LIFE08 NAT/UK/00202

FINAL Report
Covering the project activities from 01/04/2010 to 31/08/2015

01/09/2015
MoorLIFE

Project location	South Pennines Moors SAC	
Project start date:	01/04/2010	
Project end date:	30/04/2015	Extension date: 31/08/2015
Total Project duration	64 months	(including extension of 4 months)
Total budget	€6,690,856	
Total eligible budget	€6,690,856	
EU contribution:	€5,018,142	
(%) of total costs	75%	
(%) of eligible costs	75%	

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List of abbreviations

CDM	Construction (Design and Management)
Defra	Department for Environment, Food and Rural Affairs
DWSZ	Drinking Water Safeguard Zones
EC	European Commission
FSC	Field Studies Council
GHG	Greenhouse Gas
HLS	Higher Level Stewardship
IPENS	Improvement Programme for England's Natura 2000 Sites
MAVIS	Modular Analysis of Vegetation Information System
MFFP	Moors for the Future Partnership
NECPP	Natural England Conservation Plan Project
PDNPA	Peak District National Park Authority
RDPE	Rural Development Plan for England
RSPB	Royal Society for the Protection of Birds
SAC	Special Area of Conservation
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
TAG	Technical Advisory Group
WFD	Water Framework Directive

1. Executive Summary

The MoorLIFE project is based in the South Pennine Special Area of Conservation, designated largely due to its importance as a blanket bog habitat. These blanket bogs have suffered significant levels of historical pollution and visitor pressure, and as such many areas of the blanket bog were severely degraded, forming a mosaic of vegetation – often dominated by cotton grass and heather – surrounded by large areas of bare peat.

The bare peat is easily eroded, and the expansion of these areas is one of the single biggest threats to the remaining vegetation. As such, the primary aim of the project is to protect 2,500 ha of active blanket bog by stabilising the surrounding areas of bare peat. Other aims of the project include protecting these conservation efforts through wildfire mitigation actions and developing knowledge and understanding which can be shared with practitioners and policy makers.

The works undertaken through the MoorLIFE project are broadly split up into three strands:

1. Conservation works (C actions)
2. Monitoring works and project management (E actions)
3. Communication and dissemination actions (D actions)

1.1 Conservation works

During the five-year project conservation works were carried out, with three aims and objectives, as follows:

1.1.1 Stabilisation (Actions C1a and C1b)

This action aims to stabilise bare peat using nurse grasses and applying heather brash and geotextile. The brash and geotextiles create conditions on the peat substrate that provide a structure for amenity grasses to grow through, securing the surface of the peat.

Over the course of the project 863 ha was treated with lime, seed and fertiliser and 103 ha was covered with brash. 53 km of geotextiles were laid. This action has proved very successful, with monitoring showing that the reduction of peat on treatment sites was between 90-99%.

1.1.2 Diversification (Actions C2a and C2c)

The aim of this action is to improve diversification through planting plug plants, and spreading *Sphagnum* mosses. These actions will help diversify the plant communities on site towards more typical blanket bog assemblages when the nurse crop applied as part of the lime, seed and fertiliser programme dies off. In the case of *Sphagnum* mosses, these are crucial to create blanket bogs that are actively accumulating peat.

Between 2012 and 2015, 197,955 plants were planted of native species. These plants were propagated from plants taken within the Dark Peak SSSI, from above 450 metres. 30,235 litres of *Sphagnum* beads were applied, 33,750 *Sphagnum* plug plants and 950 litres of *Sphagnum* ‘slime’ covering an area of 871 ha.

Vegetation monitoring shows that the plant communities are becoming more diversified, with all quadrats showing at least one indicator blanket bog species. The results from the

Sphagnum spreading are yet to be seen. This is because the small fragments of the *Sphagnum* in the propagules used are expected to take a significant amount of time to establish. In 2015, new methods for introducing *Sphagnum* were explored – including the use of *Sphagnum* plug plants and larger *Sphagnum* fragments in a 'slime'. As these methods were trialled in 2015 no results are available about their relative success rates; however initial studies indicate high survival rates for the plug plants.

1.1.3 Improving hydrology (Action C3)

Erosion channels (gullies) in the peat are blocked to capture peat and to help raise the water table, locally restoring hydrological integrity.

3,970 dams were built on Bleaklow. Proxy monitoring from other blocked gullies on Bleaklow show that 100% of dams hold water, and 82% are holding back peat.

1.2 Monitoring works

During the course of the project annual vegetation and water table and quality surveys took place in order that the conservation works could be assessed. The sites picked for monitoring included bare peat reference sites which were not treated, treatment sites and previously re-vegetated areas. There were two predominant strands of monitoring, as follows.

1.2.1 Vegetation monitoring (E2)

An annual programme of monitoring was carried out every summer to establish the success of vegetation establishment and succession. The annual programme included the surveying of 276 fixed quadrats (2m x 2m) across all sites. Baseline transect surveys were also undertaken on sites treated with *Sphagnum* beads.

1.2.2 Monitoring changes to the water table and carbon budget of restored blanket (E3)

An annual programme of water table and water quality monitoring was carried out every winter to establish the impact of works on the water table and water quality. 390 manual dipwells on 26 sites were monitored to provide data on spatial changes in water table, and measurements from 26 automated dipwells were taken to determine the temporal changes on sites.

Water samples were also taken every year and these were used to measure the amount of dissolved organic carbon and particulate organic carbon. These measurements were used to determine the impact of works on water quality.

Unfortunately, the peat pins established at the beginning of the project failed as they were very susceptible to frost heave and disruption from members of the public.

1.2.3 Carbon audit of the project (E5)

The main conservation works undertaken as part of the project were analysed to determine the carbon 'cost' of the main restoration actions. These were then assessed against the estimated carbon benefit of the works. The total greenhouse gas (GHG) emissions from the project were calculated as 604 kg CO_2e/ha. The carbon benefit of the conservation works was estimated to

be 4.48 tonnes CO_2e/ha/year. Overall, the results suggested that two years following revegetation, the magnitude of the avoided loss of carbon from areas of bare peat will be 37 times that of the GHG emissions produced through undertaking the work.

1.3 Dissemination and communication actions

The dissemination works were split up into four main areas which were carried out across the five years of the project. The main aim of the dissemination and communication actions was to promote the project and improve knowledge and understanding.

1.3.1 Fundamental Project Communications (D1)

Fundamental project communications included the establishment of a website, installation of works and information boards at restoration sites, a launch event, promotional video, media events, promotional material, educational material and a layman's report. The aim of the communication work was to engage with the public, land owners and managers, policy makers and researchers to maximise impact, effectiveness and delivery of the concrete conservation actions.

Engagement with the public was seen as especially critical as the Peak District National Park as it is one of the most visited Parks in the world and so raising awareness of this fragile habitat was critical to protect the restoration sites.

