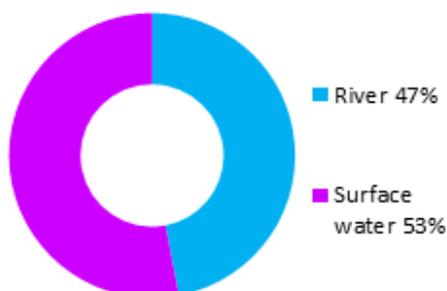


Gargunnoch (Potentially Vulnerable Area 09/06)

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

Summary of flooding impacts



At risk of flooding

- 80 residential properties
- 30 non-residential properties
- £590,000 Annual Average Damages

(damages by flood source shown left)

Summary of flooding impacts

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.

Objectives

Summary of actions to manage flooding

The actions below have been selected to manage flood risk.

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

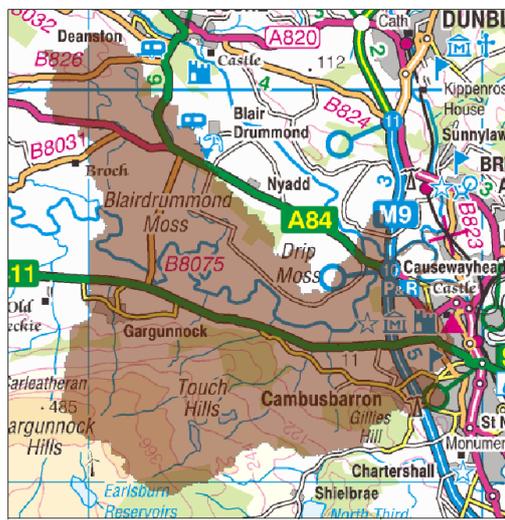
Actions

Gargunnock (Potentially Vulnerable Area 09/06)

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

Background

This Potentially Vulnerable Area is 63km² and is part of the River Forth catchment (shown below). It is a steep, rural catchment to the west of Stirling and contains the urban areas of Gargunnock and Cambusbarron. It extends from Deanston in the north to the Touch Hills in the south. The main watercourses are the River Forth and the Gargunnock Burn.



The area has a risk of river and surface water flooding. The highest risk of river flooding is from the Gargunnock Burn to Gargunnock. The highest risk of surface water flooding is also to Gargunnock and Cambusbarron.

There are approximately 80 residential properties and 30 non-residential properties at risk of flooding. The Annual Average Damages from flooding are approximately £590,000.

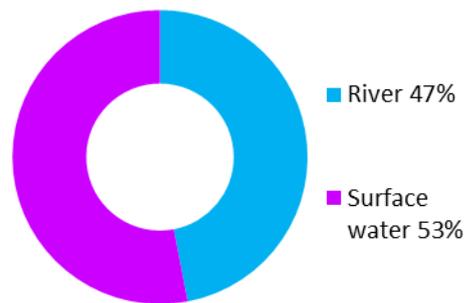


Figure 1: Annual Average Damages by flood source

Summary of flooding impacts

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 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 2,700)	20	80	110
Non-residential properties (total 360)	<10	30	60
People	40	170	240
Community facilities	0	0	0
Utilities	<10	<10	<10
Transport links (excluding minor roads)	1 M road (M9), 4 A roads, 3 B roads at 46 locations	1 M road (M9), 4 A roads, 3 B roads at 63 locations	1 M road (M9), 4 A roads, 3 B roads at 74 locations
Environmental designated areas (km ²)	0.6	0.6	0.6
Designated cultural heritage sites	11	15	16
Agricultural land (km ²)	6.9	11.5	6.4

