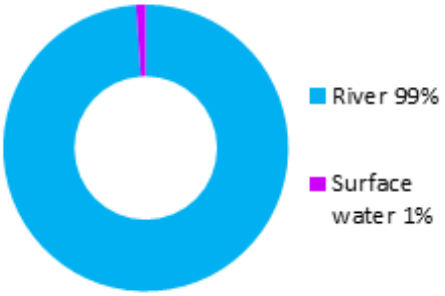
Action (ID):	**EMERGENCY PLANS/RESPONSE** (80410014)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Category 1 and 2 Responders		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Providing an emergency response to flooding is the responsibility of many organisations, including local authorities, the emergency services and SEPA. Effective management of an emergency response relies on emergency plans that are prepared under the Civil Contingencies Act 2004 by Category 1 and 2 Responders. The emergency response by these organisations is co-ordinated through regional and local resilience partnerships. This response may be supported by the work of voluntary organisations.		

Action (ID):	**PLANNING POLICIES** (80010001)		
Objective (ID):	Avoid an overall increase in flood risk (8001) Reduce overall flood risk (8041)		
Delivery lead:	Planning authority		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Scottish Planning Policy and accompanying Planning Advice Notes set out Scottish Ministers' priorities for the operation of the planning system and for the development and use of land. In terms of flood risk management, the policy supports a catchment-scale approach to sustainable flood risk management and aims to build the resilience of our cities and towns, encourage sustainable land management in our rural areas, and to address the long-term vulnerability of parts of our coasts and islands. Under this approach, new development in areas with medium to high likelihood of flooding should be avoided. For further information on the application of national planning policies see Annex 2.		

Almondbank (Potentially Vulnerable Area 08/10)

Local Plan District	Local authority	Main catchment
Tay	Perth and Kinross Council	River Almond (River Tay)

Summary of flooding impacts



At risk of flooding

- 50 residential properties
- 110 non-residential properties
- £1.2 million Annual Average Damages

(damages by flood source shown left)

Summary of objectives to manage flooding

Objectives have been set by SEPA and agreed with flood risk management authorities. These are the aims for managing local flood risk. The objectives have been grouped in three main ways: by reducing risk, avoiding increasing risk or accepting risk by maintaining current levels of management.

Many organisations, such as Scottish Water and energy companies, actively maintain and manage their own assets including their risk from flooding. Where known, these actions are described here. Scottish Natural Heritage and Historic Environment Scotland work with site owners to manage flooding where appropriate at designated environmental and/or cultural heritage sites. These actions are not detailed further in the Flood Risk Management Strategies.

Summary of actions to manage flooding

The actions below have been selected to manage flood risk.

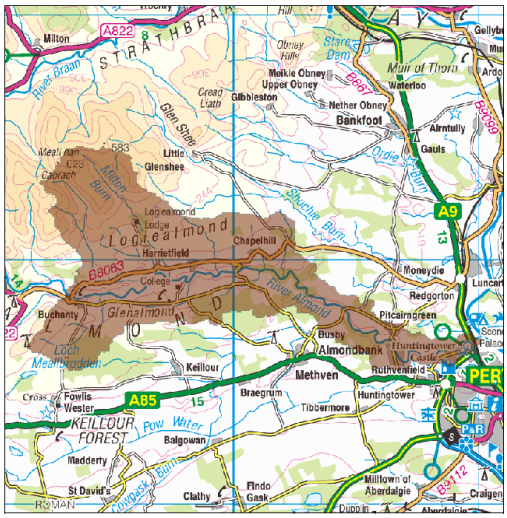
Flood protection scheme/works	*Natural flood management works*	*New flood warning*	*Community flood action groups*	*Property level protection scheme*	*Site protection plans*
Flood protection study	*Natural flood management study*	Maintain flood warning	Awareness raising	*Surface water plan/study*	Emergency plans/response
Maintain flood protection scheme	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

Almondbank (Potentially Vulnerable Area 08/10)

Local Plan District	Local authority	Main catchment
Tay	Perth and Kinross Council	River Almond (River Tay)

Background

This Potentially Vulnerable Area is 67km^2. It is part of the River Tay catchment and includes Almondbank. It originates from steep hills in the west and follows the path of the River Almond down to Almondbank in the south east. The main watercourse in this area is the River Almond.



The area has a risk of surface water and river flooding. The majority of damages are caused by river flooding.

There are approximately 50 residential properties and 110 non-residential properties at risk of flooding. The Annual Average Damages from flooding are approximately £1.2 million.

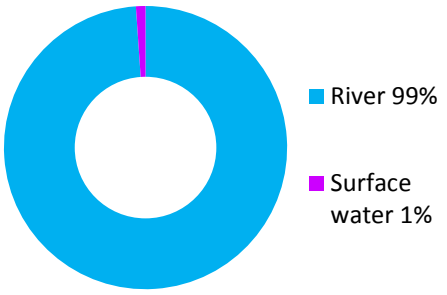


Figure 1: Annual Average Damages by flood source

Summary of flooding impacts

The highest risk of river flooding is from the River Almond and the East Pow Burn to Almondbank.

The risk of flooding to people and property, as well as to community facilities, utilities, the transport network, designated sites and agricultural land is summarised in Table 1. The damages associated with floods of different likelihood are shown in Figure 2. For this Potentially Vulnerable Area the highest damages are to non-residential properties followed by damages to residential properties.

The location of the impacts of flooding is shown in Figure 3.

The figures presented for Annual Average Damages include damages to residential properties, non-residential properties, transport and agriculture

	1 in 10 High likelihood	1 in 200 Medium likelihood	1 in 1000 Low likelihood
Residential properties (total 870)	<10	50	90
Non-residential properties (total 330)	<10	110	180
People	20	110	200
Community facilities	0	0	<10 Educational buildings
Utilities assets	<10	<10	20
Transport links (excluding minor roads)	1 A road, 1 B road at 13 locations 1 Railway route at 1 location: Perth to Inverness	1 A road, 1 B road at 20 locations 1 Railway route at 1 location: Perth to Inverness	1 A road, 1 B road at 20 locations 1 Railway route at 1 location: Perth to Inverness
Environmental designated areas (km^2)	2.0	2.1	2.5
Designated cultural heritage sites	2	2	2
Agricultural land (km^2)	1.3	1.9	2.5

Table 1: Summary of flooding impacts

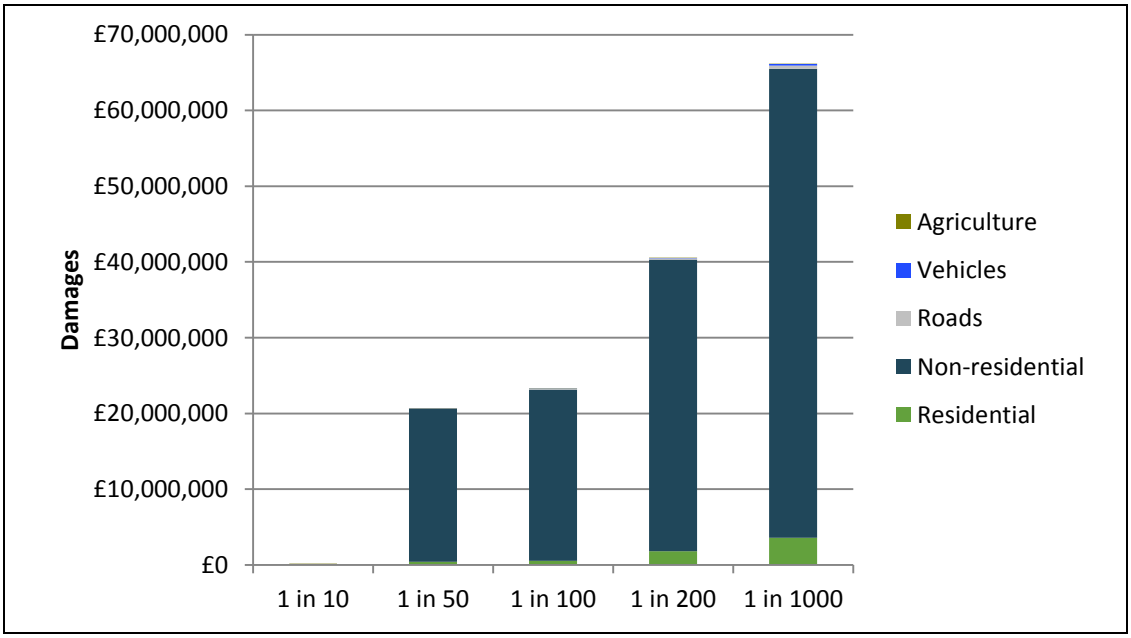


Figure 2: Damages by flood likelihood

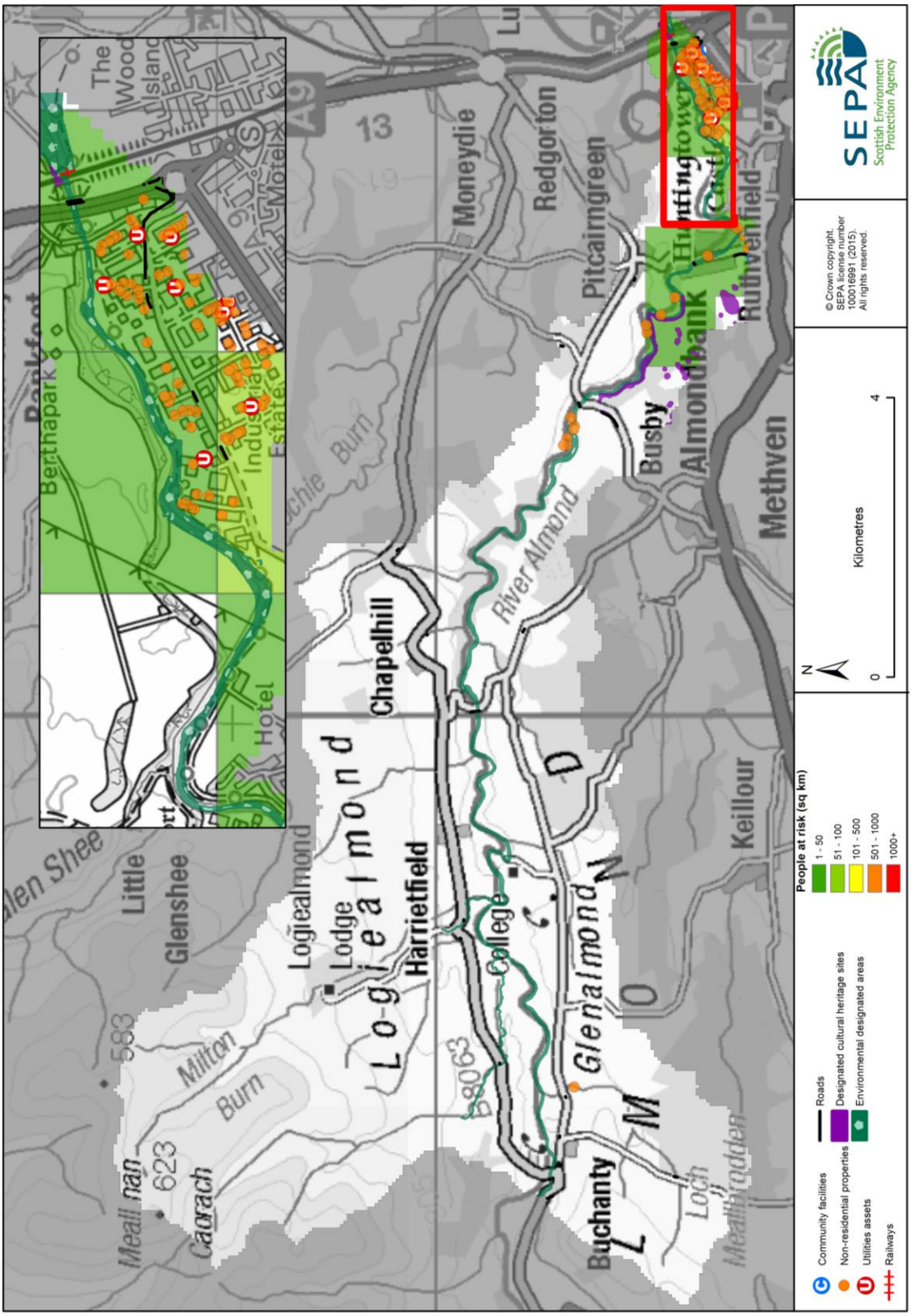


Figure 3: Impacts of flooding

History of flooding

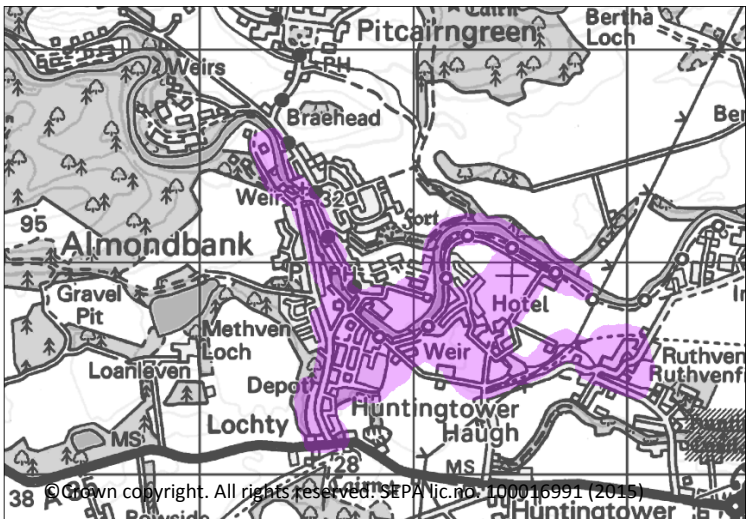
Almondbank has a long history of river flooding with serious floods taking place in 1993, 1999 and more recently in January 2011. The most notable events in this area include:

- January 2011: Flooding caused damage along the River Almond and East Pow Burn, including severe erosion on the River Almond which threatened properties on Almond Grove. Flooding also affected the Vector Aerospace site due to overtopping of the East Pow Burn.
- December 1999: Flooding was primarily related to high flows on the East Pow Burn. A number of residential and non-residential properties suffered flooding for the second time in three months, in particular the Lochty area and around the River Almond / East Pow Burn confluence.
- September 1999: This flood was deemed to be of a similar magnitude to the River Almond flood of 1993. Damages were noted at a number of residential and non-residential properties along both the River Almond and East Pow Burn.
- 16 January 1993: Widespread flooding across the Tay catchment resulting in over £20 million of damage. The flood is known to have affected Almondbank and the Lochty area.
- January 1909: Extensive and widespread flooding was recorded, exacerbated by thawing snow.

Objectives to manage flooding in Potentially Vulnerable Area 08/10

Objectives provide a common goal and shared ambition for managing floods. These objectives have been set by SEPA and agreed with flood risk management authorities following consultation. They were identified through an assessment of the underlying evidence of the causes and impacts of flooding. Target areas have been set to focus actions; they do not necessarily correspond to areas at risk in SEPA's flood map. The objectives below have been set for Almondbank Potentially Vulnerable Area.

Reduce economic damages to residential, non-residential properties and community facilities in Almondbank and Lochty from the River Almond and East Pow Burn

Indicators:	Target area:
• £49,000 Annual Average Damages from residential properties • £1.1 million Annual Average Damages from non-residential properties • One educational building	
Objective ID: 8020	

Target area	Objective	ID	Indicators within PVA
Applies across Tay Local Plan District	Avoid an overall increase in flood risk	8001	• 50 residential properties • £1.2 million Annual Average Damages
Applies across Tay Local Plan District	Reduce overall flood risk	8041	• 50 residential properties • £1.2 million Annual Average Damages
Applies across Tay Local Plan District	Organisations such as Scottish Water, energy companies and Historic Environment Scotland actively maintain and manage their own assets, including the risk of flooding. These actions are not detailed further in the Flood Risk Management Strategies.		

Actions to manage flooding in Potentially Vulnerable Area 08/10

Actions describe where and how flood risk will be managed. These actions have been set by SEPA and agreed with flood risk management authorities following consultation. Selection of actions to deliver the agreed objectives was based on a detailed assessment and comparison of economic, social and environmental criteria. The actions shaded and then described below have been selected as the most appropriate for Almondbank Potentially Vulnerable Area.

Selected actions					
Flood protection scheme/works	*Natural flood management works*	*New flood warning*	*Community flood action groups*	*Property level protection scheme*	*Site protection plans*
Flood protection study	*Natural flood management study*	Maintain flood warning	Awareness raising	*Surface water plan/study*	Emergency plans/response
Maintain flood protection scheme	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

Action (ID):	**FLOOD PROTECTION SCHEME/WORKS** (80200006)		
Objective (ID):	Reduce economic damages to residential, non-residential properties and community facilities in Almondbank and Lochty from the River Almond and East Pow Burn (8020)		
Delivery lead:	Perth and Kinross Council		
Priority:	National:	Within local authority:	
	N/A	**N/A**	
Status:	**Ongoing**	Indicative delivery:	**2016-2021**
Description:	The Almondbank Flood Protection Scheme is currently under construction, scheduled to be completed by the end of 2016. The scheme will protect Almondbank from flooding from the River Almond and East Pow Burn. The scheme includes flood defences, flood storage, bridge raising and surface water actions. The scheme will offer a 1 in 200 year standard of protection.		
Potential impacts			
Economic:	The flood protection scheme has an estimated benefit cost ratio of 1.26.		
Social:	A reduction in flood risk will have a positive benefit to the health and wellbeing of the community. One community facility has been identified as potentially benefitting from this action. There may be negative impacts through disturbance to the local community during the construction phase and changes in visual amenity and land use as a result of these works.		
Environmental:	The assessment of the proposed scheme has identified mitigation measures to reduce potentially significant impacts from the construction and future use of the scheme. A Schedule of Environmental Commitments has been incorporated into the		

Environmental:	construction contract documents and the appointed Contractor(s) are required to adhere to these requirements throughout the contract period. The construction commitments would be addressed through the Construction Environmental Management Plan.

Action (ID):	**STRATEGIC MAPPING AND MODELLING** (80410016)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	SEPA		
Status:	**Not started**	Indicative delivery:	**2016-2021**
Description:	SEPA will seek to develop flood mapping in the River Almond area (from Newton to the River Tay confluence) to improve understanding of flood risk. The extent and timing of improvements will depend on detailed scoping and data availability. SEPA will seek to incorporate additional surface water data into the flood maps to improve understanding of flood risk. Approximately 900km² of improved surface water data is currently available within this Local Plan District.		

Action (ID):	**STRATEGIC MAPPING AND MODELLING** (80410019)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Scottish Water		
Status:	**Not started**	Indicative delivery:	**2016-2021**
Description:	Scottish Water will review the assessment of flood risk within the highest risk sewer catchments to improve knowledge and understanding of surface water flood risk.		

Action (ID):	**MAINTAIN FLOOD PROTECTION SCHEME** (80200017)		
Objective (ID):	Reduce economic damages to residential, non-residential properties and community facilities in Almondbank and Lochty from the River Almond and East Pow Burn (8020)		
Delivery lead:	Perth and Kinross Council		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Continue to maintain the existing flood protection schemes that protect Almondbank and Perth against flooding. The schemes include the Perth Flood Protection Scheme that was completed 2002 and Almondbank Flood Protection Scheme which is currently under construction and due to be completed in 2016.		

Action (ID):	**MAINTAIN FLOOD WARNING** (80410030)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	SEPA		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Continue to maintain the Almondbank and the Inveralmond Industrial Estate flood warning areas which are part of the Almond (Perth) river flood warning scheme.		

Action (ID):	**FLOOD FORECASTING** (80410009)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	SEPA		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	The Scottish Flood Forecasting Service is a joint initiative between SEPA and the Met Office that produces daily, national flood guidance statements which are issued to Category 1 and 2 Responders. The service also provides information which allows SEPA to issue flood warnings, giving people a better chance of reducing the impact of flooding on their home or business. For more information please visit SEPA's website.		

Action (ID):	**SELF HELP** (80410011)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	—		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Everyone is responsible for protecting themselves and their property from flooding. Property and business owners can take simple steps to reduce damage and disruption to their homes and businesses should flooding happen. This includes preparing a flood plan and flood kit, installing property level protection, signing up to Floodline and Resilient Communities initiatives, and ensuring that properties and businesses are insured against flood damage.		

Action (ID):	**AWARENESS RAISING** (80410013)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Responsible authorities		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	SEPA and the responsible authorities have a duty to raise public awareness of flood risk. Improved awareness of flood risk and actions that prepare individuals, homes and businesses for flooding can reduce the overall impact. From 2016 SEPA will engage with the community through local participation in national initiatives, including partnership working with Neighbourhood Watch Scotland. In addition, SEPA will engage with local authorities and community resilience groups where possible. Local authorities will be undertaking additional awareness raising activities. Further details will be set out in the Local FRM Plan.		

Action (ID):	**MAINTENANCE** (80410007)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Perth and Kinross Council, asset / land managers		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Local authorities have a duty to assess watercourses and carry out clearance and repair works where such works would substantially reduce flood risk. They produce schedules of clearance and repair works and make these available for public inspection. Scottish Water undertake inspection and repair on the public sewer network. Asset owners and riparian landowners are responsible for the maintenance and management of their own assets including those which help to reduce flood risk.		

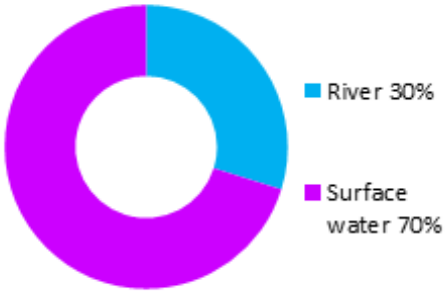
Action (ID):	**EMERGENCY PLANS/RESPONSE** (80410014)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Category 1 and 2 Responders		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Providing an emergency response to flooding is the responsibility of many organisations, including local authorities, the emergency services and SEPA. Effective management of an emergency response relies on emergency plans that are prepared under the Civil Contingencies Act 2004 by Category 1 and 2 Responders. The emergency response by these organisations is co-ordinated through regional and local resilience partnerships. This response may be supported by the work of voluntary organisations.		

Action (ID):	**PLANNING POLICIES** (80010001)		
Objective (ID):	Avoid an overall increase in flood risk (8001) Reduce overall flood risk (8041)		
Delivery lead:	Planning authority		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Scottish Planning Policy and accompanying Planning Advice Notes set out Scottish Ministers' priorities for the operation of the planning system and for the development and use of land. In terms of flood risk management, the policy supports a catchment-scale approach to sustainable flood risk management and aims to build the resilience of our cities and towns, encourage sustainable land management in our rural areas, and to address the long-term vulnerability of parts of our coasts and islands. Under this approach, new development in areas with medium to high likelihood of flooding should be avoided. For further information on the application of national planning policies see Annex 2.		

Scone (Potentially Vulnerable Area 08/11)

Local Plan District	Local authority	Main catchment
Tay	Perth and Kinross Council	Annaty Burn (River Tay

Summary of flooding impacts



At risk of flooding

- 40 residential properties
- 50 non-residential properties
- £320,000 Annual Average Damages

(damages by flood source shown left)

Summary of objectives to manage flooding

Objectives have been set by SEPA and agreed with flood risk management authorities. These are the aims for managing local flood risk. The objectives have been grouped in three main ways: by reducing risk, avoiding increasing risk or accepting risk by maintaining current levels of management.

Many organisations, such as Scottish Water and energy companies, actively maintain and manage their own assets including their risk from flooding. Where known, these actions are described here. Scottish Natural Heritage and Historic Environment Scotland work with site owners to manage flooding where appropriate at designated environmental and/or cultural heritage sites. These actions are not detailed further in the Flood Risk Management Strategies.

Summary of actions to manage flooding

The actions below have been selected to manage flood risk.

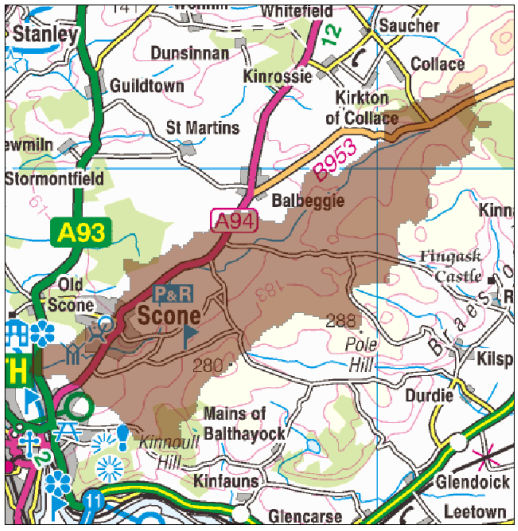
Flood protection scheme/works	*Natural flood management works*	*New flood warning*	*Community flood action groups*	*Property level protection scheme*	*Site protection plans*
Flood protection study	*Natural flood management study*	*Maintain flood warning*	Awareness raising	Surface water plan/study	Emergency plans/response
Maintain flood protection scheme	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

Scone (Potentially Vulnerable Area 08/11)

Local Plan District	Local authority	Main catchment
Tay	Perth and Kinross Council	Annaty Burn (River Tay)

Background

This Potentially Vulnerable Area is 30km^2 (shown below) and situated in the lower reaches of the River Tay catchment. It includes Scone and the main watercourse is the Annaty Burn.



The area has a risk of surface water and river flooding. The majority of flood damages are caused by surface water.

There are approximately 40 residential properties and 50 non-residential properties at risk of flooding. The Annual Average Damages are approximately £320,000.

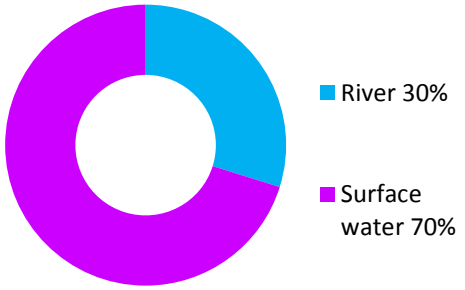


Figure 1: Annual Average Damages by flood source

Summary of flooding impacts

The highest risk of flooding in this area is to Scone from surface water flooding.

The risk of flooding to people, property, as well as to community facilities, utilities, the transport network, designated sites and agricultural land is summarised in Table 1. The damages associated with floods of different likelihood are shown in Figure 2. For this Potentially Vulnerable Area the highest damages are to roads, notably the A94, followed by damages to residential properties.

The location of the impacts of flooding is shown in Figure 3.

The figures presented for Annual Average Damages include damages to residential properties, non-residential properties, transport and agriculture.

	1 in 10 High likelihood	1 in 200 Medium likelihood	1 in 1000 Low likelihood
Residential properties (total 1,800)	20	40	60
Non-residential properties (total 350)	20	50	60
No. of people	50	90	130
Community facilities	0	0	0
Utilities assets	<10	<10	<10
Transport links (excluding minor roads)	2 A roads, 1 B road at 14 locations	2 A roads, 1 B road at 22 locations	2 A roads, 1 B road at 27 locations
Environmental designated areas (km^2)	0.1	0.1	0.1
Designated cultural heritage sites	2	2	4
Agricultural land (km^2)	0.5	0.6	0.6

Table 1: Summary of flooding impacts

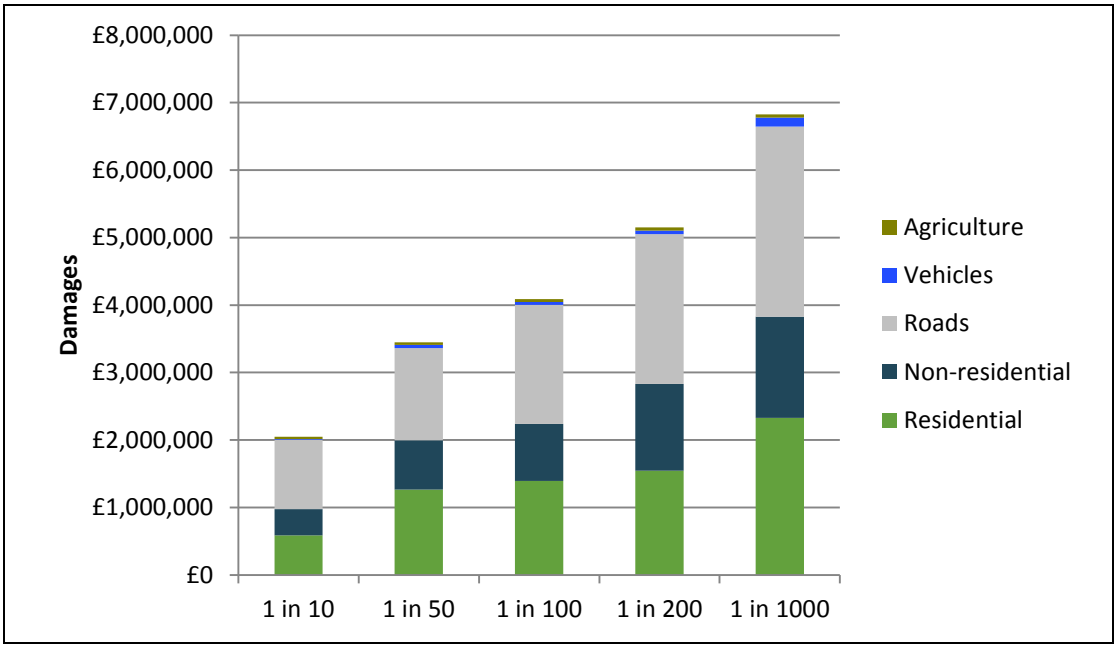


Figure 2: Damages by flood likelihood

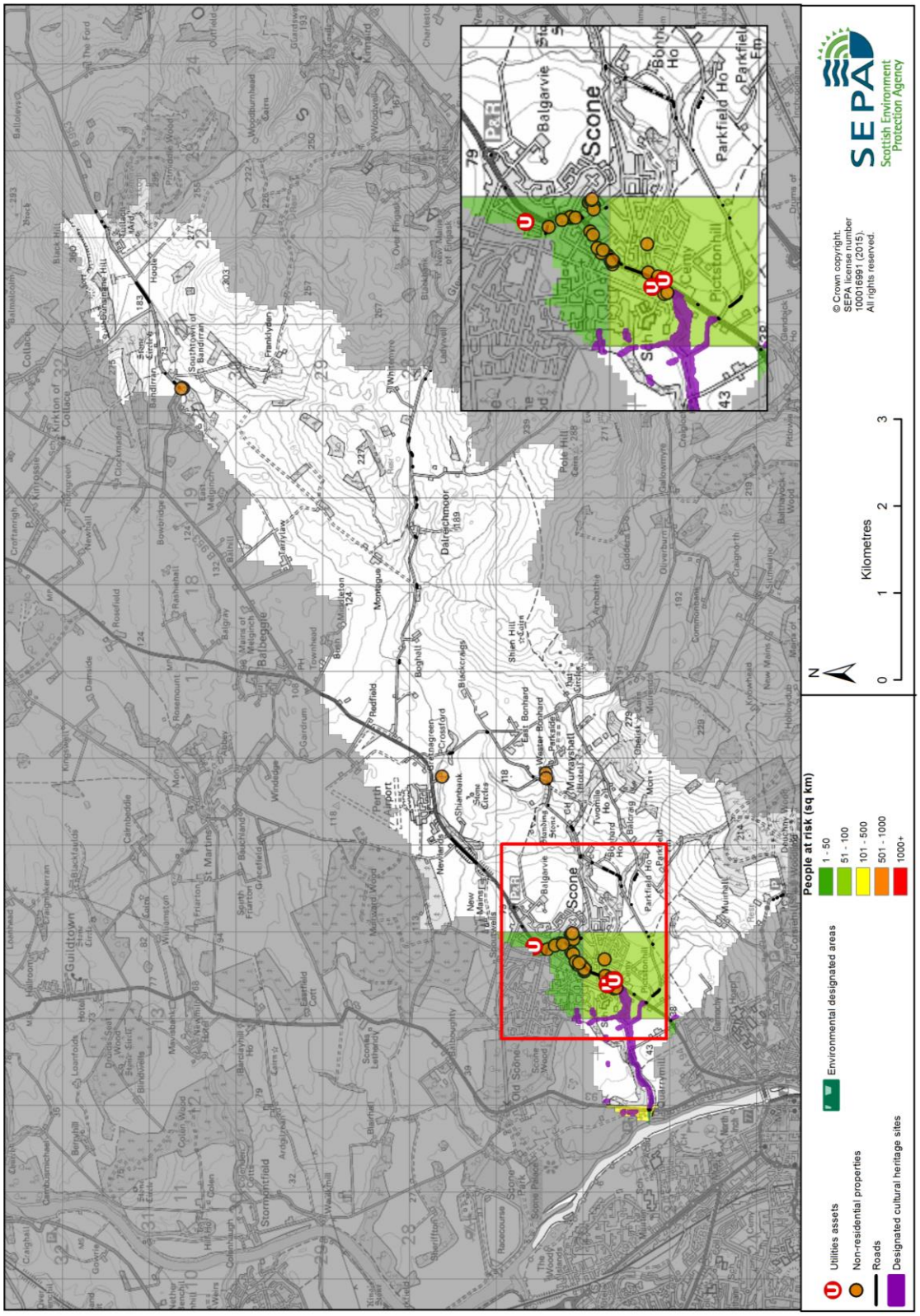


Figure 3: Impacts of flooding

History of flooding

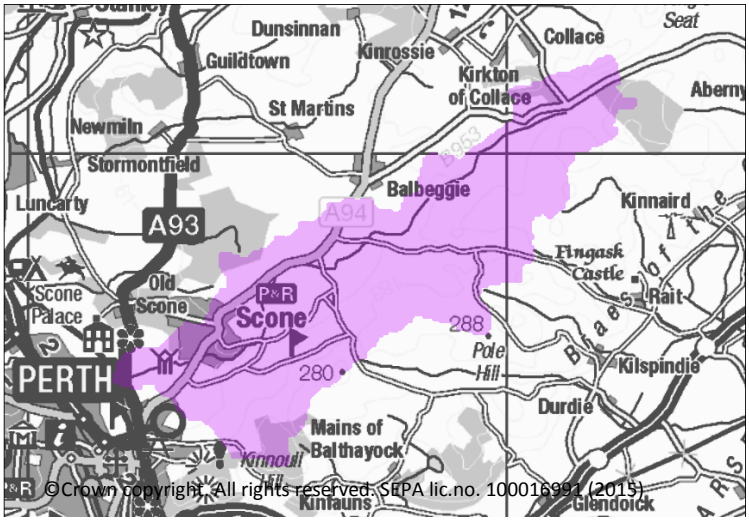
The following significant flood events have been recorded:

- A series of small scale localised floods in Scone caused by a collapse of an old barrel drain in poor condition and associated drainage were recorded in 2010, 2013 and 2014.
- August 2004: Scone experienced a period of high intensity rainfall, resulting in flooding to a number of properties. Surface water flooding occurred to properties and gardens on Highfield Road, Murray Road and Angus Road. The Annaty Burn also caused flooding to a number of properties on Den Road, Perth Road and Burnside.

