MoorLIFE: Active blanket bog restoration in the South Pennine Moors

Business Plan

Peak District National Park Authority
and Partners
1. Executive Summary

1.1 Highlights

The EU LIFE+ Programme (2007-2013) provides an exciting opportunity to develop a key area of core conservation activity through the established expertise of the Moors for the Future Partnership team in the restoration of active moorland blanket bog and the enhancement of the vital role blanket bog plays in reducing carbon emissions.

This business plan details proposals for a 5 year Life+ project – ‘MoorLIFE’, that will implement best practice approaches to this particular aspect of moorland management in the South Pennines Special Area of Conservation.

‘MoorLIFE: Active blanket bog restoration in the South Pennine Moors’, was submitted in November 2008 under the Nature theme of the Programme and was approved by the European Commission on 28th July 2009 with a total project value of €6.7 million. The funding will take effect from early 2010 and the project will run for five years, until March 2015.

The scale of this project is extremely impressive and is the largest sum of match-funding (€5.018 million) to be awarded to a project in the UK in the history of the EU Life Programme.

It will afford further prestige to the Moors for the Future partnership’s impressive environmental credentials and will produce considerable benefits for all partners and stakeholders in the wider Peak District.

1.2 Objectives

The project has three key objectives:

- Implementation of best practice to protect the integrity of 1.600 hectares of active blanket bog in the South Pennines Special Area of Conservation
- A landscape scale restoration of blanket bog habitat and comprehensive monitoring of vegetation and hydrology
- Knowledge transfer through delivery of a programme of innovative interactive lifelong learning projects through new and existing media, including a fully interactive website and a series of seminars / conferences

The project will demonstrate its pan-European relevance by its notable contribution to sustainable development on a landscape scale and through full partnership support.
2. Moors for the Future Achievements to date

2.1 The success story so far

The South Pennine Moors SAC forms an extensive area of natural habitat situated at the southern end of the upland spine of England. Surrounded by major conurbations it is a very important green lung providing an area of relative wilderness for many people (almost 16 million people live within a one hour drive of the Peak District National Park) and contributes vital (ecosystem) services - within the SAC the Peak District area alone stores 20 million tonnes of carbon and provides 450 million litres of drinking water every day. The SAC supports one-third of England’s blanket bog habitat (an EU ‘priority’ habitat) and an internationally important assemblage of wildlife. These moorlands lie at the heart of the region that saw the birth of the Industrial Revolution and as a result have long suffered from pollution deposition. They were at the forefront of the right to roam movement in the early to mid-20th century, which led to the creation of the first National Park in Britain. Intense wildfires have characterised the area over centuries and coupled with extensive periods of intensive land management they are, despite their high nature conservation and strong place within the social history of Britain, stressed and degraded. It is because of these factors however, that major ecological restoration would not only significantly improve the condition of the blanket bog vegetation and its value as wildlife habitat but will provide invaluable experience and opportunity in adapting to and mitigating the effects of climate change.

Since 2002, the Moors for the Future has acquired local, regional and national credence in its partnership approach to:

- Moorland restoration at a landscape scale
- Research achievements
- Interpretation of the importance of the moors for mitigating carbon emissions

These achievements have addressed the high levels of visitor pressure, overgrazing, industrial pollution and wildfires which have produced considerable pressure upon this fragile environment. Funding, largely through the Heritage Lottery, has helped to stabilise some 120 hectares of bare and eroding peat within 550 hectares of degraded blanket bog. The work to date has been impressive in reversing the legacy of decline and has paved the way for further intervention in establishing positive moorland management.

Future activity for the Moors for the Future Partnership was captured in the Moors for the Future Project Strategy (2006-11) approved by the Authority in Autumn 2006.

The principal objectives in the Moors for the Future Project Strategy are:

1. To raise awareness and engender a sense of social ownership and responsibility for the moorland landscape
2. To restore and conserve important recreational and natural moorland resources
3. To develop expertise about how to protect and provide a vehicle for sustainable management of moorlands into the future
MoorLIFE contributes to all three of the objectives and encapsulates the primary purposes of the Moors for the Future Partnership.


2.2 Partnership Achievements

Considerable expertise has been developed by the Moors for the Future project team, who have devised and trialled new and successful techniques for restoring blanket bogs at a landscape scale. This work formed, for example, the basis for United Utilities’ SCaMP (Sustainable Catchment Management Programme) project, and has also been used on small scale agri-environment schemes with the National Trust and Yorkshire Water.

In addition to monitoring restoration sites to inform best practice, the Moors for the Future Partnership has commissioned original and pioneering research to identify and inform best practice, and to provide understanding of patterns and processes within moorland systems. The Moors for the Future Partnership is currently writing a moorland restoration manual for Natural England, which is to be developed into a web-based initiative. A Peat Compendium has also been produced which is an interactive and user updateable database and map of UK peatland restoration and management project to encourage communications between peat projects and sharing information, experience and best practice (www.peatlands.org.uk). This site incorporates forums where users can ask questions and for advice for peatland restoration practitioners and managers.

2.3 Links to other Life projects

Regional
There has been a previous LIFE project (LIFE95 NAT/UK/000824 South Pennine Moors - An Integrated Management Strategy and Conservation Action Programme) within the South Pennine Moors SAC north of the National Park. This project brought together statutory and voluntary bodies and the private sector in a wide-ranging partnership, now known as Pennine Prospects. The project tackled the issues of overgrazing by sheep, burning and inappropriate drainage by moor-gripping, through the production of an integrated management strategy and conservation action programme.

National
The Partnership has had a great deal of interaction with UK-based restoration projects and organisations, not least through the ‘Moorland Research’ forum which has been running for the last four years. This includes an annual conference discussing a range of upland issues (most recently climate change in November 2007 and Upland Living Landscapes in November 2008) and an annual research day where scientists, both newly qualified and experienced, were able to present their latest research findings.

Practical and logistical advice and support has also been given to a number of active blanket bog and moorland restoration projects including the current LIFE project “Restoring active blanket bog in the Berwyn and Migneint SACs in Wales” (RSPB) and the Fylingdales Moors fire restoration project (North Yorkshire Moors National Park Authority) - a project that aimed to revegetate 2.4 km² of heather moorland that was devastated by wildfire in 2003.

