June 2008

Low-carbon Lake District:

Responding to climate change in the National Park

Report by Rebecca Willis

Lake District National Park Authority

Low-carbon Lake District

Contents

Foreword

Climate change is happening. It always has. But man's influence is accelerating its impact. The effects on the Lake District, its people and its economy could be far-reaching and damaging. There might be benefits too, but they are not so clear.

Put simply, the Lake District is too important to too many people to sit back and react to these changes. If we are to achieve our Vision of the Lake District as an inspirational example of sustainable development in action we need concerted and positive effort. If we are to generate a prosperous economy, sustain vibrant communities, offer world-class visitor experiences and in so doing, cherish our spectacular landscape, we need to be resolute and ambitious. The Lake District National Park Authority is determined to lead the way.

Locally we are working with the Cumbria Strategic Partnership and the Lake District National Park Partnership. Regionally, we work with the North West Development Agency and nationally with Government and other National Park Authorities. We want to help galvanise and channel the energy, resources and sheer commitment of many partner organisations as well as local residents and businesses to deliver a low-carbon Lake District.

If we are to shape policies, messages and an action agenda for climate change management, we need facts; we need an idea of what Cumbria's movers and shakers are thinking and doing; and we need inspiration from the best of local, regional and national experience. Much good practice is already evident in the Lake District. This report amply demonstrates that. But we know we can learn from experience further afield.

Rebecca Willis's report marks the beginning of a journey for the Lake District; one where those that care about and are shaping its future can embark on the journey together. Between us we will find ways that help the Lake District, its communities, visitors and its businesses both adapt to climate change and mitigate its effects.

If we're really ambitious we should aim to go beyond low-carbon to a zero-carbon Lake District. But how long will that take? Can we at least agree to halve our carbon emissions by 2025?

We have a challenging route map to follow. Let's get moving.

Richard Leafe Chief Executive
Lake District National Park Authority

About the author

Rebecca Willis is an independent researcher and Vice-Chair of the UK Sustainable Development Commission. Her work focuses on environmental politics and policymaking at both a national and regional level. She has researched and written on issues such as climate change, energy policy, public attitudes to the environment and the impact of new technologies.

Front Cover Image:
Derwent Isle, Derwentwater by Si Homfray

Introduction

Below:
Fells and tarn

Deep in a Lakeland valley, next to the hamlet of Elterwater, is the Langdale Hotel and Timeshare, a luxury hotel and holiday complex with breathtaking views over the fells. The successful business owes its existence to its spectacular surroundings. But it is not taking its environment for granted. It has taken a long hard look at its environmental performance, reducing energy use, installing a biomass boiler and looking into reinstating the water wheels that once powered the valley. Elsewhere, above Ullswater, Sundog Energy provides solar and wind energy installations for clients nationwide. Just below them, on the shores of the lake, the Outward Bound centre has created a new currency for some of its students: eco-points. Points can be earned through litter picking and other green jobs, and are spent on using the centre's minibus, giving students a practical lesson about the cost of carbon. Langdale Hotel and Timeshare, Sundog and Outward Bound are among the growing number of organisations who have realised that their future will be shaped, in part, by climate change, and the need to respond to the challenges it poses.

The Lake District has iconic status. Its dramatic landscape has always provoked strong reactions - from Daniel Defoe's description of the land as "the wildest, most barren and most frightful of any that I have passed over in England" to William Wordsworth's more complimentary assessment: "I do not indeed know any tract of country in which, within so narrow a compass, may be found an equal variety in the influences of light and shadow, upon the sublime or beautiful features of landscape". The importance of the Lakes in the literary and philosophical imagination of England was a central reason why it was designated as one of the country's first National Parks, in 1951.

Since the earliest times, the Lake District has been shaped by the interaction between people and landscape. From Neolithic settlers who mined for stone, to today's farming community, people have used the land and, in doing so, have shaped and been shaped by it. In contrast to some national parks overseas, it is not a true wilderness. But recent years have seen the beginning of a new, and very different influence on the Lakes: the effects of climate change.

Below:
Fields and fells
Quarry

About the project

“a prosperous economy, vibrant communities and world-class visitor experiences - and all sustaining the spectacular landscape, wildlife and cultural heritage.”

This report assesses the impact of climate change on the Lake District. It looks first at the physical effects of climate change, and the likely impacts on the society and economy of the Lakes. It then asks what is already being done to tackle the problem, and reduce emissions of carbon dioxide and other greenhouse gases. Lastly, it puts forward an agenda for a low-carbon Lake District - offering some recommendations for tackling climate change.

In 2006, the Lake District National Park Partnership, a grouping of organisations with a stake in the National Park, drew up a vision for 2030, envisaging a Lake District with “a prosperous economy, vibrant communities and world-class visitor experiences - and all sustaining the spectacular landscape, wildlife and cultural heritage.”

This report shows how tackling climate change could help the Lake District to achieve the aims and vision it has set itself.

Research for this report was carried out over a period of eight months, and involved desk research, interviews with 31 people representing organisations with a stake in the National Park (listed at Annex 2), and field visits to ten case studies – organisations within the National Park who are already taking action on climate change. The case studies were selected to reflect a range of private, public and voluntary sector initiatives; types of project; and location. The case studies are presented in boxes throughout the report, and listed at Annex 1.

What Climate future?

Changes to the Global Climate

Colin Nineham, a Penrith resident and local councillor, remembers the cold, snowy winters of his childhood, and the ski lifts that used to run in Troutbeck, near Windermere, to allow people to ski the fells. He, like many others, has noticed a change in weather patterns over the last few decades, with warmer, wetter winters and hotter, drier summers. He misses the skiing – but also worries about the more profound changes to the Lakeland climate that are beginning to take effect.

There is a strong scientific consensus that the global climate is changing, as a result of human action - specifically, the emission of carbon dioxide and other 'greenhouse gases' which interfere with the planet's natural heating and cooling processes. The effects of climate change will be felt across the globe, though some regions will be worse affected than others. Temperature rises lead to disruption in the water cycle, changes to habitats, and to agriculture.

In February last year, the Intergovernmental Panel on Climate Change (IPCC) issued its starkest warning yet. Its latest assessment, which drew on the expertise of 600 authors, 620 expert reviewers and representatives from 113 countries, states that average temperatures are likely to rise by four degrees centigrade towards the end of the century. The Panel concluded, with a very high degree of confidence, that temperature rises were the direct result of human action, through emission of carbon dioxide, methane, nitrous oxide and other greenhouse gases. The latest scientific evidence assessed by the Panel showed that climate change will be more severe than previously thought, and its impacts will be felt across the globe.[1]

Temperature rises lead to profound changes to the Earth's climate system. As the earth warms, the water cycle intensifies, increasing the risk of both drought and floods. Data for the UK shows an increase in heavy rain and flooding in winter, such as the January 2005 floods which hit Carlisle; and a decrease in summer.[2] Worldwide, the fraction of land area in extreme drought is expected to increase from 1% to 30% by the end of this century.[3] As global temperatures increase, there is a greater risk of abrupt and large-scale changes in the climate system. For example, the Gulf Stream and North Atlantic drift, which have a significant warming effect on Europe's climate, may be weakened. Sea levels, already rising by 3mm a year, could be increased considerably if the West Atlantic Ice Sheet collapses.[4]

Some changes caused by global warming will themselves amplify climate change. For example, thawing permafrost and drying of wetland areas, due to increased temperatures, releases methane and carbon dioxide, further contributing to climate change. The amount of carbon dioxide absorbed by the oceans is likely to decrease as temperatures rise.[5] These amplification effects mean that changes may not be linear and gradual, but sudden and unpredictable.

Climate change will impact most severely on the developing world. This is partly because greater natural changes will occur in these areas - including drought, sea-level rise and reduced agricultural production; and partly because, being poorer, developing countries have fewer resources available to fund climate change adaptation. The Stern Review on the Economics of Climate Change, a report commissioned by government and published in 2007, states that The poorest will be hit earliest and most severely. In many developing countries, even small amounts of warming will lead to declines in agricultural production because crops are already close to critical temperature thresholds. The human consequences will be most serious and widespread in Sub-Saharan Africa, where millions more will die from malnutrition, diarrhoea, malaria and dengue fever, unless effective control measures are in place.[6]
Although the developing world will be worst hit, all regions and countries will feel the effects of climate change.
As scientific understanding grows, the impacts on specific areas can be predicted with greater clarity.

Above:
Skiing on Skiddaw

Impacts on the Lake District

Above:
Arctic charr
Japanese knotweed
Storm damage

Like the rest of the UK, the Lake District is already experiencing warmer, wetter winters and hotter, drier summers, as a result of climate change. Over the years ahead, more profound changes in landscape and biodiversity are expected. A study by Natural England identifies a range of impacts, including:[7]

Species loss: Arctic-alpine species, including plants such as the stiff sedge and mossy campion, and the mountain ringlet butterfly, are rare as far south as England. Temperature rises, and changes to habitat, could lead to their local extinction. The Arctic charr, a cold-water loving fish which has lived in Windermere and other lakes since the ice-age, could disappear, as water temperature increases and oxygen levels in the lakes change. Numbers of upland birds will decline, but lowland heath birds may increase.

Migration upward: Increases in temperature will force habitats to move upwards. Upland landscapes will be squeezed into smaller areas on higher slopes, and could be more vulnerable as a result.

Increase in non-native species: As weather conditions change, this could lead to more invasive and non-native species such as pygmy weed in wetland habitats, Himalayan balsam and Japanese knotweed. Another unwelcome arrival could be Bluetongue disease in cattle, which is a spread by a species of midge and was seen for the first time in Britain in 2007.

Changes to lakes: There will be a decrease in water levels in summer, which will affect smaller lakes and tarns in particular. Water quality will decrease as pollutants become more concentrated. Erosion caused by heavy rainfall will increase siltation, and algal blooms will be more common, affecting recreational use. Midges may become more of a problem near lakes.

Changes to woodlands: Woodlands will suffer more storm damage, and trees could suffer from summer drought. Woodland composition will also change, as some species will adapt better than others.

Drying out of peat: Peat habitats lock carbon into the soil. Peatlands are the single largest carbon reserve in the UK, storing around 3 billion tonnes of carbon, the equivalent of 20 years of UK carbon emissions.[8] There are significant peat habitats in the Lakes, both upland and lowland. (One example, Foulshaw Moss, is described on page 25). However, hot, dry summers could cause peat habitats to dry out, releasing carbon into the atmosphere. Footpath erosion caused by high numbers of visitors contributes to this problem.[9]

Greater risk of extreme weather events: In common with the rest of Britain, the Lake District will experience more storms, high winds, flooding, drought and forest fires.

Some of these impacts, like lower water levels and algal blooms in lakes, and storm damage to woodlands, could result in immediate changes, affecting both visitors and residents. Other impacts, like changes to species and habitats, will be more gradual and subtle. Overall, however, the cumulative effect of all the changes could alter the look and feel of the Lake District considerably.

Case Study

Langdale Hotel and Timeshare

Above:
Recycling
Charcoal oven

"we try to make small, incremental improvements as well as very grand ones".

