

Community adaptation actions

*Practical actions communities can take to
increase resilience to climate change*

Discussion paper
April 2014

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Sniffer's project managers

The lead author of this document is Karen Miller, Project Coordinator (Climate Resilience).

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Sniffer is a charity delivering knowledge-based solutions to resilience and sustainability issues. We create and use breakthrough ideas and collaborative approaches across sectors, to make Scotland a more resilient place to live, work and play. Through innovative partnership approaches we share good practice, synthesise and translate evidence, commission new studies and target communications, guidance and training.

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Introduction

This document describes practical actions that communities can take to increase resilience and adapt to changes in climate. It offers a starting point for further discussion with communities and community-facing organisations. Over twenty actions are described across three categories:

1. Community adaptation actions in the natural environment
2. Community adaptation actions for built assets (schools, community centres, homes)
3. Community adaptation actions that raise awareness and build capacity to adapt¹.

Where possible we have included examples of how or where each of the actions has been implemented, as well as information about additional benefits. We have also suggested who communities may need to engage with to deliver the actions.

A variety of sources have been used to help identify actions:

- Feedback from the “Are You Ready?” pilot projects²
- Information from the Climate Challenge Fund pilot adaptation project reports produced by Oxfam Scotland (Outer Hebrides), Greenspace Scotland (Hazlehead Park, Aberdeen and Whitburn, West Lothian), and Perth and Kinross Council (Carse of Gowrie)
- PREPARE – The contribution and role of local and household level adaptation in overall UK adaptation³
- Community based adaptation actions checklist (Keep Scotland Beautiful)
- Greenspace Scotland climate change parks toolkit⁴
- Highlands & Islands Equality Forum Roadshow (2011) Climate change: How will vulnerable groups weather the storm?⁵

Next steps

This list of actions is not exhaustive; additional actions are likely to be identified as communities seek to address the local impacts of climate change. Sniffer will therefore further develop this resource as part of the Adaptation Scotland programme. Adaptation Scotland is also developing visuals of well-adapted places. This work includes images of many of the actions described in this document.

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¹ Capacity building and awareness raising activities (such as developing community adaptation plans) is essential to enable Scotland’s communities to adapt to current and future climate change. However the main focus of this report is on practical actions.

² <http://adaptationscotland.org.uk/5/125/0/Are-You-Ready-Vox-Pop.aspx>

³ Kent, N., Porter, J., Dessai, S., Miller, K., Winne, S., Sibille, R., Horrocks, L., Dale, N., Lonsdale, K. and Ballard D. (2013) PREPARE – The contribution and role of local and household level adaptation in overall UK adaptation, Part of the PREPARE Programme of research on preparedness, adaptation and risk, Final Report for project ERG1211 by Ricardo-AEA for Defra, Report reference Ricardo-AEA/R/ED58163/PREPARE R2/Issue 1.0.

⁴ <http://www.greenspacescotland.org.uk/climate-change-parks.aspx>

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<http://www.adaptationscotland.org.uk/Upload/Documents/HIEFClimateChangeRoadshowreportmarch2011.pdf>

Community adaptation actions in the natural environment					
What adaptation action could our community take?	What climate change impacts can this action be taken in response to?	How does this action contribute to climate change adaptation?	What other benefits does this action have?	Who should be involved?	Where has this action been taken already?
<i>Create shelterbelts using trees, hedgerows and fences</i>	Flooding Wind Coastal erosion Sea level rise Drought Heat	Shelterbelts can help prevent damage to crops and reduce soil erosion, e.g. in community gardens and allotments. Shelterbelts can also protect farm buildings and prevent snow drifting onto farm tracks. In coastal communities, sand-blow fencing can slow the rate of coastal edge and dune erosion. This helps to restore and protect fragile dune systems and protect grazing land from human and livestock-induced degradation.	Reducing carbon emissions, supporting biodiversity and enhancing green networks if species are selected carefully. Tree planting can create jobs in forest management and tree care, and provide a sustainable fuel source for local people. Trees may provide shelter enabling people to walk more safely between houses when weather is particularly stormy.	This action can be managed by communities with technical input from Forestry Commission and/or local arboricultural and biodiversity officers – e.g. where to plant trees, which species, how many. Community involvement in planting and upkeep is essential.	Oxfam and Lochboisdale Amenity Trust supported communities on North Uist, Benbecula, South Uist & Eriskay and Barra & Vatersay to plant 20,000 native trees for shelter. School children played a large role in tree planting, which was led by Woodlands Trust volunteers. This work was funded by the People's Postcode Lottery Dream Fund. This action created shelter-belts for crofters, local training agencies, hospitals, nurseries, and sheltered housing.