All activities were completed over the course of the project, and resulted in some significant media coverage including:

- 28 press and targeted news releases, generating items in local and national press, including New Scientist and TGO magazine.
- media coverage on at least 133 occasions, at local, national and international level. (Figures are based on coverage we have seen and recorded.)
- broadcast coverage (radio and television) on 27 occasions, including an entire episode of the environmental documentary, Earthrise, shown on global news network Al Jazeera as well as items on national television including BBC Countryfile and BBC Newsround.
- 12 feature articles in lifestyle magazines (like Derbyshire Life)
- 90 stories/features through various blogs, newsletters and special interest websites like Grough and Peak Walker.

Furthermore, the team gave 40 talks over the five years at conferences and events. The team also represented MoorLIFE in the *Sphagnum* Technical Advisory Group, the Upland Hydrology Group and the Catchment Area Group – all important groups in the South Pennines for steering policy.

A promotional video has been produced to explain the importance and benefits of the project in an easily digestible short format. The video includes aerial footage of project sites to show the scope and scale of the project. It is widely used in dissemination activities.

A layman's guide to the project has been produced as a celebration of the successful conclusion of the project. It is available online, as a download, and in print.

1.3.2 The History Story (D2)

The aim of this action was to tell the story of blanket bogs of the South Pennines Moors during its lifetime; including cultural heritage, threats past, present and future, ecosystem services and restoration. This action was completed by producing a range of podcasts, audio trails and field guide apps for mobile devices. All the outputs were designed to explain why the conservation works were taking place, and to help people understand the moors better.

Overall, 26 podcasts were produced highlighting all aspects of the work. This included podcasts produced through the Be Fire Aware work, as well as four flyover footage podcasts that were created alongside the promotional video. The podcasts have had 2,822 views over the course of the project.

Four audio trails were produced for each of the project sites. These have had 1,223 views.

Four field guide apps were created for mobile phones covering mosses and *Sphagnum* (MoorMOSS), moorland plants (MoorPLANTS), moorland wildlife (MoorWILD) and landscape features on the moors (MoorSIGHTS). All of the apps included information about the conservation works taking place through the project. The apps were launched in 2015, and were well-received with 2,700 downloads in six months.

1.3.3 Fire Story (D3)

The aim of this action was to raise visitor awareness of the risk, causes and damage from moorland wildfires. The objective of this work was to safeguard the future of the restoration sites within the project as well as on other moorlands. This was done by producing interactive computer installations for visitor centres that included two games for children and families, an interactive map and a real-time fire risk tool that uses live weather data to predict the fire risk across the Peak District National Park. The games and interactive map are available online, and a version of the fire risk map has also been created for the Fire Operations Group that they can take out to events to educate people about the fire risk for any particular day.

The real-time fire risk map is the first of its kind and was conceived and created by the project. The map takes weather data from on-site weather stations and uses the scientific models and mapping developed by the University of Manchester to predict wildfire risk in the Peak District National Park. The Fire Risk Map combines all the data to produce a real-time fire risk map, showing how the risk of a fire varies across Peak District moorland. Visitors can explore the map to learn how time of year, weather and access (by road or footpath) affects the risk of a moorland wildfire.

This tool, along with the games and interactive map is available on computer touch-screen displays at the Upper Derwent Visitor Centre and the Moorland Centre in Edale with combined visitor numbers of around 80,000 people per year.

1.3.4 Promoting LIFE – the shared story (D4)

The aim of this work was to disseminate project outputs through the website, social media, seminars and conferences to share knowledge of the issues tackled through the project. These actions would aim to raise the profile of the project and also help share lessons learnt with conservation practitioners and scientists.

The following conferences and seminars were held over the course of the project. They were attended by organisations including universities, statutory bodies, conservation bodies, charities and industry. Every event had between 80-130 attendees.

- Conserving moorland biodiversity: what does the future hold? 15 -16 November 2010: This conference was held to celebrate the start of the MoorLIFE project and 2010 International Year of Biodiversity and reviewed state of knowledge and knowledge gaps and delivery of conservation and ecosystem services.
- Seminar - *Sphagnum* Reintroduction in Practice, 11 June 2014: This seminar focused on what methods are currently being used, and what research is in place to support *Sphagnum* reintroduction.
- An Integrated Approach to Upland Biodiversity Conservation, 3-4 March 2015: This conference disseminated results of the MoorLIFE project, and took a look at the vision for the future of upland conservation.

The Facebook page and Twitter account are well-positioned to create a 'hub' for discussion around key events, and we have found that people are sharing their experiences and learning using these tools. Social media has been particularly useful for disseminating information to a technical audience as many of our peers and stakeholders are followers on Twitter. As a result, our tweets get disseminated through their networks as retweets.

1.4 Project administration

The project was delivered in accordance with the Common Provisions and Standing Orders of the Peak District National Park Authority. The project's end date was extended from 31 April 2015 to 31 August 2015. This was formally requested and approved by the EU Commission on 8 April 2015.

The project cost €6,533,178.59, with a final claim to the EU for €1,321,493.30.

1.5 Final report

The final report consists of the following sections.

1. Introduction: Summarises the objectives and expected outcomes of the project.
2. Administrative section: Details how the project was managed, administered and organised, and key stages to the project.
3. Evaluation of management system: Outlines how the project was managed as part of a programme of works and overall responsibility for the project.
4. Technical part: Outlines each action with details on targets, outcomes, project management and any modifications to the action. Information about complementary actions outside of LIFE and the continuation of works after LIFE are included in two separate sections after the conservation section (C actions) and monitoring section (E actions).
5. Dissemination part: Communication actions are included in this part of the report which details targets, outcomes, project management and modifications to the actions. Information is also included on complementary actions outside of LIFE and the continuation of works after LIFE for communication actions.
6. Evaluation of project implementation: This section evaluates the successes and failures of the methodology applied, and reviews the cost-benefit of the main conservation and dissemination actions.

7. Analysis of long-term benefits: This section looks at the long-term benefits from the project.
8. Comments on the final report: Outline of the accounting system used, costs incurred, final financial claim and an allocation of costs per action.

2. Introduction

2.1 Objectives

The upland peatlands included in the MoorLIFE project are part of a large area of blanket bog habitat in the centre of England. The area has suffered from a long history of atmospheric pollution, wildfire and high visitor pressure which have all had a significant impact, leading to large areas of bare and eroding peat.

The specific aim of the project was to protect Active Blanket Bog by reducing the erosion of adjacent degraded moorland. There were three main strands to achieving this objective.

1. Prevent further erosion of 909 ha of blanket bog through stabilisation, diversification and gully blocking.
2. Ensuring the future sustainability of the active blanket bog through wildfire mitigation actions and raising public awareness of wildfire risk and restoration.
3. Developing knowledge and understanding, and its effective communication to practitioners and policy makers.

2.2 Which sites are involved

The project area comprises four sites: Bleaklow Plateau (429 ha); Black Hill (46 ha); Rishworth Common (342 ha); and Turley Holes (92 ha). See Annex 1 and 2.