Objectives to manage flooding in Potentially Vulnerable Area 08/11

Objectives provide a common goal and shared ambition for managing floods. These objectives have been set by SEPA and agreed with flood risk management authorities following consultation. They were identified through an assessment of the underlying evidence of the causes and impacts of flooding. Target areas have been set to focus actions; they do not necessarily correspond to areas at risk in SEPA's flood map. The objectives below have been set for Scone Potentially Vulnerable Area.

Reduce economic damages to residential and non-residential properties in the Scone Potentially Vulnerable Area caused by river flooding

Indicators:	Target area:
• £70,000 Annual Average Damages from residential properties • £19,000 Annual Average Damages from non-residential properties	
Objective ID: 8023	

Target area	Objective	ID	Indicators within PVA
Scone	Reduce economic damages and number of residential properties at risk of surface water flooding in Scone where practical	8021	* See note below
Applies across Tay Local Plan District	Avoid an overall increase in flood risk	8001	• 40 residential properties • £320,000 Annual Average Damages
Applies across Tay Local Plan District	Reduce overall flood risk	8041	• 40 residential properties • £320,000 Annual Average Damages
Applies across Tay Local Plan District	Organisations such as Scottish Water, energy companies and Historic Environment Scotland actively maintain and manage their own assets, including the risk of flooding. These actions are not detailed further in the Flood Risk Management Strategies.		

* This objective will be monitored using surface water flood risk across the Potentially Vulnerable Area. For 08/11 there are 20 residential properties at risk and Annual Average Damages of £230,000.

Actions to manage flooding in Potentially Vulnerable Area 08/11

Actions describe where and how flood risk will be managed. These actions have been set by SEPA and agreed with flood risk management authorities following consultation. Selection of actions to deliver the agreed objectives was based on a detailed assessment and comparison of economic, social and environmental criteria. The actions shaded and then described below have been selected as the most appropriate for Scone Potentially Vulnerable Area.

Selected actions					
Flood protection scheme/works	*Natural flood management works*	*New flood warning*	*Community flood action groups*	*Property level protection scheme*	*Site protection plans*
Flood protection study	*Natural flood management study*	*Maintain flood warning*	Awareness raising	Surface water plan/study	Emergency plans/response
Maintain flood protection scheme	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

Action (ID):	**FLOOD PROTECTION SCHEME/WORKS** (80230006)		
Objective (ID):	Reduce economic damages to residential and non-residential properties in the Scone Potentially Vulnerable Area caused by river flooding (8023)		
Delivery lead:	Perth and Kinross Council		
Priority:	National:	Within local authority:	
	34 of 42	**4 of 4**	
Status:	**Under development**	Indicative delivery:	**2016-2021**
Description:	A flood protection scheme has been proposed for the Annaty Burn in Scone. The preferred option consists of raising existing footbridges and constructing riverside defences. The scheme would provide a 1 in 200 year standard of protection.		
Potential impacts			
Economic:	The proposed scheme may benefit 35 residential properties and nine non-residential properties at risk of flooding in this location, with estimated damages avoided of £880,000. The flood protection scheme has an estimated benefit cost ratio of 1.14.		
Social:	A reduction in flood risk would have a positive benefit to the health and wellbeing of the community. There may be negative impacts through disturbance to the local community during the construction phase.		
Environmental:	Flood protection schemes can have both positive and negative impacts on the ecological quality of the environment depending on how they are designed. The proposed flood protection works are located on the Annaty Burn (water body ID 6413). The physical condition of this river has been identified by SEPA to be at less than good status. Opportunities to improve the condition of the river		

Environmental:	should be considered by coordinating with river basin management planning. To be in accord with the FRM Strategy, the responsible authority (and where applicable, the licensing authority) should seek to ensure that the works will not have an adverse effect on the integrity of the River Tay Special Area of Conservation. In addition, a number of nationally and locally designated sites are also present in the study area and could be positively or negatively impacted. These include gardens and designed landscapes.

Action (ID):	**FLOOD PROTECTION STUDY** (80230005)		
Objective (ID):	Reduce economic damages to residential and non-residential properties in the Scone Potentially Vulnerable Area caused by river flooding (8023) Reduce economic damages and number of residential properties at risk of surface water flooding in Scone where practical (8021)		
Delivery lead:	Perth and Kinross Council		
Priority:	National:		Within local authority:
	72 of 168		**5 of 6**
Status:	**Not started**	Indicative delivery:	**2016-2021**
Description:	A flood protection has been carried out by Perth and Kinross Council for the Annaty Burn, Scone in 2007. The study identified a viable flood protection scheme that is currently being progressed as a priority in the first flood risk management cycle. Further study has been recommended to supplement the previous investigations, looking at natural flood management and surface water flooding. Natural flood management options that should be considered include river/ floodplain restoration and sediment management. The study should also investigate the viability of property level protection. The study should take a catchment approach and consider the potential benefits and disbenefits and interaction between actions upstream and downstream. Perth and Kinross Council has also carried out a flood protection study for the Barrel drain in Scone in 2007 which did not identify a viable flood protection scheme. However the Perth and Kinross Council intends to re-examine this previous study following recent drain failures and this will be carried out in conjunction with the studies identified above.		
Potential impacts			
Economic:	The study could benefit 56 residential properties and 58 non-residential properties at risk of flooding in this location, with potential damages avoided of up to £4.8 million.		
Social:	Social impacts will depend on the outcome of the study and recommended actions. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community. Natural flood management actions can restore and enhance natural environments and create opportunities for recreation and tourism.		
Environmental:	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment and designated sites. Where possible opportunities to enhance and restore the environment should be sought, for example through natural flood management. Annaty Burn (water body ID 6413) is located within the study area and the physical condition of		

Environmental:	this river is identified by SEPA to be at less than good status. Opportunities to improve the condition of the river should be considered by coordinating with river basin management planning. To be in accord with the FRM Strategy, the responsible authority should seek to ensure as part of the study that the action will not have an adverse effect on the integrity of the River Tay Special Area of Conservation. Gardens and designed landscapes are also present in the study area and could be positively or negatively impacted.

Action (ID):	**SURFACE WATER PLAN/STUDY** (80210018)		
Objective (ID):	Reduce economic damages and number of residential properties at risk of surface water flooding in Scone where practical (8021)		
Delivery lead:	Perth and Kinross Council		
Status:	**Not started**	Indicative delivery:	**2016-2021**
Description:	The area must be covered by a surface water management plan or plans that set objectives for the management of surface water flood risk and identify the most sustainable actions to achieve the objectives. This surface water management plan will be delivered by the local authority as part of a flood protection study.		

Action (ID):	**STRATEGIC MAPPING AND MODELLING** (80410019)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Scottish Water		
Status:	**Not started**	Indicative delivery:	**2016-2021**
Description:	Scottish Water will review the assessment of flood risk within the highest risk sewer catchments to improve knowledge and understanding of surface water flood risk.		

Action (ID):	**FLOOD FORECASTING** (80410009)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	SEPA		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	The Scottish Flood Forecasting Service is a joint initiative between SEPA and the Met Office that produces daily, national flood guidance statements which are issued to Category 1 and 2 Responders. The service also provides information which allows SEPA to issue flood warnings, giving people a better chance of reducing the impact of flooding on their home or business. For more information please visit SEPA's website.		

Action (ID):	**SELF HELP** (80410011)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	—		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Everyone is responsible for protecting themselves and their property from flooding. Property and business owners can take simple steps to reduce damage and disruption to their homes and businesses should flooding happen. This includes preparing a flood plan and flood kit, installing property level protection, signing up to Floodline and Resilient Communities initiatives, and ensuring that properties and businesses are insured against flood damage.		

Action (ID):	**AWARENESS RAISING** (80410013)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Responsible authorities		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	SEPA and the responsible authorities have a duty to raise public awareness of flood risk. Improved awareness of flood risk and actions that prepare individuals, homes and businesses for flooding can reduce the overall impact. From 2016 SEPA will engage with the community through local participation in national initiatives, including partnership working with Neighbourhood Watch Scotland. In addition, SEPA will engage with local authorities and community resilience groups where possible. Local authorities will be undertaking additional awareness raising activities. Further details will be set out in the Local FRM Plan.		

Action (ID):	**MAINTENANCE** (80410007)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Perth and Kinross Council, asset / land managers		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Local authorities have a duty to assess watercourses and carry out clearance and repair works where such works would substantially reduce flood risk. They produce schedules of clearance and repair works and make these available for public inspection. Scottish Water undertake inspection and repair on the public sewer network. Asset owners and riparian landowners are responsible for the maintenance and management of their own assets including those which help to reduce flood risk.		

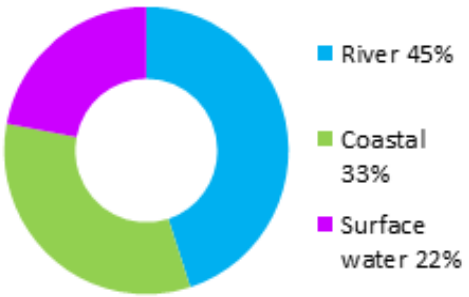
Action (ID):	**EMERGENCY PLANS/RESPONSE** (80410014)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Category 1 and 2 Responders		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Providing an emergency response to flooding is the responsibility of many organisations, including local authorities, the emergency services and SEPA. Effective management of an emergency response relies on emergency plans that are prepared under the Civil Contingencies Act 2004 by Category 1 and 2 Responders. The emergency response by these organisations is co-ordinated through regional and local resilience partnerships. This response may be supported by the work of voluntary organisations.		

Action (ID):	**PLANNING POLICIES** (80010001)		
Objective (ID):	Avoid an overall increase in flood risk (8001) Reduce overall flood risk (8041)		
Delivery lead:	Planning authority		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Scottish Planning Policy and accompanying Planning Advice Notes set out Scottish Ministers' priorities for the operation of the planning system and for the development and use of land. In terms of flood risk management, the policy supports a catchment-scale approach to sustainable flood risk management and aims to build the resilience of our cities and towns, encourage sustainable land management in our rural areas, and to address the long-term vulnerability of parts of our coasts and islands. Under this approach, new development in areas with medium to high likelihood of flooding should be avoided. For further information on the application of national planning policies see Annex 2.		

Perth to Kinfauns (north of A90) (Potentially Vulnerable Area 08/12)

Local Plan District	Local authority	Main catchment
Tay	Perth and Kinross Council	River Tay

Summary of flooding impacts



At risk of flooding

- 80 residential properties
- 20 non-residential properties
- £180,000 Annual Average Damages

(damages by flood source shown left)

Summary of objectives to manage flooding

Objectives have been set by SEPA and agreed with flood risk management authorities. These are the aims for managing local flood risk. The objectives have been grouped in three main ways: by reducing risk, avoiding increasing risk or accepting risk by maintaining current levels of management.

Many organisations, such as Scottish Water and energy companies, actively maintain and manage their own assets including their risk from flooding. Where known, these actions are described here. Scottish Natural Heritage and Historic Environment Scotland work with site owners to manage flooding where appropriate at designated environmental and/or cultural heritage sites. These actions are not detailed further in the Flood Risk Management Strategies.

Summary of actions to manage flooding

The actions below have been selected to manage flood risk.

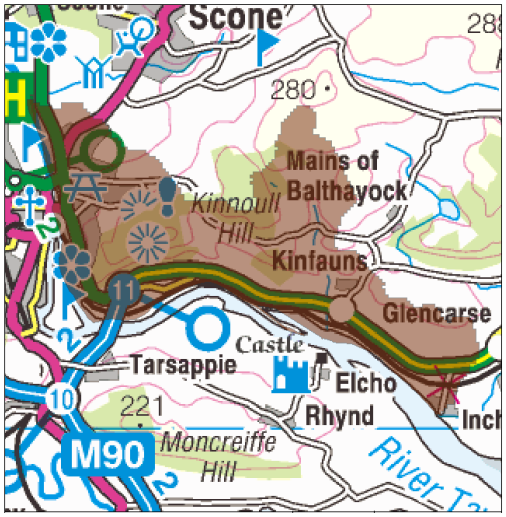
Flood protection scheme/works	*Natural flood management works*	*New flood warning*	*Community flood action groups*	*Property level protection scheme*	*Site protection plans*
Flood protection study	*Natural flood management study*	Maintain flood warning	Awareness raising	Surface water plan/study	Emergency plans/response
Maintain flood protection scheme	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

Perth to Kinfauns (north of A90) (Potentially Vulnerable Area 08/12)

Local Plan District	Local authority	Main catchment
Tay	Perth and Kinross Council	River Tay

Background

This Potentially Vulnerable Area is 14km^2 and part of the River Tay catchment (shown below). It is situated on the eastern bank at the mouth of the River Tay where it flows into the Firth of Tay and includes the eastern side of Perth, Kinfauns and Inchyra. The interaction between river and coastal flooding where the River Tay meets the Firth of Tay influences flooding in Perth.



The area has a risk of river, coastal and surface water flooding. The majority of damages occur as a result of river flooding.

There are approximately 80 residential properties and 20 non-residential properties at risk of flooding. The Annual Average Damages are approximately £180,000.

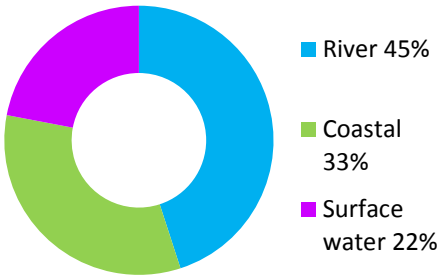


Figure 1: Annual Average Damages by flood source

Summary of flooding impacts

It should be noted that Perth Flood Protection Scheme reduces the risk of river and coastal flooding in Perth.

The highest risk of flooding is in the eastern side of Perth from surface water flooding. The risk of flooding to people and property, as well as to community facilities, utilities, the transport network, designated sites and agricultural land is summarised in Table 1.

The damages associated with floods of different likelihood are shown in Figure 2. For this Potentially Vulnerable Area the highest damages are to residential properties followed by damages to roads, notably the M90/A90. The location of the impacts of flooding is shown in Figure 3.

The figures presented for Annual Average Damages include damages to residential properties, non-residential properties, transport and agriculture.

The risk of flooding to utilities in Table 1 does not include Scottish Water data. Scottish Water undertook a national assessment of above ground assets at medium likelihood of flooding (including water treatment works, wastewater treatment works and pumping stations). Within this Potentially Vulnerable Area there is one asset identified as being at risk of flooding.

	1 in 10 High likelihood	1 in 200 Medium likelihood	1 in 1000 Low likelihood
Residential properties (total 1,800)	<10	80	90
Non-residential properties (total 300)	10	20	30
People	20	170	190
Community facilities	0	0	0
Utilities assets	0	<10	<10
Transport links (excluding minor roads)	1 M road (M90), 4 B roads at 37 locations 1 Railway route at 20 locations: Dundee to Dunblane	1 M road (M90), 4 B roads at 43 locations 1 Railway route at 32 locations: Dundee to Dunblane	1 M road (M90), 4 B roads at 57 locations 1 Railway route at 34 locations: Dundee to Dunblane
Environmental designated areas (km^2)	0.3	0.3	0.3
Designated cultural heritage sites	3	3	4
Agricultural land (km^2)	0.6	0.7	0.7

Table 1: Summary of flooding impacts

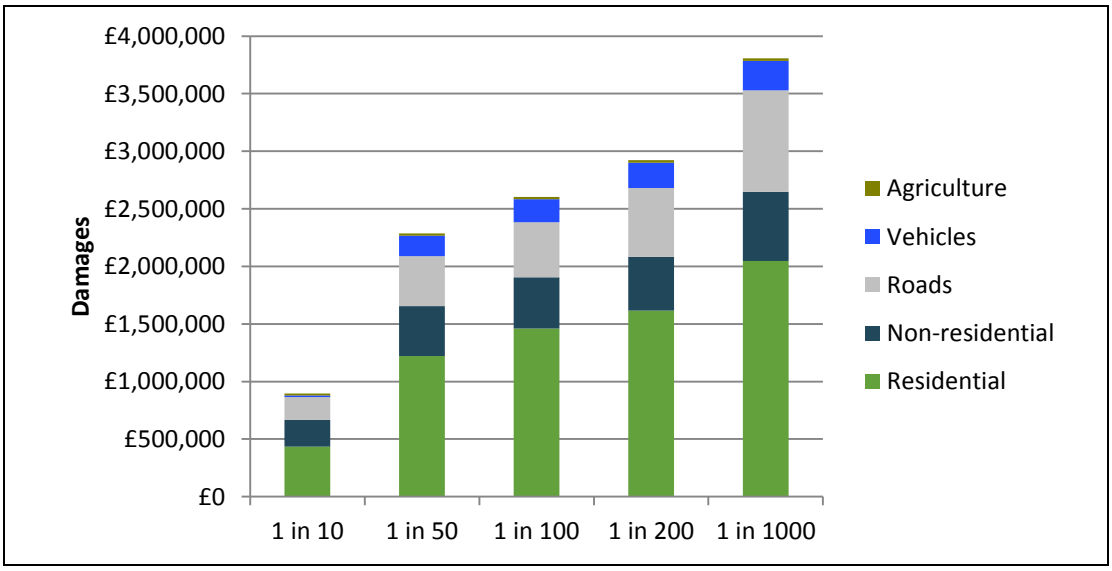


Figure 2: Damages by flood likelihood

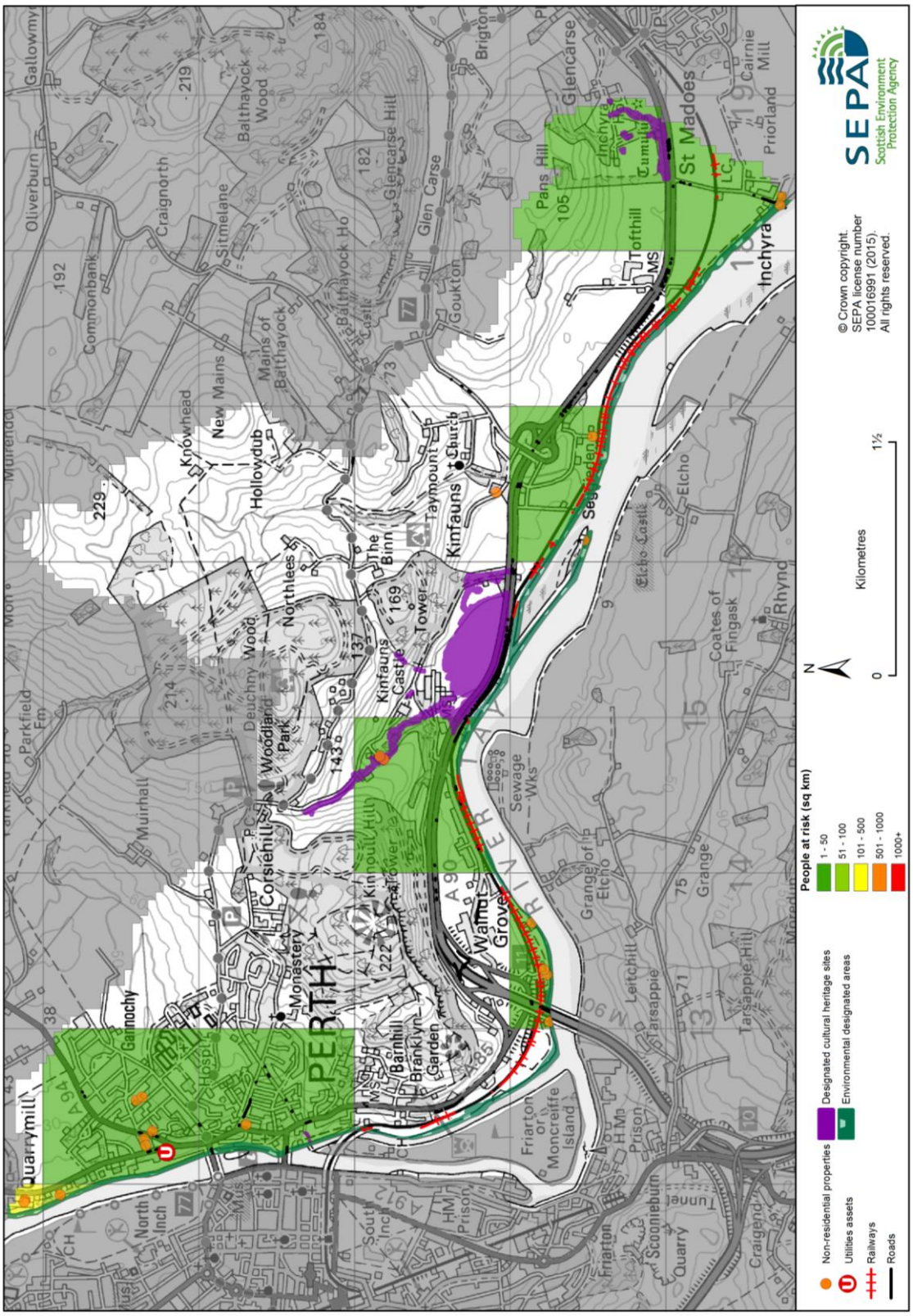


Figure 3: Impacts of flooding

History of flooding

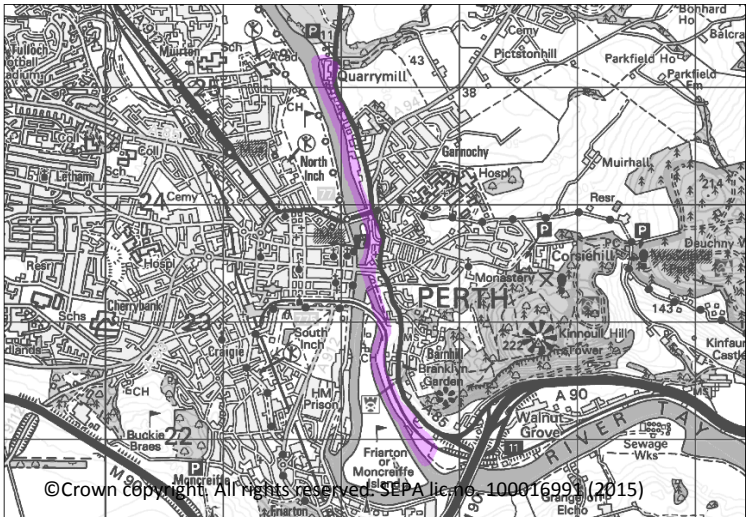
Perth has a long history of flooding from the River Tay and surface water. A number of river floods may have had tidal influences. The following floods have been recorded in this area:

- July 2012: The Langley Burn flooded at Kinfauns.
- 16 July 2011: Heavy rain caused surface water flooding in Perth. Homes and businesses were affected.
- 21 July 2010: Extensive surface water flooding around Perth affecting properties and roads.
- December 2006: Surface water flooding around Bridgend Court from heavy rain and overwhelmed drains.
- 16 January 1993: Widespread flooding resulted in damage to communication networks, hundreds of properties and farmland in and around Perth, causing an estimated £20 million of damage. Residents were evacuated in the North Muirton housing estate after flood defences were breached.
- 7 February 1990: Following a period of heavy rain and snowfall, widespread flooding affected the whole of the Tay catchment. Properties, roads and railways were damaged. The water level at Smeaton's Bridge in Perth was recorded as 5.85m above ordinary levels.
- 17 February 1950: Flooding within Perth on several roads including Tay Street, North and South Inches, the junction of Scott Street and Marshall Street, Moncrieffe Island, Commercial Street (Bridgend) and James Street. Telephone cables damaged outside Perth and properties flooded.
- February 1928: Residents of several farms in Muirton had to be rescued as roads became impassable.
- 31 January 1903: Nearly all cellars in Perth flooded after heavy rains and strong gales, including North and South Inches, Rose Terrace, North Port, Lower Commercial Street, Princes Street, Nelson Street, Scott Street, James Street, King Street, Edinburgh Road and Marshall Place. Many roads impassable.
- 2 October 1847: Flooding from the River Tay affected Perth, Dunkeld, Dalguise and Dalmarnock. Many residents were evacuated and there were reports of cattle being swept away in flood waters. The water level at Perth Bridge was estimated to be 6.11m above ordinary levels.
- 12 February 1814: Blocks of ice on the River Tay caused bridges to become blocked resulting in widespread flooding to the Perth region. North and South Inch were submerged for two days. An estimated flood height of 7.0m above ordinary levels was recorded on the River Tay.
- 14 February 1774: Snow and ice melt caused widespread flooding from the River Almond and River Tay to Perth and the surrounding area.
- 12-14 October 1621: Constant heavy rain over a two day period caused flooding from the River Tay. Residents were evacuated from numerous properties and severe damage was caused to Milne's Bridge. Perth was surrounded by water for 5-6 days after the event.

Objectives to manage flooding in Potentially Vulnerable Area 08/12

Objectives provide a common goal and shared ambition for managing floods. These objectives have been set by SEPA and agreed with flood risk management authorities following consultation. They were identified through an assessment of the underlying evidence of the causes and impacts of flooding. Target areas have been set to focus actions; they do not necessarily correspond to areas at risk in SEPA's flood map. The objectives below have been set for Perth to Kinfauns (north of A90) Potentially Vulnerable Area.

Accept that significant flood risk in Perth is managed appropriately. Maintain existing actions that reduce flood risk in Perth caused by flooding from the River Tay and coastal flooding.

Indicators:	Target area:
• 150 residential properties protected • 350 non-residential properties protected • £28 million damages avoided	
Objective ID: 8026	

Target area	Objective	ID	Indicators within PVA
Perth	Reduce economic damages and number of residential properties at risk of surface water flooding in Perth where practical	8024	* See note below
Applies across Tay Local Plan District	Avoid an overall increase in flood risk	8001	• 80 residential properties • £180,000 Annual Average Damages
Applies across Tay Local Plan District	Reduce overall flood risk	8041	• 80 residential properties • £180,000 Annual Average Damages
Applies across Tay Local Plan District	Organisations such as Scottish Water, energy companies and Historic Environment Scotland actively maintain and manage their own assets, including the risk of flooding. These actions are not detailed further in the Flood Risk Management Strategies.		

* This objective will be monitored using surface water flood risk across the Potentially Vulnerable Area. For 08/12 there are <10 residential properties at risk and Annual Average Damages of £39,000.

Actions to manage flooding in Potentially Vulnerable Area 08/12

Actions describe where and how flood risk will be managed. These actions have been set by SEPA and agreed with flood risk management authorities following consultation. Selection of actions to deliver the agreed objectives was based on a detailed assessment and comparison of economic, social and environmental criteria. The actions shaded and then described below have been selected as the most appropriate for Perth to Kinfauns (north of A90) Potentially Vulnerable Area.

Selected actions					
Flood protection scheme/works	*Natural flood management works*	*New flood warning*	*Community flood action groups*	*Property level protection scheme*	*Site protection plans*
Flood protection study	*Natural flood management study*	Maintain flood warning	Awareness raising	Surface water plan/study	Emergency plans/response
Maintain flood protection scheme	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

Action (ID):	**FLOOD PROTECTION SCHEME/WORKS** (80240006)		
Objective (ID):	Reduce economic damages and number of residential properties at risk of surface water flooding in Perth where practical (8024)		
Delivery lead:	Perth and Kinross Council		
Status:	**Under development**	Indicative delivery:	**2016-2021**
Description:	Flood protection works have been proposed at Bridgend in Perth to deal with surface water flooding. The works will include a high capacity drainage channel and outfall to the River Tay.		
Potential impacts			
Economic:	The economic impacts have not been defined at this stage.		
Social:	A reduction in flood risk would have a positive benefit to the health and wellbeing of the community. There may be negative impacts through disturbance to the local community during the construction phase.		
Environmental:	Flood protection schemes can have both positive and negative impacts on the ecological quality of the environment depending on how they are designed.		

Action (ID):	**SURFACE WATER PLAN/STUDY** (80240018)
Objective (ID):	Reduce economic damages and number of residential properties at risk of surface water flooding in Perth where practical (8024)
Delivery lead:	Perth and Kinross Council

Status:	**Not started**	Indicative delivery:	**2016-2027**
Description:	The area must be covered by a surface water management plan or plans that set objectives for the management of surface water flood risk and identify the most sustainable actions to achieve the objectives.		

Action (ID):	**SURFACE WATER PLAN/STUDY** (80240019)		
Objective (ID):	Reduce economic damages and number of residential properties at risk of surface water flooding in Perth where practical (8024)		
Delivery lead:	Scottish Water in partnership with local authorities		
Status:	**Ongoing**	Indicative delivery:	**2016-2027**
Description:	An integrated catchment study will be carried out to support the surface water management plan process and improve knowledge and understanding of surface water flood risk and interactions with other sources of flooding e.g. with the sewer network, watercourses and the sea.		

Action (ID):	**STRATEGIC MAPPING AND MODELLING** (80410019)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Scottish Water		
Status:	**Not started**	Indicative delivery:	**2016-2021**
Description:	Scottish Water will review the assessment of flood risk within the highest risk sewer catchments to improve knowledge and understanding of surface water flood risk.		

Action (ID):	**MAINTAIN FLOOD PROTECTION SCHEME** (80260017)		
Objective (ID):	Accept that significant flood risk in Perth is managed appropriately. Maintain existing actions that reduce flood risk in Perth caused by flooding from the River Tay and coastal flooding. (8026)		
Delivery lead:	Perth and Kinross Council		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Continue to maintain the existing Perth Flood Protection Scheme along the east bank of the River Tay. The scheme was completed in 2002 and includes major flood defence works such as embankments, walls, sluice gates, ponds and pumping stations.		

Action (ID):	**MAINTAIN FLOOD WARNING** (80410030)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	SEPA		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Continue to maintain the Basement Properties from North Inch to Friarton Bridge flood warning area which is part of the Tay river flood warning scheme.		

Action (ID):	**FLOOD FORECASTING** (80410009)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	SEPA		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	The Scottish Flood Forecasting Service is a joint initiative between SEPA and the Met Office that produces daily, national flood guidance statements which are issued to Category 1 and 2 Responders. The service also provides information which allows SEPA to issue flood warnings, giving people a better chance of reducing the impact of flooding on their home or business. For more information please visit SEPA's website.		

Action (ID):	**SELF HELP** (80410011)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	—		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Everyone is responsible for protecting themselves and their property from flooding. Property and business owners can take simple steps to reduce damage and disruption to their homes and businesses should flooding happen. This includes preparing a flood plan and flood kit, installing property level protection, signing up to Floodline and Resilient Communities initiatives, and ensuring that properties and businesses are insured against flood damage.		

Action (ID):	**AWARENESS RAISING** (80410013)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Responsible authorities		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	SEPA and the responsible authorities have a duty to raise public awareness of flood risk. Improved awareness of flood risk and actions that prepare individuals, homes and businesses for flooding can reduce the overall impact. From 2016 SEPA will engage with the community through local participation in national initiatives, including partnership working with Neighbourhood Watch Scotland. In addition, SEPA will engage with local authorities and community resilience groups where possible. Local authorities will be undertaking additional awareness raising activities. Further details will be set out in the Local FRM Plan.		

Action (ID):	**MAINTENANCE** (80410007)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Perth and Kinross Council, asset / land managers		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Local authorities have a duty to assess watercourses and carry out clearance and repair works where such works would substantially reduce flood risk. They produce schedules of clearance and repair works and make these available for public inspection. Scottish Water undertake inspection and repair on the public sewer network. Asset owners and riparian landowners are responsible for the maintenance and management of their own assets including those which help to reduce flood risk.		

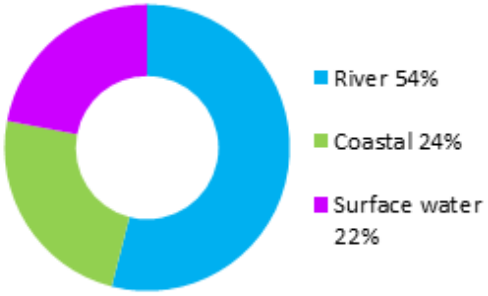
Action (ID):	**EMERGENCY PLANS/RESPONSE** (80410014)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Category 1 and 2 Responders		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Providing an emergency response to flooding is the responsibility of many organisations, including local authorities, the emergency services and SEPA. Effective management of an emergency response relies on emergency plans that are prepared under the Civil Contingencies Act 2004 by Category 1 and 2 Responders. The emergency response by these organisations is co-ordinated through regional and local resilience partnerships. This response may be supported by the work of voluntary organisations.		