Diners at the Langdale Hotel and Timeshare will be pleased to know that the carbon cost of their meal has just gone down. The chef has recently taken delivery of a new oven, which will run on locally-sourced charcoal. This is just the latest in a series of green innovations at Langdale. Four years ago, the owners and managers of the hotel and leisure complex decided that they needed to take action to reduce the impact of their operation. Several years, and several awards, later, they have an impressive programme in place: as well as the charcoal oven, there's an energy management system; environmental training and support for staff; and a comprehensive waste minimisation and recycling programme. Halving the amount of waste produced by the site has resulted in savings of around £10,000.

A recent refurbishment gave the hotel a chance to install low-energy light fittings and extra insulation – as General Manager Nick Lancaster says,"we try to make small, incremental improvements as well as very grand ones".

On the list of grand improvements, the hotel will shortly be installing a wood-fired boiler, which will provide twenty per cent of the site's energy needs. They estimate that it will pay back within three years. The wood will be supplied from local sources, to minimise transport emissions. It has been a complicated project – it has taken them four years to get to this stage. But they are hoping to generate more energy on site in future – perhaps hydro power. The site used to house a gunpowder factory, powered by water, and the old millrace is still turning – there's a chance it could be re-used to generate power in future.

Next on the list, Langdale will begin a comprehensive carbon footprinting process, to develop a better understanding of where their main impacts are. This will be used to prioritise future carbon-saving efforts. One more intransigent problem, though, is transport – in a valley poorly served by public transport, there are few real alternatives: "realistically, it's the car that brings them here and it will take more than us to change that."

To begin with, the company didn't really talk about what it was doing to its customers. But they are beginning to market it a bit more, and believe it could be a key selling point. As Nick says, "it's the right thing to do if we're to have a sustainable business that's dependent on the landscape".

What has helped?

The company has received help and advice from CBEN[10] , the Tourism and Conservation Partnership, Cumbria Woodlands and the Carbon Trust. Rising fuel costs have helped to make energy efficiency and on-site generation more cost competitive.

What has hindered?

Nick is frustrated that there is no nationally recognised award for 'green' hotels. There is a range of different schemes, which is confusing for the customer. It has also been difficult and complicated to get information about on-site generation.

Wider consequences of climate change

Climate change will bring other changes to the Lake District too, as communities elsewhere adapt. The Stern Review predicts a number of changes to the climate of the UK and elsewhere, which could in turn affect the Lake District[11]:

More demand for water: as water availability is increasingly constrained, particularly in the south-east of England where demand is highest, there will be more demand for water from elsewhere, including Cumbria. Reservoirs in the National Park, like Thirlmere, may be emptier, which will affect the landscape.

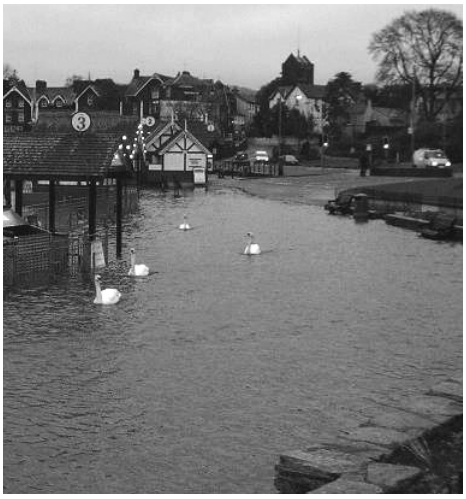
Changing agricultural practices: Climate change will alter the way that farmers manage land. They may switch to more drought-tolerant plants or convert grazing land to arable.[12] According to Natural England, "changes in agricultural practices as a result of climate change may have a greater impact on biodiversity than direct biophysical impacts."[13]

Tourism shifting northwards: with warmer regions like Southern Europe suffering increased heat wave frequency and reduced water availability, tourism in more northerly areas of Europe, including the UK, is likely to increase. If managed well, this could bring economic advantages. But there will be a risk to habitats on land and in water. For example, ground-nesting birds may be affected by an increase in visitors in spring and autumn, and footpath erosion may worsen.[14]

Migration: The effects of climate change on temperate regions like the UK will be relatively mild, possibly prompting migration from more seriously affected areas. Globally, some estimates suggest that up to 200 million people may become permanently displaced by the middle of the century.[15] Within the UK, those living in coastal and low-lying areas, including London, will be more vulnerable to floods and sea-level rise, possibly leading to internal migration to areas of the country less affected, including Cumbria.

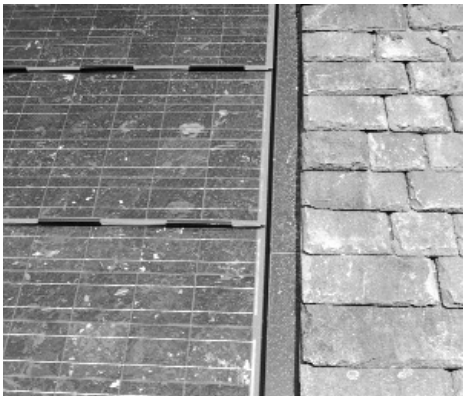
Global economic impacts: The Stern Review warns of economic instability caused by climate change: "large-scale shocks and financial contagion originating from poorer countries which are more vulnerable to climate change will also pose growing risks for rich countries, with increasing pressures for large-scale migration and political instability."[16]

In assessing these impacts, the Stern Review estimates that the costs of climate change, if no action is taken to reduce greenhouse gas emissions, could be between 5 and 20% of global economic output (Gross Domestic Product). In contrast, stabilising emissions at manageable levels would cost around 1% of GDP.



Above:
Bowness floods

Towards a low-carbon society



Above:

Transport accounts for over a quarter of the UK carbon emissions

Sundog Energy, more 'green jobs' created

As the UK and other countries begin to take steps to reduce greenhouse gases, particularly carbon dioxide, this, in turn, will alter the Lake District's future. Some changes may benefit the Lakes; others will prove challenging. Changes will include:

A focus on energy efficiency: As energy prices rise, due to decreasing global supply, and as a result of climate change policies, there will be more focus on encouraging energy efficiency in transport, buildings, products and industrial processes. For example, government has pledged that all new homes will be carbon-neutral by 2016. Energy efficiency improvements remain the cheapest option for carbon reduction.

More renewable energy and nuclear power: The UK is committed to a binding EU target to obtain 20% of Europe's energy (electricity, heat and transport) from renewable sources by 2020. The main sources are likely to be onshore and offshore wind, solar, hydro and biomass. Although large-scale renewables developments are not permitted within the National Park, there will be more small-scale renewables (see below) as well as large-scale developments elsewhere in Cumbria, and offshore. The government is supporting a new generation of nuclear power stations, one of which could be sited near the National Park, on the West Cumbrian Coast.

More distributed energy: Carbon emissions can be reduced by producing electricity and heat near to where it is used. As well as small-scale renewables, community heating (where a number of buildings are linked through a heat network) or combined heat-and-power (where electricity is generated, and the waste heat is used in nearby buildings) are all likely to increase.

Carbon pricing: To facilitate shifts toward greater energy efficiency and use of renewable energy, there will be a shift toward pricing and trading carbon. This already happens through the European Emissions Trading Scheme, affecting large energy users; other businesses and even individuals could be involved in carbon trading in the future.

Low-carbon transport: Transport currently accounts for over a quarter of total UK carbon emissions, and is the fastest growing source of emissions. To tackle this, government aims to increase the fuel efficiency of vehicles and encourage walking, cycling, public transport and car sharing. Over time there may be a move toward national road pricing. The expansion of air travel could also be curtailed. Alternatives to travel, such as home working and video conferencing, are likely to increase.

Making green choices: Recent years have seen a growing awareness of climate change, and consumers are starting to choose products and services on the basis of their environmental performance. In consumer-focused sectors like retail and tourism, businesses who take action on climate change will benefit from this. Businesses, too, are starting to ask questions of their supply chain.

Green jobs: the move to a low-carbon economy will bring with it a change in employment patterns, with more 'green jobs' created, in areas such as energy services, insulation, plumbing, recycling, installation of renewable energy systems and low-carbon technologies.

Case Study

"through this project, we could create local employment, retain forestry skills, and improve the look and value of the forest."

Biomass in Eskdale

When foot and mouth hit Eskdale in 2001, the loss of farming and tourism income was devastating, and the local vicar established a community group to discuss the future of the valley. They talked to Gareth Browning from the Forestry Commission – and hit upon the idea of generating energy from wood.

Heating has always been a major expense for Eskdale households and businesses. With no connection to the gas grid, oil is the main source of energy. But there is plenty of wood about. So using biomass energy would save money as well as carbon. Members of the group, including Tony Fox and Celia MacKenzie, sought the advice of the CLAREN project, which offered help to communities wanting to look into generating their own power. (CLAREN's funding has since come to an end, so it is no longer operational).

They decided to raise funds for three pilot projects, sourcing woodfuel from local Forestry Commission resources. As Celia explains, they wanted "to look at how effective biomass is in different circumstances", and planned installations for the village school, the Youth Hostel and a group of private houses. Interest generated locally by the pilot projects has resulted in Impact Housing Association planning a community heating scheme in the centre of Eskdale Green.

The log-burning boiler in the school has now been operating successfully for a year, and reducing carbon dioxide emissions by 12 tonnes annually.

The Youth Hostel woodchip boiler and fuel store has taken longer, but is now almost complete. Arranging funding for the private housing micronet has been difficult, and this installation has not begun yet.

An associated community-owned company, West Cumbria Wood Products Ltd, provides the fuel for and operates the boilers, and could ultimately serve domestic and business users throughout West Cumbria. As Tony says, "through this project, we could create local employment, retain forestry skills, and improve the look and value of the forest."

The challenge now is to reach a critical mass of biomass installations, so the new company can benefit from economies of scale, and create a viable business. Although wood is a cheaper fuel than oil, upfront costs are higher, as Celia explains: "the kit is expensive compared to an oil boiler. People would like to do their bit for renewable energy but will look at the cost. There's a need for funding to overcome this gap." So far, funding has been difficult to access, particularly as the project is quite small-scale. This frustrates Celia, who sees large sums of money being poured into big, flagship regeneration projects. She says there's a "severe lack of understanding about how much people want to do themselves" and that much more support is needed for communities with the ideas and commitment to act on climate change. Tony, meanwhile, is constantly thinking about the scheme's future development but also needs to spend time just keeping the current system going: "I've got a vision but I'm still getting up at 5.30am to light the school boiler."

What has helped

The biomass project in Eskdale has had valuable support and advice from CLAREN, the LDNPA's sustainable development fund and Cumbria Woodlands, and has been helped by the commitment and enthusiasm of local people.

What has hindered

Funding, particularly from national government sources, has been difficult and bureaucratic to access. In particular, it is difficult to get material grants for private household installations. The demise of CLAREN means there is no longer a source of independent advice for similar projects.