2.3 Habitat types and species targeted

All four project sites lie within the South Pennine Moors Special Area of Conservation (UK0030280) designated due to its importance for Active Blanket Bog, a recognised priority habitat for nature conservation action under the EC Habitats Directive.

The area also overlaps with the South Pennine Moors Phase 1 (Peak District Moors; UK9007021) and South Pennine Moors Phase 2 (UK9007022) Special Protection Areas (SPAs). These areas are designated as they host a number of qualifying upland breeding bird assemblages including merlin, European golden plover and short-eared owl.

Bleaklow Plateau and Black Hill are located within the Dark Peak Moors Site of Special Scientific Interest (SSSI). Rishworth Common and Turley Holes lies within the South Pennine Moors SSSI. Both SSSIs are notified for both biological and geological interest.

2.4 Expected longer term results

Monitoring of the vegetation shows that the amount of bare peat has reduced by over 90% and that indicator species for blanket bog are colonising treated areas soon after the bare peat has been stabilised. When comparing the MoorLIFE sites to other, previously revegetated, sites it is expected that this trend will continue and that the sites will continue to recover. These changes will continue to move the sites towards Unfavourable-Recovering status, as required by the UK's Biodiversity 2020 Strategy.

The MoorLIFE sites also provide ecosystem services, including recreation, drinking water and flood risk protection. Peatlands are also an important carbon store, and the area has an important role in climate mitigation efforts. By reducing the amount of bare peat, the contribution to these ecosystem services is increased. As the sites become more complex and stable, their contribution will increase further.

3. Administrative part

3.1 Description of the management system

3.1.1 Working method

The project was split up into roughly three strands:

1. Phase one: Project planning and establishment
2. Phase two: Project evaluation and delivery
3. Phase three: Project dissemination

Annex 3 outlines these phases and the main strands of work undertaken.

3.*1.1.1 Project planning and establishment*

Phase one involved the recruitment of staff and initial project planning over the summer of 2010. This included the delivery of the following actions:

- A1: Project Delivery Plan. This included the delivery plans for conservation and monitoring works. As part of this phase, the project received a visit from the EU Monitor.
- A2: Monitoring Delivery Plan. This outlined the monitoring methodologies, work schedule and targets. As part of the planning phase, vegetation monitoring quadrats dipwell clusters and peat pins were set up on the sites and baseline data was collected before works took place.
- A3: Conservation Delivery Plan. This outlined the expected programme of works. The Plan detailed when works were expected to take place, specifications for the works and what the expected outputs were.

The final planning action, Action A4: Dissemination Delivery Plan, was delayed until March 2012 when it was submitted with the 2012 Progress Report. The plan was not produced until 2012 due to the Communication Officer not being in post until the end of November 2010 and the time taken to then produce urgent deliverables, for example the works noticeboards. The plan outlined the time frames for delivering the remaining communications actions and who would be responsible for delivery.

3.1.1.2 Delivery and monitoring

The delivery and monitoring stage started in winter 2010 and continued through to spring 2015. In general, conservation works took place between October and March, outside of the bird breeding and grouse shooting seasons. Monitoring for vegetation growth took place in late summer, and monitoring for hydrology and water quality was carried out in winter. Communications work could be carried out throughout the year, but where necessary was tied in with seasons, works and monitoring. For example filming for the podcasts took place over winter when works were taking place, and launching the Be Fire Aware displays was done in the summer when the risk of wildfires was higher.

Over the five years, the conservation work was front-loaded. This meant that the majority of the peat stabilisation work (brashing, geotextiles, and initial lime, fertiliser, and seed) took

place in the first three years of the project, with diversification work (plug planting and *Sphagnum* application) in the last two years.

3.1.1.3 Project dissemination

Dissemination of the work taking place was ongoing throughout the life of the project; a full list of dissemination activities can be found in the Dissemination Report, Annex 9e.

3.1.2 Project organisation

The Peak District National Park Authority (PDNPA) is the co-ordinating beneficiary for the MoorLIFE project through the Moors for the Future Partnership (MFFP). MFFP carries out a programme of moorland restoration, research and communication work for a number of partners under a number of funding streams. The MoorLIFE project is carried out as part of this programme.

There are five Co-Financiers of the MoorLIFE project: Yorkshire Water Services, United Utilities, the Environment Agency, the National Trust and Natural England. All Co-Financiers are partners of MFFP and are represented on its Strategic Management Group which reviews the activities of MFFP as a whole.

All co-financiers met their financial commitments to the project.

In addition to the Strategic Management Group meetings, all co-financiers, the PDNPA, and members of MFFP meet four to five times a year for a MoorLIFE Steering Group to address the status of the MoorLIFE project directly. At these meetings, the project plan, risk assessment and finances of the project are reviewed. In addition, feedback and input from the Steering Group is sought in relation to upcoming project actions. Over the course of the project there have been 22 Strategic Management Group meetings, as shown in Annex 3. The EU Monitor is sent the agenda, meeting documents and minutes of the meetings.

Individual members of the Steering Group will also be contacted directly on an ad hoc basis to ask for support or advice when their individual expertise is needed. One example of this is where input was required on the content of the MoorLIFE apps.

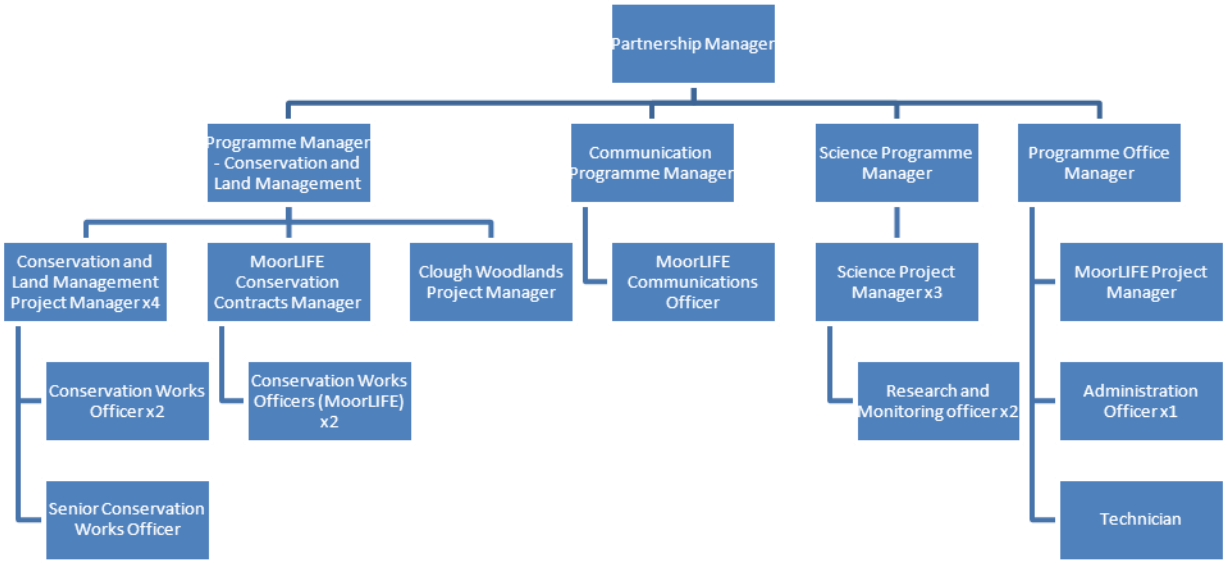
Where required, MoorLIFE representatives also attend separate meetings with stakeholders including landowners, co-financiers and Natural England as the regulatory body.

