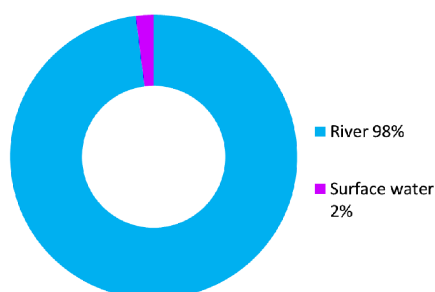


Dalrymple to Patna (Potentially Vulnerable Area 12/15)

Local Plan District	Local authority	Main catchment
Ayrshire	East Ayrshire Council, South Ayrshire Council	River Doon

Summary of flooding impacts



At risk of flooding

- 90 residential properties
- 20 non-residential properties
- £120,000 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>	<i>Maintain flood warning</i>	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

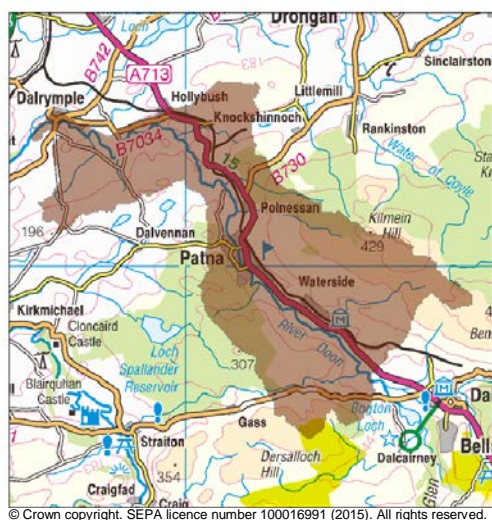
Actions

Dalrymple to Patna (Potentially Vulnerable Area 12/15)

Local Plan District	Local authority	Main catchment
Ayrshire	East Ayrshire Council, South Ayrshire Council	River Doon

Background

This Potentially Vulnerable Area is located to the south east of the Ayrshire Local Plan District is approximately 50km² (shown below). It encompasses an area along the River Doon between the village of Dalrymple and Bogton Loch.



There are approximately 90 residential properties and 20 non-residential properties at risk of flooding. The Annual Average Damages are approximately £120,000.

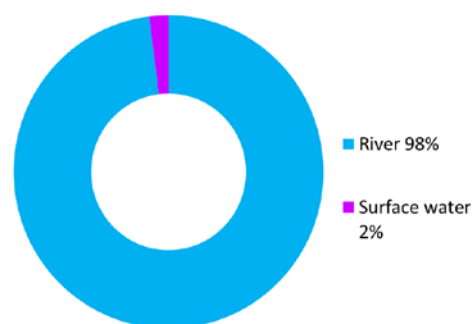


Figure 1: Annual Average Damages by flood source

Summary of flooding impacts

This area is situated within the River Doon catchment where land use is primarily hill pasture and forestry. The River Doon affects a number of residential and non-residential properties in the villages of Dalrymple, Patna and Waterside. Areas of agricultural land to the south of Waterside are also predicted to be affected by river flooding. Doon Dam on Loch Doon straddles the boundary between Ayrshire and Solway. During most conditions Loch Doon helps to reduce the force of flows however if left open during extreme conditions this dam can contribute to flooding downstream.

Surface water flooding is predicted within the natural floodplain of the River Doon on land used for agricultural purposes. There are fewer than 10 residential properties at risk however, sections of road and rail infrastructure are at risk of surface water flooding (notably the A713).

A now closed opencast mine, Dunstonhill, is situated to the east of Polnessan. There is a potential flood risk relating to water overflowing from this mine should the necessary levels of maintenance and pumping not be provided.

The risk of flooding to people and property, as well as to community facilities, utilities, transport routes, designated sites and agricultural land is summarised in Table 1. The damages associated with floods of different likelihood are shown in Figure 2.

Residential properties affected by river flooding experience the highest economic impact at approximately 75% of the damages.

Within this Potentially Vulnerable Area it is estimated that climate change will increase the number of residential properties at risk of flooding from approximately 90 to 110.

The impact of flooding is shown in Figure 3. Most of impacts are within Dalrymple and Patna with flooding to people, non-residential properties and roads.