3. Project Description

3.1. Overview

The objective of this five year project is to restore the integrity of 1600 ha of active blanket bog vegetation that is seriously degraded and other management has failed. The project will
take a landscape scale strategic approach and seek to heal the damaged bog, allowing natural processes to operate again. The emphasis will be on addressing functionally impaired ecological blanket bog complexes, rather than being restricted to ownership boundaries, and on implementing the appropriate package of measures to restore their ecological structure and function rather than a piecemeal approach to restoration. In implementing this work the project will seek to demonstrate the contribution that healthy bogs can make to the delivery of wider ecosystem services such as carbon storage and sequestration as well as water supply and management. Demonstrating the wider benefits of sites in the Natura 2000 network and European Annex 1 Habitats to sustainable development is key to realising the full value of a healthy natural environment to society. To encourage understanding, learning, engagement and involvement the project will also seek to communicate to a wide variety of stakeholders and interested parties through a variety of media and approaches. As well as focussing on the South Pennine Moors SAC the project will seek to highlight the importance of blanket bog restoration to a national and international audience, including the development of a first stop shop for moorland restoration guidance.

Primary threats that MoorLIFE will address

Restoring the blanket bog to good condition through the MoorLIFE project will improve the capacity of the moors to lock up significant amounts of carbon and therefore help combat global warming. Degraded or bare peat soils have been shown to become carbon sources, releasing the stored carbon into the atmosphere and water courses. The most conservative estimate of remaining bare peat within the Dark Peak SSSI by the Moors for the Future Partnership suggests there are still at least 250 ha of bare peat. Bare peat erodes quickly, forming a network of gullies that further exacerbate the drying out the bog. In winter, carbon leaches from the peat into water courses and in summer peat desiccates and simply blows away. In good condition these moors have the capacity to lock up significant amounts of carbon and therefore help counter increasing atmospheric CO₂ concentrations; however, when degraded or bare they become carbon sources, releasing ‘old’, previously inactive carbon into the atmosphere. This is the most critical long-term threat facing the South Pennine Moors SAC.

Required Actions

The immediate actions required are to stabilise eroding peat and reduce erosion, large areas of the South Pennines Moors active blanket bog are under threat from the expansion of areas of active erosion. Work is required to significantly improve the condition of areas of degraded active blanket bog that are often degraded as a result of the impacts from the impaired hydrological/ catchment function of neighbouring areas of bare peat.

Evidence base

In England, the largest and thickest masses of peat are found on the Pennine plateau between 190 and 893m above mean sea-level (Jarvis et al., 1984). The drying out of peat often results in irreversible changes to the physical character of the soil through shrinkage. Drier conditions lead to an acceleration of peat decomposition effected by aerobic decay, resulting in greater compaction of the peat and a decline in permeability (Heathwaite, 1992; Heathwaite, 1993). Primary consolidation, shrinkage, secondary compression and wastage and subsidence further add to the degradation of the surface. If unchecked, accelerated upland erosion through fluvial dissection and sub-aerial processes may result in the complete removal of the peat. Modelling by Durham University shows that if the moors of the Peak District National Park could be restored to pristine moorland, large areas of the Park could be a substantial net sink of carbon rather than a net source.
3.2 Major Project Objectives

The main objective of this five year project is to implement best practice to protect the integrity of 1,600 hectares of active blanket bog, a priority habitat of the EU Birds and Habitats Directive, thereby attracting a grant rate of 75% (instead of the usual 50%) from the Programme. The moors are internationally recognised for their breeding birds and they provide habitat for nationally rare and significant plant communities.

MoorLIFE will implement current best practice to protect active blanket bog by reducing erosion of bare peat, restore a significant area of severely damaged peat bog and deliver an innovative knowledge transfer programme.

These three major objectives of the project are expanded upon below:

1. Implementation of best practice to protect active blanket bog by reducing the erosion of adjacent degraded moorland

The primary aim of the project, and the purpose of points 2 and 3 below, is to protect 1,600 hectares of active blanket bog within these degraded moorlands by implementing current best practice to stabilise areas of bare peat within the active blanket bog mosaic of the South Pennine Moors SAC. Associated gully blocking and diversification works will redress the current levels of peat desiccation and loss and thereby benefit their hydrological functioning. The project work will build resilience into the system to safeguard the site against future damage in a changing climate with increased visitor numbers, where both factors are implicated in increasing frequency of damaging summer wildfires.

This can be quantified by the fact that work to stabilise 186 ha of bare and eroding peat will prevent the loss of some 46,500m³ of peat per year, which equates to approximately 629 tonnes of carbon into the atmosphere per year, an impressive statistic which clearly demonstrates the efficacy of the works in mitigating climate change.

Over the past five years the Moors for the Future Partnership has worked to stabilise 120 ha of bare and eroding peat; considerable expertise has been developed by the project team, who have devised and trialled new and successful techniques for restoring eroding blanket bog at a landscape scale, which has protected a further 550ha of blanket bog. Best practice has been informed from monitoring the success of all capital restoration works and additionally through commission and collaboration with academic institutions on a number of research projects that have sought to assess and develop restoration practices.

This experience now takes the Partnership into a new phase of expertise and provides a showcase for best practice moorland restoration both nationally and internationally.

2. Restoration of 862 hectares of active blanket bog through stabilisation, diversification and gully blocking

The peat bogs of the Peak District and South Pennines have suffered a long history of drainage, inappropriate management and extremely high levels of pollution. The remaining areas in the Bleaklow area of the project for example, have now reached a critical stage and without immediate intervention, they will disappear altogether within the next few years. MoorLIFE will aim to treat 862 hectares of the most badly damaged active blanket bog, of which 186 hectares is bare and eroding peat. This will be stabilised within a treatment area of 587 hectares using grass ‘nurse’ crops, heather brash and geo-textiles. The grasses have the additional effect of moderating local environmental conditions to help facilitate re-colonisation by native vegetation. The techniques Moors for the Future have used have
proven highly effective, with almost 550 hectares of bare peat now covered with vegetation through the Heritage Lottery funded programme referred to above.

The active blanket bog system comprises a dynamic mosaic of vegetation and eroding peat, MoorLIFE aims to stabilise and restore this as a conservation priority as it represents the biggest threat to the active blanket bog. The aim is not simply to stabilise, but to restore ecological function. Restoration work will be supported by undertaking a comprehensive monitoring programme, including surveys of vegetation, carbon flux and hydrology.