Internally, the MoorLIFE Project Manager and Conservation Contracts Manager met fortnightly as part of a wider Conservation Programme Meeting to plan works across MFFP projects and to review working practices. On the alternating weeks, the MoorLIFE team met to plan and coordinate activities on the MoorLIFE project specifically. There were also weekly catch-up meetings between the individual team members and the project manager.

3.1.3 Project team

The project team was embedded in the overall structure of MFFP, with the MoorLIFE officers sitting within separate teams (Figure 1). This structure meant that the team did not work in isolation and could work more efficiently as part of the overall programme.

Figure 1: MFFP Structure Chart



The project has been largely delivered using staff working on fixed term and casual contracts. In exceptional cases, permanent staff working for MFFP have been employed.

The structure of the project team has remained largely the same over the course of the project, with the exception of the Conservation Works Officers and MoorLIFE Communications Officer. In addition, more casual staff have been employed over the course of the project than originally anticipated.

The Conservation Works Officer roles are no longer solely funded by the project; instead Works Officers work on the MFFP programme as a whole and time is recharged according to the hours spent on the MoorLIFE project. This has been found to be a more cost-efficient way of working as time can be allocated to projects only when it is needed. This change was outlined in the Progress Report of 16 July 2014.

The role of the Communications Officer was extended from three days to four in September 2014 and the Officer continued to work four days a week for the duration of the project. This change was outlined in the Progress Report of 16 July 2014. The reason for the change was that there was still a significant amount of work to be achieved within the project term on communication actions.

The increased use of casual staff has been to allow the conservation and monitoring works to be completed within the relatively short time windows available – especially in the case of airlifting operations that could only take place under certain weather conditions, and vegetation monitoring which was time limited, and very time consuming. Administrative and Communication Casual staff have also been employed when there were periods of high work load. This change was detailed in the Mid-term report of 21 March 2013.

Information about the timekeeping records kept for staff is detailed in Section 7.2.

3.2 Changes due to amendments of the Grant Agreement

The only formal change to the Grant Agreement has been the extension of the project end date from 31 April 2015 to 31 August 2015. This was confirmed by the EC in their letter dated 8 April 2015.

There have also been a number of changes to the Grant Agreement that did not require the Agreement to be re-signed, as detailed below. More information on these changes are detailed in the relevant technical or dissemination section.

Fencing: 6.9km of fencing was built on Turley Holes in March 2011 to protect the site and to prevent grazing from sheep on adjacent land. Reported in Progress Report of 22 April 2012, and agreed in a letter from EC of 6 July 2012.

Hydroseeding: Instead of being applied separately, heather seed is now applied along with the grass seed due to developments in the availability of seed that did not need to be prilled. This was reported in the Progress Report of 22 April 2012.

Field guides: The bid originally outlined that five field guide apps would be created. Four were created with content for the fifth (information about conservation works) incorporated into the other four. This change was discussed at the EU Mission of 25 September 2014.

Restoration guide: The original bid stated that a Restoration Manual, which was at that time in preparation, would be added to the MoorLIFE website to outline best practice techniques for the restoration of blanket bog in the uplands. In place of the Restoration Manual, a *Practitioner's Guide to the Reintroduction of Sphagnum* has been produced that outlines the main methods currently in place for reintroducing *Sphagnum* in the uplands. This change was agreed in the EC's letter of 31 October 2014.

Comic book: In the original bid, it was expected that a comic book would be produced to help promote learning through other, non-traditional, means. This was changed to producing a video to make best use of new media which would appeal to children and drive online traffic as agreed in a letter from the EU on 3rd July 2013. It would also give this action online longevity that could not be assured with limited printed stocks.

Be Fire Aware games: The number of games was reduced from 5 to 2 and the fire aware games were integrated with the displays to increase their reach, as reported in the Progress Report. This change was acknowledged in the EU's letter of 3rd July 2013.

Water quality monitoring: The monitoring programme changed from 2-3 day surveys twice a year over five years to a weekly sampling campaign to coincide with dipwell campaign. This was to try to provide better samples when taking into account meteorological variations over the winter.

3.3 Evaluation of the management system

3.3.1 Project management process

The project was managed as part of a wider programme of works undertaken by MFFP. This meant that work was not delivered in isolation, allowing conservation, monitoring and communications works to be delivered efficiently.

In the case of conservation works this approach meant that:

- economies of scale could be utilised;
- companies receiving larger contracts were able to innovate and work to deliver custom-made solutions to unique problems;
- learning from one project could be transferred to the MoorLIFE project and vice versa;
- works could be delivered more efficiently as resources, such as helicopters, could be moved easily between jobs, as well as picking up ad hoc jobs as they were available.

In the case of monitoring works this approach meant that:

- results for vegetation and hydrology are not reported in isolation;
- results from other projects can be used to verify results and to build a bigger picture;
- it is possible to run larger annual vegetation surveys and dipwell campaigns as the co-ordination of the surveys can be efficiently coordinated.

In the case of communications work, this approach meant that:

- work could be used by different projects, for example, the MoorLIFE apps include target species for monitoring and are being used and promoted by the Community Science team;
- MoorLIFE deliverables such as press releases and the website can be given a higher profile by using the MFFP platform.

Overall management of the project could also be better achieved as part of the programme as the project could utilise:

- financial and administrative processes already in place for delivering works;
- MMFP's casual staff pool;
- expertise and advice from individuals working within the programme.

The main risk of working as part of a wider programme was ensuring that the project was given due priority. This was mitigated through clear project milestones and deadlines which ensured the project stayed on track and delivered its actions.

3.3.2 Responsibility for delivering actions

Each team member was responsible for individual actions, as follows.

- Project Manager: Responsibility for delivering A actions, action E1, and overall responsibility for the day-to-day financial planning and management, administrative processes for the project, as well as reporting requirements. The Project Manager was also responsible for ensuring the delivery of the project as a whole.
- Conservation Contracts Manger: Responsibility for delivering C actions as part of the programme of works carried out by Moors for the Future.

- Monitoring Officer: Responsibility for delivering E2, E3 and E5 actions and co-ordinating the annual vegetation and dipwell surveys.
- Communications Officer: Responsibility for delivering D actions.

