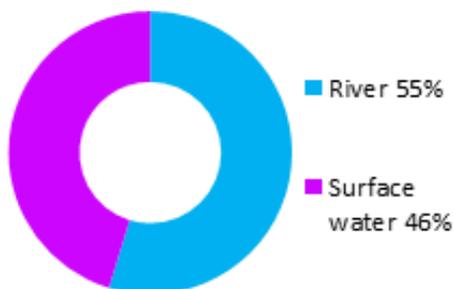


Inverkeithing, Rosyth, Dunfermline and Wellwood (Potentially Vulnerable Area 10/06)

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

Summary of flooding impacts



At risk of flooding

- 410 residential properties
- 230 non-residential properties
- £2.0 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

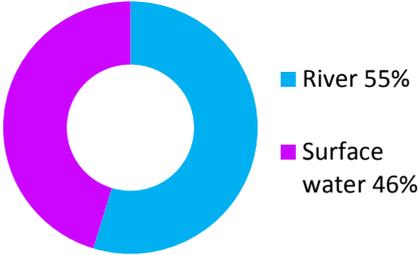
The actions below have been selected to manage flood risk.

<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	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

Actions

Inverkeithing, Rosyth, Dunfermline and Wellwood (Potentially Vulnerable Area 10/06)

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

Background	
<p>This Potentially Vulnerable Area is 82km² and part of the Firth of Forth catchment (shown below). This is a moderately sized, partially urbanised area centrally located within the catchment. It contains the towns of Dunfermline, Rosyth and the majority of Inverkeithing.</p>  <p>© Crown copyright. SEPA licence number 100016991 (2015). All rights reserved.</p>	<p>The main watercourse is the Lyne Burn, flowing from its source in the north east, westward through Dunfermline and into the Firth of Forth at Charleston. Other notable watercourses include the Tower Burn, Baldrige Burn, Broomhead Burn and the Keithing Burn.</p> <p>The area has a risk of river and surface water flooding. The majority of damages are caused by river flooding.</p> <p>There are approximately 410 residential properties and 230 non-residential properties at risk of flooding. The Annual Average Damages are approximately £2.0 million.</p>  <p>Figure 1: Annual Average Damages by flood source</p>

Summary of flooding impacts

The highest risk of river flooding is from Tower Burn and the Lyne Burn to Dunfermline, Rosyth and Inverkeithing. The highest risk of surface water flooding is in Dunfermline.

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.

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 three 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 33,000)	50	410	730
Non-residential properties (total 3,600)	70	230	260
People	120	910	1,600
Community facilities	0	<10 Educational buildings	<10 Educational buildings
Utilities	<10	30	30
Transport links (excluding minor roads)	1 M road (M90), 8 A roads, 8 B roads at 158 locations 1 Railway route at 41 locations: Fife Circle	1 M road (M90), 8 A roads, 8 B roads at 283 locations 1 Railway route at 63 locations: Fife Circle	1 M road (M90), 8 A roads, 8 B roads at 330 locations 1 Railway route at 63 locations: Fife Circle
Environmental designated areas (km²)	0.1	0.1	0.1
Designated cultural heritage sites	6	6	8
Agricultural land (km²)	2.3	2.8	3.0

