



Executive Summary

Community Climate Change Adaptation

**A proposed model for climate change adaptation and community
resilience in a rural setting**

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1. Introduction

The Cumbrian floods of November 2009 were devastating for many individuals, communities and businesses. Around 1,300 homes and businesses were destroyed, there was widespread damage to roads, bridges and footpaths, and significant economic costs. This event has pushed flooding up the agenda for many communities, public agencies and third sector organisations. It has brought with it widespread recognition that climate change is now a reality in Cumbria, with extreme weather events expected to become more frequent and more intense over coming decades.

Efforts to address climate change have so far focused primarily on mitigation, that is, initiatives intended to reduce the emission of greenhouse gases and limiting the extent of climate change. However, it has become increasingly apparent that even if we do reduce our emissions, we are nevertheless likely to experience a certain amount of climate change from historical emissions. This has led to the recognition that we must begin to adapt, reducing our vulnerability and increasing our resilience to the unavoidable impacts of climate change. There are two levels of adaptation response required to address climate change:

- **Preparation:** the development of emergency plans that can be initiated when inevitable climate emergencies occur; and
- **Prevention:** the prevention of those emergencies happening in the first place so that, for example, heavy rainfall does not necessarily result in a flooding emergency, or in water pollution.

Action with Communities in Cumbria has been commissioned by the Lake District National Park Authority to prepare a model for climate change adaptation and community resilience planning in a rural setting – the Ullswater catchment in Cumbria. This report provides an evidence base for identifying climate change risks relevant to the Ullswater valley, and links this to concerns raised during direct community engagement. It identifies a range of possible responses that might help the community to become more resilient, from reactive community emergency planning to proactive and longer-term land management strategies. The approach used in this project is designed to be applicable to other rural communities.

The project has taken place as part of the Lake District National Park Partnership's Whole Valley Planning initiative, which is a geographical approach to partnership working, involving local people, visitors, businesses, farmers and public agencies. Valley Planning allows these different groups within a particular area to come together and agree a plan for the future of their valley.

While the primary focus of the report is climate change adaptation, the range of possible responses outlined here are designed to link, where possible, with mitigation efforts, which remain a key priority for the Lake District National Park.

2. What is community resilience?

A resilient community is one which is able to respond effectively to economic, social or environmental change. In the context of climate change a resilient community is able to prepare for, respond to and recover from climate emergencies, and also adapt to the more gradual changes taking place within the wider landscape and society. In order to do this a community must be cooperative and flexible, have access to good information, and have good communication networks and high levels of social capital.

3. How is our climate changing?

There is consensus among the international scientific community that human activities (principally the burning of fossil fuels since the Industrial Revolution) are responsible for most of the warming we have seen since the middle of the 20th Century. In addition to an increase in average global temperature, there has been a marked increase in weather extremes, including heatwaves and flooding. Human-induced climate change is likely to have increased the risk of events such as the Autumn 2000 flooding in England and Wales by more than 90%.

There is little doubt that extreme weather events will become more common and more intense over coming decades, and that global temperatures will continue to rise. However, there is less certainty over how these trends will play out regionally. Most research to date suggests that the north west of England will experience hotter dryer summers, and warmer wetter winters as a result of climate change. There is mounting evidence, however, to suggest that the rapid melting of the Arctic sea ice (itself a consequence of global warming), may in fact result in colder snowier northern English winters, and possibly wetter summers, as cold moist air from the Arctic moves south.

The fact that 'global warming' may not result in straightforward warming in all areas, and that weather systems will change differently, and unpredictably, in different parts of the world, has led some to adopt the term 'global weirding' to describe the changes that climate change will bring. The one thing that is certain, though, is that our climate will become, and is already becoming, more unpredictable, and our communities must therefore adapt to cope with a wide range of possible eventualities.

4. Climate change impacts

Climate change is already having, and will continue to have, many direct and indirect impacts on our economy, society and environment. A significant amount of research has gone into identifying specific potential impacts that might occur in the UK and also locally, in the Lake District. This work has been drawn together in this report, to determine the most important climate change impacts for the Ullswater community.

These have been grouped under the following key themes:

- Flooding;
- Peat bogs and soils;
- Water quality and quantity;
- Agriculture and forestry;
- Non-native species;
- Natural environment and ecosystems;
- Infrastructure and services;
- Tourism;
- Community health and wellbeing;
- Property; and
- Cultural heritage.

5. How can the Ullswater community respond to climate change?

The report identifies a set of 11 priority actions for the Ullswater valley. These are response-focussed, highlighting the adaptation and mitigation measures that could be adopted by the community to address the key climate change impacts identified:

Adapting to climate change in the Ullswater Valley:

Priority actions

1. Tree planting can reduce soil erosion, flood risk and pollution, and sequesters carbon.

Trees and other vegetation help to bind the soil, and so reduce the amount of water, sediment and nutrient pollution reaching rivers and lakes. They slow the rate of water run-off compared with most other vegetation cover. This helps to prevent flooding and water pollution, including algal blooms like blue-green algae, all of which are expected to worsen with climate change. Trees also absorb carbon dioxide, so they help to limit climate change. Landowners can earn an income from woodland creation, as there are grants available, and it is possible to sell the carbon which the new woodland will store.