The team was supported by the management structure at MFFP, who also oversaw works as part of their management responsibilities towards the MoorLIFE project staff. Overall sign-off of project reporting was carried out by the Partnership Manager. The Steering Group provided an external check that the project was running to schedule and provided an advisory role.

The Chief Financial Officer for the Peak District National Park oversaw the financial management and provided the overall annual budget. Further support was provided by the Assistant Director of the Peak District National Park who chaired the Steering Group. The Chair of the Moors for the Future Partnership, an elected member of the PDNPA, also provided political support for the project.

The Project Manager provided the point of contact for communication with the Independent Monitoring Officer, which was mainly via email. Formal correspondence between the EC and MFFP was with the MFFP Partnership Manager.

4. Technical part

4.1 C Actions: Conservation Works

4.1.1 Action C1a: Stabilise bare peat using nurse grasses

4.1.1.1 Outline of task:

Lime, seed and fertiliser has been applied to all the sites. Historic pollution has reduced the pH level of the peat to between 2.5 and 3.5 so the purpose of the lime is to bring the pH of the peat up to a level where plants are able to grow. A nurse crop of amenity grasses, *Deschampsia flexuosa,* and heather seed is then applied to quickly stabilise the peat. Fertiliser is applied to aid the growth of the grasses so that they are able to establish. The application of lime, seed and fertiliser is largely done by helicopter. Towards the end of the project, heather seed was applied by hand in targeted areas where the team identified a low count of heather seedlings.

4.1.1.2 Target:

615 hectares (ha) receiving treatments of lime and fertiliser.

4.1.1.3 Status:

863 ha have received applications of lime, seed and fertiliser.
See Annex 4, Maps 3a-3c
Photographs of works are included in Annex 10a.

4.1.1.4 Work undertaken by:

The purchase of the materials was originally organised and coordinated by the Conservation Contracts Manager, supported by fixed term staff. From 2013, lime and fertiliser was purchased through contracts for the application works. The spreading of lime, seed and fertiliser was undertaken by contractors; fixed term staff, supported by casual staff supervised the works on the ground. The Conservation Contracts Manager oversaw the work.

4.1.1.5 Project management:

Details of the planned time frames against the actual time frames are shown in Annex 5. Explanations for deviations from the original bid, changes to time frames and alterations to the outputs are detailed below.

Time frames for initial lime, fertiliser and seed:

Lime, seed and fertiliser was applied in the spring following the winter application of heather brash and geotextile (please also see Section 4.1.2, C1b: Application of Heather Brash and Geo-textile for descriptions of changes in the work programme). In the original bid, it was proposed that lime would be applied six weeks prior to the application of the seed. This gives enough time for the lime to raise the pH level of the soil, creating ideal conditions for the grass seed to grow. The seed is then applied two weeks prior to the fertiliser to allow the seed to germinate before the fertiliser is applied, boosting the root growth of the nurse crop. This is the method used in agricultural best practice.

However, due to the logistical challenges involved in delivering a large programme of works the application of lime, seed and fertiliser was generally undertaken in a single application. This was because there was a high risk that by adhering to agricultural best practice, one of the components (lime, seed or fertiliser) might be applied without any of the other components, with the likelihood of causing a complete failure of the action. This risk was due to:

a) the availability of helicopter companies and length of time they can be paid to stay on site to complete works;
b) access restrictions on moors; and
c) the number of suitable days to complete the work due to the weather, particularly in the case of the seed that needed to be applied when wind speeds were very low.

As a result, in most cases the works took place in a single application. The two exceptions were applications on Woodhead (Bleaklow) and Rishworth North (Rishworth Common).

On Woodhead (Bleaklow) the lift sites had much tighter restrictions on access and so we were constrained to carrying out applications before and after the bird nesting season. This meant that on some areas of Woodhead application of lime and seed occurred in March/early April and then fertiliser was applied in July/August.

The Rishworth Common application programme overran in 2011 due to poor weather and so the lime application on Rishworth North was rescheduled for late September 2011. The seed and fertiliser application occurred during the following year in 2012.

Time frames for maintenance treatments of lime and fertiliser:

After the initial lime, seed and fertiliser treatment, two maintenance treatments of lime and fertiliser were then applied annually, depending on annual site assessments.

A site assessment of Woodhead sites (Bleaklow) showed that a third treatment of lime and maintenance fertiliser was needed to sustain the nurse crop of grasses to encourage the development of dwarf shrubs. This occurred in March 2015.

At the National Trust's request, heather brash treatment on one site on Bleaklow (Ronksley) was delayed to allow resources to be allocated to alternative projects. This area was treated with initial lime, seed and fertiliser in summer 2014 and then received a single maintenance treatment of lime in March 2015.

After the initial application of lime, seed and fertiliser on the most northern site on Rishworth Common (RISHN BP01) no further applications were deemed necessary and so further lime, seed and fertiliser works were completed in this shape.

The work on the three northwest sites on Rishworth Common (RISHN BP02, 03, 04) did not receive a final maintenance treatment of lime and fertiliser following a positive assessment of the site in summer 2014.

Hand application of lime, seed and fertiliser with brash:

Following surveys of Alport (Bleaklow) in 2012, it was identified that revegetation works from a previous project had not been successful and the active blanket bog was therefore at

risk. These areas were formed of small patches of bare peat or ground covered with the invasive moss species *Campylopus introflexus*, within a wider area of establishing vegetation and active blanket bog. Due to the size of the patches, a full lime, seed and fertiliser treatment would result in wasted material as it would be applied on already re-vegetated/intact areas. This led to MFFP trialling the application of lime, seed and fertiliser by hand.

The appropriate quantities of lime, seed and initial fertiliser were bagged up in plastic bags and flown up with bags of heather brash. They were then applied along with the brash. Lime and maintenance fertiliser were applied aerially in the following two years. Photo monitoring work has occurred every six months after application to demonstrate its success (Annex 10b) and this has now become a widely used technique for cost-effective application of lime, seed and fertiliser on small-scale treatment areas.

Single pellets of lime seed and fertiliser:

Vegetation surveys on certain areas of Woodhead (Bleaklow) showed that dwarf shrubs were not establishing at the required the rate. In autumn 2015 there was an application of over 90ha of a new treatment that used single pellets of dwarf shrub seed, lime and fertiliser (plus other ingredients required for establishment). These pellets were spread by hand over areas of nurse crop.

This is a new product that has been developed and trialled by private landowners, and has been shown to increase the numbers of heather seedlings. This product is being trialled because it does not need a further application of lime to be successful. It is anticipated that this will make it a useful product where there is limited time for conservation works in an area, and where a targeted approach is needed.

4.1.1.6 Overview of work:

A Gantt chart showing when works were completed is shown in Annex 5. Maps of the works done in each treatment area are shown in Annex 4, Maps 3a-3c.

4.1.1.7 Modifications:

There have been two major modifications to the project that have had implications on the budget.