Table 1: Summary of flooding impacts

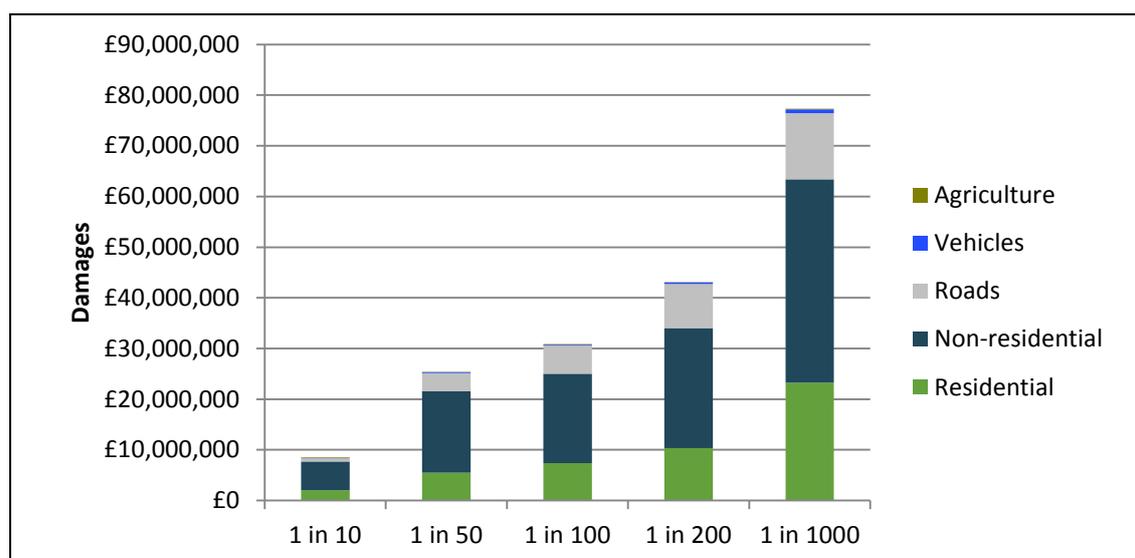


Figure 2: Damages by flood likelihood

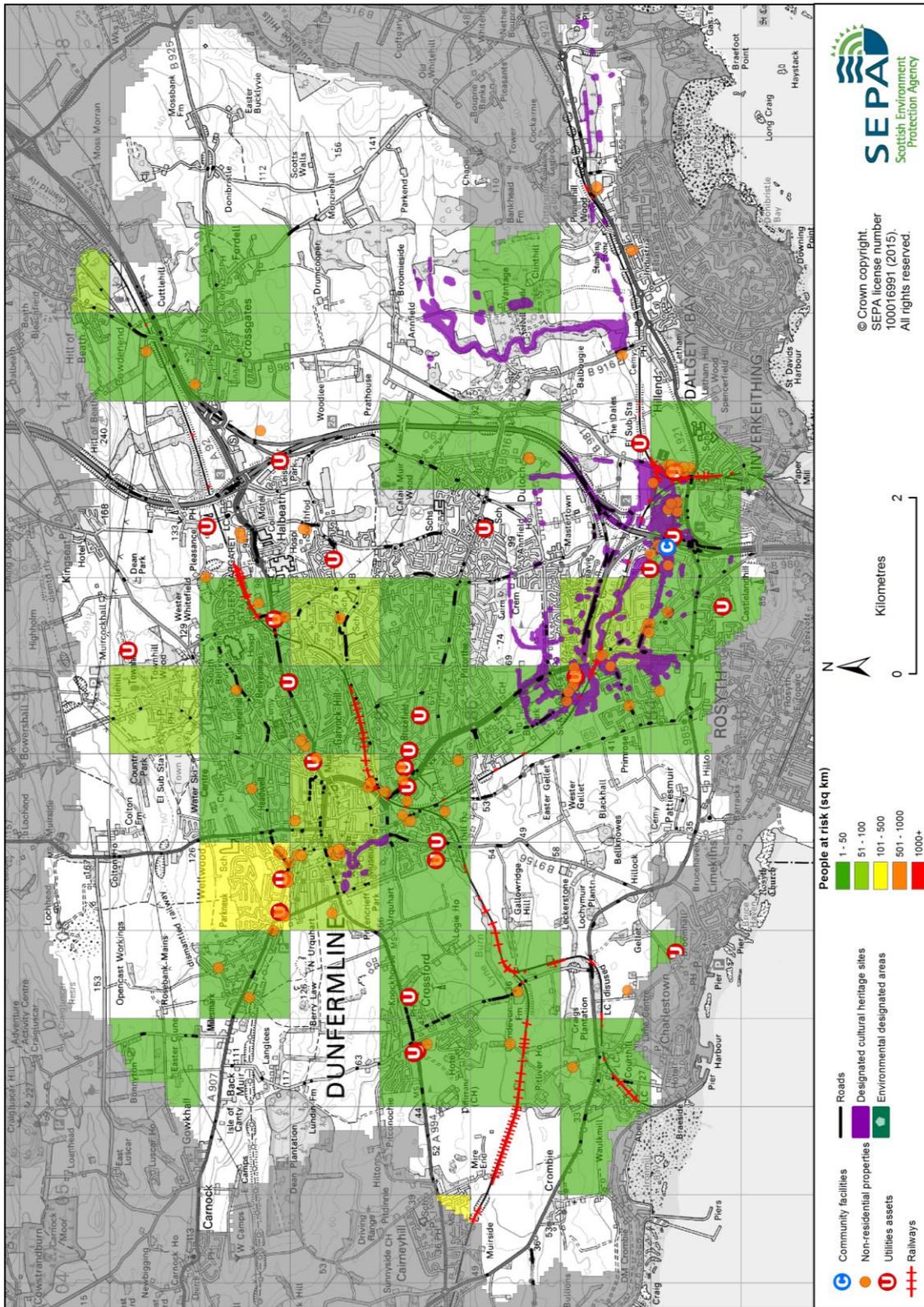


Figure 3: Impacts of flooding

History of flooding

One significant flood has been recorded in this area. On 1 April 1992, an extreme weather event resulted in 80mm of rain falling in 24 hours. This caused flooding of the Lyne Burn and its tributaries, the Tower Burn and Calais Burn and affected residential and non-residential properties in Dunfermline.

Objectives to manage flooding in Potentially Vulnerable Area 10/06

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 Inverkeithing, Rosyth, Dunfermline and Wellwood Potentially Vulnerable Area.

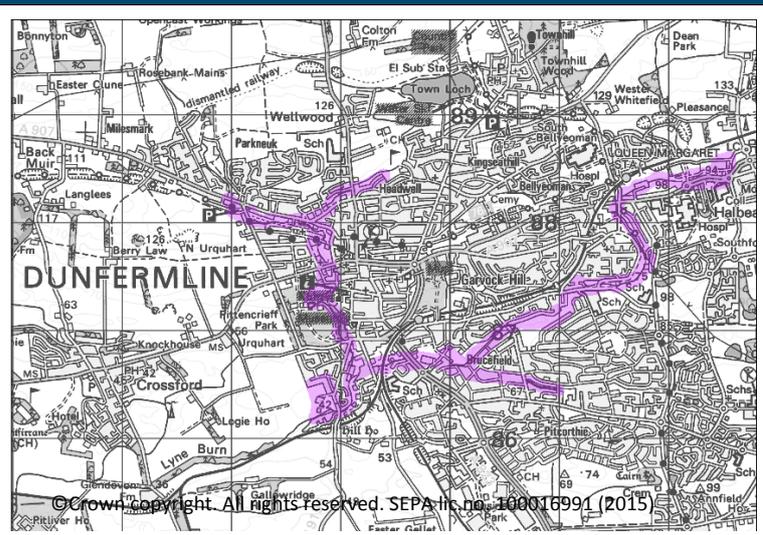