Through the MoorLIFE project, the following will be monitored:

1. The success of vegetation establishment and succession within fixed vegetation plots
2. Carbon flux from bare and restored blanket bog at a plot and catchment scale
3. Hydrological monitoring of restoration works (effects on water table)
4. The success of wildfire mitigation work
5. The reach and effectiveness of the knowledge transfer, education and awareness raising work package

### 3. Delivery of a comprehensive knowledge transfer programme of training schemes and lifelong learning projects

The project will undertake a number of supporting projects to mitigate the effects of climate change, wildfire risk and severity to safeguard the active blanket bog. Complementary projects to reduce the risk of wildfire occurrence will also be developed, for example, interactive fire-aware installations at key moorland gateway sites and a series of children’s wildfire-aware ‘computer’ games that provide remote learning. A series of audio-trails and field guides will also be produced focusing on key blanket bog features and conservation issues.

As part of the project a fully interactive website will be maintained from which full project details and all deliverables and results (monitoring and best practice lessons) will be published. The site will provide a ‘first stop shop’ for moorland restoration advice. Two seminars and a conference will be organised during the project that will provide a platform for the direct dissemination of project results and knowledge, facilitating discussion and exchange of experience and interests to a broad range of stakeholders

### 3.3 Partners

The Moorlife project consists of the following partners:

» Natural England
» National Trust
» United Utilities
» Yorkshire Water
» Environment Agency

Partners are described as co-financiers in the Life+ Programme because they contribute financially to the project but are not involved in it’s technical implementation. All partners will be contractually bound to the project by specific agreements with the Authority and in accordance with the regulations of the Life+ Programme.
3.4 Outputs

The principal objectives of MoorLIFE detailed above will deliver impressive outputs across the three strands of activity as outlined below:

- Stabilise and diversify 587 ha of damaged ground (186 ha of bare and eroding peat) within a mosaic of 1,327 hectares of active blanket bog

- Diversify an additional 516 ha of stabilised peat, comprising the planting of 165,000 plug plants and inoculation with sphagnum

- Installation of 4,000 gully blocks along 40 km of gullies

- Establish best practice of plug planting and sphagnum delivery at a landscape scale

- Initiate a wildfire awareness raising programme to reduce the risk and damage caused by fires by the installation of two interactive computer displays at key moorland gateway centres (used by 40,000 people per year) and two children’s ‘fire-aware’ computer games (downloadable; 5,000 downloads of each expected)

- Provide an educational programme on the ecology of blanket bogs, the threats they face, the services they provide and their restoration. This will be via four audio trails (downloadable self-guide walks) and five digital field guides (e.g. plants, animal, restoration techniques) (2000 downloads of each expected)

- Undertake monthly bird surveys over three years of the project and annual water vole surveys to determine the impact of the restoration works on moorland wildlife

- Carry out annual vegetation surveys of 300 fixed vegetation plots to assess restoration success

- Initiate monitoring of carbon flux and hydrological functioning from different blanket bog habitats and conditions within the SAC covering the restored and active areas

- Provide a fully interactive project website where project news, reports, interactive deliverables and all project reports will be published (5,000 hits per month by the end of the project)

- Arrange two seminars and a project conference, attended by 500 delegates in total.

3.5 Communications

This combination of conservation actions, training schemes and innovative interactive lifelong learning projects will help the project work towards safeguarding the wider moorland habitat within the SAC. In order to most effectively and widely communicate about the invaluable ecosystem services active blanket bog provides and the threats it faces, the project
will actively engage with a diverse range of stakeholders, including; gamekeepers, ramblers, researchers and farmers.

The results and lessons learnt within the project will be communicated to a wide variety of interested parties through new and existing media, including the fully interactive website and seminars / conferences referred to above. These communications will extend beyond the South Pennine Moors and form a key resource for the conservation of active blanket bog nationally and internationally.

There is a very important message to be communicated about the enhanced ecosystem services that could be provided by a healthy natural blanket bog system. These might include carbon storage, water quality, flood risk mitigation and a better recreational and tourist experience for people. The understanding of how the Natura 2000 network can contribute to society’s social and economic well-being needs to be better understood. MoorLIFE, through it’s restoration of blanket bogs will provide a very good model to communicate these ideas.

This communications strategy will demonstrate the contribution that active blanket bogs can make to the delivery of wider ecosystem services such as carbon storage and sequestration as well as water supply and management. As well as focussing on the South Pennine Moors SAC the project will seek to highlight the importance of active blanket bog restoration to a national and international audience, including the development of a first stop shop for moorland restoration guidance.

3.6 Public awareness and dissemination of results

The proposed public awareness projects are very much integrated into the project objectives outlined in 3.2 above, underpinning the actions and helping to convey the message, but are separated into three strands to provide clarity for the knowledge transfer element of the MoorLIFE.

A. Putting life back in the South Pennines – the history story
Looking at forces shaping the South Pennines, the first theme examines who and what has lived, worked and played there, and the impact effected by these on the landscape we see today, by providing insight on the following:

- Industrial heritage (this landscape has been worked for thousands of years, and different industries have come and gone)
- The carbon story (the carbon storage capacity of the moors)
- What restoration involves, and who is it for (both people and wildlife). The project will use a mixture of traditional and ‘new’ media to relay these stories; ranging from audio and video podcasts (freely available from the website), to simple ‘field guides’ revealing what the restoration work involves (along similar lines to the Field Studies Council plant and animal ID guides). It is envisaged wireless technology will be utilised, with Bluetooth and GPS playing an important role in providing content to wireless devices

B. Protecting life in the South Pennines – the fire story
This theme examines the way in which the project partners can relay how fire plays a central role in the moorland ecosystem, and the role it has, and will play in shaping its past, present and future. Three initiatives are proposed:

- Face to face interpretation – on-site 'wildfire aware' units touring high-risk moorland areas, shows and schools to promoting education on wildfires
Visitor interpretation at key sites - raising awareness of wildfire risk to visitors at key moorland gateway sites

Remote interpretation – web-based and downloadable interactive features highlighting wildfire risk and suppression

C. Promoting life in the South Pennines – the shared story
Dissemination of the outputs are a vital element of MoorLIFE, and a project website will be used as the primary tool in this delivery. In addition, the provision of a seminar/conference series will complement knowledge transfer between practitioners, policy makers and other relevant professionals.