<p>Expand/create and maintain woodland to provide shelter, shade and reduce waterlogging</p>	<p>Rainfall Flooding Wind Drought Heat</p>	<p>Trees create shade for people and contribute to local cooling. This is important in vast concrete areas which heat rapidly, for example car parks, civic areas and streets. Shelterbelts protect buildings from prevailing wind and rain helping to reduce maintenance costs.</p> <p>Creation and maintenance of woodlands and hedgerows can intercept runoff and hold back flood waters, increase the rate of infiltration from rainfall, provide a windbreak and a barrier to intercept soils mobilised by wind blow, provide shade and shelter to livestock and also connect areas of valuable habitat.</p>	<p>Woodlands are an excellent carbon sink. They can also help reduce diffuse pollution from agriculture, as water draining from well-managed woodland tends to be high quality with low levels of pollution. Woodlands also support biodiversity, enhance green networks and provide recreational areas.</p> <p>Tree planting can create jobs in forest management and tree care, and provide a sustainable fuel source for local people.</p> <p>If woodland areas are integrated into wider water management such as river catchment management and sustainable urban drainage systems, they will help reduce flood risk.</p>	<p>This action can be managed by communities with technical input from Community Woodlands Association – e.g. where to plant trees, which species, how many. Community involvement in planting and upkeep is essential and can be carried out in existing community gardens.</p>	<p>The Scottish Borders is home to the first community owned woodland in the UK - Wooplaw Wood. Community members were brought together by Tim Stead, wood sculptor and furniture maker, to develop an innovative concept of woodlands for people. In 1987 Wooplaw Woods, outside Lauder, came on the market and was successfully bought by the community group.</p>
<p>Create and maintain wetlands</p>	<p>Rainfall Flooding Drought</p>	<p>Wetlands help reduce the flow rate of water thereby helping to alleviate flood risk. Wetlands also replenish freshwater aquifers. Maintenance is important so that the land does not revert to its previous state.</p>	<p>New wetlands capture and store carbon and support biodiversity. They can also provide a source of income for the community, for example by growing and harvesting willow.</p>	<p>This action will require leadership and technical input from SNH, SEPA, local biodiversity officers or other expert groups. Location of wetlands should be informed by surface water management plans. Communities may identify and initiate the idea and participate in design and maintenance. They may also lobby landowners to create wetlands.</p>	<p>At Hazlehead Park in Aberdeen, the community planted trees on an area of mown grassland which was too wet for use and which is adjacent to a community facility which is regularly flooded by surface water from the Park. Across two planting sessions, the community worked with Council staff to plant 1000 trees to create wet alder/willow woodland.</p>

