



Flood Risk Management Strategy

Outer Hebrides



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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 220 residential and 170 non-residential properties are at risk of flooding in the Outer Hebrides Local Plan District. Benbecula, Stornoway and South Uist 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 £2.3 million, largely from coastal 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 Comhairle nan Eilean Siar 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 Comhairle nan Eilean Siar, Scottish Water 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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Outer Hebrides Local Plan District

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:

- Comhairle nan Eilean Siar;
- 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. The local authority 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 Outer Hebrides Local Advisory Group include representatives from a range of sectors, including government agencies, the local authority, 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 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 a 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

Outer Hebrides 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 Outer Hebrides Local Plan District

The Outer Hebrides Local Plan District comprises all of the islands which form the Outer Hebrides. It has an area of approximately 3,100km² and a coastline with a length of approximately 2,300km. There are eight Potentially Vulnerable Areas in the Outer Hebrides Local Plan District. The locations of these 8 areas are shown in Figure 2.

Flood risk in the Outer Hebrides

There are approximately 220 residential properties and 170 non-residential properties at risk of flooding within the Local Plan District. This equates to less than 1% of all properties at risk of flooding nationally. Within the Local Plan District, approximately 2% of all residential properties and 5% of all non-residential properties are at risk and it is estimated that 71% of these are located within Potentially Vulnerable Areas. The Annual Average Damages from flooding (see glossary) are approximately £2.3 million, with an estimated 63% of the damages for the entire Local Plan District accounted for in Potentially Vulnerable Areas.

The main source of flooding is coastal flooding which accounts for approximately 77% of the Annual Average Damages (Figure 1). Annual Average Damages caused by coastal floods are approximately £1.8 million, with those caused by river and surface water floods being approximately £470,000 and £59,000 respectively.

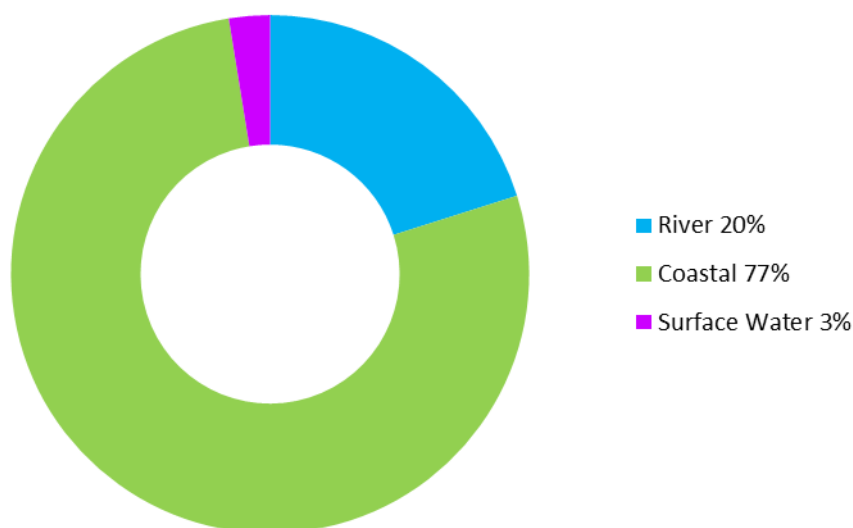


Figure 1: Annual Average Damages by flood source

Table 1 shows the number of properties at risk and the Annual Average Damages caused by flooding in the main areas within the Local Plan District. This includes damages to residential properties, non-residential properties, transport and agriculture. Please note that economic damages to airports are not included as information on damages at this scale is not available.

	Residential and non-residential properties at risk of flooding	Annual Average Damages
Benbecula	110	£560,000
Stornoway	90	£210,000
South Uist	80	£530,000

Table 1: Main areas at risk of flooding

Background information on the Outer Hebrides Local Plan District

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

The population of the Outer Hebrides is in the region of 28,000. There are 14 inhabited islands and more than 60 uninhabited islands. Stornoway is the largest settlement in the Outer Hebrides with a population of around 6,300. Of the inhabited islands, Lewis and Harris is the largest and the majority of the population of the Outer Hebrides live here (approximately 21,000 people). South Uist, North Uist, Benbecula, and Barra all have populations between 1,000 and 2,000 people. The remaining inhabited islands have populations of less than 300 people.

Only about 1% of the Outer Hebrides Local Plan District is classed as urban. The predominant land cover for the islands is bog which covers 46% of the area. Heather grassland and rough grassland are also important covering 20% and 11% respectively. Approximately 6% of the area of the islands is covered by freshwater lochs.



Figure 2: Outer Hebrides Local Plan District, Potentially with Vulnerable Areas identified

Objectives and actions in the Outer Hebrides 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 the Outer Hebrides Local Plan District	Avoid an overall increase in flood risk	200001	<ul style="list-style-type: none"> • 220 residential properties • 170 non-residential properties • 480 people
Applies across the Outer Hebrides Local Plan District	Reduce overall flood risk	200002	<ul style="list-style-type: none"> • 220 residential properties • 170 non-residential properties • 480 people

Action (ID):	FLOOD FORECASTING (2000020009)		
Objective (ID):	Reduce overall flood risk. (200002)		
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 (2000020011)		
Objective (ID):	Reduce overall flood risk. (200002)		
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 (2000020013)		
Objective (ID):	Reduce overall flood risk. (200002)		
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 (2000020007)		
Objective (ID):	Reduce overall flood risk. (200002)		
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 (2000020014)		
Objective (ID):	Reduce overall flood risk. (200002)		
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 (2000010001)		
Objective (ID):	Avoid an overall increase in flood risk. (200001) Reduce overall flood risk. (200002)		
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.

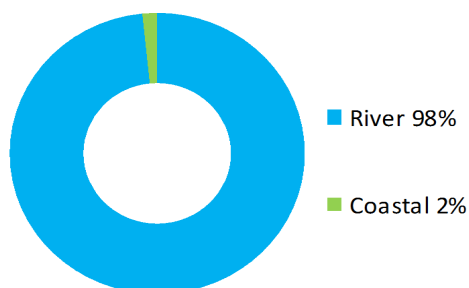
PVA	Flood protection scheme/ works	Natural flood management works	New flood warning	Flood protection study	Natural flood management study	Surface water plan/study	Strategic mapping and modelling	Maintain flood protection scheme*	Maintain flood warning*	Flood forecasting	Property level protection scheme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

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

Ness, Isle of Lewis (Potentially Vulnerable Area 02/01)

Local Plan District	Local authority	Main catchment
Outer Hebrides	Comhairle nan Eilean Siar	Lewis and Harris coastal

Summary of flooding impacts



At risk of flooding

- <10 residential properties
- <10 non-residential properties
- £2,500 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>	New flood warning	<i>Community flood action groups</i>	<i>Property level protection scheme</i>	<i>Site protection plans</i>
<i>Flood protection study</i>	<i>Natural flood management study</i>	<i>Maintain flood warning</i>	Awareness raising	<i>Surface water plan/study</i>	Emergency plans/response
<i>Maintain flood protection scheme</i>	<i>Strategic mapping and modelling</i>	Flood forecasting	Self help	Maintenance	Planning policies

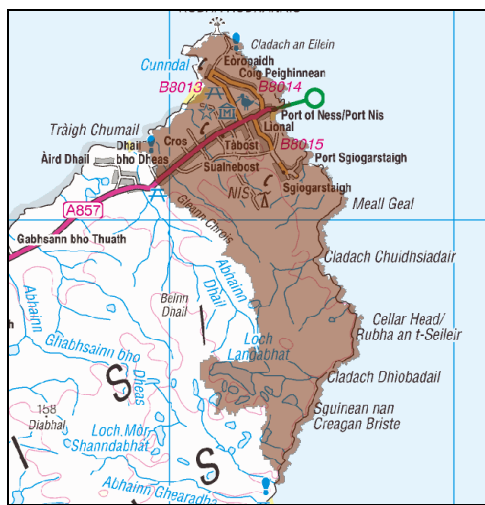
Actions

Ness, Isle of Lewis (Potentially Vulnerable Area 02/01)

Local Plan District	Local authority	Main catchment
Outer Hebrides	Comhairle nan Eilean Siar	Lewis and Harris coastal

Background

This Potentially Vulnerable Area is located in the north east of the Isle of Lewis (shown below). The area extends from the Butt of Lewis in the north of the island and down the east coast to just north of Tolsta point. It is approximately 53km².



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The Potentially Vulnerable Area includes several small burns which flow into the sea along the eastern and northern coast.

There are fewer than 10 residential and non-residential properties at risk of flooding.

The Annual Average Damages are approximately £2,500 with the majority caused by river flooding.

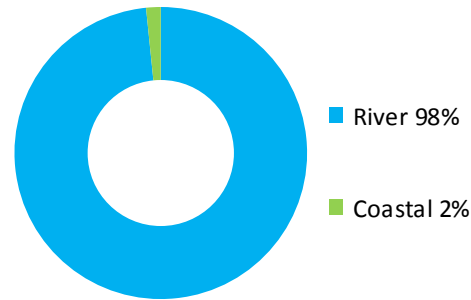


Figure 1: Annual Average Damages by flood source

Summary of flooding impacts

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.

One designated cultural heritage site is at risk of flooding. In addition, small areas of environmental importance are at risk of flooding, including Ness and Barvas Special Protection Area (SPA) and Lewis Peatlands SPA.

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 agricultural land.

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

	1 in 10	1 in 200	1 in 1000
	High likelihood	Medium likelihood	Low likelihood
Residential properties (total 540)	<10	<10	<10
Non-residential properties (total 130)	<10	<10	<10
People	<10	<10	<10
Community facilities	0	0	0
Utilities assets	0	0	0
Transport links (excluding minor roads)	Roads at <10 locations	Roads at <10 locations	Roads at <10 locations
Environmental designated areas (km ²)	1	1	1
Designated cultural heritage sites	1	1	1
Agricultural land (km ²)	0.6	0.6	0.6

Table 1: Summary of flooding impacts¹

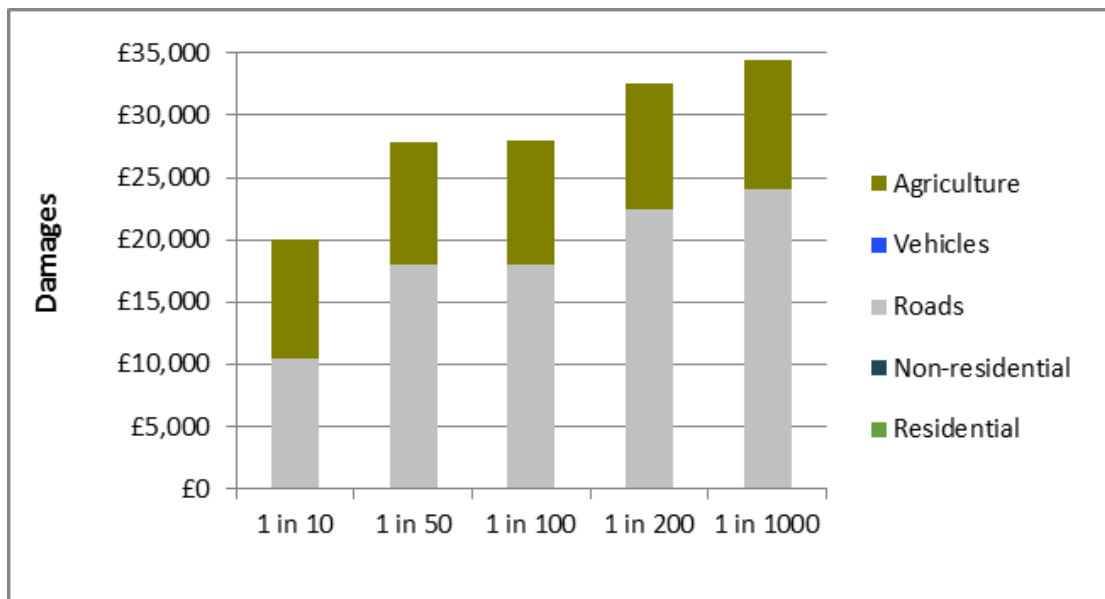


Figure 2: Damages by flood likelihood

History of flooding

There is no record of historic floods in this Potentially Vulnerable Area.

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

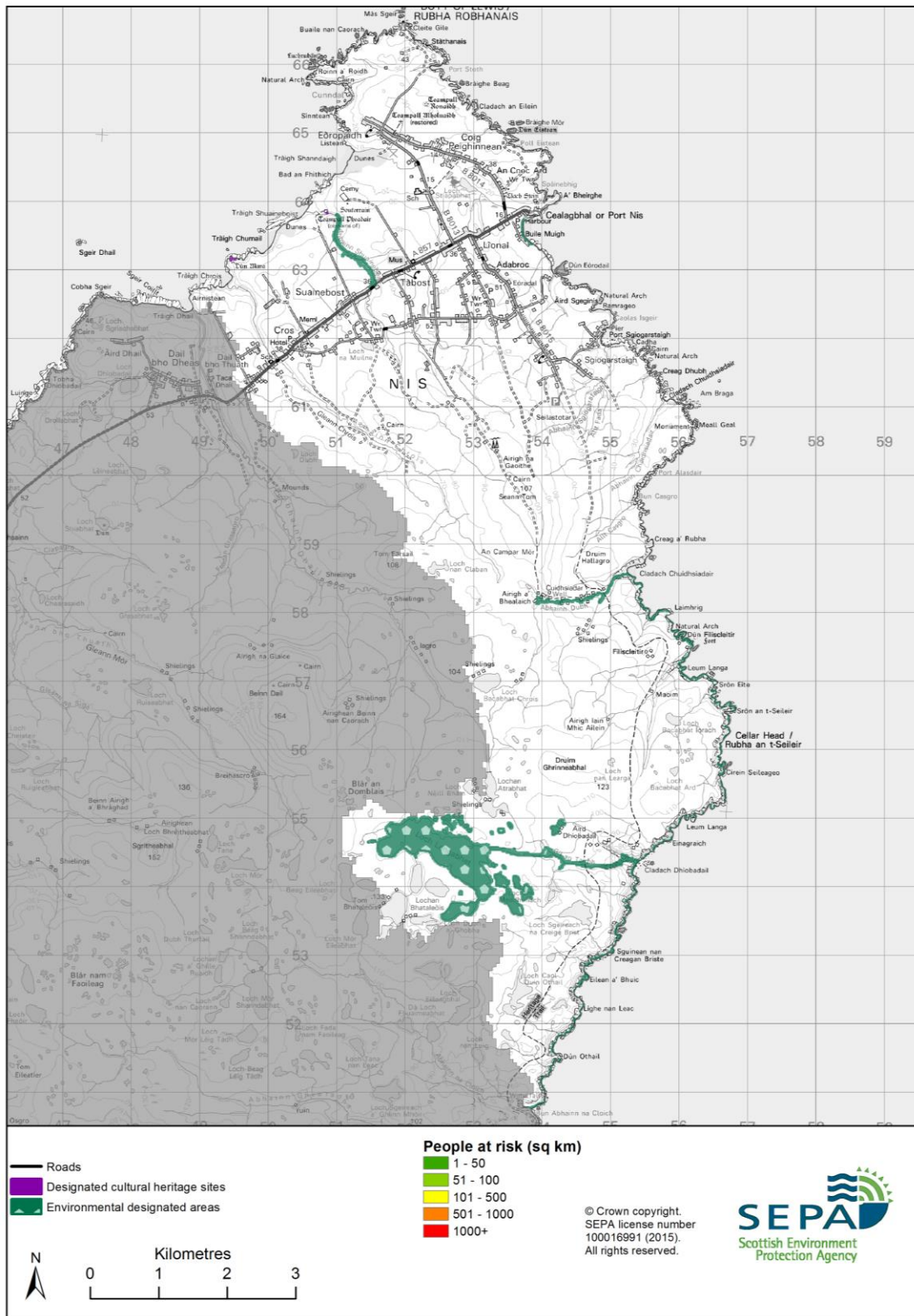


Figure 3: Impacts of flooding

Objectives to manage flooding in Potentially Vulnerable Area 02/01

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 Ness, Isle of Lewis Potentially Vulnerable Area.

Target area	Objective	ID	Indicators within PVA
Applies across Outer Hebrides Local Plan District	Avoid an overall increase in flood risk	200001	<ul style="list-style-type: none"> • <10 residential properties • £2,500 Annual Average Damages
Applies across Outer Hebrides Local Plan District	Reduce overall flood risk	200002	<ul style="list-style-type: none"> • <10 residential properties • £2,500 Annual Average Damages
Applies across Outer Hebrides 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 02/01

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 Ness, Isle of Lewis Potentially Vulnerable Area.

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

Action (ID):	NEW FLOOD WARNING (2000020010)		
Objective (ID):	Reduce overall flood risk (200002)		
Delivery lead:	SEPA		
Status:	Not started	Indicative delivery:	2016-2021
Description:	The area under consideration covers the coastline of the Outer Hebrides. A flood forecasting system will be required before flood warnings can be implemented for this area.		

Action (ID):	FLOOD FORECASTING (2000020009)		
Objective (ID):	Reduce overall flood risk (200002)		
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. The Potentially Vulnerable Area is within the 'Western Isles' flood alert area.		

Action (ID):	SELF HELP (2000020011)		
Objective (ID):	Reduce overall flood risk (200002)		
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 (2000020013)		
Objective (ID):	Reduce overall flood risk (200002)		
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 (2000020007)		
Objective (ID):	Reduce overall flood risk (200002)		
Delivery lead:	Comhairle nan Eilean Siar, 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.		

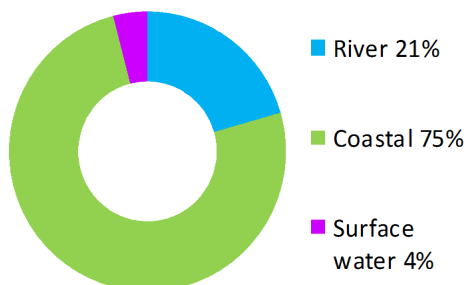
Action (ID):	EMERGENCY PLANS/RESPONSE (2000020014)		
Objective (ID):	Reduce overall flood risk (200002)		
Delivery lead:	Category 1 and 2 Responders		
Status:	Existing	Indicative delivery:	Ongoing
Description:	<p>Providing an emergency response to flooding is the responsibility of many organisations, 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 (2000010001)		
Objective (ID):	Avoid an overall increase in flood risk (200001) Reduce overall flood risk (200002)		
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>		

Stornoway (Potentially Vulnerable Area 02/02)

Local Plan District	Local authority	Main catchment
Outer Hebrides	Comhairle nan Eilean Siar	Lewis and Harris coastal

Summary of flooding impacts



At risk of flooding

- 20 residential properties
- 70 non-residential properties
- £210,000 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>	New flood warning	<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
<i>Maintain flood protection scheme</i>	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

Actions

Stornoway (Potentially Vulnerable Area 02/02)

Local Plan District	Local authority	Main catchment
Outer Hebrides	Comhairle nan Eilean Siar	Lewis and Harris coastal

Background

This Potentially Vulnerable Area is located in the east of the Isle of Lewis (shown below). It extends from Stornoway across the Eye Peninsula and covers an area of approximately 57km².

The area has a long coastline comprising rocky and sandy shorelines. The estuary of the Abhainn Lacasdail river is located just to the north east of Stornoway.



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Stornoway is the administrative centre of the Outer Hebrides and the principal town with a population of approximately 9,000. The harbour and airport are important links to the mainland and the southern islands.

Approximately 20 residential properties and 70 non-residential properties are at risk of flooding.

The Annual Average Damages are estimated to be £210,000 with the majority caused by coastal flooding.

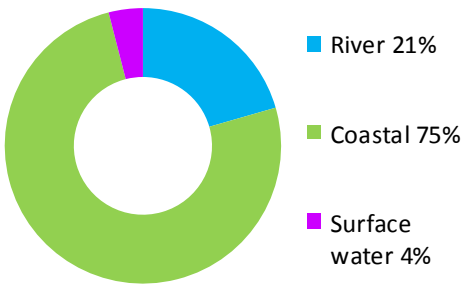


Figure 1: Annual Average Damages by flood source

Summary of flooding impacts

Coastal flooding extends from the Abhainn Lacasdail estuary across the low lying land to the north and east of Stornoway. Coastal flooding also affects low lying parts of the town of Stornoway, notably around Bayhead and North Beach. A strip of land connecting the Eye Peninsula to the mainland at the Bhragh is subject to wave action during storms which results in disruption to the A866 road, cutting off commuters and local communities on a regular basis.

River flooding affects the west of the area from the Abhainn a Ghlinn Mhoir which flows along the west of Stornoway and discharges into the Cala Steornabhaigh.

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.

Most of the impacts of flooding are in Stornoway itself. Designated cultural heritage sites are at risk of flooding, including a church and several scheduled monuments. Small areas of environmental importance are also at risk of flooding, including the Stornoway Castle Woodlands Site of Special Scientific Interest (SSSI) and Tong Saltings SSSI.

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

	1 in 10 High likelihood	1 in 200 Medium likelihood	1 in 1000 Low likelihood
Residential properties (total 4,200)	<10	20	50
Non-residential properties (total 1,000)	30	70	90
People	20	50	100
Community facilities	0	0	0
Utilities assets	<10	10	10
Transport links (excluding minor roads)	Roads at 40 locations Airport runway	Roads at 90 locations Airport runway	Roads at 110 locations Airport runway
Environmental designated areas (km ²)	<0.1	<0.1	<0.1
Designated cultural heritage sites	9	14	14
Agricultural land (km ²)	0.8	0.8	0.9

Table 1: Summary of impacts of flooding¹

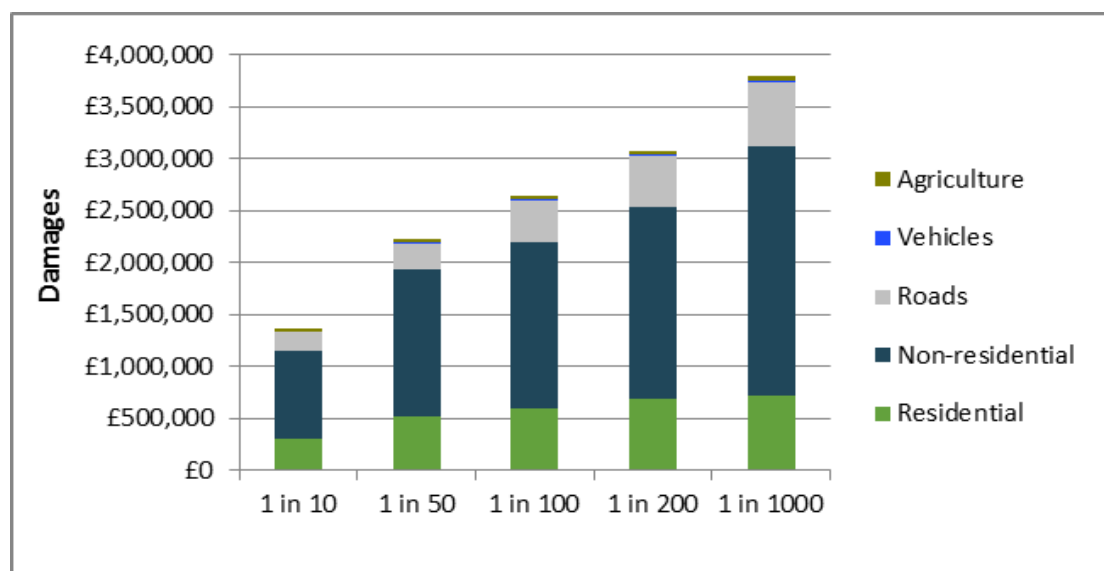


Figure 2: Damages by flood likelihood

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

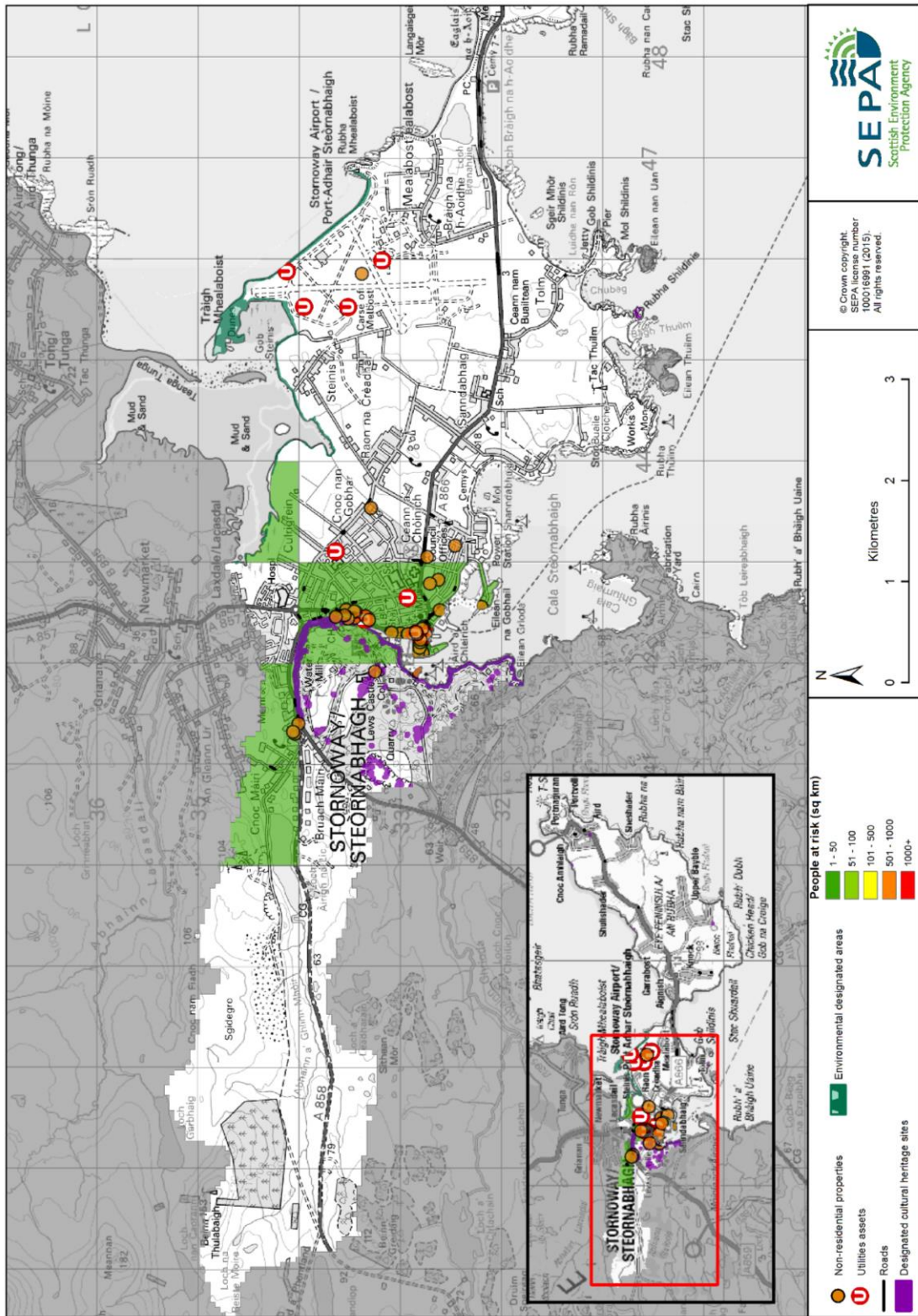


Figure 3: Impacts of flooding

History of flooding

There is a long history of floods in this Potentially Vulnerable Area with flooding from high tides, wave action or a combination of the two frequently recorded.