Action (ID):	**PLANNING POLICIES** (80010001)		
Objective (ID):	Avoid an overall increase in flood risk (8001) Reduce overall flood risk (8041)		
Delivery lead:	Planning authority		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Scottish Planning Policy and accompanying Planning Advice Notes set out Scottish Ministers' priorities for the operation of the planning system and for the development and use of land. In terms of flood risk management, the policy supports a catchment-scale approach to sustainable flood risk management and aims to build the resilience of our cities and towns, encourage sustainable land management in our rural areas, and to address the long-term vulnerability of parts of our coasts and islands. Under this approach, new development in areas with medium to high likelihood of flooding should be avoided. For further information on the application of national planning policies see Annex 2.		

Perth centre (Potentially Vulnerable Area 08/13)

Local Plan District	Local authority	Main catchment
Tay	Perth and Kinross Council	Perth coastal

Summary of flooding impacts



At risk of flooding

- 320 residential properties
- 260 non-residential properties
- £1.8 million Annual Average Damages

(damages by flood source shown left)

Summary of objectives to manage flooding

Objectives have been set by SEPA and agreed with flood risk management authorities. These are the aims for managing local flood risk. The objectives have been grouped in three main ways: by reducing risk, avoiding increasing risk or accepting risk by maintaining current levels of management.

Many organisations, such as Scottish Water and energy companies, actively maintain and manage their own assets including their risk from flooding. Where known, these actions are described here. Scottish Natural Heritage and Historic Environment Scotland work with site owners to manage flooding where appropriate at designated environmental and/or cultural heritage sites. These actions are not detailed further in the Flood Risk Management Strategies.

Summary of actions to manage flooding

The actions below have been selected to manage flood risk.

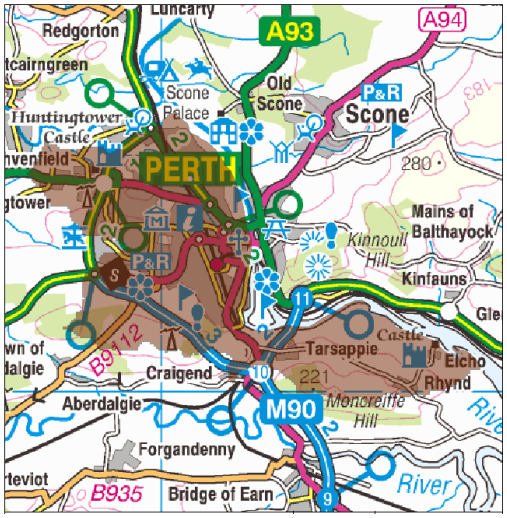
Flood protection scheme/works	*Natural flood management works*	*New flood warning*	Community flood action groups	*Property level protection scheme*	*Site protection plans*
Flood protection study	*Natural flood management study*	Maintain flood warning	Awareness raising	Surface water plan/study	Emergency plans/response
Maintain flood protection scheme	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

Perth centre (Potentially Vulnerable Area 08/13)

Local Plan District	Local authority	Main catchment
Tay	Perth and Kinross Council	Perth coastal

Background

This Potentially Vulnerable Area is 28km^2 and part of the River Tay catchment (shown below). It covers the west bank of the lower River Tay where it meets the Firth of Tay and includes the city of Perth. The main watercourse is River Tay. Other watercourses include the Town's Lade that carries water from the River Almond to the River Tay and the Craigie Burn.



The area has a risk of surface water, coastal and river flooding. The majority of flood damages are caused by river flooding.

There are approximately 320 residential properties and 260 non-residential properties at risk of flooding. The Annual Average Damages are approximately £1.8 million.

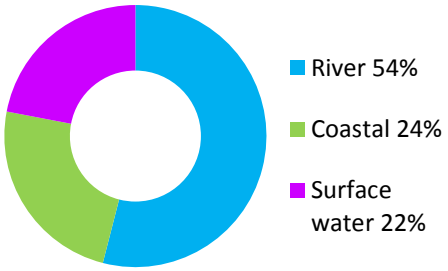


Figure 1: Annual Average Damages by flood source

Summary of flooding impacts

It should be noted that Perth Flood Protection Scheme reduces the risk of river and coastal flooding in Perth.

The highest risk of river flooding is from the Town's Lade and Craigie Burn to Perth. The interaction between river and coastal flooding where the River Tay meets the Firth of Tay is an important factor for flooding in Perth. Coastal flooding extends upstream of the River Tay as far as Perth racecourse.

The risk of flooding to people and property, as well as to community facilities, utilities, the transport network, designated sites and agricultural land is summarised in Table 1. The damages associated with floods of different likelihood are shown in Figure 2. For this Potentially Vulnerable Area the highest damages are to residential and non-residential properties. The location of the impacts of flooding is shown in Figure 3.

The figures presented for Annual Average Damages include damages to residential properties, non-residential properties, transport and agriculture.

The risk of flooding to utilities in Table 1 does not include Scottish Water data. Scottish Water undertook a national assessment of above ground assets at medium likelihood of flooding (including water treatment works, wastewater treatment works and pumping stations). Within this Potentially Vulnerable Area there are two assets identified as being at risk of flooding.

	1 in 10 High likelihood	1 in 200 Medium likelihood	1 in 1000 Low likelihood
Residential properties (total 20,000)	90	320	4,000
Non-residential properties (total 3,600)	30	260	1,300
People	200	710	8,900
Community facilities	0	<10 Educational buildings	<10 Includes: emergency services and educational buildings
Utilities assets	<10	30	80
Transport links (excluding minor roads)	1 M road (M90), 4 A roads, 1 B road at 74 locations 2 Railway routes at 13 locations: Perth to Inverness Dundee to Dunblane	1 M road (M90), 5 A roads, 1 B road at 146 locations 2 Railway routes at 41 locations: Perth to Inverness Dundee to Dunblane	1 M road (M90), 5 A roads, 1 B road at 240 locations 2 Railway routes at 76 locations: Perth to Inverness Dundee to Dunblane
Environmental designated areas (km^2)	0.1	0.1	0.1
Designated cultural heritage sites	5	9	9
Agricultural land (km^2)	1.0	1.6	2.6

Table 1: Summary of flooding impacts

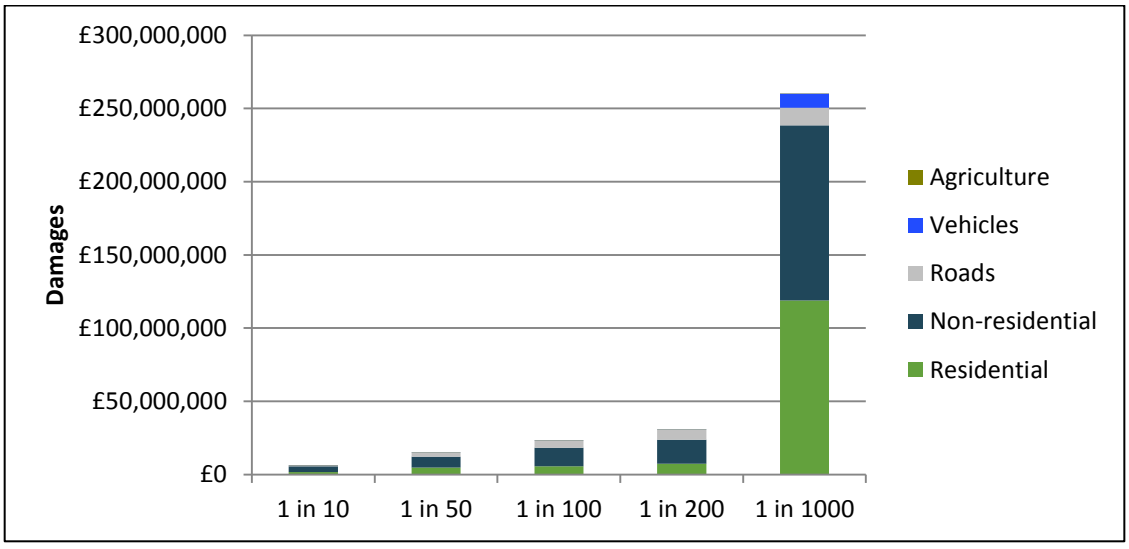


Figure 2: Damages by flood likelihood

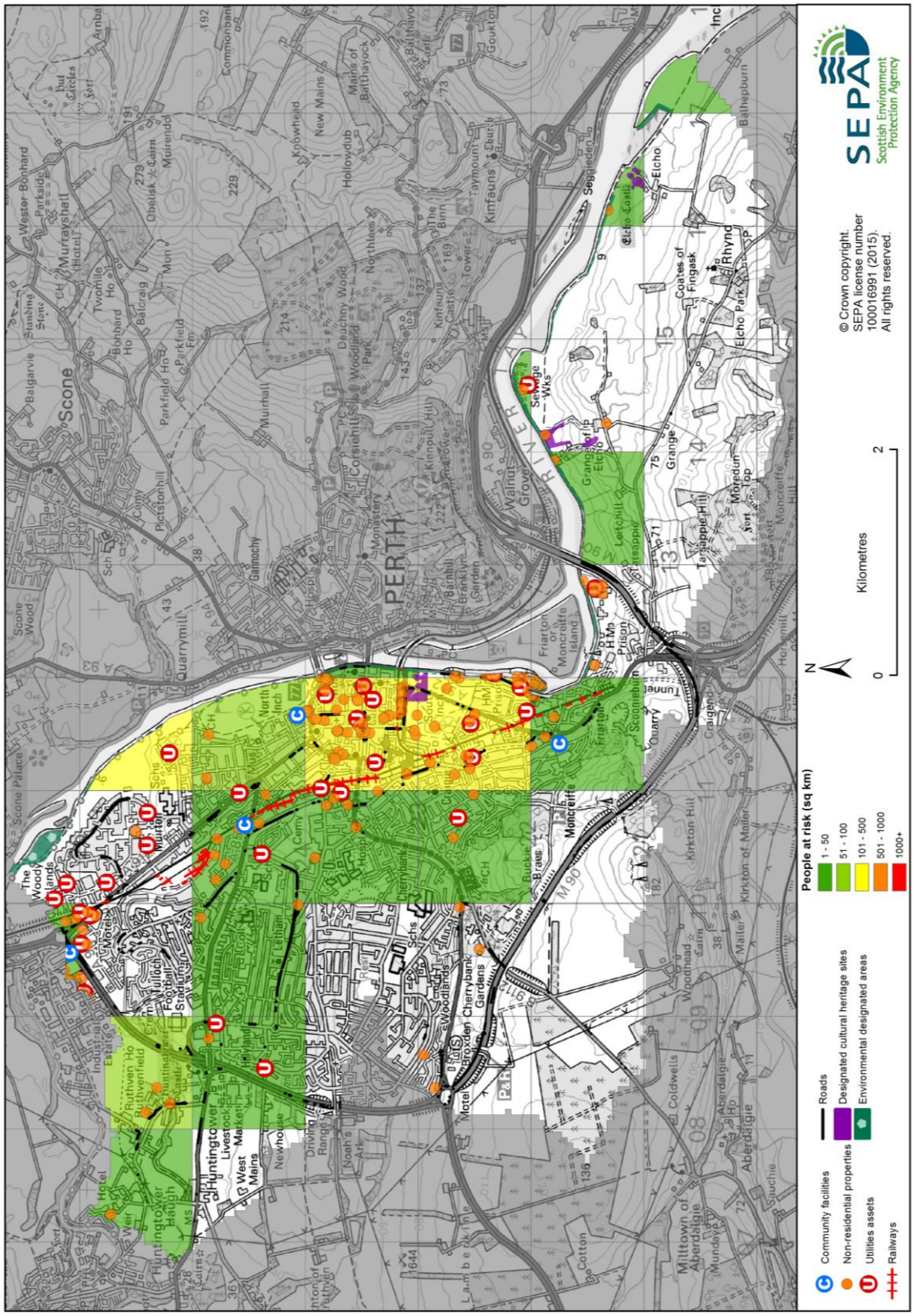


Figure 3: Impacts of flooding

History of flooding

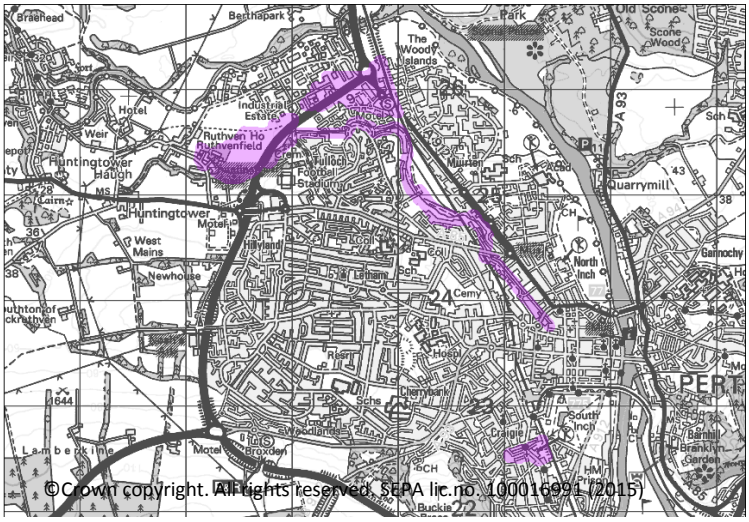
Perth has a long history of flooding. The following significant floods have been recorded in this area:

- 20-21 December 2012: Heavy rain and snow melt affected a number of locations in Perth including Marshall Place from James Street to Princes Street, Moncrieffe Island, Edinburgh Road, North Port and Tay Street. Flood levels reached 5.68m above normal levels at Smeaton's Bridge.
- 16 July 2011: Heavy rain caused surface water flooding in Perth. Homes and businesses were affected.
- 21 July 2010: Extensive surface water flooding around Perth affecting properties and roads.
- 6 August 2002: There was flash flooding on the Craigie Burn in Perth when approximately 30mm of rain fell in 60 minutes.
- 16 January 1993: Widespread flooding resulted in damage to communication networks, hundreds of properties and farmland in and around Perth, causing an estimated £20 million of damage. Residents were evacuated in the North Muirton housing estate after flood defences were breached.
- 17 February 1950: Flooding within Perth on several roads including Tay Street, North and South Inches, the junction of Scott Street and Marshall Street, Moncrieffe Island, Commercial Street (Bridgend) and James Street. Telephone cables damaged outside of Perth and properties flooded.
- 22 January 1928: Wettest January on record caused flooding across Perth and Kinross including Perth and Muirton. Residents of several farms in Muirton had to be rescued as roads became impassable. The River Tay reached 5.77m above normal levels at Smeaton's Bridge in Perth.
- 31 January 1903: Nearly all cellars in Perth flooded after heavy rains and strong gales resulted in flooding on the River Tay, including North and South Inches, Rose Terrace, North Port, Lower Commercial Street, Princes Street, Nelson Street, Scott Street, James Street, King Street, Edinburgh Road, Marshall Place, Moncrieffe Island. Many roads impassable.
- 7 October 1847: Flooding from the River Tay affected Perth, Dunkeld, Dalguise and Dalmarnock. Many residents were evacuated and there were reports of cattle being swept away in flood waters. The water level at Smeaton's Bridge in Perth was estimated to be 6.11m above ordinary levels.
- 12 February 1814: Blocks of ice on the River Tay caused bridges to become blocked resulting in widespread flooding to the Perth region. North and South Inch were submerged for two days. An estimated flood height of 7.0m above ordinary levels was recorded on the River Tay which is the highest known flood level.
- 12-14 October 1621: Constant heavy rain over a two day period caused flooding from the River Tay. Residents were evacuated from numerous properties and severe damage was caused to Milne's Bridge. Perth was surrounded by water for 5-6 days after the event.

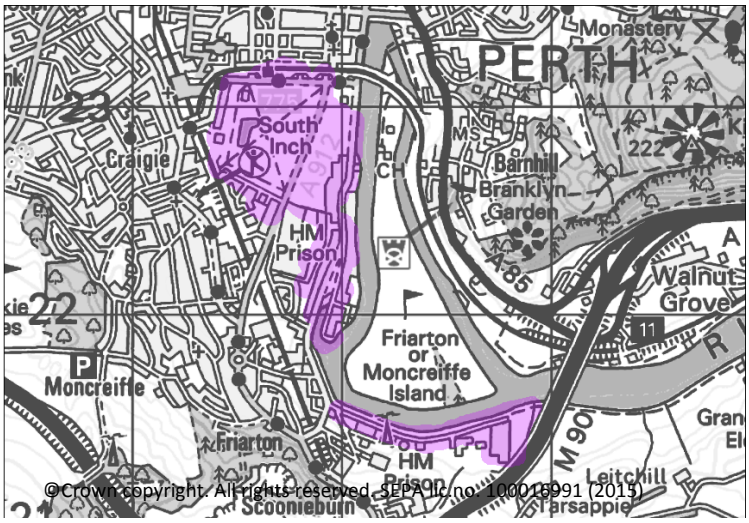
Objectives to manage flooding in Potentially Vulnerable Area 08/13

Objectives provide a common goal and shared ambition for managing floods. These objectives have been set by SEPA and agreed with flood risk management authorities following consultation. They were identified through an assessment of the underlying evidence of the causes and impacts of flooding. Target areas have been set to focus actions; they do not necessarily correspond to areas at risk in SEPA's flood map. The objectives below have been set for Perth centre Potentially Vulnerable Area.

Reduce economic damages to residential and non-residential properties and risk to people in Perth caused by flooding from the Perth Town Lade and the Craigie Burn

Indicators:	Target area:
• 220 people • £850,000 Annual Average Damages from residential properties • £640,000 Annual Average Damages from non-residential properties	
Objective ID: 8029, 8031	

Accept that risk in Perth from flooding on the River Tay, Craigie Burn, Scouring Burn and coastal flooding is being managed appropriately and maintain existing actions that reduce flood risk

Indicators:	Target area:
• 150 residential properties protected • 350 non-residential properties protected • £28 million damages avoided	
Objective ID: 8030	

Target area	Objective	ID	Indicators within PVA
Perth	Reduce economic damages and number of residential properties at risk of surface water flooding in Perth where practical	8024	* See note below
Applies across Tay Local Plan District	Avoid an overall increase in flood risk	8001	• 320 residential properties • £1.8 million Annual Average Damages
Applies across Tay Local Plan District	Reduce overall flood risk	8041	• 320 residential properties • £1.8 million Annual Average Damages
Applies across Tay Local Plan District	Organisations such as Scottish Water, energy companies and Historic Environment Scotland actively maintain and manage their own assets, including the risk of flooding. These actions are not detailed further in the Flood Risk Management Strategies.		

* This objective will be monitored using surface water flood risk across the Potentially Vulnerable Area. For 08/13 there are 110 residential properties at risk and Annual Average Damages of £400,000.

Actions to manage flooding in Potentially Vulnerable Area 08/13

Actions describe where and how flood risk will be managed. These actions have been set by SEPA and agreed with flood risk management authorities following consultation. Selection of actions to deliver the agreed objectives was based on a detailed assessment and comparison of economic, social and environmental criteria. The actions shaded and then described below have been selected as the most appropriate for Perth centre Potentially Vulnerable Area.

Selected actions					
Flood protection scheme/works	*Natural flood management works*	*New flood warning*	Community flood action groups	*Property level protection scheme*	*Site protection plans*
Flood protection study	*Natural flood management study*	Maintain flood warning	Awareness raising	Surface water plan/study	Emergency plans/response
Maintain flood protection scheme	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

Action (ID):	**FLOOD PROTECTION STUDY** (80290005)		
Objective (ID):	Reduce economic damages to residential and non-residential properties and risk to people in Perth caused by flooding from the Perth Town Lade and the Craigie Burn (8029, 8031)		
Delivery lead:	Perth and Kinross Council		
Priority:	National:	Within local authority:	
	116 of 168	**6 of 6**	
Status:	**Not started**	Indicative delivery:	**2016-2021**
Description:	A flood protection study has been recommended for Perth and should consider flood risk from the Craigie Burn. The study should assess direct flood defences and sediment management. The study should take a catchment approach and consider the potential benefits and disbenefits and interaction between actions upstream and downstream.		
Potential impacts			
Economic:	The study could benefit 58 residential properties and four non-residential properties at risk of flooding in this location, with potential damages avoided of up to £2.8 million.		
Social:	Social impacts will depend on the outcome of the study and recommended actions. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community and socially vulnerable people located within the study area.		
Environmental:	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment land designated sites. Where possible opportunities to enhance and restore the environment should be sought, for example through natural flood management. To be in accord with the FRM		

Environmental:	Strategy, the responsible authority should seek to ensure as part of the study that the action will not have an adverse effect on the integrity of the River Tay Special Area of Conservation.

Action (ID):	**SURFACE WATER PLAN/STUDY** (80240018)		
Objective (ID):	Reduce economic damages and number of residential properties at risk of surface water flooding in Perth where practical (8024)		
Delivery lead:	Perth and Kinross Council		
Status:	**Not started**	Indicative delivery:	**2016-2027**
Description:	The area must be covered by a surface water management plan or plans that set objectives for the management of surface water flood risk and identify the most sustainable actions to achieve the objectives.		

Action (ID):	**SURFACE WATER PLAN/STUDY** (80240019)		
Objective (ID):	Reduce economic damages and number of residential properties at risk of surface water flooding in Perth where practical (8024)		
Delivery lead:	Scottish Water in partnership with local authorities		
Status:	**Ongoing**	Indicative delivery:	**2016-2021**
Description:	An integrated catchment study will be carried out to support the surface water management plan process and improve knowledge and understanding of surface water flood risk and interactions with other sources of flooding e.g. with the sewer network, watercourses and the sea.		

Action (ID):	**STRATEGIC MAPPING AND MODELLING** (80410016)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	SEPA		
Status:	**Not started**	Indicative delivery:	**2016-2021**
Description:	SEPA will seek to develop flood mapping in the River Almond area to improve understanding of flood risk. The extent and timing of improvements will depend on detailed scoping and data availability. Where this work coincides with local authority studies, SEPA will work collaboratively to ensure consistent modelling approaches are applied.		

Action (ID):	**STRATEGIC MAPPING AND MODELLING** (80410019)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Scottish Water		
Status:	**Not started**	Indicative delivery:	**2016-2021**
Description:	Scottish Water will review the assessment of flood risk within the highest risk sewer catchments to improve knowledge and understanding of surface water flood risk.		

Action (ID):	**MAINTAIN FLOOD PROTECTION SCHEME** (80290017)		
Objective (ID):	Reduce economic damages to residential, non-residential properties and community facilities in Almondbank and Lochty from the River Almond and East Pow Burn (8020) Reduce economic damages to residential and non-residential properties and risk to people in Perth caused by flooding from the Perth Town Lade and the Craigie Burn (8029, 8031)		
Delivery lead:	Perth and Kinross Council		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Continue to maintain the flood protection schemes that protect Perth against flooding. The schemes include the Perth Flood Protection Scheme that was completed 2002, defences on the Perth Town Lade and Craigie Burn and the Almondbank Flood Protection Scheme which is currently under construction and due to be completed in 2016.		

Action (ID):	**MAINTAIN FLOOD PROTECTION SCHEME** (80300017)		
Objective (ID):	Accept that risk in Perth from flooding on the River Tay, Craigie Burn, Scouring Burn and coastal flooding is being managed appropriately and maintain existing actions that reduce flood risk (8030)		
Delivery lead:	Perth and Kinross Council		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Continue to maintain the Perth Flood Protection Scheme. The scheme was completed in 2002 and includes major flood defence works such as embankments, walls, sluice gates, ponds and pumping stations.		

Action (ID):	**MAINTAIN FLOOD WARNING** (80410030)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	SEPA		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Continue to maintain the Almondbank and the Inveralmond Industrial Estate flood warning areas which are part of the Almond (Perth) river flood warning scheme. Continue to maintain the North Muirton Industrial Estate and the Basement Properties from North Inch to Friarton Bridge flood warning areas which are part of the Tay river flood warning scheme.		

Action (ID):	**FLOOD FORECASTING** (80410009)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	SEPA		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	The Scottish Flood Forecasting Service is a joint initiative between SEPA and the Met Office that produces daily, national flood guidance statements which are issued to Category 1 and 2 Responders. The service also provides information which allows SEPA to issue flood warnings, giving people a better chance of reducing the impact of flooding on their home or business. For more information please visit SEPA's website.		

Action (ID):	**COMMUNITY FLOOD ACTION GROUPS** (80290012)		
Objective (ID):	Reduce economic damages to residential and non-residential properties and risk to people in Perth caused by flooding from the Perth Town Lade and the Craigie Burn (8029, 8031)		
Delivery lead:	Community		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Perth Business Community Resilience Group operates in this area. Membership of the group includes Perth and Kinross Council, SEPA, Tayside Fire and Rescue and the Scottish Flood Forum. The group aims to reduce flooding to businesses and communities within Perth city centre, improve joint working before, during and after flooding and develop ways of increasing community resilience against flooding.		

Action (ID):	**SELF HELP** (80410011)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	—		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Everyone is responsible for protecting themselves and their property from flooding. Property and business owners can take simple steps to reduce damage and disruption to their homes and businesses should flooding happen. This includes preparing a flood plan and flood kit, installing property level protection, signing up to Floodline and Resilient Communities initiatives, and ensuring that properties and businesses are insured against flood damage. Perth and Kinross Council is working with a group of businesses in Perth city centre to develop a maintenance plan.		

Action (ID):	**AWARENESS RAISING** (80410013)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Responsible authorities		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	SEPA and the responsible authorities have a duty to raise public awareness of flood risk. Improved awareness of flood risk and actions that prepare individuals, homes and businesses for flooding can reduce the overall impact. From 2016 SEPA will undertake flood risk education and awareness raising activities. In addition, SEPA will engage with community resilience groups and participate in property level protection events delivered by the Scottish Flood Forum where possible. Local authorities will be undertaking additional awareness raising activities. Further details will be set out in the Local FRM Plan.		

Action (ID):	**MAINTENANCE** (80410007)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Perth and Kinross Council, asset / land managers		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Local authorities have a duty to assess watercourses and carry out clearance and repair works where such works would substantially reduce flood risk. They produce schedules of clearance and repair works and make these available for public inspection. Scottish Water undertake inspection and repair on the public sewer network. Asset owners and riparian landowners are responsible for the maintenance and management of their own assets including those which help to reduce flood risk.		

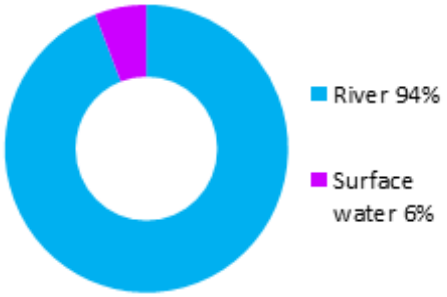
Action (ID):	**EMERGENCY PLANS/RESPONSE** (80410014)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Category 1 and 2 Responders		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Providing an emergency response to flooding is the responsibility of many organisations, including local authorities, the emergency services and SEPA. Effective management of an emergency response relies on emergency plans that are prepared under the Civil Contingencies Act 2004 by Category 1 and 2 Responders. The emergency response by these organisations is co-ordinated through regional and local resilience partnerships. This response may be supported by the work of voluntary organisations.		

Action (ID):	**PLANNING POLICIES** (80010001)		
Objective (ID):	Avoid an overall increase in flood risk (8001) Reduce overall flood risk (8041)		
Delivery lead:	Planning authority		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Scottish Planning Policy and accompanying Planning Advice Notes set out Scottish Ministers' priorities for the operation of the planning system and for the development and use of land. In terms of flood risk management, the policy supports a catchment-scale approach to sustainable flood risk management and aims to build the resilience of our cities and towns, encourage sustainable land management in our rural areas, and to address the long-term vulnerability of parts of our coasts and islands. Under this approach, new development in areas with medium to high likelihood of flooding should be avoided. For further information on the application of national planning policies see Annex 2.		

Comrie (Potentially Vulnerable Area 08/14)

Local Plan District	Local authority	Main catchment
Tay	Perth and Kinross Council, Stirling Council	River Earn

Summary of flooding impacts



At risk of flooding

- 510 residential properties
- 100 non-residential properties
- £2.0 million Annual Average Damages

(damages by flood source shown left)

Summary of objectives to manage flooding

Objectives have been set by SEPA and agreed with flood risk management authorities. These are the aims for managing local flood risk. The objectives have been grouped in three main ways: by reducing risk, avoiding increasing risk or accepting risk by maintaining current levels of management.

Many organisations, such as Scottish Water and energy companies, actively maintain and manage their own assets including their risk from flooding. Where known, these actions are described here. Scottish Natural Heritage and Historic Environment Scotland work with site owners to manage flooding where appropriate at designated environmental and/or cultural heritage sites. These actions are not detailed further in the Flood Risk Management Strategies.

Summary of actions to manage flooding

The actions below have been selected to manage flood risk.

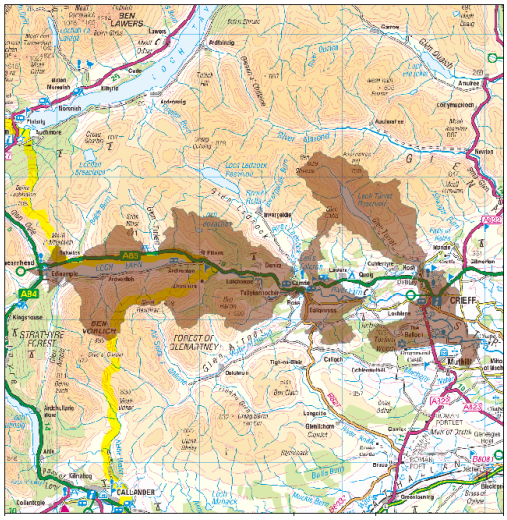
Flood protection scheme/works	*Natural flood management works*	*New flood warning*	Community flood action groups	*Property level protection scheme*	*Site protection plans*
Flood protection study	*Natural flood management study*	Maintain flood warning	Awareness raising	*Surface water plan/study*	Emergency plans/response
Maintain flood protection scheme	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

Comrie (Potentially Vulnerable Area 08/14)

Local Plan District	Local authority	Main catchment
Tay	Perth and Kinross Council, Stirling Council	River Earn

Background

This Potentially Vulnerable Area is 168km^2 (shown below). It is situated in the upper reaches of the River Earn catchment and includes Comrie and Crieff. The main watercourses are the River Earn, River Lednock and the Turret Burn. It also includes Loch Earn and the Turret Reservoir.



There are approximately 510 residential properties and 100 non-residential properties at risk of flooding. The Annual Average Damages are approximately £2.0 million.

The majority of flood damages are caused by river flooding.

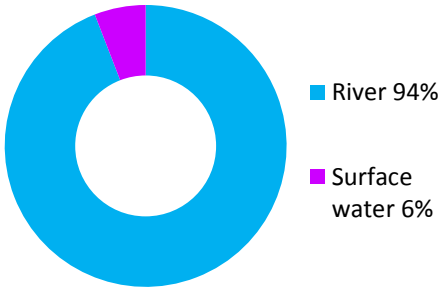


Figure 1: Annual Average Damages by flood source

Summary of flooding impacts

The highest risk of flooding is in Comrie from the River Earn and River Lednock and in Crieff from the Turret Burn.

The risk of flooding to people, property, community facilities, utilities, the transport network, designated sites and agricultural land is summarised in Table 1.

The damages associated with floods of different likelihood are shown in Figure 2. For this Potentially Vulnerable Area the highest damages are to residential properties followed by damages to non-residential properties. The A85 is also impacted at a number of locations. The location of the impacts of flooding is shown in Figure 3.

The figures presented for Annual Average Damages include damages to residential properties, non-residential properties, transport and agriculture.