Reduce economic damages to residential and non-residential properties and risk to people in Dunfermline caused by flooding from the Lyne Burn and Tower Burn

Indicators:

- 210 people
- £190,000 Annual Average Damages from residential properties
- £450,000 Annual Average Damages from non-residential properties

Objective ID: 10019, 10022

Target area:



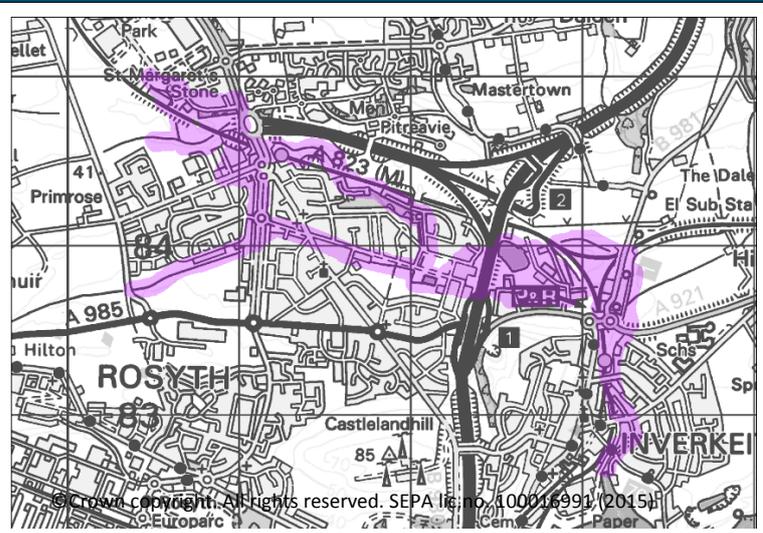
Reduce economic damages to residential and non-residential properties and flood risk to community facilities in Rosyth and Inverkeithing caused by river flooding

Indicators:

- £42,000 Annual Average Damages from residential properties
- £280,000 Annual Average Damages from non-residential properties
- One educational building