The earliest recorded flood was in 1850, when the sea flooded low lying coastal and estuary areas. Flooding on a burn in 1890 washed away a substantial bridge in Bayble and in 1933 the retaining embankment of a loch, which supplies Stornoway with water, collapsed, destroying bridges and flooding properties.

There were coastal floods in 1926, 1959, 1967, 1974, 1975 and 1984, which affected properties near the harbour. The airport suffered from flooding in 1974 and in February 1990, a coastal flood again affected the airport plus several streets and the town hall in Stornoway whilst wave action cut off access to the bus station.

In February 2014 Kenneth Street, Beach Street and the Bayhead areas of Stornoway were affected by high sea levels.

Objectives to manage flooding in Potentially Vulnerable Area 02/02

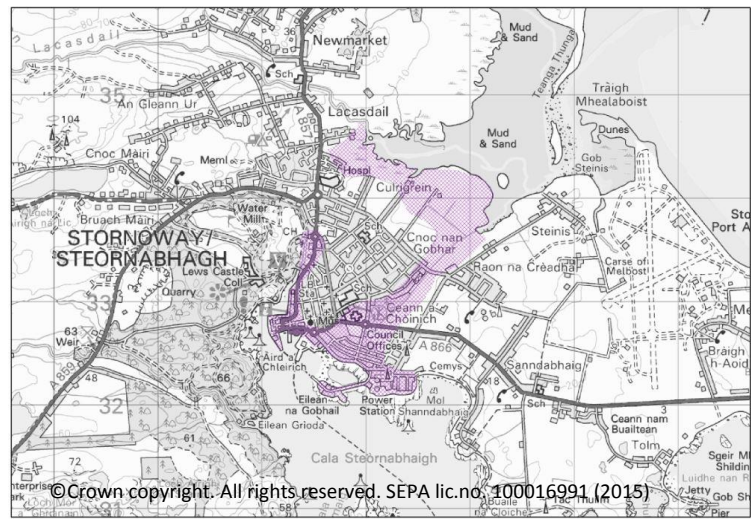
Objectives provide a common goal and shared ambition for managing floods. These objectives have been set by SEPA and agreed with flood risk management authorities following consultation. They were identified through an assessment of the underlying evidence of the causes and impacts of flooding. Target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

Reduce risk to Stornoway from coastal flooding

Indicators:

- 30 people
- £17,000 Annual Average Damages from residential properties
- £100,000 Annual Average Damages from non-residential properties

Target area:



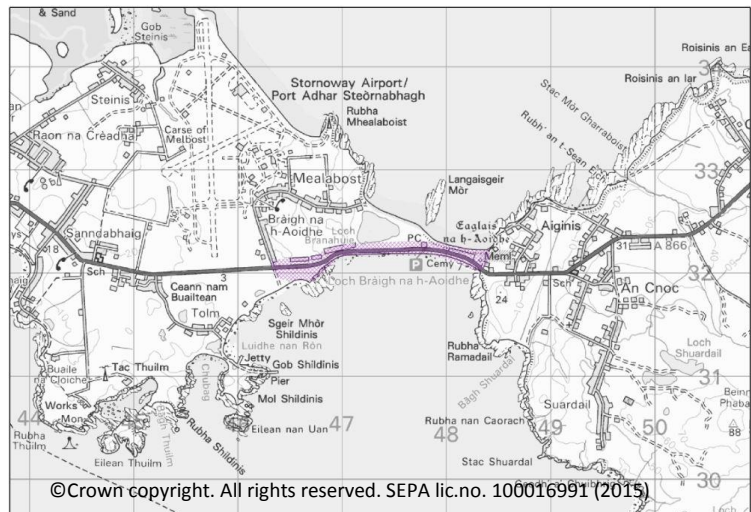
Objective ID: 200201

Reduce disruption to roads in the Braigh area from coastal flooding

Indicators:

- A866 (Stornoway to Eye Peninsula)

Target area:



Objective ID: 200202

Target area	Objective	ID	Indicators within PVA
Applies across Outer Hebrides Local Plan District	Avoid an overall increase in flood risk	200001	<ul style="list-style-type: none"> • 20 residential properties • £210,000 Annual Average Damages
Applies across Outer Hebrides Local Plan District	Reduce overall flood risk	200002	<ul style="list-style-type: none"> • 20 residential properties • £210,000 Annual Average Damages
Applies across Outer Hebrides 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 02/02

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 Stornoway Potentially Vulnerable Area.

Selected actions					
<i>Flood protection scheme/works</i>	<i>Natural flood management works</i>	New flood warning	<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
<i>Maintain flood protection scheme</i>	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

Action (ID):	NEW FLOOD WARNING (2000020010)		
Objective (ID):	Reduce overall flood risk (200002)		
Delivery lead:	SEPA		
Status:	Not started	Indicative delivery:	2016-2021
Description:	The area under consideration covers the coastline of the Outer Hebrides. A flood forecasting system will be required before flood warnings can be implemented for this area.		

Action (ID):	FLOOD PROTECTION STUDY (2002010005)		
Objective (ID):	Reduce disruption to roads in the Braigh area from coastal flooding (200202) Reduce risk to Stornoway from coastal flooding (200201)		
Delivery lead:	Comhairle nan Eilean Siar		
Priority:	National: 79 of 168	Within local authority:	2 of 5
Status:	Not started	Indicative delivery:	2016-2021
Description:	A study is needed to confirm the business case and determine the extent and size of defences required. The study should focus on options of constructing new or improving existing direct defences around the harbour area (in particular Cromwell Street) and along the northern edge of Stornoway, improvements to the existing flap valve on the outfall of the unnamed watercourse through the Goat Hill area,		

	consideration of property level protection for any residual flood risk and improving the existing flood defence walls either side of the A866 on the isthmus between Stornoway and the Eye peninsula (the Braigh area). Any other actions may also be considered to develop the most sustainable range of options. Wave overtopping should be considered as part of the study.
Potential impacts	
Economic:	The study could benefit 13 residential and 55 non-residential properties at risk of flooding in this location, with potential damages avoided of up to £4.2 million.
Social:	Approximately 29 people could directly benefit from flood protection works. The community has a higher than average proportion of vulnerable residents. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community and socially vulnerable people. Reduced flood risk to three energy production/electricity utility sites and roads (including Anderson Road, A866, A857, Newton Street) could reduce disruption to the wider community. The A866 is the only land link between the Eye peninsula and Stornoway. Road closures result in considerable disruption to residents commuting for work and children attending school in Stornoway. Road closures also affect the provision of emergency services to the communities on the Eye peninsula. Construction of direct defences has the potential to reduce access to the waterfront. Negative impacts through disturbance to the local community during the construction phase should be considered.
Environmental:	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment. Opportunities to mitigate any environmental impacts may include design and timing of works. There is potential for impacts on coastal landscapes and habitats; as there are existing structures in the locations where defences are proposed the impacts are likely to be limited. Future flood protection works would be located outside of the garden and designed landscape cultural heritage site and the Tong Saltings Site of Special Scientific Interest (off the northern frontage of Stornoway), and there are unlikely to be any significant impacts.

Action (ID):	STRATEGIC MAPPING AND MODELLING (2000020019)		
Objective (ID):	Reduce overall flood risk (200002)		
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 (2000020009)		
Objective (ID):	Reduce overall flood risk (200002)		
Delivery lead:	SEPA		
Status:	Existing	Indicative delivery:	Ongoing
Description:	<p>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.</p> <p>The Potentially Vulnerable Area is within the 'Western Isles' flood alert area.</p>		

Action (ID):	SELF HELP (2000020011)		
Objective (ID):	Reduce overall flood risk (200002)		
Delivery lead:	—		
Status:	Existing	Indicative delivery:	Ongoing
Description:	<p>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.</p>		

Action (ID):	AWARENESS RAISING (2000020013)		
Objective (ID):	Reduce overall flood risk (200002)		
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 (2000020007)		
Objective (ID):	Reduce overall flood risk (200002)		
Delivery lead:	Comhairle nan Eilean Siar, 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.		

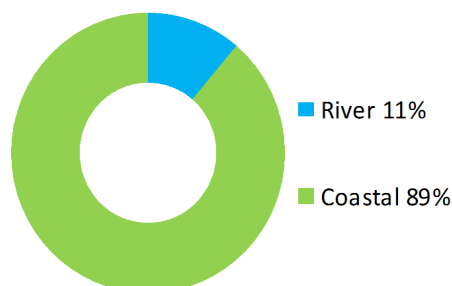
Action (ID):	EMERGENCY PLANS/RESPONSE (2000020014)		
Objective (ID):	Reduce overall flood risk (200002)		
Delivery lead:	Category 1 and 2 Responders		
Status:	Existing	Indicative delivery:	Ongoing
Description:	Providing an emergency response to flooding is the responsibility of many organisations, including 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 (2000010001)		
Objective (ID):	Avoid an overall increase in flood risk (200001) Reduce overall flood risk (200002)		
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.		

Southern Harris (Potentially Vulnerable Area 02/03)

Local Plan District	Local authority	Main catchment
Outer Hebrides	Comhairle nan Eilean Siar	Lewis and Harris coastal

Summary of flooding impacts



At risk of flooding

- <10 residential properties
- 10 non-residential properties
- £130,000 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>	New flood warning	<i>Community flood action groups</i>	<i>Property level protection scheme</i>	<i>Site protection plans</i>
<i>Flood protection study</i>	<i>Natural flood management study</i>	<i>Maintain flood warning</i>	Awareness raising	<i>Surface water plan/study</i>	Emergency plans/response
<i>Maintain flood protection scheme</i>	<i>Strategic mapping and modelling</i>	Flood forecasting	Self help	Maintenance	Planning policies

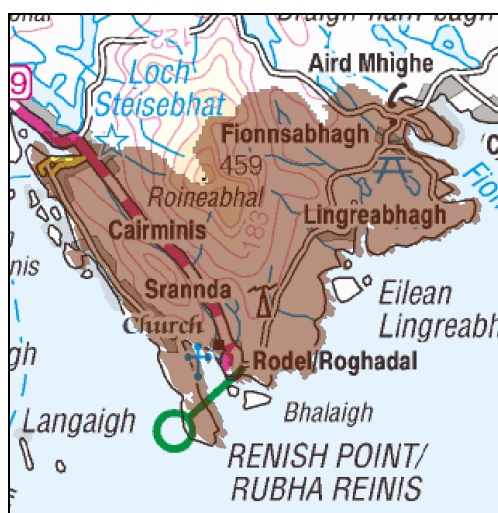
Actions

Southern Harris (Potentially Vulnerable Area 02/03)

Local Plan District	Local authority	Main catchment
Outer Hebrides	Comhairle nan Eilean Siar	Lewis and Harris coastal

Background

This Potentially Vulnerable Area is approximately 21 km². It is located at the southern end of the Isle of Harris (shown below) and extends from the coastline at Aird Minghe, westwards to Leverburgh. Most of the properties in the area are located in Leverburgh.



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The landscape is dominated by rock outcrops and numerous fresh water lochs particularly in the north east.

Fewer than 10 residential properties and around 10 non-residential properties are at risk of flooding.

The Annual Average Damages are approximately £130,000 with the majority caused by coastal flooding.

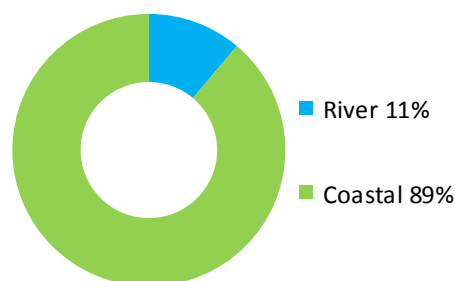


Figure 1: Annual Average Damages by flood source

Summary of flooding impacts

The impacts of coastal flooding are mainly focused in Leverburgh however flooding does not extend far inland. Flooding affects the road to the ferry port which impacts on commuting and community links as there are no alternative access routes.

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.

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

	1 in 10 High likelihood	1 in 200 Medium likelihood	1 in 1000 Low likelihood
Residential properties (total 150)	<10	<10	<10
Non-residential properties (total 60)	10	10	10
People	<10	<10	<10
Community facilities	0	0	0
Utilities assets	<10	<10	<10
Transport links (excluding minor roads)	Roads at 20 locations	Roads at 20 locations	Roads at 20 locations
Environmental designated areas (km ²)	0	0	0
Designated cultural heritage sites	0	0	0
Agricultural land (km ²)	0.2	0.2	0.2

Table 1: Summary of flooding impacts¹

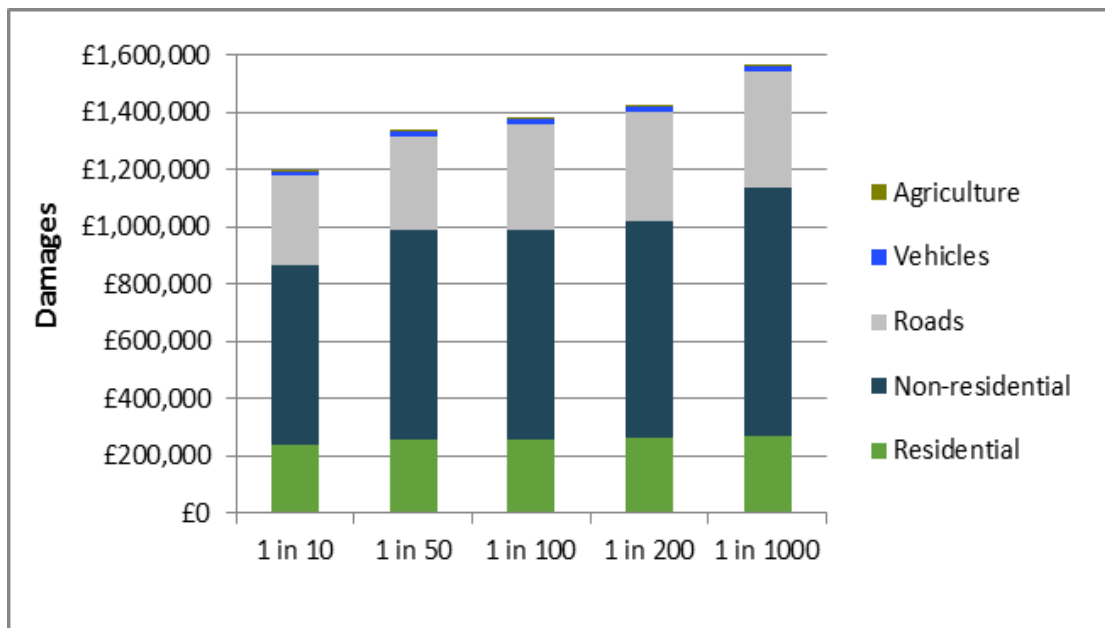


Figure 2: Damages by flood likelihood

History of flooding

There are no recorded floods in this Potentially Vulnerable Area.

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

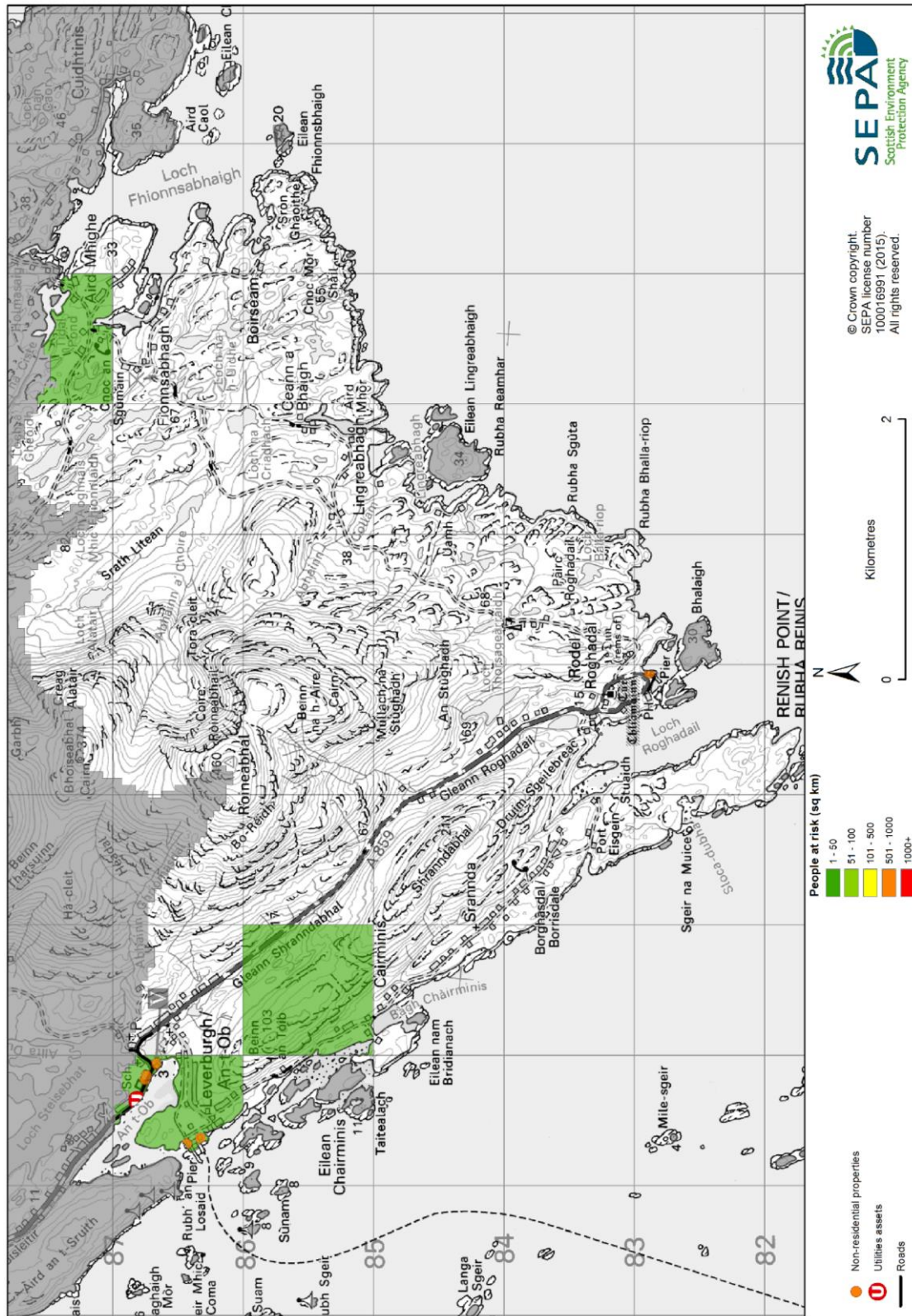


Figure 3: Impacts of flooding

Objectives to manage flooding in Potentially Vulnerable Area 02/03

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 Southern Harris Potentially Vulnerable Area.

Target area	Objective	ID	Indicators within PVA
Applies across Outer Hebrides Local Plan District	Avoid an overall increase in flood risk	200001	<ul style="list-style-type: none"> • <10 residential properties • £130,000 Annual Average Damages
Applies across Outer Hebrides Local Plan District	Reduce overall flood risk	200002	<ul style="list-style-type: none"> • <10 residential properties • £130,000 Annual Average Damages
Applies across Outer Hebrides 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 02/03

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 Southern Harris Potentially Vulnerable Area.

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

Action (ID):	NEW FLOOD WARNING (2000020010)		
Objective (ID):	Reduce overall flood risk (200002)		
Delivery lead:	SEPA		
Status:	Not started	Indicative delivery:	2016-2021
Description:	The area under consideration covers the coastline of the Outer Hebrides. A flood forecasting system will be required before flood warnings can be implemented for this area.		

Action (ID):	FLOOD FORECASTING (2000020009)		
Objective (ID):	Reduce overall flood risk (200002)		
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. The Potentially Vulnerable Area is within the 'Western Isles' flood alert area.		

Action (ID):	SELF HELP (2000020011)		
Objective (ID):	Reduce overall flood risk (200002)		
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 (2000020013)		
Objective (ID):	Reduce overall flood risk (200002)		
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 (2000020007)		
Objective (ID):	Reduce overall flood risk (200002)		
Delivery lead:	Comhairle nan Eilean Siar, 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.		

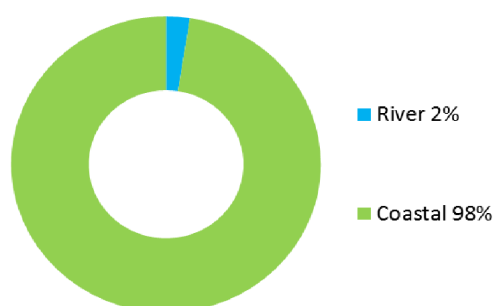
Action (ID):	EMERGENCY PLANS/RESPONSE (2000020014)		
Objective (ID):	Reduce overall flood risk (200002)		
Delivery lead:	Category 1 and 2 Responders		
Status:	Existing	Indicative delivery:	Ongoing
Description:	<p>Providing an emergency response to flooding is the responsibility of many organisations, 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 (2000010001)		
Objective (ID):	Avoid an overall increase in flood risk (200001) Reduce overall flood risk (200002)		
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>		

Lochmaddy and Trumisgarry (Potentially Vulnerable Area 02/04)

Local Plan District	Local authority	Main catchment
Outer Hebrides	Comhairle nan Eilean Siar	North Uist coastal

Summary of flooding impacts



At risk of flooding

- <10 residential properties
- <10 non-residential properties
- £61,000 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>	New flood warning	<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
<i>Maintain flood protection scheme</i>	<i>Strategic mapping and modelling</i>	Flood forecasting	Self help	Maintenance	Planning policies

Actions

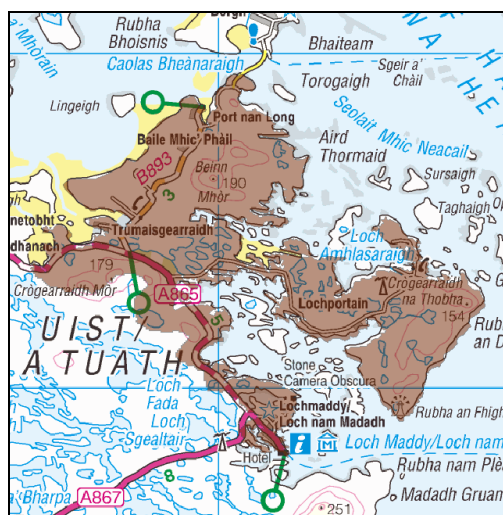
Lochmaddy and Trumisgarry (Potentially Vulnerable Area 02/04)

Local Plan District	Local authority	Main catchment
Outer Hebrides	Comhairle nan Eilean Siar	North Uist coastal

Background

This Potentially Vulnerable Area covers the north east of North Uist and is approximately 51km² (shown below).