	1 in 10 High likelihood	1 in 200 Medium likelihood	1 in 1000 Low likelihood
Residential properties (total 4,800)	220	510	830
Non-residential properties (total 1,100)	50	100	120
People	490	1,100	1,800
Community facilities	<10 Emergency services	<10 Includes: emergency services and healthcare facilities	<10 Includes: emergency services and healthcare facilities
Utilities assets	<10	<10	10
Transport links (excluding minor roads)	3 A roads, 2 B roads at 86 locations	3 A roads, 2 B roads at 89 locations	3 A roads, 2 B roads at 109 locations
Environmental designated areas (km^2)	0.8	0.8	0.8
Designated cultural heritage sites	7	7	9
Agricultural land (km^2)	5.6	8.2	9.9

Table 1: Summary of flooding impacts

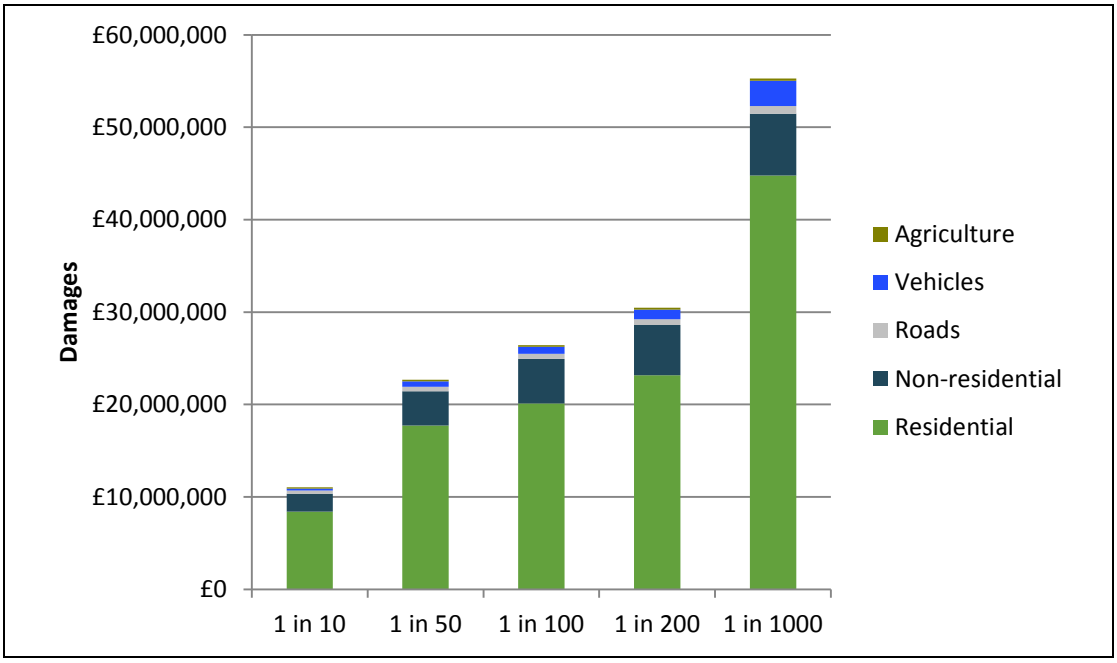


Figure 2: Damages by flood likelihood

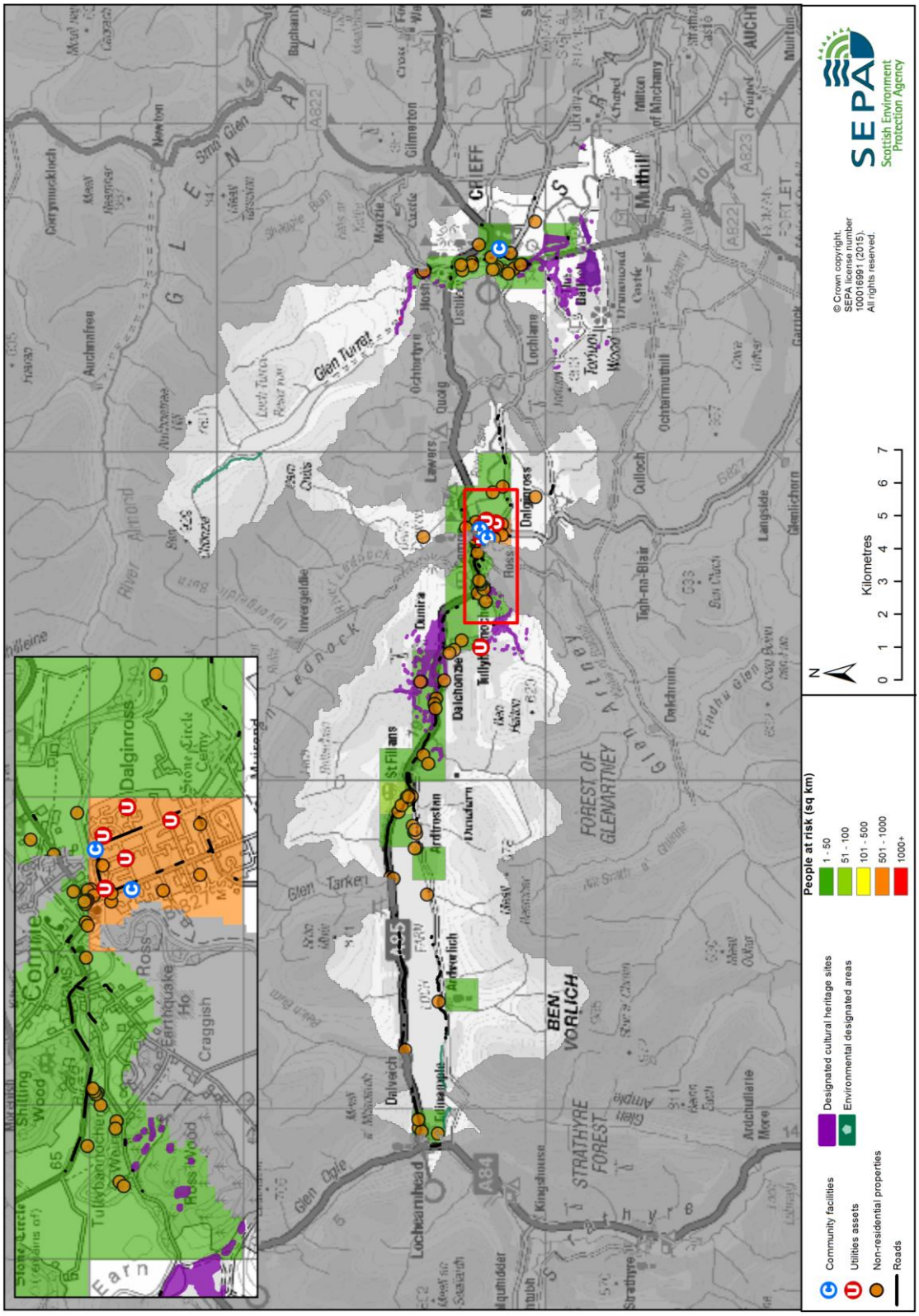


Figure 3: Impacts of flooding

History of flooding

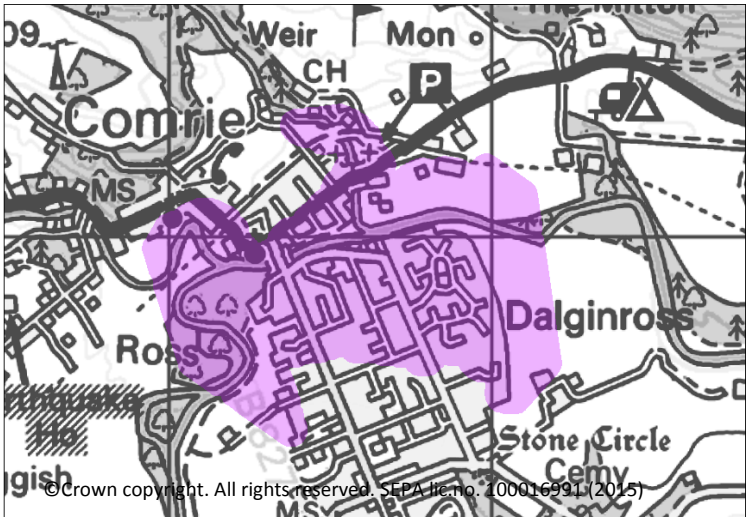
The area has a long history of flooding. The following notable floods have been recorded in this area:

- 19 November 2012: Approximately 150 properties were flooded in Dalginross from the Water of Ruchill.
- 27 August 2012: Approximately 60 properties were flooded in Dalginross from the Water of Ruchill.
- 19 February 1997: A number of streets and houses in Dalginross were flooded, as well as farm land and farm buildings.
- 16 January 1993: Widespread flooding across the Tay Catchment resulted in over £20 million of damage. The flooding is known to have affected Comrie.
- 2 February 1948: Telephone lines and power was disrupted within the Strathearn district when power lines were damaged. Two hundred acres of land were flooded.
- 22 January 1928: Wettest January on record at the time caused flooding across Perth and Kinross including Comrie and Crieff. The River Tay reached 5.77m above normal levels at Smeaton's Bridge in Perth
- 8 November 1926: Flooding throughout the area due to the River Earn and tributaries rising up to a depth of 3.5m in some places. Gas works flooded in Comrie. Residential properties, shops and commercial properties also affected.
- January 1909: The road between Comrie and St Fillans at East Tullybannocher was reported to have five to seven feet of water over it due to snow melt. Farmlands at Carse of Trowan and Carse of Lennoch were under water. A lake reportedly formed between Comrie and Monzievaird.
- 17 March 1903: Railway infrastructure seriously affected causing major disruption to traffic after large stretch of embankment was washed away by flooding at New Comrie.

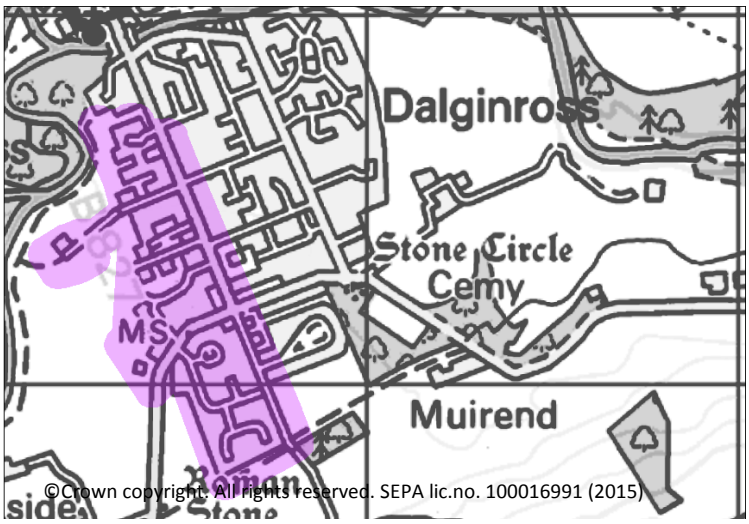
Objectives to manage flooding in Potentially Vulnerable Area 08/14

Objectives provide a common goal and shared ambition for managing floods. These objectives have been set by SEPA and agreed with flood risk management authorities following consultation. They were identified through an assessment of the underlying evidence of the causes and impacts of flooding. Target areas have been set to focus actions; they do not necessarily correspond to areas at risk in SEPA's flood map. The objectives below have been set for Comrie Potentially Vulnerable Area.

Reduce economic damages to residential and non-residential properties in Comrie caused by flooding from the River Earn and River Lednock

Indicators:	Target area:
• £1.3 million Annual Average Damages from residential properties • £280,000 Annual Average Damages from non-residential properties	
Objective ID: 8033	

Accept that significant flood risk in Dalginross is being managed appropriately. Maintain existing actions that reduce flood risk in Dalginross caused by flooding from the Water of Ruchill.

Indicators:	Target area:
• 90 residential properties and one non-residential properties protected (100 year event)	
Objective ID: 8035	

Target area	Objective	ID	Indicators within PVA
Comrie	Reduce the physical or disruption risk related to the transport network for roads	8303	• 7.4km of road at 43 locations on the A85
Applies across Tay Local Plan District	Avoid an overall increase in flood risk	8001	• 510 residential properties • £2.0 million Annual Average Damages
Applies across Tay Local Plan District	Reduce overall flood risk	8041	• 510 residential properties • £2.0 million Annual Average Damages
Applies across Tay Local Plan District	Organisations such as Scottish Water, energy companies and Historic Environment Scotland actively maintain and manage their own assets, including the risk of flooding. These actions are not detailed further in the Flood Risk Management Strategies.		

Actions to manage flooding in Potentially Vulnerable Area 08/14

Actions describe where and how flood risk will be managed. These actions have been set by SEPA and agreed with flood risk management authorities following consultation. Selection of actions to deliver the agreed objectives was based on a detailed assessment and comparison of economic, social and environmental criteria. The actions shaded and then described below have been selected as the most appropriate for Comrie Potentially Vulnerable Area.

Selected actions					
Flood protection scheme/works	*Natural flood management works*	*New flood warning*	Community flood action groups	*Property level protection scheme*	*Site protection plans*
Flood protection study	*Natural flood management study*	Maintain flood warning	Awareness raising	*Surface water plan/study*	Emergency plans/response
Maintain flood protection scheme	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

Action (ID):	**FLOOD PROTECTION SCHEME/WORKS** (80330006)		
Objective (ID):	Reduce economic damages to residential and non-residential properties in Comrie caused by flooding from the River Earn and River Lednock (8033)		
Delivery lead:	Perth and Kinross Council		
Priority:	National:	Within local authority:	
	7 of 42	**1 of 4**	
Status:	**Under development**	Indicative delivery:	**2016-2021**
Description:	A flood protection scheme has been proposed for Comrie to reduce the combined flood risk from the Water of Ruchill, River Earn and River Lednock. The scheme would consist of flood defences and flood storage areas. The scheme would provide a 1 in 100 year standard of protection.		
Potential impacts			
Economic:	The proposed scheme may benefit 382 residential properties and 15 non-residential properties at risk of flooding in this location, with estimated damages avoided of £89 million. The flood protection scheme has an estimated benefit cost ratio of 6.7.		
Social:	A reduction in flood risk would have a positive benefit to the health and wellbeing of the community. In addition there are one emergency service and one healthcare facility which have been identified as potentially benefitting from this action. There may be negative impacts through disturbance to the local community during the construction phase.		
Environmental:	Flood protection schemes can have both positive and negative impacts on the ecological quality of the environment depending on how they are designed. A number of nationally and locally designated		

Environmental:	sites are present in the study area and could be positively or negatively impacted. These include conservation areas, National Scenic Areas, scheduled monuments, gardens and designed landscapes, listed buildings, national parks, Sites of Special Scientific Interest and ancient woodlands.

Action (ID):	**FLOOD PROTECTION SCHEME/WORKS** (8303021)		
Objective (ID):	Reduce the physical or disruption risk related to the transport network for roads (8303)		
Delivery lead:	Transport Scotland		
Status:	**Under development**	Indicative delivery:	**2016-2021**
Description:	Transport Scotland will carry out civil engineering work which will reduce the risk of flooding on identified sections of the trunk road.		

Action (ID):	**STRATEGIC MAPPING AND MODELLING** (80410016)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	SEPA		
Status:	**Not started**	Indicative delivery:	**2016-2021**
Description:	SEPA will seek to develop flood mapping in the Upper Earn area to improve understanding of flood risk. The extent and timing of improvements will depend on detailed scoping and data availability.		

Action (ID):	**STRATEGIC MAPPING AND MODELLING** (80410019)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Scottish Water		
Status:	**Not started**	Indicative delivery:	**2016-2021**
Description:	Scottish Water will carry out an assessment of flood risk within the highest risk sewer catchments to improve knowledge and understanding of surface water flood risk.		

Action (ID):	**MAINTAIN FLOOD PROTECTION SCHEME** (80330017)		
Objective (ID):	Reduce economic damages to residential and non-residential properties in Comrie caused by flooding from the River Earn and River Lednock (8033)		
Delivery lead:	Perth and Kinross Council		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Continue to maintain existing flood defences and flood protection works in Comrie. These include the Ruchill Flood Protection Scheme constructed in the 1960s and flood protection works carried out in 2013.		

Action (ID):	**MAINTAIN FLOOD PROTECTION SCHEME** (80350017)		
Objective (ID):	Accept that significant flood risk in Dalginross is being managed appropriately. Maintain existing actions that reduce flood risk in Dalginross caused by flooding from the Water of Ruchill. (8035)		
Delivery lead:	Perth and Kinross Council		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Continue to maintain the Ruchill flood protection scheme constructed in 1960 that protects Dalginross from river flooding.		

Action (ID):	**MAINTAIN FLOOD WARNING** (80410030)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	SEPA		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Continue to maintain the Carse of Lennoch to Lochlane and the Crieff to Innerpeffray flood warning areas which are part of the Earn river flood warning scheme. Continue to maintain the Comrie flood warning area which covers properties at risk of flooding from the Water of Ruchill and/or the River Earn as part of the Ruchill river flood warning scheme.		

Action (ID):	**FLOOD FORECASTING** (80410009)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	SEPA		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	The Scottish Flood Forecasting Service is a joint initiative between SEPA and the Met Office that produces daily, national flood guidance statements which are issued to Category 1 and 2 Responders. The service also provides information which allows SEPA to issue flood warnings, giving people a better chance of reducing the impact of flooding on their home or business. For more information please visit SEPA's website.		

Action (ID):	**COMMUNITY FLOOD ACTION GROUPS** (80330012)		
Objective (ID):	Reduce economic damages to residential and non-residential properties in Comrie caused by flooding from the River Earn and River Lednock (8033)		
Delivery lead:	Community		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Comrie Resilience Group operates in this area. The membership includes Perth and Kinross Council, SEPA, Scottish Fire and Rescue and the Scottish Flood Forum. The group aims to reduce flooding of businesses and communities in Comrie. The resilience group was formed as a response to severe flooding in Comrie in August and November 2012.		

Action (ID):	**SELF HELP** (80410011)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	—		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Everyone is responsible for protecting themselves and their property from flooding. Property and business owners can take simple steps to reduce damage and disruption to their homes and businesses should flooding happen. This includes preparing a flood plan and flood kit, installing property level protection, signing up to Floodline and Resilient Communities initiatives, and ensuring that properties and businesses are insured against flood damage. Perth and Kinross Council is piloting a project for flood protection products for properties in flood risk areas.		

Action (ID):	**AWARENESS RAISING** (80410013)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Responsible authorities		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	SEPA and the responsible authorities have a duty to raise public awareness of flood risk. Improved awareness of flood risk and actions that prepare individuals, homes and businesses for flooding can reduce the overall impact. SEPA will undertake flood risk education and awareness raising activities. In addition, SEPA will engage with community resilience groups and participate in property level protection events delivered by the Scottish Flood Forum where possible. Local authorities will be undertaking additional awareness raising activities. Further details will be set out in the Local FRM Plan.		

Action (ID):	**MAINTENANCE** (80410007)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Local authorities, asset / land managers		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Local authorities have a duty to assess watercourses and carry out clearance and repair works where such works would substantially reduce flood risk. They produce schedules of clearance and repair works and make these available for public inspection. Scottish Water undertake inspection and repair on the public sewer network. Asset owners and riparian landowners are responsible for the maintenance and management of their own assets including those which help to reduce flood risk.		

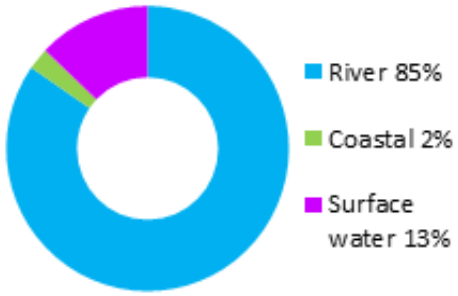
Action (ID):	**EMERGENCY PLANS/RESPONSE** (80410014)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Category 1 and 2 Responders		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Providing an emergency response to flooding is the responsibility of many organisations, including local authorities, the emergency services and SEPA. Effective management of an emergency response relies on emergency plans that are prepared under the Civil Contingencies Act 2004 by Category 1 and 2 Responders. The emergency response by these organisations is co-ordinated through regional and local resilience partnerships. This response may be supported by the work of voluntary organisations.		

Action (ID):	**PLANNING POLICIES** (80010001)		
Objective (ID):	Avoid an overall increase in flood risk (8001) Reduce overall flood risk (8041)		
Delivery lead:	Planning authority		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Scottish Planning Policy and accompanying Planning Advice Notes set out Scottish Ministers' priorities for the operation of the planning system and for the development and use of land. In terms of flood risk management, the policy supports a catchment-scale approach to sustainable flood risk management and aims to build the resilience of our cities and towns, encourage sustainable land management in our rural areas, and to address the long-term vulnerability of parts of our coasts and islands. Under this approach, new development in areas with medium to high likelihood of flooding should be avoided. For further information on the application of national planning policies see Annex 2.		

Forteviot (Potentially Vulnerable Area 08/15)

Local Plan District	Local authority	Main catchment
Tay	Perth and Kinross Council	River Earn

Summary of flooding impacts



At risk of flooding

- <10 residential properties
- <10 non-residential properties
- £15,000 Annual Average Damages

(damages by flood source shown left)

Summary of objectives to manage flooding

Objectives have been set by SEPA and agreed with flood risk management authorities. These are the aims for managing local flood risk. The objectives have been grouped in three main ways: by reducing risk, avoiding increasing risk or accepting risk by maintaining current levels of management.

Many organisations, such as Scottish Water and energy companies, actively maintain and manage their own assets including their risk from flooding. Where known, these actions are described here. Scottish Natural Heritage and Historic Environment Scotland work with site owners to manage flooding where appropriate at designated environmental and/or cultural heritage sites. These actions are not detailed further in the Flood Risk Management Strategies.

Summary of actions to manage flooding

The actions below have been selected to manage flood risk.

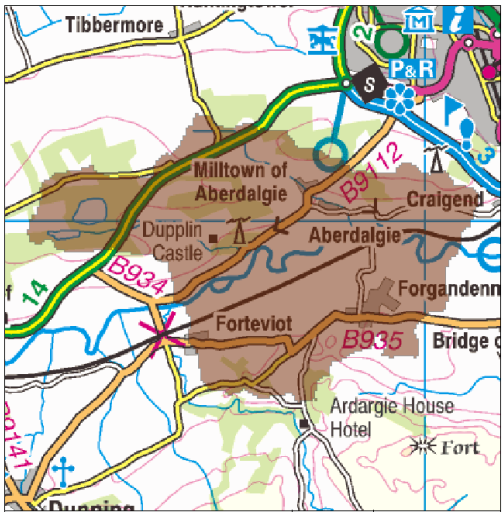
Flood protection scheme/works	*Natural flood management works*	*New flood warning*	*Community flood action groups*	*Property level protection scheme*	*Site protection plans*
Flood protection study	*Natural flood management study*	Maintain flood warning	Awareness raising	*Surface water plan/study*	Emergency plans/response
Maintain flood protection scheme	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

Forteviot (Potentially Vulnerable Area 08/15)

Local Plan District	Local authority	Main catchment
Tay	Perth and Kinross Council	River Earn

Background

This Potentially Vulnerable Area is 29km^2 (shown below). It is situated in the lower reaches of the River Earn catchment and includes Forteviot and Forgandenny.



The majority of flood damages are caused by river flooding.

There are fewer than 10 residential and non-residential properties at risk of flooding. The Annual Average Damages are approximately £15,000.

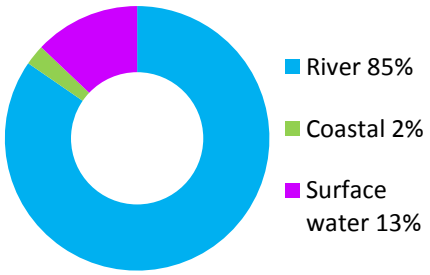


Figure 1: Annual Average Damages by flood source

Summary of flooding impacts

Work carried out since the National Flood Risk Assessment in 2011 has concluded that the risk of flooding in this Potentially Vulnerable Area is now relatively low. The designation of this Potentially Vulnerable Area will be reviewed in the next flood risk management planning cycle.

The main flood risk in this area is concentrated around small areas of the railway line to the north of Forgandenny.

The risk of flooding to people, property, as well as to community facilities, utilities, the transport network, designated sites and agricultural land is summarised in Table 1.

The damages associated with floods of different likelihood are shown in Figure 2. Surface water damages may be under-represented in Figure 2 due to limitations in the available modelling output. For this Potentially Vulnerable Area the highest damages are to agricultural land followed by damages to roads.

The location of the impacts of flooding is shown in Figure 3.

The figures presented for Annual Average Damages include damages to residential properties, non-residential properties, transport and agriculture.

	1 in 10 High likelihood	1 in 200 Medium likelihood	1 in 1000 Low likelihood
Residential properties (total 2,600)	<10	<10	<10
Non-residential properties (total 90)	<10	<10	<10
People	<10	<10	<10
Community facilities	0	0	0
Utilities assets	0	0	0
Transport links (excluding minor roads)	2 A roads, 1 B road at 10 locations 2 Railway routes at 10 locations: Perth to Thornton Junctions Dundee to Dunblane	2 A roads, 1 B road at 10 locations 2 Railway routes at 10 locations: Perth to Thornton Junctions Dundee to Dunblane	2 A roads, 1 B road at 10 locations 2 Railway routes at 10 locations: Perth to Thornton Junctions Dundee to Dunblane
Environmental designated areas (km^2)	0	0	0
Designated cultural heritage sites	4	4	4
Agricultural land (km^2)	2.8	3.4	3.5

Table 1: Summary of flooding impacts

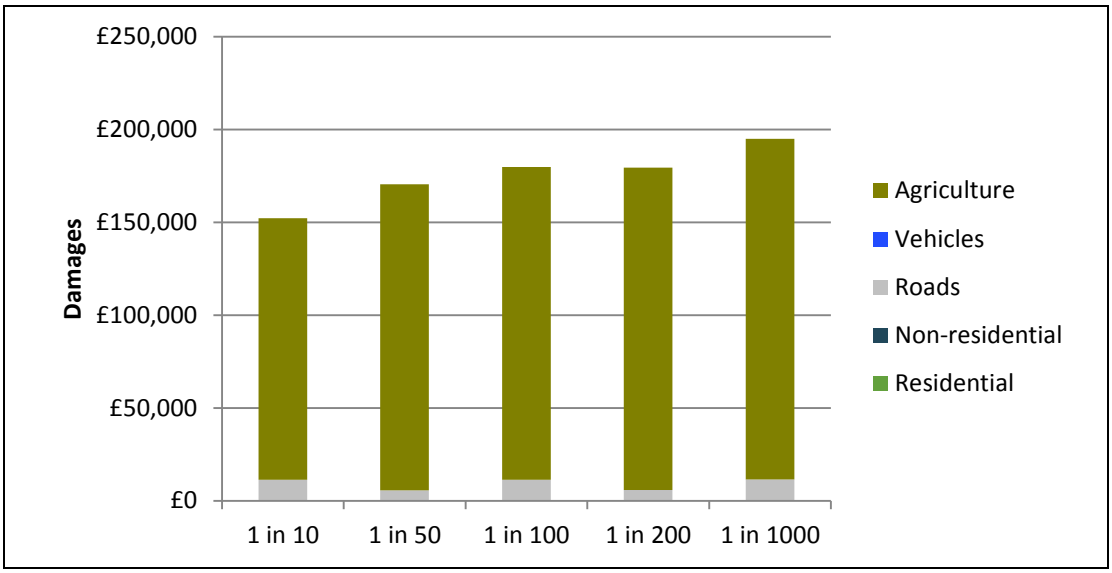


Figure 2: Damages by flood likelihood

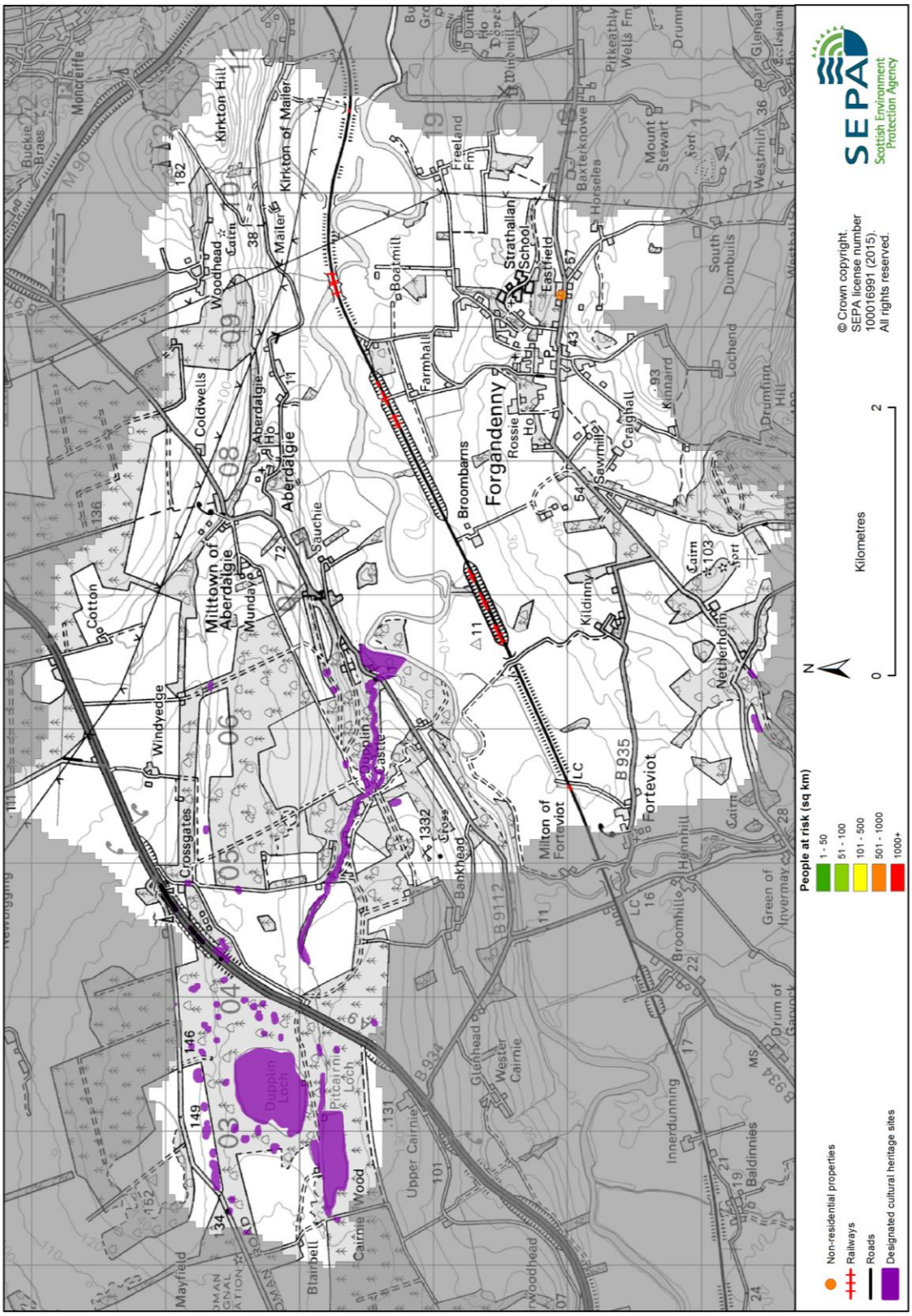


Figure 3: Impacts of flooding

History of flooding

In January 1993 hundreds of properties flooded in Perth and Kinross and surrounding areas from the River Earn with over £20 million of damage.

Objectives to manage flooding in Potentially Vulnerable Area 08/15

Objectives provide a common goal and shared ambition for managing floods. These objectives have been set by SEPA and agreed with flood risk management authorities following consultation. They were identified through an assessment of the underlying evidence of the causes and impacts of flooding. Target areas have been set to focus actions; they do not necessarily correspond to areas at risk in SEPA's flood map. The objectives below have been set for Forteviot Potentially Vulnerable Area.

Target area	Objective	ID	Indicators within PVA
Applies across Tay Local Plan District	Avoid an overall increase in flood risk	8001	• <10 non-residential properties • £15,000 Annual Average Damages
Applies across Tay Local Plan District	Reduce overall flood risk	8041	• <10 non-residential properties • £15,000 Annual Average Damages
Applies across Tay Local Plan District	Organisations such as Scottish Water, energy companies and Historic Environment Scotland actively maintain and manage their own assets, including the risk of flooding. These actions are not detailed further in the Flood Risk Management Strategies.		

Actions to manage flooding in Potentially Vulnerable Area 08/15

Actions describe where and how flood risk will be managed. These actions have been set by SEPA and agreed with flood risk management authorities following consultation. Selection of actions to deliver the agreed objectives was based on a detailed assessment and comparison of economic, social and environmental criteria. The actions shaded and then described below have been selected as the most appropriate for Forteviot Potentially Vulnerable Area.

Selected actions					
Flood protection scheme/works	*Natural flood management works*	*New flood warning*	*Community flood action groups*	*Property level protection scheme*	*Site protection plans*
Flood protection study	*Natural flood management study*	Maintain flood warning	Awareness raising	*Surface water plan/study*	Emergency plans/response
Maintain flood protection scheme	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

Action (ID):	**STRATEGIC MAPPING AND MODELLING** (80410016)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	SEPA		
Status:	**Not started**	Indicative delivery:	**2016-2021**
Description:	SEPA will seek to incorporate additional surface water data into the flood maps to improve understanding of flood risk. Approximately 900km² of improved surface water data is currently available within this Local Plan District. SEPA will seek to develop flood mapping in the Lower Earn area (from Forteviot Bridge to the River Tay confluence) to improve understanding of flood risk. The extent and timing of improvements will depend on detailed scoping and data availability.		

Action (ID):	**MAINTAIN FLOOD WARNING** (80410030)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	SEPA		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Continue to maintain the Innerpeffray to Bridge of Earn flood warning area which is part of the Earn river flood warning scheme.		

Action (ID):	**FLOOD FORECASTING** (80410009)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	SEPA		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	The Scottish Flood Forecasting Service is a joint initiative between SEPA and the Met Office that produces daily, national flood guidance statements which are issued to Category 1 and 2 Responders. The service also provides information which allows SEPA to issue flood warnings, giving people a better chance of reducing the impact of flooding on their home or business. For more information please visit SEPA's website.		

Action (ID):	**SELF HELP** (80410011)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	—		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Everyone is responsible for protecting themselves and their property from flooding. Property and business owners can take simple steps to reduce damage and disruption to their homes and businesses should flooding happen. This includes preparing a flood plan and flood kit, installing property level protection, signing up to Floodline and Resilient Communities initiatives, and ensuring that properties and businesses are insured against flood damage.		

Action (ID):	**AWARENESS RAISING** (80410013)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Responsible authorities		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	SEPA and the responsible authorities have a duty to raise public awareness of flood risk. Improved awareness of flood risk and actions that prepare individuals, homes and businesses for flooding can reduce the overall impact. From 2016 SEPA will engage with the community through local participation in national initiatives, including partnership working with Neighbourhood Watch Scotland. In addition, SEPA will engage with local authorities and community resilience groups where possible. Local authorities will be undertaking additional awareness raising activities. Further details will be set out in the Local FRM Plan.		

Action (ID):	**MAINTENANCE** (80410007)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Perth and Kinross Council, asset / land managers		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Local authorities have a duty to assess watercourses and carry out clearance and repair works where such works would substantially reduce flood risk. They produce schedules of clearance and repair works and make these available for public inspection. Scottish Water undertake inspection and repair on the public sewer network. Asset owners and riparian landowners are responsible for the maintenance and management of their own assets including those which help to reduce flood risk.		