Options for using the existing Moors for the Future website will be investigated together with wider public platforms and networking sites.

Beyond the basic project information pages, visitors to the website will be able to ‘sign up’ and be in a position to discuss topics, provide knowledge and experience of project areas, through uploading comments, images, videos, audio and other documents. This tier would also allow access to certain project documents that may aid students.

In addition, there will be links to the Moorland Restoration Handbook, which will be updated as the project progresses:

A conference and two seminars will also be held in three of the five project years, drawing international speakers and delegates. These would be broadcast on the web in ‘real-time’ for members of an invite only area of the website or available as ‘enhanced’ podcast downloads, including presentation slides and audio commentary

4. Strategic Context for the Peak District National Park Authority and Partners

The full context of the National Park Management Plan outcomes, relevant National Park Authority and partner corporate objectives/Strategies are given in Annex 1.

4.1 National Park Management Plan 2006 - 11

The MoorLIFE project will contribute to a number of outcomes, specifically:

> Outcome 1 – Biodiversity – dynamic partnerships have achieved outcomes for biodiversity and begun to tackle the challenge of climate change

> Outcome 3 – Natural Beauty – the natural beauty of landscapes means:
There is a clear characterisation of the whole of the landscape and it is conserved and enhanced in accordance with that characterisation

> Outcome 4 – Climate Change and Natural Resources – climate change is being addressed and the natural resources of the National Park are being managed sustainably

> Outcome 8 – Understanding the National Park – there is increased understanding of the special qualities of the PDNP amongst target groups

A fundamental underpinning principle of all of the National Park Authority corporate outcomes concerns addressing the effects of climate change. Corporate Outcomes A1 and 3, E1 and 3 and G1 relating to landscape, biodiversity and promoting understanding are particularly relevant as far as the Moorlife project is concerned. This builds on the fact that at the time of preparing the bid, all were Level 1 Priority Actions.

4.2 National Park Authority Corporate Strategies
The Authority has developed several strategies across its key work areas to deliver the vision of the Management Plan. The following are particularly relevant:

> Landscape Strategy and Action Plan
> Biodiversity Action Plan
> Climate Change Action Plan
> Recreation Strategy

The full context of these strategies can be found in Annex 1.

4.3 Moorlife Partner Strategies on Climate Change

All of the partners in MoorLIFE are committed to tackling climate change and have policies and plans in place which have a proven synergy to the aims and objectives of the project. An outline of the context of these strategies for each partner can be found in Annex 1.

4.4 Regional Context

4.4.1 Regional Development Agencies

The project covers two regional boundaries; East Midlands and Yorkshire. The Regional Development Agencies covering the two regions, emda and Yorkshire Forward have both committed to measures in their respective Regional Economic Strategies to combat climate change and reduce carbon emissions. This emphasises how the challenges that are addressed via the project at a relatively local level are easily transferable to the regional and national agendas. The relationship between MoorLIFE and the RDA agendas is outlined in Annex 1.

> Regional Economic Strategy for the East Midlands 2006 – 2020

Emda has 10 strategic priorities in this document, two of which are particularly relevant to ‘Moorlife’:

- Strategic Priority 5 relating to energy and resources
- Strategic Priority 6 relating to environmental protection, which is particularly relevant to Defra’s PSA Target 3 relating to natural heritage, biodiversity and SSSI condition.

> Integrated Regional Strategy

All of these strategic priorities will be integrated into the umbrella framework of the Integrated Regional Strategy which also encompasses the Regional Spatial Strategy and the Regional Environment Strategy. All of these documents are mutually supportive and reinforcing and provide the context for securing sustainable development across the East Midlands.

> Regional Economic Strategy for Yorkshire and Humber 2006 – 2015

Yorkshire Forward, the Regional Development Agency has three cross-cutting themes (including sustainable development), that underpin everything in the Strategy and how they deliver it. Six objectives are contained in the RES and sustainability underpins them all.
Objective 5 relates to reducing carbon emissions and mitigation of pollution by offset schemes such as enhanced land management.

> **The Regional Spatial Strategy** also emphasises the focus on climate change reduction and how key agencies in the region have a responsibility to protect areas with special environmental designations.

### 4.4.2 Other Regional Initiatives

> **Nottingham Agreement on Climate Change** commits councils and partner organisations to systematically address climate change and to prepare their communities for its impacts. The Peak District National Park Authority recently pledged support to this.

> **Staffordshire OC3** is a change partnership campaigning initiative as part of the required climate change targets under the Staffordshire Local Area Agreement.

> **Humber River Basin Management Plan and the Mersey River Basin Management Plan** cover a diverse area from the uplands of the Peak District and the South Penines including the area covered by the MoorLIFE project to the North York Moors and Cheshire Plain. They include all the tributary headwaters in the Peak District and river valleys of the Trent Mersey and Ouse. A River basin management plan has been prepared and recently published under the Water Framework Directive (WFD) which is the cyclical approach the Environment Agency uses to ensure improvements to water quality and management of the water environment to consistent standards.

### 4.5 National and key external drivers

From the national and international perspective the crucial factors that MoorLIFE will address are:

- Climate change and the possible scenarios for the future based on climate modelling
- Flood risk management and the impact of the Water Framework Directive
- Water quality improvements in drinking water catchments
- PSA target for the improvement of SSSI condition

**Climate Change**

The active blanket bogs in the project area are among the most southerly upland bog landscapes of any significant size in Europe. They have a unique geographical location and any changes to these active blanket bogs as a result of climate change are analogous to what may happen to active blanket bog habitats further north in the UK and across Europe. As such they have a unique function in providing early warning of changes in active blanket bog condition and distribution.

