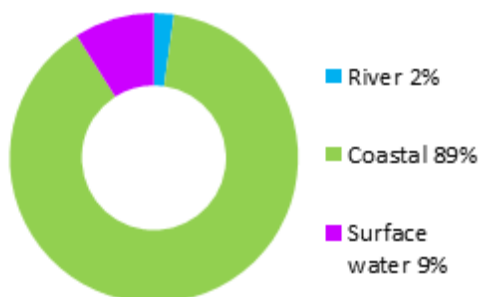


Hawkhill, Kincardine, Kennet Pans and Culross (Potentially Vulnerable Area 10/08)

Local Plan District	Local authority	Main catchment
Forth Estuary	Clackmannanshire Council, Fife Council	South Fife coastal

Summary of flooding impacts



At risk of flooding

- 240 residential properties
- 30 non-residential properties
- £1.4 million 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.

Flood protection scheme/works	<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	<i>Surface water plan/study</i>	Emergency plans/response
Maintain flood protection scheme	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

Actions

Hawkhill, Kincardine, Kennet Pans and Culross (Potentially Vulnerable Area 10/08)

Local Plan District	Local authority	Main catchment
Forth Estuary	Clackmannanshire Council, Fife Council	South Fife coastal

Background

This Potentially Vulnerable Area is 31km² and part of the Firth of Forth catchment (shown below). This is a small coastal area containing the villages of Kincardine and Culross. There are numerous small burns around Kincardine which collectively cause flooding issues in the area.

The area has a risk of coastal, surface water and river flooding. The majority of damages in this Potentially Vulnerable Area are caused by coastal flooding.

There are approximately 240 residential properties and 30 non-residential properties at risk of flooding.

The Annual Average Damages from flooding are approximately £1.4 million.

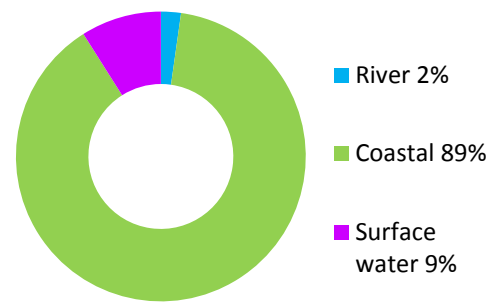


Figure 1: Annual Average Damages by flood source

Summary of flooding impacts

The highest risk of coastal flooding is from the Firth of Forth to Culross and Kincardine. The highest risk of river flooding is to Kincardine.

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 and 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.

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 six 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 2,200)	80	240	330
Non-residential properties (total 190)	20	30	40
People	180	520	730
Community facilities	0	0	<10 Educational buildings
Utilities	<10	<10	<10
Transport links (excluding minor roads)	3 A roads, 1 B road at 14 locations	3 A roads, 1 B road at 19 locations	3 A roads, 1 B road at 23 locations
Environmental designated areas (km ²)	0.2	0.3	0.3
Designated cultural heritage sites	6	9	9
Agricultural land (km ²)	2.9	3.2	3.6