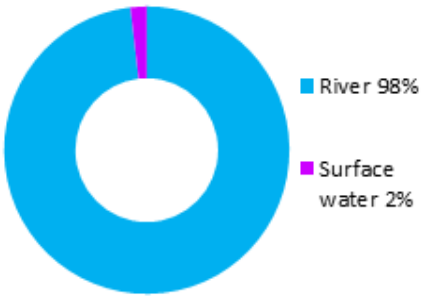
Action (ID):	**EMERGENCY PLANS/RESPONSE** (80410014)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Category 1 and 2 Responders		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Providing an emergency response to flooding is the responsibility of many organisations, including local authorities, the emergency services and SEPA. Effective management of an emergency response relies on emergency plans that are prepared under the Civil Contingencies Act 2004 by Category 1 and 2 Responders. The emergency response by these organisations is co-ordinated through regional and local resilience partnerships. This response may be supported by the work of voluntary organisations.		

Action (ID):	**PLANNING POLICIES** (80010001)		
Objective (ID):	Avoid an overall increase in flood risk (8001)		
Delivery lead:	Planning authority		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Scottish Planning Policy and accompanying Planning Advice Notes set out Scottish Ministers' priorities for the operation of the planning system and for the development and use of land. In terms of flood risk management, the policy supports a catchment-scale approach to sustainable flood risk management and aims to build the resilience of our cities and towns, encourage sustainable land management in our rural areas, and to address the long-term vulnerability of parts of our coasts and islands. Under this approach, new development in areas with medium to high likelihood of flooding should be avoided. For further information on the application of national planning policies see Annex 2.		

Dunning (Potentially Vulnerable Area 08/16)

Local Plan District	Local authority	Main catchment
Tay	Perth and Kinross Council	Dunning Burn (River Earn)

Summary of flooding impacts



At risk of flooding

- 40 residential properties
- <10 non-residential properties
- £120,000 Annual Average Damages

(damages by flood source shown left)

Summary of objectives to manage flooding

Objectives have been set by SEPA and agreed with flood risk management authorities. These are the aims for managing local flood risk. The objectives have been grouped in three main ways: by reducing risk, avoiding increasing risk or accepting risk by maintaining current levels of management.

Many organisations, such as Scottish Water and energy companies, actively maintain and manage their own assets including their risk from flooding. Where known, these actions are described here. Scottish Natural Heritage and Historic Environment Scotland work with site owners to manage flooding where appropriate at designated environmental and/or cultural heritage sites. These actions are not detailed further in the Flood Risk Management Strategies.

Summary of actions to manage flooding

The actions below have been selected to manage flood risk.

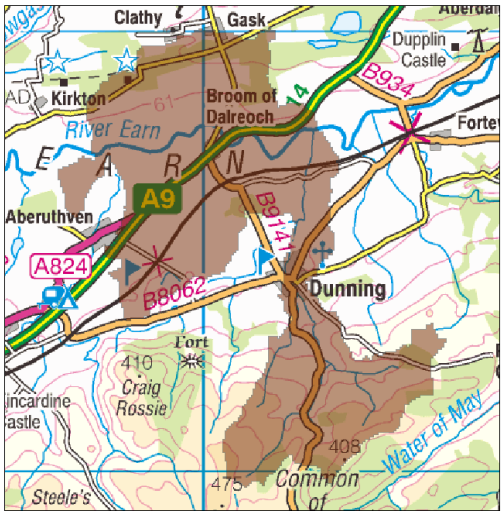
Flood protection scheme/works	*Natural flood management works*	*New flood warning*	*Community flood action groups*	*Property level protection scheme*	*Site protection plans*
Flood protection study	*Natural flood management study*	Maintain flood warning	Awareness raising	*Surface water plan/study*	Emergency plans/response
Maintain flood protection scheme	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

Dunning (Potentially Vulnerable Area 08/16)

Local Plan District	Local authority	Main catchment
Tay	Perth and Kinross Council	Dunning Burn (River Earn)

Background

This Potentially Vulnerable Area is 37km^2 (shown below). It is situated in the lower reaches of the River Earn catchment and includes the town of Dunning. The main watercourses are the River Earn and its tributary the Dunning Burn.



The majority of flood damages are caused by river flooding.

There are approximately 40 residential properties at risk of flooding. The Annual Average Damages are approximately £120,000.

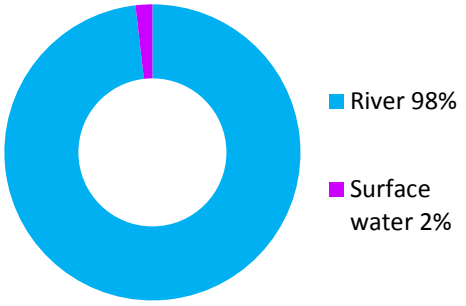


Figure 1: Annual Average Damages by flood source

Summary of flooding impacts

The highest risk of flooding is in Dunning from the Dunning Burn.

The risk of flooding to people, property, as well as to community facilities, utilities, the transport network, designated sites and agricultural land is summarised in Table 1.

The damages associated with floods of different likelihood are shown in Figure 2. For this Potentially Vulnerable Area the highest damages are to residential properties. The location of the impacts of flooding is shown in Figure 3.

The figures presented for Annual Average Damages include damages to residential properties, non-residential properties, transport and agriculture.

	1 in 10 High likelihood	1 in 200 Medium likelihood	1 in 1000 Low likelihood
Residential properties (total 490)	30	40	40
Non-residential properties (total 120)	<10	<10	10
People	60	80	90
Community facilities	0	0	0
Utilities assets	0	<10	<10
Transport links (excluding minor roads)	1 A road, 1 B road at 9 locations 1 Railway route at 4 locations: Dundee to Dunblane	1 A road, 2 B roads at 11 locations 1 Railway route at 4 locations: Dundee to Dunblane	1 A road, 2 B roads at 12 locations 1 Railway route at 4 locations: Dundee to Dunblane
Environmental designated areas (km^2)	0	0	0
Designated cultural heritage sites	4	4	4
Agricultural land (km^2)	2.4	3.0	3.4

Table 1: Summary of flooding impacts

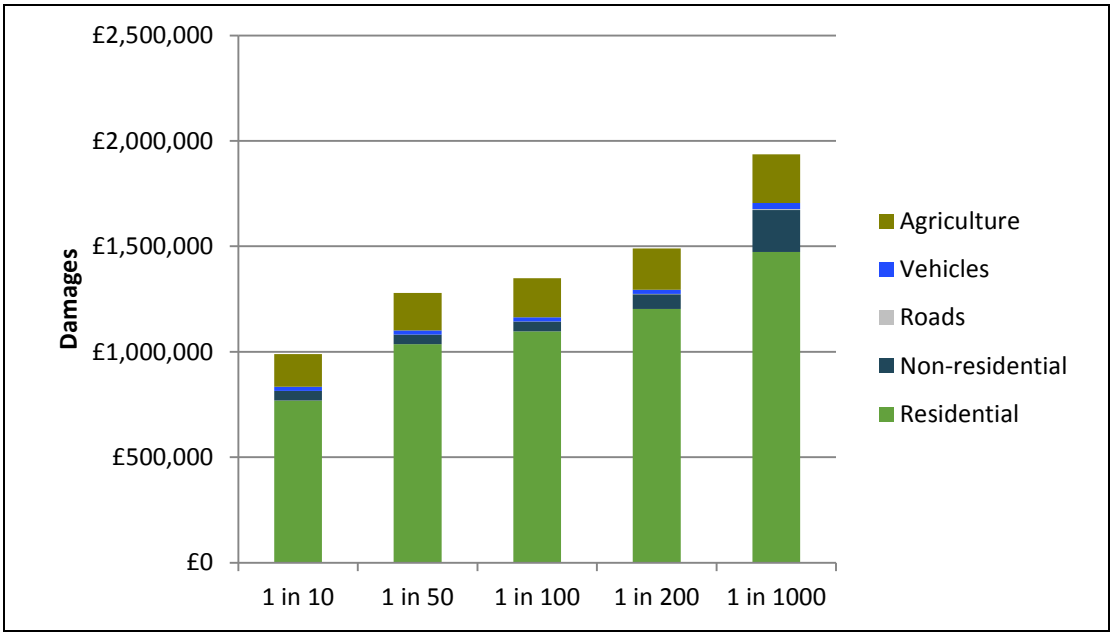


Figure 2: Damages by flood likelihood

Figure 3: Impacts of flooding

History of flooding

The following significant floods have been recorded:

- 2 February 1948: Telephone lines and power disrupted within Strathearn district when poles carrying high tension wires were toppled. Two hundred acres of land were flooded.
- 18 September 1930: A dam, four bridges, a dyke and a garage washed away in Dunning. Residential and non-residential properties in the vicinity were also flooded. Evacuation of some properties was required.
- 8 November 1926: Flooding throughout the area due to the River Earn and tributaries flooding up to 3.5m in some places.

Objectives to manage flooding in Potentially Vulnerable Area 08/16

Objectives provide a common goal and shared ambition for managing floods. These objectives have been set by SEPA and agreed with flood risk management authorities following consultation. They were identified through an assessment of the underlying evidence of the causes and impacts of flooding. Target areas have been set to focus actions; they do not necessarily correspond to areas at risk in SEPA's flood map. The objectives below have been set for Dunning Potentially Vulnerable Area.

Target area	Objective	ID	Indicators within PVA
Dunning	Avoid an overall increase in flood risk	8037	• 40 residential properties • £120,000 Annual Average Damages
Applies across Tay Local Plan District	Reduce overall flood risk	8041	• 40 residential properties • £120,000 Annual Average Damages
Applies across Tay Local Plan District	Organisations such as Scottish Water, energy companies and Historic Environment Scotland actively maintain and manage their own assets, including the risk of flooding. These actions are not detailed further in the Flood Risk Management Strategies.		

Actions to manage flooding in Potentially Vulnerable Area 08/16

Actions describe where and how flood risk will be managed. These actions have been set by SEPA and agreed with flood risk management authorities following consultation. Selection of actions to deliver the agreed objectives was based on a detailed assessment and comparison of economic, social and environmental criteria. The actions shaded and then described below have been selected as the most appropriate for Dunning Potentially Vulnerable Area.

Selected actions					
Flood protection scheme/works	*Natural flood management works*	*New flood warning*	*Community flood action groups*	*Property level protection scheme*	*Site protection plans*
Flood protection study	*Natural flood management study*	Maintain flood warning	Awareness raising	*Surface water plan/study*	Emergency plans/response
Maintain flood protection scheme	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

Action (ID):	**STRATEGIC MAPPING AND MODELLING** (80410016)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	SEPA		
Status:	**Not started**	Indicative delivery:	**2016-2021**
Description:	SEPA will seek to develop flood mapping in the Middle Earn area to improve understanding of flood risk. The extent and timing of improvements will depend on detailed scoping and data availability.		

Action (ID):	**STRATEGIC MAPPING AND MODELLING** (80410019)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Scottish Water		
Status:	**Not started**	Indicative delivery:	**2016-2021**
Description:	Scottish Water will carry out an assessment of flood risk within the highest risk sewer catchments to improve knowledge and understanding of surface water flood risk.		

Action (ID):	**MAINTAIN FLOOD WARNING** (80410030)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	SEPA		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Continue to maintain the Innerpeffray to Bridge of Earn flood warning area which is part of the Earn river flood warning scheme.		

Action (ID):	**FLOOD FORECASTING** (80410009)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	SEPA		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	The Scottish Flood Forecasting Service is a joint initiative between SEPA and the Met Office that produces daily, national flood guidance statements which are issued to Category 1 and 2 Responders. The service also provides information which allows SEPA to issue flood warnings, giving people a better chance of reducing the impact of flooding on their home or business. For more information please visit SEPA's website.		

Action (ID):	**SELF HELP** (80410011)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	—		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Everyone is responsible for protecting themselves and their property from flooding. Property and business owners can take simple steps to reduce damage and disruption to their homes and businesses should flooding happen. This includes preparing a flood plan and flood kit, installing property level protection, signing up to Floodline and Resilient Communities initiatives, and ensuring that properties and businesses are insured against flood damage.		

Action (ID):	**AWARENESS RAISING** (80410013)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Responsible authorities		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	SEPA and the responsible authorities have a duty to raise public awareness of flood risk. Improved awareness of flood risk and actions that prepare individuals, homes and businesses for flooding can reduce the overall impact. From 2016 From 2016 SEPA will engage with the community through local participation in national initiatives, including partnership working with Neighbourhood Watch Scotland. In addition, SEPA will engage with local authorities and community resilience groups where possible. Local authorities will be undertaking additional awareness raising activities. Further details will be set out in the Local FRM Plan.		

Action (ID):	**MAINTENANCE** (80410007)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Perth and Kinross Council, asset / land managers		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Local authorities have a duty to assess watercourses and carry out clearance and repair works where such works would substantially reduce flood risk. They produce schedules of clearance and repair works and make these available for public inspection. Scottish Water undertake inspection and repair on the public sewer network. Asset owners and riparian landowners are responsible for the maintenance and management of their own assets including those which help to reduce flood risk.		

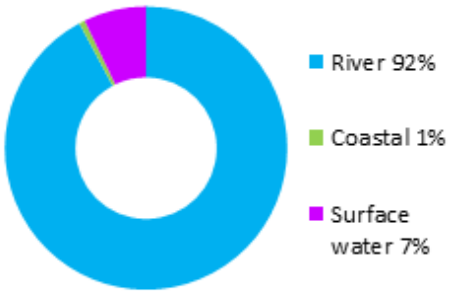
Action (ID):	**EMERGENCY PLANS/RESPONSE** (80410014)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Category 1 and 2 Responders		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Providing an emergency response to flooding is the responsibility of many organisations, including local authorities, the emergency services and SEPA. Effective management of an emergency response relies on emergency plans that are prepared under the Civil Contingencies Act 2004 by Category 1 and 2 Responders. The emergency response by these organisations is co-ordinated through regional and local resilience partnerships. This response may be supported by the work of voluntary organisations.		

Action (ID):	**PLANNING POLICIES** (80010001)		
Objective (ID):	Avoid an overall increase in flood risk (8037) Reduce overall flood risk (8041)		
Delivery lead:	Planning authority		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Scottish Planning Policy and accompanying Planning Advice Notes set out Scottish Ministers' priorities for the operation of the planning system and for the development and use of land. In terms of flood risk management, the policy supports a catchment-scale approach to sustainable flood risk management and aims to build the resilience of our cities and towns, encourage sustainable land management in our rural areas, and to address the long-term vulnerability of parts of our coasts and islands. Under this approach, new development in areas with medium to high likelihood of flooding should be avoided. For further information on the application of national planning policies see Annex 2.		

Bridge of Earn (Potentially Vulnerable Area 08/17)

Local Plan District	Local authority	Main catchment
Tay	Fife Council, Perth and Kinross Council	River Earn

Summary of flooding impacts



At risk of flooding

- 50 residential properties
- 20 non-residential properties
- £410,000 Annual Average Damages

(damages by flood source shown left)

Summary of objectives to manage flooding

Objectives have been set by SEPA and agreed with flood risk management authorities. These are the aims for managing local flood risk. The objectives have been grouped in three main ways: by reducing risk, avoiding increasing risk or accepting risk by maintaining current levels of management.

Many organisations, such as Scottish Water and energy companies, actively maintain and manage their own assets including their risk from flooding. Where known, these actions are described here. Scottish Natural Heritage and Historic Environment Scotland work with site owners to manage flooding where appropriate at designated environmental and/or cultural heritage sites. These actions are not detailed further in the Flood Risk Management Strategies.

Summary of actions to manage flooding

The actions below have been selected to manage flood risk.

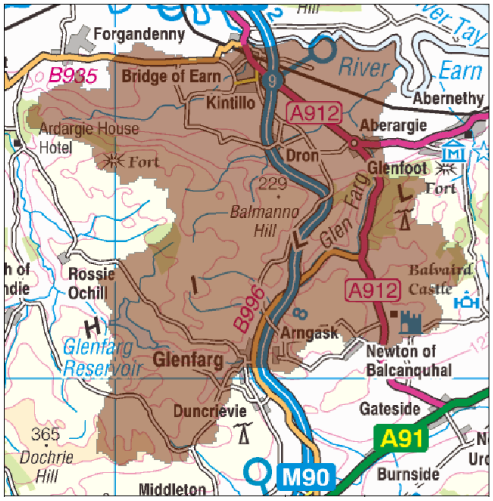
Flood protection scheme/works	*Natural flood management works*	*New flood warning*	Community flood action groups	*Property level protection scheme*	*Site protection plans*
Flood protection study	*Natural flood management study*	Maintain flood warning	Awareness raising	*Surface water plan/study*	Emergency plans/response
Maintain flood protection scheme	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

Bridge of Earn (Potentially Vulnerable Area 08/17)

Local Plan District	Local authority	Main catchment
Tay	Fife Council, Perth and Kinross Council	River Earn

Background

This Potentially Vulnerable Area is 66km^2 and part of the River Earn catchment (shown below). It is situated on the south bank at the mouth of the River Earn where it flows into the Firth of Tay. It includes Bridge of Earn and Glenfarg and the main watercourses are the River Earn and River Farg.



The majority of flood damages are caused by river flooding, however, the interaction between river and coastal flooding where the River Earn meets the Firth of Tay influences flooding in Bridge of Earn.

There are approximately 50 residential properties and 20 non-residential properties at risk of flooding. The Annual Average Damages are approximately £410,000.

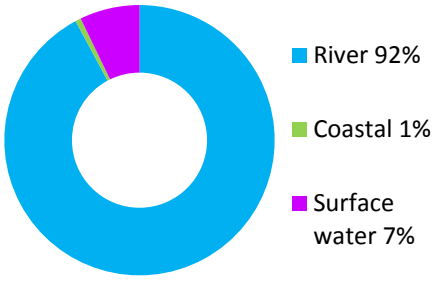


Figure 1: Annual Average Damages by flood source

Summary of flooding impacts

The highest risk of flooding is in Bridge of Earn from the River Earn, Deich Burn and Yellow Burn.

The risk of flooding to people and property, as well as to community facilities, utilities, the transport network, designated sites and agricultural land is summarised in Table 1.

The damages associated with floods of different likelihood are shown in Figure 2. For this Potentially Vulnerable Area the highest damages are to residential properties followed by damages to non-residential properties. The location of the impacts of flooding is shown in Figure 3.

The figures presented for Annual Average Damages include damages to residential properties, non-residential properties, transport and agriculture.

The risk of flooding to utilities in Table 1 does not include Scottish Water data. Scottish Water undertook a national assessment of above ground assets at medium likelihood of flooding (including water treatment works, wastewater treatment works and pumping stations). Within this Potentially Vulnerable Area there are two assets identified as being at risk of flooding.

	1 in 10 High likelihood	1 in 200 Medium likelihood	1 in 1000 Low likelihood
Residential properties (total 1,700)	30	50	140
Non-residential properties (total 330)	<10	20	30
People	70	120	300
Community facilities	0	<10 Educational buildings	<10 Educational buildings
Utilities assets	0	<10	<10
Transport links (excluding minor roads)	1 M road (M90), 2 A roads, 2 B roads at 41 locations 1 Railway route at 3 locations: Perth to Thornton Junctions	1 M road (M90), 2 A roads, 2 B roads at 48 locations 1 Railway route at 3 locations: Perth to Thornton Junctions	1 M road (M90), 2 A roads, 2 B roads at 51 locations 1 Railway route at 3 locations: Perth to Thornton Junctions
Environmental designated areas (km^2)	0	0	0
Designated cultural heritage sites	2	3	3
Agricultural land (km^2)	1.3	1.6	2.0

Table 1: Summary of flooding impacts

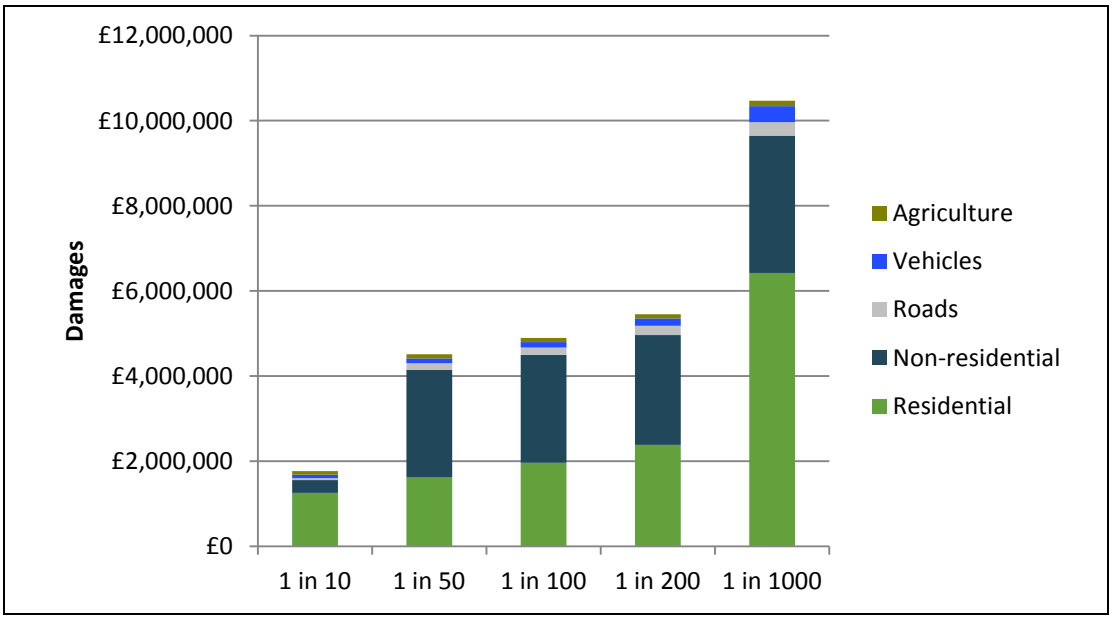


Figure 2: Damages by flood likelihood

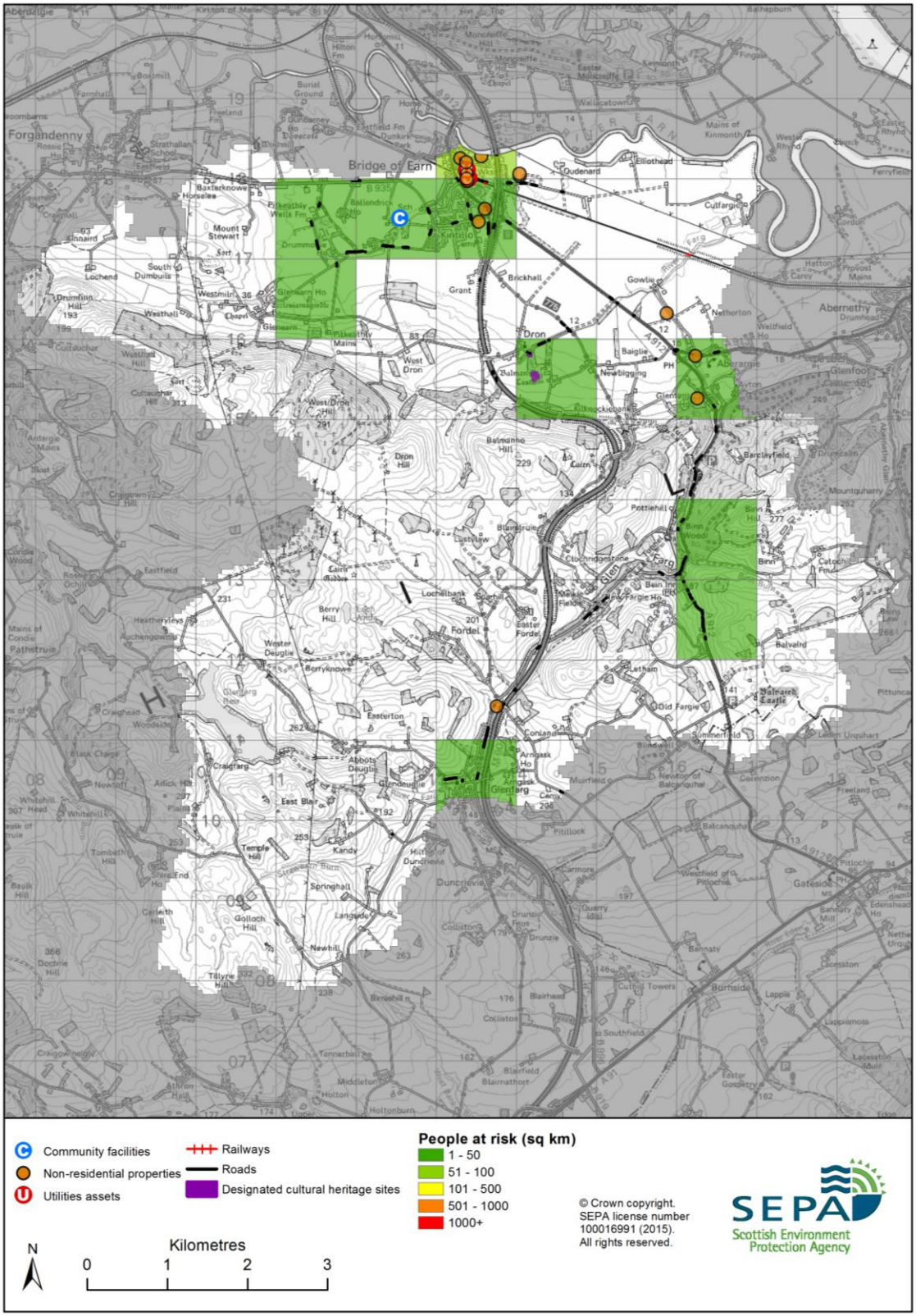


Figure 3: Impacts of flooding

History of flooding

One flood has been recorded as significant in this area, which occurred in January 1993. Widespread flooding across the Tay catchment resulted in over £20 million of damage. The flooding is known to have affected Bridge of Earn.

Objectives to manage flooding in Potentially Vulnerable Area 08/17

Objectives provide a common goal and shared ambition for managing floods. These objectives have been set by SEPA and agreed with flood risk management authorities following consultation. They were identified through an assessment of the underlying evidence of the causes and impacts of flooding. Target areas have been set to focus actions; they do not necessarily correspond to areas at risk in SEPA's flood map. The objectives below have been set for Bridge of Earn Potentially Vulnerable Area.

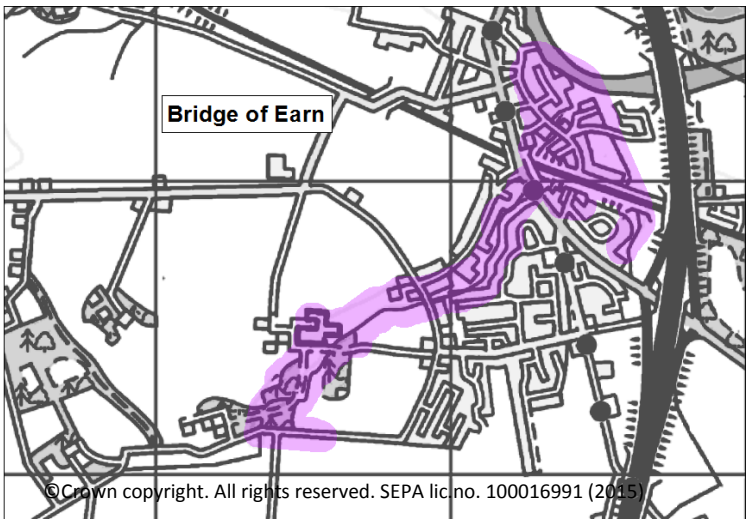
Accept that significant flood risk in Bridge of Earn is being managed appropriately. Maintain existing actions that reduce risk of flooding on the River Earn, Deich Burn and Yellow Burn.

Indicators:

- 23 residential properties protected
- £1.9 million damages avoided

Objective ID: 8040

Target area:



Target area	Objective	ID	Indicators within PVA
Applies across Tay Local Plan District	Avoid an overall increase in flood risk	8001	• 50 residential properties • £410,000 Annual Average Damages
Applies across Tay Local Plan District	Reduce overall flood risk	8041	• 50 residential properties • £410,000 Annual Average Damages
Applies across Tay Local Plan District	Organisations such as Scottish Water, energy companies and Historic Environment Scotland actively maintain and manage their own assets, including the risk of flooding. These actions are not detailed further in the Flood Risk Management Strategies.		

Actions to manage flooding in Potentially Vulnerable Area 08/17

Actions describe where and how flood risk will be managed. These actions have been set by SEPA and agreed with flood risk management authorities following consultation. Selection of actions to deliver the agreed objectives was based on a detailed assessment and comparison of economic, social and environmental criteria. The actions shaded and then described below have been selected as the most appropriate for Bridge of Earn Potentially Vulnerable Area.

Selected actions					
Flood protection scheme/works	*Natural flood management works*	*New flood warning*	Community flood action groups	*Property level protection scheme*	*Site protection plans*
Flood protection study	*Natural flood management study*	Maintain flood warning	Awareness raising	*Surface water plan/study*	Emergency plans/response
Maintain flood protection scheme	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

Action (ID):	**STRATEGIC MAPPING AND MODELLING** (80410016)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	SEPA		
Status:	**Not started**	Indicative delivery:	**2016-2021**
Description:	SEPA will seek to incorporate additional surface water data into the flood maps to improve understanding of flood risk, to be completed early in the first flood risk management cycle. Approximately 900km² of improved surface water data is currently available within this Local Plan District. SEPA will seek to develop flood mapping in the Lower Earn area to improve understanding of flood risk. The extent and timing of improvements will depend on detailed scoping and data availability.		

Action (ID):	**STRATEGIC MAPPING AND MODELLING** (80410019)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Scottish Water		
Status:	**Not started**	Indicative delivery:	**2016-2021**
Description:	Scottish Water will review the assessment of flood risk within the highest risk sewer catchments to improve knowledge and understanding of surface water flood risk.		

Action (ID):	**MAINTAIN FLOOD PROTECTION SCHEME** (80400017)		
Objective (ID):	Accept that significant flood risk in Bridge of Earn is being managed appropriately. Maintain existing actions that reduce risk of flooding on the River Earn, Deich Burn and Yellow Burn. (8040)		
Delivery lead:	Perth and Kinross Council		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Continue to maintain the existing flood protection scheme along the Deich Burn and Yellow Burn. This includes the Bridge of Earn Flood Protection Scheme completed in 2006.		

Action (ID):	**MAINTAIN FLOOD WARNING** (80410030)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	SEPA		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Continue to maintain the Bridge of Earn and the Bridge of Earn to the River Tay flood warning areas which are part of the Earn river flood warning scheme.		

Action (ID):	**FLOOD FORECASTING** (80410009)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	SEPA		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	The Scottish Flood Forecasting Service is a joint initiative between SEPA and the Met Office that produces daily, national flood guidance statements which are issued to Category 1 and 2 Responders. The service also provides information which allows SEPA to issue flood warnings, giving people a better chance of reducing the impact of flooding on their home or business. For more information please visit SEPA's website.		

Action (ID):	**COMMUNITY FLOOD ACTION GROUPS** (80400012)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Community		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Glenfarg Community Council operates in this area. The community council have prepared a community resilience plan to help prepare for and respond to emergencies.		

Action (ID):	**SELF HELP** (80410011)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	—		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Everyone is responsible for protecting themselves and their property from flooding. Property and business owners can take simple steps to reduce damage and disruption to their homes and businesses should flooding happen. This includes preparing a flood plan and flood kit, installing property level protection, signing up to Floodline and Resilient Communities initiatives, and ensuring that properties and businesses are insured against flood damage.		

Action (ID):	**AWARENESS RAISING** (80410013)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Responsible authorities		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	SEPA and the responsible authorities have a duty to raise public awareness of flood risk. Improved awareness of flood risk and actions that prepare individuals, homes and businesses for flooding can reduce the overall impact. From 2016 SEPA will engage with the community through local participation in national initiatives, including partnership working with Neighbourhood Watch Scotland. In addition, SEPA will engage with local authorities and community resilience groups where possible. Local authorities will be undertaking additional awareness raising activities. Further details will be set out in the Local FRM Plan.		

Action (ID):	**MAINTENANCE** (80410007)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Fife Council and Perth and Kinross Council, asset / land managers		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Local authorities have a duty to assess watercourses and carry out clearance and repair works where such works would substantially reduce flood risk. They produce schedules of clearance and repair works and make these available for public inspection. Scottish Water undertake inspection and repair on the public sewer network. Asset owners and riparian landowners are responsible for the maintenance and management of their own assets including those which help to reduce flood risk.		

Action (ID):	**EMERGENCY PLANS/RESPONSE** (80410014)		
Objective (ID):	Reduce overall flood risk (8041)		
Delivery lead:	Category 1 and 2 Responders		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Providing an emergency response to flooding is the responsibility of many organisations, including local authorities, the emergency services and SEPA. Effective management of an emergency response relies on emergency plans that are prepared under the Civil Contingencies Act 2004 by Category 1 and 2 Responders. The emergency response by these organisations is co-ordinated through regional and local resilience partnerships. This response may be supported by the work of voluntary organisations.		

Action (ID):	**PLANNING POLICIES** (80010001)		
Objective (ID):	Avoid an overall increase in flood risk (8001) Reduce overall flood risk (8041)		
Delivery lead:	Planning authority		
Status:	**Existing**	Indicative delivery:	**Ongoing**
Description:	Scottish Planning Policy and accompanying Planning Advice Notes set out Scottish Ministers' priorities for the operation of the planning system and for the development and use of land. In terms of flood risk management, the policy supports a catchment-scale approach to sustainable flood risk management and aims to build the resilience of our cities and towns, encourage sustainable land management in our rural areas, and to address the long-term vulnerability of parts of our coasts and islands. Under this approach, new development in areas with medium to high likelihood of flooding should be avoided. For further information on the application of national planning policies see Annex 2.		