	1 in 10 High likelihood	1 in 200 Medium likelihood	1 in 1000 Low likelihood
Residential properties (total 1,500)	20	90	100
Non-residential properties (total 260)	10	20	20
People	30	190	220
Community facilities	0	0	0
Utilities assets	0	<10	<10
Transport links - roads (km)	0.8	1.8	2.2
Transport links - rail (km)	0.6	0.5	0.6
Environmental designated areas (km ²)	<0.1	<0.1	<0.1
Designated cultural heritage sites	8	8	8
Agricultural land (km ²)	2.0	2.3	2.4

Table 1: Summary of flooding impacts¹

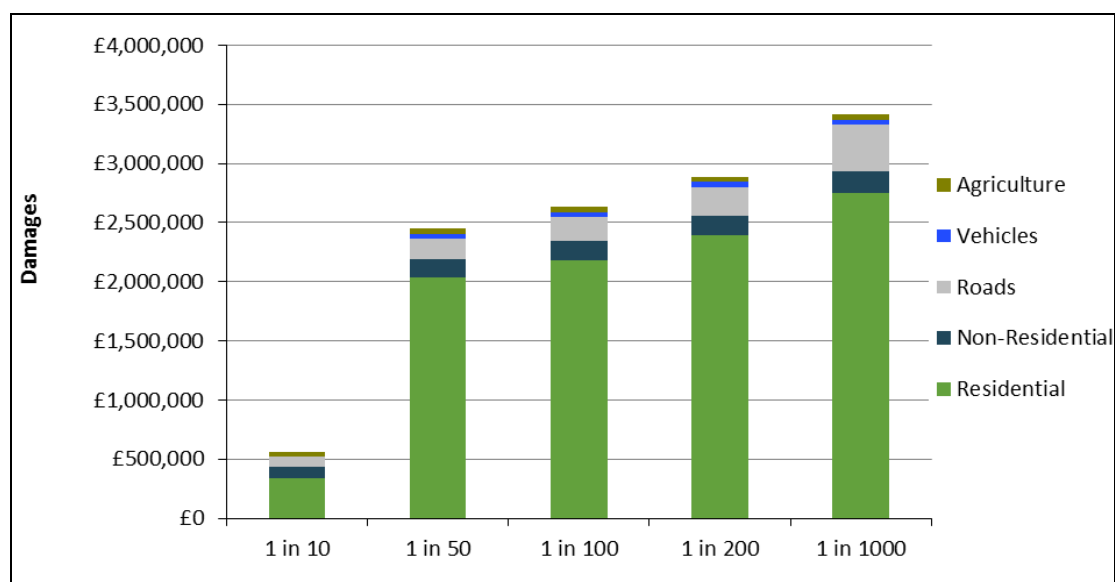


Figure 2: Damages by flood likelihood

¹ Some receptors are counted more than once if flooded from multiple sources

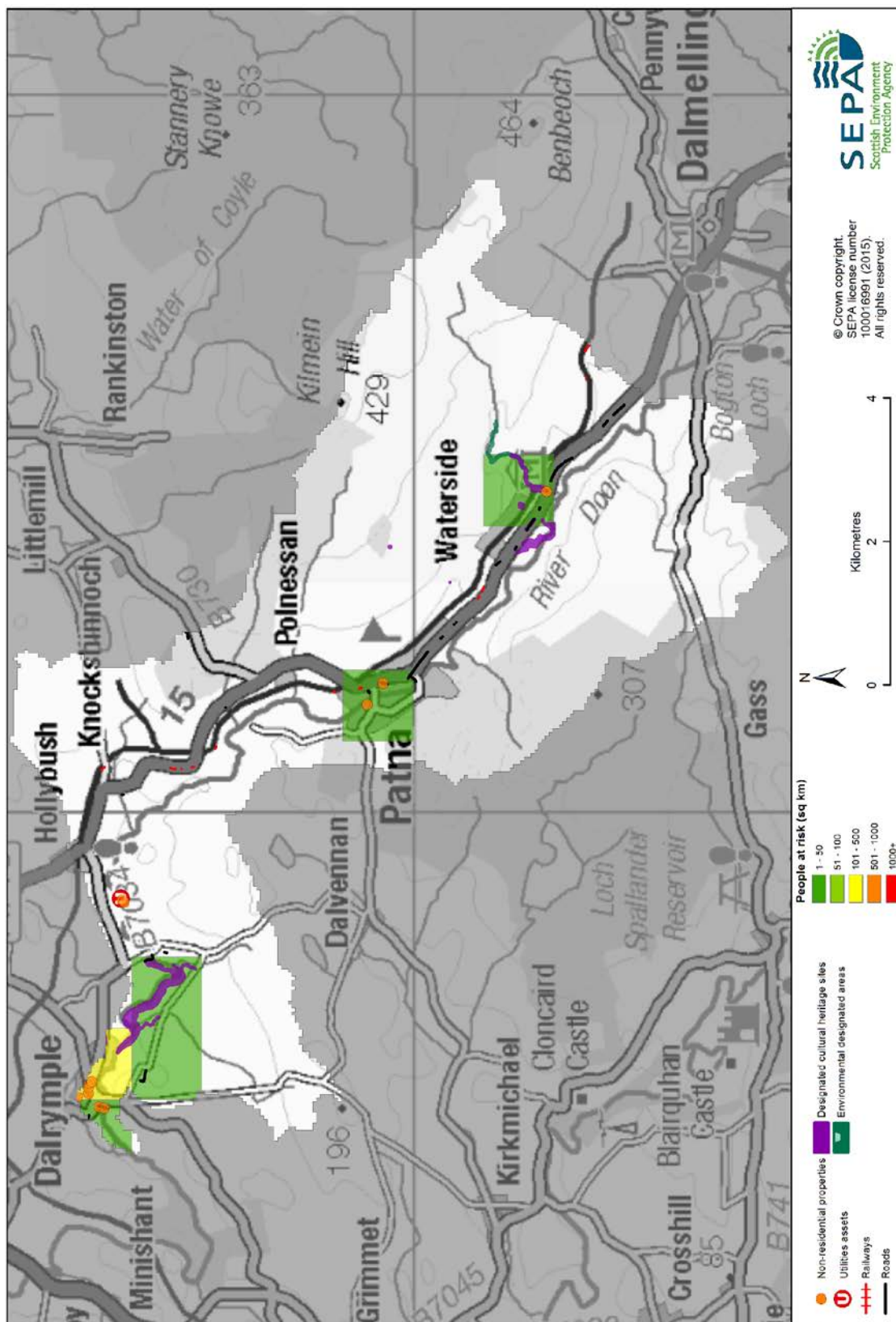


Figure 3: Impacts of flooding

History of flooding