There is a long coastline which comprises rocky and sandy shorelines and numerous sea lochs and tidal inlets.



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The A865, which runs along the southern boundary, is an important transport link between the islands.

There are fewer than 10 residential and non-residential properties at risk of flooding.

The Annual Average Damages are estimated to be £61,000, the majority of which is a result of coastal floods.

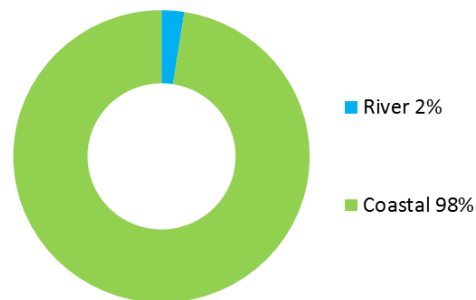


Figure 1: Annual Average Damages by flood source

Summary of flooding impacts

Flood risk is caused by coastal flooding, affecting the surrounding lochs and their drainage into the sea. 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. The impacts of flooding are limited mainly to minor lengths of road and areas of agricultural land. For this Potentially Vulnerable Area the highest damages are to roads followed by residential properties.

Four designated cultural heritage sites are at risk of flooding. Environmentally designated sites are also at risk, including Loch au Duin Site of Special Scientific Interest (SSSI), Loch nam Madadh Special Area of Conservation and SSSI, Machairs Robach and Newton SSSI and the North Uist Machair and Island Special Protection Area.

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

	1 in 10	1 in 200	1 in 1000
	High likelihood	Medium likelihood	Low likelihood
Residential properties (total 170)	<10	<10	<10
Non-residential properties (total 80)	<10	<10	<10
People	<10	<10	<10
Community facilities	0	0	0
Utilities assets	0	0	0
Transport links (excluding minor roads)	Roads at 10 locations	Roads at 20 locations	Roads at 20 locations
Environmental designated areas (km ²)	1	1	1
Designated cultural heritage sites	4	4	4
Agricultural land (km ²)	0.6	0.7	0.8

Table 1: Summary of flooding impacts¹

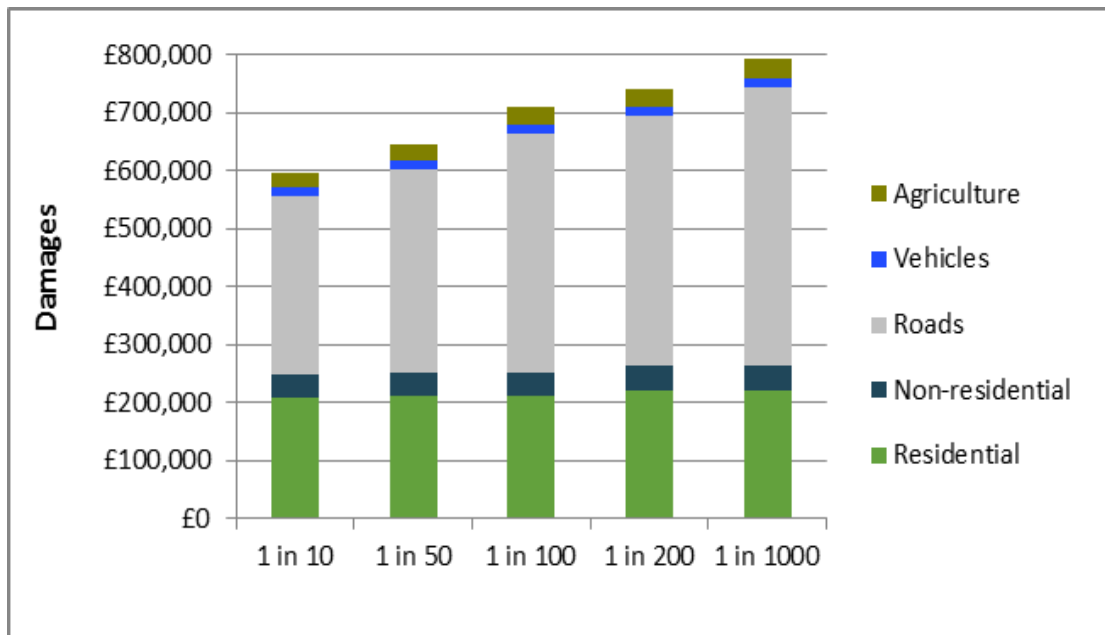


Figure 2: Damages by flood likelihood

History of flooding

There is no record of historic floods within this Potentially Vulnerable Area.

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

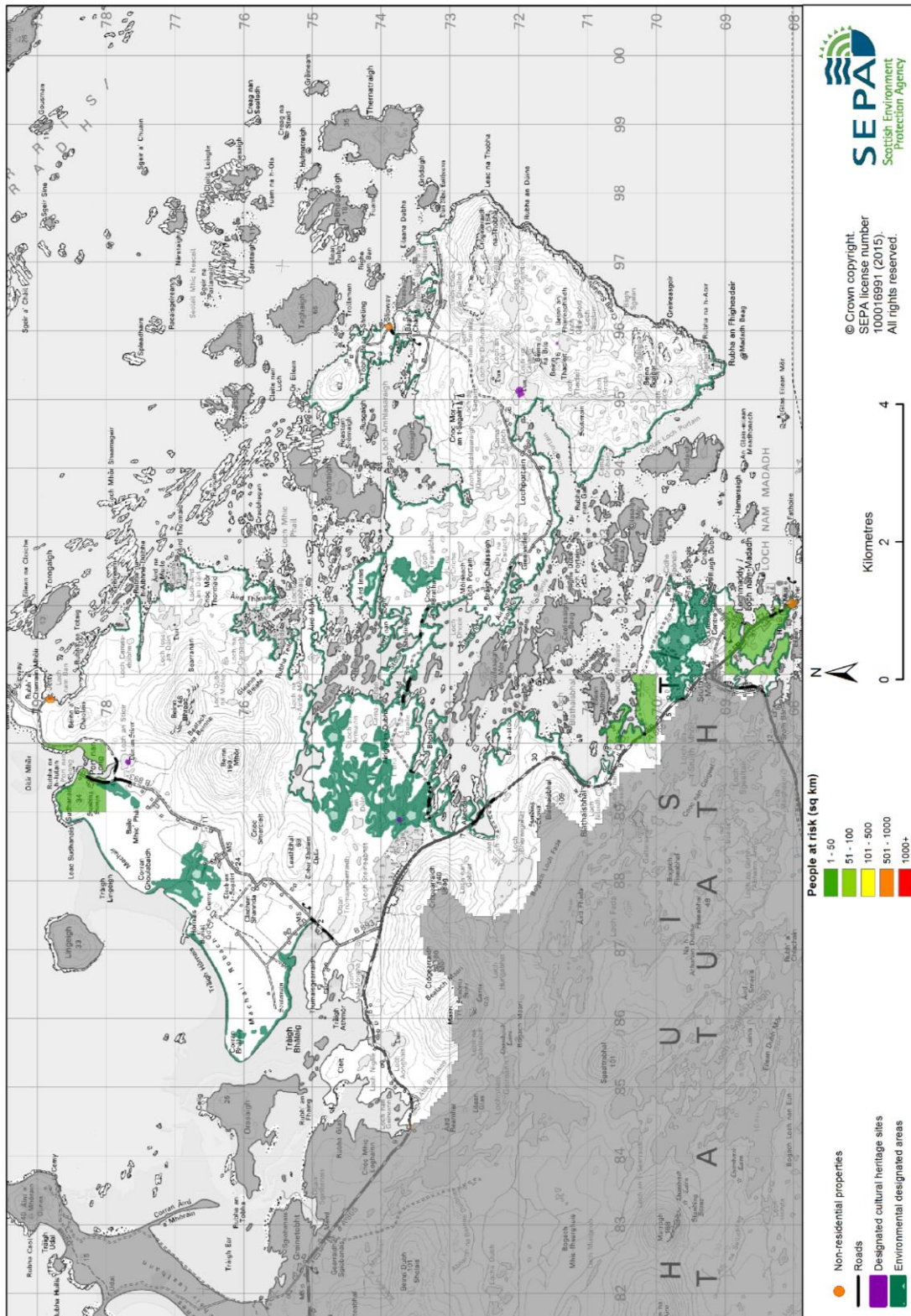


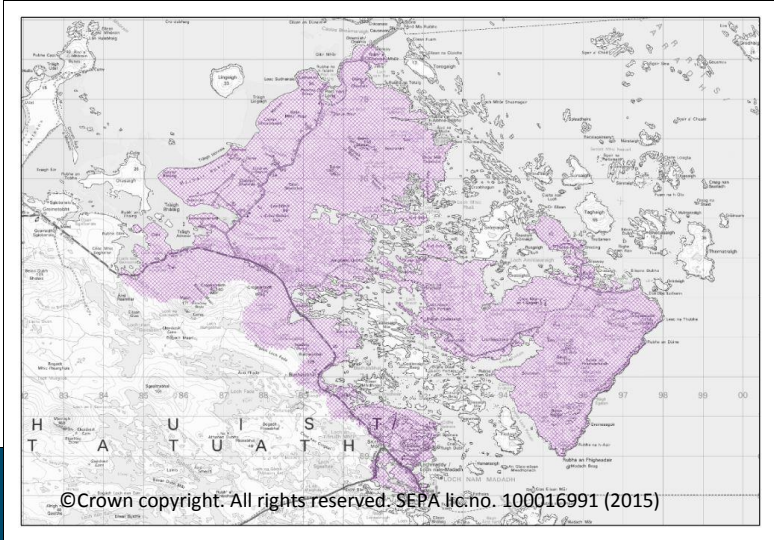
Figure 3: Impacts of flooding

Objectives to manage flooding in Potentially Vulnerable Area 02/04

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 Lochmaddy and Trumisgarry Potentially Vulnerable Area.

Reduce disruption to roads in North Uist from coastal flooding

- Indicators:
- A865 (Aileodair)
 - B893 (Port nan Long and Trumisgarry)



Objective ID: 200401

Target area	Objective	ID	Indicators within PVA
Applies across Outer Hebrides Local Plan District	Avoid an overall increase in flood risk	200001	<ul style="list-style-type: none"> • <10 residential properties • £61,000 Annual Average Damages
Applies across Outer Hebrides Local Plan District	Reduce overall flood risk	200002	<ul style="list-style-type: none"> • <10 residential properties • £61,000 Annual Average Damages
Applies across Outer Hebrides 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 02/04

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 Lochmaddy and Trumisgarry Potentially Vulnerable Area.

Selected actions					
<i>Flood protection scheme/works</i>	<i>Natural flood management works</i>	New flood warning	<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
<i>Maintain flood protection scheme</i>	<i>Strategic mapping and modelling</i>	Flood forecasting	Self help	Maintenance	Planning policies

Action (ID):	NEW FLOOD WARNING (2000020010)		
Objective (ID):	Reduce overall flood risk (200002)		
Delivery lead:	SEPA		
Status:	Not started	Indicative delivery:	2016-2021
Description:	The area under consideration covers the coastline of the Outer Hebrides. A flood forecasting system will be required before flood warnings can be implemented for this area.		

Action (ID):	FLOOD PROTECTION STUDY (2004010005)		
Objective (ID):	Reduce disruption to roads in North Uist from coastal flooding (200401)		
Delivery lead:	Comhairle nan Eilean Siar		
Priority:	National:	Within local authority:	
	146 of 168	5 of 5	
Status:	Not started	Indicative delivery:	2016-2021
Description:	A study is required to investigate what improvements could be made to the existing flap valve structures on culverts to reduce coastal flooding of the B893 road as a result of interaction with the small watercourses. The impacts of improvement works would require further assessment. Other actions may also be considered to develop the most sustainable range of options.		

Potential impacts	
Economic:	The business case for works in this location would need to be developed as part of the study, focusing on the disruption to traffic during floods.
Social:	The B893 is the only road which connects the causeway from the island of Berneray to the main A865 road around North Uist. Flooding of this road causes disruption to communities on Berneray and along the B893, potentially cutting them off from the rest of North Uist. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community and socially vulnerable people. Negative impacts through disturbance to the local community during the construction phase should be considered.
Environmental:	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment. Opportunities to mitigate any environmental impacts may include design and timing of works. There is potential for impacts on coastal landscapes and habitats; as there are existing structures in the locations where defences are proposed the impacts are likely to be limited. 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 North Uist Machair and Islands Special Protection Area, and North Uist Machair Special Area of Conservation. There is potential for direct impacts on the Machairs Robach and Newton Site of Special Scientific Interest. There are three scheduled monuments which may benefit from future flood protection works.

Action (ID):	FLOOD FORECASTING (2000020009)		
Objective (ID):	Reduce overall flood risk (200002)		
Delivery lead:	SEPA		
Status:	Existing	Indicative delivery:	Ongoing
Description:	<p>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.</p> <p>The Potentially Vulnerable Area is within the 'Western Isles' flood alert area.</p>		

Action (ID):	SELF HELP (2000020011)		
Objective (ID):	Reduce overall flood risk (200002)		
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 (2000020013)		
Objective (ID):	Reduce overall flood risk (200002)		
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 (2000020007)		
Objective (ID):	Reduce overall flood risk (200002)		
Delivery lead:	Comhairle nan Eilean Siar, 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> <p>There is a flap valve situated in the culvert below the B893 road to Berneray which allows freshwater to flow out to sea and which prevents sea water from flowing into the loch. Regular maintenance of the flap valve is essential and is undertaken by the land manager.</p>		

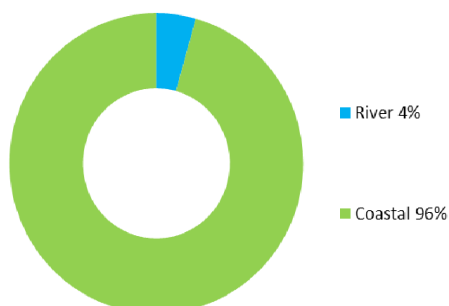
Action (ID):	EMERGENCY PLANS/RESPONSE (2000020014)		
Objective (ID):	Reduce overall flood risk (200002)		
Delivery lead:	Category 1 and 2 Responders		
Status:	Existing	Indicative delivery:	Ongoing
Description:	<p>Providing an emergency response to flooding is the responsibility of many organisations, 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 (2000010001)		
Objective (ID):	Avoid an overall increase in flood risk (200001) Reduce overall flood risk (200002)		
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.		

North Uist (Potentially Vulnerable Area 02/05)

Local Plan District	Local authority	Main catchment
Outer Hebrides	Comhairle nan Eilean Siar	North Uist coastal

Summary of flooding impacts



At risk of flooding

- <10 residential properties
- <10 non-residential properties
- £87,000 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>	New flood warning	<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
<i>Maintain flood protection scheme</i>	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

Actions

North Uist (Potentially Vulnerable Area 02/05)

Local Plan District	Local authority	Main catchment
Outer Hebrides	Comhairle nan Eilean Siar	North Uist coastal

Background

This Potentially Vulnerable Area is located on North Uist and comprises the majority of the coastline from Loch nan Geireann in the west, to Loch nam Madadh in the east (shown below). It is approximately 162 km².

There are a significant number of lochs located in the south east. By contrast the north west comprises mainly higher ground.



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The A865 follows the eastern coastline of North Uist to Lochmaddy and then runs west and south to the causeway at North Ford.

There are fewer than 10 residential and non-residential properties at risk of flooding.

The Annual Average Damages are estimated to be £87,000 with the majority caused by coastal flooding.

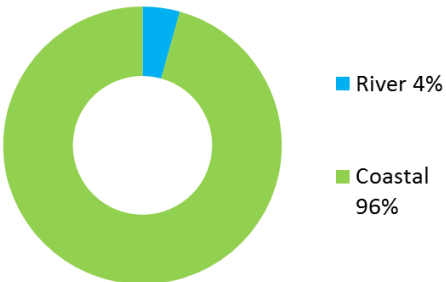


Figure 1: Annual Average Damages by flood source

Summary of flooding impacts

The most significant flood risk in this area is damage and disruption to key transport routes including the causeways at Baleshare and Grimsay. Access to the local primary school is also at risk of disruption due to 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.

Eight designated cultural heritage sites are at risk of flooding. Areas of environmental importance at risk of flooding include North Uist Machair, Special Area of Conservation (SAC), North Uist Machair SAC, Obain Loch Euphoirt SAC, Loch nam Madadh SAC, Mointeach Scadabhaigh Special Protection Area and SAC and Loch Obisary Site of Special Scientific Interest.

The damages associated with floods of different likelihood are shown in Figure 2. For this Potentially Vulnerable Area the highest damages are to roads.

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

	1 in 10 High likelihood	1 in 200 Medium likelihood	1 in 1000 Low likelihood
Residential properties (total 460)	<10	<10	<10
Non-residential properties (total 150)	<10	<10	<10
People	<10	<10	10
Community facilities	0	0	0
Utilities assets	0	0	0
Transport links (excluding minor roads)	Roads at 30 locations	Roads at 40 locations	Roads at 40 locations
Environmental designated areas (km ²)	1	1	1
Designated cultural heritage sites	6	8	7
Agricultural land (km ²)	1	2	2.8

Table 1: Summary of flooding impacts¹

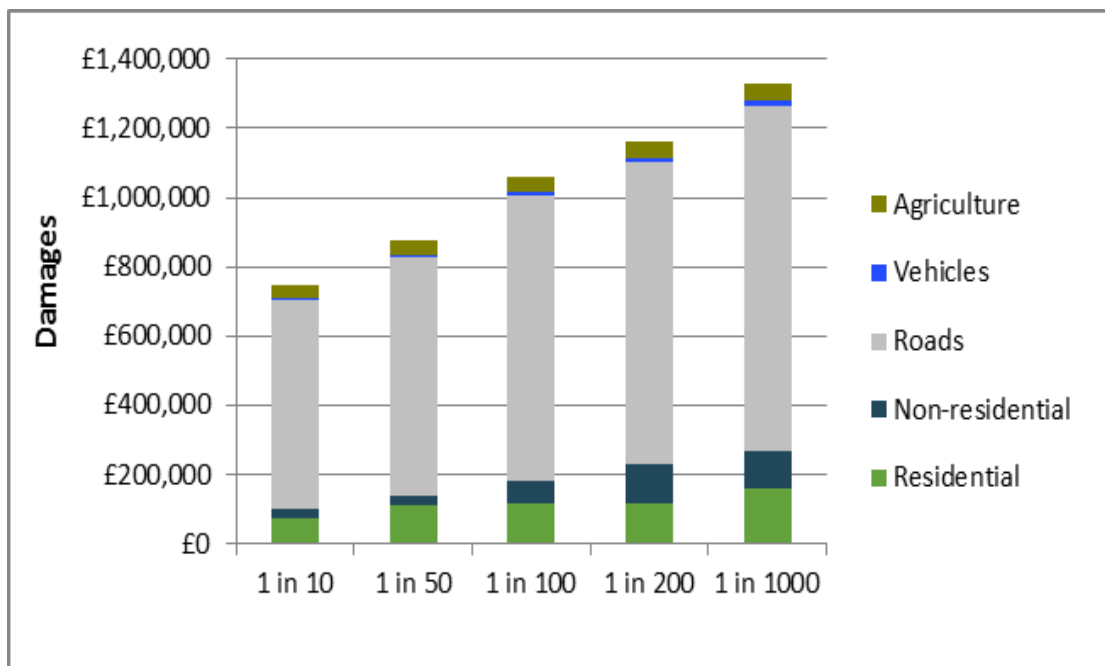


Figure 2: Damages by flood likelihood

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

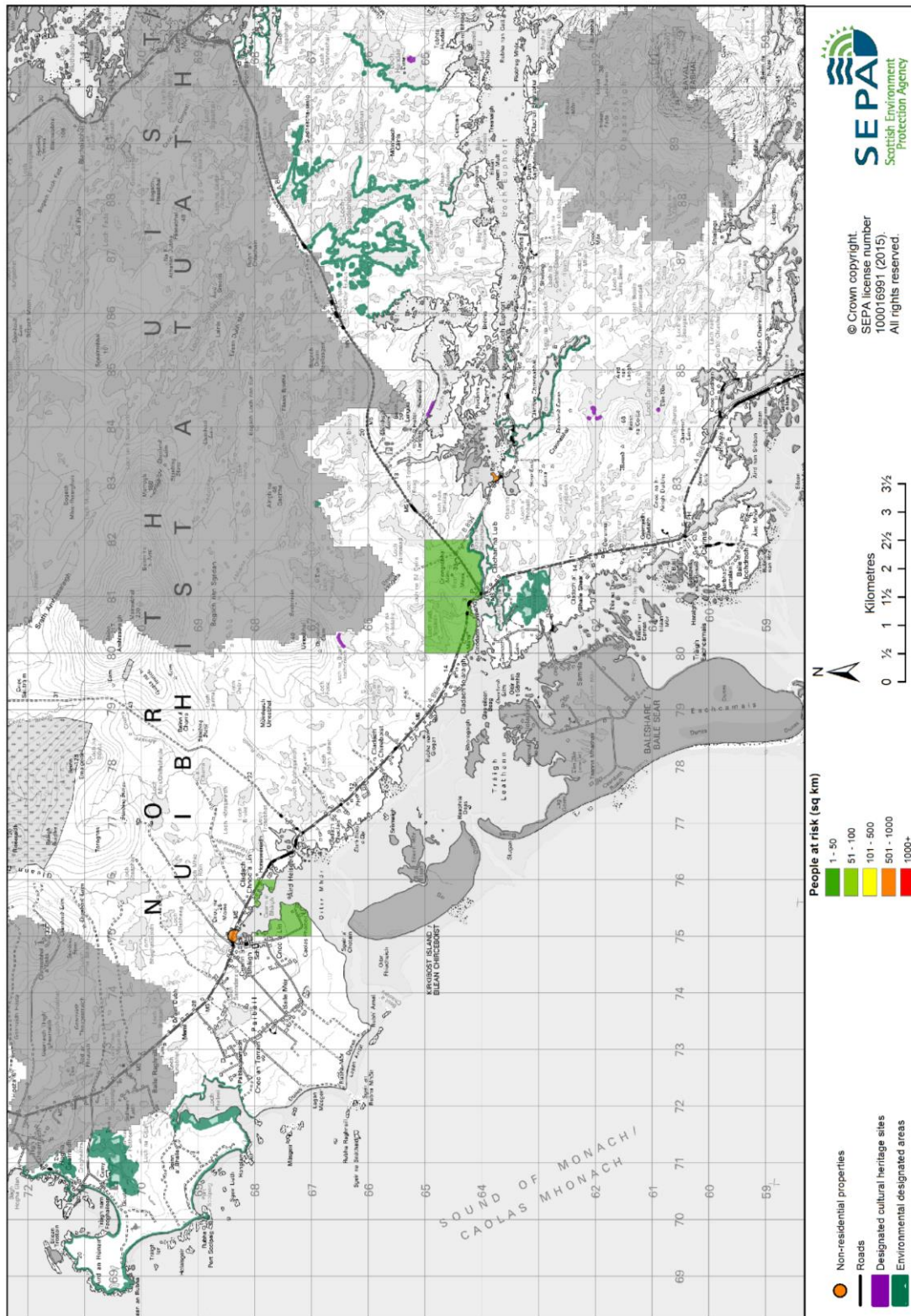


Figure 3: Impacts of flooding

History of flooding

In January 2005 a severe storm hit the west coast of Scotland including the Outer Hebrides. Widespread flooding occurred in many locations in North Uist, particularly on the west coast with roads, agricultural land, houses and non-residential buildings being inundated with sea water. The North Ford Causeway and Baleshare Causeway were closed as were roads at Clachan, Ard Heisgeir, Bayhead and further north in the Malacleit area.

Coastal flooding has occurred on numerous occasions when storm surge and high tides coincide. An added risk factor is that when coastal flooding occurs it is usually accompanied by high strength winds, which can create waves and cause additional damage.