Restore and conserve peatlands	Rainfall Flooding Drought	Peatlands are an important mechanism for storing water in river catchments, helping alleviate flood risk. Communities can restore and conserve peatlands which help manage flood risk.	The carbon stored in Scotland's peat and peaty soil is equivalent to over 180 years of greenhouse gas emissions from Scotland at current emission rates. Restoring peat-forming habitat which has been drained or damaged helps ensure that they remain as long-term sinks rather than sources of greenhouse gases. Peatlands also provide important habitats.	Communities can take actions to restore and manage peatlands, with technical guidance from peatlands managers and SNH.	Commonhead Moss local nature reserve is the largest area of raised bog in Glasgow – and an important peatland site in the Seven Lochs Wetland park. Volunteers at the park have installed plastic dams – up to 3 metres deep – to hold water in the bogs and stop the peat drying out. There are many more hectares of degraded raised bog across the wetland park. A key aim of the wetland park is to bring this into positive management to benefit biodiversity, support nature to adapt, help store carbon and help manage flood risk.
Establish a group of volunteers to help prevent and respond to wildfires	Drought Heat	The risk of wildfire is growing while the resources available to fight it are decreasing. Land use trends are indirectly increasing vegetation cover while there is likely to be an increase in warm, dry conditions. In affected areas, volunteer groups can raise awareness of wildfire risk and the need for careful land management. Volunteers can also be trained by emergency services to help tackle them.	Wildfires destroy large areas of carbon storing trees and vegetation, leading to carbon emissions. It is therefore in our interest to reduce the risk of wildfires occurring and spreading. In addition this action mobilises additional resources to prevent and react to wildfires, which is critical to the safety and wellbeing of communities and the environment at a time when fire and rescue services have limited resources.	Communities can instigate this action in partnership with the local fire and rescue service and local authorities who can provide training and equipment.	People in Applecross are working with the Fire Service to prevent wildfires and to respond to them when they do occur. Scottish Land & Estates recently published a wildfire information guide. The guide was prepared in response to the results of a survey of deer management groups which showed 96% of respondents were willing to participate in creating wildfire defence, by working with the Fire and Rescue Services and their rural neighbours.
Soil conservation / mulching	Heavy rainfall Drought Heat	Using mulches help maintain soil water levels by reducing evaporation from the soil surface and retaining some rain close to the soil. Mulches can also reduce soil erosion.	Mulching reduces the need for watering and weeding, and improves the appearance of community gardens.	Applying mulches can be done easily in community food gardens or allotments. Community groups can encourage local landowners and farmers to apply mulches.	Mulching is a common action already carried out by community volunteer groups. The Conservation Volunteers recently carried out tree mulching and planting at Leith Links Children's Orchard, Edinburgh.

<p><i>Check insurance cover and conditions</i> for damage to polytunnels, greenhouses and other structures</p>	<p>Strong wind Heavy rainfall Flooding Storms Snowfall</p>	<p>Ensure protection against the cost of damage to property and possessions.</p>	<p>This action can reduce economic losses and negative health impacts.</p>	<p>Community groups may encourage action amongst householders and those responsible for community gardens and allotments.</p>	<p>In the Scottish Borders, community groups have been approaching householders to ensure they have the right insurance. This was instigated by the Scottish Borders Council.</p>
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Community adaptation actions for built assets [schools, health facilities, community centres, homes]					
What adaptation action could our community take?	What climate change impacts can this action be taken in response to?	How does this action contribute to climate change adaptation?	What other benefits does this action have?	Who should be involved?	Where has this action been taken already?
<i>Install rainwater harvesting systems</i>	Heavy rainfall Flooding Drought	<p>Rainwater drains into sewers and sewage treatment plants, and storms can cause systems to overflow leading to flooding. Rainwater storage can reduce run off rates during a storm, reducing flood risk.</p> <p>Rainwater storage systems are a component of sustainable urban drainage systems. They comprise collecting surfaces such as roofs or pavements which harvest rainwater, and are linked to storage vessels, such as water butts or underground tanks. They can be combined with pumps and filtration systems to recycle the water.</p> <p>Collecting rainwater can reduce dependency on public water supplies during periods of water shortage. Water can be used for horticultural/ irrigation or cleaning.</p>	Installing rainwater harvesting systems can raise community awareness of the value of scarce water resources.	Communities can encourage owners of community buildings to install rain water harvesting, or if they own a building they can install their own system. They can also raise awareness amongst householders. Support may be needed from architects or designers, engineers, council recreation and parks departments and community building assets managers.	At Hazlehead Park in Aberdeen, the Pavilion collects rainwater from the roof for use in the building. It is also connected to the combined heat and power system.
<i>Install grey water harvesting</i>	Drought	Grey water recycling systems collect and treat wastewater from showers, baths and wash basins. Grey water recycling systems collect this water, treat it and re-use it for purposes that do not require drinking water quality, helping to conserve water for other purposes during periods of water shortage. The recycled water can be used to	Installing grey water harvesting systems can raise community awareness of the value of scarce water resources.	Communities can encourage owners of community buildings to install grey water harvesting, or if they own a building they can install their own system. They can also raise awareness with householders. Support may be needed from architects or designers, engineers, council recreation and parks departments and	There are no known community-based examples as this is an emerging technology.