Table 1: Summary of flooding impacts

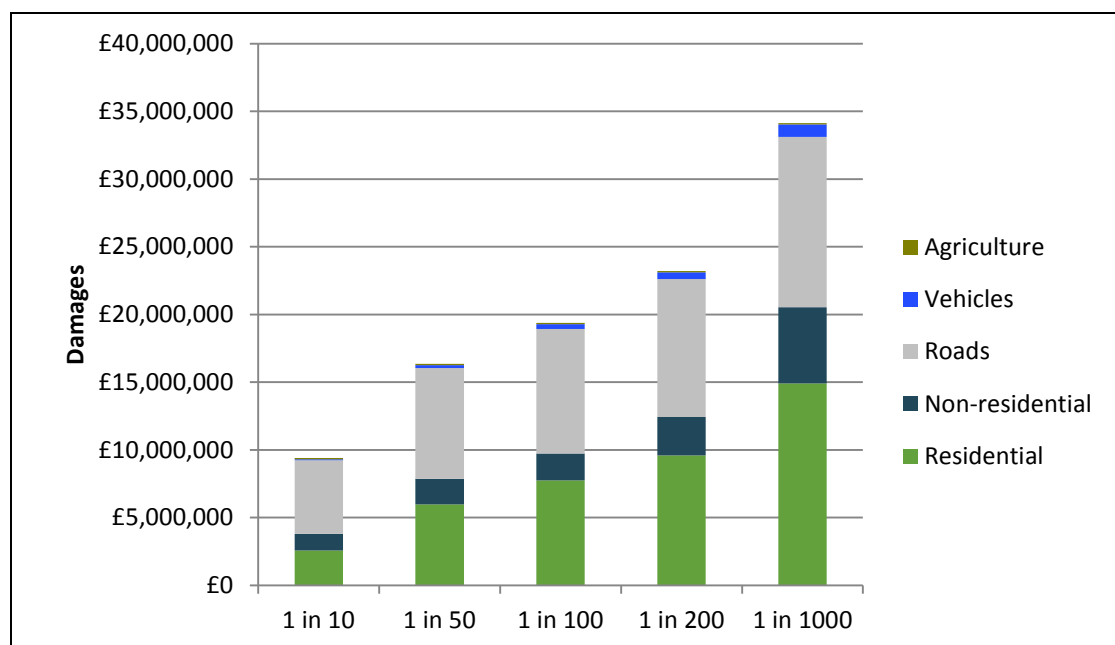


Figure 2: Damages by flood likelihood

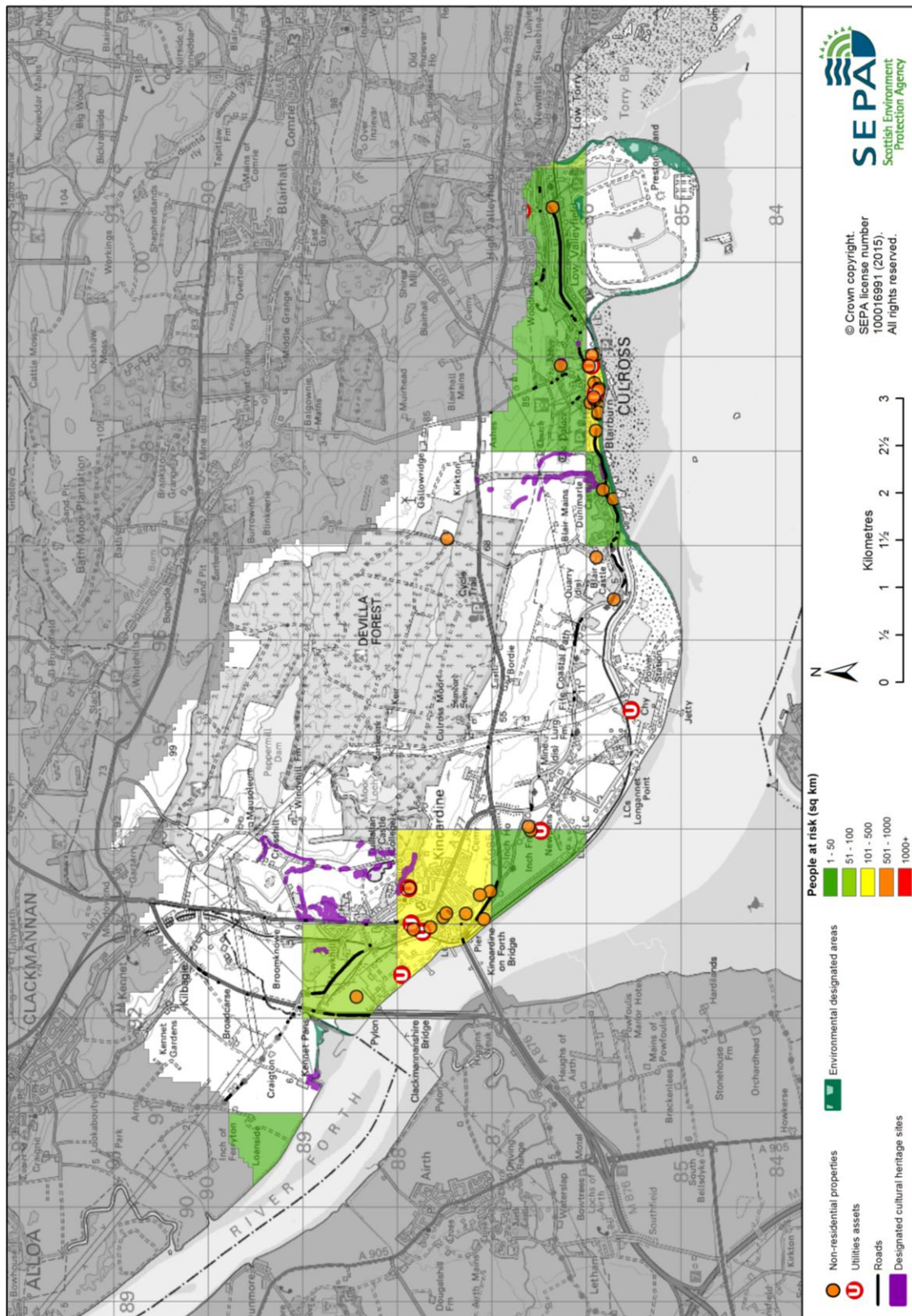


Figure 3: Impacts of flooding

History of flooding

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

Objectives to manage flooding in Potentially Vulnerable Area 10/08

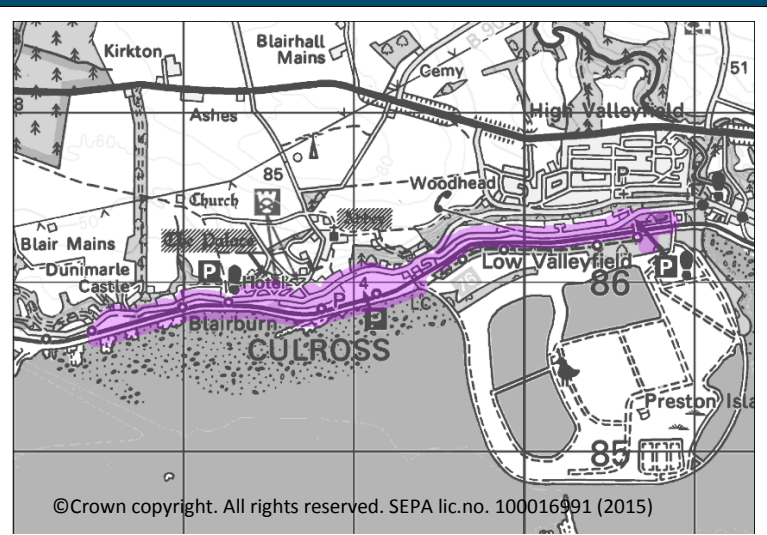
Objectives provide a common goal and shared ambition for managing floods. These objectives have been set by SEPA and agreed with flood risk management authorities following consultation. They were identified through an assessment of the underlying evidence of the causes and impacts of flooding. Target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

Reduce economic damages to residential and non-residential properties and risk to people in Culross caused by coastal flooding

Indicators:

Target area:

- 200 people
- £120,000 Annual Average Damages from residential properties
- £14,000 Annual Average Damages from non-residential properties