Objectives to manage flooding in Potentially Vulnerable Area 02/05

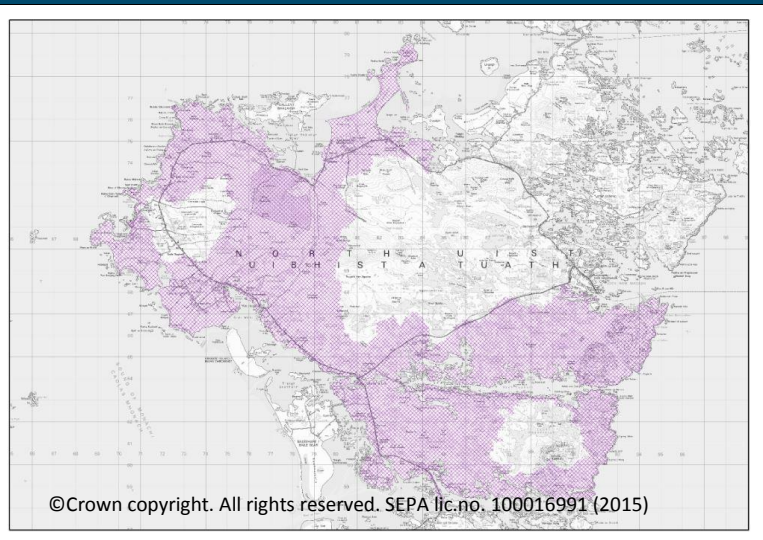
Objectives provide a common goal and shared ambition for managing floods. These objectives have been set by SEPA and agreed with flood risk management authorities following consultation. They were identified through an assessment of the underlying evidence of the causes and impacts of flooding. Target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

Reduce disruption to roads in North Uist from coastal flooding

Indicators:

Target area:

- Causeway to Baleshare
- A865 (Botarubha and Aird Heisgeir)



Objective ID: 200501

Target area	Objective	ID	Indicators within PVA
Applies across Outer Hebrides Local Plan District	Avoid an overall increase in flood risk	200001	<ul style="list-style-type: none"> • <10 residential properties • £87,000 Annual Average Damages
Applies across Outer Hebrides Local Plan District	Reduce overall flood risk	200002	<ul style="list-style-type: none"> • <10 residential properties • £87,000 Annual Average Damages
Applies across Outer Hebrides 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 02/05

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 North Uist Potentially Vulnerable Area.

Selected actions					
<i>Flood protection scheme/works</i>	<i>Natural flood management works</i>	New flood warning	<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
<i>Maintain flood protection scheme</i>	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

Action (ID):	NEW FLOOD WARNING (2000020010)		
Objective (ID):	Reduce overall flood risk (200002)		
Delivery lead:	SEPA		
Status:	Not started	Indicative delivery:	2016-2021
Description:	The area under consideration covers the coastline of the Outer Hebrides. A flood forecasting system will be required before flood warnings can be implemented for this area.		

Action (ID):	FLOOD PROTECTION STUDY (2005010005)		
Objective (ID):	Reduce disruption to roads in North Uist from coastal flooding (200501)		
Delivery lead:	Comhairle nan Eilean Siar		
Priority:	National:	Within local authority:	
	127 of 168	4 of 5	
Status:	Not started	Indicative delivery:	2016-2021
Description:	Further investigation into the feasibility of reducing wave overtopping through direct defences at the Baleshare causeway is required. A dune management plan is to be developed for the machair and sand dunes on the west coast of North Uist to cover natural flood management including wave attenuation and considering the long term stability of the coastline and flood risk management. Other actions may also be considered to develop the most sustainable		

	range of options.
Potential impacts	
Economic:	The business case for works to the Baleshare causeway would need to be developed as part of the study, focusing on the disruption to traffic during high risk floods, which has not been quantified at this stage. The causeway is the only access between Baleshare and North Uist.
Social:	The causeway is the only road which connects the island of Baleshare to North Uist. Flooding of this road causes disruption to communities on Baleshare, and affects the safe access/egress for residents and emergency services. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community and socially vulnerable people. Natural flood management actions can restore and enhance natural environments and create opportunities for recreation and tourism. Negative impacts through disturbance to the local community during the construction phase should be considered.
Environmental:	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment. Natural flood management actions can have a positive impact by restoring and enhancing natural habitats. Opportunities to mitigate any environmental impacts may include design and timing of works. There is potential for impacts on coastal landscapes and habitats; as there are existing structures in the locations where defences are proposed the impacts are likely to be limited. 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 North Uist Machair and Islands Special Protection Area, and North Uist Machair Special Area of Conservation. There is potential for impacts on the Baleshare and Kirkibost Site of Special Scientific Interest.

Action (ID):	STRATEGIC MAPPING AND MODELLING (2000020016)		
Objective (ID):	Reduce overall flood risk (200002)		
Delivery lead:	SEPA		
Status:	Not started	Indicative delivery:	2016-2021
Description:	SEPA will be seeking to develop the flood hazard mapping in the South Uist to North Uist area to improve understanding of the coastal flood risk. The extent and timing of the completed improvements will be dependent on detailed scoping and data availability.		

Action (ID):	FLOOD FORECASTING (2000020009)		
Objective (ID):	Reduce overall flood risk (200002)		
Delivery lead:	SEPA		
Status:	Existing	Indicative delivery:	Ongoing
Description:	<p>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.</p> <p>The Potentially Vulnerable Area is within the 'Western Isles' flood alert area.</p>		

Action (ID):	SELF HELP (2000020011)		
Objective (ID):	Reduce overall flood risk (200002)		
Delivery lead:	—		
Status:	Existing	Indicative delivery:	Ongoing
Description:	<p>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.</p>		

Action (ID):	AWARENESS RAISING (2000020013)		
Objective (ID):	Reduce overall flood risk (200002)		
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 (2000020007)		
Objective (ID):	Reduce overall flood risk (200002)		
Delivery lead:	Comhairle nan Eilean Siar, 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.		

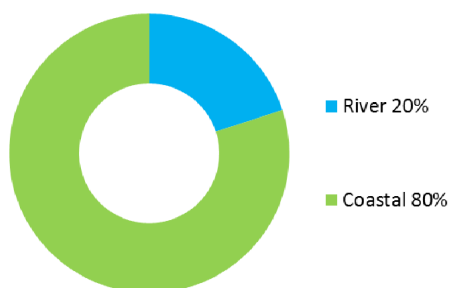
Action (ID):	EMERGENCY PLANS/RESPONSE (2000020014)		
Objective (ID):	Reduce overall flood risk (200002)		
Delivery lead:	Category 1 and 2 Responders		
Status:	Existing	Indicative delivery:	Ongoing
Description:	Providing an emergency response to flooding is the responsibility of many organisations, including 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 (2000010001)		
Objective (ID):	Avoid an overall increase in flood risk (200001) Reduce overall flood risk (200002)		
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.		

Benbecula (Potentially Vulnerable Area 02/06)

Local Plan District	Local authority	Main catchment
Outer Hebrides	Comhairle nan Eilean Siar	Benbecula coastal

Summary of flooding impacts



At risk of flooding

- 110 residential properties
- 10 non-residential properties
- £560,000 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.

Flood protection scheme/works	<i>Natural flood management works</i>	New flood warning	Community flood action groups	<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
<i>Maintain flood protection scheme</i>	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

Actions

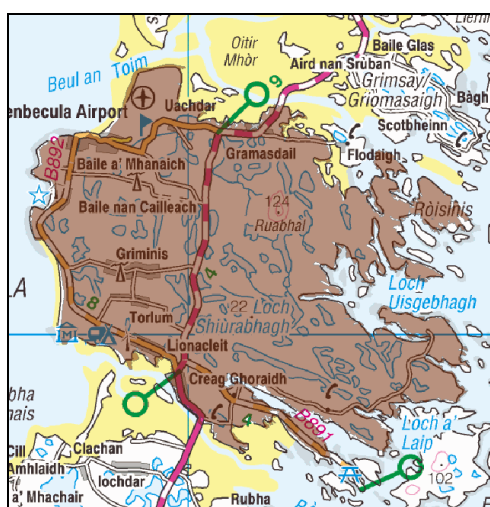
Benbecula (Potentially Vulnerable Area 02/06)

Local Plan District	Local authority	Main catchment
Outer Hebrides	Comhairle nan Eilean Siar	Benbecula coastal

Background

This Potentially Vulnerable Area comprises the entire island of Benbecula (shown below). It is approximately 76km².

The area is low-lying with numerous lochs. It is fringed by dunes to the west.



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The main access route, the A865, runs down the centre of the island with minor roads and small, populated areas located mainly to the west. The airport is located close to the coast on the north west of the island.

There are approximately 110 residential properties and 10 non-residential properties at risk of flooding.

The Annual Average Damages are estimated to be £560,000 with the majority caused by coastal flooding.

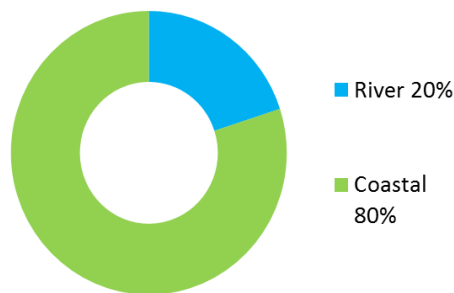


Figure 1: Annual Average Damages by flood source

Summary of flooding impacts

Coastal flood risk extends northwards from Creagorry across the populated areas to Balivanich with a second area of risk east of the airport around Uachdar and Gramsdale. River flooding is associated with drainage from lochs which flow out to sea through Balivanich. Maintenance of the Benbecula Main Drain and its outfalls is shared between Stòras Uibhist, Scottish Government Rural Payments and Inspections Directorate (SGRPID), Scottish Water and local crofters. The main town of Balivanich and other low-lying settlements depend on the drain and outfalls functioning correctly.

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.

Five designated cultural heritage sites are at risk of flooding. Environmentally designated sites at risk include Aird and Borge Special Protection Area and West Benbecula Lochs Site of Special Scientific Interest.

The damages associated with floods of different likelihood are shown in Figure 2.

The location of the impacts of flooding is shown in Figure 3. Most of the impacts are to the west of the A865.

	1 in 10 High likelihood	1 in 200 Medium likelihood	1 in 1000 Low likelihood
Residential properties (total 560)	90	110	110
Non-residential properties (total 210)	<10	10	20
People	200	230	240
Community facilities	0	0	0
Utilities assets	<10	<10	<10
Transport links (excluding minor roads)	Roads at 50 locations Airport	Roads at 80 locations Airport	Roads at 90 locations Airport
Environmental designated areas (km ²)	0.6	0.6	0.6
Designated cultural heritage sites	5	7	7
Agricultural land (km ²)	5	5.2	5.6

Table 1: Summary of flooding impacts¹

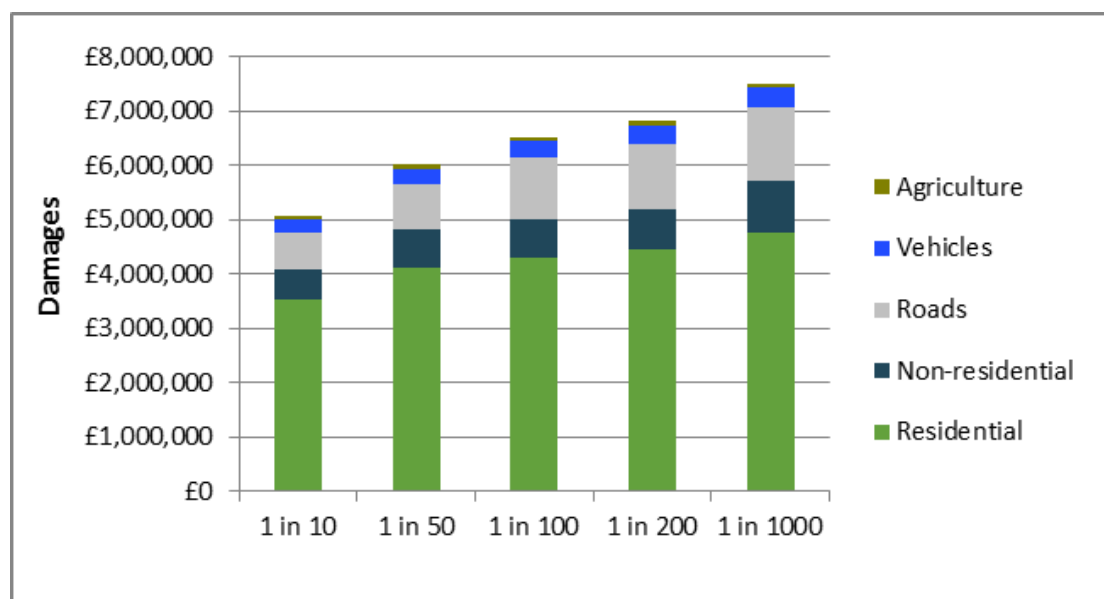


Figure 2: Damages by flood likelihood

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

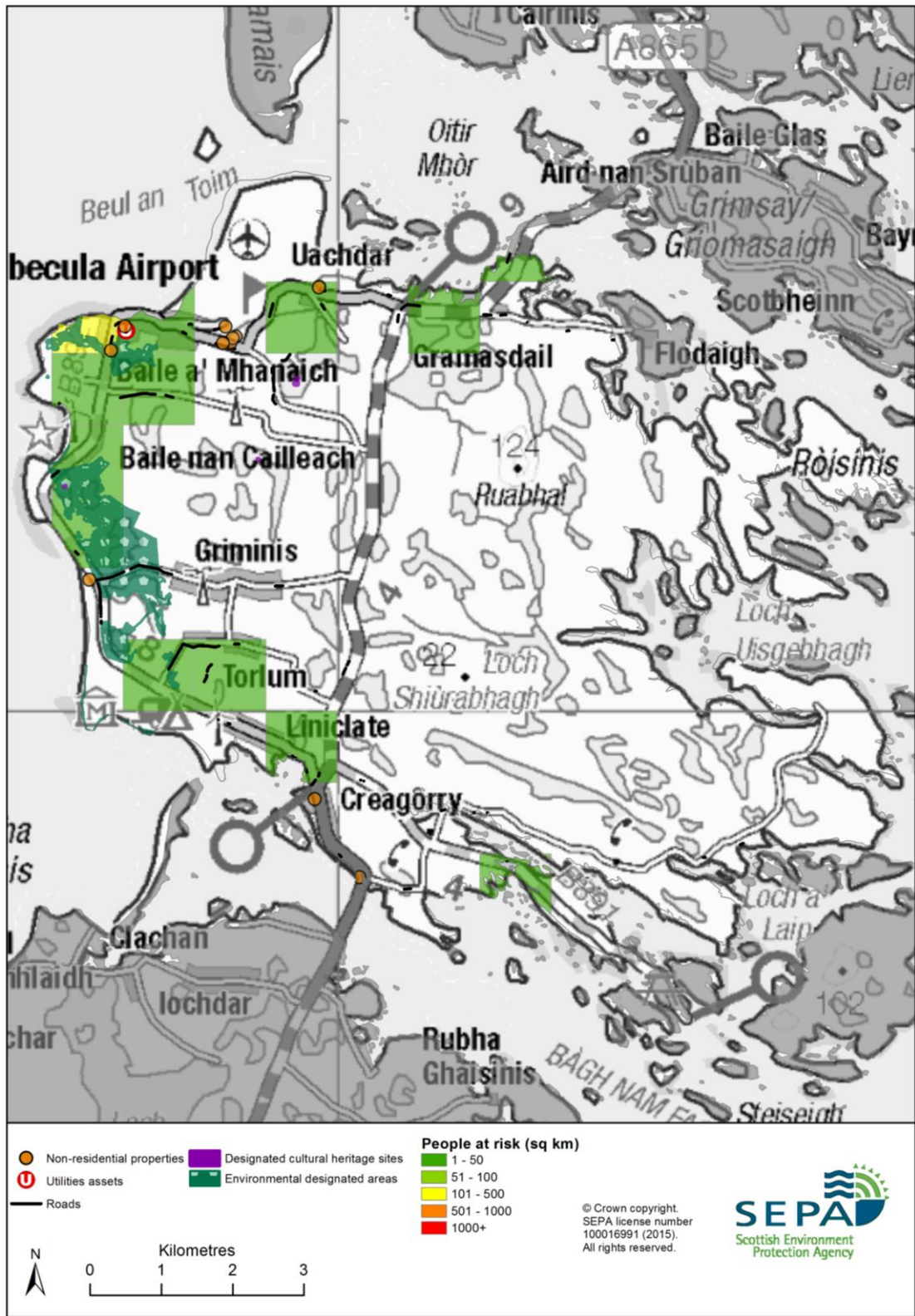


Figure 3: Impacts of flooding

History of flooding

In January 2005 a severe storm hit the west coast of Scotland including the Outer Hebrides. Widespread flooding occurred in many locations in Benbecula, particularly on the west coast, with roads, agricultural land, houses and non-residential properties being inundated with sea water. Roads were closed at Balivanich, Nunton, Pol na Cran, Lionacleit and Gramsdale. The South Ford Hydrodynamics Study provides a detailed account of this flood in Benbecula and South Uist.

Although there are no other officially recorded floods in this Potentially Vulnerable Area, coastal flooding has occurred on numerous occasions when storm surge and high tides coincide. An added risk factor is that when coastal flooding occurs it is usually accompanied by high strength winds, which can create waves and cause additional damage.

The A865 road is known to flood at Gramsdale as are the B892 at Pol na Cran and the B892 at Balivanich where waves cause the carriageway to be blocked by debris.

Objectives to manage flooding in Potentially Vulnerable Area 02/06

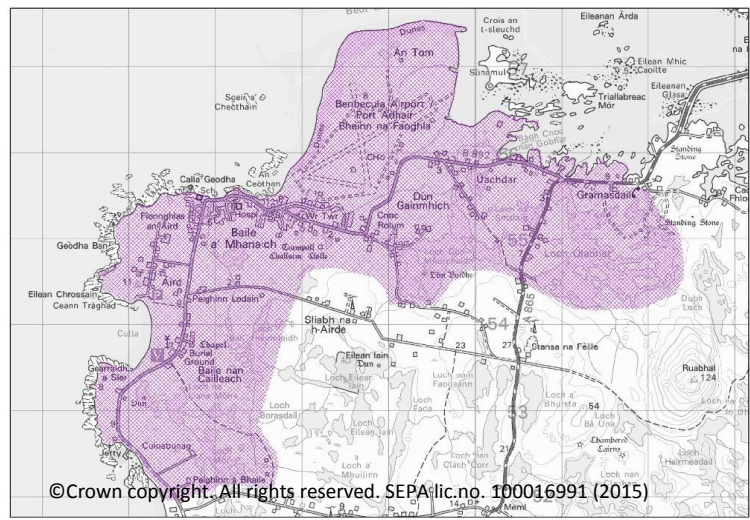
Objectives provide a common goal and shared ambition for managing floods. These objectives have been set by SEPA and agreed with flood risk management authorities following consultation. They were identified through an assessment of the underlying evidence of the causes and impacts of flooding. Target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

Reduce risk in the Balivanich area from river and coastal flooding

Indicators:

- 220 people
- £350,000 Annual Average Damages from residential properties
- £57,000 Annual Average Damages from non-residential properties

Target area:



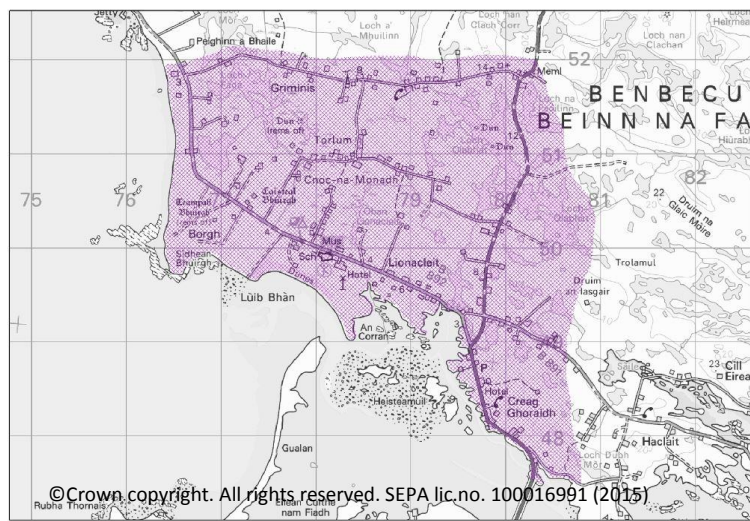
Objective ID: 200601

Reduce risk to south-west Benbecula from river and coastal flooding

Indicators:

- 10 people
- £24,000 Annual Average Damages from residential properties

Target area:



Objective ID: 200602

Target area	Objective	ID	Indicators within PVA
Benbecula airport	Reduce flood risk to Benbecula airport	200604	<ul style="list-style-type: none"> • Benbecula airport
Applies across Outer Hebrides Local Plan District	Avoid an overall increase in flood risk	200001	<ul style="list-style-type: none"> • 110 residential properties • £560,000 Annual Average Damages
Applies across Outer Hebrides Local Plan District	Reduce overall flood risk	200002	<ul style="list-style-type: none"> • 110 residential properties • £560,000 Annual Average Damages
Applies across Outer Hebrides 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 02/06

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 Benbecula Potentially Vulnerable Area.

Selected actions					
Flood protection scheme/works	<i>Natural flood management works</i>	New flood warning	Community flood action groups	<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
<i>Maintain flood protection scheme</i>	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

Action (ID):	FLOOD PROTECTION SCHEME/WORKS (2007010006)				
Objective (ID):	Reduce risk to south-west Benbecula from river and coastal flooding (200602)				
Delivery lead:	Comhairle nan Eilean Siar				
Priority:	National:		Within local authority:		
	14 of 42		1 of 1		
Status:	Under development	Indicative delivery:	2016-2021		
Description:	Detailed design for a flood protection scheme for the South Ford area is progressing. The South Ford Scheme aims to reduce flood risk on South Uist as well as the southern coast of Benbecula. The scheme will likely include the construction of embankments, beach recharge at Gualan Island, sand dune/machair restoration and may also include property level protection for any residual risk. The flood protection scheme would be constructed to a standard of 1 in 100 years (locally 1 in 200 years) and will include an allowance for climate change. An option to relieve flooding by creating larger openings in the South Ford causeway is also being considered by the local authority with the encouragement of local community groups. The viability and funding for this option is being investigated outwith the flood risk management process.				
Potential impacts					
Economic:	The scheme would reduce risk to an estimated 58 properties and would achieve an estimated £7.8 million damages avoided. The benefit-cost ratio of the proposed works is 3.97.				
Social:	The flood protection scheme would have a positive benefit to the health and wellbeing of the community and to socially vulnerable people. A scheme could also reduce the significant flood impacts on				

Social:	a rural community including key local facilities and transport links. The last major storm in 2005 led to five fatalities as a family attempted to escape the floods. Climate change is likely to have a significant impact in this area and the scheme should be designed to help reduce long term impacts of sea level rise.
Environmental:	Flood protection works can have both positive and negative impacts on the ecological quality of the environment depending on how they are designed. There is potential for both positive impacts such as restoring coastal habitats at Gualan Island, as well as negative impacts such as impacting on coastal habitats and landscapes at Lionacleit. There are potential adverse effects on biodiversity, active coastal processes, and even coastal flood risk if sediment extraction allows greater wave attack. 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 South Uist Machair and Lochs Special Protection Area and South Uist Machair Special Area of Conservation. Opportunities to mitigate any environmental impacts should be identified as part of the on-going studies through the design and timing of works.

Action (ID):	FLOOD PROTECTION SCHEME/WORKS (2006040021)		
Objective (ID):	Reduce flood risk to Benbecula airport (200604)		
Delivery lead:	Highlands and Islands Airport Limited		
Status:	Under development	Indicative delivery:	2016-2027
Description:	Coast protection works that protect the airport from erosion and that reduce flood risk will be extended subject to approvals. Phase 3 of the works is planned for completion in 2016/2021 and Phase 4 works in 2022/2027.		

Action (ID):	NEW FLOOD WARNING (2000020010)		
Objective (ID):	Reduce overall flood risk (200002)		
Delivery lead:	SEPA		
Status:	Not started	Indicative delivery:	2016-2021
Description:	The area under consideration covers the coastline of the Outer Hebrides. A flood forecasting system will be required before flood warnings can be implemented for this area.		

Action (ID):	FLOOD PROTECTION STUDY (2006010005)		
Objective (ID):	Reduce risk in the Balivanich area from river and coastal flooding (200601)		
Delivery lead:	Comhairle nan Eilean Siar		

Priority:	National:		Within local authority:	
	34 of 168		1 of 5	
Status:	Not started	Indicative delivery:	2016-2021	
Description:	A study is needed to confirm the business case and determine the extent and size of defences required. The study should be focused on Balivanich, but should also confirm the feasibility of defences in the Uachdar area. The study should include direct defences, channel modifications, improvements to the floodgate on the Uachdar drainage system (coastal management action) and consideration of property level protection for any residual flood risk. Other actions may also be considered to develop the most sustainable range of options.			
Potential impacts				
Economic:	The study could benefit 97 residential and four non-residential properties at risk of flooding in this location, with potential damages avoided of up to £15 million.			
Social:	Approximately 216 people could directly benefit from flood protection works. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community and socially vulnerable people. Potentially there may also be reduced flood risk to an energy production/electricity utility site and roads (including B892), reducing disruption to the wider community. There is potential that the community may become disconnected from the watercourses and sea through reduced access. Negative impacts through disturbance to the local community during the construction phase should be considered.			
Environmental:	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment. Opportunities to mitigate any environmental impacts may include design and timing of works. There is potential for impacts on coastal landscapes and habitats, and inland lochs. 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 Aird and Borve - Benbecula Special Protection Area. Due to the location of any future flood protection works it is unlikely that the scheduled monuments would be affected or benefit.			