As a result of climate change, the ecological connectivity of habitats is, and will increasingly be, essential to facilitate northerly migration of species. The north-south spatial extent of blanket bog that is now bare peat within the SAC negatively impacts on the connectivity of the active blanket bog habitat. The restoration areas and actions in MoorLIFE will improve the ecological connectivity within both the South Pennine Moors SAC and the South Pennines Moors SPAs. This is a key factor in assessing potential Life+ projects. The essential criteria are:

- Actions that improve the ecological coherence/ connectivity of the Natura 2000 network
Maintain or restore the integrity of a Natura 2000 site

MoorLIFE has demonstrated a match with the aims and ambitions of the Life+ Programme by its potential contribution to the implementation of the Birds and Habitats Directive. It will be a long-term sustainable investment in this protected landscape and have demonstrable European added value.

**Water Framework Directive (WFD) and Flood Risk Management**

There is increasing interest in the role peat restoration work plays in affecting downstream river quality, and will become more important as the WFD impacts further on water management across the European Union.

The Environment Agency, as agents of Defra, have drawn up management plans for river basin districts across England and Wales under the Water Framework Directive which will protect and improve the water environment. These River Basin Management Plans were submitted in September 2009 and will be published in December 2009. The Humber and the North West plans are relevant to the South Pennines. The consultation documents for both plans were responded to by Moors for the Future who reiterated the importance and benefits of moorland restoration to upper catchment and flood risk management in its widest sense. The consultation responses in the Humber plan have acknowledged the inter-relationship between Natura 2000 Protected Areas and water bodies. The aim is to achieve both the required River Basin Management Plan status objectives for each water body as well as the objective for the Natura 2000 Protected Area of Favourable Conservation Status.

The Environment Agency endorsed the Moorlife bid: ‘The Moorlife project supports the aims of the WFD, in particular by improving water quality through reducing sediment input into the river system, and reducing colouration in water abstracted for potable supply hence reducing treatment costs and overall environmental impact. An improved water retention function will also contribute to reducing flooding and improving upland habitats.’

Encouraging water retention in the upland wetlands will delay and weaken peak river flows while augmenting low base flows at times of low rainfall. This will help reduce erosion and alleviate flooding risks. Minor changes in climate or management can result in dramatic changes to flood magnitude and frequency, and water quality from catchments dominated by organic soils (Holden, 2005).

Other relevant documents and initiatives are:

» Climate Change Bill (2008)

» UK Climate Change Indicators Programme (UKCP09)

» European Landscape Convention

» Soil Framework Directive

» Environmental Change Network

The full context of these and their relationship with MoorLIFE outcomes can be found In Annex 1.

4.5.1 How will MoorLIFE reduce it’s carbon footprint?
The whole rationale of the MoorLIFE project underpins attempts to mitigate carbon emissions and this will be embodied in the project actions and activities. The project will take all relevant measures to reduce it’s carbon footprint in it’s restoration work and through the administration and management. The full list of measures can be found in Annex 2.

5. Implementation and Delivery

5.1 MoorLIFE Operational Area

The project area is within the South Pennine Moors Special Area of Conservation and is a significant water catchment for the North and Midlands of England for two of the partners in MoorLIFE – United Utilities and Yorkshire Water. The Bleaklow plateau is owned by the National Trust and is a popular area for informal recreation, the principal uses are extensive sheep production and grouse shooting. Two of the sites are located in the National Park: (Bleaklow Plateau and Black Hill), whilst the remaining two sites are located to the north of the National Park boundary at Rishworth Moor and Turley Stones.

Delivery

Steering

The implementation of Moorlife will be overseen by representatives of the partners in the project and will link closely with the Moors for the Future Strategic Management Group.

Staffing

Delivery will be by seven additional members of staff in the Moors for the Future team who will be employed specifically for the project on a fixed-term basis and will represent an additional cost to the partnership funding profile.

Overall project management will be the responsibility of the MoorLIFE Project Manager whilst management of the stabilisation and restoration works will be undertaken by a Works Officer. Project management of the supporting work (including monitoring) will be overseen by the MoorLIFE Monitoring Officer. There will also be a Conservation Contracts Manager to supervise works and a Project administrator who will undertake financial management and grant drawdown.

These members of staff will be charged against the project at a grant rate of 75% and are subject to specific rules under the Life+ Programme (i.e they must be charged to the project and justified by timesheets etc).

Contracting/Suppliers

The team will enter into contracts with specialist contractors and project delivery agreements with partners as co-financiers to deliver the areas of work within the three project themes (outlined at Section 3).

5.2 Project Management and Reporting

Project management structures and mechanisms will underpin the implementation of the entire project

MoorLIFE will have a specific project manager in post for the duration of the project who will be responsible to the Moors for the Future Programme Manager; There will be regular reporting to the Head of Field Services and the Director of Operations on the overall progress of the project together with reports to Services Committee as appropriate. Project reporting continuity and correlation is ensured as a key Member on Services Committee is also the Chair of the Moors for the Future Partnership.
An organisational flow chart at Annex 4 shows the relationship between staff employed for ‘MoorLIFE’ and the rest of the Moors for the Future team.

Life funding has strict requirements relating to regular review and reporting. Three technical reports on progress are required throughout the 5 year term of the project which includes a strong element of monitoring and evaluation. Dissemination of the achievements of the project in its latter stages to a wide range of audiences is also obligatory.

### 5.4 Grant Payment and Cash Flow

The longevity and scale of the project has implications for the cash flow position of the Authority which are addressed below. The grant payment draw-down schedule is as follows:

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<thead>
<tr>
<th>Grant Payment</th>
<th>%</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grant Payment 1</td>
<td>40%</td>
<td>Paid within 45 days of signing grant agreement</td>
</tr>
<tr>
<td>Grant Payment 2</td>
<td>30%</td>
<td>Paid subject to 150% of first payment being consumed, approval of mid-term technical report and statement of income/expenditure</td>
</tr>
<tr>
<td>Grant Payment 3</td>
<td>30%</td>
<td>Paid subject to approval of final technical report and statement of income/expenditure</td>
</tr>
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A detailed summary on the likely cash flow of the project over the 5 year period is at Annex 5, however the scale of the project and the potential variances to the year-on-year budget mitigate against absolute accuracy at the outset of the project. Whilst the risks associated with MoorLIFE are analysed (Section 6.1), the following elements are key areas of risk management:

**Financial**
- Partners may need work carrying out on site at different times to the work programme which will affect the financial profile of Annex 5. For example, some of the works may proceed ahead of the profile if they are ‘front-loaded’ and not carried out strictly in accordance with the anticipated work programme.
- The cash flow will be affected by differences in the work programme as partner payment for works may well not coincide with the Authority being reimbursed as financial managers of the project. (This is addressed in the risks analysis in section 6.1).
- Exchange rate fluctuations may well affect cash flow as the amounts claimed and reimbursed by the EU are in Euros. The exchange rate in any one calendar year is determined by the rate which is applied by the European Central Bank on the first working day of the year in which the expenditure is paid. A currency strategy (Section 5.5) giving parameters and coping mechanisms to deal with fluctuations in the exchange rates between the two currencies has been developed by National Park Authority officers and is presented below.
- The currency strategy encompasses the potential for expenditure reduction in order to save costs should adverse exchange rate scenarios occur. This is explored more fully alongside the currency strategy at Section 5.6.