Table 1: Summary of flooding impacts

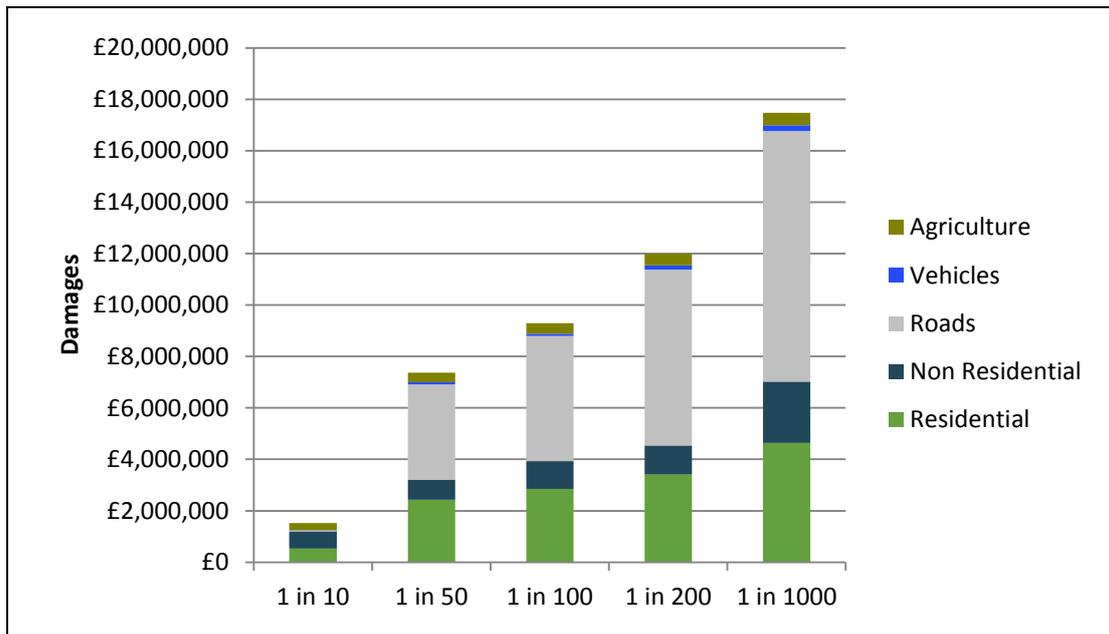


Figure 2: Damages by flood likelihood

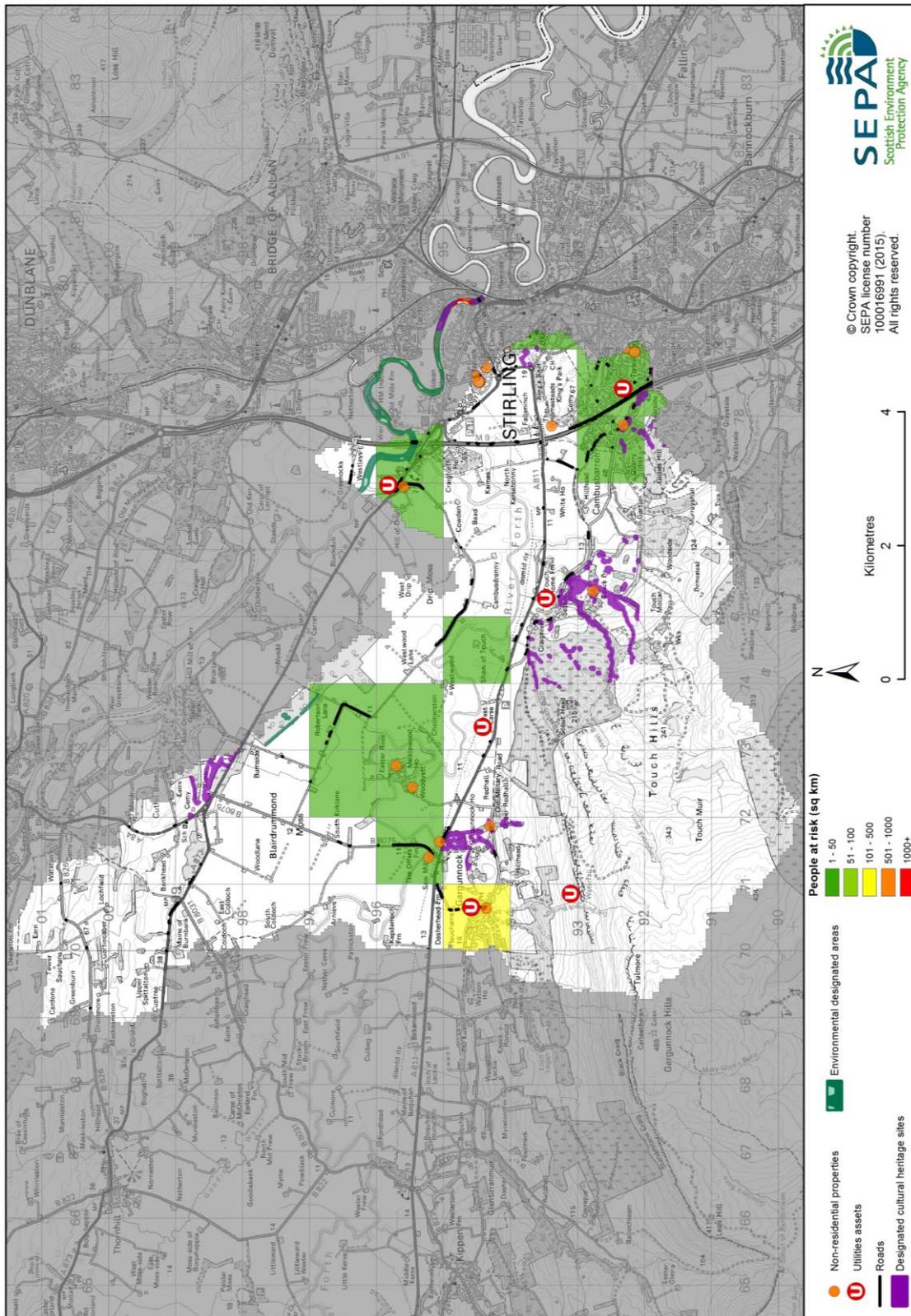


Figure 3: Impacts of flooding

History of flooding

One significant flood has been recorded in this area. In December 2006, flooding from the River Forth affected large areas of the carse, including a number of rural residential properties.

Objectives to manage flooding in Potentially Vulnerable Area 09/06