Action (ID):	STRATEGIC MAPPING AND MODELLING (2000020016)			
Objective (ID):	Reduce overall flood risk (200002)			
Delivery lead:	SEPA			
Status:	Not started	Indicative delivery:	2016-2021	
Description:	SEPA will be seeking to develop the flood hazard mapping in the South Uist to North Uist area to improve understanding of the coastal flood risk. The extent and timing of the completed improvements will be dependent on detailed scoping and data availability.			

Action (ID):	FLOOD FORECASTING (2000020009)		
Objective (ID):	Reduce overall flood risk (200002)		
Delivery lead:	SEPA		
Status:	Existing	Indicative delivery:	Ongoing
Description:	<p>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.</p> <p>The Potentially Vulnerable Area is within the 'Western Isles' flood alert area.</p>		

Action (ID):	COMMUNITY FLOOD ACTION GROUPS (2000020012)		
Objective (ID):	Reduce overall flood risk (200002)		
Delivery lead:	Community		
Status:	Existing	Indicative delivery:	Ongoing
Description:	<p>The lochdar Flood Action Group and the Middle District Flood Action Group were formed in the immediate aftermath of the January 2005 storm. Public workshops and meetings have been held to discuss coastal erosion and flooding issues.</p>		

Action (ID):	SELF HELP (2000020011)		
Objective (ID):	Reduce overall flood risk (200002)		
Delivery lead:	—		
Status:	Existing	Indicative delivery:	Ongoing
Description:	<p>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.</p>		

Action (ID):	AWARENESS RAISING (2000020013)		
Objective (ID):	Reduce overall flood risk (200002)		
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 (2000020007)		
Objective (ID):	Reduce overall flood risk (200002)		
Delivery lead:	Comhairle nan Eilean Siar, 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> <p>The Benbecula Main Drain provides drainage to low-lying land in the west of Benbecula and has outfalls controlled by floodgates in Balivanich to the north and Lionacleit to the southwest. Another drainage canal, also controlled by a floodgate, flows from south and east of the airport to Uachdar in the north of the island. Maintenance of both of these drainage systems is important and responsibility for this is shared between Stòras Uibhist, Scottish Government Rural Inspectorates and Payments Division, Scottish Water and local crofters.</p>		

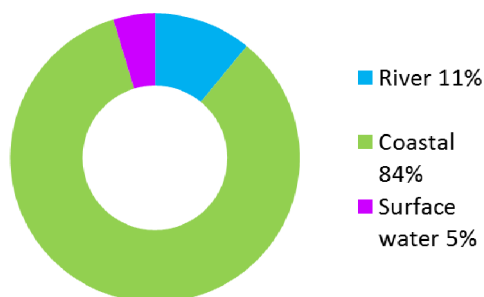
Action (ID):	EMERGENCY PLANS/RESPONSE (2000020014)		
Objective (ID):	Reduce overall flood risk (200002)		
Delivery lead:	Category 1 and 2 Responders		
Status:	Existing	Indicative delivery:	Ongoing
Description:	<p>Providing an emergency response to flooding is the responsibility of many organisations, 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 (2000010001)		
Objective (ID):	Avoid an overall increase in flood risk (200001) Reduce overall flood risk (200002)		
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>		

Lochs Bi and Druidibeg (Potentially Vulnerable Area 02/07)

Local Plan District	Local authority	Main catchment
Outer Hebrides	Comhairle nan Eilean Siar	South Uist coastal

Summary of flooding impacts



At risk of flooding

- 30 residential properties
- <10 non-residential properties
- £240,000 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.

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

Actions

Special Area of Conservation, South Uist Machair and Lochs Special Protection Area.

The damages associated with floods of different likelihood are shown in Figure 2.

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

	1 in 10 High likelihood	1 in 200 Medium likelihood	1 in 1000 Low likelihood
Residential properties (total 250)	20	30	40
Non-residential properties (total 90)	<10	<10	<10
People	50	70	80
Community facilities	0	0	0
Utilities assets	0	0	0
Transport links (excluding minor roads)	Roads at 60 locations	Roads at 70 locations	Roads at 80 locations
Environmental designated areas (km ²)	32	32	32
Designated cultural heritage sites	4	10	10
Agricultural land (km ²)	6.4	7.3	7.5

Table 1: Summary of flooding impacts¹

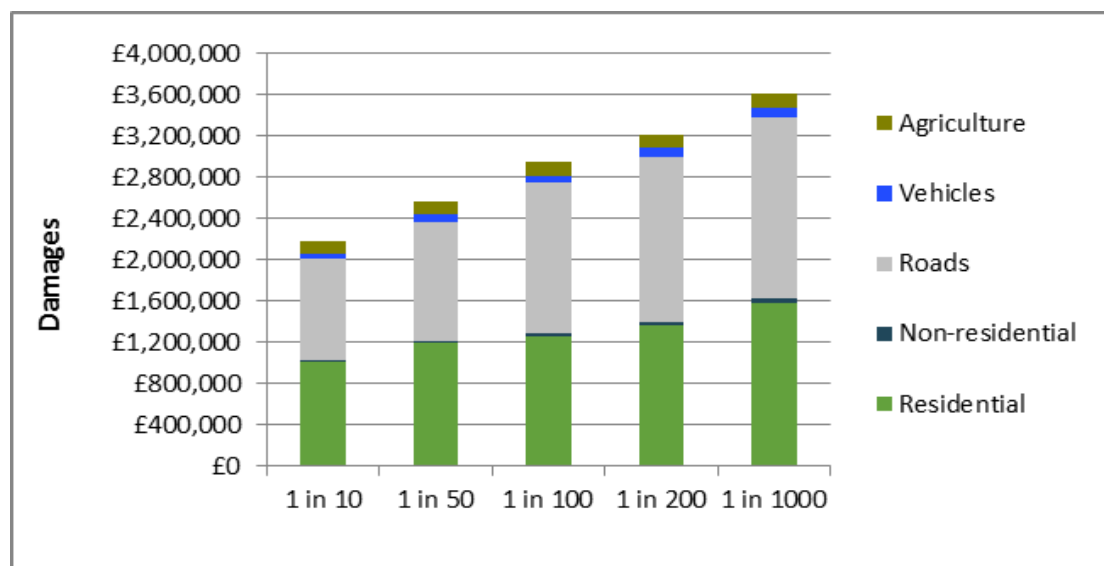


Figure 2: Damages by flood likelihood

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

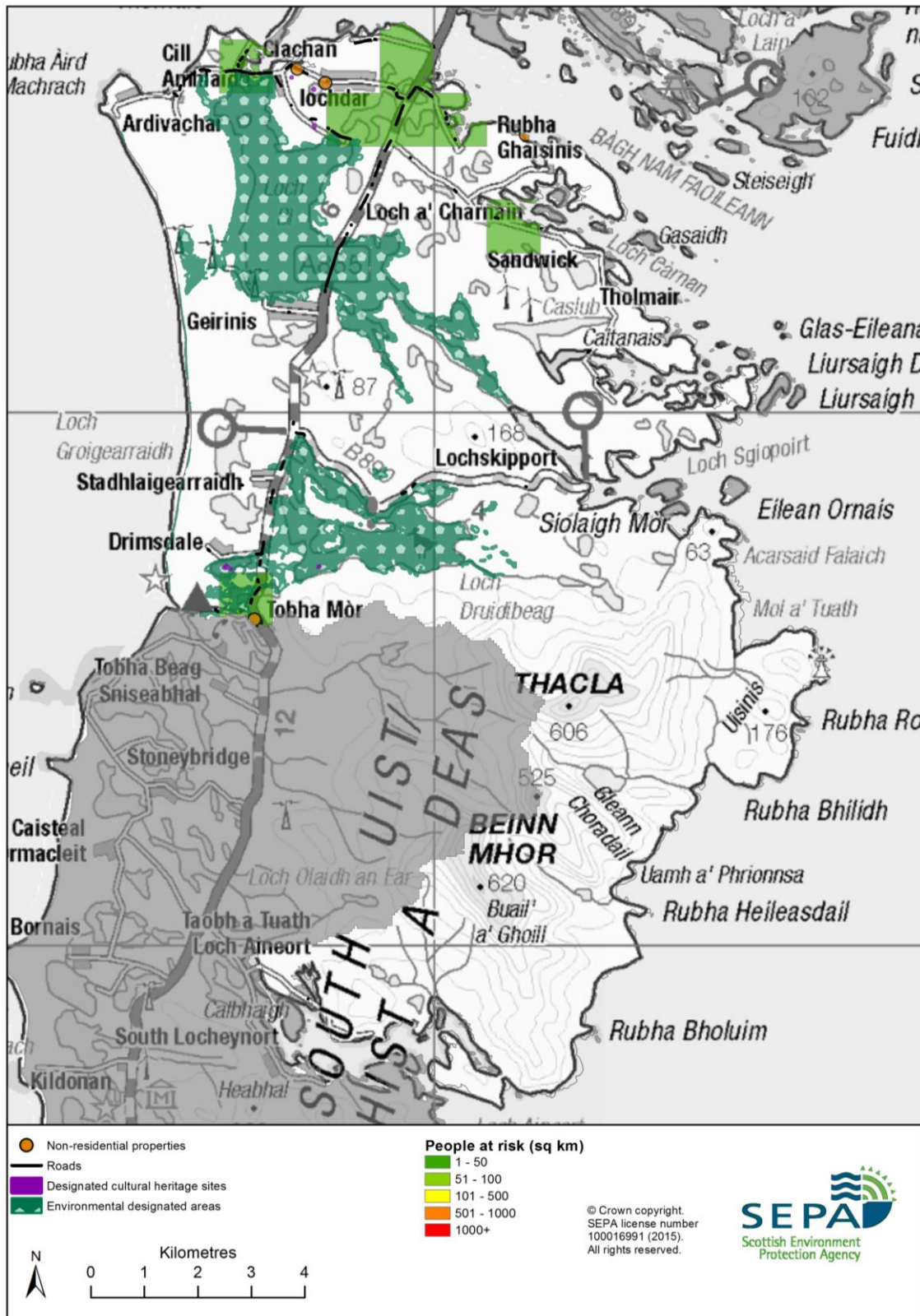


Figure 3: Impacts of flooding

History of flooding

In January 2005 a severe storm hit the west coast of Scotland including the Outer Hebrides. During the storm five people from the same family died when their cars were swept from a coastal road in South Uist as they were trying to escape from flood waters. Widespread flooding occurred in many locations, particularly in the lochdar area, and along the west coast, with roads, agricultural land, houses and other buildings being inundated with seawater. The South Ford Hydrodynamics Study provides a detailed account of this flood.

Although there are no other officially recorded floods in this area, coastal flooding has occurred on numerous occasions when storm surge and high tides coincide. If high rainfall also occurs during these conditions this causes the Howmore River to flood over an extensive land area. An added risk factor is that when coastal flooding occurs it is usually accompanied by high strength winds, which can create waves and cause additional damage.

Objectives to manage flooding in Potentially Vulnerable Area 02/07

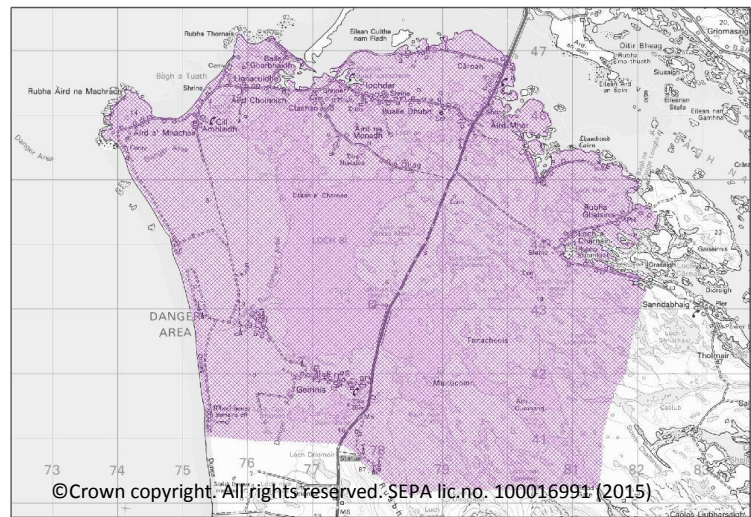
Objectives provide a common goal and shared ambition for managing floods. These objectives have been set by SEPA and agreed with flood risk management authorities following consultation. They were identified through an assessment of the underlying evidence of the causes and impacts of flooding. Target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

Reduce risk to the area surrounding Loch Bi from river and coastal flooding

Indicators:

- 60 people
- £110,000 Annual Average Damages from residential properties
- A865

Target area:



Objective ID: 200701

Target area	Objective	ID	Indicators within PVA
Applies across Outer Hebrides Local Plan District	Avoid an overall increase in flood risk	200001	<ul style="list-style-type: none"> • 30 residential properties • £240,000 Annual Average Damages
Applies across Outer Hebrides Local Plan District	Reduce overall flood risk	200002	<ul style="list-style-type: none"> • 30 residential properties • £240,000 Annual Average Damages
Applies across Outer Hebrides 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 02/07

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 Lochs Bi and Druidibeag Potentially Vulnerable Area.

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

Action (ID):	FLOOD PROTECTION SCHEME/WORKS (2007010006)				
Objective (ID):	Reduce risk to the area surrounding Loch Bi from river and coastal flooding (200701)				
Delivery lead:	Comhairle nan Eilean Siar				
Priority:	National:		Within local authority:		
	14 of 42		1 of 1		
Status:	Under development	Indicative delivery:	2016-2021		
Description:	Detailed design for a flood protection scheme for the South Ford area is progressing. The South Ford Scheme aims to reduce flood risk on South Uist as well as the southern coast of Benbecula. The scheme will likely include the construction of embankments, beach recharge at Gualan Island, sand dune/machair restoration and may also include property level protection for any residual risk. The flood protection scheme would be constructed to a standard of 1 in 100 years (locally 1 in 200 years) and will include an allowance for climate change. An option to relieve flooding by creating larger openings in the South Ford causeway is also being considered by the local authority with the encouragement of local community groups. The viability and funding for this option is being investigated outwith the flood risk management process.				
Potential impacts					
Economic:	The scheme would reduce risk to an estimated 58 properties and would achieve an estimated £7.8 million damages avoided. The benefit-cost ratio of the proposed works is 3.97.				
Social:	The flood protection scheme would have a positive benefit to the health and wellbeing of the community and to socially vulnerable people. A scheme could also reduce the significant flood impacts on				

Social:	a rural community including key local facilities and transport links. The last major storm in 2005 led to five fatalities as a family attempted to escape the floods. Climate change is likely to have a significant impact in this area and the scheme should be designed to help reduce long term impacts of sea level rise.
Environmental:	Flood protection works can have both positive and negative impacts on the ecological quality of the environment depending on how they are designed. There is potential for both positive impacts such as restoring coastal habitats at Gualan Island, as well as negative impacts such as impacting on coastal habitats and landscapes at Lionacleit. There are potential adverse effects on biodiversity , active coastal processes, and even coastal flood risk if sediment extraction allows greater wave attack. 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 South Uist Machair and Lochs Special Protection Area and South Uist Machair Special Area of Conservation. Opportunities to mitigate any environmental impacts should be identified as part of the on-going studies through the design and timing of works.

Action (ID):	NEW FLOOD WARNING (2000020010)		
Objective (ID):	Reduce overall flood risk (200002)		
Delivery lead:	SEPA		
Status:	Not started	Indicative delivery:	2016-2021
Description:	The area under consideration covers the coastline of the Outer Hebrides. A flood forecasting system will be required before flood warnings can be implemented for this area.		

Action (ID):	STRATEGIC MAPPING AND MODELLING (2000020016)		
Objective (ID):	Reduce overall flood risk (200002)		
Delivery lead:	SEPA		
Status:	Not started	Indicative delivery:	2016-2021
Description:	SEPA will be seeking to develop the flood hazard mapping in the South Uist to North Uist area to improve understanding of the coastal flood risk. The extent and timing of the completed improvements will be dependent on detailed scoping and data availability.		

Action (ID):	FLOOD FORECASTING (2000020009)		
Objective (ID):	Reduce overall flood risk (200002)		
Delivery lead:	SEPA		
Status:	Existing	Indicative delivery:	Ongoing
Description:	<p>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.</p> <p>The Potentially Vulnerable Area is within the 'Western Isles' flood alert area.</p>		

Action (ID):	COMMUNITY FLOOD ACTION GROUPS (2000020012)		
Objective (ID):	Reduce overall flood risk (200002)		
Delivery lead:	Community		
Status:	Existing	Indicative delivery:	Ongoing
Description:	<p>The lochdar Flood Action Group and the Middle District Flood Action Group were formed in the immediate aftermath of the January 2005 storm. Public workshops and meetings have been held to discuss coastal erosion and flooding issues.</p>		

Action (ID):	SELF HELP (2000020011)		
Objective (ID):	Reduce overall flood risk (200002)		
Delivery lead:	—		
Status:	Existing	Indicative delivery:	Ongoing
Description:	<p>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.</p>		

Action (ID):	AWARENESS RAISING (2000020013)		
Objective (ID):	Reduce overall flood risk (200002)		
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 (2000020007)		
Objective (ID):	Reduce overall flood risk (200002)		
Delivery lead:	Comhairle nan Eilean Siar, 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> <p>Loch Bi to the north of the Potentially Vulnerable Area is an extensive freshwater/brackish water body which drains mainly to the sea on the east of the island to Loch Sgioport and also to the north at Clachan. Sea water is excluded from Loch Bi by a flap valve discharging at Loch Sgioport. It is planned during 2015 to install flap valves on the stone culverts at the Clachan Mor to the north west of Loch Bi. Freshwater lochs located in the south of the Potentially Vulnerable Area are interconnected by a system of drainage ditches and they drain to the sea through a drainage canal (the Leacach How) and the Howmore River.</p>		

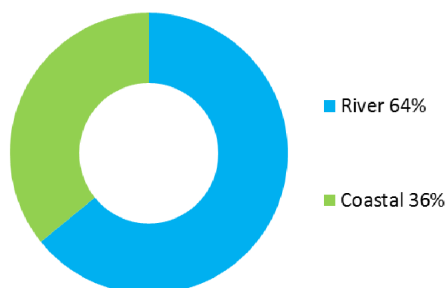
Action (ID):	EMERGENCY PLANS/RESPONSE (2000020014)		
Objective (ID):	Reduce overall flood risk (200002)		
Delivery lead:	Category 1 and 2 Responders		
Status:	Existing	Indicative delivery:	Ongoing
Description:	<p>Providing an emergency response to flooding is the responsibility of many organisations, 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 (2000010001)		
Objective (ID):	Avoid an overall increase in flood risk (200001) Reduce overall flood risk (200002)		
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>		

Bornish to Boisdale (Potentially Vulnerable Area 02/08)

Local Plan District	Local authority	Main catchment
Outer Hebrides	Comhairle nan Eilean Siar	South Uist coastal

Summary of flooding impacts



At risk of flooding

- 30 residential properties
- <10 non-residential properties
- £180,000 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>	New flood warning	Community flood action groups	<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
<i>Maintain flood protection scheme</i>	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

Actions

Bornish to Boisdale (Potentially Vulnerable Area 02/08)

Local Plan District	Local authority	Main catchment
Outer Hebrides	Comhairle nan Eilean Siar	South Uist coastal

Background

This Potentially Vulnerable Area on South Uist stretches from Rubha Aird a Mhuile to Boisdale (shown below). It extends either side of the A865 as far east as Loch Snigiscleit and is approximately 50km².

The majority of the properties are located to the west of the A865.



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The area is generally low-lying with numerous lochs and interconnected drainage channels. To the west, the area is fringed by machair.

There are approximately 30 residential and fewer than 10 non-residential properties at risk of flooding.

The Annual Average Damages are estimated to be £180,000 with around two-thirds caused by river flooding.

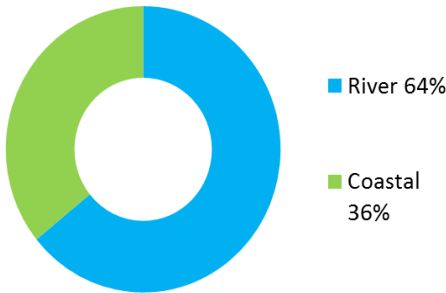


Figure 1: Annual Average Damages by flood source

Summary of flooding impacts

River flooding is centred around lochs to the west of the A865. During floods the lochs extend across the low lying surrounding areas, resulting in them connecting in many places. The coastal flood risk is from Loch Boisdale in the south east and Trolaisgeir in the north west. Coastal flooding enters near these locations and is then able to spread further across low lying areas in the west.

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.

Eight designated cultural heritage sites are at risk of flooding, as are extensive areas of environmental importance. The sites include Bornish and Ormiclate Machairs Site of Special Scientific Interest (SSSI), Loch Hallan SSSI, South Uist Machair Special Area of Conservation and Special Protection Area (SPA) and Kilpheder to Smerclate, South Uist SPA.

The damages associated with floods of different likelihood are shown in Figure 2.

The location of the impacts of flooding is shown in Figure 3. Most of the impacts of flooding are found in the south west of the area.