Above:

Eskdale YHA Hardware

The case for action

Right:
People getting aboard the Windermere train

The Lake District could stand to gain from some of these trends – such as the move toward more decentralised energy generation, and greener products and services. A new study on the economic impacts of climate change legislation for Cumbria[17] estimates that, with the right support and encouragement, the county as a whole could benefit from moves to cut carbon. While all businesses will have to adapt to higher prices for carbon, the overall impact is likely to be positive, with the potential for around 1500 new jobs in the sustainable energy and tourism sectors. The study points to a number of areas that should be supported, because of the potential for combined economic, social and environmental gain:

- The biomass and biogas supply chain, making use of the wood resources from forestry operations, to be used for heating in properties not on the gas grid. Several hundred jobs could be created in forestry, fuel preparation, equipment supply, installation and maintenance. Farm biogas systems, using anaerobic digestion, could also play a part.

- The sustainable energy supply chain, working with the microgeneration equipment installers already operating in Cumbria to develop small-scale renewable installations, and developing businesses in the energy efficiency sector, for homes and businesses; as well as low-carbon building construction and refurbishment.

- Marketing Cumbria as a green tourism destination, advising firms in this sector how to reduce carbon emissions and working on transport infrastructure.

These opportunities and their relevance to the National Park in particular, are discussed in the final chapter.

Right:
Local produce

The Scorecard: How well is the Lake District doing?

The science is clear: in the UK, we need to reduce emissions of carbon and other greenhouse gases by 80% over the next forty years.[18] The Climate Bill, currently before Parliament, will shortly set binding limits on carbon dioxide emissions by setting five-yearly 'carbon budgets' for the UK as a whole, with around a 30% reduction by 2020. This means that each region of the UK will need to achieve substantial reductions in emissions.

So what contribution can the Lake District National Park make? This chapter reviews, firstly, how well Cumbria and the North West are doing in terms of actual emissions reductions and estimates what this means for the National Park. Second, it looks at efforts being made to reduce carbon and other greenhouse gases within the National Park; it then turns to areas of weakness, where more needs to be done.

Greenhouse gases: the figures

While UK emissions as a whole are static or falling slightly,[19] a study of greenhouse gas emissions in the North West[20] last year reported that the region as a whole is not on track to meet national targets. Emissions are, in fact, rising instead of falling – they have increased 13% since 1990, across the North West region as a whole.

The study does not give data for the National Park itself, but the data for Cumbria offers a reasonable proxy.[21] Cumbria has high emissions per head of population – around 16 tonnes, compared to 7 tonnes for Greater Manchester.[22] This is partly due to Cumbria's more dispersed population, and to high levels of road transport.[23] The transport and energy use of the 12 million visitors to the Lake District increases overall emissions considerably – by around 7%, according to one estimate.[24] Cumbria also has higher levels of other greenhouse gas emissions – 25% of total greenhouse gas emissions (by 'global warming potential' or GWP[25]) are made up of gases other than carbon dioxide – mainly methane and nitrous oxide, emitted from agriculture and natural sources.

Though the figures for Cumbria offer an approximate picture, the precise situation of the National Park is different. Key differences include: fewer emissions from industry; increased emissions due to the high number of visitors to the National Park (from the hospitality sector, and transport); and higher emissions from car travel due to the sparse population and limited public transport. Though no specific data is yet available, this estimate suggests that the greenhouse gas emissions of the National Park, per head of population, will be higher than for Cumbria as a whole. This gives the National Park a clear responsibility to address its climate impact.

Above:

Friars Crag, Derwentwater

What the Lake District is doing well

The evidence shows that greenhouse gas emissions are rising, rather than falling, within the National Park. However, there are many individuals and organisations across the Lake District who are taking action on climate change, and working to reduce future emissions. The Lake District's current strengths in this area include:active green community groups; a vibrant green business sector; a focus on environmental education through outdoor activity; and an emerging partnership on climate change between public agencies and the private and voluntary sector.

Eco-communities

Paul Milling is amused at the Daily Mail's new campaign against plastic bags, and the reusable bag fervour that has swept the nation in recent months. His small community in and around Hawkshead is ahead of the game. Four years ago, Paul, his wife Rachael and around thirty villagers decided to raise the profile of environmental issues locally, by producing reusable cloth shopping bags and giving them out free at the Hawkshead Show. Local schoolchildren contributed pictures to decorate the bags – one child's picture of a giant earthworm, complete with a message about 'global worming', is given pride of place.

Paul's group, Esthwaite Green Link, is one of quite a number of community-based environmental action groups in the Lake District (See page 16 for more on Esthwaite Green Link). Similar groups exist in Grasmere and Staveley, and there are active 'transition town' initiatives centred on Kendal and Penrith, planning how communities can reduce dependence on oil and cut carbon emissions.[26]

Phil Davies, of Cumbria Action for Sustainability, which provides support for such groups, says that there is a real spirit of self-help in many communities, which extends to taking local action on climate change issues. As Phil explains, "lots of things are happening, but many are hidden. It is in the nature of self-help that things go unrecognised." Many of those involved in local groups point to the special, but fragile, nature of the Lake District landscape as a motivation for their actions. Lawrence Conway, Strategic Director (Customer Services) at South Lakeland District Council, has noticed that "people here are very conscious of green issues – it's why they like living here".

These local initiatives are inspiring. But many involved in community groups point to the barriers that prevent them doing more. The lack of alternatives to car travel is seen as the most significant hurdle, and local attempts to tackle this, through car-sharing for example, have not been a huge success. Many groups are investigating ways of generating their own energy, but are thwarted by the cost, and bureaucracy, involved in such schemes.

The Lake District's current strengths in this area include: active green community groups; a vibrant green business sector; a focus on environmental education through outdoor activity; and an emerging partnership on climate change between public agencies and the private and voluntary sector.

Case Study

Esthwaite Green Link

Above:
Esthwaite Green Link bag

Among the fell ponies, sheepdogs and champion vegetables at the 2005 Hawkshead Show, was a new attraction: the small green gazebo of Esthwaite Green Link. Volunteers handed out distinctive home-made cloth shopping bags, along with green advice and information for residents and holidaymakers alike. Paul Milling, one of the group's founders, explains that they are motivated by the idea that "small changes add up".

Esthwaite Green Link is one of five community groups established with the help of Cumbria Action for Sustainability (formerly Eden LA21). After Hawkshead Show, they went on to initiate a range of projects to help the local community take simple steps to improve their impact on the environment. They offered residents a free energy survey; worked with the local school to design screen printed cotton bags; wrote regular articles for the church magazine; and campaigned against the closure of their Post Office. Paul is impressed by how fast their ideas have caught on. Back in 2005, he says, they were "a voice in the wilderness".

Lynda Johnson, another member, had an idea for an eye-catching event: Apple Day, held in October 2007. Lynda noticed how many apples in local orchards were being wasted, and thought that she could encourage people to juice them, so they could be stored as juice or turned into cider. The group hired an apple press, and set it up in the village square. People came and used the press, sterilising equipment and bottler for free, with an enthusiastic crowd looking on. Lynda says that people loved the day: "it's still talked about now". It was followed by a similar event at the village school, where children learned science, maths and cookery through weighing, juicing and cooking their apples.

Lately, the group's sights have turned to renewable bio-diesel, from a very local source: the deep-fat fryers of the many hotels and pubs in their community. They are exploring the possibility of building a bio-diesel plant which could process and refine used vegetable oil, turning it into a fuel for cars.

It hasn't all been straightforward. The group investigated whether they could generate hydro power, but found it too time-consuming and complex. They would have needed to draw up legal agreements with landowners, connect to the national grid, gain an abstraction licence from the Environment Agency and get planning permission – very difficult for a small group of volunteers.

What has helped

The enthusiasm of the committee and the wider community has been the driving force for the group. Cumbria Action for Sustainability have been very helpful. They also received a grant of £1000 from Cumbria Community Foundation, which was easy to access.

What has hindered

The group has found it difficult to research and apply for grants from the Lottery and other sources, and are put off by the bureaucracy of many funding schemes. Their efforts to find a source of renewable energy have been hampered by the lack of independent advice and support for small-scale generation. They would also like help to work on better transport options for the valley.

Green business

There is also a vibrant green business sector in the Lake District, linked to a growing awareness of the interdependence of the economy and the environment. The environmental economy generates £2.6 billion a year for the region as a whole, according to the Natural Economy Northwest project.[27] Many tourism businesses like Elder Grove bed-and-breakfast (see page 34) and Langdale Hotel and Timeshare (see page 8) are beginning to see the business case for action on climate change. The Tourism and Conservation Partnership, which supports green tourism initiatives, has seen its membership grow by 40% in the last three years; around one in ten direct tourism businesses are now members.[28] Each member contributes to the Partnership by sponsoring an environmental project. Increasingly, the Partnership is working with members on ways to reduce the environmental impact of their operation, including carbon reduction.

Like the community groups, however, green businesses face the problem that "the local facilities are totally inadequate to support anyone who wants to go green", in the words of John Barwise, a founder of the Cumbria Green Business Forum. The Forum has started to campaign to provide better facilities, like recycling depots for business.

Although most economic activity in the National Park is linked to tourism[29], the Lake District is increasingly becoming a location for knowledge-based industries, including those offering environmental goods and services, like Sundog (see page 21) which designs, supplies and installs renewable electricity systems; and Turbine Services, based in Lorton, near Cockermouth, specialising in the installation of wind and water turbines. Again, the beautiful environment is a prime reason for location in the Lakes.

Environmental educator

A 2004 study into the future of the Lake District[30] identified the important role of the Lakes as "a centre of learning, training and development", providing a home to education, training and outdoor centres and businesses. From schoolchildren to business executives, people come to the Lakes to learn outdoors. Conservation volunteering, holidays and courses are organised by the National Park Authority, National Trust, Friends of the Lake District and many others.

Away from everyday life, there is a chance to question established outlooks and habits. Geoff Cooper, who chairs the 'Adventure and Environmental Awareness' (AEA) group and runs an outdoor centre at Coniston, says that "youngsters are motivated and receptive when they come on trips, and we're not locked into a tight curriculum. We can get them to think about the links between the local and the global." The AEA group has recently turned its attention to ways of communicating climate change through the outdoors.

At Geoff Cooper's centre, wind and solar power, recycling and composting facilities and practical work on conservation projects help to make environmental issues come alive. At Outward Bound's new Howtown centre, on Ullswater, most road travel is being designed out of the programmes, so participants walk, canoe or catch the lake steamer to get to activities (see page 18). The National Trust's beautiful new footprint building at St Catherine's, designed as a base for school groups, is built with natural and recycled materials, including straw bales. These are all examples of what Kate Rawles, of the University of Cumbria, calls the 'double dividend': through reducing their own emissions, educational centres also provide inspiration for their visitors.

An emerging dialogue

It is clear that action on climate change will require co-operation and dialogue between government, the private sector, and community and voluntary groups. The Cumbria Strategic Partnership provides a forum for dialogue between these groups, and has drawn up a climate change strategy for Cumbria as a whole. Within the Local Area Agreement for Cumbria, (an agreement between central and local government and other key partners at the local level) there is a carbon reduction target, and discussions are underway to decide how this target can be met. The Local Development Framework for the National Park, which sets out how planning will be managed in the local area, looks at how planning frame-works can mitigate climate change, through promoting renewable energy and lower-carbon buildings, and improving sustainable transport options.

The Cumbria Futures Forum, an independent think-tank, also works to share experience, commission research and create a supportive framework for action.