		flush toilets, water gardens and sometimes feed washing machines. Grey water recycling systems can be installed in new or existing buildings and can meet a significant proportion of domestic demand for water.		community building assets managers.	
Increasing permeable surfaces	Heavy rainfall Flooding	Increasing permeable surfaces is a component of sustainable urban drainage systems. Permeable surfaces, soakaways or detention ponds should be included as integral design features helping reduce and slow surface water run-off and flood risk to communities.	This action, when implemented as part of a flood risk management strategy, can reduce flood water damage and the financial and health consequences that flooding can cause (to those directly affected, family members and additional pressure on public services).	National Planning Policy Guideline on Planning and Flooding states that the susceptibility of land to flooding is a material consideration when assessing a planning application. Communities can encourage local residents and building owners to increase permeable surfaces retrospectively.	During Adaptation Scotland's "Are You Ready" pilot project, the idea of installing sustainable urban drainage components on vacant and derelict land was identified by the Possilpark community.
Obtain community grit banks	Freezing temperatures Ice Snow	Having access to and control of community grit banks allows communities to respond quickly to weather warnings for freezing conditions. This action builds capacity for communities to cope with increasingly frequent extreme weather conditions.	Installing community grit banks reduces the need for multiple individual car journeys to purchase grit during icy conditions, thus leading to emissions savings. This can also reduce pressure on public sector roads departments to grit roads, and may reduce accidents and the associated burden on emergency services.	The local authority can provide grit banks for community access and communities can monitor and manage their own supplies. This action will foster greater partnership working.	Scottish Borders Council has provided communities across the region with satellite grit banks that they maintain themselves.
Install green roofs on community buildings	Rainfall Flooding Heat	Retrofitting green roofs and creating green roofs on new buildings offers a range of adaptation benefits including: <ul style="list-style-type: none"> reducing water flow rates from buildings and therefore flood risk; increasing the life expectancy of waterproofing membranes on roofs and reducing maintenance costs; 	Green roofs reduce carbon emissions by increasing thermal efficiency. They also support biodiversity and enhance green networks. Green roofs can transform small, uninhabited buildings into eye-catching new habitats.	This action can be driven by a community group. Technical advice will be required from architects, designers and structural engineers to avoid any risk to the building structure. Local biodiversity officers can advise on species composition. The community may contact the local planning department and building	In Manchester, Red Rose Forest worked with local communities to create green roofs on small, uninhabited, communal buildings and structures around Manchester. Red Rose Forest approached community centres, places of worship, colleges, schools, allotment societies and health centres across Manchester and encouraged them to construct a

		<ul style="list-style-type: none"> • supporting and enhancing biodiversity, particularly when linked to wider habitat networks; • reducing the urban heat island effect by cooling neighbouring areas; and • improving air quality. 		control team for advice.	Little Green Roof. Each roof is supported by an innovative education session for the people who will look after the roof and those who use the building the roof is on. Little Green Roofs is a Red Rose Forest project, part funded by Manchester City Council's Carbon Innovation Fund.
Design and create green walls on community buildings	Rainfall Flooding Heat	Green 'living' walls contribute to rainwater and flood management by slowing runoff from buildings. They also help to clean rainwater and have a cooling influence on the local environment.	Green walls provide a form of insulation which reduces buildings heating and cooling demands. They can improve local air quality, support biodiversity and offer education possibilities – as well as improving building appearance.	This action needs to be factored in at the building design stage, but could be driven by a community group with input from local biodiversity officers. The community may need to consult the local planning department.	The use of green walls is an emerging adaptation action in Scotland. Designers of Dunbar Community Centre included a green wall in the central courtyard. This improves the appearance of the building and – combined with the building's green roof – reduces rainwater run-off.
Retrofit flood resistance measures	Heavy rainfall Flooding	Flood resistance measures on individual buildings or properties can prevent flood water from entering properties. Measures include door guards or gates, sealing utility entry points, toilet plugs, water proofing external walls and sewerage non-return valves. These actions can be factored in when community buildings or homes are being constructed or undergoing routine maintenance.	Taking early action to fit flood resistance measures can help avoid the carbon impacts associated with repairing flood-damaged buildings. This action can also reduce economic and health and wellbeing consequences of flooding.	Community groups can advise on and encourage uptake amongst householders, landlords and businesses of flood resilience measures in communities. Communities should contact SEPA for advice on installing flood resistance measures in buildings.	In Skinningrove Beck, a small coastal village in North East England, the community is working closely with the Environment Agency to manage and reduce flood risk. The village has a number of voluntary 'river wardens' who alert the Environment Agency when there are problems such as debris blockages. The Agency installed flood gates in response to serious flooding in 2000, and the wardens are trained to close these in emergencies. Sirens have been installed to warn the community.
Install flood resilience measures	Heavy rainfall Flooding Snowfall	Resilience measures reduce damage to properties where water has entered the property and act to reduce damage so properties can be repaired and reoccupied rapidly and relatively inexpensively following a flooding	Taking early action to fit flood resistance measures can help avoid the carbon impacts associated with repairing flood-damaged buildings. This action can also reduce the economic and health and wellbeing	Community groups can advise on and encourage uptake amongst householders, landlords and businesses of flood resilience measures in communities. This includes awareness raising, lobbying and	Mary Dhonau (of Mary Dhonau OBE and Associates) has had her home flooded on numerous occasions. In response she has led communities at risk to 'work with' rather than 'against', those who manage flood risk. Mary was