	1 in 10 High likelihood	1 in 200 Medium likelihood	1 in 1000 Low likelihood
Residential properties (total 270)	20	30	30
Non-residential properties (total 70)	<10	<10	<10
People	50	60	70
Community facilities	0	0	0
Utilities assets	0	0	0
Transport links (excluding minor roads)	Roads at 40 locations	Roads at 40 locations	Roads at 50 locations
Environmental designated areas (km ²)	7	8	8
Designated cultural heritage sites	5	7	7
Agricultural land (km ²)	7.4	8.1	8.4

Table 1: Summary of flooding impacts¹

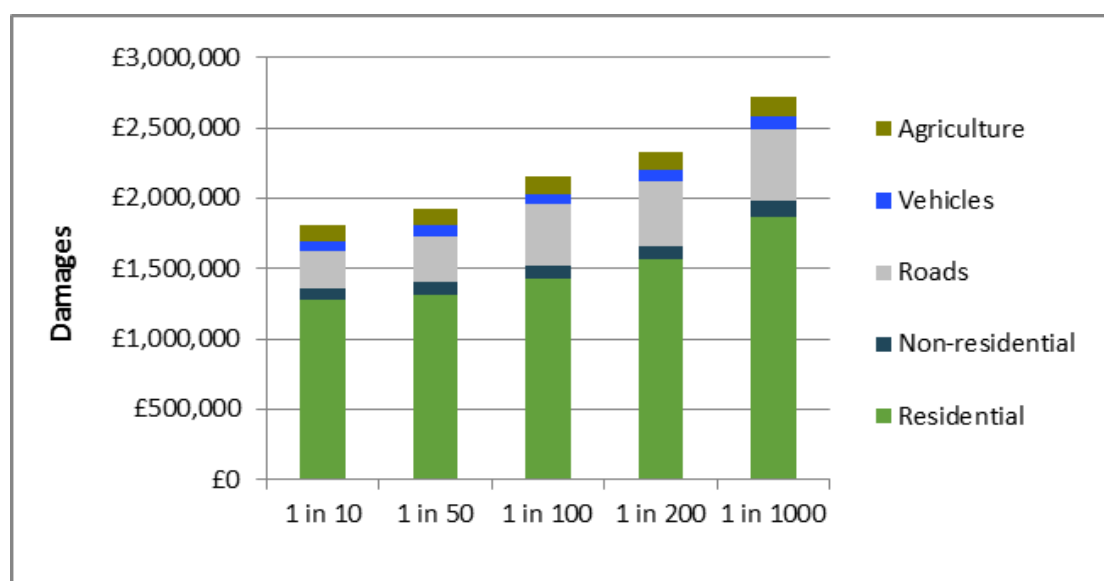


Figure 2: Damages by flood likelihood

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

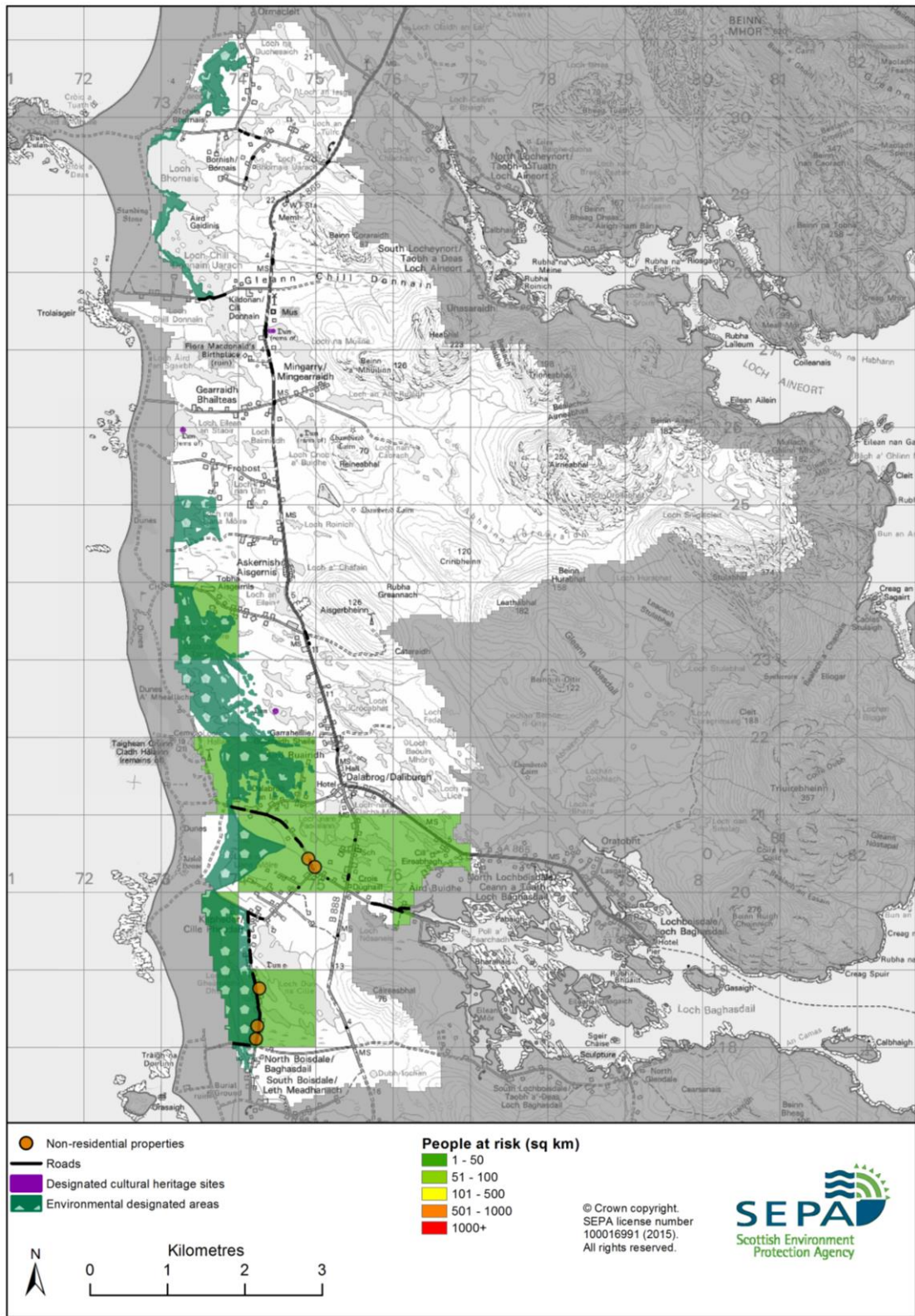


Figure 3: Impacts of flooding

History of flooding

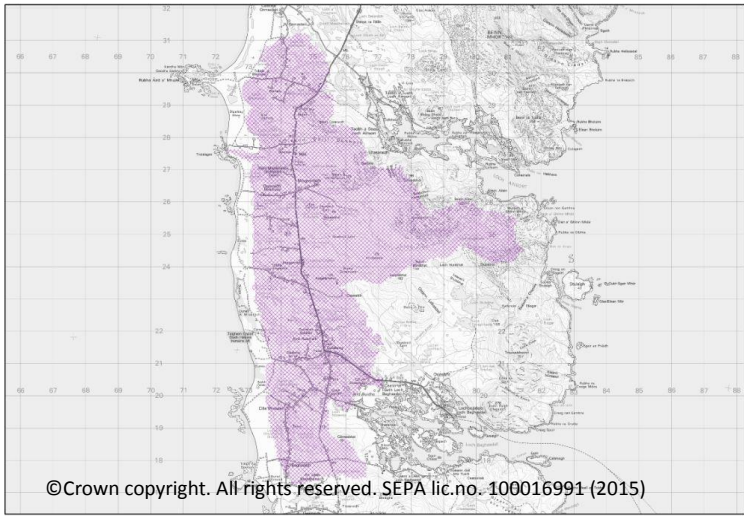
In January 2005 a severe storm hit the west coast of Scotland including the Outer Hebrides. Wave action contributed to significant erosion of the west coast of South Uist and resulted in overtopping of the machair edge at Kilpheder causing extensive flooding of low lying agricultural land.

Although there are no other officially recorded floods in this Potentially Vulnerable Area, coastal flooding has occurred on numerous occasions when storm surge and high tides coincide. An added risk factor is that when coastal flooding occurs it is usually accompanied by high strength winds, which can create waves and cause additional damage.

Objectives to manage flooding in Potentially Vulnerable Area 02/08

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 Bornish to Boisdale Potentially Vulnerable Area.

Reduce risk to southern South Uist from river and coastal flooding

Indicators:	Target area:
<ul style="list-style-type: none"> 60 people £130,000 Annual Average Damages from residential properties A865 (Mingearraidh) B888 (Cille Phaedair) 	 <p style="font-size: small; text-align: center;">©Crown copyright. All rights reserved. SEPA lic.no. 100016991 (2015)</p>
Objective ID: 200801	

Target area	Objective	ID	Indicators within PVA
Applies across Outer Hebrides Local Plan District	Avoid an overall increase in flood risk	200001	<ul style="list-style-type: none"> 30 residential properties £180,000 Annual Average Damages
Applies across Outer Hebrides Local Plan District	Reduce overall flood risk	200002	<ul style="list-style-type: none"> 30 residential properties £180,000 Annual Average Damages
Applies across Outer Hebrides 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 02/08

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 Bornish to Boisdale Potentially Vulnerable Area.

Selected actions					
<i>Flood protection scheme/works</i>	<i>Natural flood management works</i>	New flood warning	Community flood action groups	<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
<i>Maintain flood protection scheme</i>	Strategic mapping and modelling	Flood forecasting	Self help	Maintenance	Planning policies

Action (ID):	NEW FLOOD WARNING (2000020010)		
Objective (ID):	Reduce overall flood risk (200002)		
Delivery lead:	SEPA		
Status:	Not started	Indicative delivery:	2016-2021
Description:	The area under consideration covers the coastline of the Outer Hebrides. A flood forecasting system will be required before flood warnings can be implemented for this area.		

Action (ID):	FLOOD PROTECTION STUDY (2008010005)		
Objective (ID):	Reduce risk to southern South Uist from river and coastal flooding (200801)		
Delivery lead:	Comhairle nan Eilean Siar		
Priority:	National:	Within local authority:	
	98 of 168	3 of 5	
Status:	Not started	Indicative delivery:	2016-2021
Description:	Further investigation into the operation of the existing sluice gates is recommended to determine their impact on flood risk and the feasibility of improving their operation for this purpose (installation/modification of river control structures action). A dune management plan is to be developed for the machair and sand dunes on the west coast of South Uist to cover natural flood management, including wave attenuation and considering the long term stability of		

	the coastline and flood risk management. Other actions may also be considered to develop the most sustainable range of options.
Potential impacts	
Economic:	The business case for improvements to the existing sluice gates would need to be developed as part of the study. This would include confirming the number of properties which may benefit and any traffic disruption which could be avoided through improvements to existing structures. Potentially up to 18 residential and five non-residential properties may benefit from future flood protection works.
Social:	Around 40 people may benefit from improvements to existing structures. A reduction in flood risk would have a positive benefit to the health and wellbeing of the community and socially vulnerable people. Works to improve the operation of the existing sluices and floodgates may reduce stress and uncertainty for the residents in this area, and also reduce disruption through reduced flooding of roads. Natural flood management actions can restore and enhance natural environments and create opportunities for recreation and tourism. Negative impacts through disturbance to the local community during the construction phase should be considered.
Environmental:	Flood protection studies should consider the positive and negative impacts of proposed actions on the ecological quality of the environment. Natural flood management actions can have a positive impact by restoring and enhancing natural habitats. Opportunities to mitigate any environmental impacts may include design and timing of works. The sluices are existing structures and any improvements are unlikely to have significant impacts. Improvements of the existing structures will prevent their deterioration and reduce impacts from flooding such as pollution. 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 South Uist Machair and Lochs Special Protection Area, Kilpheder and Smerclate South Uist Special Protection Area, South Uist Machair Special Area of Conservation, and Sound of Barra Special Area of Conservation. There is potential for future maintenance or restoration works to impact on the Loch Hallan Site of Special Scientific Interest.

Action (ID):	STRATEGIC MAPPING AND MODELLING (2000020016)		
Objective (ID):	Reduce overall flood risk (200002)		
Delivery lead:	SEPA		
Status:	Not started	Indicative delivery:	2016-2021
Description:	SEPA will be seeking to develop the flood hazard mapping in the South Uist to North Uist area to improve understanding of the coastal flood risk. The extent and timing of the completed improvements will be dependent on detailed scoping and data availability.		

Action (ID):	FLOOD FORECASTING (2000020009)		
Objective (ID):	Reduce overall flood risk (200002)		
Delivery lead:	SEPA		
Status:	Existing	Indicative delivery:	Ongoing
Description:	<p>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.</p> <p>The Potentially Vulnerable Area is within the 'Western Isles' flood alert area.</p>		

Action (ID):	COMMUNITY FLOOD ACTION GROUPS (2000020012)		
Objective (ID):	Reduce overall flood risk (200002)		
Delivery lead:	Community		
Status:	Existing	Indicative delivery:	Ongoing
Description:	<p>The lochdar Flood Action Group and the Middle District Flood Action Group were formed in the immediate aftermath of the January 2005 storm. Public workshops and meetings have been held to discuss coastal erosion and flooding issues.</p>		

Action (ID):	SELF HELP (2000020011)		
Objective (ID):	Reduce overall flood risk (200002)		
Delivery lead:	—		
Status:	Existing	Indicative delivery:	Ongoing
Description:	<p>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.</p>		

Action (ID):	AWARENESS RAISING (2000020013)		
Objective (ID):	Reduce overall flood risk (200002)		
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 (2000020007)		
Objective (ID):	Reduce overall flood risk (200002)		
Delivery lead:	Comhairle nan Eilean Siar, 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> <p>Freshwater lochs located in the Potentially Vulnerable Area are interconnected by a system of drainage ditches. These drainage ditches outfall to the Atlantic Ocean in the north-west through the Roe Glas floodgate and in the southeast to the Minch through the Strom floodgate and dam system. Efficient land drainage is dependant on regular maintenance of drainage ditches, canals and associated structures. Maintenance arrangements for these features rest primarily with the land managers and with the Scottish Government's Rural Payments and Inspections Directorate (SGRPID).</p>		

Action (ID):	EMERGENCY PLANS/RESPONSE (2000020014)		
Objective (ID):	Reduce overall flood risk (200002)		
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 (2000010001)		
Objective (ID):	Avoid an overall increase in flood risk (200001)		
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>		

Flood Risk Management Strategy

Outer Hebrides 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.

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3.1 Introduction

In the Outer Hebrides Local Plan District, coastal flooding is reported across three distinct coastal areas. River 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			
Outer Hebrides river catchment group	90	£470,000	Comhairle nan Eilean Siar
Coastal flooding			
Lewis and Harris coastal area	130	£600,000	Comhairle nan Eilean Siar
North Uist and Berneray coastal area	30	£260,000	Comhairle nan Eilean Siar
Benbecula, South Uist and Barra coastal area	150	£930,000	Comhairle nan Eilean Siar
Surface water flooding			
Outer Hebrides Local Plan District	40	£59,000	Comhairle nan Eilean Siar

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

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

3.2 River flooding Outer Hebrides Local Plan District

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

Much of the Outer Hebrides (Figure 1) is characterised by bog, heather, rough grassland and freshwater lochs connected by small watercourses. The islands have a mild marine climate with an annual average rainfall of around 1,100mm. There are no major rivers. However, there are numerous smaller rivers and burns that drain the highland areas into lochs or directly to the sea. There are more than 7,500 freshwater lochs in the Outer Hebrides, mostly concentrated on Lewis and in the Uists.

Since the early 19th century, artificial drainage systems have modified natural drainage patterns to produce a complex system of freshwater lochs, ditches, stream connections and diversions. This was designed to drain large areas of wet marsh to create a greater quantity and quality of agricultural land. Flood gates on both the east and west coasts allow fresh water to drain to the sea during low tide whilst preventing the ingress of sea water at high tide.

The machairs of the Uists and Barra have a close association with the water table. Winter rainfall raises the level of the water table on the machair leading to localised flooding in low areas and forming inland lochs, often just behind the beach dune ridge.

Much of the drainage system for the Uists and Barra is below the level of the mid to high tide level and the outfalls have floodgates that prevent sea water entering the system. During prolonged periods of higher sea levels, for example due to low atmospheric pressure, the time available for water to drain through the floodgates is reduced leading to more water being stored in lochs and on the land, which in turn leads to an increased risk of flooding.

There are eight Potentially Vulnerable Areas:

- Ness (02/01)
- Stornoway (02/02)
- Southern Harris (02/03)
- Lochmaddy and Trumisgarry (02/04)
- North Uist (02/05)
- Benbecula (02/06)
- Lochs Bi and Druidibeag (02/07)
- Bornish to Boisdale (02/08)

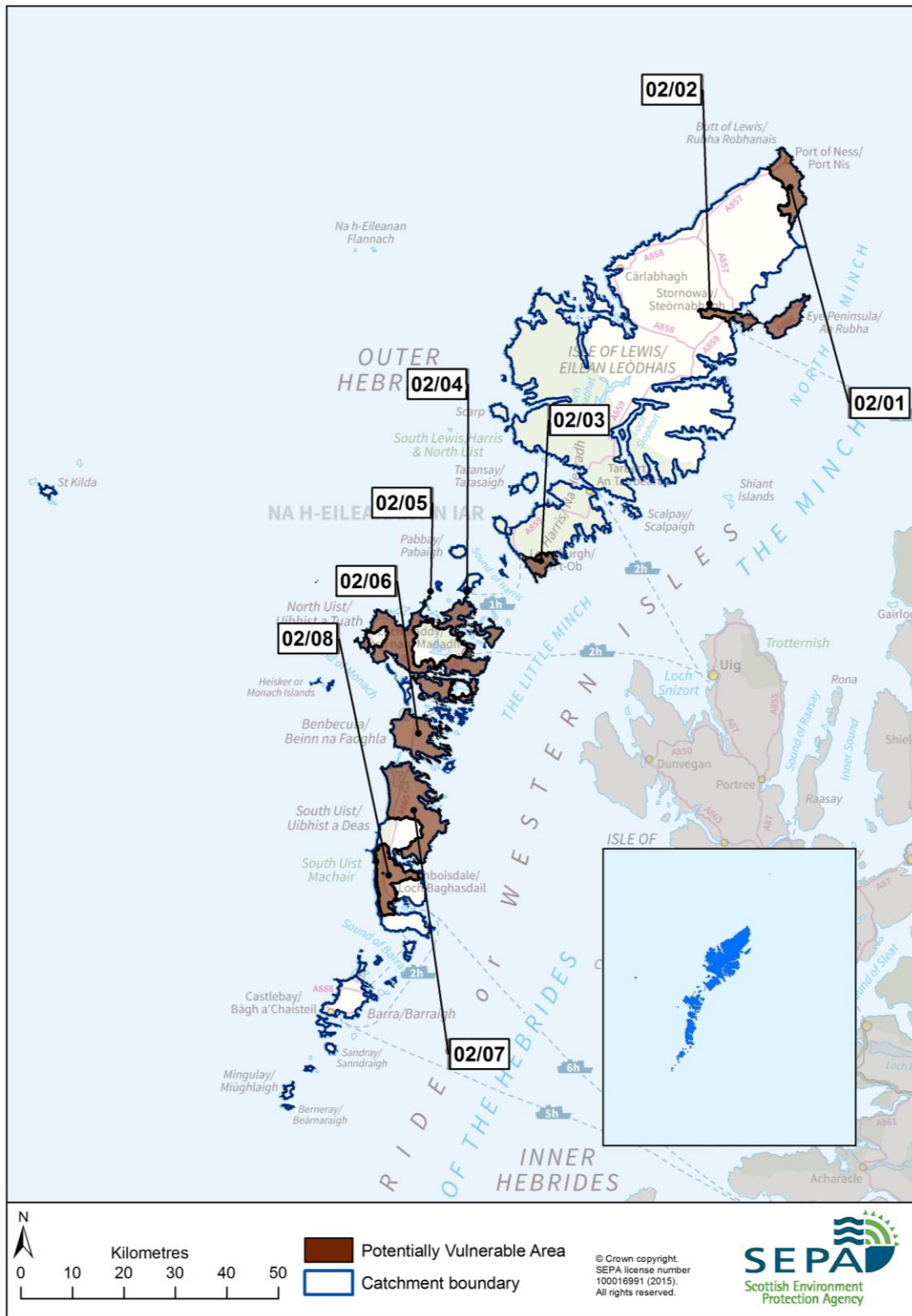


Figure 1: Outer Hebrides river catchments area and Potentially Vulnerable Areas

Flood risk in the catchment

There are approximately 60 residential properties and 30 non-residential properties at risk of river flooding in the Outer Hebrides. Approximately 95% of residential and 47% of non-residential properties at risk of flooding are located within the Potentially Vulnerable Areas.

Main areas at risk

The main areas at risk of river flooding are shown in Table 1, which also includes an estimate of the Annual Average Damages from river flooding for each area.

	Residential and non-residential properties at risk of river flooding	Annual Average Damages
Bornish to Boisdale	20	£110,000
Benbecula	20	£74,000
Stornoway	10	£43,000

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 catchment are estimated to be £470,000. This accounts for approximately 20% of the total damages for this Local Plan District from all sources of flooding. The damages are distributed as follows:

- 45% residential properties (£210,000)
- 19% roads (£88,000)
- 17% agriculture (£77,000)
- 12% non-residential properties (£58,000)
- 6% emergency services (£27,000)
- 2% vehicles (£9,300)

Figure 2 shows the location of Annual Average Damages from river flooding across the area.

Table 2 shows the approximate numbers of further infrastructure assets which are at risk of river flooding within this catchment.

	Number at risk	Further detail
Community facilities	0	n/a
Utility assets	0	n/a
Roads (excluding minor roads)	240 locations	Notably the A859, A857, A865, A867, B892 and B893.
Railway routes	n/a	n/a
Agricultural land	54km ²	n/a

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

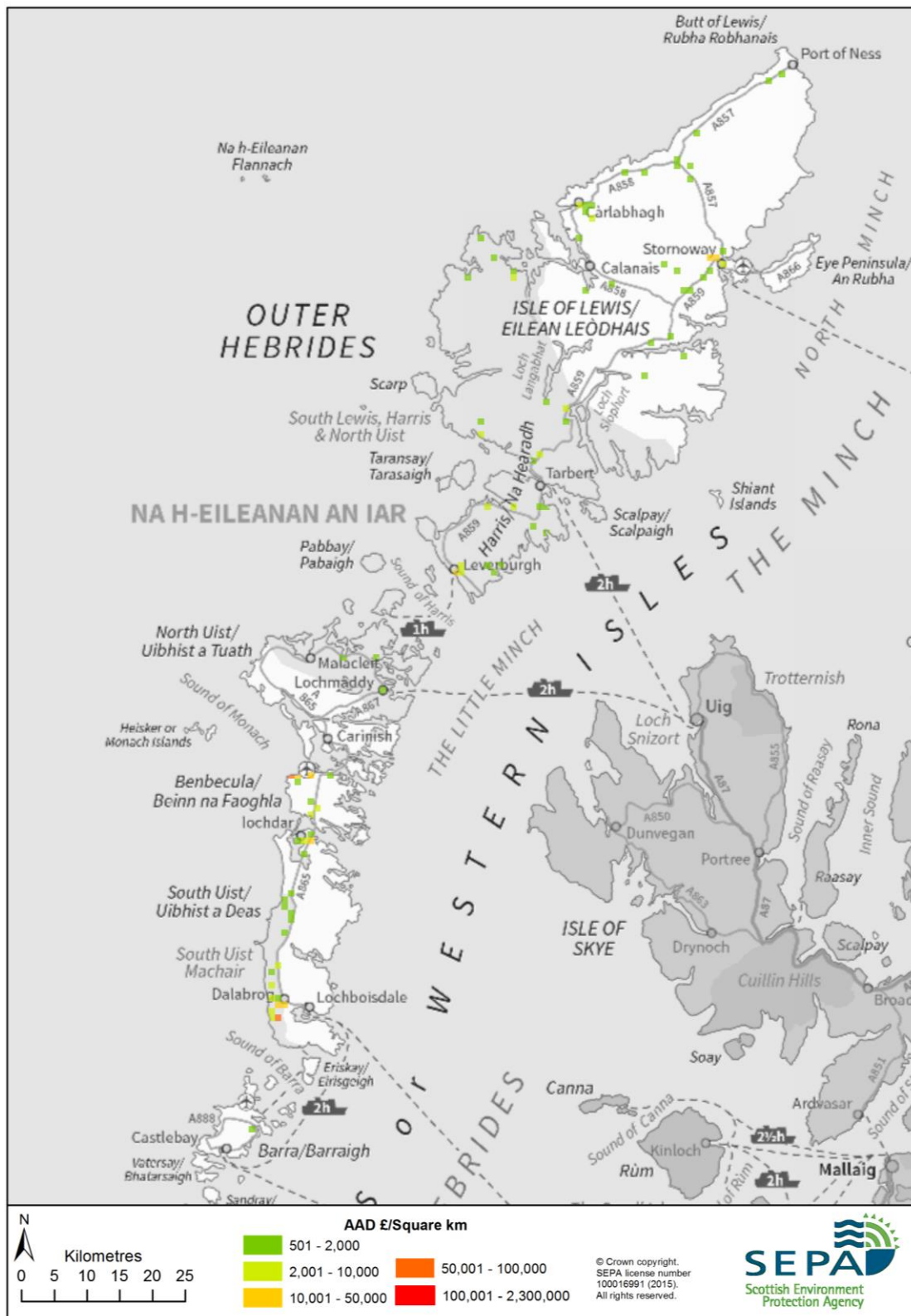


Figure 2: Annual Average Damages from river flooding

Designated environmental and cultural heritage sites at risk

There are 21 cultural heritage sites at risk of river flooding. These sites include scheduled monuments and listed buildings.

Approximately 163km² of designated environmental area is at risk of river flooding across the Outer Hebrides, including Special Areas of Conservation, Special Protection Areas and Sites of Special Scientific Interest. The sites affected include Balranald Bog and Loch nam Feithean, Gress Saltings, Langavat, Lewis Peatlands, Luskentyre Banks and Saltings, Mointeach Scadabhaigh, Obain Loch Euphoirt, South Uist Machair and Stornoway Castle Woodlands. These designated sites are quite resilient to existing levels of river flooding although ground nesting birds can be adversely affected.

History of river flooding

There have been a number of localised floods from rivers and lochs, some of which occurred during periods of tidal surge combined with high rainfall. This resulted in flooding of land upstream of river estuaries, such as at Bayhead, Stornoway.

In the Uists, periods of heavy rainfall are particularly common during winter. This can result in a rise in the levels of lochs and also groundwater, causing persistent localised flooding. Low pressure systems associated with heavy rainfall also raise sea levels, which inhibit drainage of water from the low lying land to the sea leading to further increases in the water levels locally.

Further detail about the history of flooding in this area is available in the relevant PVA chapter of this document.

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 of this document.

Existing actions that are in place to manage flood risk and that are in addition to the information presented in Section 2 are described below.

Awareness raising campaigns and community groups

There are two community flood action groups, the Lochdar Flood Action Group and the Middle District Flood Action Group. Both were formed in the immediate aftermath of the January 2005 coastal flooding. Public meetings and workshops have been held in recent years to discuss flooding and coastal erosion issues, particularly in Benbecula and South Uist. These events have been well attended reflecting the importance of coastal issues to the local population and the willingness of local people to be involved in decision making and implementation of schemes.

The management of levels in lochs, connecting channels and the outlets to the sea are crucial in maintaining a lowered groundwater level. Maintenance arrangements for these features rest primarily with the land managers.

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 Outer Hebrides catchment may increase by 56%¹. This would potentially increase in the number of residential properties at risk of river flooding from approximately 60 to 70, and the number of non-residential properties from approximately 30 to 40.

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 has taken place to identify where local authorities could include natural flood management as part of flood risk management schemes and studies.

Runoff reduction

Whilst the majority of the islands show potential for runoff reduction, no locations were identified where runoff reduction could practically contribute to significantly reduce river flooding in the Potentially Vulnerable Areas. Opportunities may exist however to make use of natural flood management techniques to assist with localise flooding issues.