Fencing:

In March 2011, 6.9km of fencing was built on Turley Holes to protect the site from sheep on adjacent land. The fencing was not originally assigned any funding in the original bid, and so was instead funded by a reduction in the diversification and gully blocking budgets. This was detailed in the Progress Report of 22 April 2012, and agreed in a letter from EC of 6 July 2012.

There is a ten year agreement on the fence, and it is due to remain in place until 2021. At this time Natural England will assess the site and determine whether it should be removed, or remain in place. The removal of the fence after this date and any maintenance is now the responsibility of the tenants.

Hydroseeding:

In the original bid, applying heather seed was included under Action C2b: Hydroseeding. However, instead of being applied separately, heather seed is now applied along with the

grass seed during lime, seed and fertiliser application. This alteration was reported in the Progress Report of 22 April 2012. See Section 4.1.4 for more details.

4.1.1.8 Issues:

On certain landholdings there was a very tight window of opportunity for delivering this work. The lime, seed and fertiliser needed to be on the ground in the spring, in time for the summer growth season and the shooting tenants preferred us not to overfly their areas during the bird breeding season in order to prevent any reduction in grouse numbers. With this restricted window, and the work being highly weather-dependent, there were often limited days in which the work could take place. This issue was compounded by lift sites being located on land that was not part of the works. As a result, there was often additional work restrictions put in place to avoid helicopter disturbance affecting other moors.

The combination of poor weather and the bird breeding season had a significant impact on works throughout 2012 and into 2013. The summer of 2012 was one of the wettest summers on record and as such we had limited opportunities to apply the lime and fertiliser. This resulted in a disjointed application programme and also the loss of some material that was spoiled when it could not be removed from the lift site.

Following the loss of this material, MFFP amended the contract for its lime and fertiliser application programme. Previously, MFFP purchased the lime and fertiliser directly in order to take advantage of bulk purchasing, and then organised the delivery and forwarding of materials. However, in this process, any damaged or spoilt material was the responsibility of MFFP. In 2012, this resulted in the purchase of additional material. By altering the agreement so that the contractor responsible for the aerial application was also responsible for material supply, this risk was avoided and the overall efficiency of the operation was improved.

During the winter and spring of 2012/13, snow that fell in November 2012 remained on the ground until May 2013. This had an impact on the 2013 works programme as many planned activities could not take place. As a result of this delay, some work had to be carried forward to the 2014/15 season. Due to the risk of further poor weather, an extension was requested from the EC to ensure that this work could take place.

4.1.2 Action C1b: Apply heather brash and geotextiles

4.1.2.1 Outline of task:

Brash and geotextiles are laid on the bare peat prior to seeding to provide a structure that can be ‘knitted’ together by the amenity grasses, further stabilising the peat. Heather brash also provides a seed source to allow heather establishment, and brings in various mosses that grow to create an understory to the nurse crop and dwarf shrub.

4.1.2.2 Target:

186 ha receiving brash treatment and geotextiles.

4.1.2.3 Status:

16,079 bags of brash, around 2,400 tonnes, have been applied across all sites.

The brash has been applied to bare peat on sites totalling 102.9 ha (based on one bag covering 64m^2).

53 km of geotextiles have been laid, covering nearly 6.4 hectares.

There was a typographical error in the Mid-term Report of 21 March 2013 report was carried through into following reports. The error stated that over 75 km of geotextiles had been laid. The correct figure is 53 km.

See Annex 4, Maps 4a to 4c and Maps 8a to 8c

Photographs of works are included in Annex 10a.

4.1.2.4 Work undertaken by:

The supply and spreading of brash and geotextiles was undertaken by contractors with separate contractors undertaking the cutting, flying and spreading works. The Conservation Contracts Manager oversaw the work. Fixed term staff supported by casual staff supervised the works on the ground.

4.1.2.5 Project management:

Details of the planned time frames against the actual time frames are shown in Annex 5. Explanations for deviations from the original bid, changes to time frames and alterations to the outputs are detailed below.

Areas covered and schedule:

The areas covered by the brash and geotextile programme, and schedule for delivery, were slightly altered from the original works programme.

Rishworth South (Rishworth Common) was completed a year ahead of schedule due to the requirements of one of the MoorLIFE co-financiers. The Bleaklow works were split into two applications as originally planned, but the areas covered in each phase changed in order to align these works better with the other works being delivered on the site. There were also some alterations in the delivery schedule due to weather constraints, both on the work site and the donor site, with the result that it was not possible to cut, fly and apply the brash in time for the bird-nesting season.

These changes did not have an impact on the overall delivery of the lime, seed and fertiliser actions (see Section 4.1.1).

Brash on Turley Holes and Rishworth North (Rishworth Common) were applied as scheduled.

The geotextile was applied in two phases due to the size of the application programme. These occurred in year 1 and 2 of the work programme as scheduled on Bleaklow, Turley Holes and Rishworth Common.

Spot-treatments of brash

Following an assessment of the sites, all areas received a further spot-treatment of brash to cover any remaining areas of bare peat.

Exclusion areas:

The exclusion areas on Turley and Rishworth that had been used as bare peat reference sites for the duration of the project received a treatment of brash in spring 2015. As other reference sites exist as part of the science monitoring programmes, the reference sites were no longer needed. As a result, the work was done to help ensure that the sites did not erode surrounding blanket bog habitats.

4.1.2.6 Modifications:

Geotextiles were used predominantly at the beginning of the project on slopes steeper than 45°. Evolution of techniques through the project showed that brash could also be applied on steeper slopes, and was actually more effective at stabilising the peat as well as giving additional benefits such as providing a seed source. Where possible, the use of brash instead of geotextiles is now considered to be best practice, and as a result sites receiving C1b actions in the latter part of the project were treated with brash instead of geotextiles.

4.1.2.7 Issues:

The airlifting of heather brash is generally undertaken in the winter months, often in poor weather conditions. Any resulting delays in the airlifting of brash can result in it becoming wetter, and therefore heavier. This increases the cost of the airlifting operation. Similarly, any delays due to spreading caused by severe weather conditions on the ground can result in the brash becoming frozen, making it more time-consuming to spread. These issues are closely managed to ensure that the project does not incur unnecessary cost, but as described above did mean that some works were undertaken later in the work schedule than originally planned.

With the delays that occurred due to poor weather we often had to bring in additional workers towards the end of the work window in order to complete the works before the bird nesting season. This was always well-managed to ensure that the spreading was still completed to a high standard.

The second issue around the use of brash is the potential for it to transfer disease or pests onto the sites, or for the presence of pests and disease to reduce the availability of brash. MFFP have always undertaken checks for known pests and diseases (like sheep ticks (*Ixodes ricinus*) but since 2012 we have also introduced a brash passport. This shows where the brash has come from and provides assurance that additional checks have been done for evidence of *Phytophthora* and heather beetle (*Lochmaea suturalis*).

The use of the passport followed an outbreak of *Phytophthora* in 2012 in the South West Peak District, which although did not affect the MoorLIFE sites, did highlight a risk for all cutting works we undertake. The summer of 2014 also saw a combination of ideal conditions for heather beetle, damaging many of our donor sites and reducing access to brash.