Flood Risk Management Strategy

Tay Local Plan District

This section provides supplementary information on the characteristics and impacts of river, coastal and surface water flooding. Future impacts due to climate change, the potential for natural flood management and links to river basin management are also described within these chapters.

Detailed information about the objectives and actions to manage flooding are provided in Section 2.

Section 3: Supporting information

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3.1 Introduction

In the Tay Local Plan District, river flooding is reported across two distinct river catchments. Coastal flooding and surface water flooding are reported across the whole Local Plan District.

A summary of the number of properties and Annual Average Damages from river, coastal and surface water flooding is outlined in Table 1.

	Total number of properties at risk[1]	Annual Average Damages	Local authority
River catchments			
River Tay catchment	2,100	£7.4 million	Angus Council Perth and Kinross Council Stirling Council
River Earn catchment	730	£2.8 million	Perth and Kinross Council Fife Council Stirling Council
Coastal flooding			
Tay coastal area	260	£550,000	Perth and Kinross Council
Surface water flooding			
Tay Local Plan District	940	£1.9 million	Angus Council Fife Council Perth and Kinross Council Stirling Council

Table 1: Summary of flood risk from various sources within the Tay Local Plan District

[1] Total number of residential and non-residential properties at risk of flooding.

3.2 River flooding

Tay Local Plan District

This section provides supplementary information on river flooding at the catchment level. It provides an overview of the catchment's natural characteristics, flood risk and the existing actions to manage flooding. It outlines the likely impact of climate change and the potential for natural flood management.

Detailed information about the objectives and actions to manage flooding are provided in Section 2.

In the Tay Local Plan District, river flooding is reported across two distinct river catchments, shown below.

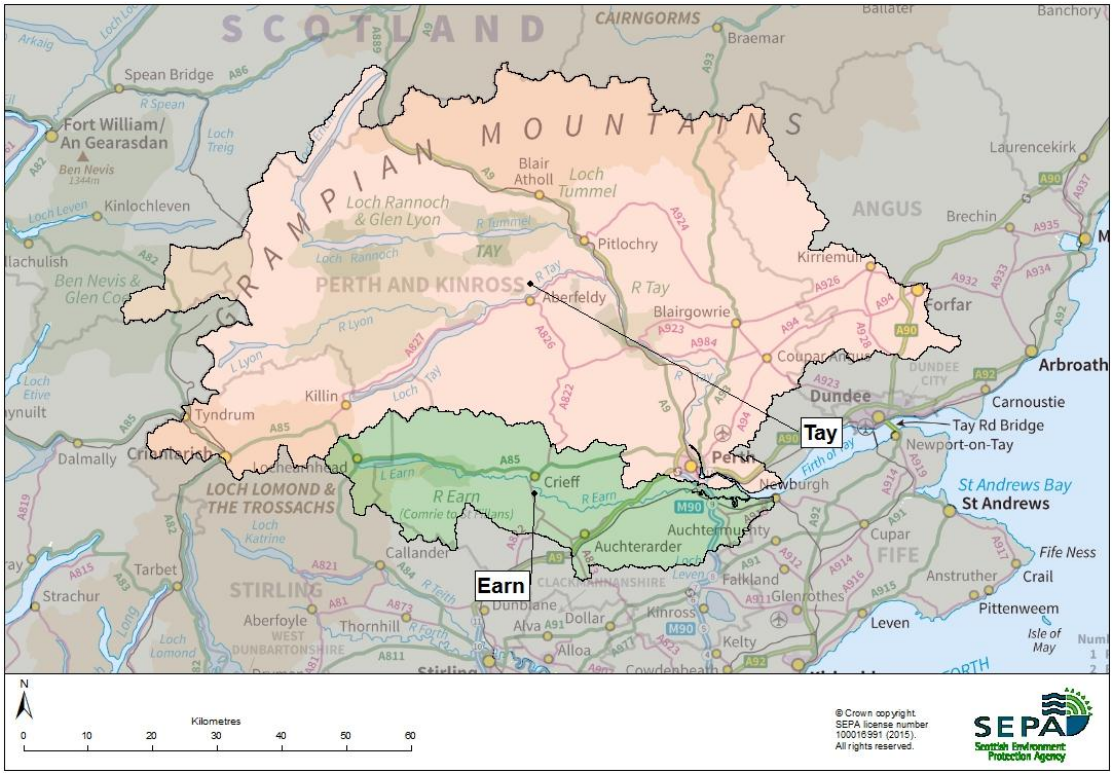

Figure 1: River catchments within the Tay Local Plan District

River flooding
River Tay catchment

This chapter provides supplementary information on river flooding at the catchment level. It provides an overview of the catchment's natural characteristics, flood risk and the existing actions to manage flooding. It outlines the likely impact of climate change and the potential for natural flood management.

Detailed information about the objectives and actions to manage flooding are provided in Section 2.

Catchment overview

The River Tay has the largest catchment area and is the longest river in Scotland. It covers an area of 5,088km^2 and is around 190km in length. More water flows through the River Tay than any other river in the United Kingdom. The main tributaries include the River Garry, River Tummel, River Lyon, River Braan, River Isla and River Almond. The largest lochs in the River Tay catchment include Loch Ericht, Loch Rannoch and Loch Tay. Many of the lochs and rivers in the River Tay catchment are managed to produce hydropower.

The Highland boundary fault cuts across the catchment from Buchantly (Glen Almond) in the west to Kirriemuir in the east. The fault line marks distinct differences in topography, rainfall and land use.

North of the boundary fault the catchment is steep and upland in nature. Rainfall is higher in the upland section of the catchment, with average annual rainfall between 1500mm-3000mm. South of the boundary fault the catchment is more lowland in nature, with gentle slopes. Rainfall is lower than average with annual rainfall between 800mm-1000mm.

Flood risk in the catchment

Within the River Tay catchment approximately 1,400 residential and 750 non-residential properties are at risk of river flooding. It is estimated that 70% of these properties are located within Potentially Vulnerable Areas. There are 13 Potentially Vulnerable Areas at risk of river flooding in this catchment (Figure 1):

- Blair Atholl (08/01)
- Kinloch Rannoch (08/02)
- Aberfeldy and Pitlochry (08/03)
- Alyth (08/04)
- Kirriemuir and Forfar (08/05)
- Blairgowrie (08/06)
- Coupar Angus (08/07)
- Luncarty, Stanley, Bankfoot, Dunkeld and Birnam (08/08)
- Tyndrum and Crianlarich (08/09)
- Almondbank (08/10)
- Scone (08/11)
- Perth to Kinfauns (north of A90) (08/12)
- Perth centre (08/13).

Main areas at risk

The main areas at risk of river flooding can be seen in Table 1. The table shows the number of properties at risk and the Annual Average Damages caused by river flooding. This includes damages to residential and non-residential properties, transport and agriculture.

	Residential and non-residential properties at risk of river flooding	Annual Average Damages
Dunkeld and Birnam	250[1]	£280,000
Almondbank	240	£1.2 million
Pitlochry	160	£620,000
Aberfeldy	160	£360,000
Perth	120	£1.3 million
Bankfoot	110	£290,000
Forfar	80	£450,000
Alyth	60	£150,000
Scone	40	£88,000
Tyndrum	30	£130,000
Methven	30	£98,000
Kirriemuir	20	£39,000
Coupar Angus	20	£29,000
Meigle	10	£83,000
Blairgowrie and Rattray	10	£7,000
Killin	<10	£16,000
Crianlarich	<10	£8,000
Weem	<10	£7,000

Table 1: Main areas at risk of river flooding

Economic activity and infrastructure at risk

The Annual Average Damages caused by river flooding in the River Tay catchment is approximately £7.4 million. The damages are distributed as follows:

- 42% residential properties (£3.1 million)
- 38% non-residential properties (£2.8 million)
- 7% emergency services (£500,000)
- 7% agriculture (£500,000)
- 4% roads (£300,000)
- 2% vehicles (£200,000).

[1] The numbers presented in this report are derived from SEPA data that is assessed at a strategic level. Perth and Kinross Council have estimated that there are substantially lower numbers of people at risk from river flooding in Dunkeld.

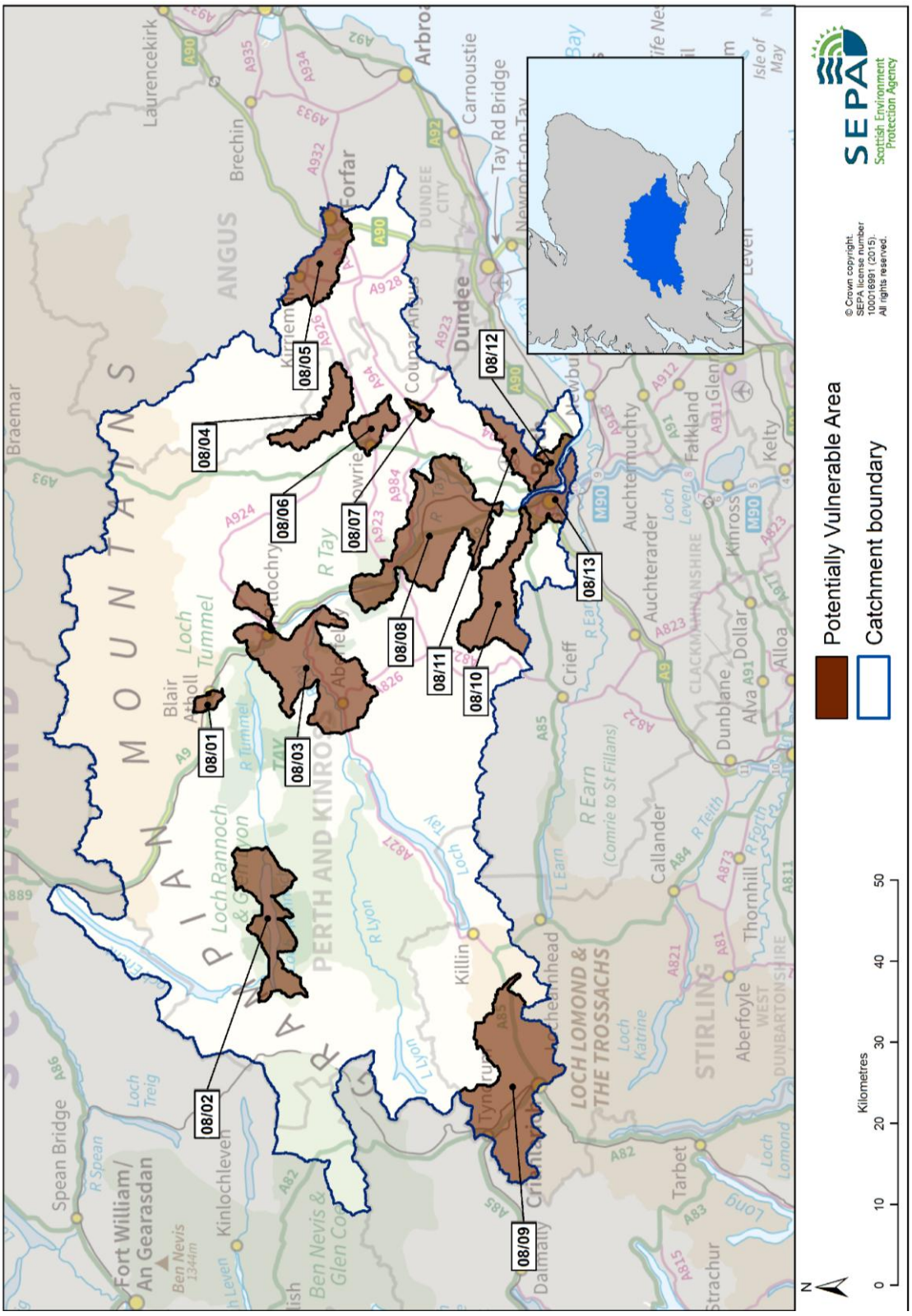

Figure 1: The River Tay catchment

Figure 2 shows the Annual Average Damages throughout the River Tay catchment. The highest damages can be seen south of Almondbank due to a high density of non-residential properties.

Table 2 shows further information about infrastructure and agricultural land at risk of flooding within this catchment.

	Number at risk	Further detail
Community facilities	10	Includes: educational buildings and emergency services
Utility assets	70	Includes: electricity substations and telephone exchanges
Roads (excluding minor roads)	32	1 M roads (M90) at 6 locations 15 A roads at 310 locations 16 B roads at 145 locations
Railway routes	4	Dundee to Dunblane (16 locations at risk) Glasgow Queen Street to Mallaig (9 locations at risk) Glasgow Queen Street to Oban (8 locations at risk) Perth to Inverness (50 locations at risk)
Agricultural land (km^2)	153	

Table 2: Infrastructure and agricultural land at risk of river flooding

Designated environmental and cultural heritage sites at risk

Within the catchment it is estimated that 117 designated cultural heritage sites are at risk of river flooding. These sites include scheduled monuments, gardens and designed landscapes, battlefield sites and listed buildings.

It is estimated that 105 environmental designated areas are at risk of river flooding. These include 17 Special Areas of Conservation, 11 Special Protection Areas and 77 Sites of Special Scientific Interest. Amongst these sites are Ben Lawers, the Cairngorm Massif, Glen Etive and Glen Fyne and the Rannoch Lochs.

Part of the River Tay catchment lies within the boundary of the Loch Lomond and the Trossachs National Park and the Cairngorms National Park. The National Parks are recognised for the outstanding national importance of their natural and cultural heritage, and some of these features may be at risk of flooding.

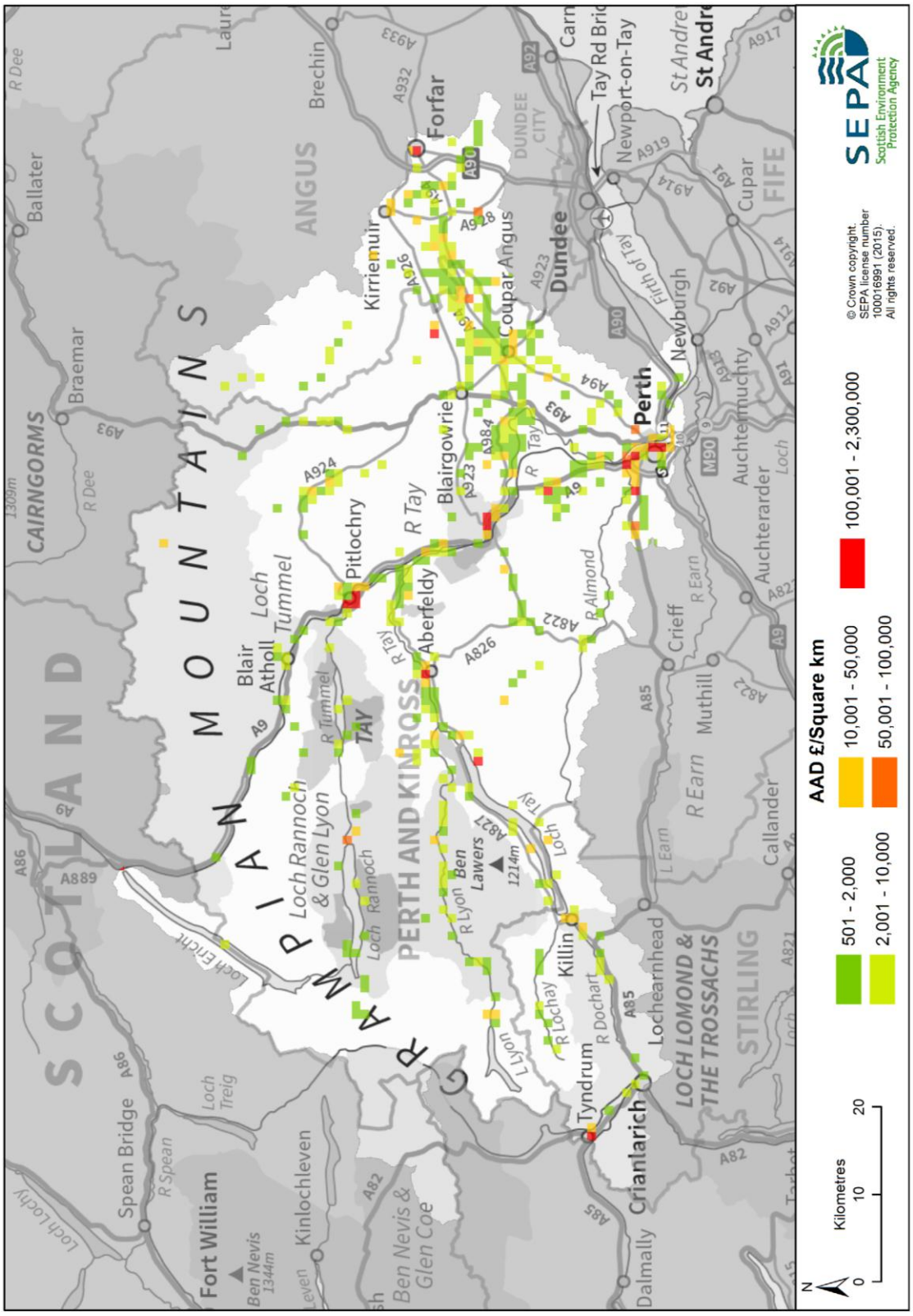

Figure 2: Annual Average Damages from river flooding

History of river flooding

The River Tay catchment has a long history of flooding. Areas often affected include Perth, Aberfeldy, Dunkeld and Pitlochry.

Perhaps the most significant River Tay flood is believed to have occurred in February 1814 where flood waters at Perth reached 7m above normal levels. Ice caused large blockages of bridges and widespread flooding to the Perth region. North and South Inch were submerged for two days.

A recent significant flood occurred on 13 December 2006 when the River Tay flooded numerous houses in Aberfeldy, Dunkeld, Logierait and Dalguise as well as isolated rural properties. The railway was also washed out at Dalguise.

More recently Alyth flooded after heavy rainfall on 17 July 2015 with over 50 properties in the Springbank Road area being evacuated. This rainfall event was widespread with properties in Prieston Road, Bankfoot also being flooded from the nearby Garry Burn.

The earliest flood on record occurred in October 1621 when the River Tay flooded after constant heavy rain over two days. There was an evacuation of numerous properties and severe damage to Milne's Bridge. Perth was surrounded by water up to six days after the event.

Further detail about the history of flooding in this area is available in the relevant Potentially Vulnerable Area chapters.

Managing flood risk

A range of public bodies have responsibility for managing flood risk in Scotland and they are working closer than ever before to target action in the areas where the greatest benefit can be gained. Members of the public also have a role to play and are the first line of defence against flooding by taking action to protect themselves and their property from flooding. Further information about roles and responsibilities is provided in Section 1.

This section describes the existing actions that are in place to manage flood risk and are in addition to the information presented in the relevant Potentially Vulnerable Area chapters.

Flood protection schemes

There are three flood protection schemes in this catchment to reduce the risk of river flooding:

- Kirriemuir (Gairie Burn) Flood Prevention Scheme
- Perth Flood Prevention Scheme
- Weem Flood Prevention Scheme.

Almondbank Flood Protection Scheme is currently under construction and due to be completed in early 2017.

River flood warning schemes

There are 23 river flood warning areas within this catchment as shown in Table 3 and Figure 3. Table 3 shows the total number of properties in the flood warning area and the percentage of those properties that have signed up to receive flood warnings. Please note that this is not the number of properties at risk of flooding.

Flood warning area (FWA)	River	Number of properties within FWA	% of properties registered January 2014
Aberbothrie	River Isla	15	53%
Aberfeldy	River Tay	114	36%
Almondbank	River Almond	141	57%
Ballinluig to Logierait	River Tay	33	48%
Basement Properties from North Inch to Friarton Bridge	River Tay	3,773	5%
Blairgowrie to the River Isla	River Ericht	26	58%
Boat of Murthly	River Tay	2	50%
Bridge of Ruthven to Leitfie	River Isla	11	73%
Caputh to Kinclaven	River Tay	75	59%
Dalguise	River Tay	46	52%
Dunkeld and Burnmouth Road	River Tay	102	30%
Glen Lyon	River Tay	7	100%
Inveralmond Industrial Estate	River Almond	241	27%
Kemphill to Bridge of Isla	River Isla	4	100%
Kenmore	River Tay	46	39%
Logierait to Victoria Bridge	River Tay	12	100%
Moulinearn	River Tay	8	50%
North Muirton Industrial Estate to North Inch	River Almond	1,525	26%
Pitlochry to Ballinluig	River Tay	8	88%
Stanley Mills	River Tay	39	36%
The River Isla at Coupar Angus	River Isla	5	40%
The River Tummel in Pitlochry	River Tummel	144	41%
Upper Tay	River Tay	56	59%

Table 3: River flood warning areas

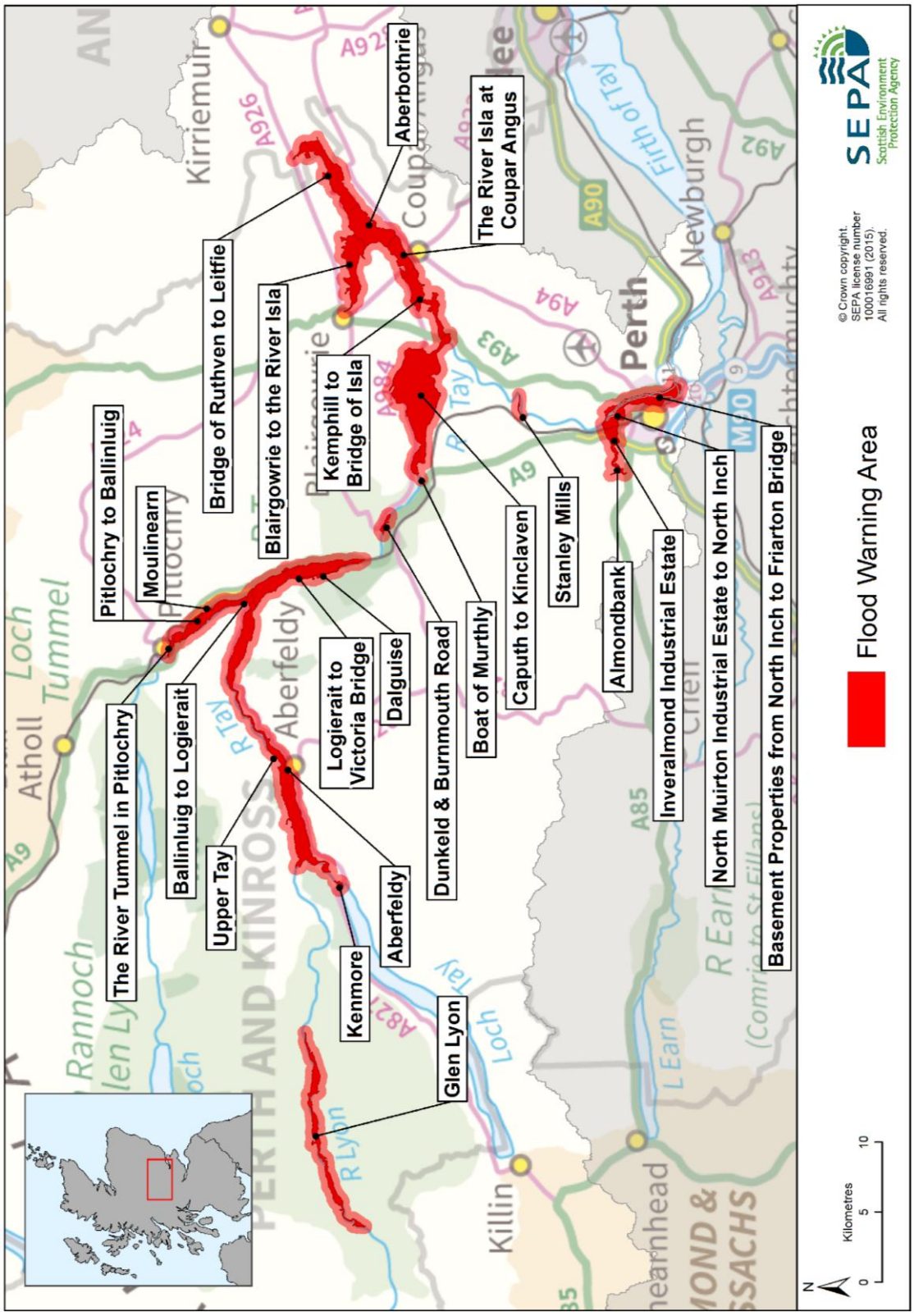

Figure 3: River flood warning areas

Community groups

The following community groups are known to operate within this catchment:

- Aberfeldy Resilience Group
- Perth Business Community Resilience Group.

Pitlochry, Blair Atholl and Kenmore are currently developing community resilience plans which consider flooding.

Property level protection

Each local authority has its own incentives or subsidies to help property owners with property level protection. Within the River Tay catchment, Perth and Kinross Council is piloting a project for flood protection products for properties in a number of flood risk areas.

Climate change and future flood risk

The UK Climate Projections (UKCP09) predicts that climate change may lead to warmer and drier summers, warmer and wetter winters with less snow, and more extreme temperature and rainfall. The predicted increase in rainfall and river flows may increase the potential for river flooding.

Under the UKCP09 high emissions scenario for 2080, average peak river flows for the River Tay catchment may increase by 35%[2]. This would potentially increase in the number of residential properties at risk of river flooding from approximately 1,400 to 3,600 and the number of non-residential properties from approximately 750 to 1,100.

The predicted increases in flood risk are solely based on the impact of a changing climate on the magnitude of flooding; they do not take into account any potential increase due to population change, development pressures or urban creep, nor do they take into account any mitigation as a result of actions contained in this or future Flood Risk Management Strategies.

Potential for natural flood management

The assessment of the potential for natural flood management is shown on SEPA's flood maps (http://www.sepa.org.uk/environment/water/flooding/flood-maps/). The maps indicate the potential for runoff reduction, floodplain storage and sediment management. They show areas where natural flood management could be effective and where further detailed assessment should take place. This information was used to identify where local authorities could include natural flood management as part of flood risk management schemes and studies. The proposed schemes and studies are listed in the relevant Potentially Vulnerable Area chapters of this document.

[2] From the study 'An assessment of the vulnerability of Scotland's river catchments and coasts to the impacts of climate change' (CEH, 2011)

Natural flood management initiatives are already underway in this catchment:

- River Mashie Scoping Study
- Lindores Loch Environmental Improvement Actions Plan
- Tay Priority Catchment
- Lead Burn Drain Measurements.

Runoff reduction

In the River Tay catchment, potential for runoff reduction is located in the upper reaches of tributaries and smaller catchments, in particular the River Garry and the Loch Earn catchment. This may benefit the Aberfeldy and Pitlochry Potentially Vulnerable Area (08/03) and the Luncarty, Stanley, Bankfoot, Dunkeld and Birnam Potentially Vulnerable Area (08/08).

Floodplain storage

A number of potential floodplain storage areas have been identified in eastern parts of the River Tay catchment. Floodplain storage may in particular benefit the Potentially Vulnerable Areas that include Alyth (08/04), Forfar (08/05) and Scone (08/11). The Gairie Burn at Kirriemuir and the Annaty Burn upstream of Scone may warrant further consideration for floodplain storage or floodplain woodland planting.

Sediment management

Areas of high deposition and erosion have been identified across the River Tay catchment. This may be attributed to natural processes as well as man-made channel modifications. In the east of the catchment, some watercourses have been modified which may contribute to the high deposition, potentially warranting further investigation.

River flooding
River Earn catchment

Catchment overview

The River Earn catchment is 973km^2. The main watercourses are River Earn, Water of Ruchill, Machanay Water and River Farg.

The catchment headwaters are very steep rising to 985m at Ben Vorlich. Land use within the low lying areas is dominated by intensive agriculture, including arable and horticulture. Higher up the catchment, arable is replaced with pasture and improved /acid grasslands. In the upper parts of the catchment dominant land cover is coniferous woodland.

The average annual rainfall for this catchment is low to average for Scotland, with 800mm-1000mm falling in the lower part of the Earn catchment, rising to 1500mm-2000mm in the upper catchment.

Flood risk in the catchment

Within the River Earn catchment approximately 630 residential properties and 100 non-residential properties are at risk of river flooding. It is estimated that 89% of these properties are located within Potentially Vulnerable Areas. There are four Potentially Vulnerable Areas at risk of river flooding in this catchment (Figure 1):

- Comrie (08/14)
- Forteviot (08/15)
- Dunning (08/16)
- Bridge of Earn (08/17).

Main areas at risk

The main areas at risk of river flooding can be seen in Table 1. The table shows the number of properties at risk and the Annual Average Damages caused by river flooding. This includes damages to residential and non-residential properties, transport and agriculture.

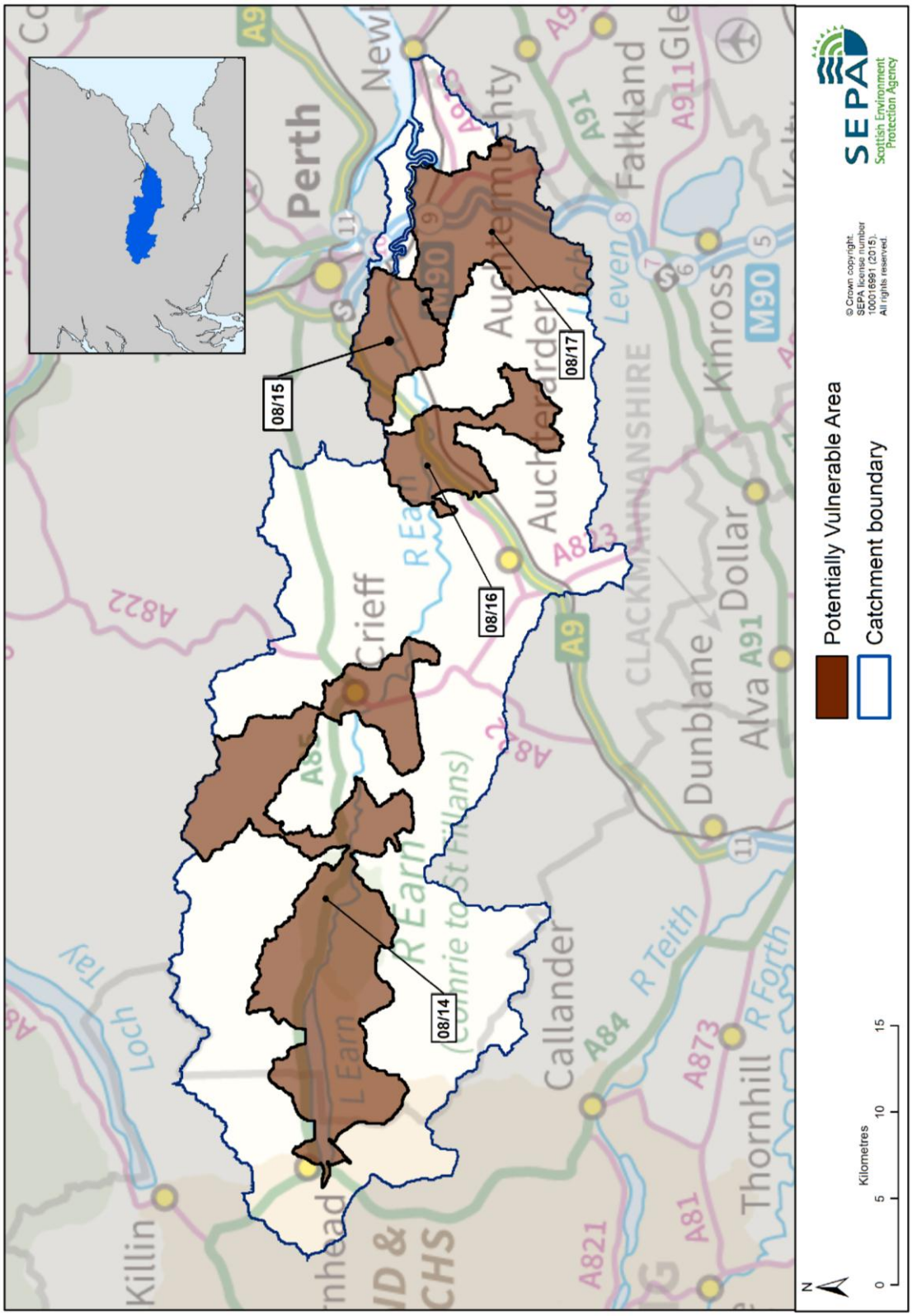

Figure 1: The River Earn catchment

	Residential and non-residential properties at risk of river flooding	Annual Average Damages
Comrie	410	£1.1 million
St Fillans	50	£310,000
Dunning	40	£100,000
Bridge of Earn	40	£240,000
Crieff	20	£22,000
Lochearnhead	10	£100,000
Auchterarder	<10	£17,000

Table 1: Main areas at risk of river flooding

Economic activity and infrastructure at risk

The Annual Average Damages caused by river flooding in the River Earn catchment are approximately £2.8 million. The damages are distributed as follows:

- 65% residential properties (£1.8 million)
- 17% non-residential properties (£480,000)
- 8% emergency services (£210,000)
- 4% roads (£120,000)
- 4% agriculture (£100,000)
- 2% vehicles (£70,000).

Figure 2 shows the Annual Average Damages from river flooding throughout the catchment. The highest damages can be seen around Comrie due to the high density of residential properties at risk of flooding from the River Earn.

Table 2 shows further information about infrastructure and agricultural land at risk of flooding within this catchment.