Floodplain storage

There are some areas with potential for floodplain storage scattered throughout the Uists and in Benbecula, including close to Balivanich and on South Uist. The unique water level management situation in the Uists needs to be taken into account to determine the practicalities and effectiveness of these flood risk management solutions. No locations were identified where floodplain storage could practically contribute to significantly reduce river flooding in the Potentially Vulnerable Areas. Opportunities may exist however to make use of natural flood management techniques to assist with localise flooding issues.

Sediment management

High rates of sediment deposition can contribute to flooding by reducing the capacity of watercourses to convey water particularly where they pass under bridges and through culverts. Actions to reduce the supply of sediment at source by restoring

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

sections of river bank may offer opportunities to reduce flood risk in areas where it currently accumulates.

No locations were identified where sediment supply could be practically managed at source in a way that contributes to significantly reduce river flooding in the Potentially Vulnerable Areas. Opportunities may exist however to make use of natural flood management techniques to assist with localise flooding issues.

Within the complex drainage systems in the Outer Hebrides, the shallow gradient of watercourses that connect the lochs and drainage systems leads to deposition of fine sediment and the growth of vegetation in ditches and drains. This is removed to help maintain drainage and the flow of water.

3.3 Coastal flooding

Outer Hebrides Local Plan District

This section 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.

In the Outer Hebrides Local Plan District, coastal flooding is reported across three coastal areas (Figure 1).



Figure 1: Coastal areas within the Outer Hebrides Local Plan District

Coastal flooding Lewis and Harris

Coastal overview

The Lewis and Harris coastal area (Figure 1) has a coastline with a length of approximately 940km. It comprises the northern portion of the Outer Hebrides Local Plan District and includes the island of Lewis and Harris.

For the most part, the coast is rocky in nature comprising cliffs, reefs and rocky outcrops and with many inlets and sea lochs. Locally, shingle and sandy beaches form at the heads of inlets and in bays. Some of the sandy beaches are extensive, for example at Uig, Luskentyre and Borve on the west coast. On the west coast of Lewis in the district of Uig, machair grasslands are the predominant land form extending to around two kilometres inland from the coastline.

There are three Potentially Vulnerable Areas:

- Ness, Isle of Lewis (02/01)
- Stornoway, (02/02)
- Southern Harris (02/03)

Flood risk in the coastal area

Within the Lewis and Harris coastal area, there are approximately 40 residential properties and 90 non-residential properties at risk of coastal flooding. Approximately 40% of the residential and 73% of non-residential properties at risk in this coastal area are located within the three Potentially Vulnerable Areas, with the majority located in Stornoway (02/02).

Main areas at risk

There is coastal flood risk at Stornoway, Ardvourlie, Gearraidh Bhaird, Calanais, and Griomarstadh on Lewis, Scalpay, Leverburgh and Fionnsabhagh on Harris. The main urban area at risk of coastal flooding is Stornoway where there are approximately 20 residential properties at risk of flooding from the sea.

Economic activity and infrastructure at risk

The Annual Average Damages from coastal flooding in the Lewis and Harris coastal area are approximately £600,000. This accounts for around 26% of the total damages for the Local Plan District from flooding. The damages are distributed as follows:

- 41% non-residential properties (£240,000)
- 33% roads (£200,000)
- 16% residential properties (£99,000)
- 6% emergency services (£37,000)
- 2% agriculture (£11,000)
- 1% vehicles (£7,500).

Figure 2 shows the location of Annual Average Damages from coastal flooding across the area. The highest damages are in Stornoway.

There are approximately 110 road locations at risk of coastal flooding. The main routes affected include the A857, A859 and A866. Minor roads are also impacted. Stornoway airport is also at risk of coastal flooding.

Designated environmental and cultural heritage sites at risk

The Outer Hebrides have hundreds of archaeological sites situated along the coast and in the adjacent low lying areas. Many of these sites are in a relatively good condition and have minimal disturbance. The main threat to these sites is from coastal erosion.

In relation to the many cultural heritage sites at risk of coastal erosion, assessment surveys and excavations, such as those run by the SCAPE Trust (Scottish Coastal Archaeology and the Problem of Erosion), and information recorded by other agencies have helped to highlight this issue.

There are 31 designated cultural heritage sites at risk of coastal flooding. These sites include scheduled monuments and listed buildings.

Approximately 7km² of environmentally designated area is at risk of coastal flooding including Special Protection Areas and Sites of Special Scientific Interest. The sites affected include Stornoway Castle Woodlands, Tong Saltings, Lewis Peatlands and Port of Ness.

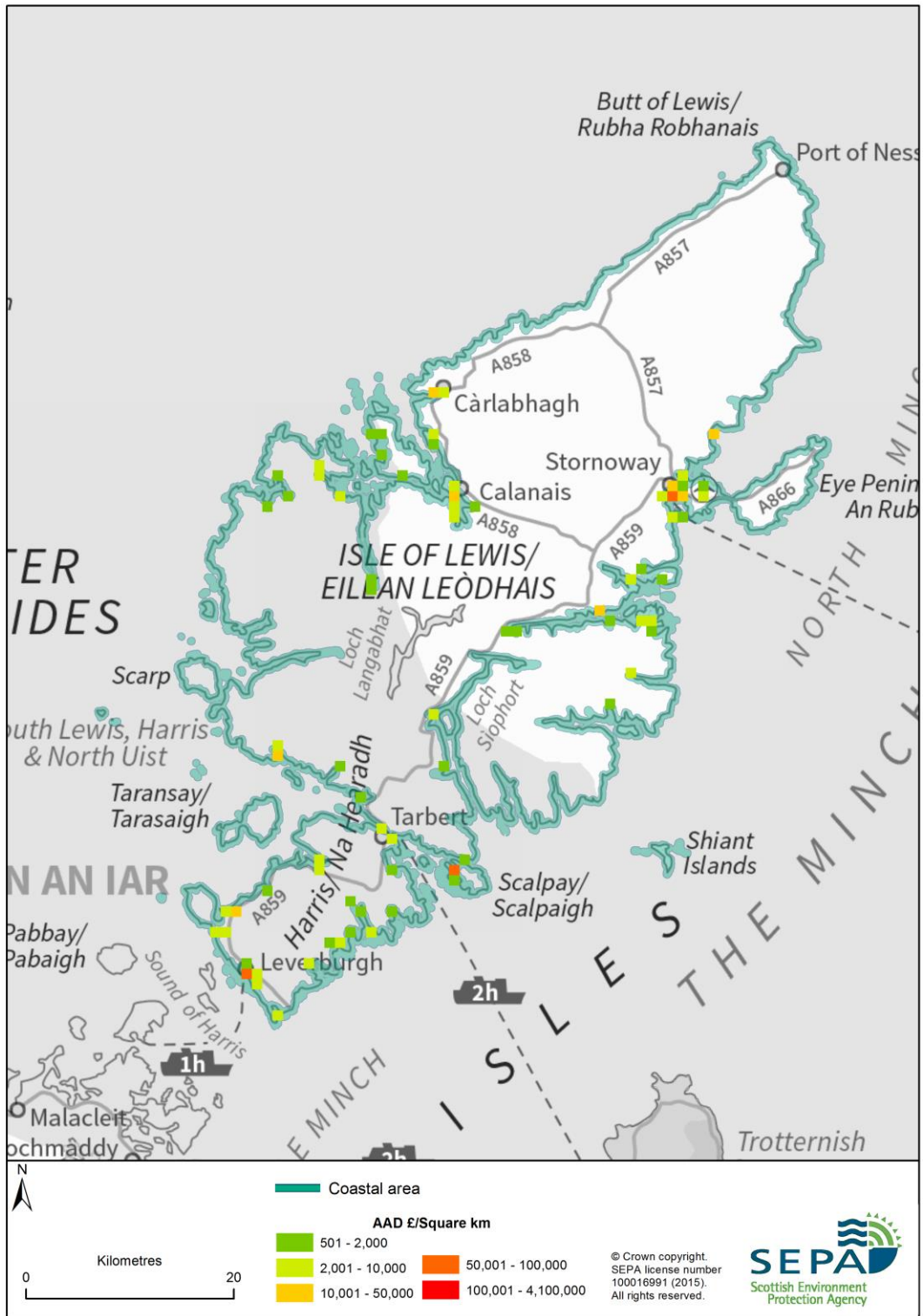


Figure 2: Annual Average Damages from coastal flooding

History of flooding

Stornoway was affected by a coastal flood in February 1990 when the airport, streets and Town Hall were flooded, the bus station was cut off by waves and there was a loss of power. This is the largest coastal flood on record, although there have been a number of localised floods.

A more recent flood occurred in early January 2014, when roads in Stornoway were closed due to flooding caused by a combination of high spring tides and unusually low atmospheric pressure. Fortunately, the surge was not accompanied by wind and wave action, and the flooding was solely due to the high still water. Flood waters did not enter properties on this occasion.

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.

Existing actions that are in place to manage flood risk in this coastal area are described in Section 2.

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 Lewis and Harris coastal area is 0.55m by 2080. This may increase the number of residential properties at risk of coastal flooding from approximately 40 to 160, and the number of non-residential properties from 90 to 190. 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 properties 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 of this document.

Estuarine surge

No assessment of estuarine surge attenuation potential was carried out for the Outer Hebrides.

Wave energy

There are a number of relatively short sections of the coastline on Lewis and Harris that have potential for wave energy dissipation. For example, along the western coast of northern Lewis. Further examples can be found along the southern end of Broad Bay and along the strip of land connecting with the Eye Peninsula.

Coastal flooding North Uist and Berneray

Coastal overview

The North Uist and Berneray coastal area (Figure 1) has a coastline with a length of approximately 350km. It comprises the islands of North Uist and Berneray which form the central part of the Outer Hebrides Local Plan District.

The coastline is embayed with inlets and sea lochs particularly on the east and south coast. The east is dominated by a hard rocky coast with intertidal rock platforms and occasional sparse beaches.

On the north and west coasts rock outcrops and headlands control the location and shape of the extensive, wide sandy beaches that are often backed by dunes and machair grasslands. Many of the beaches on the west coast are sheltered by offshore islands, rock reefs and shoals. The beaches are relatively stable with minimal net sediment losses. Transport by wind is probably the most dynamic erosive process occurring at present.

Due to the wide and shallow coastal slope, and the rocky and irregular bathymetry, most of the Atlantic wave energy is dissipated before the waves reach the coastline. Wave action is therefore greatest during spring tides and / or during storm surges when water depths can sustain larger waves.

There are two Potentially Vulnerable Areas:

- Lochmaddy and Trumisgarry (02/04)
- North Uist (02/05)

Flood risk in the coastal area

Within the North Uist and Berneray coastal area, there are approximately 20 residential properties and 10 non-residential properties at risk of coastal flooding. Approximately 20% of residential and 50% of non-residential properties in this coastal area are located within Potentially Vulnerable Areas.

Main areas at risk

There is coastal flood risk to residential properties at Borgh on Berneray, Port nan Long, Malacleit, Cnoc a' Lin, Lochmaddy on North Uist and the island of Grimsay.

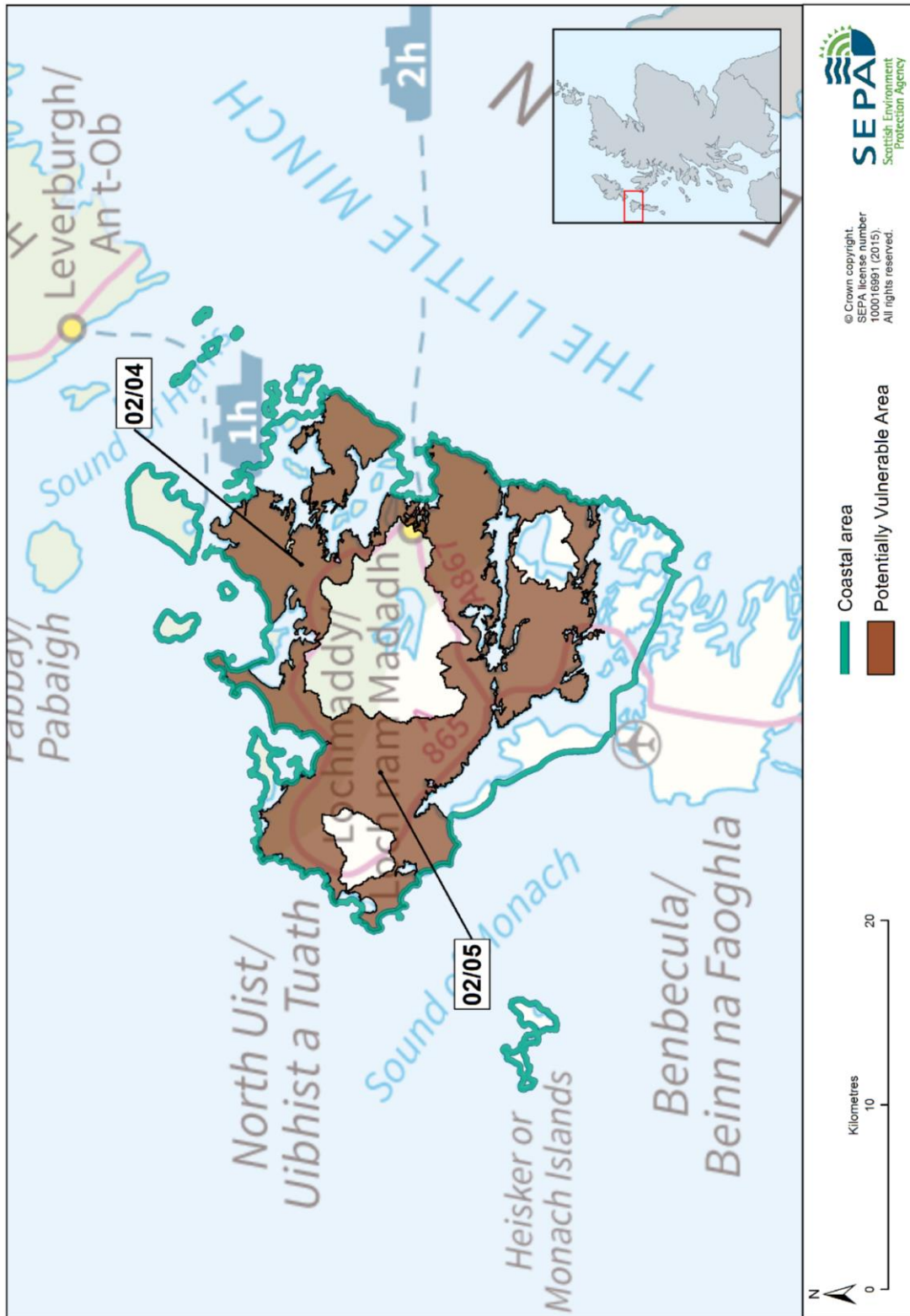


Figure 1: North Uist and Berneray coastal area and Potentially Vulnerable Areas

Economic activity and infrastructure at risk

The Annual Average Damages from coastal flooding in the North Uist and Berneray Coastal area are approximately £260,000. This accounts for around 11% of the total damages for the Local Plan District from all sources of flooding. The damages are distributed as follows:

- 58% roads (£150,000)
- 27% residential properties (£71,000)
- 5% non-residential properties (£12,000)
- 4% emergency services (£10,000)
- 4% agriculture (£9,000)
- 2% vehicles (£6,200)

Figure 2 shows the location of Annual Average Damages from coastal flooding across the area.

There are approximately 60 road locations at risk of coastal flooding. The main routes affected include the A865, A867, B893 and B894. Minor roads are also impacted.

Designated environmental and cultural heritage sites at risk

The Outer Hebrides have hundreds of archaeological sites situated along the coast and in the adjacent low lying areas. Many of these sites are in a relatively good condition and have minimal disturbance. The main threat to these sites is from coastal erosion.

In relation to the many cultural heritage sites at risk of coastal erosion, assessment surveys and excavations such as those run by the SCAPE Trust (Scottish Coastal Archaeology and the Problem of Erosion), and information recorded by other agencies have helped to highlight this issue.

There are 11 cultural heritage sites at risk of coastal flooding, all of which are designated as scheduled monuments. The majority of the sites are prehistoric domestic and defensive sites.

Approximately 30km² of environmentally designated area is at risk of coastal flooding including Special Areas of Conservation (SAC), Special Protection Areas (SPA) and Sites of Special Scientific Interest (SSSI). The sites affected include Loch Nam Madadh, North Uist Machair, Loch an Duin, Machairs Robach and Newton, Obain Loch Euphoirt, Mointeach Scadabhaigh, Loch Obisary, Balranald Bog and Loch nam Feithean.

A study conducted shortly after the January 2005 storm has shown that machair habitats are resilient to short duration seawater flooding, possibly due to the high level of interaction between freshwater/brackish water in the inland machair loch system and the water table (Angus S. & Rennie A.F. 2012). However, if seawater flooding is more persistent, either due to a failure of drainage systems or to more frequent marine inundation, this dispersal effect may become a liability as it would result in saline contamination to both the groundwater and the surface water.

Management of drainage systems is therefore important for flood water dispersal and for maintaining current levels of salinity in the water table. Adjustments may be required to cope with increased saline inflow caused by rising sea level, but as sea level rises still further it will become more difficult for the drainage system to cope.

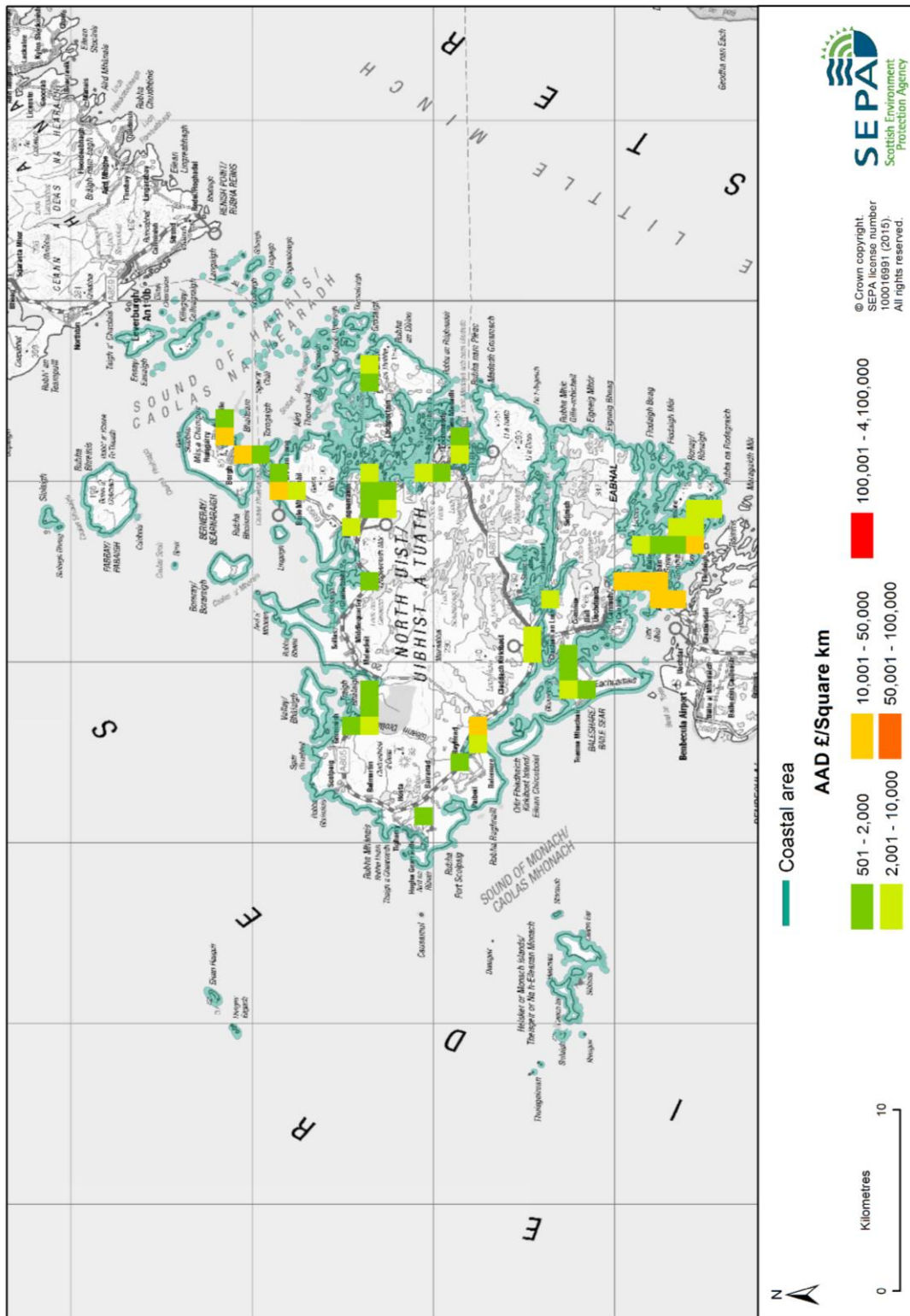


Figure 2: Annual Average Damages from coastal flooding

History of flooding

In January 2005 a severe storm hit the west coast of Scotland including the Outer Hebrides. Sections of the causeway that joins North Uist to the neighbouring islands of Grimsay and Benbecula were virtually destroyed. Causeways at Baleshare and at Ard Heisgeir suffered severe damage, and significant coastal flooding occurred in many locations including the main road junction at Clachan. The Baleshare causeway is overtopped on a regular basis and rocks, stones and seaweed are washed onto the carriageway.

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.

Existing actions that are in place to manage flood risk and that are in addition to the information presented in Section 2 are described below.

Awareness raising campaigns and community groups

The European funded CoastAdapt project (www.coastadapt.org) investigated means of adaptation to a changing climate with Comhairle nan Eilean Siar as lead partner. Coastal erosion and flooding have been discussed by the North Uist Community Council on a number of occasions.

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 North Uist to Berneray coastal area is 0.53m by 2080. This may increase the number of residential properties at risk of coastal flooding from approximately 20 to 30 and the number of non-residential from approximately 10 to 20. 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 properties 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 of this document.

Estuarine surge

No assessment of estuarine surge attenuation potential was carried out for the Outer Hebrides.

Wave energy

Beach systems in the Outer Hebrides, whether sand, shingle or dunes provide a natural coastal defence function thereby reducing the risk of flooding. A notable feature of the inshore seabed to the west of the islands is its shallow gradient, which together with vast kelp forests play a critical role in protecting the soft coastline of the Uists from wave action. The combination of shallow gradient and roughness created by the kelp forest greatly dissipate wave energy.

The northern and western coastlines of North Uist and Berneray have potential for wave energy dissipation. The main area with potential for wave energy dissipation is on the northern coastline around the Beinn Mhor peninsula, particularly along the machair on the western coastline. There are significant lengths of potential for wave energy dissipation around the Aird a Mhorain peninsula, Traigh Bhalairigh bay and the entire west coast from Aird an Runair to Carinish including Kirkibost Island and Baleshare. There is little potential along the eastern and southern coastline.

Coastal flooding Benbecula, South Uist and Barra

Coastal overview

The Benbecula, South Uist and Barra coastal area (Figure 1) has a coastline with an approximate length of 830km. It comprises the southern portion of the Outer Hebrides Local Plan District and includes the islands of Benbecula, South Uist and Barra.

The predominant landform on the west coast is machair grasslands, often flanked with sand dunes which can extend up to two kilometres inland from the coastline. By contrast the east coast is dominated by a hard rocky coast which is typically embayed with inlets, sea lochs and only sparse beaches.

There are also a large number of shingle beaches on the west coast, in some cases forming ridges lying above sandy beaches or forming the core of the sandy beaches. However, due to a sediment deficit much of the coastline is eroding and over 30% of beaches lack a protective dune cordon. In these areas the coast is susceptible to over wash and flooding. Coastal flooding is also a major risk to the delicately balanced machair ecosystem. Large areas of the machair are near mean sea-level in elevation making natural drainage of these areas increasingly challenging.

Due to the wide and shallow coastal slope, and the rocky and irregular bathymetry, most of the Atlantic wave energy is dissipated before the waves reach the coastline. Wave action is therefore greatest during spring tides and / or during storm surges when water depths can sustain larger waves.

There are three Potentially Vulnerable Areas:

- Benbecula (02/06)
- Lochs Bi and Druidibeag (02/07)
- Bornish to Boisdale (02/08).

Flood risk in the coastal area

Within the Benbecula, South Uist and Barra coastal area, there are approximately 120 residential properties and 30 non-residential properties at risk of coastal flooding. Approximately 94% of residential and 71% of non-residential properties at risk are located within the three Potentially Vulnerable Areas.