**Technical**
Many of the project actions are weather dependent, which could affect site works and consequent payment for them. Availability of material and contractors to carry out restoration works may affect work, and consequently payments.

5.5 Currency Strategy

The Authority recognised that the sterling:euro exchange rate was one of the key economic factors which would need to be carefully monitored and managed during the duration of the project, with a view to ensuring that the Authority is able to cope with the risks which may attach to any significant variations in the euro:sterling exchange rate over the duration of the project.

Contribution of Partners

The co-financiers’ contributions are set out in the contract and are defined as annual contributions payable in sterling at the euro:sterling exchange rate which prevailed on the application date; they will not therefore share the risks or rewards of any exchange rate movements.

Sensitivity of the Project to exchange rate risk

The Sterling:Euro exchange rate has been very volatile over the last 5 years with fluctuations from the application rate (1.1627) of –10% to +30% (1.02 – 1.5). Currently the outlook for sterling suggests short term weakness at least up to the important mid February 2010 date when 40% of the grant becomes payable. Assuming that the sterling expenditure of the project remains at the application level, which is costed to achieve the required outputs, modelling possible exchange rate fluctuations leads to the following conclusions:-

- A weak sterling rate in mid February 2010 is beneficial to the project.
- Sterling remaining weak or weaker during the project (below 1.1627) minimises risk in the project although it does affect the eligible expenditure in euros and will lead to a subsequent reduction in grant level.
- A strong sterling rate in mid February 2010 and a rising rate causes more problems as the grant level is capped. If the exchange rate remains at the average 5 year rate (1.37) the potential deficit is £250,000.
- A rate at the higher level (1.5) would yield a deficit of over £600,000.

Mitigation Actions

Parameters within which the Authority is able to underwrite exchange rate movements.

- The likely position on the exchange rate at February 2010 suggests that the Authority should be able to proceed with the project within the overall budget if the exchange rate remains below the application rate of 1.1627.
- If sterling becomes stronger at or about the current 5 year average rate (1.37) then the sterling expenditure on the project overall will need to be adjusted by £250,000 or 4.3% of gross expenditure, whilst maintaining the stated outputs.
- If sterling becomes stronger at or about the current highest level (1.5) there will be a need to adjust sterling expenditure on the project overall by up to £600,000 or 10% of...
These adjustments will be made to forward budgets as the exchange rate position becomes known in February 2010 and will be monitored at six monthly intervals.

Parameters within which the Authority is not able to underwrite exchange rate movements

- The history of the Euro: Sterling exchange rate since 1999 shows that sterling was very strong relatively against the Euro up to 2003 (about 1.75), and there is a risk that if these levels are repeated starting from February 2010 the Authority may not be able to respond with a further reduction in sterling expenditure as the outputs are likely to be affected. Such a risk will be substantially removed if the February 2010 rate remains low.

5.6 Expenditure Strategies

The primary aim of the MoorLIFE project is the restoration of bare peat. This is undertaken as a series of works:

1. Application of heather brash;
2. Application of geo-textiles;
3. Application of lime, seed and fertiliser;
4. Application of heather seed;
5. Planting of plug plants.

It is possible to reduce the cost of these works by stringent planning at each stage but does not imply that these are unnecessary expenses which should be cut anyway. Each bag of brash or cut of jute may prevent an area of restoration from failing and they should be used when possible. The process outlined above is expensive - as much money as possible should be spent to minimise the chances of small areas failing, which may require further interventions at a later date. If additional funds are available, the amount of brash or geo-textiles could be increased.

The following demonstrates the savings that could be made without significantly reducing the area to be treated, which is how the works previously undertaken on Bleaklow and Black Hill were carried out.

Mitigation Actions

Woodhead site 4 – A case study on expenditure rationalisation

Woodhead 4 is one of 12 sites on Bleaklow. It is one of the smaller sites but the following rationalisation could be undertaken for any of the sites. There will be smaller gains on some sites and significantly larger gains on others. These gains are predominantly from the purchase of materials and services, reducing the amount purchased will not reduce the amount of work required by the MoorLIFE team and consequently will not reduce the staffing requirements.

Heather brash and geo-textiles

Application of heather brash and geo-textiles will allow the biggest saving in roughly the same way:

1 bag of heather brash will cover approximately 64m$^2$ of bare peat. By spreading a bag slightly further, covering 73m$^2$ of bare peat, the number of bags required would be reduced by
13%. In addition, by looking in more depth at the aerial images of the site, it is possible to cut the number of bags required. For example: on Woodhead site 4 (shown below), the amount of bare peat requiring brash has been cut from 4.23 hectares (a cost of £26,650) to 2.43 hectares (a cost of £14,435). The area to be covered by geo-jute has also been reduced from 3.574 hectares (a cost of £33,020) to 2.24 hectares (a cost of £20,672).

- The black squares represent the areas that would benefit from brash, which are included in the MoorLIFE calculations.
- The red squares represent those which could be done if funds were reduced.
- The blue lines represent the gullies that are proposed for treatment with geo-textiles in the MoorLIFE calculations.
- The dotted green lines represent those which could be done if funds were reduced.

Nurse crop
Establishment of nurse grasses through the application of lime, seed and fertiliser cannot be significantly reduced without reducing the area to be treated or impacting on the effectiveness of the treatment. However, the cost of treatments to be undertaken could be reduced by:
1. reducing the amount of lime applied (e.g. 900kg/ha rather than 1000kg/ha);
2. reducing the amount of fertiliser applied (2 applications rather than 3).
These would again increase the likelihood of failure of some small areas but would not significantly impact on the success of the project as a whole.