2. Restoring damaged peat bogs improves their capacity to regulate and purify water, and store carbon.

Peat bogs in the northern uplands have traditionally been drained for agriculture and sporting interests. The drying out of these bogs has led to loss of vegetation and increased soil erosion, which in turn can reduce water quality and increase the risk of flash flooding. Their carbon storage potential and habitat value is also affected. Blocking drainage ditches can help restore the natural functions of peatlands.

3. Maintaining farm drainage, and keeping drains clear of debris, can help reduce flood risk

Landowners can help alleviate flooding and waterlogging by maintaining their drainage infrastructure. Local people can also help to keep drains in their area free of leaves and other debris, thereby reducing the risk of surface water flooding.

4. Improving water storage and distribution and minimising water use can help summer droughts

Droughts are expected to become more common over coming decades. This could lead to competition between locals, tourists, agriculture and the natural environment for increasingly scarce water resources. Water consumption can be minimised through maintaining farm water storage and distribution systems, installing low-flow devices in showers and taps, placing a brick in toilet cisterns and reducing water wastage.

5. Reducing surface water run-off into rivers and lakes helps prevent water pollution

If water containing silt and nutrients runs into watercourses, it poses a threat to freshwater species and can lead to algal blooms. Planting trees, restoring peat bogs, avoiding soil compaction and over-grazing and maintaining footpaths can all help to reduce soil erosion and run-off. Optimising the application of fertilisers and using phosphate-free laundry detergents can also help reduce pollution.

6. Improving habitats can enhance biodiversity and increase the resilience of the natural environment to climate change

Climate change is likely to result in the earlier timing of spring events (e.g. egg-laying), the northward and upslope migration of species and habitats, an increase in non-native species and habitat damage. Protecting, expanding and linking existing habitats, and maintaining a diverse landscape, could enhance biodiversity and increase the ability of natural systems to adapt to a rapidly changing climate.

7. Improving public transport system, and providing work spaces in the valley, could reduce disruption during extreme weather

Climate change is likely to increase disruption to transport, supply chains, emergency services and communications networks from flooding and other extreme weather events. An improved and integrated public transport system, which makes use, when possible, of boat transport, could reduce reliance on road access, improve the visitor experience and reduce transport-related carbon emissions. Providing local communal work spaces would reduce the need to leave the valley to work.

8. Flood-proofing properties

Flooding events will continue to become more common over coming decades. Floods can damage properties and businesses, increase insurance premiums and pose a risk to people's physical and mental health. Installing flood-protection measures in at-risk properties during renovations – for example, solid flooring, durable kitchen units, and high-level electrical wiring, sockets – can reduce the impact and help in the recovery.

9. The use of natural insulation in traditional buildings can prevent condensation, reducing the risk of respiratory illness

Installing conventional insulation in buildings designed to 'breathe' can cause condensation and mould build-up, which can lead to respiratory illness. This is likely to worsen with the projected increase in prolonged periods of wet weather. The use of natural, breathable insulation, such as sheep's wool or wood fibreboard, which regulates air and moisture, can improve air quality and health and maintain building integrity. These products generally have a lower carbon footprint than their conventional counterparts.

10. Preserving key local services helps to maintain strong communities

Successful adaptation to climate change will require strong community cooperation, which in turn requires good social links between community members. Local services, such as schools, post offices and pubs, form an important part of the social fabric of any community, and so preserving these is critical.

11. Sourcing of local food and drink can support local producers, increase resilience and reduce carbon emissions

Climate change, particularly global water shortage, is likely to disrupt global food production and result in food price volatility, resulting in an increasing need for local food production. Developing a market for local produce by supporting local producers could help to increase self-reliance within the valley and reduce emissions associated with food transport.

A photo of the Ullswater valley, annotated with these priority actions, has been developed as a visual tool to accompany this report. It is intended that it be displayed in public places within the valley. It can also be accessed via the ACT website.

6. Community engagement

Two meetings with the Ullswater community have been held so far, as part of the Valley Planning process. Eight key themes emerged from this process as being of particular importance. These are:

- Managing the environment;
- Water;
- Employment & Economy;
- Sustainable tourism;
- Heritage;
- Community Services;
- Public Transport, parking and roads; and
- Housing.

These themes link closely with the key climate change impacts identified in this report. This provides a good basis from which to engage the community further on community-led climate change adaptation and mitigation responses.

7. Conclusions and next steps

This report has demonstrated a clear need to address climate change risks in Ullswater, and presents a range of responses that could be developed by the community (in particular landowners and farmers) in conjunction with the relevant agencies, to deliver both mitigation and adaptation outcomes. It provides a model that is widely applicable across other rural communities.

The report recommends a number of next steps to ensure the model is used by communities in both Ullswater and other rural areas in the Lake District, Cumbria and beyond:

- Assemble a climate change working group, consisting of agencies and members of the local community, to drive forward and oversee the use of this model in Ullswater. This group will be part of the wider Valley Planning initiative being trialled in Ullswater;
- Use of an annotated photo of the Ullswater valley (produced as part of this project) as an engagement tool for communities;
- The Lake District National Park Partnership could include the model within their Valley Planning approach across all Lake District valleys;
- ACTion with Communities in Cumbria could take the model to the community resilience sub-group, seeking support for rolling out the approach across Cumbria; and
- The Lake District National Park Authority will disseminate project learning among local, regional and national networks and other relevant organisations, including other national parks.

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