Objective ID: 10020

Target area:



Target area	Objective	ID	Indicators within PVA
Dunfermline, Bowershall, Crossford, Wellwood, Townhill and Halbeath	Reduce economic damages and number of residential properties at risk of surface water flooding in Dunfermline, Bowershall, Crossford, Wellwood, Townhill and Halbeath where practical	10017	* See note below
Cairneyhill, Crombie and Muirside	Reduce economic damages and number of residential properties at risk of surface water flooding in Cairneyhill, Crombie and Muirside where practical	10023	* See note below
Applies across Forth Estuary Local Plan District	Avoid an overall increase in flood risk	10001	<ul style="list-style-type: none"> • 410 residential properties • £2.0 million Annual Average Damages
Applies across Forth Estuary Local Plan District	Reduce overall flood risk	10099	<ul style="list-style-type: none"> • 410 residential properties • £2.0 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.		

* This objective will be monitored using surface water flood risk across the Potentially Vulnerable Area. For 10/06 there are 290 residential properties at risk and Annual Average Damages of £900,000.

Actions to manage flooding in Potentially Vulnerable Area 10/06

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 Inverkeithing, Rosyth, Dunfermline and Wellwood 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	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 (100190005)		
Objective (ID):	Reduce economic damages to residential and non-residential properties and risk to people in Dunfermline caused by flooding from the Lyne Burn and Tower Burn (10019, 10022)		
Delivery lead:	Fife Council		
Priority:	National:		Within local authority:
	25 of 168		2 of 16
Status:	Not started	Indicative delivery:	2016-2021
Description:	A flood protection study has been recommended for Dunfermline to assess whether modification of conveyance, sediment management, installation/ modification of fluvial control structures, flood defences and natural flood management could reduce flood risk. The study should also investigate property relocation and the viability of property level protection. Natural flood management options that should be considered include runoff control and sediment management. The assessment should consider these actions in combination and the impacts on flood risk upstream and downstream of each action.		
Potential impacts			
Economic:	The study could benefit 59 residential properties and 31 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 and socially vulnerable people located within the flood protection 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. Tower Burn and Lyne Burn (water body IDs 4330 and 6907) 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. Conservation 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.
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Action (ID):	SURFACE WATER PLAN/STUDY (100170018)		
Objective (ID):	Reduce economic damages and number of residential properties at risk of surface water flooding in Dunfermline, Bowershall, Crossford, Wellwood, Townhill and Halbeath where practical (10017)		
Delivery lead:	Fife 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 (100170019)		
Objective (ID):	Reduce economic damages and number of residential properties at risk of surface water flooding in Dunfermline, Bowershall, Crossford, Wellwood, Townhill and Halbeath where practical (10017) Reduce economic damages to residential and non-residential properties and flood risk to community facilities in Rosyth and Inverkeithing caused by river flooding (10020)		
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):	SURFACE WATER PLAN/STUDY (100230018)		
Objective (ID):	Reduce economic damages and number of residential properties at risk of surface water flooding in Cairneyhill, Crombie and Muirside where practical (10023)		
Delivery lead:	Fife 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 (100230019)		
Objective (ID):	Reduce economic damages and number of residential properties at risk of surface water flooding in Cairneyhill, Crombie and Muirside where practical (10023)		
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 (100990016)		
Objective (ID):	Reduce overall flood risk (10099)		
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 2,600km ² of improved surface water data is currently available within this Local Plan District. The inclusion of additional surface water hazard data resulting from the completion of local authority surface water management plans and Scottish Water integrated catchment studies will be considered when these projects are completed.		

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 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 (100190017)		
Objective (ID):	Reduce economic damages to residential and non-residential properties and risk to people in Dunfermline caused by flooding from the Lyne Burn and Tower Burn (10019, 10022)		
Delivery lead:	Fife Council		
Status:	Existing	Indicative delivery:	Ongoing
Description:	Continue to maintain the existing flood protection schemes. These include the Dunfermline Flood Protection Scheme in the south west of the town and Parkneuk Flood Protection 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:	<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>From 2016 SEPA will undertake flood risk education and awareness raising activities. In addition, SEPA will engage with Fife Council and 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 (100990007)		
Objective (ID):	Reduce overall flood risk (10099)		
Delivery lead:	Fife 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 (100990014)		
Objective (ID):	Reduce overall flood risk (10099)		
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> <p>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.</p>		

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:	<p>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.</p>		