Above (left to right):
Keswick market
National Trust Footprint building
Haweswater

Case Study

Outward Bound Ullswater

Young people on one of the courses at Outward Bound's Ullswater centre are trading in a new currency: the eco-point. Senior Instructor Nick Austin awards eco-points to students for collecting litter and other green jobs. If they want to use the centre's minibus, it costs them hard-earned units. Nick says that the scheme is a great way of engaging people, particularly teenagers, in discussions about climate change and environmental issues. "Some environmental education", he says, "is about playing games, listening to experts or doing experiments. It works well with younger children or adults. I want to find other ways, using adventure and taking responsibility."

The eco-points are just one way in which the centre is starting engage its students and staff in environmental issues. Just under a year ago, Outward Bound agreed on a new strategic direction for the organisation, with environmental sustainability emerging as a core value for the organisation. Now, it appears on all job descriptions, as an agenda item for every meeting, and most importantly, as a learning outcome for every course. Basic environmental improvements, like comprehensive recycling and insulation, have already been undertaken at the Ullswater centre, steered by a new environment committee, and they are exploring ideas which could include solar photovoltaic panels – in a prominent location so that they have an educational value, too.

Outward Bound recently opened a new centre at Howtown, just the other side of the lake from its main base, and the centre only has one minibus for sixty students. Instead of driving, they get around using the steamers on the lake, or walking to each activity. It's a change of mindset for all involved, but it all helps to connect students to the environment and the world around them.

This year, for the first time, the centre will run a course specifically on environmental leadership and personal development. Sponsored by Npower, it will be attended by a hundred young people. Nick says that the whole philosophy of Outward Bound has always been to help people through transitions in their life – like the transition to adulthood. Through combining adventure with environmental responsibility, "people will be impressed by the quality of the landscape around them, and realise that they have the power in their hands to make changes."

What has helped

Nick was involved in a local sustainability project in Arthur Street, Penrith, helped by Cumbria Action for Sustainability. This gave him the ideas and confidence to push the agenda forward at work,too. They have been helped by an informal network of allies, and by Outward Bound's new strategy, which has environmental sustainability at its core.

What has hindered

The centre is limited by a lack of resources, to upgrade buildings, for example.

"Some environmental education is about playing games, listening to experts or doing experiments. It works well with younger children or adults. I want to find other ways, using adventure and taking responsibility."

Above:
Sailing on Ullswater

Room for improvement

There are tensions between those promoting economic growth, and those who are focusing on environmental protection.

Despite these successes, there are some areas of weakness in the response to climate change across the National Park. Perhaps most crucially, many people feel a lack of overall strategy or direction. Second, and linked, there are tensions between those promoting economic growth, and those who are focusing on environmental protection. Third, there are very few attempts to reduce transport emissions in the Lakes, although road transport accounts for the highest single source of carbon. Lastly, it is striking that many conservation-based initiatives in the National Park do not yet take account of climate change.

No sense of direction?

As shown above, a strategic dialogue on climate change for the county is emerging, through the Cumbria Strategic Partnership process. However, many interviewees contacted for this study pointed to mixed messages on climate change, in Cumbria as a whole, and within the National Park. This is partly because of the plethora of public-sector players in Cumbria: the North West Development Agency, Cumbria Vision, Cumbria County Council, the District Councils, and the National Park Authority, as well as statutory agencies like the Environment Agency and Natural England. The organisations vary in the degree to which they are tackling climate change, and in their approaches to the issue. No organisation was seen to be taking a lead. As one interviewee said, “institutional failure is the biggest issue. There’s a lack of clarity and responsibility.”

Smaller businesses and community groups in particular felt removed from the Strategic Partnership process, and had not had any contact with local or regional government initiatives, though they pointed to the useful co-ordination role played by Cumbria Action for Sustainability.

The problems involved with co-ordination across Cumbria as a whole could well make it worthwhile for areas within the county, such as the National Park, to carve out a distinctive approach and a leadership role on climate change, within the context of the Cumbria-wide strategy.

Above:
Bank Holiday parking

The confusion is not helped by a complex set of national policies and initiatives. At a national level, responsibility for energy and climate change is split between two government departments, Defra[31] and BERR[32], with planning policy residing in a third department, CLG[33]; and a raft of regulatory and delivery agencies – the Carbon Trust, Energy Saving Trust, OFGEM[34], the Environment Agency and so on. This patchwork of departments and agencies tends to cause confusion at the local level. Esthwaite Green Link (see page 16) encountered a number of institutional hurdles when they attempted to reinstall a small hydro electricity scheme in the valley, having to deal with regulations on electricity supply and distribution, water abstraction and planning, as well as navigating through the various possible grant schemes. It was too much for them: "the amount of work involved was astronomical. The process was so slow, so complex and so expensive that we gave up."

The Climate Change Bill, currently before Parliament, may help to provide a clearer sense of direction at national level. Statutory national carbon emissions targets will be set, broken down into specific targets for each sector of the economy. In this way, there should be a clearer sense of direction overall.

Growth first?

Both Cumbria as a whole, and the Lake District in particular, face economic difficulties, with lower wage levels and fewer employment opportunities in comparison with the UK as a whole. Some interviewees expressed a worry that higher environmental standards could make life harder for businesses, or encourage them to locate elsewhere. As one said, "We can't be too prescriptive when encouraging businesses in." Some infrastructure development schemes for the County, such as road improvements or the proposed airport at Carlisle, are seen as necessary for the economy, despite their high carbon cost. The implicit argument is that economic growth is a prerequisite, and that a higher level of environmental protection is only possible once the fundamentals are right: the logic of 'growth first'.

This argument is by no means unique to Cumbria. At national level, government support for increased airport and road capacity, such as Heathrow's third runway, in order to promote economic growth, conflicts with its stated aim for ambitious carbon reduction. But the tension seems particularly acute within Cumbria, which has both a fragile economy and a highly prized natural environment. This leads to what one interviewee described as "different factions" with very different priorities.

However, many argue that much of the Cumbrian economy, and particularly the economy of the National Park, is dependent on the environment, and the spectacular landscape. This is obviously the case with the visitor economy. But there is also some evidence that other businesses choose to locate here because of the beautiful surroundings – particularly high-tech and knowledge-based industries. Sundog is an example of such a company (see page 21). It would be far easier, in logistical terms, to locate in Manchester or Birmingham.

But Matterdale is a much more pleasing prospect for their employees, and Sundog has won a high-achieving, loyal workforce as a result: As Sundog's Martin Cotterell says, "the area attracts great people".

The study on the impacts of climate change legislation for Cumbria, described earlier, points to significant economic benefits arising from action on climate change[35]. Elsewhere, a study of Yorkshire demonstrated that the three National Parks in the region "bring economic benefits for the businesses within them, for businesses just outside them, and for the region… there is no evidence that businesses as a whole are suffering from undue restrictions compared to those elsewhere."[36]

"the amount of work involved was astronomical. The process was so slow, so complex and so expensive that we gave up."

Case Study

Sundog Energy

Above:
Keswick School house

"It offers a real solution to something I'd been campaigning on"

Perched on the fells above Ullswater, the small farming village of Matterdale End is not the sort of place you'd expect to find one of the UK's leading solar energy companies. But Sundog Energy has been based here for eleven years, and the staff love it. Sundog's owner Martin Cotterell says that "as a place to work, you can't fault it."

Martin set up Sundog in 1995, with his partner Ali. Both had been working for Greenpeace, campaigning among other things to promote renewable energy, and wanted, in Martin's words, to help "offer a real solution to something I'd been campaigning on" – so Sundog was born. The company designs, supplies and installs systems that generate electricity from solar or wind energy, working with schools, housing associations, local councils, businesses and homeowners.

Martin and Ali scoured the country looking for a suitable location. They decided upon their base in the Lakes because it is a beautiful place to be, and most parts of the UK are accessible via the West Coast Mainline which runs through Penrith, ten miles away. Sundog now has eighteen staff, and a full order book. They recently finished installing a solar photovoltaic system on the roof of the London Transport Museum, and managed to travel by train for most of the project, driving just one van down to London.

Despite their location, Sundog have not done much work within the National Park. They did fit solar panels to the roof of Keswick School, but most of their projects are elsewhere. Martin thinks that people assume it's not possible to install renewables on buildings: "there's a general perception that you can't do that in the Park". He would like to see a few high-profile schemes, together with better information and awareness-raising, to change this perception.

Sundog's challenge now is to stay put. They have outgrown their current premises, but are having problems finding anywhere to go: "We'd like to stay in the Park, but it's difficult because there's just not the places. There are no business units nearby, and property turnover is pretty slow." Martin would like Sundog to locate with other like-minded businesses, and showcase the technologies that they work with.

What has helped

Sundog's business is closely tied to government grants for renewable energy, most recently the Low-Carbon Buildings programme. However, this means that it is hard to plan longer-term, as the market is grant-dependent. Sundog has also received help with marketing and business planning from Business Link Northwest. Partly due to its idyllic location, Sundog has managed to recruit and retain dedicated staff, and their proximity to the railway mainline has helped them to minimise road travel.

What has hindered

Although they are helped by grants, it is still hard for small-scale energy to compete in a system which is designed to favour large-scale generation. The market for their services is still small. Sundog is also limited by the lack of suitable business premises in the Lakes, and housing shortages mean that it is hard for staff to find accommodation.

Left:
Osprey bus

Roads to nowhere

Car use, and other road transport, accounts for the largest single chunk of carbon emissions within the National Park, and is growing at the rate of one per cent per year.[37] The vast majority of residents, and visitors, get around by car. This problem is by no means unique to the Lakes: the English National Park Authorities Association says that in many areas, "The sheer volume of traffic can undermine the special qualities of National Parks, like their tranquillity, and conflict with aims to conserve and enhance the natural environment, heritage and local character."[38]

There are some initiatives in place to reduce car dependence in the Lake District. The National Park Authority promotes a number of schemes, such as leaflets encouraging visitors to 'give the driver a break' and get around by bus, boat or bicycle. Cumbria County Council has recently employed its first cycling development officer (see page 23) and subsidises rural bus services, in common with most local authorities. The 'Cross Lakes Experience' links tickets and timetables from Windermere to Coniston. Other initiatives include the Osprey Bus, funded by Heritage Lottery Fund, which takes visitors from Keswick to Bassenthwaite, and promotional leaflets by the Lakes Line Railway, including an enterprising scheme mapping all the real ale pubs within walking distance of Lakes Line Stations – with discounts on the beer for rail ticket holders.

Within other National Parks, similar projects aim to get visitors out of their cars. Perhaps the most extensive network is the MoorsBus, in the North York Moors National Park, which brings an estimated £300,000 into the local economy, and provides access for those without a car.[39] Other schemes include the Pembrokeshire Puffin and Dales Bus networks, and the Snowdonia Green Key Partnership. The Peak District has been investigating possibilities of road user charging, backed by Derbyshire County Council.[40]

In the Lakes, though the existing initiatives are useful, they do not add up to a cohesive transport alternative for the National Park as a whole. The rural nature of the Lakes means that providing such an alternative is challenging. But the problems are becoming more acute. Some areas of the Lakes, such as the Windermere to Ambleside road, are severely congested at peak holiday times, and parking is difficult in many tourist areas, including more remote valleys popular with walkers. As cycling development officer Mark Brierley says, "increased car use is going to force us into some hard decisions. There are pinchpoints where the car is a real problem, both in terms of congestion and safety. When there are too many cars parked near Cat Bells, fire engines can't get into the Newlands Valley."