The following year, in 2015, Moors for the Future Partnership was alerted to a potential case of *Cryptosporidium baileyi* (Bulgy-eye) on one of the donor sites cut by its contractor. The two exclusion areas received brash from this site and could potentially be affected by the disease that affects moorland birds, particularly grouse. This situation has been closely monitored by gamekeepers, but there has been no indication that the disease has been transferred to any of MFFP's sites.

Approvals for cutting were also obtained from Natural England following an archaeological survey of the site.

4.1.3 Action C2a: Increase stability by plug planting

4.1.3.1 Outline for task:

After the peat has been stabilised, plug plants are used to diversify flora at the sites. As restoration sites often do not contain many – if any – indicator species for blanket bog, it is often difficult for native species to re-colonise newly stabilised areas. Five species are reintroduced:

- cloudberry *(Rubus chamaemorus)*
- hare's-tail cotton-grass *(Eriophorum vaginatum)*
- common cotton-grass *(Eriophorum angustifolium)*
- bilberry *(Vaccinium myrtillus)*
- crowberry *(Empetrum nigrum)*

These species are grown from propagating native species taken from within the Dark Peak SSSI and 450m above sea level.

4.1.3.2 Target:

110 ha
150,000 plugs

4.1.3.3 Status:

A total of 197,955plants have been planted on Turley Holes, Rishworth Common and Bleaklow.

See Annex 4, Maps 5a-5c

Photographs of works are included in Annex 10a.

4.1.3.3 Work undertaken by:

The plants were grown, flown and planted out by contractors. The Conservation Contracts Manager oversaw the work. Fixed term staff supported by casual staff supervised the works on the ground.

4.1.3.4 Project management:

The planting of plugs took place after the nurse crop had established and stabilised the bare peat. The planting work occurred at an appropriate stage after the initial lime, seed and fertiliser application programme. This was delivered according to schedule and ran without any issues.

4.1.3.5 Overview of work:

An overview of when works were delivered is shown in Annex 5.

Planting on Rishworth Common was completed in September 2012. Planting on Turley Holes was completed in the spring of 2013. Planting on Bleaklow was carried out in the autumn of 2013, autumn of 2014 and spring of 2015.

4.1.3.6 Modifications:

There were no modifications to this work, which was delivered according to the original works programme.

4.1.3.7 Issues:

There were logistical difficulties for this activity, due to the weather, including delays to planting due to snow on the ground. However, these did not significantly impact on the works and there are no significant issues to report.

4.1.4 Action C2b: Increase stability by hydroseeding

4.1.4.1 Outline of task:

Dwarf shrub seed was applied along with the amenity grasses as part of the lime, seed and fertiliser operation to help stabilise the bare peat with native species. The heather seed was applied in the same operation. This was different to the original plan that required the dwarf shrub to be seeded separately (see the explanation in Section 4.1.1).

4.1.4.2 Target:

710 ha

4.1.4.3 Status:

781.5 ha seeded.

Annex 4, Maps 3a-c

Photographs of works are included in Annex 10a.

4.1.4.4 Work undertaken by:

This operation was completed within Action C1a – see Section 4.1.1 for more details.

4.1.4.5 Project management:

The hydro-seeding work was removed from the original work programme and replaced with an aerial application of dwarf shrub as part of the lime, seed and fertiliser programme. See Section 4.1.1 for details of project management.

4.1.4.6 Overview of work:

Seed, including a variety of heather seeds and dwarf shrubs were incorporated into the nurse grass mix that was applied as part of the lime and fertiliser works (C1a).

A total of 781.5 ha across Turley Holes, Rishworth Common and Bleaklow have been seeded.

Where vegetation monitoring identified areas with proportionally low numbers of heather seedlings on Bleaklow, an additional treatment of dwarf shrub seed pellets were applied in the summer of 2015 (see Section 4.1.1.5 of C1a).

4.1.4.7Modifications:

In the original bid, applying heather seed was included under Action C2b: Hydroseeding. However, instead of being applied separately, heather seed is now applied along with the grass seed during the lime, seed and fertiliser application. This alteration was reported in the Progress Report of 22 April 2012.

The reason for the change is that when the MoorLIFE project was originally developed, nurse grass seeds were applied from a standard fertiliser hopper, using a high speed spinning disc, in a prilled form, surrounded by a mixture of clay and waste paper pulp to add appropriate weight to the seed. This added weight ensures an even dispersal of the seed and reduces the risk of excessive wind dispersal. Heather seed was applied by hydro-seeding following this application as it did not germinate well when combined in the prilled grass seed. However,

between receipt of the grant offer and the first application of seed, a contractor demonstrated the ability to apply grass seed through an air drill, which removed the need to add the prilling material. We had measured the efficiency of this new technique prior to allowing its use and, having concluded that it distributes seed as efficiently and evenly as the previous prilled seed, accepted this new technique. This meant that the heather seed could be applied in the same operation as the grass seed, removing the requirement for the additional hydro-seeding operation as well as removing the cost of prilling the grass seed.

4.1.4.8 Issues:

The same issues which impacted on the aerial application of lime and fertiliser (as noted in the description of C1a) occurred with the aerial application of seed. The problems are often even worse as, due to the lightweight nature of the material, the application can only occur in almost still conditions. These conditions are rare and so the contractors need to be flexible and apply the seed when conditions are appropriate.

4.1.5 Action C2c: Increase stability with *Sphagnum* propagules

4.1.5.1 Outline of task:

Active Blanket Bog needs to be actively accumulating peat. In the South Pennine Moors SAC, *Sphagnum* mosses are the basis for peat formation and so they need to be present in the moorland flora. In addition, a cover of mosses prevents erosion, protecting adjacent areas of moorland. *Sphagnum* mosses have been largely lost from the MoorLIFE sites, due to historic industrial pollution and wildfires and therefore need to be reintroduced.

The MoorLIFE project initially used propagules (beads) – small gel capsules containing fragments of eleven species of *Sphagnum*. At the beginning of the project, this was the best practice methodology for applying large amounts of *Sphagnum* to areas where it was not present. The methods for reintroduction evolved through the course of the project, and in 2015 several other techniques were trialled including larger *Sphagnum* fragments in a 'slime', *Sphagnum* plug plants and translocating *Sphagnum* clumps. These operations all occurred in consultation with Natural England, the competent authority in England for sites designated through the Habitats Directive.

4.1.5.2 Target:

610 ha

4.1.5.3 Status:

870.9 ha

Annex 4, Maps 6a to 6d

Photographs of works are included in Annex 10a

4.1.5.4 Work undertaken by:

Sphagnum material was divided into two main types: propagated and harvested. All propagated material was grown by contractors through one contract. All harvested material was collected by contractors. Contractors also planted both types of material. The Conservation Contracts Manager oversaw the work. Fixed term staff, supported by casual staff supervised the works on the ground.