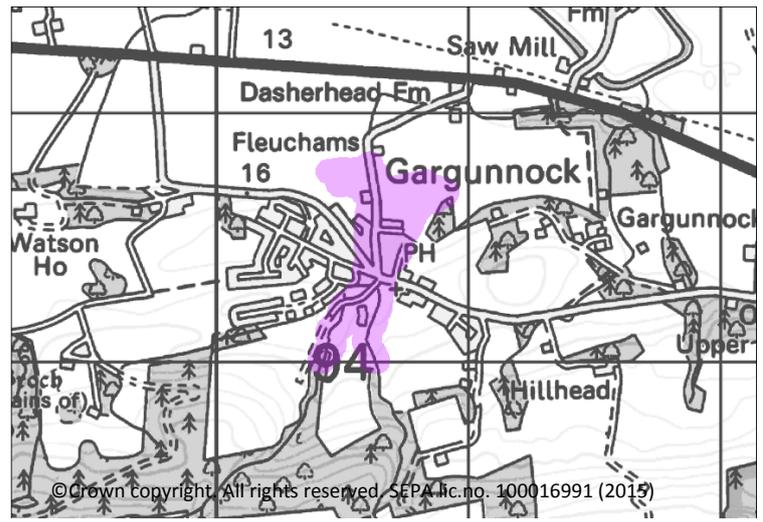
Objectives provide a common goal and shared ambition for managing floods. These objectives have been set by SEPA and agreed with flood risk management authorities following consultation. They were identified through an assessment of the underlying evidence of the causes and impacts of flooding. Target 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 Gargunnock Potentially Vulnerable Area.