Plug plants
In an ideal situation, 3 plants per metre$^2$ of bare peat would be planted, which would be extremely expensive (approximately £60,000 per hectare). MoorLIFE proposes 1/12 plant per metre$^2$ of bare peat, which is a reasonable compromise (cost £1600 per hectare). Again, by further fine-tuning the targeting of areas to be treated by accurately surveying them, this could be reduced further (using the figures above from 7.8 hectares (£12,486) to 4.67 hectares (£7472)).
Additional cost savings
Cost savings could be made throughout the project by refining operations, for example, if seed is applied unprilled (which is possible), the cost to prill seed could be removed (approximately £250 per hectare) and the costs for separate application of heather seed, which could be applied with the unprilled grass seed.

From the above workings, the immediate costs for undertaking this work on Woodhead 4 could be reduced, as a minimum (excluding efficiencies) as follows:

<table>
<thead>
<tr>
<th>Operation</th>
<th>Bid calculations</th>
<th>Revised calculations</th>
<th>Percentage change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Area</td>
<td>Cost</td>
<td>Area</td>
</tr>
<tr>
<td>Heather brash application</td>
<td>4.23ha</td>
<td>£26,650</td>
<td>2.43ha</td>
</tr>
<tr>
<td>Geo-jute application</td>
<td>3.574ha</td>
<td>£33,020</td>
<td>2.24ha</td>
</tr>
<tr>
<td>Nurse crop establishment</td>
<td>12.9ha</td>
<td>£11,567</td>
<td>12.9ha</td>
</tr>
<tr>
<td>Plug planting</td>
<td>7.8ha</td>
<td>£12,486</td>
<td>4.67ha</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>£72,156</td>
<td></td>
</tr>
</tbody>
</table>

These do not reflect the overheads of the project as a whole but this would be possible for all of the sites within the MoorLIFE project, if the significant currency fluctuations modelled were to happen.

6. Risk analysis

6.1 Risk Assessment and Management

The MoorLIFE project will confer a number of significant legal, financial and administrative obligations upon the Authority as applicant and lead partner. The Authority will be legally responsible for delivery and performance of the entire project.

Annex 3 contains a document entitled ‘Common Provisions’ which describes all procedural matters associated with the project and governs the relationship between the Authority and the European Union, and the Authority and co-financing partners. The Common Provisions are the obligations and commitments the Authority will be accepting and, as such will be annexed to the main Grant Agreement with the EU and to the individual contracts we will have with each co-financing partner.

Below is a summary of the principal financial, technical and reputational risks and. (The full range of financial and legal obligations is given in the full Common Provisions document at Annex 3).

6.1.2 Legal and Financial

- The Authority would be legally and financially responsible for the implementation of the project and act as single point of contact with the European Commission
- The Authority would receive the grant and ensure it is distributed as specified in the partner agreements. Progress and technical activity reports are also the responsibility of the Authority
the dissemination of the project results

- Cash contributions are required as detailed in the project funding below
- If a partner reduces their contribution, it is incumbent on the applicant, in agreement with partners to find the necessary resources to ensure correct implementation of the project. There is no possibility of the grant rate being increased by the European Commission
- As only three payments are made during a project that should last 5 years, cash flow issues need careful consideration. This has been discussed with the Head of Finance (and Chief Finance Officer) who finds this position acceptable subject to any interest receipts arising from early payment of the grant being ring-fenced and set against any adverse conditions in future years, together with the clarification from the grant body of one of the grant provisions, which requires a declaration of any interest yield to be declared to the funders and recovered. Possible fluctuations in the exchange rates between the two currencies is covered in the currency strategy described above which sets out the parameters within which the Authority is able to underwrite smaller fluctuations in the currency rates or tailor the work programme to suit a less favourable exchange rate environment. A cost saving strategy is also described at Section 5.6 which allows for a certain ‘re-modelling’ of the works to suit differing financial environments. The cash flow forecast (subject to the caveats in Section 5.4) is provided at Annex 5
- This is a major contractual commitment under which the Authority would be legally bound to deliver the project outcomes. There are also specific rules regarding any amendments to the principal Grant Agreement
- There are stringent regulations regarding publicity of the project and its results together with the set up of a project website

**Probability and mitigation actions**

The above legal and financial obligations are ones that the Authority has extensive experience of, and has an excellent track record in, the management of European, Government and regional funded projects. This experience minimises the probability of maladministration or poor performance. The Moors for the Future team have previously successfully undertaken a large-scale restoration programme which was delivered on time and on budget through the Heritage Lottery Fund. They also have the support of other experienced and multi-disciplined staff if required. Strong project management and regular reporting systems are in place to ensure the project delivers in accordance with the Life+ Programme regulations; under this regime correctional action will be taken in the event of any element of the project under-performing.

**The specific mitigation actions relating to the currency and cost savings strategies are explored in full above (Sections 5.5 and 5.6).**

**6.1.3 Technical**

N. B. Each technical risk is described with an associated mitigating action

- Heather brash supply. The most significant issue for the successful delivery of this project within the timescales proposed is the supply of heather brash. It is important that heather brash is applied during year 1 of the restoration of a site, prior to the application of lime, seed and fertiliser. Heather brash is a finite product on an annual basis and so supply of heather brash has been split over two years. There is no risk associated with delivery of the project with two Year 1s (i.e. some sites will start in year 2 of the project)
illed labour. To pre-empt the possibility that there maybe shortage of skilled labour for implementing some of the works, particularly for gully/ grip blocking and helicopter application of lime and fertiliser, it is intended that contractor training days will be offered, which will be used to increase the availability of skilled labour for this and other projects as part of the knowledge transfer section of the proposal

- Poor harvesting year and locally sourced seed. All locally sourced seed (heathers, wavy-hair grass) is subject to availability. It will always be possible to source local wavy-hair grass, although the cost will vary depending on the season. However, it may not be possible to source sufficient heather seed to seed all the desired sites in one year. As this seed is sown into a developing sward, availability is less critical. To overcome this all tenders for the supply of locally sourced seed will be released in good time for collection

- Loss of key personnel. In order to mitigate the risk of this factor, a detailed project delivery plan has been produced. Responsibility for delivery of each stream within the project will rest with more than one person, mitigating the risk of personnel changes

- Burning of restored areas. There is the potential for all of the restoration work, particularly those areas using heather brash and timber dams to burn if wildfires occur at the wrong time. Mitigating this risk is the basis of the Theme 3 projects, all sites within the Peak District are covered by the workings of the Fire Operations Group and Fire Watch and this has been extended into the South Pennines

- Failure of nurse crop. This is weather dependant but will be overcome by the application of heather brash and geo-jute to nurse crops at the start of the project. Animal disease outbreak - a repeat of the foot-and-mouth epidemic that swept through the UK in 2001, or an outbreak of another serious livestock disease – could make it difficult or impossible to gain access to the project sites. However, strict controls have been put in place throughout the UK to prevent another outbreak of foot-and-mouth, and the probability that the project will be impacted by disease is extremely low.