Flooding within the area was reported in October and November 2009, which resulted in two road closures in Patna and the closure of the B7037 and B741. The B741 is reported to flood regularly between the Muck Bridge and the River Doon Bridge, with flooding experienced on 11 September 2000, 25 October 2000 and 6 December 1999.

Objectives to manage flooding in Potentially Vulnerable Area 12/15

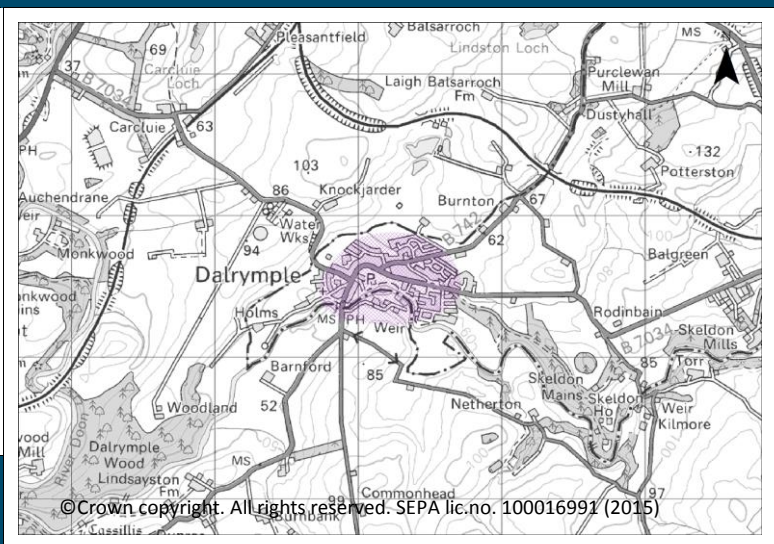
Objectives provide a common goal and shared ambition for managing floods. These objectives have been set by SEPA and agreed with flood risk management authorities following consultation. They were identified through an assessment of the underlying evidence of the causes and impacts of flooding. Target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