The issues of congestion, parking limits and carbon emissions are linked. Transport problems were mentioned by nearly every interviewee in this research. The scale of the problem means that there may be an appetite for radical change – as one respondent said, "we are beginning to think the unthinkable".

"The sheer volume of traffic can undermine the special qualities of National Parks, like their tranquillity, and conflict with aims to conserve and enhance the natural environment, heritage and local character."

Case Study

Mark Brierley, Cycling Development Officer for Cumbria County Council

Above:
Cycle hire

Mark Brierley has only got a year to persuade Cumbrians to get on their bikes. He has a year's worth of funding for his new post, as cycling development officer for Cumbria County Council. Given the overwhelming focus on car-based transport in Cumbria, Mark is remarkably upbeat. He says that the work he's doing is a great starting point – beforehand, there was no co-ordination of efforts to promote cycling across the County. Now, people know who to call.

There is huge potential in promoting the Lakes as a destination for cycling holidays, particularly for families, and Mark is working to develop traffic-free cycle routes, including a track round Thirlmere reservoir. He would like to see designated cycle 'hubs' in the Lakes – places like Windermere station, where people could arrive with bikes, or hire them on the spot, and travel around the area easily and safely. Promoting cycle tourism in West Cumbria, around Cleator Moor and Egremont, would help regeneration efforts, too.

Mark finds a lot of support and enthusiasm for his work, from local politicians and communities. He says that it would be quite possible to create an entire non-car transport network in the National Park, with walking and cycling routes backed up by good public transport, information provision and marketing. The high number of visitors to the Lakes could, he believes, provide the motivation for a shift toward more sustainable transport provision – one which residents would benefit from, too. Conversely, a failure to act could impact badly on tourism, with visitors avoiding spots like Ambleside, where congestion makes the environment unpleasant for pedestrians and drivers alike.

But Mark struggles against what he calls the inbuilt 'car culture', with people very dependent on cars to get around; and resistant to efforts to restrain cars. He also notes a tendency toward maintaining the status quo, which prevents development of ambitious solutions such as car-free routes.

Mark was heartened to hear a complaint recently about children cycling on the pavements in Carlisle. Although not impressed by their lawlessness, he was "glad that there were enough of them to be noticed, even if it's for the wrong reasons!"

What has helped

The close involvement of Cumbria County Council, who are responsible for transport planning, has helped; as has strong political support, from local politicians and MPs.

What has hindered

Partnership working, though necessary, is difficult. Multiple funders mean multiple agendas. An inbuilt car culture, and a wider picture of declining public transport provision, give Mark limited room for manoeuvre. Lastly, there is a tendency for the Northwest Development Agency to support big, flagship projects, rather than small, incremental improvements, which is what is needed to improve walking and cycling provision.

Left:
Foulshaw Moss

Conservation or climate?

From John Ruskin onward, the Lake District has always been important to conservationists. Statutory agencies including the National Park Authority and Natural England, as well as voluntary bodies like the National Trust, Friends of the Lake District and Cumbria Wildlife Trust, exist to conserve and enhance the Lake District landscape and its biodiversity. Climate change will have a significant impact on both landscape and biodiversity, as discussed above. However, these linkages are complex and difficult to understand or predict. As a result, some conservation groups admit that they have been slow to link conservation with climate change mitigation or adaptation. As one such organisation said, "our focus is on biodiversity. We need to add carbon to the list."

The challenge for conservationists is twofold. Firstly, there is a need to better understand how climate change may change the natural environment, and consequently, what needs to be done to allow species to adapt to climate change. Natural England's work in this area is a helpful starting point.[41]

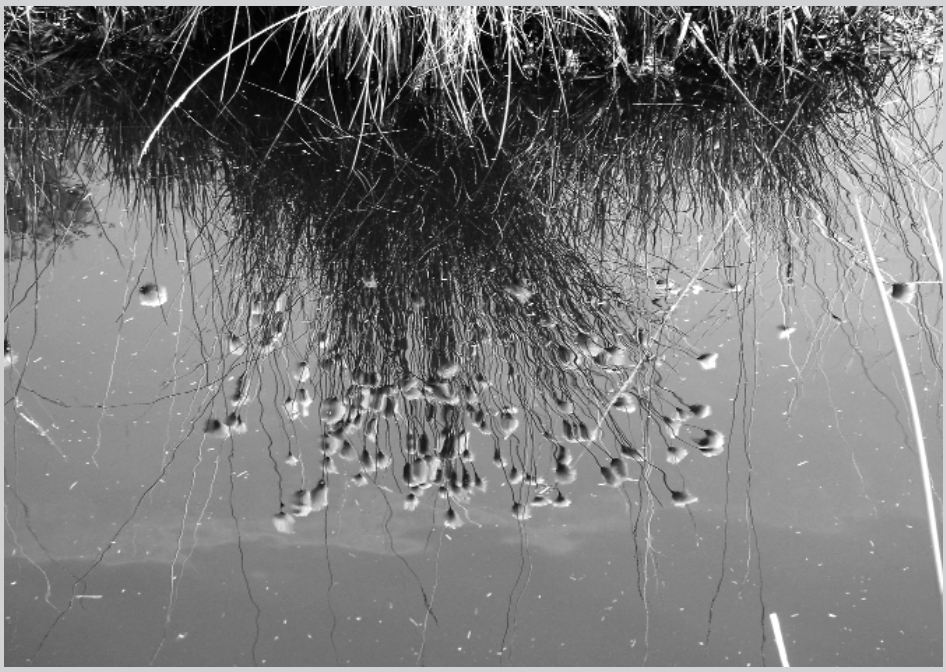
Second, conservation groups need to look at their own impacts – both in terms of reducing greenhouse gas emissions, and in terms of what they can do to sequester greenhouse gases through planting, changes to agriculture or peat bog restoration. Groups like Cumbria Wildlife Trust are starting to do this (see page 25). By taking action on climate change as part of their daily operations, groups can inspire their members and visitors to do likewise.

"our focus is on biodiversity. We need to add carbon to the list."

Case Study

Foulshaw Moss nature reserve, Cumbria Wildlife Trust

Right:
Cotton grass reflection



The peat bog at Foulshaw Moss, near Witherslack, has been around a long time – it was formed around 8,000 years ago, as part of a much larger area of wetland, extending from the Kent Estuary to the Lyth and Winster valleys. Hundreds of years ago, coaches travelling north from Lancashire had to cross the treacherous sands of Morecambe Bay, as the bog made the land itself impassable. Today, although much smaller, it covers 350 hectares, making it one of the largest areas of uncut lowland peatbog in Britain. Nationally, only six per cent of originally-existing peat bogs remain, due to peat extraction for use as fuel or as a growing medium.

When Cumbria Wildlife Trust bought the land in 1998, with help from the Heritage Lottery Fund, the main aim was to protect the rare habitat, and the species that inhabit it, such as the large heath butterfly and the bog bush cricket. The Trust worked to block off drainage channels and re-wet the bog, to restore the acidic and waterlogged conditions that are essential for many of the rare plants and animals. But restoring peat bogs has an added benefit: it locks in carbon. Peat soils contain huge amounts of carbon, which is released as carbon dioxide if the bog dries out. So protecting peat bogs is a valuable way of reducing carbon emissions. According to the Moors for the Future project[42], peatlands store around three billion tonnes of carbon, the equivalent of 20 years of UK carbon dioxide emissions.

But there are currently no funds available to help land managers lock in carbon, through managing peat bogs. Cumbria Wildlife Trust receives funding from Natural England to preserve Foulshaw Moss, but the money is received for nature conservation, not for carbon benefits. Neither has the Trust mentioned the carbon sink role of its reserve in funding bids – as conservation manager David Harpley explains, “when we started doing this, nobody talked about locking up carbon. But it fits well with nature conservation objectives.”

He thinks that there would be great potential, though, in funds to help land managers preserve carbon-rich soils – it would also be a way of paying upland farmers to manage the fells.

What has helped

Grants to preserve and enhance the biodiversity of Foulshaw Moss have also helped to protect the bog as a carbon store. The ‘Moors for the Future’ partnership, set up to restore the Peak District moors, has commissioned research to gain better understanding of the role of peatlands as carbon stores.

What has hindered

Carbon management is not a criterion of grants for biodiversity or nature conservation. There is no funding source available for carbon management of peat bogs, although it an economical way of reducing emissions to the atmosphere.

Towards a low-carbon Lake District

Over the next decade, all regions of the UK will need to take significant action in order to achieve deep cuts in emissions of carbon and other greenhouse gases. The inspirational environment of the Lake District gives the National Park an opportunity to lead and inspire visitors on climate change, too. The challenge will be to find ways of doing this that fit with the culture, history, landscape and local communities.

The Lake District National Park Partnership could provide a useful forum for leading the overall response to climate change, and for agreeing the distinct contribution of the National Park, within the context of Cumbria's climate change strategy.

Based on the research conducted for this report, and the findings of the separate study on the impacts of climate change legislation for Cumbria, described earlier[43], there are six areas in which the Lake District could make a difference, reducing its own emissions and inspiring others to do likewise.

The Lake District could work to develop community energy solutions, with small-scale energy generation linked to other energy saving measures. A sustainable transport strategy could offer the Lakes a workable alternative to private car travel, which would bring other benefits too, including reduced congestion and parking problems.

There is a need to diversify employment in the area, and one way of doing this would be through developing a green business hub, encouraging low-carbon businesses and services to locate in the National Park. Positioning the Lake District as an environmental enabler – inspiring visitors to take action on climate change – would reap dividends. Related to this, the Lakes could join with other National Parks to encourage holidays at home – low-impact domestic tourism. Lastly, there is a need to look at evolving landscapes – joining together debates about conservation and climate change, to examine how the landscape and biodiversity of the Lakes will change over time, and how it can best adapt to future changes in the climate.

Each of these opportunities is outlined below, with indications of how they could be achieved, and who could be involved.

Above:

Sundog Energy

Community energy solutions

The Lake District has an abundance of natural resources that could be used to generate renewable electricity and heat, from wind, sun, water and wood. Small-scale schemes can be designed in ways that do not impact adversely on the landscape. They are more efficient than large-scale schemes, because power is used locally, minimising the losses involved in distribution. Renewable generation is particularly carbon- and cost-effective in rural locations which are off the gas grid. Crucially, small-scale energy generation helps to engage people in energy and climate change issues, creating the link in people's minds between their use of energy and where it comes from.[44] Building on the success of groups like Esthwaite Green Link (see page 16), there is also considerable potential for encouraging and supporting community action on climate change.