		event. Measures include water resistant finishes in ground floor areas, including tiles or waterproof paint and concrete, vinyl or ceramic flooring. These actions can be factored in at little extra cost when community buildings or homes are being constructed or undergoing routine maintenance or upgrades.	consequences of flooding.	retrofitting community-owned buildings.	commissioned by the Environment Agency to work with communities and individuals in Shropshire, Herefordshire and Gloucestershire to raise awareness of flood risks and advise and encourage them to work towards flood resilience. Communities were engaged via one-to-one communication, leafleting, presentations, workshops, local meetings and using contacts in media.
<i>Check windows, doors, guttering and exposed building fabric, and maintain and upgrade them</i>	Heavy rainfall Flooding Wind Freezing temperatures Snowfall Ice	Checking windows, doors and exposed building fabric for wear and tear and water/wind ingress helps reduce the need for costly reactive actions after damage has occurred. Retrofitting community buildings with double glazing ensures buildings are fit for purpose, reducing the likelihood of health impacts from living in cold, damp conditions (e.g. respiratory illnesses).	This action reduces greenhouse gas emissions by minimising heat loss and draughts.	Community groups can work with Housing Associations to monitor and inspect community buildings. Communities can then encourage property owners to take remedial or preventative action. Communities can help maintain community-owned buildings.	The need for communities to monitor buildings to prevent weather-related damage was highlighted at the Highlands & Islands Equality Forum Climate Change Roadshow in 2011, particularly at a time when funds and resources are in short supply.
<i>Check insurance cover and conditions for damage to buildings</i>	Strong winds Heavy rainfall Flooding Storms Snowfall	This action offers protection against the cost of damage to property and possessions, which may become more frequent due to climate change.	This action can reduce economic losses and negative health impacts such as stress or depression caused by not having adequate insurance cover.	Building owners have a responsibility to check their insurance cover; however community groups may encourage action amongst householders and owners of community buildings.	In the Scottish Borders, community groups have been approaching households to ensure they have the right insurance. This was instigated by the Scottish Borders Council.

Community adaptation actions that raise awareness and build capacity to adapt to current and future risks					
What adaptation action could our community take?	What climate change impacts can this action be taken in response to?	How does this action contribute to climate change adaptation?	What other benefits does this action have?	Who should be involved?	Where has this action been taken already?
Develop community contingency plans to help remote communities manage risks from loss of critical power and water supplies	Heavy rainfall Flooding Freezing temperatures Snow Ice High winds Drought Extreme heat	Community services are highly dependent on reliable power and water supplies (e.g. health facilities, emergency services, schools and shops). Loss of these critical supplies poses a serious threat to communities, therefore it is essential to understand the risks and know how to manage them. This could be done via scenario planning and developing contingency plans in partnership with emergency services and local authorities.	Having a contingency plan provides further motivation to find low carbon solutions to increase energy self-sufficiency. Community-owned renewables can provide energy security and a source of income. This action will support the work of the public sector, protecting the health and wellbeing of communities and the environment.	This action can be led by community groups with support from local authorities, emergency services and utilities providers. This is particularly important for remote communities.	Colintraive and Glendurel Development Trust are helping to future proof community buildings. Colintraive Hall is about to go through a major refurbishment to include insulation and an air source heat pump which will reduce their vulnerability to disruptions to centralised energy supplies.
Establish a community response team to assist with local emergency planning, provide flood risk advice to homeowners, and create a local contact network and plan of action	Heavy rainfall Flooding Freezing temperatures Snow Ice High winds Drought Extreme heat	This action creates awareness of the increasing risks of climate change, builds capacity within the community to be on guard for extreme weather and climate emergencies, and provides capacity to support emergency services and councils to respond to these.	This can mobilise and empower communities, while helping statutory agencies deliver essential services such as emergency response, e.g. by understanding how medical conditions can be made worse by extreme temperatures and providing advice via health services or on community notice boards.	Support requirements may be guided by local authorities, community partners (e.g. health and emergency services) and SEPA. Community input can be coordinated by a Local Development Trust or similar community group.	Scottish Borders Council has provided community groups with advice on flood risk in conjunction with the Flood Protection Forum. These groups now take this advice door to door, helping residents understand if they live in a flood risk zone. They have also established a “community vulnerability list” and mobilised a bank of volunteers.
Provide essential emergency equipment for households, particularly those in remote communities	Heavy rainfall Flooding Freezing temperatures Snow Ice High winds Drought Extreme heat	Providing emergency equipment to residents in remote communities can help reduce their vulnerability to severe weather. This is especially important for vulnerable communities (e.g. in care homes, homeless shelters and schools).	Ensuring vulnerable individuals and sites are equipped with emergency boxes will buy time for the emergency services to reach endangered communities, potentially saving lives but also enabling stretched resources to be spread further.	Scottish Government’s “Ready Scotland” initiative already encourages homeowners to prepare for emergencies, but community groups are more in touch with residents and are therefore best placed to lead.	The idea of ‘emergency boxes’ was proposed at the “Are You Ready?” meeting in Colintraive and Glendurel community.