Reduce the risk of flooding from the River Doon and the Primpton Burn, to residential properties in Dalrymple

Indicators:

- 140 residential properties
- £160,000 Annual Average Damages

Objective ID: 12031



Target area	Objective	ID	Indicators within PVA
Applies across Ayrshire Local Plan District	Avoid an overall increase in flood risk	12039	<ul style="list-style-type: none"> • 90 residential properties • £120,000 Annual Average Damages
Applies across Ayrshire Local Plan District	Reduce overall flood risk	12082	<ul style="list-style-type: none"> • 90 residential properties • £120,000 Annual Average Damages
Applies across Ayrshire 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 12/15

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 Dalrymple to Patna 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 (120310005)		
Objective (ID):	Reduce the risk of flooding from the River Doon and the Primpton Burn, to residential properties in Dalrymple (12031)		
Delivery lead:	East Ayrshire Council		
Priority:	National:		Within local authority:
	136 of 168		4 of 4
Status:	Not started	Indicative delivery:	2016-2021
Description:	A study is recommended to further investigate the feasibility of a flood protection scheme, focusing on modification of conveyance through an historic bridge and construction of direct defences. The study should also explore the feasibility of changing the current operating procedure of Loch Doon to increase the level of storage. Given the other uses of the loch this may not be possible and discussions with Scottish Power should commence at the beginning of this study. Other actions may also be considered to select the most sustainable combination of actions.		
Potential impacts			
Economic:	The flood protection study should consider how to reduce flood risk to 29 residential properties and 3 non-residential properties in this location, with potential damages avoided of up to £1.1 million.		
Social:	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. There may be negative impacts through disturbance to the local community during the construction phase.		
Environmental:	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the		

Environmental: environment. There is the potential for impacts on the Loch Doon and Ness Glen Sites of Special Scientific Interest with the storage action. There is the potential for loss of existing natural terrestrial habitats due to increased water levels; however, there could be an increase in wetland habitats. Incorporation of hydro power dams to the scheme could have negative impacts on fish passage. Downstream of these actions there may be negative impacts on water quality through increased erosion and sedimentation, which has the potential to impact upon Bogton Loch Site of Special Scientific Interest. Implementation of the storage action will have permanent negative impacts on the water body morphology. There is likely to be a loss of habitat and displacement of species in the short term during modification works which are likely to re-establish and return in the medium to long term. However, this is likely to be permanent in the footprint and vicinity of the direct defences. There is the potential for negative impacts on local water quality downstream of works during the construction period. There is the potential for impacts on the protected monuments, properties in care and listed buildings in and around Loch Doon from the storage action. With direct defences there is the potential for impacts on the setting of the Dalrymple Heritage Conservation Area, Dalrymple Bridge listed structure, the Skeldon House garden and designed landscape conservation area and views of the river in the town.

Action (ID):	STRATEGIC MAPPING AND MODELLING (120820016)		
Objective (ID):	Reduce overall flood risk (12082)		
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 1,300km 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 Management Studies will be considered as these projects are completed.		

Action (ID):	MAINTAIN FLOOD PROTECTION SCHEME (120310017)		
Objective (ID):	Reduce the risk of flooding from the River Doon and the Primpton Burn, to residential properties in Dalrymple (12031)		
Delivery lead:	East Ayrshire Council		
Status:	Existing	Indicative delivery:	Ongoing
Description:	An existing overflow channel on the Primpton Burn reduces the flood risk from the watercourse. This channel will be maintained, and will continue to manage flooding according to the design standard at the time of construction. Levels of flood risk are likely to increase over time as a consequence of climate change. The local authority should investigate the current benefit which is offered by the scheme.		

Action (ID):	FLOOD FORECASTING (120820009)		
Objective (ID):	Reduce overall flood risk (12082)		
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 (120820011)		
Objective (ID):	Reduce overall flood risk (12082)		
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 (120820013)		
Objective (ID):	Reduce overall flood risk (12082)		
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 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.</p>		

Action (ID):	MAINTENANCE (120820007)		
Objective (ID):	Reduce overall flood risk (12082)		
Delivery lead:	Local authorities, 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 (120820014)		
Objective (ID):	Reduce overall flood risk (12082)		
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 (120390001)		
Objective (ID):	Avoid an overall increase in flood risk (12039) Reduce overall flood risk (12082)		
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.		