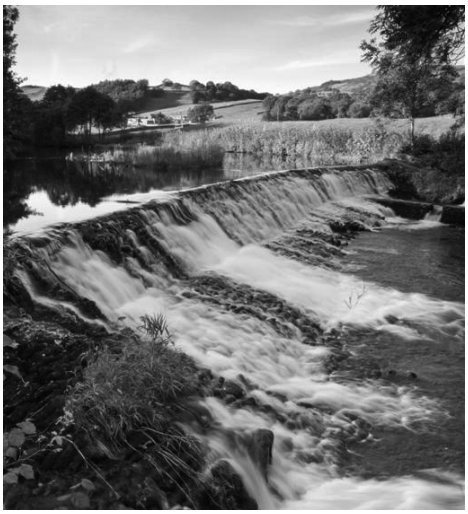
Under the current regulatory system, the financial, technical and legal hurdles involved in establishing local energy generation are considerable, and many community groups and small businesses do not have the resources or expertise to set schemes up. There is a need for independent advice, and easy-to-access project funding, for community energy solutions. This could be achieved through:

An advice and facilitation service: Such a service would help with technical issues, planning, regulation, access to finance, and legal questions. A possible model for this would be The North York Moors Community Renewable Energy Project, which is working with local communities to help them find ways to save and generate energy,[45] or the Marches Energy Agency in Shropshire.[46] It should be closely linked to, or run by, existing organisations who have experience in working with communities and businesses on sustainability issues, such as Cumbria Action for Sustainability, the Tourism and Conservation Partnership, Cumbria Business Environment Network and Cumbria Woodlands. Cumbria Community Foundation could also help to involve voluntary groups who may not yet have considered climate change issues.

As an alternative to grants, a low-interest loan scheme could provide capital for carbon-saving projects. The scheme would be a revolving fund: money saved through energy efficiency improvements, or energy generation, would be paid back into the fund for use by others. Such a scheme runs in the Borough of Camden, in London. These schemes are also used widely, by local authorities, to finance improvements in the public sector.[47]

Creating an energy services company: An energy services company (ESCO) for the National Park could design, build, own and operate decentralised energy systems for both new and existing developments. London, Southampton, Woking and other areas have established successful schemes of this nature. There are many different types of ESCO, and detailed research by the Energy Saving Trust and others sets out the various models.[48] An ESCO could be run as a partnership between the Authority, major energy users such as large hotels or conference centres, and an energy company. It could allow organisations such as schools, outdoor centres, community groups and businesses, to buy into renewable energy and energy efficiency services. It could act as a 'broker', linking energy users together. This will increase efficiency, as different users use power at different times of day. For example, schools use power during the day, in term time; during the summer months, power could be used elsewhere.

Positive planning for small-scale renewables: The National Park Authority should, as a planning authority, promote small-scale renewable energy. This can be done through specifying that new developments should generate a proportion of energy on-site[49]; and through providing pre-application support and advice for renewables developments that require planning permission. A survey of the potential for such energy (for example, potential hydro sites;[50] and the potential for solar and wind energy in different parts of the National Park) would help to identify where schemes could be developed.



Above:
Weir at Staveley

A sustainable transport strategy

There is a clear consensus that improvements must be made to the Lake District's transport infrastructure, to allow genuine alternatives to private car travel, for both residents and visitors to the Park. As well as being a fast-growing source of carbon emissions, increased car use is leading to congestion and parking problems, particularly in the peak holiday periods. A separate study into an integrated sustainable transport framework for the National Park is currently underway, and will report later in 2008, setting out possible ways forward. On the basis of the research conducted for this report, there are a number of options for tackling the climate change impacts of transport: Some of these are listed below. It is important that these and others form an input to the transport study.

A sustainable transport network for the Lakes: There is a need to link and co-ordinate between the different modes of non-car travel – bus, trains, bicycles, boats and walking – to promote a sustainable transport network linking all major villages and attractions in the National Park. Initially, this could be based upon existing services, with improvements made to timetable co-ordination, shared ticketing, marketing, bicycle carriage and storage. A Lake District travel map could be produced, to make non-car options clear and accessible. It could be supported by an IT solution such as YourNextBus, a scheme in South Yorkshire which sends users real-time bus information by text.[51] The 'Cross Lakes Experience', which co-ordinates buses and boats to allow easy travel between Windermere Station and Coniston, is a smaller-scale example of what is possible. Such a network would benefit both residents and visitors.

A Lakes Travelcard: A flat-fee Travelcard, which covered all non-car travel, would encourage take-up of sustainable transport options. Like the London Travelcard, it would allow unlimited travel on all public transport, including boats, for a day or longer. The Travelcard could also be linked to long-stay car parking, for those who travel to the Lakes by car. Residents could be offered discounted rates.

Smart travel planning: Pilot studies have shown that sustainable travel can be encouraged, and car travel reduced, through promotion of travel planning. In the 'sustainable travel towns' of Darlington, Peterborough and Worcester, traffic fell by 10% or more, and public transport, walking and cycling increased. The rural nature of the Lake District makes comparison difficult. But smart travel planning could form part of the solution. It involves home visits from travel advisers, who talk through options for regular journeys such as trips to work and school, and gather feedback to improve services. For visitors, accommodation providers could be trained to offer support and advice to their guests.

Car sharing and car clubs: In rural areas, there will continue to be a need for car-based transport. However, carshare schemes and car clubs (easy, cheap car hire for short periods of time) could help reduce the number of trips, and the need for households to own a second car. This is starting to happen - the Keswick Business Improvement District recently introduced 'Keswick Carshare'. Major employers, community groups and local authorities could collaborate to promote such schemes.

Above:
Improved bus links

Improvements to bus and rail networks: There is also a need for improvements to bus and rail networks. Bus and rail services need to be more frequent and reliable if they are to provide a viable alternative to car travel. Possible areas for improvement include: increased frequency and journey times on the Cumbrian Coast rail route, to allow access to the Western lakes; and reintroduction of rail or light rail between Penrith, Keswick and Cockermouth.

Getting the incentives right:
At present, car travel is the cheapest way to access most areas of the Lake District. There is a need to change the financial signals, to make sustainable transport options more competitive, particularly for visitors. This could be done by charging cars, through a National Park entry fee, congestion charging or parking charges; with the revenues spent on sustainable transport options. Charges could vary seasonally, to reflect demand and levels of congestion. Residents, and people with mobility impairments, could pay reduced charges. However, such charges should not be introduced unless a reliable public transport network is functioning, to provide a clear alternative to car travel.

Case Study

University of Cumbria

Above:
Biodiesel

"our location is fundamental to what we do. Cumbria conjures up images of greenness and everything right with the world. We need to reflect this in our courses and practice."

When the new University of Cumbria was created in 2007, staff and students had a long hard think about what should set their university apart. One of their core values, they decided, would be environmental sustainability. As Eunice Simmons, Dean of the Faculty of Natural Resources, explains, "our location is fundamental to what we do. Cumbria conjures up images of greenness and everything right with the world. We need to reflect this in our courses and practice."

The University has put in place a thorough process by which environmental improvements are identified and implemented. A committee of senior managers leads the work, and task groups look at different areas – energy, biodiversity, land use, buildings, water and waste, reporting to the main committee. There are active green groups for staff and students, too.

There is lots of work to be done – some of it very basic, like fitting insulation to many campus buildings. They now apply rigorous sustainability standards to all refurbishment projects and new buildings. Last year, they won a 'green gown' award for efforts to promote biodiversity at the Newton Rigg campus. They have done a travel review, and are looking at ways to reduce miles travelled, investing in video conferencing. One of the hidden benefits, says Eunice, is that it can "unlock different ways of doing things. It makes you ask, do we really need this meeting? Are there smarter ways to work?"

Another area where much can be done is procurement. Changes in EU procurement rules mean that the University is allowed to favour local and regional suppliers. They are now actively seeking local suppliers, and the next step will be to work with those suppliers to improve environmental standards.

The university has a special interest in biodiesel, and produces its own fuel, to power farm vehicles and heating boilers. The biodiesel press and reactor system was built by engineering students, and local farmers are offered the chance to grow oilseed rape which the university then processes. The biodiesel project is primarily an educational tool, for teaching students about the energy cycle.
It saves carbon, too, if the crops are grown locally: "it's not the global answer but it might be a local answer", as Eunice explains.

Future plans include a new construction school, specialising in heritage construction and retrofitting renewables; and more short courses in sustainability issues for professionals, like planning officers.

What has helped

Top-level support from the University has been important. The biodiesel project was funded by Leader +.

What has hindered

The time it takes to make improvements is problematic: "The hardest thing is to maintain momentum. People can start to switch off."

A green business hub

Above:
Wind turbine

There is a pressing need to create employment in knowledge-based, hi-tech and creative industries, and evidence that people working in these industries would welcome the opportunity to locate in or near the National Park.[52] Much work of this sort could be carried out remotely. The Lake District Economic Futures Study put forward a possible future scenario called 'Digital Waterside', in which "the Lake District increasingly becomes a location for remote workers", leading to a "big increase in the extent of knowledge workers in the Lake District – with potential attraction to inward investors into some other parts of Cumbria."[53]

The Lake District National Park Authority, working with Cumbria Vision, could link the drive for knowledge-based employment with a desire to promote environmental industries, through positioning itself as an attractive location for green business. This could be done through, for example:

Creation of a 'green business park' or employment zone in or near the National Park: There is currently a shortage of suitable business sites within the National Park.[54] This prevents existing companies expanding, and new companies locating in the Lakes. The Local Development Framework for the National Park identifies a need for new business sites. A green business park would provide a home for environmental businesses, such as renewable energy companies or environmental consultancies. It could be linked to the University of Cumbria. As well as providing employment, it would make environmental goods and services more easily available locally. The business park could itself be an exemplar of sustainable building. It would need to be supported by sustainable transport provision to and from the site.

Support for home knowledge workers: Cumbria Vision could provide support for knowledge-based home workers in Cumbria as a whole, and particularly in the National Park. Research by the Commission for Rural Communities shows that home workers make up one in nine of the rural workforce, but home working is rarely acknowledged or encouraged by central or local government, despite the benefits of reduced travel and economic diversification that it brings.[55] Home knowledge workers can be supported through good broadband connections across the area; shared facilities for meeting and video conferencing (perhaps linked to the business park, as above); and support for networking activities. Cornwall's Digital Peninsula Network[56] is a potential model. It links over 170 micro-businesses and offers training, networking and a resource centre for members' use.

Growth from within: In recent years, efforts have been made to encourage and market local products, particularly food, drink and crafts. The Leader + programme[57] and the Distinctly Cumbrian initiative run by Cumbria Rural Enterprise Agency[58] are examples. These programmes are likely to have climate change benefits too, through reducing transport emissions and encouraging seasonal produce, and this should be acknowledged. At the moment, such initiatives tend to target the tourist sector, but local products could also be marketed to local people. In addition, Cumbria Vision and CREA could promote local energy and environment companies – such as Second Nature, manufacturers of sheep's wool insulation; Cumbria Woodlands, who promote biomass heating; Sundog (see page 21); and Turbine Services.