Objective ID: 10026, 10028

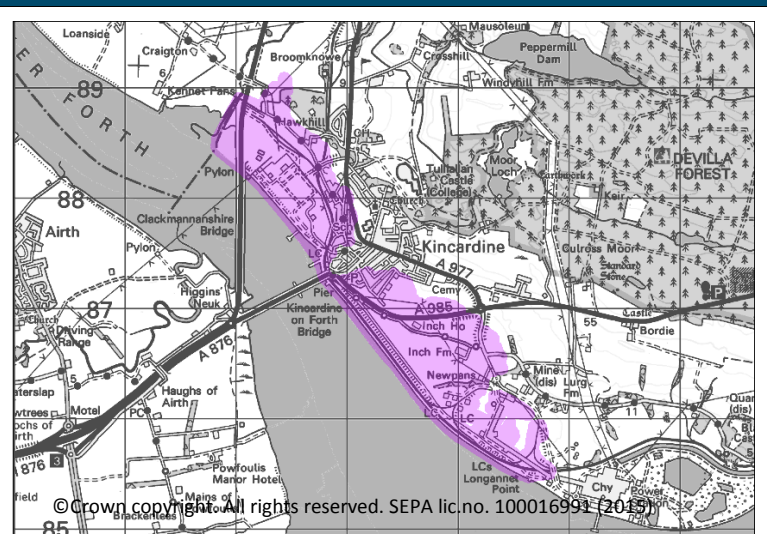
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Reduce economic damages to residential and non-residential properties in Kincardine caused by river flooding and coastal flooding

Indicators:

Target area:

- £300,000 Annual Average Damages from residential properties
- £79,000 Annual Average Damages from non-residential properties



Objective ID: 10027

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Target area	Objective	ID	Indicators within PVA
Hawkhill, Kincardine, Kennet Pans and Culross	Accept the physical or disruption risk related to the transport network for roads	10301	<ul style="list-style-type: none"> • 330m of the A985 at two locations • 360m of the A876 at one location
Culross	Reduce the physical or disruption risk related to the transport network for rail	10302	<ul style="list-style-type: none"> • 3.5km of rail track at 10 locations
Applies across Forth Estuary Local Plan District	Avoid an overall increase in flood risk	10001	<ul style="list-style-type: none"> • 240 residential properties • £1.4 million Annual Average Damages
Applies across Forth Estuary Local Plan District	Reduce overall flood risk	10099	<ul style="list-style-type: none"> • 240 residential properties • £1.4 million Annual Average Damages
Applies across Forth Estuary 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 10/08

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 Hawkhill, Kincardine, Kennet Pans and Culross Potentially Vulnerable Area.

Selected actions					
Flood protection scheme/works	<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	<i>Surface water plan/study</i>	Emergency plans/response
Maintain flood protection scheme	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

Action (ID):	FLOOD PROTECTION SCHEME/WORKS (10301021)		
Objective (ID):	Accept the physical or disruption risk related to the transport network for roads (10301)		
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):	FLOOD PROTECTION SCHEME/WORKS (10302021)		
Objective (ID):	Reduce the physical or disruption risk related to the transport network for rail (10302)		
Delivery lead:	Network Rail		
Status:	Under development	Indicative delivery:	2016-2021
Description:	Network Rail will carry out civil engineering work which will reduce the risk of flooding on identified sections of the rail network within this Potentially Vulnerable Area.		

Action (ID):	FLOOD PROTECTION STUDY (100270005)		
Objective (ID):	Reduce economic damages to residential and non-residential properties in Kincardine caused by river flooding and coastal flooding (10027)		
Delivery lead:	Fife Council		
Priority:	National:	Within local authority:	
	21 of 168	1 of 16	
Status:	Not started	Indicative delivery:	2016-2021
Description:	A flood protection study has been recommended for Kincardine to assess whether flood storage, flood defences, sediment management and natural flood management could reduce flood risk. The study should also consider the viability of property level protection. Natural flood management options that should be considered include surge attenuation. The study should take a sustainable approach and consider the interaction between actions upstream and downstream and potential effects on coastal processes along the shoreline.		
Potential impacts			
Economic:	The study could benefit 147 residential properties and nine non-residential properties at risk of flooding in this location, with potential damages avoided of up to £12 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 four utilities and two roads 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. The Middle Forth Estuary and Upper Forth Estuary (water body IDs 200436 and 200437) are located within the study area and the physical condition of these estuaries is identified by SEPA to be at less than good status. Opportunities to improve the condition of the estuary 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 Firth of Forth Special Protection Area. Conservation areas, gardens and designed landscapes, listed buildings, Sites of Special Scientific Interest, Ramsar sites and ancient woodlands are also present in the study area and could be positively or negatively impacted.		
Action (ID):	FLOOD PROTECTION STUDY (100260005)		
Objective (ID):	Reduce economic damages to residential and non-residential properties and risk to people in Culross caused by coastal flooding (10026, 10028)		