- Impact of the global economic crisis and its impact on fuel and materials - costs for many items required for restoration have risen significantly in the last twelve months (e.g. aviation fuel, N:P:K fertilisers, transportation costs). To overcome this, all works will be timed to overcome seasonal variations in commodities, for example, fertiliser costs can be reduced by purchasing at low points in the fertiliser supply cycle and prices will be monitored to ensure that items are bought at the best possible time

- Lack of support from neighbouring landowners has also been analysed and addressed. Although the proposed practical management actions will take place on land under the project partners’ control, concerted opposition from neighbouring landowners/tenants and/or the general public could make it difficult to implement these actions. Moreover, efforts to promote blanket bog restoration more widely will be adversely affected if support is lacking from local people. However, the Moors for the Future Project has been working in this area for some time and has developed strong links between the project partners and local people. Based on previous experiences in the area, the project has confidence that it will gain the support of the local communities and that any objections that do arise will be overcome. A wide
range of actions will be carried out to improve understanding of the project and build support for it, both locally and more widely.

6.1.4 Reputational

The proposed grant of over €5million from the Life+ Programme is the largest a UK project has been awarded and as such, will be the focus of considerable attention from government – regional and national, environmental organisations and networks, and research bodies. The media focus will also be very apparent – this attention places a certain pressure on the Authority, and it’s ability to deliver an effective project will come under close scrutiny. This risk to the Authority’s reputation for project delivery means that effective project management and monitoring of MoorLIFE together is essential. This must also be supported by corrective action as required to ensure project performance is robust and successful.

Probability and mitigation actions

The specific EU regulations concerning reporting and monitoring of projects provides an effective framework for problem mitigation. This is further underpinned by the NPA’s approach to reporting and risk management.

A strong reporting line will be established as a specific project manager will be appointed for MoorLIFE who will report directly to the Moors for the Future Programme Manager. Regular reporting and monitoring is then carried through to the Strategic Management Group of Moors for the Future and ultimately the Services Committee of the NPA. The Authority has it’s own monitoring and performance framework which includes effective risk management procedures under which MoorLIFE will be scrutinised.

7. Financial Management

As applicant, the Authority will manage the project finances through its usual financial services and management systems. The Authority is very experienced in successfully managing and delivering large European-funded projects and is fully aware of the particular EU requirements relating to audit, document retention and publicity.

The Head of Finance is also conversant with the particular requirements of the Common Provisions (Annex 3).

8. Project Funding

<table>
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<tr>
<th>Partner Funds</th>
<th>2010/11 (£s)</th>
<th>2011/12 (£s)</th>
<th>2012/13 (£s)</th>
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National Trust 41,802 41,800 41,800 41,800 41,800 209,002  
Environment Agency 17,600 17,600 17,600 17,600 17,600 88,000  
Life+ INCOME 1,733,868 1,300,402 1,300,402 4,334,670  
TOTALS 2,023,006 289,136 289,136 1,589,536 1,589,527 5,780,341  
Project Expenditure  
Personnel 164,610 172,965 181,321 154,582 162,102 835,580  
Travel 10,766 12,008 12,788 12,732 9,724 58,018  
External Assistance 9,036 83,584 1,088,858 704,820 372,744 2,259,042  
Equipment 97,839 97,839  
Consumables 9,132 84,480 1,100,548 712,384 376,740 2,283,284  
Overheads 34,056 35,784 37,513 31,981 33,536 172,870  
TOTALS 325,439 388,821 2,421,028 1,616,499 2,070,400 5,706,633  

A full breakdown on likely cash flow during the term of the project is given at Annex 5

9. PDNPA Costs

The National Park Authority contribution of c £4,748 shown above is part of and not additional to the current commitment to Moors for the Future of £82K p.a.

The MoorLIFE project will be delivered by the Partnership, specifically supported by the co-financiers contributing towards the cost of the staff. This co-financing supplements the National Park Authority contribution and makes it significantly greater than the minimum requirement of personnel costs plus 2% which is stipulated by the LIFE Programme. This explains the relatively modest contribution of the National Park Authority who will be legally and financially responsible for project implementation.

10. Exit Strategy

The Moorlife project will be completed in 2015 and is therefore a relatively long-term commitment for the Authority and its partners. In terms of an exit strategy, this long-term perspective becomes increasingly difficult to portray. The future of restoration initiatives such as these are largely outside the control of the Authority. Much will depend on future legislation covering SSSI management, PSA targets and agri-environment payments and as such cannot be predicted with any degree of accuracy. However, with evidence of the increasing importance of the role the blanket bogs play in carbon capture and catchment management, it would seem unlikely the potential this has for tackling climate change will be reflected in a lesser way in regional and Government priorities.

The whole area is an important drinking water catchment, and it is now fully recognised that good conservation management of blanket bog will produce cleaner water in the future. The water companies and the Environment Agency, our partners in MoorLIFE, will be working to promote the protection of blanket bog for this purpose which will further optimise conditions for biodiversity. The increasing impacts of the Water and Soil Framework Directives will also help influence further positive land management.

MoorLIFE will firmly establish best practice principles in moorland restoration which will be incorporated into the Natural England ‘Moorland Restoration Manual’, allowing practitioners access to cutting edge information developed and tested by MoorLIFE, producing a lasting legacy of environmental excellence for future generations.

It is anticipated that a more detailed exit strategy will be developed in years 3 and 4 in context of changing priorities for the Government, EU legislation, the Authority and our partners.