An environmental enabler

Over 12 million people a year visit the Lake District.[59] Research shows that people are more receptive to ideas for changing their behaviour when they are removed from their normal surroundings and habits.[60] Many people have a strong bond with the Lake District and are willing to support it, through donating to initiatives like 'Fix the Fells' and through volunteering and conservation holidays. So any climate change initiative within the National Park which is visible and well communicated, will have a double dividend. As well as resulting in reductions of greenhouse gases directly, it will inform and motivate visitors and local people. The Tourism and Conservation Partnership's visitor payback scheme is an example of a project that helps visitors to understand and act on environmental issues in the National Park. The inspirational landscape of the Lakes, coupled with inspirational examples of low-carbon initiatives, could play a key role in engaging people to take action on climate change. This could be achieved through:

Further support for business action: Cumbria Tourism could work with established organisations such as the Cumbria Business and Environment Network (CBEN), Cumbria Green Business Forum (CGBF) and the Tourism and Conservation Partnership to encourage more tourism businesses to take action, and look at ways of communicating this action to visitors. There should be a particular focus on outreach to businesses who are not currently engaged. It could take place through regular contact with businesses (such as assessment visits and training courses, for example). Limited resources currently restrict the reach of existing schemes. Similar support is needed for outdoor education centres and organisations, perhaps working in partnership with the Adventure and Environmental Awareness group.

Climate Leadership: There is a need to reach out to organisations not currently involved in the climate debate, and encourage them to think through the impacts of climate change for their business or sector. Through the Lake District National Park Partnership, potential 'climate leaders' could be identified, to form a network. This approach has been pioneered at the Cambridge Programme for Industry, which brings together UK leaders to help them communicate the challenges of climate change and explore ways of taking further action.[61] Lancaster University's new Academy for Environmental Leadership could play a role in such a scheme for the Lakes.

A 'Low-carbon Lake District' brand: Such a brand could be used by public, private and voluntary sector organisations who are taking action on climate change. This would not be a separate award scheme, but would link to existing accreditation schemes such as the CBEN scheme, the Green Tourism Business Scheme awards[62] and projects supported by the National Park Authority's Sustainable Development Fund.

Case Study

Rod Hughes, architect, ad.hoc associates

Right:
Environmental building techniques

Rod Hughes, a Penrith-based architect, was championing green buildings long before it was fashionable to do so. Over fifteen years ago, he started experimenting with energy efficient buildings, pioneering new approaches and presenting his findings to the Building Research Establishment. When he started out, his approach was seen as unnecessary and expensive, especially as there were limited regulatory standards or financial support for green buildings. “Back then”, he explains, “it was definitely a niche, strange, fringe activity – but no longer”.

Today, he works with clients in the National Park and further afield, trying to reduce carbon impacts of new buildings and refurbishments alike. A refurbishment project at the Lakeside Hotel, Newby Bridge gave him the chance to install energy control systems, and passive heating and cooling. Over a number of years of working with the hotel, he has gradually improved their energy performance.

At Cockermouth school, Rod worked with pupils and staff to design an eco-centre, which is a showcase for environmental design. It generates it own energy from three different sources: a ground-source heat pump, solar panels, and a wind turbine. Being super-insulated, it doesn’t need much heating, so it exports excess power back to the grid. Building materials include recycled bricks and old food bins. The centre is used by school students, as well as community groups, and helps to spread the message about green architecture.

Rod believes that much more could be done to promote small-scale renewable energy. Farm buildings like lambing sheds have large roofs, ideal for solar panels, but there is little incentive to install them. He thinks more could be done to get groups to link together on energy issues – community heating schemes, solar water heating and so on could all be retrofitted into existing buildings. He would also like experiment more with ultra-low impact settlements in the National Park.

Over recent years, Rod has seen the interest in green buildings grow and grow – thanks, in part, to the television programme Grand Designs. He is pleased that it is gradually becoming mainstream, “following years of beating my head against the wall.”

What has helped

Energy standards in building regulations have increased dramatically, which has helped persuade clients to try new approaches. It is now much easier to assess the green criteria of a building during the design stage with the various energy and performance models available. The green movement more generally has gained momentum, and more people are interested in the environmental performance of buildings.

What has hindered

It can be difficult to persuade clients to go green, they always anticipate extra capital cost but rarely look at reduced lifetime costs. The interest is generally in complying with building regulations and getting planning permission, not going further than the legislation requires.

Holidays at home

Right:
Picnic in Colwith Force Woods

One of the most significant ways in which the Lake District could contribute to carbon reduction would be to encourage more UK residents to holiday at home, rather than flying abroad. There is a growing market for 'low-impact' tourism, and increasing unease among some (but still a small minority of) holidaymakers about the carbon impact of their travel. Devon recently began a marketing campaign based around climate change, telling holiday makers "if you want to lessen your carbon footprint on holiday, make tracks for Devon."[63] Economic benefits of encouraging domestic tourism could be considerable. A 2003 study showed that UK tourists took more money out of the economy than visitors brought in - the tourism 'balance of payments' was over £11 billion in the red. This equates to the loss of 165,000 jobs in the North West alone.[64] The Lake District could be part of a wider initiative to encourage low-impact domestic tourism in the UK. It could work with other National Parks as well as organisations like the National Trust, to establish a 'holiday at home' initiative. This could be achieved through:

Work with other National Parks: working through the Association of National Park Authorities (ANPA), and through direct links with other National Park Authorities, to promote the environmental benefits of UK holidays.

Creation of a 'holiday at home' coalition: involving, for example, National Park Authorities; rail companies such as Virgin Trains; Visit Britain; the National Trust; environmental groups like the RSPB and Friends of the Earth, to encourage low-impact holidays within the UK. This could involve joint branding and marketing; research into the carbon benefits of UK holidays; a 'train miles' scheme to encourage public transport; and so on.

Case Study

Elder Grove bed and breakfast, Ambleside

Above:
Elder Grove jams

"We just feel like we're doing our bit, really".

Visitors to Elder Grove bed and breakfast will definitely notice the home-made jam and locally produced sausages and eggs on the breakfast table. But, unless they catch sight of the bulging file of environmental achievements on the coffee table in the lounge, they may not realise that they are staying in one of the Lake District's greenest guesthouses. Last year, Elder Grove was awarded a gold award in the Green Tourism and Business Scheme, in recognition of its thorough environmental management. Every effort is made to reduce energy use, increase recycling rates and cut down on wastage.

Paul and Vicky McDougall's green transformation began a few years ago when they were thinking of new ways to develop their business and attract visitors. They knew that membership of green schemes, like the Tourism and Conservation Partnership, would help to differentiate them. They got involved in the Partnership, and, with help from the Cumbria Business and Environment Network, they took some basic steps to monitor and manage their environmental impact. It began to take on a life of its own. When they needed a new boiler, Paul pored over energy efficiency ratings as much as comparing prices, and looked into getting a government grant for the most efficient model, though they were thwarted by the form-filling involved. A new carpet for the lounge was sourced locally, and made with local sheep's wool; the old one was reused elsewhere. An old bed was recycled into wood for a log burner, and old furniture donated to help people whose houses had been damaged by the floods in Carlisle. They even fundraise for local conservation projects, and raised £1000 last year.

Paul and Vicky now see their environmental efforts as part-and-parcel of doing business in the Lake District – "We just feel like we're doing our bit, really".

They would like to see more support for businesses like theirs, who are making a real effort to reduce their carbon footprint. They suggested that all bed-and-breakfasts could be asked to draw up a basic environmental policy, as part of their registration with Visit Britain, and should be given help to take the first steps. Businesses with a recognised green accreditation could be eligible for reduced membership rates of Cumbria Tourism, in recognition of their achievement. And they said that they would be happy to help their guests use the car less, and get around on public transport – if the buses are regular and cheap enough.

What has helped

The main sources of help for Elder Grove came from the Tourism and Conservation Partnership, and Cumbria Business and Environment Network.

What has hindered

The McDougalls found it difficult to access government funds for low-carbon technologies – businesses are entitled to 'enhanced capital allowances' for certain low-carbon technologies but it is hard to ascertain which products are eligible, and the form-filling required is difficult for a small business to manage.

The limited recycling facilities for businesses discourage recycling, as it is more expensive than normal waste disposal. Inadequate and expensive public transport also causes problems, as it means that it is difficult to persuade guests to leave their car in the car park.

Evolving landscapes

Climate change will alter the look and feel of the Lake District. But there is also a great deal of uncertainty surrounding the future of upland farming in the Lake District, following changes to EU subsidy regimes.[65] The challenge now is to link these two issues together, and look at how the Lake District landscape could, and should, evolve over time. Land management practices can help with climate change mitigation and adaptation, but there is a pressing need for a system of reward for land managers who take action. First steps to doing this include:

Better understanding of climate change impacts and adaptation: Natural England's work on climate change impacts in the Cumbria High Fells Joint Character Area[66] has begun to map climate change futures for the Lake District. But more research is needed about how to improve adaptation to climate change. For example, some species will only survive by shifting their habitat upwards – but this upward movement may be prevented by agricultural practices, such as grazing animals. An approach based on 'ecosystem services', which assesses the benefits that the natural environment provides, could be beneficial.[67] Mapping the ecosystem services provided by the Lake District would help to place a value on natural assets, find ways to support them, and reward land managers for their role.

Working with the farming community: There is a need to work with the NFU and other farming organisations to build an understanding of climate change into ongoing discussions about the future of Lake District farming. Both the 'Farming Futures' initiative[68], and Defra's Rural Climate Change Forum, could help with this. Cumbria Farm Link, run by CREA, delivers environmental advice to farmers alongside farm business programmes, and is increasingly promoting energy management and microgeneration. Dartmoor National Park Authority is also working with farm businesses to encourage climate change adaptation and mitigation.

A strategic look at resource futures: The Lake District's water and woodland resources and agricultural land are likely to be in higher demand as climate change takes hold. A strategic look at resource issues would be valuable in determining future responses. Should Cumbria aim for more local food production, for example? Work of this sort is already underway through the Cumbria Futures Forum. Again, this could be done through an ecosystem services approach.

Funding for carbon lock-in: Projects that preserve and enhance peatland, woodland and other carbon 'sinks' help to lock in carbon. However, this is not generally recognized in funding for biodiversity and conservation. There is a need to look at ways in which carbon sequestration in the Lakes could be rewarded, both through existing funding schemes for biodiversity and nature protection; and through new initiatives like the Northwest Climate Fund.