Delivery lead:	Fife Council		
Priority:	National:	Within local authority:	
	90 of 168	13 of 16	
Status:	Not started	Indicative delivery:	2016-2021
Description:	A flood protection study has been recommended for Culross to assess flood defences, sediment management and natural flood management. The study should also investigate the viability of property level protection. Natural flood management options that should be considered include wave and surge attenuation. The study should take a sustainable approach and consider the interaction between actions and potential effects on coastal processes along the shoreline.		
Potential impacts			
Economic:	The study could benefit 83 residential properties and 13 non-residential properties at risk of flooding in this location, with potential damages avoided of up to £4.0 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. 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. The Middle Forth Estuary (water body ID 200436) is located within the study area and the physical condition of this estuary is identified by SEPA to be at less than good status. Opportunities to improve the condition of the estuary 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 Firth of Forth Special Protection Area. Conservation areas, scheduled monuments, listed buildings, local nature reserves, Sites of Special Scientific Interest and Ramsar sites are also present in the study area and could be positively or negatively impacted.		

Action (ID):	STRATEGIC MAPPING AND MODELLING (100990016)		
Objective (ID):	Reduce overall flood risk (10099)		
Delivery lead:	SEPA		
Status:	Not started	Indicative delivery:	2016-2021
Description:	SEPA will seek to develop flood mapping in the Dunbar to Stirling area to improve understanding of coastal 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.
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Action (ID):	STRATEGIC MAPPING AND MODELLING (100990019)		
Objective (ID):	Reduce overall flood risk (10099)		
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 (100270017)		
Objective (ID):	Reduce economic damages to residential and non-residential properties in Kincardine caused by river flooding and coastal flooding (10027)		
Delivery lead:	Fife Council		
Status:	Existing	Indicative delivery:	Ongoing
Description:	Continue to maintain the Kincardine-on-Forth Flood Protection Scheme that provides protection against flooding from the Peffermill Burn. The scheme includes flow diversion from the Moor Loch Burn, culverts and channel improvements.		

Action (ID):	MAINTAIN FLOOD WARNING (100990030)		
Objective (ID):	Reduce overall flood risk (10099)		
Delivery lead:	SEPA		
Status:	Existing	Indicative delivery:	Ongoing
Description:	Continue to maintain the Culross, Longannet and Kincardine flood warning area which is part of the Firth of Forth and Tay coastal flood warning scheme.		

Action (ID):	FLOOD FORECASTING (100990009)		
Objective (ID):	Reduce overall flood risk (10099)		
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 (100990011)		
Objective (ID):	Reduce overall flood risk (10099)		
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 (100990013)		
Objective (ID):	Reduce overall flood risk (10099)		
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 and promote Floodline. This will be achieved through SEPA-led education events. Local authorities will be undertaking additional awareness raising activities. Further details will be set out in the Local FRM Plan.		

Action (ID):	MAINTENANCE (100990007)		
Objective (ID):	Reduce overall flood risk (10099)		
Delivery lead:	Fife Council and Clackmannanshire 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 (100990014)		
Objective (ID):	Reduce overall flood risk (10099)		
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. Fife Council operates an Emergency Flood Plan. Fife Council also provides flood sacks for use in emergencies and has installed flood pods containing flood protection products for use in emergencies in flood risk areas.		

Action (ID):	PLANNING POLICIES (100010001)		
Objective (ID):	Avoid an overall increase in flood risk (10001) Reduce overall flood risk (10099)		
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.		