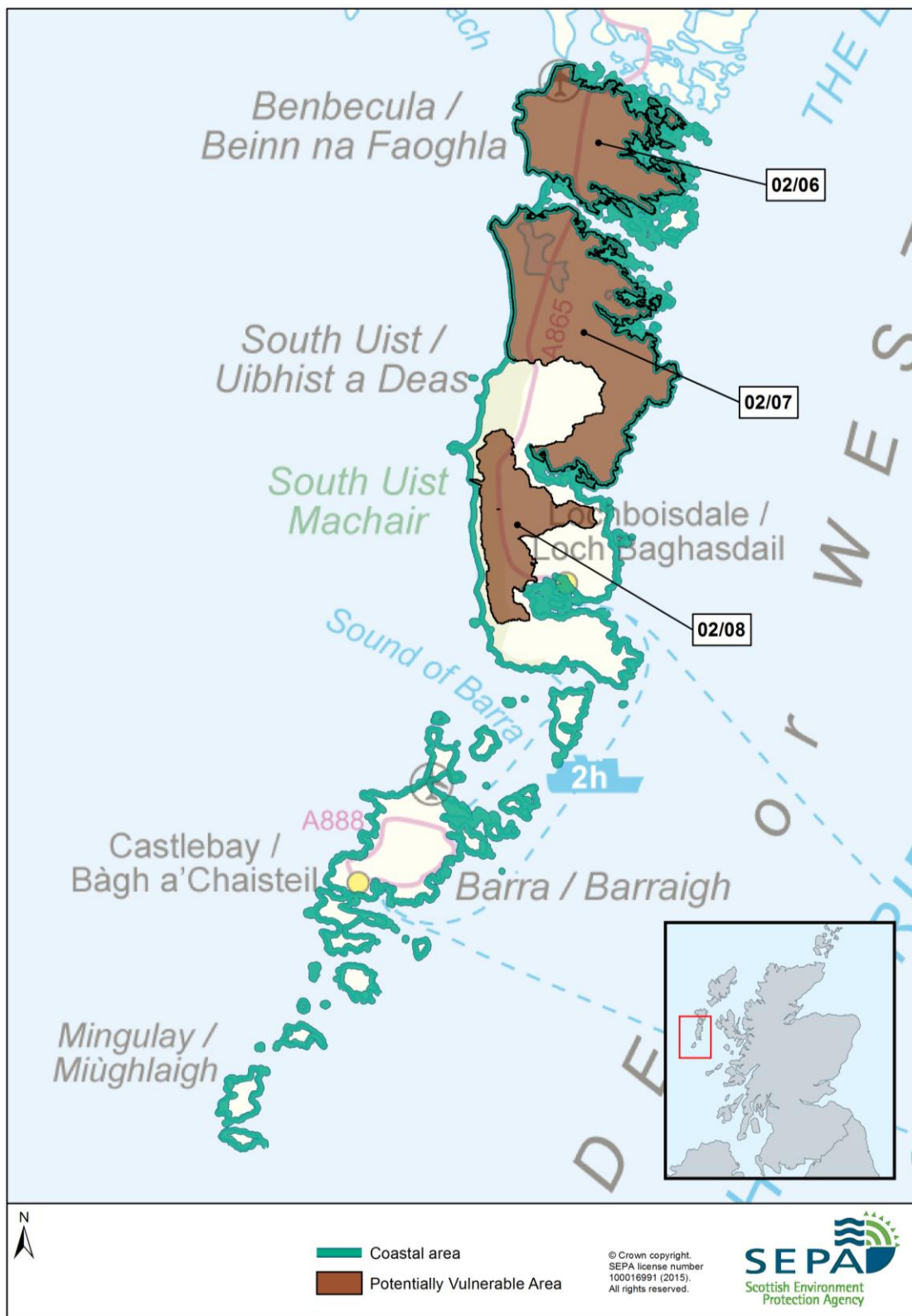


Figure 1: Benbecula, South Uist and Barra coastal area and Potentially Vulnerable Areas

Main areas at risk

The location with the largest number of properties at risk of coastal flooding is Balivanich. There is also coastal flood risk in the Dalabrog and lochdar areas on South Uist and Gramasdail, Creagorry and Lionacleit on Benbecula.

Economic activity and infrastructure at risk

The Annual Average Damages from coastal flooding in the Benbecula, South Uist and Barra coastal area are estimated to be approximately £930,000. This accounts for around 40% of the total damages for the Local Plan District from all flood sources. The damages are distributed as follows:

- 40% residential properties (£370,000)
- 35% roads (£330,000)
- 12% non-residential properties (£110,000)
- 6% emergency services (£52,000)
- 4% vehicles (£36,000)
- 3% agriculture (£28,000).

Figure 2 shows the location of Annual Average Damages from coastal flooding across the area.

There are approximately 150 road locations at risk of coastal flooding. The main routes affected include the A865, B891 and B892. Minor roads are also impacted. The airport at Benbecula is at risk of coastal flooding.

Designated environmental and cultural heritage sites at risk

The Outer Hebrides have hundreds of archaeological sites situated along the coast and in the adjacent low lying areas. Many of these are in a relatively good condition and have minimal disturbance. The main threat to these sites is from coastal erosion.

In relation to the many cultural heritage sites at risk of coastal erosion, assessment surveys and excavations such as those run by the SCAPE Trust (Scottish Coastal Archaeology and the Problem of Erosion), and information recorded by other agencies have helped to highlight this issue.

There are 15 cultural heritage sites at risk of coastal flooding. Most of these are scheduled monuments and the majority are prehistoric domestic and defensive sites. There is one listed building at risk of coastal flooding.

Approximately 30km² of environmentally designated area is at risk of coastal flooding including Special Areas of Conservation (SAC), Special Protection Areas (SPA), and Sites of Special Scientific Interest (SSSI). The sites affected include South Uist Machair, Bornish and Ormiclate Machairs, Loch Hallan, Aird and Borge Benbecula, West Benbecula Lochs, Howmore Estuary, Lochs Roag and Fada, Loch Druidibeg, Loch Bee, and Kilpheder to Smerclate South Uist.

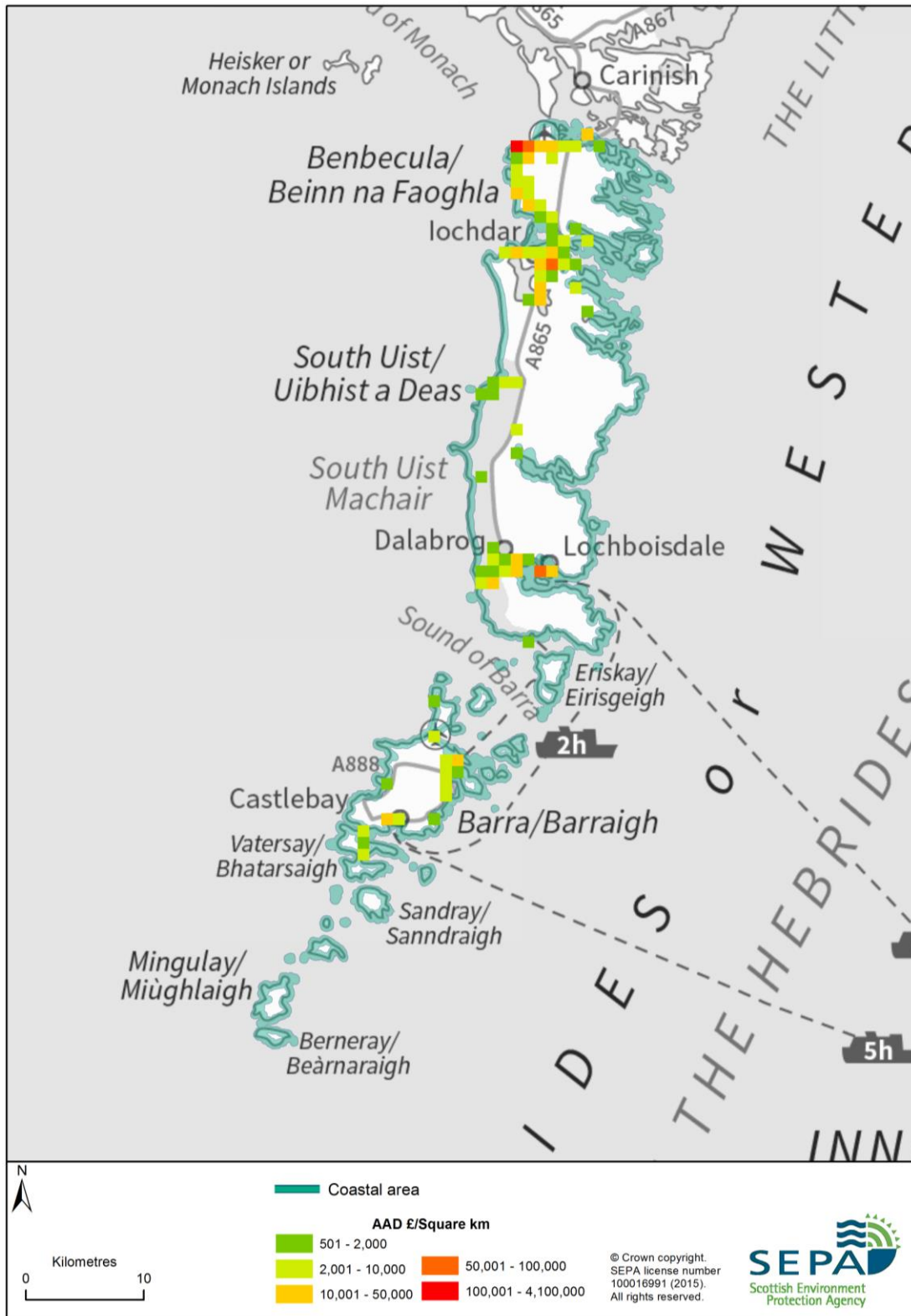


Figure 2: Annual Average Damages from coastal flooding

A study conducted shortly after the January 2005 storm has shown that machair habitats are resilient to short duration seawater flooding possibly due to the high level of interaction between freshwater/brackish water in the inland machair loch system and the water table (Angus S. & Rennie A.F. 2012). However, if seawater flooding is more persistent, either due to a failure of drainage systems or to more frequent marine inundation, this dispersal effect may become a liability as it would result in saline contamination to both the groundwater and the surface water.

Management of drainage systems is therefore important for flood water dispersal and for maintaining current levels of salinity in the water table. Ingress of saltwater into freshwater systems such as Loch Bi can be detrimental to salmonid populations. Adjustments to operation of gates and flap valves may be required to cope with increased saline inflow caused by rising sea level, but as sea level rises still further, it will become more difficult for the drainage system to cope.

History of flooding

In January 2005 a severe storm hit the west coast of Scotland including the Outer Hebrides. During the storm five people from the same family died when their cars were swept from a coastal road in lochdar, South Uist as they were trying to escape from flood waters. Widespread flooding occurred in many locations, particularly on the west coast, with roads, agricultural land, houses and other buildings being inundated with sea water. More recently, on 1 February 2014, there was flooding on the B892 at Stinky Bay in Benbecula.

Coastal flooding has occurred on a number of occasions on the islands when storm surge and high tides coincide.

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.

Existing actions that are in place to manage flood risk and that are in addition to the information presented in Section 2 are described below.

Awareness raising campaigns and community groups

There are two community flood action groups, the lochdar Flood Action Group and the Middle District Flood Action Group which were formed in the immediate aftermath of the January 2005 storm. Public meetings and workshops have been held in recent years to discuss flooding and coastal erosion issues particularly in Benbecula and South Uist. These events have been well attended reflecting the importance of coastal issues to the local population and the willingness of local people to be involved in decision making and implementation of schemes.

Organisations that have been involved include the Comhairle nan Eilean Siar; Scottish Natural Heritage; Coast Hebrides, the local coastal partnership (www.coasthebrides.co.uk); Stòras Uibhist, the community land owner; the CoastAdapt project (www.coastadapt.org); and Oxfam Scotland who provided community education and support.

Comhairle nan Eilean Siar was the lead partner in the CoastAdapt EU project which aimed to safeguard people living in North Atlantic coastal communities and help them adapt to the impacts of climate change.

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 Benbecula, South Uist and Barra coastal area is 0.52m by 2080. This may increase the number of residential properties at risk of coastal flooding from approximately 120 to 210, and the number of non-residential properties will increase from 30 to 60. 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 properties 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 of this document.

Estuarine surge

No assessment of estuarine surge attenuation potential was carried out for the Outer Hebrides.

Wave energy

Beach systems in the Outer Hebrides, (whether sand beaches, shingle beaches or dunes), provide a natural coastal defence function that reduces the risk of flooding. A notable feature of the inshore seabed to the west of the islands is its shallow gradient, which together with vast kelp forests which grow on it, play a critical role in protecting the soft coastline of the Uists from wave action. The combination of shallow gradient and roughness created by the kelp forest greatly dissipate wave energy.

The main areas of potential for wave energy attenuation tend to be on the soft sandy western coastlines of the Benbecula, South Uist and Barra coastal area. Very little potential has been identified along the eastern coastlines.

Due to a sediment deficit much of the western coastline is eroding and a large proportion lacks a protective dune cordon. In these areas the coast is susceptible to over wash and flooding which is of particular concern as the level of the land generally decreases inland from the coastal edge. Potential exists for rebuilding gaps in dune systems and for development of methods to counter undercutting of the low machair edge by wave action.

On Benbecula the entire western coastline from the airport to Luib Bhan bay has potential for wave energy dissipation. There are also small areas of potential at Rubha ma-thuath on the south coast, Rairnis and Orasaigh Uisgeabhigh on the east coast, and the area around the end of the causeway from Grimsay. On South Uist the entire western coastline has potential for wave energy dissipation.

The South Ford Hydrodynamics Study has identified beach recharge at Gualan Island together with dune stabilisation at Lionacleit as a means of wave energy dissipation for the South Ford area and the south west coast of Benbecula.

3.4 Surface water flooding

Outer Hebrides 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 a history of surface water flooding. The predicted impacts on infrastructure are also identified. Due to the nature of surface water flooding, 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 the relevant Potentially Vulnerable Area chapters in Section 2.

Flood risk

Within the Outer Hebrides Local Plan District there are estimated to be fewer than 10 residential properties at risk of surface water flooding. The number of non-residential properties at risk of surface water flooding is approximately 30, representing a small proportion of the total number at risk of flooding from all sources.

Economic activity and infrastructure at risk

The Annual Average Damages from surface water flooding are estimated to be £59,000. This accounts for just 3% of the total flood damages for the Local Plan District. The damages are distributed as follows:

- 89% non-residential properties (£52,000)
- 11% residential properties (£6,700)

Figures 1a and 1b shows the location of Annual Average Damages from surface water flooding across the Local Plan District.

Approximately 340 road locations and small sections of the airport runways at Stornoway and Benbecula are also at risk of surface water flooding.

Designated environmental and cultural heritage sites at risk

There are an estimated 50 designated cultural heritage sites at risk of surface water flooding in the Outer Hebrides. These sites include scheduled monuments and designed gardens and landscapes.

The impact of surface water flooding on environmental sites has not been assessed and is assumed to be relatively low.

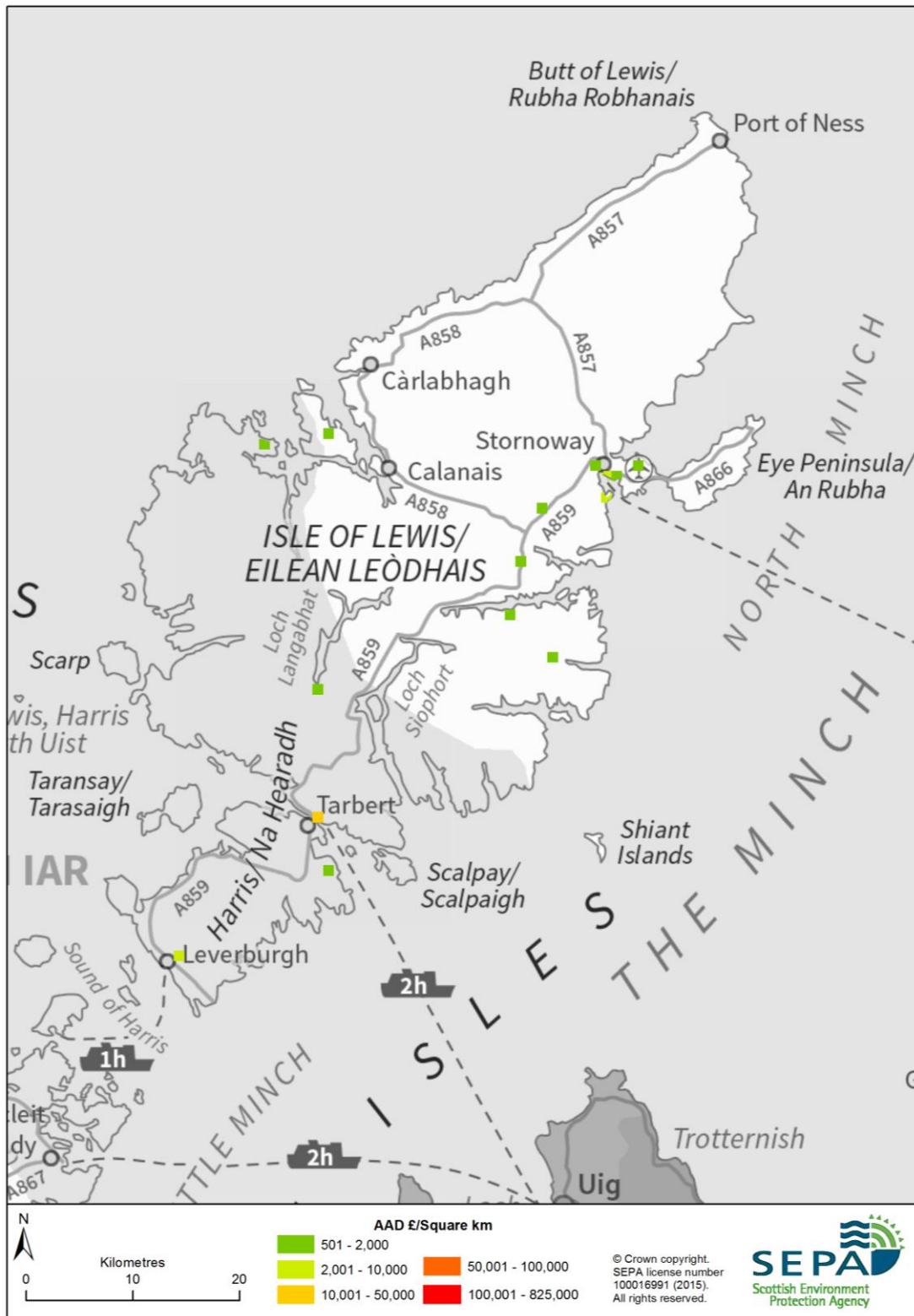


Figure 1a: Annual Average Damages from surface water flooding on Lewis and Harris

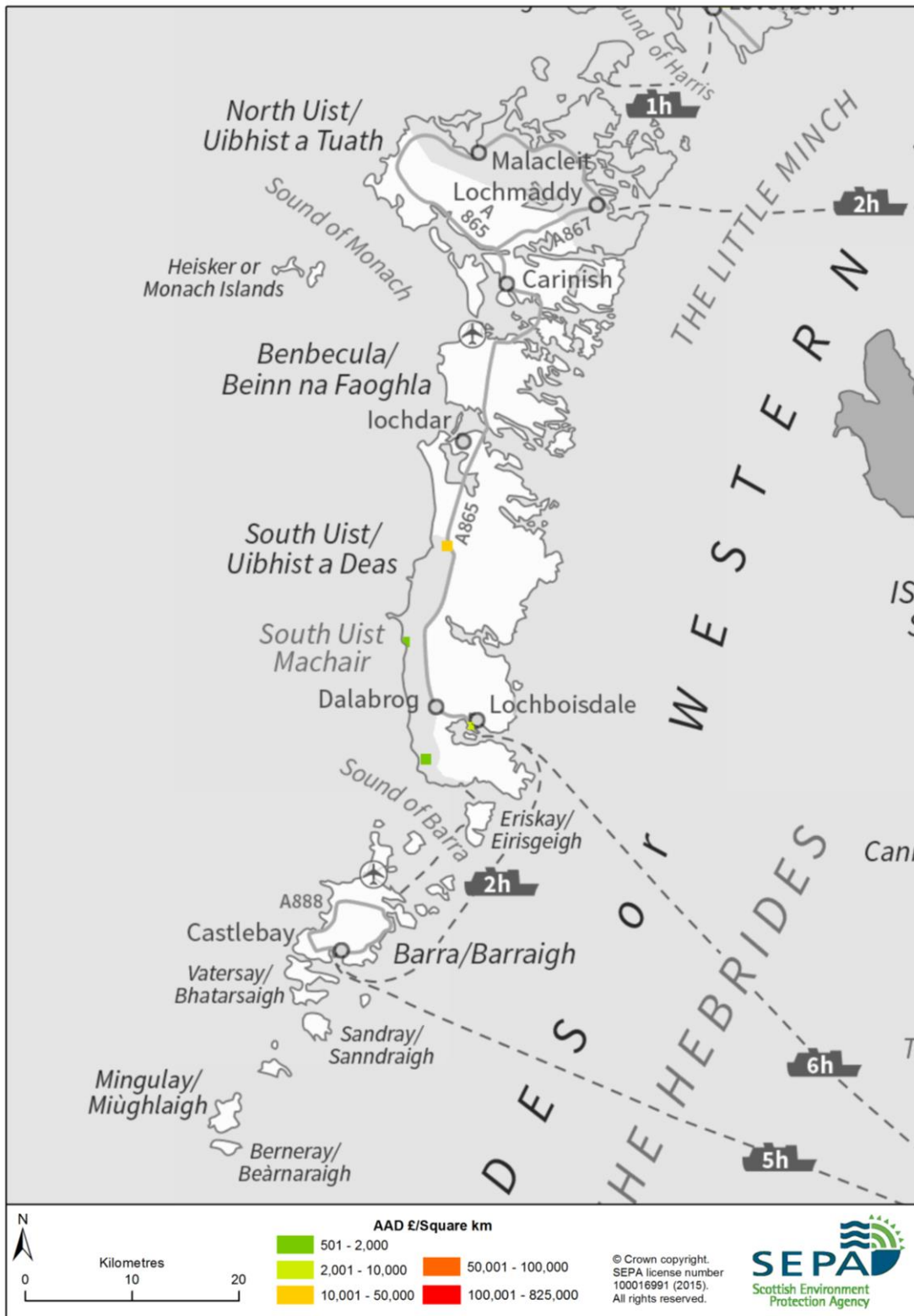


Figure 1b: Annual Average Damages from surface water flooding on Berneray, North Uist, Benbecula, South Uist and Barra

History of surface water flooding

There have been a number of localised floods due to surface water. These floods often occur during periods of tidal surge combined with high rainfall and can result in flooding of land upstream of river estuaries, such as at the Howmore River (Tabha Mor) in South Uist and low-lying parts of Stornoway.

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.

Surface water flooding, taken on its own, has a relatively low impact on overall flood risk in the Outer Hebrides. However, when combined with high tide levels, or when surface water discharge to sea outfalls is reduced or blocked, localised flooding can occur as a consequence. Management of surface water flooding is therefore closely linked to river and coastal flood management and this interaction will be taken into account as far as practical in the consideration of river and coastal flood issues.

Surface water management priority areas

The areas at highest risk from surface water flooding nationally have been identified as priority areas. These priority areas were identified using SEPA flood models, supplemented with evidence from historic surface water floods and, where available, more detailed modelling carried out by local authorities.

Due to the relatively low impact of surface water flooding assessed for the Outer Hebrides, no specific surface water priority areas have been identified for detailed study. However any instances of surface water flooding will be investigated by the local authority and Scottish Water as appropriate.

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 does not change significantly. However this does not take account of the combined impact of sea level rise and a consequential rise in groundwater and loch levels.

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
	<p>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.</p> <p>See also 'Annual Average Damages'</p>
Demountable defences	<p>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</p>
Deposition	<p>A natural process leading to an accumulation of sediment on a river bed, floodplain or coastline.</p>
Economic impact	<p>An assessment of the economic value of the positive and negative effects of flooding and / or the actions taken to manage floods.</p>
Embankment	<p>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.</p>
Emergency plans / response	<p>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.</p>
Environmental impact	<p>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.</p>
Environmental Impact Assessment (EIA)	<p>Environmental Impact Assessment (EIA) is a process which identifies the potential environmental impacts, both negative and positive, of a proposal.</p>
Environmental sites / environmental designated areas/ environmentally designated sites	<p>Areas formally designated for environmental importance, such as Sites of Special Scientific Interest (SSSI), Special Protection Area (SPA) or Special Areas of Conservation (SAC).</p>
Episodic erosion	<p>Erosion induced by a single event, such as a storm.</p>
Erosion	<p>A natural process leading to the removal of sediment from a river bed, bank or floodplain or coastline.</p>
Estuarine surge attenuation	<p>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.</p>
Estuary	<p>A coastal body of water usually found where a river meets the sea; the part of the river that is affected by tides.</p>
Fault (fault line)	<p>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.</p>
Flash flood	<p>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.</p>
Flashy watercourse	<p>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</p>

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 from 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

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- ^{ix} <http://www.snh.gov.uk/protecting-scotlands-nature/protected-areas/local-designations/lmr/> 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=ufmfs#w=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:

Ordnance Survey

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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.