Above:

Grazing sheep at Town Head Farm, Grasmere

Footnotes

1 Intergovernmental Panel on Climate Change, Climate Change 2007: The physical science basis, summary for policymakers, IPCC, Geneva, February 2007
2 UK Climate Impacts Programme: The climate of the UK and recent trends, December 2007 p12
3 The Economics of Climate Change: The Stern Review, HM Treasury / Cambridge University Press, 2007 p3
4 The Economics of Climate Change: The Stern Review, HM Treasury / Cambridge University Press, 2007 p20
5 The Economics of Climate Change: The Stern Review, HM Treasury / Cambridge University Press, 2007 p14
6 The Economics of Climate Change: The Stern Review, HM Treasury / Cambridge University Press, 2007 p99
7 Climate Change Impact Assessment and Response Strategy: Cumbria High Fells Character Area,Consultation draft, Natural England, April 2008
8 Figures from the Moors for the Future project, www.moorsforthefuture.org.uk
9 See www.fixthefells.co.uk
10 Cumbria Business Environment Network
11 The Economics of Climate Change: The Stern Review, HM Treasury / Cambridge University Press, 2007 chapters 4 and 5
12 Climate Change Impact Assessment and Response Strategy: Cumbria High Fells Character Area, Consultation draft, Natural England, April 2008, p29
13 Climate Change Impact Assessment and Response Strategy: Cumbria High Fells Character Area, Consultation draft, Natural England, April 2008, p35
14 For discussion of the effects of climate change on tourism, see Climate Change and the Visitor Economy: Challenges and opportunities for England's Northwest, Sustainability Northwest and UKCIP, 2006.
15 The Economics of Climate Change: The Stern Review, HM Treasury / Cambridge University Press, 2007 p91
16 The Economics of Climate Change: The Stern Review, HM Treasury / Cambridge University Press, 2007 p139
17 The Economic Implications of Climate Change Legislation for Cumbria, report by Quantum Consulting, draft May 2008, commissioned by Cumbria Vision in conjunction with the Cumbria Strategic Partnership Climate Change Task Group in order to understand economic impact and opportunities that Cumbria can benefit from.
18 Intergovernmental Panel on Climate Change, Climate Change 2007: The physical science basis, summary for policymakers, IPCC, Geneva, February 2007
19 "UK emissions figures down, but 'much more must be done': Benn". Defra press release, 31 January 2008
20 NWRA Energy and Greenhouse Gas Emissions Study, report to the NorthWest Regional Assembly by AEA Energy and Environment, August 2007
21 The National Park covers around a third of the area of Cumbria, but is home to less than a tenth of Cumbria's population.
22 NWRA Energy and Greenhouse Gas Emissions Study, report to the NorthWest Regional Assembly by AEA Energy and Environment, August 2007 p38; see also The Economic Implications of Climate Change Legislation for Cumbria, report by Quantum Consulting, commissioned by Cumbria Vision in conjunction with the Cumbria Strategic Partnership Climate Change Task Group, which gives similar figures.
23 NWRA Energy and Greenhouse Gas Emissions Study, report to the NorthWest Regional Assembly by AEA Energy and Environment, August 2007 p40
24 The Economic Implications of Climate Change Legislation for Cumbria, report by Quantum Consulting, draft May 2008, commissioned by Cumbria Vision in conjunction with the Cumbria Strategic Partnership Climate Change Task Group
25 GWP or 'global warming potential': each greenhouse gas has a different capacity to cause global warming, depending on its radiative properties, its molecular weight and its residence time in the atmosphere. The GWP index developed by the Intergovernmental Panel on Climate Change assesses the relative global warming effect of different gases, relative to CO2. Methane, for example, has 23 times the GWP of carbon dioxide, so a small amount of methane emitted has a significant effect. See 'Climate Change: The UK Programme 2006' (HM Government 2006) for further explanation.
26 See www.transitiontowns.org
27 See www.naturaleconomynorthwest.co.uk/about.php
28 Information from the Tourism and Conservation partnership – it has 222 members, out of an estimated 2500 direct tourism businesses.
29 The Lake District Economic Futures study estimate that 59% of economic activity in the park is linked to tourism
30 Lake District: Economic Futures Study, Regeneris Consulting for the Northwest Development Agency, June 2004
31 Department for Environment, Food and Rural Affairs
32 Business Enterprise and Regulatory Reform
33 Communities and Local Government

34 Energy market regulator
35 The Economic Implications of Climate Change Legislation for Cumbria, report by Quantum Consulting, draft May 2008, commissioned by Cumbria Vision in conjunction with the Cumbria Strategic Partnership Climate Change Task Group
36 Prosperity and Protection: The economic impact of National Parks in the Yorkshire and Humber Region, Council for National Parks, 2006
37 Local Development Framework Integrated Core Strategy: Preferred Options, Draft to Authority, LDNPA, April 2008, p62
38 ENPAA position statement on transport, 2007, p1
39 ENPAA position statement on transport, 2007, p2
40 for details of transport in other National Parks, see Tackling Traffic: Sustainable leisure transport in National Parks, CNP, 2006; and Good Practice Guide: Integrated transport measures in National Parks, Defra, DfT and Welsh Assembly Government, 2005
41 Climate Change Impact Assessment and Response Strategy: Cumbria High Fells Character Area, Consultation draft, Natural England, April 2008
42 Moors for the Future project, www.moorsforthefuture.org.uk
43 The Economic Implications of Climate Change Legislation for Cumbria, report by Quantum Consulting, draft May 2008, commissioned by Cumbria Vision in conjunction with the Cumbria Strategic Partnership Climate Change Task Group
44 Grid 2.0: The next generation, Green Alliance, 2006
45 See www.visitnorthyorkshiremoors.co.uk/content.php?nID=560
46 www.mea.org.uk
47 See www.salixfinance.co.uk for details of such funds working in the public sector.
48 See the Energy Saving Trust briefing note Energy services and renewable energy, EST May 2005; and Making ESCOs Work: Guidance and advice on setting up and delivering an ESCO, London Energy Partnership, February 2007
49 The so-called Merton Rule – see www.themertonrule.org
50 The Joule Centre has already done work to map potential hydro resources. www.joulecentre.org
51 See www.travelsouthyorkshire.com/your_travel/buses/YourNextBus+Introduction.htm
52 Lake District: Economic Futures Study, Regeneris Consulting for the Northwest Development Agency, June 2004, page 98
53 Lake District: Economic Futures Study, Regeneris Consulting for the Northwest Development Agency, June 2004, page IV
54 The Local Development Framework suggests that 8.6ha of employment land could be needed in the National Park between now and 2021. Several interviewees in this study pointed to the lack of suitable employment premises.
55 Under the Radar, Commission for Rural Communities and the Live/Work network, February 2006. A similar argument is made by NESTA: Rural Innovation, NESTA, December 2007
56 www.digitalpeninsula.com
57 www.fellsanddales.org.uk
58 www.distinctlycumbrian.co.uk
59 www.lake-district.gov.uk/index/understanding/facts_and_figures.htm
60 Defra research on pro-environmental behaviours, www.defra.gov.uk/evidence/social/behaviour/index.htm
61 www.cpi.cam.ac.uk
62 See www.cumbriaben.com and www.green-business.co.uk for details of these schemes.
63 Full-page advertisement in The Observer travel supplement, 20 Jan 2008
64 The Economics of Aviation: A North West England Perspective, John Whitelegg for CPRE, 2003
65 See for example, National Trust work on future of hill farming and Leader+ Programme; also Hill Farming Matters, briefing 599, RuSource, the rural information network, February 2008 (briefing from a Fells and Dales Leader+ programme and Carnegie UK Trust initiative on sustaining hill farming communities)
66 Climate Change Impact Assessment and Response Strategy: Cumbria High Fells Character Area, Consultation draft, Natural England, April 2008
67 Defra research on ecosystem services is at www.ecosystemservices.org.uk
68 Farming Futures is a collaboration project between the NFU, CLA, Applied Research Forum, Forum for the Future and Defra. www.farmingfutures.co.uk

Annexes

1 List of case studies

Langdale Hotel and Timeshare www.langdale.co.uk
Eskdale biomass West Cumbria Wood Products
Esthwaite Green Link www.egl.org.uk
Outward Bound Ullswater www.outwardbound.org.uk
Sundog Energy www.sundogenergy.co.uk
Mark Brierley, Cycling Development Officer for Cumbria County Council
Foulshaw Moss nature reserve, Cumbria Wildlife Trust www.wildlifetrust.org.uk/cumbria
University of Cumbria www.cumbria.ac.uk
Rod Hughes, architect, ad.hoc associates www.adhoc-associates.co.uk
Elder Grove bed and breakfast, Ambleside www.eldergrove.co.uk

2 List of interviewees

Ian Crosher, Natural England
Jenny Rogers, University of Cumbria
Neil Cumberlidge, Government Office NorthWest
Steve Kempster, Lancaster University
Gill Fenna, Quantum strategy
Colin Nineham, Eden District Council
Martin Varley, Friends of the Lake District
John Gilliland, Defra Rural Climate Change Forum
Claire Chapman, Tourism and Conservation Partnership
John Darlington, National Trust
Vicky Darrall, LDNPA
Ian Stephens, Cumbria Tourism
Jack Ellerby, NorthWest Rural Affairs Forum
Laurence Conway, South Lakeland District Council
Sonny Khan, Maggie Mason and Margaret Sanders, South Lakes Action on Climate Change
Paul Hamblin, English National Park Authorities Association
Nick Jones, Cumbria Futures Forum
Nigel Catterson, Cumbria Futures Forum
Peter Bullard, Cumbria Wildlife Trust
John Barwise, Green Business Forum
Kate Rawles, Outdoor Philosophy / University of Cumbria
Phil Davies, Cumbria Action for Sustainability
Alex McKenzie, Cumbria County Council
Rachel Osborn, Carlisle District Council
Keith Jones, Forestry Commission
Simon Sjenitzer, Cumbria Vision
Paul Needham, Environment Agency
Mark Atherton, North West Development Agency
Jim Lowther and David Horton-Fawkes, Lowther Estates
Geoff Cooper, Adventure and Environmental Awareness

3 Sources of advice and support

Cumbria Action for Sustainability www.cafs.org.uk
Enables community groups, households and businesses to take local action for environmental sustainability in Cumbria.

Cumbria Business Environment Network www.cumbriaben.org.uk
Offers free environmental advice, audits and awards to help businesses.

Carbon Trust www.carbontrust.co.uk
Works with organisations to reduce carbon emissions and develop commercial low carbon technologies.
Offers interest-free loans to companies for energy efficiency improvements.

Cumbria Energy Efficiency Advice Centre www.energyinfo.org.uk.
Provides free, impartial energy efficiency advice to households, and grants for insulation measures.

Tourism and Conservation Partnership www.ourstolookafter.co.uk
Works with tourism and related businesses, encouraging both fundraising for landscape conservation, and the development of environmentally sustainable practices within the industry.

Cumbria Green Business Forum www.cgbf.co.uk
A business network. Members share best practice to improve their environmental performance, and campaign for improvements in environmental services provision across the County.

Lake District National Park Authority Sustainable Development Fund
www.lakedistrict.gov.uk/index/living_in/sustdev_fund.htm
A grant scheme to support projects that combine economic, social and environmental benefits and have positive impact on future generations. Encourages applications from projects addressing climate change.

Voluntary Action Cumbria www.ruralcumbria.org.uk
The Rural Community Council for Cumbria, working with people and communities to improve the quality of life. Offers small grants to community groups.

Act On CO2 www.direct.gov.uk/actonco2
A government campaign offering advice and information on tackling climate change. Includes a carbon calculator which people can use to calculate their carbon footprint.

3 Photography Credits

Charlie Hedley
Cumbria Wildlife Trust
David Willis
Elder Grove
Eskdale YHA
Esthwaite Green Link
Foulshaw Moss
Freshwater Biological Association (FBS), from an original illustration by David Lewins
Friends of the Lake District
Helen Reynolds
James Cook
Karen Barden
LDNPA
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Low-carbon Lake District

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