Reduce economic damages to residential and non-residential properties in Gargunnock caused by flooding from the Gargunnock Burn

Indicators:

- £100,000 Annual Average Damages from residential properties
- £670 Annual Average Damages from non-residential properties

Target area:



Objective ID: 9018

Target area	Objective	ID	Indicators within PVA
Stirling and Bridge of Allan	Reduce economic damages and number of residential properties at risk of surface water flooding in Stirling and Bridge of Allan where practical	9016	* See note below
Applies across Forth Local Plan District	Avoid an overall increase in flood risk	9001	<ul style="list-style-type: none"> • 80 residential properties • £590,000 Annual Average Damages
Applies across Forth Local Plan District	Reduce overall flood risk	9032	<ul style="list-style-type: none"> • 80 residential properties • £590,000 Annual Average Damages
Applies across Forth 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 09/06 there are 30 residential properties at risk and Annual Average Damages of £320,000.

Actions to manage flooding in Potentially Vulnerable Area 09/06

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 Gargunnoch Potentially Vulnerable Area.

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

Action (ID):	FLOOD PROTECTION STUDY (90180005)		
Objective (ID):	Reduce economic damages to residential and non-residential properties in Gargunnoch caused by flooding from the Gargunnoch Burn (9018)		
Delivery lead:	Stirling Council		
Priority:	National:	Within local authority:	
	118 of 168	2 of 2	
Status:	Not started	Indicative delivery:	2016-2021
Description:	A flood protection study has been recommended to assess the level of flood risk in Gargunnoch. The area has been identified at risk of flooding by SEPA but no flooding issues were previously identified by Stirling Council. The watercourse should be resurveyed and the model updated in collaboration between SEPA and Stirling Council.		
Potential impacts			
Economic:	The study could benefit 49 residential properties and one non-residential property at risk of flooding in this location, with potential damages avoided of up to £3.5 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, one utility is located within the study area and could benefit from any potential actions.		
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.		

Action (ID):	SURFACE WATER PLAN/STUDY (90160018)		
Objective (ID):	Reduce economic damages and number of residential properties at risk of surface water flooding in Stirling and Bridge of Allan where practical (9016)		
Delivery lead:	Stirling Council		
Status:	Ongoing	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 (90160019)		
Objective (ID):	Reduce economic damages and number of residential properties at risk of surface water flooding in Stirling and Bridge of Allan where practical (9016)		
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 (90320019)		
Objective (ID):	Reduce overall flood risk (9032)		
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 (90320030)		
Objective (ID):	Reduce overall flood risk (9032)		
Delivery lead:	SEPA		
Status:	Existing	Indicative delivery:	Ongoing
Description:	Continue to maintain the Callander to Stirling flood warning area which covers the River Teith to the confluence with the River Forth and the Bridgehaugh, Cornton and Raploch flood warning areas which cover the River Forth, all of which are part of the Stirling river flood warning scheme.		

Action (ID):	FLOOD FORECASTING (90320009)		
Objective (ID):	Reduce overall flood risk (9032)		
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 (90320011)		
Objective (ID):	Reduce overall flood risk (9032)		
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 (90320013)		
Objective (ID):	Reduce overall flood risk (9032)		
Delivery lead:	Responsible authorities		
Status:	Existing	Indicative delivery:	Ongoing
Description:	<p>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.</p> <p>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.</p> <p>Local authorities will be undertaking additional awareness raising activities. Further details will be set out in the Local FRM Plan.</p>		

Action (ID):	MAINTENANCE (90320007)		
Objective (ID):	Reduce overall flood risk (9032)		
Delivery lead:	Stirling Council, asset / land managers		
Status:	Existing	Indicative delivery:	Ongoing
Description:	<p>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.</p>		

Action (ID):	EMERGENCY PLANS/RESPONSE (90320014)		
Objective (ID):	Reduce overall flood risk (9032)		
Delivery lead:	Category 1 and 2 Responders		
Status:	Existing	Indicative delivery:	Ongoing
Description:	<p>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.</p>		

Action (ID):	PLANNING POLICIES (90010001)		
Objective (ID):	Avoid an overall increase in flood risk (9001) Reduce overall flood risk (9032)		
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.		