	Number at risk	Further detail
Community facilities	<10	Includes: educational buildings, healthcare facilities and emergency services
Utility assets	10	Includes: electricity substations and telephone exchanges
Roads (excluding minor roads)	16	1 M road (M90) at 8 locations 8 A roads at 101 locations 7 B roads at 29 locations
Railway routes	2	Dundee to Dunblane (14 locations at risk) Perth to Thornton junctions (6 locations at risk)
Agricultural land (km²)	42.2	

Table 2: Infrastructure and agricultural land at risk of river flooding

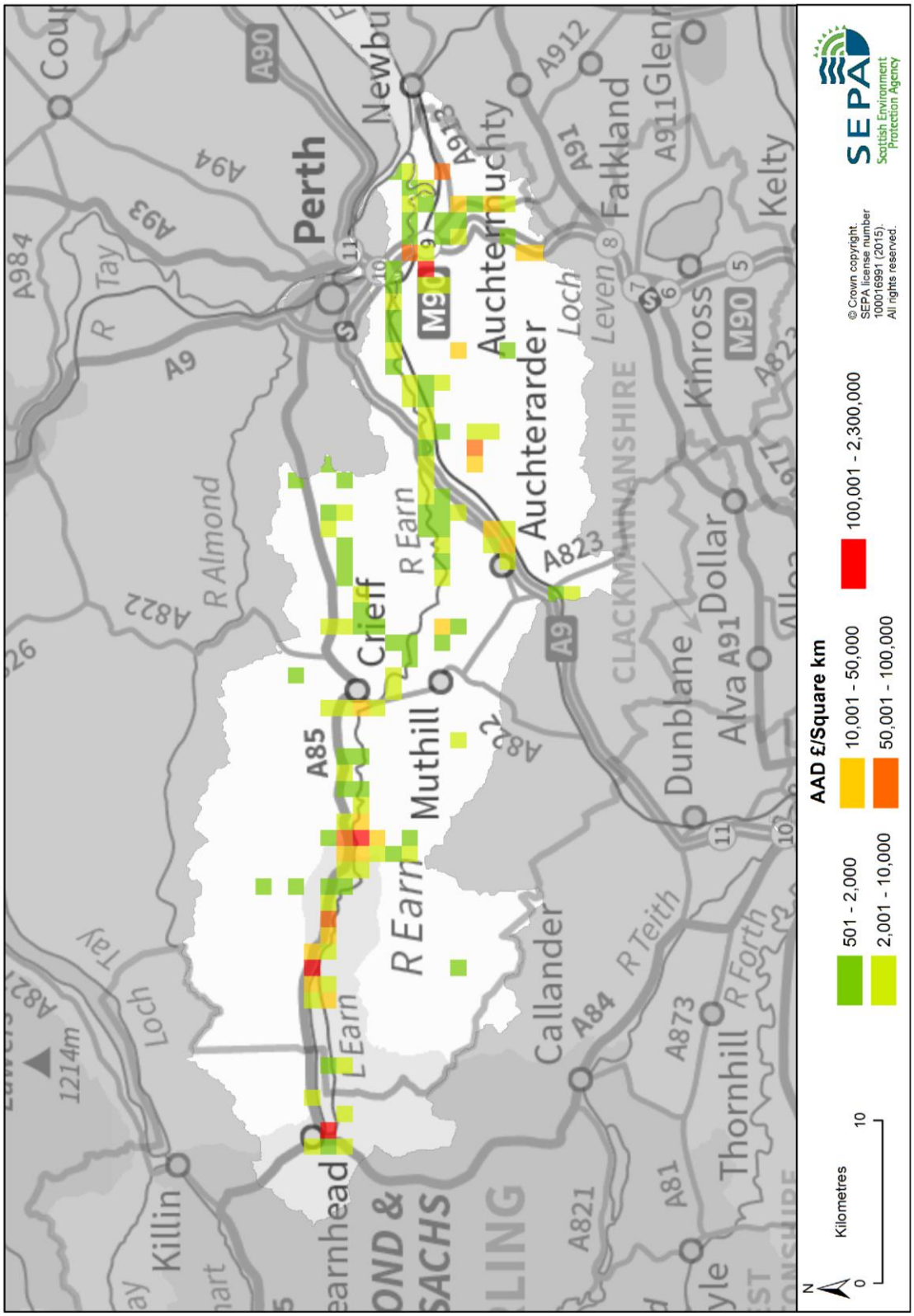

Figure 2: Annual Average Damages from river flooding

Designated environmental and cultural heritage sites at risk

Within the catchment there are approximately 36 designated cultural heritage sites at risk of river flooding. These sites include scheduled monuments, gardens and designed landscapes, battlefield sites and listed buildings.

Approximately 19 environmental designated areas have a risk of river flooding. This includes three Special Areas of Conservation, a Special Protection Area and 15 Sites of Special Scientific Interest. This includes South Tayside Goose Roosts, Methven Moss and Upper Strathearn Oakwoods.

Part of the River Earn catchment lies within the boundary of the Loch Lomond and the Trossachs National Park. The National Park is recognised for the outstanding national importance of its natural and cultural heritage and some of these features may be at risk of flooding.

History of river flooding

The River Earn catchment has a long history of flooding. The most frequent floods have been recorded in the towns of Dalginross and Comrie.

The highest river level recorded at the SEPA's Dalginross gauging station on the River Earn was in January 1993, where the river levels reached 3.58m. This flood was perhaps the biggest on record in this catchment with hundreds of properties flooded in Perth and Kinross and the surrounding areas. The flood caused over £20 million of damage.

A recent flood recorded in the River Earn catchment occurred on 19 November 2012 when around 150 properties flooded in Dalginross from the Water of Ruchill and 200 people were evacuated from their homes. This followed a flood on 27 August 2012 when around 60 properties flooded in the same location.

The earliest flood on record dates back to 17 March 1903 when a large stretch of embankment was washed away by flooding at New Comrie, seriously affecting railway infrastructure and causing major disruption to traffic.

Further detail about the history of flooding in this area is available in the relevant Potentially Vulnerable Area chapters.

Managing flood risk

A range of public bodies have responsibility for managing flood risk in Scotland and they are working closer than ever before to target action in the areas where the greatest benefit can be gained. Members of the public also have a role to play and are the first line of defence against flooding by taking action to protect themselves and their property from flooding. Further information about roles and responsibilities is provided in Section 1.

This section describes the existing actions that are in place to manage flood risk and are in addition to the information presented in the relevant Potentially Vulnerable Area chapters.

Flood protection schemes

There are two flood protection schemes that reduce the risk of river flooding:

- Bridge of Earn Flood Protection Scheme
- Water of Ruchill Flood Protection Scheme.

River flood warning schemes

There are six river flood warning areas within this catchment as shown in Table 3 and Figure 3. Table 3 shows the total number of properties in the flood warning area and the percentage of those properties that have signed up to receive flood warnings. Please note that this is not the number of properties at risk of flooding.

Flood warning area (FWA)	River	Number of properties within FWA	% of properties registered July 2014
Bridge of Earn	River Earn	238	36%
Bridge of Earn to the River Tay	River Earn	30	77%
Carse of Lennoch to Lochlane	River Earn	7	100%
Comrie	River Earn and Water of Ruchill	551	35%
Crieff to Innerpeffray	River Earn	73	40%
Innerpeffray to Bridge of Earn	River Earn	27	96%

Table 3: River flood warning areas

Awareness raising campaigns and community groups

Comrie Resilience Group is active within this catchment. The community in Glenfarg is also developing a community resilience plan which will consider flooding.

Property level protection

Each local authority has its own incentives or subsidies to help property owners with property level protection. Perth and Kinross Council is piloting a project for flood protection products for properties in a number of flood risk areas.

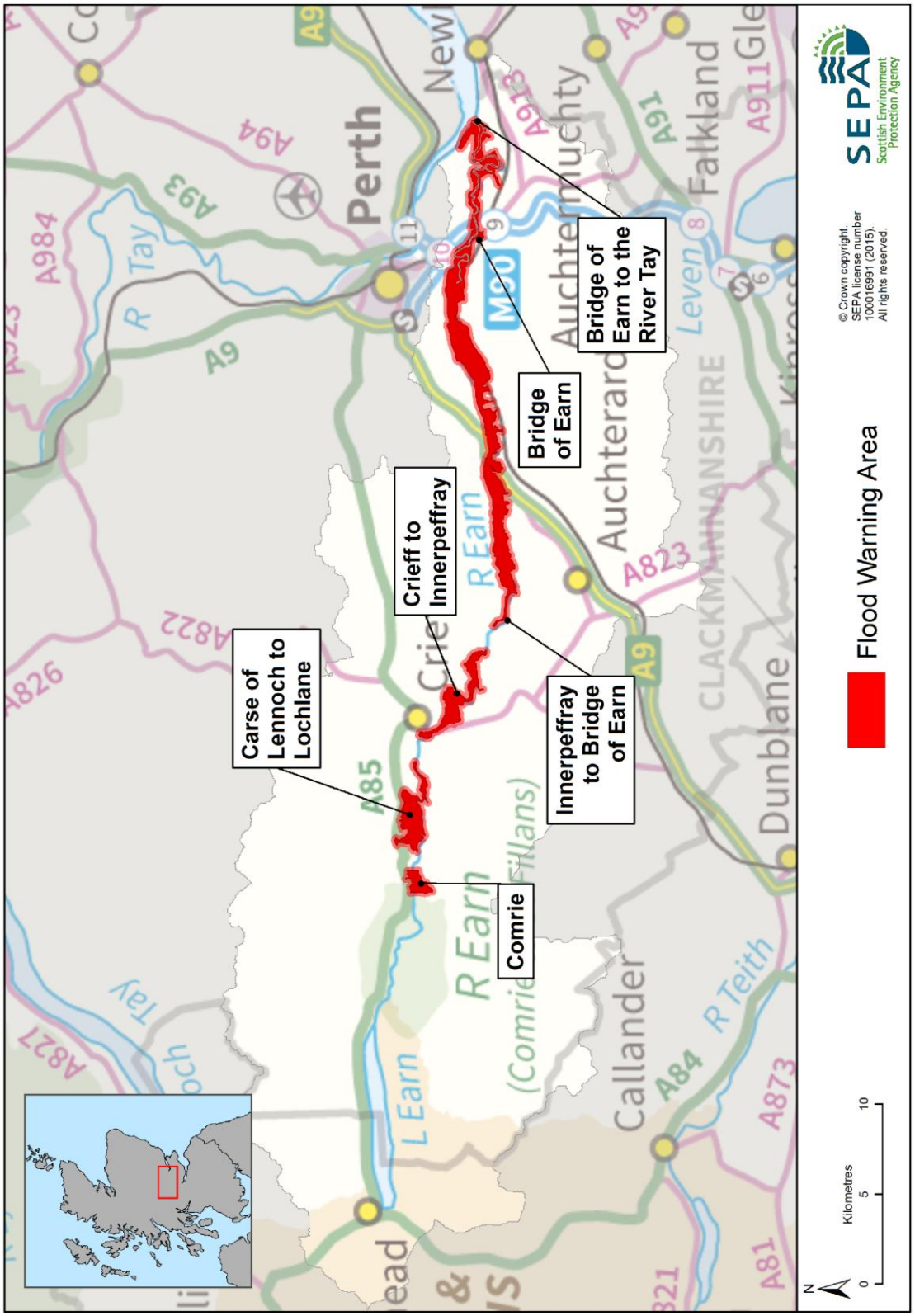

Figure 3: Flood warning areas

Climate change and future flood risk

The UK Climate Projections (UKCP09) predicts that climate change may lead to warmer and drier summers, warmer and wetter winters with less snow, and more extreme temperature and rainfall. The predicted increase in rainfall and river flows may increase the potential for river flooding.

Under the UKCP09 high emissions scenario for 2080, average peak river flows for the River Earn catchment may increase by 35%[1]. This would potentially increase in the number of residential properties at risk of river flooding from approximately 630 to 1,100 and the number of non-residential properties from approximately 100 to 150.

The predicted increases in flood risk are solely based on the impact of a changing climate on the magnitude of flooding; they do not take into account any potential increase due to population change, development pressures or urban creep, nor do they take into account any mitigation as a result of actions contained in this or future Flood Risk Management Strategies.

Potential for natural flood management

The assessment of the potential for natural flood management is shown on SEPA's flood maps (http://www.sepa.org.uk/environment/water/flooding/flood-maps/). The maps indicate the potential for runoff reduction, floodplain storage and sediment management. They show areas where natural flood management could be effective and where further detailed assessment should take place. This information was used to identify where local authorities could include natural flood management as part of flood risk management schemes and studies. The proposed schemes and studies are listed in the relevant Potentially Vulnerable Area chapters.

Runoff reduction

The highest potential for runoff reduction is located in the west and the north parts of the catchment. Actions to reduce runoff may benefit Comrie Potentially Vulnerable Area (08/14).

Floodplain storage

The River Earn catchment shows good potential for floodplain storage with areas identified along the whole length of the catchment. In particular it is worth noting the storage potential upstream of Comrie Potentially Vulnerable Area (08/14). Loch Earn, the Pow Water and the surrounding area also have good potential for floodplain storage.

Sediment management

Areas of erosion and deposition occur along the entire length of the River Earn. Much of this will be attributable to natural processes. However, some reaches of the river Earn and its tributaries have been modified by human activity and show high erosion and deposition. These reaches may benefit from natural flood management actions to manage sedimentation, such as improvement of bankside vegetation.

[1] An assessment of the vulnerability of Scotland's river catchments and coasts to the impacts of climate change (CEH, 2011)

3.3 Coastal flooding

Tay Local Plan District

This chapter provides supplementary information on flooding for coastal areas. It provides an overview of the natural characteristics of the coast, a summary of flood risk within the coastal area and a brief history of flooding. It also outlines the likely impact of climate change and the potential for natural flood management.

Information about the objectives and actions to manage flood risk are provided in Section 2.

Coastal overview

The coastal area of the Tay Local Plan District is around 74km in length. It incorporates the lower reaches of the River Tay and River Earn and includes the inner Firth of Tay.

The main area affected by coastal flooding is the city of Perth where the River Tay and the River Earn meet the Tay Estuary.

The interaction between coastal and river flooding is important in this area. Coastal flooding along the inner Firth of Tay is less influenced by waves due to the sheltering effects of the estuary but is still influenced by storm surges.

Flood risk

Within the Tay Local Plan District approximately 190 residential properties and 70 non-residential properties are at risk of coastal flooding. It is estimated that 97% of these properties are located within Potentially Vulnerable Areas. There are four Potentially Vulnerable Areas in this Local Plan District that are a risk of coastal flooding (Figure 1):

- Perth to Kinfauns (08/12)
- Perth centre (08/13)
- Forteviot (08/15)
- Bridge of Earn (08/17).

Main areas at risk

Perth is the main area that has been identified at risk of coastal flooding, where approximately 230 residential and non-residential properties are at risk of coastal flooding with Annual Average Damages estimated at £350,000. This includes damages to residential and non-residential properties, transport and agriculture.

Figure 2 shows the distribution of Annual Average Damages throughout this Local Plan District.

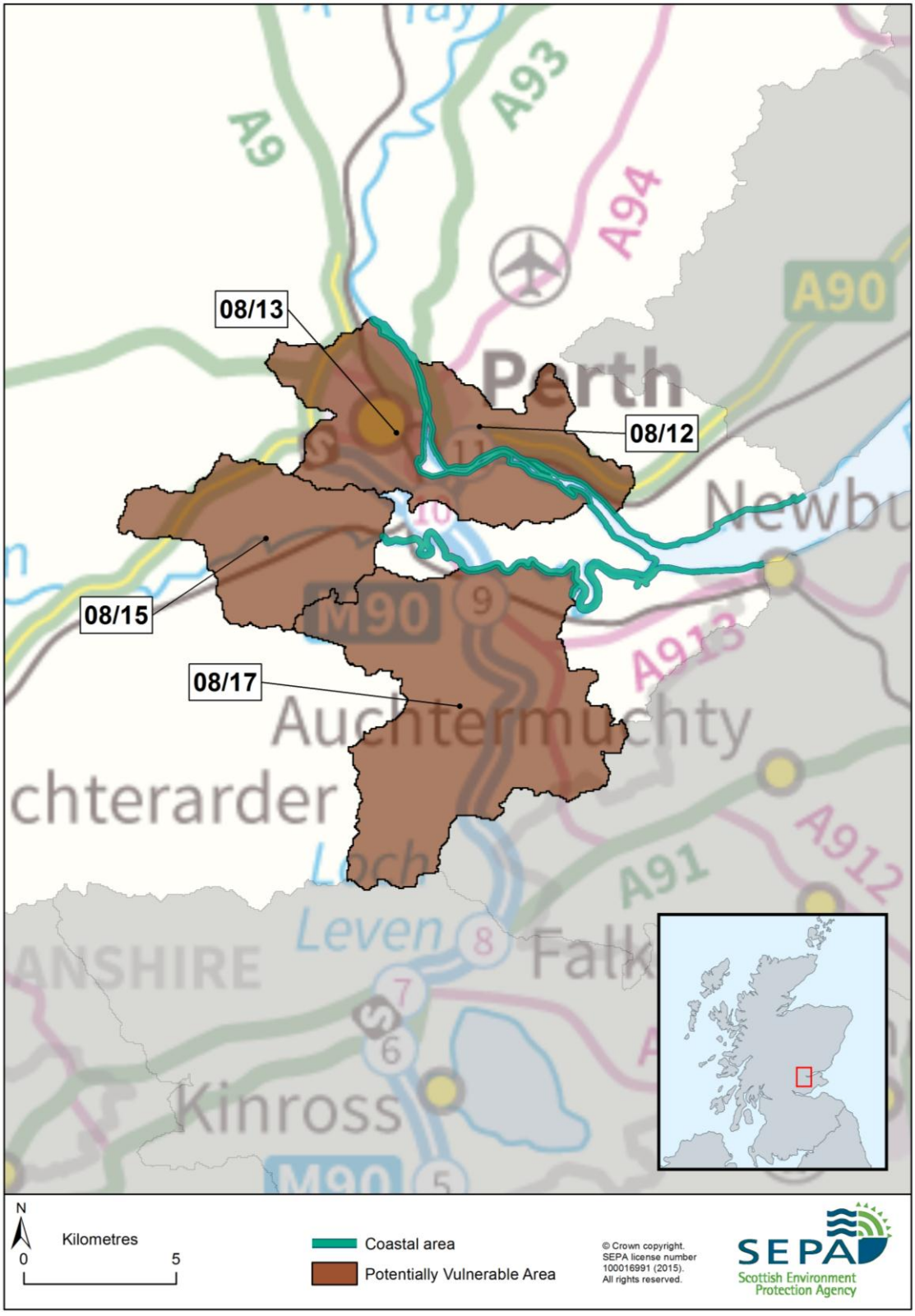

Figure 1: Tay Local Plan District coastal area and Potentially Vulnerable Areas with a coastal flood risk

Economic activity and infrastructure at risk

The Annual Average Damages caused by coastal flooding across the whole Tay coastal area are approximately £550,000. The damages are distributed as follows:

- 42% non-residential properties (£230,000)
- 40% residential properties (£220,000)
- 7% roads (£42,000)
- 6% emergency services (£32,000)
- 4% agriculture (£20,000)
- 1% vehicles (£6,000).

Figure 2 shows the Annual Average Damages throughout the coastal area. The highest damages can be seen to residential properties in Perth. This is followed by damages to industrial units along the southern bank of the estuary of Perth and around Perth Harbour.

Table 1 shows further information about infrastructure and agricultural land at risk of coastal flooding.

	Number at risk	Further detail
Community facilities	<10	Includes educational buildings
Utility assets	<10	Includes electricity substations
Roads (excluding minor roads)	6	1 M road (M90) at 10 locations 5 A roads at 17 locations
Railway routes	2	Perth to Ladybank (2 locations at risk) Dundee to Dunblane (16 locations at risk)
Agricultural land (km²)	6.9	

Table 1: Infrastructure and agricultural land at risk of coastal flooding

Designated environmental and cultural heritage sites at risk

Within the catchment it is estimated there are approximately eight designated cultural heritage sites at risk of river flooding. These sites include scheduled monuments, battlefield sites and listed buildings.

It is estimated that five environmental designated areas are at risk of coastal flooding. These include two Special Areas of Conservation, one Special Protection Area and two Sites of Special Scientific Interest, notably the Firth of Tay and Eden Estuary.

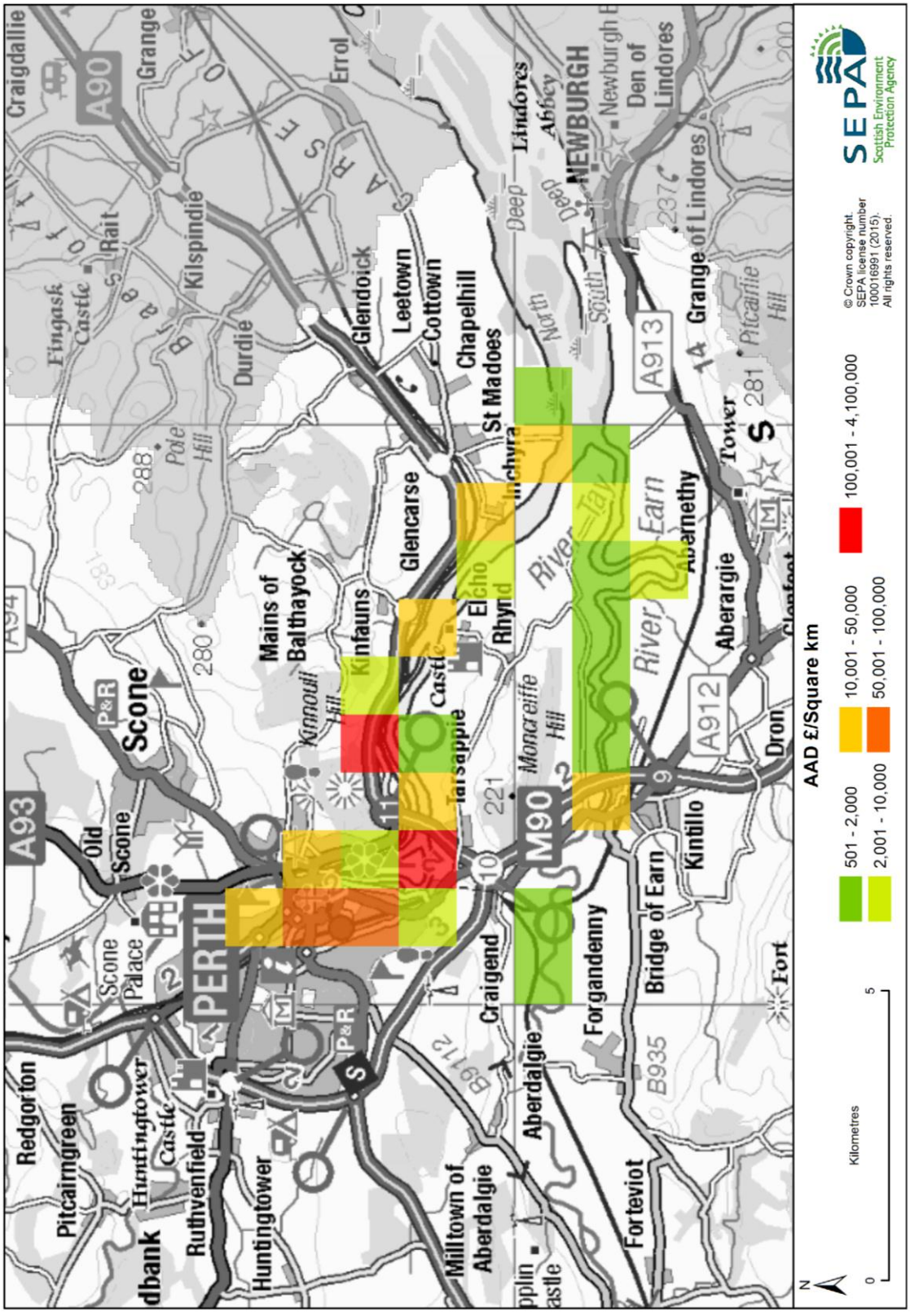

Figure 2: Annual Average Damages from coastal flooding

History of coastal flooding

No significant coastal floods have been identified in the Inner Tay Estuary. However, a number of river flooding events have occurred which may have had tidal influences. Further detail is available in the relevant Potentially Vulnerable Area chapters in Section 2.

Managing flood risk

A range of public bodies have responsibility for managing flood risk in Scotland and they are working closer than ever before to target action in the areas where the greatest benefit can be gained. Members of the public also have a role to play and are the first line of defence against flooding by taking action to protect themselves and their property from flooding. Further information about roles and responsibilities is provided in Section 1.

This section describes the existing actions that are in place to manage flood risk and are in addition to the information presented in the relevant Potentially Vulnerable Area chapters.

Flood protection schemes

There are no formal coastal flood protection schemes in this area. However, the Perth Flood Protection Scheme and the Bridge of Earn Flood Protection Scheme may contain elements that reduce the risk of coastal flooding.

Coastal flood warning schemes

There are no coastal flood warning areas in this area but river flood warning areas around Perth take into account coastal and tidal data.

Community groups

The following community groups are known to operate within this coastal area:

- Carse of Gowrie Sustainability Group
- Perth Business Community Resilience Group.

Perth and Kinross Council is part of a wider community resilience group which works with various communities in its local authority area.

Property level protection

Each local authority has its own incentives or subsidies to help property owners with property level protection:

- Fife Council installed flood pods, which contain flood protection products, close to areas containing properties at risk of flooding.

Climate change and future flood risk

UK Climate Projections (UKCP09) predicts that climate change may increase sea levels. The magnitude of sea level rise varies around the coastline.

For the UKCP09 high emissions scenario, the predicted average sea level increase for the inner Firth of Tay is 0.48m by 2080. This may increase the number of residential properties at risk from coastal flooding from approximately 190 to 460 and the number of non-residential from approximately 70 to 260. Coastal flood modelling by SEPA has not taken into account the impacts of a future climate on wave overtopping or storminess, which could increase the number of people affected by coastal flooding.

The predicted increases in flood risk are solely based on the impact of a changing climate on the magnitude of flooding; they do not take into account any potential increase due to population change, development pressures or urban creep, nor do they take into account any mitigation as a result of actions contained in this or future Flood Risk Management Strategies.

Potential for natural flood management

The assessment of the potential for natural flood management is shown on SEPA's flood maps (http://www.sepa.org.uk/environment/water/flooding/flood-maps/). The maps indicate the potential for wave attenuation and estuarine surge attenuation. They show areas where natural flood management could be effective and where further detailed assessment should take place.

This information was used to identify where local authorities could include natural flood management as part of flood risk management schemes and studies. The proposed schemes and studies are listed in the relevant Potentially Vulnerable Area chapters in Section 2 of this document.

Wave energy

In the Tay Local Plan District there are sites with medium potential for estuarine surge attenuation located at the mouth of the River Earn. However, these sites are mostly located outside Potentially Vulnerable Areas.

3.4 Surface water flooding

Tay Local Plan District

This chapter provides supplementary information on surface water flooding across the Local Plan District. It provides an overview of the main areas at risk and the history of surface water flooding. The predicted impacts on infrastructure are also identified. The impacts on environmental sites and agricultural land have not been assessed.

Information about the objectives and actions to manage flood risk are provided in Section 2.

Flood risk

Within the Tay Local Plan District approximately 380 residential properties and 560 non-residential properties are at risk of surface water flooding. It is estimated that 87% of these properties are located within Potentially Vulnerable Areas.

Main areas at risk

The main areas at risk of surface water flooding can be seen in Table 1, which shows the number of properties at risk and the Annual Average Damages caused by surface water flooding. The damages include impacts to residential and non-residential properties, vehicles, emergency services and roads.

	Residential and non-residential properties at risk of surface water flooding	Annual Average Damages
Perth	270	£300,000
Forfar	120	£160,000
Blairgowrie	90	£86,000
Scone	60	£110,000
Comrie	40	£53,000
Crieff	20	£30,000
Kirriemuir	10	£29,000

Table 1: Main areas at risk of surface water flooding

Economic activity and infrastructure at risk

The Annual Average Damages caused by surface water flooding in the Tay Local Plan District are approximately £1.9 million. The damages are distributed as follows:

- 44% roads (£810,000)
- 34% non-residential properties (£640,000)
- 19% residential properties (£345,000)
- 3% emergency services (£55,000)
- 1% vehicles (£6,000).

Of the economic damages assessed, the highest proportion is from damages to roads, with the A90 and A9 particularly affected. Figure 1 shows the distribution of Annual Average Damages throughout the Tay Local Plan District. The highest damages can be seen around Perth due to the higher number of residential properties, commercial properties and community facilities.

Table 2 shows the approximate numbers of further infrastructure assets which are at risk of flooding within this catchment.

	Number at risk	Further detail
Community facilities	<10	Includes: educational buildings and emergency services
Utility assets	50	Includes: electricity substations, fuel extraction sites and telephone exchanges
Roads (excluding minor roads)	50	1 M road (M90) at 30 locations 21 A roads at 560 locations 28 B roads at 210 locations
Railway routes	5	Dundee to Dunblane (40 locations at risk) Glasgow Queen Street to Mallaig (10 locations at risk) Glasgow Queen Street to Oban (10 locations at risk) Perth to Inverness (80 locations at risk)

Table 2: Infrastructure at risk of surface water flooding

Designated environmental and cultural heritage sites at risk

Within the Local Plan District it is estimated that approximately 135 designated cultural heritage sites are at risk of surface water flooding. These sites include scheduled monuments, gardens and designed landscapes, battlefield sites and listed buildings.

The impact of surface water flooding on environmental sites has not been assessed and is assumed to be relatively low.

History of surface water flooding

Two surface water flood events have been recorded as significant in this Local Plan District.

Heavy rain caused surface water flooding in Perth on 16 July 2011, with homes and businesses affected. Extensive surface water flooding around Perth on 21 July 2010 affected properties and roads.

Further detail about the history of flooding is available in the relevant Potentially Vulnerable Area chapters in Section 2.

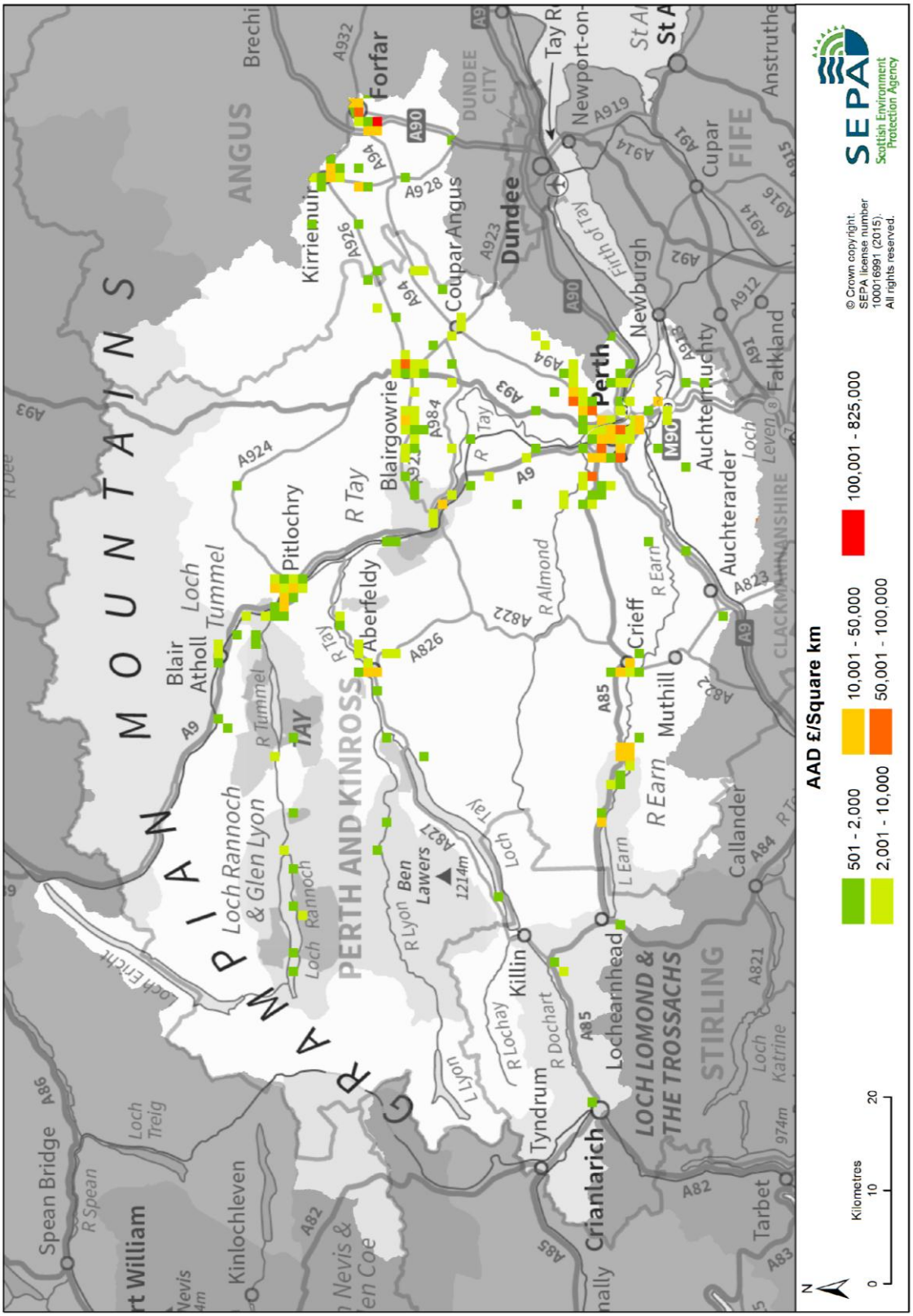

Figure 1: Average Annual Damages from surface water flooding

Managing flood risk

Surface water management priority areas

The areas at highest risk from surface water flooding have been prioritised. These priority areas were identified using SEPA flood models, supplemented with historical flood information and, where available, more detailed modelling from local authorities. These priority areas require the preparation of surface water management plans, the details of which can be found in Section 2.