<p>Provide soil management advice to local farmers and land owners, e.g. use raised beds to reduce soil erosion; change management to reduce soil compaction/erosion; understand symptoms of water stress</p>	<p>Heavy rainfall Flooding Drought</p>	<p>This action centres on community members encouraging and teaching farmers and land owners to prepare soils for current and future climate conditions. This can improve soil conditions allowing it to cope with increased heavy rainfall and flooding, as well as drought.</p>	<p>Reducing fertiliser run-off by applying it during dry conditions reduces the need for reapplication thus minimising greenhouse gas emissions. This action can indirectly increase income from crop growth and recreational activities.</p>	<p>This action could be led by a group of individuals who understand principles of good soil and land management. This advice can be applied to community allotments or food growing projects. Communities might approach the Scottish Agricultural College or James Hutton Institute for expert advice and training prior to sharing this advice with others in the community.</p>	<p>In Dunbar, there are soil erosion problems caused by monocultures and industrial agriculture. This is an example of where such an action could be beneficial for long term productivity of land.</p>
<p>Community mapping of local assets (built, open space, etc)</p>	<p>Heavy rainfall Flooding Freezing temperatures Snow Ice High winds Drought Extreme heat</p>	<p>Mapping provides improved geographic data related to climate issues such as flooding and drainage. Gathering this local data can help communities assess their climate vulnerability. Mapping technology also allows communities to report extreme weather incidents rapidly, helping to minimise the effects and/or recover quickly from negative impacts.</p>	<p>Community-based maps and data can inform local planning and development, as well as larger, public agency data systems. They can also improve communities' access to (and training in) information and technology/GPS for participatory planning, and encourage peer-to-peer learning networks contributing to social cohesion.</p>	<p>This action can be managed by a community with support from community mapping experts to understand the technology. Interested individuals and community groups (e.g. farmers, land managers, businesses, schools) receive training to carry out the mapping.</p>	<p>Carse of Gowrie Sustainability Group recently received funding from CCF to use open-source GIS software and community knowledge to build an accurate map of the local area, focusing on mapping pows and recording flood events. This will facilitate better water management as the climate becomes wetter. Because of the flexibility of the approach and software, the community could map other local assets that may be at risk under a changing climate or assets that could help build local resilience.</p>

Adaptation Scotland is a programme funded by the Scottish Government and delivered by Sniffer



**Adaptation
Scotland**
supporting climate change resilience

Adaptation Scotland provides advice and support to help organisations, businesses and communities in Scotland prepare for, and build resilience to, the impacts of climate change.

Adaptation Scotland

Sniffer, Greenside House, 25 Greenside Place, Edinburgh, EH1 3AA, Scotland, UK

T: 0131 557 2140 **E:** adaptationscotland@sniffer.org.uk **W:** www.adaptationscotland.org.uk