A range of public bodies have responsibility for managing flood risk in Scotland and they are working closer than ever before to target action in the areas where the greatest benefit can be gained. Members of the public also have a role to play and are the first line of defence against flooding by taking action to protect themselves and their property from flooding. Further information about roles and responsibilities is provided in Section 1.

Flood protection schemes

There are three formal flood protection schemes which have aspects that contribute to the management of surface water flooding in the Local Plan District:

- Perth Flood Protection Scheme;
- Weem Flood Protection Scheme;
- Kirriemuir Flood Protection Scheme.

Community groups

The following community groups are also known to operate within the Tay Local Plan District:

- Aberfeldy Resilience Group;
- Comrie Resilience Group;
- Perth Business Community Resilience Group;
- Pitlochry, Blair Atholl, Glenfarg and Kenmore are at different stages of developing community resilience plans, which include flooding;
- Perth and Kinross Council is also part of a wider community resilience group which works with various communities within the local authority area.

Property level protection

Each local authority has its own incentives or subsidies to help property owners with property level protection. In this Local Plan District:

- Fife Council provides Aquasacs for use in emergencies and these area available from stores throughout Fife;
- Perth and Kinross Council is currently working towards introducing a pilot project for flood protection products for properties in a number of flood risk areas.

Climate change and future flood risk

UK Climate Projections (UKCP09) predicts that climate change may lead to warmer and drier summers, warmer and wetter winters with less snow, and more extreme temperature and rainfall. The surface water modelling undertaken considered climate change scenarios with a 20% increase in rainfall intensity.

Under these conditions it is estimated that the number of residential properties at risk of surface water flooding may increase from approximately 390 to 550 and the number of non-residential properties from approximately 560 to 710.

The predicted increases in flood risk are solely based on the impact of a changing climate on the magnitude of flooding; they do not take into account any potential increase due to population change, development pressures or urban creep, nor do they take into account any mitigation as a result of actions contained in this or future Flood Risk Management Strategies.

Annex 1: Glossary

Term	Definition
Accretion	Accumulation of sediment.
Actions	Actions describe where and how flood risk will be managed. These actions have been set by SEPA and agreed with flood risk management authorities following consultation. Selection of actions to deliver the agreed objectives has been based on a detailed assessment and comparison of economic, social and environmental criteria.
Annual Average Damages (AAD)	Depending on its size or severity each flood will cause a different amount of damage to a given area. Annual Average Damages are the theoretical average economic damages caused by flooding when considered over a very long period of time. It does not mean that damage will occur every year: in many years there will be no damages, in some years minor damages and in a few years major damages may occur. High likelihood events, which occur more regularly, contribute proportionally more to AADs than rarer events. Within the Flood Risk Management Strategies AADs incorporate economic damages to the following receptors: residential properties, non-residential properties, vehicles, emergency services, agriculture and roads. They have been calculated based on the principles set out in the Flood Hazard Research Centre Multi-Coloured Handbook (2010).
Appraisal	Appraisal is the process of defining objectives, examining options and weighing up the costs, benefits, risks and uncertainties before a decision is made. The FRM Strategy appraisal method is designed to set objectives and identify the most sustainable combination of actions to tackle flooding from rivers, sea and surface water.
Appraisal baseline	Defines the existing level of flood risk under the current flood risk management regime.
Awareness raising	Public awareness, participation and community support are essential components of sustainable flood risk management. SEPA and the responsible authorities have a duty to raise public awareness of flood risk. This is undertaken both individually and collaboratively by a range of organisations. Improved awareness of flood risk and actions that prepare individuals, homes and businesses for flooding can reduce the overall impact.
Bathing waters	Bathing waters are classed as protected areas under Annex IV of the Water Framework Directive (WFD). There are 84 designated bathing waters in Scotland. [i]
Benefit cost ratio (BCR)	A benefit cost ratio summarises the overall value for money of an action or project. It is expressed as the ratio of benefits to costs (both expressed as present value monetary values). A ratio of greater than 1:1 indicates that the economic benefits associated with an action are greater than the economic costs of implementation; therefore this is taken as the threshold of economic viability. It should be acknowledged that it is not always possible to accurately estimate economic values for all elements of benefit, and BCR is just one a number of techniques used in appraisal.
Blue infrastructure	Blue infrastructure is often complementary to 'green infrastructure' and includes sustainable drainage systems, swales (shallow, broad and vegetated channels designed to store and/or convey runoff and remove pollutants[ii]), wetlands, rivers, canals (and their banks) and other watercourses[iii]
Candidate Potentially Vulnerable Area (PVAc)	Candidate PVAs are those areas identified after the National Flood Risk Assessment (2011), as a result of new information, where the impact of flooding is potentially sufficient to justify further assessment and appraisal. They will be considered for inclusion as new PVAs in the next flood risk management planning cycle.
Catchment	All the land drained by a river and its tributaries.

Term	Definition
Category 1 and 2 Responders (Cat 1 / 2)	Category 1 and 2 Responders are defined as part of the Civil Contingencies Act 2004 which seeks to minimise disruption in the event of an emergency. Category 1 Responders are 'core' responders: local authorities, police, fire and rescue services, ambulance service, NHS health boards, SEPA and the Maritime and Coastguard Agency. Category 2 Responders are key co-operating responders in support of Category 1 Responders. These include gas and electricity companies, rail and air transport operators, harbour authorities, telecommunications providers, Scottish Water, the Health and Safety Executive and NHS National Services Scotland[iv].
Channel improvement	Where work has been carried out on a river channel allowing an increase in the volume of water it can carry.
Characterisation	Provides a description of the natural characteristics of catchments, coastlines and urban areas in terms of hydrology, geomorphology, topography and land use. It also includes the characterisation of existing levels of flood risk and existing flood risk management activity.
Coastal flooding	Flooding that results from high sea levels or a combination of high sea levels and stormy conditions. The term coastal flooding is used under the Flood Risk Management (Scotland) Act 2009, but in some areas it is also referred to as tidal flooding and covers areas such as estuaries and river channels that are influenced by tidal flows.
Combined sewer	Combined sewers transport sewage from homes and industry as well as carrying surface water runoff from gutters, drains and some highways. Heavy or prolonged rainfall can rapidly increase the flow in a combined sewer until the amount of water exceeds sewer capacity.
Combined sewer (overflow) (CSO)	Combined sewer overflows are purposely designed structures to ensure any excess water from sewerage systems is discharged in a controlled way and at a specific managed location.
Community facility	Within the FRM Strategies this term includes: Emergency Services (Police, Fire, Ambulance, Coastguard, Mountain Rescue) Educational Buildings (crèche, nursery, primary, secondary, further, higher and special education premises) Healthcare facilities: hospitals, health centres and residential care homes
Community flood action groups	Community flood action groups are community based resilience groups which, on behalf of local residents and business, help to prepare for and minimise the effects of flooding. They reflect the interests of their local communities and may differ in composition and remit. There are over 60 groups already established in Scotland. The Scottish Flood Forum provides support for both new and existing groups.
Confluence	Where two or more rivers meet.
Conveyance	Conveyance is a measure of the carrying capacity of a watercourse. Increasing conveyance enables flow to pass more rapidly and reducing conveyance slows flow down. Both actions can be effective in managing flood risk depending on local conditions.
Cultural heritage site	Historic Environment Scotland maintains lists of buildings of special architectural or historic interest; these buildings are referred to as 'listed buildings'. The highest level of designation is a World Heritage Site. Other designations included in this assessment are scheduled monuments, gardens and designed landscapes, and battlefields.
Culvert	A pipe, channel or tunnel used for the conveyance of a watercourse or surface drainage water under a road, railway, canal or other obstacle.
Damages	Flood damages are categorised as direct or indirect i.e. as a result of the flood water itself, or subsequent knock on effects. Damage to buildings and contents caused by flood water are an example of direct damages, whilst loss of industrial production, travel disruption or stress and anxiety are indirect. Some damages can be quantified in monetary terms, and others can only be described.

Term	Definition
	The potential damages avoided by implementation of a flood risk management action are commonly referred to as the benefits of that action. When comparing the effectiveness of different actions, it is useful to consider estimated damages and damages avoided across the lifespan of the action. Within the FRM Strategies, a 100 year appraisal period has been used as standard. This allows costs, damages and benefits across this time frame to be compared in present value terms. See also 'Annual Average Damages'
Demountable defences	A temporary flood barrier is one that is only installed when the need arises, that is, when flooding is forecast. A demountable flood defence is a particular type of temporary defence that requires built-in parts and therefore can only be deployed in one specific location.[v]
Deposition	A natural process leading to an accumulation of sediment on a river bed, floodplain or coastline.
Economic impact	An assessment of the economic value of the positive and negative effects of flooding and / or the actions taken to manage floods.
Embankment	Flood embankments are engineered earthfill structures designed to contain high river levels or protect against coastal flooding. They are commonly grass-covered, but may need additional protection against erosion by swiftly flowing water, waves or overtopping.
Emergency plans / response	Emergency response plans are applicable for all types of flooding. They set out the steps to be taken during flooding in order to maximise safety and minimise impacts where possible. Under the Civil Contingencies Act, Category 1 Responders have a duty to maintain emergency plans. Emergency plans may also be prepared by individuals, businesses, organisations or communities.
Environmental impact	A change in the environment as a result of an action or activity. Impacts can be positive or negative and may vary in significance, scale and duration.
Environmental Impact Assessment (EIA)	Environmental Impact Assessment (EIA) is a process which identifies the potential environmental impacts, both negative and positive, of a proposal.
Environmental sites / environmental designated areas/ environmentally designated sites	Areas formally designated for environmental importance, such as Sites of Special Scientific Interest (SSSI), Special Protection Area (SPA) or Special Areas of Conservation (SAC).
Episodic erosion	Erosion induced by a single event, such as a storm.
Erosion	A natural process leading to the removal of sediment from a river bed, bank or floodplain or coastline.
Estuarine surge attenuation	A reduction in the wave energy caused by storm surge. Breakwaters (barriers built out into the sea to protect a coast or harbour from the force of waves) or habitats such as saltmarsh can slow down and reduce the inland impact of storm surges (the rising of the sea due to wind and atmospheric pressure changes associated with storms), thereby reducing coastal flood risk.
Estuary	A coastal body of water usually found where a river meets the sea; the part of the river that is affected by tides.
Fault (fault line)	A break or fracture in the earth's crust as a result of the displacement of one side with respect to the other. In Scotland the Great Glen Fault is a major geological fault line cutting diagonally across the Highlands from Fort William to Inverness.
Flash flood	A flood that occurs a short period of time after high intensity rainfall or a sudden snow melt. A sudden increase in the level and velocity of the water body is often characteristic of these events, leaving a short time for warning or actions.
Flashy watercourse	A 'flashy' river or watercourse has a short lag time (the delay between peak rainfall intensity and peak river discharge), high peak discharge, and quickly returns to average flow. Rivers with these characteristics

Term	Definition
	can be prone to flooding and leave a short time for warning or actions.
Flood	In the terms of the FRM Act, 'flood' means a temporary covering by water, from any source, of land not normally covered by water. This does not include a flood solely from a sewerage system, as a result of normal weather or infrastructure drainage. A flood can cause significant adverse impacts on people, property and the environment. drainage.
Flood bund	A constructed retaining wall, embankment or dyke designed to protect against flooding to a specified standard of protection.
Flood defence	Infrastructure, such as flood walls, embankments or flood storage intended to protect an area against flooding to a specified standard of protection.
Flood extent	The area that has been affected by flooding, or is at risk of flooding fror one or more sources for a particular likelihood.
Flood forecasting	SEPA operates a network of over 250 rainfall, river and coastal monitoring stations throughout Scotland that generate data 24 hours a day. This hydrological information is combined with meteorological information from the Met Office. A team of experts then predict the likelihood and timing of river, coastal and surface water flooding. This joint initiative between SEPA and the Met Office forms the Scottish Flood Forecasting Service.
Flood frequency	The probability that a particular size/severity of flood will occur in a given year (see likelihood).
Flood gate	An adjustable, sometimes temporary, barrier used as a flood defence to control the flow of water within a water system or during a flood. Flood gates can also be part of operational flood defences or protect individual buildings or sites.
Flood guard	Flood guards cover a variety of types of door and window barriers that can be fitted to individual properties and operated by the owners / occupiers prior to a flood event. They act as a physical barrier to water entering the property and can provide protection against frequent and relatively shallow flooding.
Flood hazard	In terms of the FRM Act, hazard refers to the characteristics (extent, depth, velocity) of a flood.
Flood hazard map	Flood hazard maps are required by the FRM Act to show information that describes the nature of a flood in terms of the source, extent, water level or depth and, where appropriate, velocity of water. Flood hazard and risk maps are referred to collectively as flood maps and are available on the SEPA website.
Flood Prevention Scheme / Flood Protection Scheme (FPS)	A flood protection scheme, as defined by the FRM Act, is a scheme by a local authority for the management of flood risk within the authority area. This includes defence measures (flood prevention schemes) formerly promoted under the Flood Prevention (Scotland) Act 1961.
Flood protection study	Flood protection studies aim to refine understanding of the hazard and risk associated with flooding in a particular area, catchment or coastline. They will involve detailed assessment of flood hazard and / or risk and may develop options for managing flood risk.
Flood protection works	Flood protection works can include the same flood defence measures that would make up a formal Flood Protection Scheme but without the legal process, protections and requirements that would come by delivering the works as a scheme.
Flood risk	A measure of the combination of the likelihood of flooding occurring and the associated impacts on people, the economy and the environment.
Flood Risk Assessment (FRA)	Flood Risk Assessments are detailed studies of an area where flood risk may be present. These are often used to inform planning decisions, may help to develop flood schemes and have also contributed to the National Flood Risk Assessment.

Term	Definition
Flood Risk Management (Scotland) Act 2009 (FRM Act)	The flood risk management legislation for Scotland. It transposes the EC Floods Directive into Scots Law and aims to reduce the adverse consequences of flooding on communities, the environment, cultural heritage and economic activity.
Flood risk management cycle	Under the FRM Act flood risk management planning is undertaken in six year cycles. The first planning cycle is 2015 – 2021. The first delivery cycle is lagged by approximately 6 months and is from 2016 - 2022.
Flood Prevention (Scotland) Act 1961	The Flood Prevention (Scotland) Act 1961 gave local authorities discretionary powers to make and build flood prevention schemes. It was superseded by the Flood Risk Management (Scotland) Act 2009.
Flood Risk Management Local Advisory Groups	FRM Local Advisory Groups are stakeholder groups convened to advise SEPA and lead local authorities in the preparation of Flood Risk Management Plans. SEPA and lead local authorities must have regard to the advice they provide.
Flood Risk Management Plans (FRM Plans)	A term used in the FRM Act. FRM Plans set out the actions that will be taken to reduce flood risk in a Local Plan District. They comprise Flood Risk Management Strategies, developed by SEPA, and Local Flood Risk Management Plans produced by lead local authorities.
Flood Risk Management Strategy (FRM Strategy)	Sets 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 actions for Potentially Vulnerable Areas.
Flood risk map	Complements the flood hazard maps published on the SEPA website providing detail on the impacts of flooding on people, the economy and the environment. Flood hazard and risk maps are referred to collectively as flood maps and are available on the SEPA website.
Flood wall	A flood defence feature used to defend an area from flood water to a specified standard of protection.
Flood Warning area (FWA)	A Flood Warning area is where SEPA operates a formal Flood Monitoring Scheme to issue targeted Flood Warning messages for properties located in the area.[vi]
Flood warning scheme	A flood warning scheme is the network of monitoring on a coastal stretch or river, which provides SEPA with the ability to issue Flood Warnings.
Floods Directive	European Directive 2007/60/EC on the Assessment and Management of Flood Risks builds on and is closely related to the Water Framework Directive (see river basin management planning). It was transposed into Scots Law by the Flood Risk Management (Scotland) Act 2009. The Directive requires Member States to assess if all watercourses and coastlines are at risk from flooding, to map the flood extent, assets and humans at risk in these areas and to take adequate and coordinated measures to reduce this flood risk[vii].
Floodplain	Area of land that borders a watercourse, an estuary or the sea, over which water flows in time of flood, or would naturally flow but for the presence of flood defences and other structures where they exist.
Floodplain storage	Floodplains naturally store water during high flows. Storage can be increased through natural or man-made features to increase flood depth or slow flows in order to reduce flooding elsewhere.
Gabion	A metal cage filled with rocks often used in river bank protection.
Green infrastructure	The European Commission defines green infrastructure as “the use of ecosystems, green spaces and water in strategic land use planning to deliver environmental and quality of life benefits. It includes parks, open spaces, playing fields, woodlands, wetlands, road verges, allotments and private gardens. Green infrastructure can contribute to climate change mitigation and adaptation, natural disaster risk mitigation, protection against flooding and erosion as well as biodiversity conservation.” See also ‘blue infrastructure’[viii]

Term	Definition
Groundwater flooding	This type of flooding is caused by water rising up from underlying rocks or flowing from springs. In Scotland groundwater is generally a contributing factor to flooding rather than the primary source.
Integrated catchment study (ICS)	In urban areas, the causes of flooding are complex because of the interactions between rivers, surface water drainage and combined sewer systems and tidal waters. Scottish Water works with SEPA and local authorities to assess these interactions through detailed studies.
Land use planning (LUP)	The process undertaken by public authorities to identify, evaluate and decide on different options for the use of land, including consideration of long term economic, social and environmental objectives and the implications for different communities and interest groups.
Lead local authority	A local authority responsible for leading the production, consultation, publication and review of a Local Flood Risk Management Plan.
Likelihood of flooding	The chance of flooding occurring. **High likelihood**: A flood is likely to occur in the defined area on average once in every ten years (1:10). Or a 10% chance of happening in any one year. **Medium likelihood:** A flood is likely to occur in the defined area on average once in every two hundred years (1:200). Or a 0.5% chance of happening in any one year. **Low likelihood:** A flood is likely to occur in the defined area on average once in every thousand years (1:1000). Or a 0.1% chance of happening in any one year.
Local Flood Risk Management Plans (Local FRM Plan)	Local Flood Risk Management Plans, produced by lead local authorities, will take forward the objectives and actions set out in Flood Risk Management Strategies. They will provide detail on the funding, timeline of delivery, arrangements and co-ordination of actions at the local level during each six year FRM planning cycle.
Local Nature Reserve (LNR)	A Local Nature Reserve is a protected area of land designated by a local authority because of its local special natural interest and / or educational value. Local authorities select and designate local nature reserves using their powers under the National Parks and Access to the Countryside Act 1949[ix].
Local Plan District	Geographical areas for the purposes of flood risk management planning. There are 14 Local Plan Districts in Scotland.
Local Plan District Partnerships	Each LPD has established a local partnership comprised of local authorities, SEPA, Scottish Water and others as appropriate. These partnerships are distinct from the FRM Local Advisory Groups and they retain clear responsibility for delivery of the FRM actions set out in the Local Flood Risk Management Plans. It is the local partnership that makes decisions and supports the delivery of these plans.
Maintenance	Sections 18 and 59 of the Flood Risk Management (Scotland) Act 2009 put duties of watercourse inspection, clearance and repair on local authorities. In addition, local authorities may also be responsible for maintenance of existing flood protection schemes or defences.
Montane habitat	This habitat encompasses a range of natural or near-natural vegetation occurring in the montane zone, lying above or beyond the natural tree-line.
National Flood Management Advisory Group (NFMAG)	The National Flood Management Advisory Group provides advice and support to SEPA and, where required, Scottish Water, local authorities and other responsible authorities on the production of FRM Strategies and Local FRM Plans.
National Flood Risk Assessment (NFRA)	A national analysis of flood risk from all sources of flooding which also considers climate change impacts. Completed in December 2011 this provides the information required to undertake a strategic approach to flood management that identifies areas at flood risk that require further appraisal. The NFRA will be reviewed and updated for the second cycle of FRM Planning by December 2018.

Term	Definition
Natural flood management (NFM)	A set of flood management techniques that aim to work with natural processes (or nature) to manage flood risk.
Non-residential properties	Properties that are not used for people to live in, such as shops or other public, commercial or industrial buildings.
Objectives	Objectives provide a common goal and shared ambition for managing floods. These objectives have been set by SEPA and agreed with flood risk management authorities following consultation. They were identified through an assessment of the underlying evidence of the causes and impacts of flooding.
One in 200 year flood	See 'likelihood of flooding' and 'return period'.
Planning policies	Current national planning policies, Scottish Planning Policy and accompanying Planning Advice notes restrict development within the floodplain and limit exposure of new receptors to flood risk. In addition to national policies, local planning policies may place further requirements within their area of operation to restrict inappropriate development and prevent unacceptable risk.
Potentially Vulnerable Areas (PVA)	Catchments identified as being at risk of flooding and where the impact of flooding is sufficient to justify further assessment and appraisal. There were 243 PVAs identified by SEPA in the National Flood Risk Assessment and these are the focus of the first FRM planning cycle.
Property level protection	Property level protection includes flood gates, sandbags and other temporary barriers that can be used to prevent water from entering individual properties during a flood.
Property level protection scheme	Some responsible authorities may have a formal scheme to provide, install and maintain property level protection for properties.
Ramsar sites	Ramsar sites are wetlands of international importance designated under the Ramsar Convention.
Receptor	Refers to the entity that may be impacted by flooding (a person, property, infrastructure or habitat). The vulnerability of a receptor can be reduced by increasing its resilience to flooding.
Residual risk	The risk that remains after risk management and mitigation. This may include risk due to very severe (above design standard) storms or risks from unforeseen hazards.
Resilience	The ability of an individual, community or system to recover from flooding.
Responsible authority	Designated under the FRM (Scotland) Act 2009 and associated legislation as local authorities, Scottish Water and, from 21 December 2013, the National Park Authorities and Forestry Commission Scotland. Responsible authorities, along with SEPA and Scottish Ministers, have specific duties in relation to their flood risk related functions.
Return period	A measure of the rarity of a flood event. It is the statistical average length of time separating flood events of a similar size. (see likelihood)
Revetment	Sloping structures placed on banks or at the foot of cliffs in such a way as to deflect the energy of incoming water.
Riparian	The riparian area is the interface between land and a river or stream. For the purposes of FRM this commonly refers to the riparian owner, which denotes ownership of the land area beside a river or stream.
River basin management planning (RBMP)	The Water Environment and Water Services (Scotland) Act 2003 transposed the European Water Framework Directive into Scots law. The Act created the River Basin Management Planning process to achieve environmental improvements to protect and improve our water environment. It also provided the framework for regulations to control the negative impacts of all activities likely to have an impact on the water environment.
Runoff reduction	Actions within a catchment or sub-catchment to reduce the amount of runoff during rainfall events. This can include intercepting rainfall,

Term	Definition
	storing water, diverting flows or encouraging infiltration.
Scottish Advisory and Implementation Forum for Flooding (SAIFF)	The stakeholder forum on flooding set up by the Scottish Government to ensure legislative and policy aims are met and to provide a platform for sharing expertise and developing common aspirations and approaches to reducing the impact of flooding on Scotland's communities, environment, cultural heritage and economy.
Sediment balance	Within a river where erosion and deposition processes are equal over the medium to long-term resulting in channel dimensions (width, depth, slope) that are relatively stable.
Sediment management	Sediment management covers a wide range of activities that includes anything from the small scale removal of dry gravels to the dredging of whole river channels and the reintroduction of removed sediment into the water environment. Historically, sediment management has been carried out for several reasons, including reducing flood risk, reducing bank erosion, for use as aggregate and to improve land drainage.
Self help	Self help actions can be undertaken by any individuals, businesses, organisations or communities at risk of flooding. They are applicable to all sources, frequency and scales of flooding. They focus on awareness raising and understanding of flood risk.
Sewer flooding (and other artificial drainage system flooding)	Flooding as a result of the sewer or other artificial drainage system (e.g. road drainage) capacity being exceeded by rainfall runoff or when the drainage system cannot discharge water at the outfall due to high water levels (river and sea levels) in receiving waters.
Site protection plans	Site protection plans are developed to identify whether normal operation of a facility can be maintained during a flood. This may be due to existing protection or resilience of the facility or the network.
Shoreline Management Plan (SMP)	A Shoreline Management Plan is a large scale assessment of the coastal flood and erosion risks to people and the developed, historic and natural environment. It sets out a long-term framework for the management of these risks in a sustainable manner.
Site of Special Scientific Interest (SSSI)	Sites of Special Scientific Interest are protected by law under the Nature Conservation (Scotland) Act 2004 to conserve their plants, animals and habitats, rocks and landforms[x].
Source of flooding	The type of flooding. This can be coastal, river, surface water or groundwater.
Special Area of Conservation (SAC)	Special Areas of Conservation are strictly protected sites designated under the European Habitats Directive. The Directive requires the establishment of a European network of protected areas which are internationally important for threatened habitats and species[xi].
Special Protection Areas (SPA)	Special Protection Areas are strictly protected sites classified in accordance with the European Birds Directive. They are classified for rare and vulnerable birds (as listed in the Directive), and for regularly occurring migratory species[xii].
Standard of protection (SoP)	All flood protection structures are designed to be effective up to a specified flood likelihood (Standard of Protection). For events beyond this standard, flooding will occur. The chosen Standard of Protection will determine the required defence height and / or capacity.
Storage area	A feature that can be used to store floodwater, this can be natural in the form of low lying land or manmade such as a reservoir or modified landform.
Strategic Environmental Assessment (SEA)	A process for the early identification and assessment of the likely significant environmental effects, positive and negative, of activities. Often considered before actions are approved or adopted.
Strategic Flood Risk Assessment (SFRA)	A Strategic Flood Risk Assessment is designed for the purposes of specifically informing the Development Plan Process. A SFRA involves the collection, analysis and presentation of all existing and readily available flood risk information (from any source) for the area of interest. It constitutes a strategic overview of flood risk.

Term	Definition
Strategic mapping and modelling	Strategic mapping and modelling actions have been identified in locations where SEPA is planning to undertake additional modelling or analysis of catchments and coastlines, working collaboratively with local authorities where appropriate, to improve the national understanding of flood risk.
Surcharge	Watercourses and culverts can carry a limited amount of water. When they can no longer cope, they overflow, or 'surcharge'.
Surface water flooding	Flooding that occurs when rainwater does not drain away through the normal drainage systems or soak into the ground, but lies on or flows over the ground instead[xiii]
Surface water management plan (SWMP)	A plan that takes an integrated approach to drainage accounting for all aspects of urban drainage systems and produces long term and sustainable actions. The aim is to ensure that during a flood the flows created can be managed in a way that will cause minimum harm to people, buildings, the environment and business.
Surface water plan/study	The management of flooding from surface water sewers, drains, small watercourses and ditches that occurs, primarily in urban areas, during heavy rainfall. FRM Strategy actions in this category include: Surface Water Management Plans, Integrated Catchment Studies and assessment of flood risk from sewerage systems (FRM Act Section 16) by Scottish Water. These have been selected as appropriate for each Potentially Vulnerable Area.
Sustainable flood risk management	The sustainable flood risk management approach aims to meet human needs, whilst preserving the environment so that these needs can be met not only in the present, but also for future generations. The delivery of sustainable development is generally recognised to reconcile three pillars of sustainability – environmental, social and economic.
Sustainable drainage systems (SuDS)	A set of techniques designed to slow the flow of water. They can contribute to reducing flood risk by absorbing some of the initial rainfall and then releasing it gradually, thereby reducing the flood peak and helping to mitigate downstream problems. SuDS encourage us to take account of quality, quantity and amenity / biodiversity.
UK Climate Change Projections (UKCP09)	The leading source of climate change information for the UK. It can help users to assess their climate risks and plan how to adapt to a changing climate. The high emissions scenario refers to the SRES A1F1 emission scenario. See Annex 1 of the UKCP09 Climate change projections report for details.[xiv]
Utility assets	Within the FRM Strategies this refers to electricity sub stations, mineral and fuel extraction sites, telephone assets, television and radio assets.
Voe	A dialect term, common in place names and used to refer to a small bay or creek in Orkney or Shetland.
Vulnerability	A measure of how likely someone or something is to suffer long-term damage as a result of flooding. It is a combination of the likelihood of suffering harm or damage during a flood (susceptibility) and the ability to recover following a flood (resilience).
Wave energy dissipation	Process by which a wave loses its energy.
Wave overtopping	Wave overtopping occurs when water passes over a flood wall or other structure as a result of wave action. Wave overtopping may lead to flooding particularly in exposed coastal locations.

[i] http://apps.sepa.org.uk/bathingwaters/ accessed 14/10/2015 last updated 2015
[ii] http://www.susdrain.org/delivering-suds/using-suds/suds-components/swales-and-conveyance-channels/swales.html accessed 12/10/2015 last updated 2012
[iii] http://www.gov.scot/Resource/Doc/362219/0122541.pdf accessed 12/10/2015 last updated 2011
[iv] http://www.legislation.gov.uk/ukpga/2004/36/schedule/1 accessed 12/10/2015 last updated 2004
[v] http://evidence.environment-agency.gov.uk/FCERM/en/FluvialDesignGuide/Chapter9.aspx?pagenum=10 accessed 12/10/2015 last update 07/03/2012
[vii] http://ec.europa.eu/environment/water/flood_risk/ accessed 12/10/2015 last updated 17/09/2015
[viii] http://www.gov.scot/Resource/Doc/362219/0122541.pdf accessed 12/10/2015 last updated 2011

[ix] http://www.snh.gov.uk/protecting-scotlands-nature/protected-areas/local-designations/lnr/ accessed 12/10/2015 last updated 12/07/2015
[x] http://www.snh.gov.uk/protecting-scotlands-nature/protected-areas/national-designations/sssis/ accessed 12/10/2015 last updated 21/01/2015
[xi] http://www.snh.gov.uk/protecting-scotlands-nature/protected-areas/international-designations/sac/ accessed 12/10/2015 last updated 01/03/2013
[xii] http://www.snh.gov.uk/protecting-scotlands-nature/protected-areas/international-designations/spa/ accessed 12/10/2015 last updated 01/03/2013
[xiii] http://watermaps.environment-agency.gov.uk/wiyby/wiyby.aspx?topic=ufmfsw#x=357683&y=355134&scale=2 accessed 12/10/2015 last updated 12/10/2015
[xiv] http://ukclimateprojections.metoffice.gov.uk Document © Crown copyright 2009 accessed 01/12/15 last updated 30/04/2012

Annex 2: Land use planning

Flood risk management actions from national planning policies
AVOID DEVELOPMENT IN MEDIUM TO HIGH RISK AREAS a) **Planning authorities** work in partnership undertaking catchment-wide Strategic Flood Risk Assessments to inform their development plan allocations in line with SEPA's guidance and Land Use Vulnerability. b) **Planning authorities and SEPA** require the submission of flood risk assessments that accord with SEPA's *Technical Flood Risk Guidance for Stakeholders*, to support planning applications where there is a potential flood risk. The flood risk assessment should be used to demonstrate as far as possible that the development will be safe for its lifetime, without increasing flood risk elsewhere and, where possible, takes opportunities to reduce flood risk overall. c) **SEPA** ensures that its flood risk advice to planning authorities is clear and appropriate. SEPA, in consultation with planning authorities, undertakes an annual assessment of planning advice and its contribution to flood risk. d) **SEPA and planning authorities** engage at an early stage of the development plan process to agree appropriate forms of development to help inform the preparation and implementation of Strategic Flood Risk Assessments.
REDUCE IMPACTS TO EXISTING BUILDINGS a) **SEPA, planning authorities and local communities** are required to engage at an early stage of the development plan process to agree the best long term land uses for areas where relocation, abandonment and/or change of use have been identified to deliver sustainable flood risk management. Where possible, new land uses should aim to achieve multiple benefits for local communities such as the creation of blue / green infrastructure and increased resilience to climate change.
PROTECT AND ENHANCE NATURAL FEATURES THAT HAVE A POSITIVE IMPACT ON REDUCING OVERALL FLOOD RISK a) **SEPA and planning authorities** are required to engage early in the development plan process to identify opportunities for the restoration and protection of natural features which help manage flood risk. Opportunities should be maximised to achieve multiple benefits such as the development of green / blue infrastructure and improved place making. Areas of land that may contribute to flood management should be identified and protected.
NEW DEVELOPMENTS ARE DESIGNED TO ENSURE THAT SURFACE WATER DRAINAGE DOES NOT INCREASE FLOOD RISK ON OR OFF SITE a) **SEPA** prepares guidance for planning authorities and developers on the use of surface water hazard maps for land use planning purposes. b) **Planning authorities** support the implementation of Surface Water Management Plans, developed by the local authorities, through development plan allocations and policies. Surface Water Management Plans should take account of development opportunities that could contribute to the reduction of surface water flood risk. c) **SEPA** engages at an early stage of the development plan process to progress exemplar projects that demonstrate the potential for land use planning to mitigate surface water flooding and contribute to wider environmental benefits.
a) **NEW DEVELOPMENT IS RESILIENT TO PREDICTED FUTURE CHANGES IN CLIMATE Planning authorities** ensure that climate change is considered in Strategic Flood Risk Assessments and Flood Risk Assessments, based upon the best scientific evidence and the information requirements of planners to make informed decisions.

Table 1: Objectives and actions that reflect national Land Use Planning policies and guidance

Annex 3: Acknowledgements

SEPA gratefully acknowledges the cooperation and input that various parties have provided, including *inter alia*, the following organisations:

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Local authorities
SEPA acknowledges the provision of flood models and other supporting data and information from local authorities in Scotland and their collaboration in the production of flood risk management information.

Scottish Water
SEPA acknowledges the inclusion of surface water flooding data generated by Scottish Water in preparation of flood risk information.

Further detail on the datasets that have been used in the development of the Flood Risk Management Strategies can be found in the Strategic Appraisal Methodology, which is available from the SEPA webpage.