4.1.5.5 Project management:

The application of *Sphagnum* was originally programmed for the end of the project. However, following discussions with contractors it was decided that application should occur earlier on in the programme to allow the *Sphagnum* propagules easier access to the peat. This was considered to be beneficial as it would:

a) allow better establishment of the *Sphagnum* as it would be applied directly to the peat surface, and
b) allow the nurse crop to grow over the developing *Sphagnum* providing it with protection whilst it establishes.

This also was advantageous to the works programme for two reasons:

1. Most of the *Sphagnum* used for the action required micro-propagation and the contractor was only able to produce a certain amount of material each year.

2. The cost of the material also meant that any losses due to delays in flying or spreading would be expensive, and so it was considered too risky to buy large amounts of material. In addition, the dominant factor affecting the success of *Sphagnum* propagule application is the weather following the application. By spreading the works out over a longer period the risk of weather that would impede *Sphagnum* growth was reduced.

4.1.5.6 Overview of work:

Sphagnum propagules were spread on:

- Black Hill (30 ha) in October 2012;
- southern Bleaklow sites in September and October 2013 (22 ha);
- northern Bleaklow sites in October 2014 and March 2015 (444.5 ha);
- Turley Holes (35 ha) in April 2013
- Rishworth Common (319.4 ha) in April 2014
- Rishworth Common (20 ha) in March 2015.

Through continual development and innovation Moors for the Future have refined their application methods. Sites that have received treatments in March 2015 (northern Bleaklow sites and Rishworth South) received *Sphagnum*, in the form of micro-plugs, plug plants and 'slime' as well as the beads. See Section 4.1.5.7 (below) for more details.

A full description of the new methods, and the process involved are fully discussed in MFFP's guide: *A Practitioners' Guide to Sphagnum Reintroduction* (Annex 9h).

4.1.5.7 Modifications:

Sphagnum application by hand:

It was originally anticipated that *Sphagnum* beads would be spread using aerial application by helicopter. Two factors changed this:

1. Due to the wet nature of the beads, putting them through a hopper designed for dry material did not work. This meant that a new application technique was required.
2. 50-70% of most sites were dry hagg tops, and therefore not ideal habitats for *Sphagnum* growth.

Sphagnum beads were applied by hand. Although this method took longer, the approach was more targeted and therefore reduced wastage of material.

Sphagnum Technical Advisory Group (TAG) and introduction of other methods:

In 2008 MFFP started a *Sphagnum* Technical Advisory Group (TAG). This group was expanded in 2010 by representatives from the MoorLIFE project. The group is a discussion forum for moorland practitioners, research scientists and Natural England advisors to talk about the *Sphagnum* application techniques and trials that are being undertaken. Throughout this time we had been taking the successes and failures of other projects and adjusting the way we apply *Sphagnum* as part of the MoorLIFE project. In 2014, other techniques for the reintroduction of *Sphagnum* were explored including:

- Hand-spreading of larger fragments of *Sphagnum* suspended in a liquid medium (Solumoss or *Sphagnum* 'slime').
- Use of *Sphagnum* plug plants (Plugamoss).

These new techniques were introduced as the various trials on *Sphagnum* propagules have been producing good results in controlled environments but have been much slower to grow on the work sites. It is thought that this is because the fragments contained in the propagule are too small to be able to produce results quickly. The fragments contained within the Solumoss solution are 2-4cm in length, significantly longer than the fragments in a bead, and initial trials have shown that these may produce quicker results.

There has also been work over the last three years with projects translocating handfuls of live *Sphagnum* material (clumps). The initial results of these works have been promising and the translocated *Sphagnum* has established and developed quickly. However, on the large scales required by the MoorLIFE project, translocation was not possible within the timescales required as very large quantities of suitable donor material needed to be available. These donor sites do not currently exist in the South Pennines.

To help remove the problems associated with finding a suitable donor site, plugs of *Sphagnum* were grown using the same micro-propagation technique used to produce the propagules. The plug had several advantages over using donor site material as follows:

- It produced a consistent product that would be easier to plant by contractors.
- The type and quantity of *Sphagnum* could be specified, so that the best species could be planted for any situation.
- The *Sphagnum* is free from disease or pests.

However, it was found that as *Sphagnum* does not have roots, there was no real connection between the *Sphagnum* and the peat plug. This meant that during transportation the *Sphagnum* was becoming removed from the peat. The latest iteration of this application of *Sphagnum* was as micro-plugs. Following the growth of the *Sphagnum*, it was removed from the peat and bagged up to be carried up to the work site. The *Sphagnum* is then planted into the peat, in a similar way to harvested hummocks.

Several trials have been set up to establish the success of these new methods. These are detailed in the *Practitioners' Guide to Sphagnum Reintroduction* (Annex 9h).

4.1.5.8 Issues:

The growth of the *Sphagnum* beads has not been as quick as we expected. Our trials have demonstrated reasonable success, but in the field we have not seen much growth over the three years since we applied the beads on the first site (Black Hill). This has, however, resulted in continued developments in *Sphagnum* application techniques that have resulted in new and exciting application methods.

4.1.6 Action C3: Gully blocking

4.1.6.1 Outline of task:

As areas of damaged peat and old drainage ditches become eroded they can form gullies which act as channels for water running off the moors. In doing so they cause significant erosion, as well as reducing the water tables in the peat body. In order to help keep the water on the moors, stone has been used to block gullies on MoorLIFE sites. The stone gully blocks have been used primarily where the force of the erosion has eroded the gullies down to the mineral base.

4.1.6.2 Target:

3,500 dams on 102km of gullies

4.1.6.3 Status:

3,970 dams have been built on Bleaklow

Annex 4, Maps 7a

Photographs of works are included in Annex 10a.

4.1.6.4 Work undertaken by:

The stone was sourced from an external company, and flown onto site by contractors. Contractors then constructed the stone gully blocks. The Conservation Contracts Manager oversaw the work. Fixed term staff, supported by casual staff supervised the works on the ground.

4.1.6.5 Project management:

The work was planned to be delivered throughout the five-year works period. The majority of the works were delivered in 2011/12 and 2012-13 and additional works were completed in 2013-14 and 2014-15.

In 2011 - 2012, dams were built alongside other gully blocking work taking place through another MFFP project on Woodhead (Bleaklow). As the projects had very similar aims and were being run for the same partner (United Utilities) around 1,000 of the dams built were sited in MoorLIFE shapes, but funded by Natural England. After 2012, all work in gullies on these sites was completed and no further work was needed – allowing the LIFE project to realise additional benefits of working as part of a wider programme. These dams have not been claimed for in the MoorLIFE finance claim.

4.1.6.6 Overview of work:

Stone gully blocking works and heather bale dams were built on Bleaklow in the winter of 2011/12 and 2012/13, with a further 100 stone dams built in 2013 around existing dams. These additional 100 dams were built when the accumulation of peat behind the dam was close to the top, making it necessary to raise the height of the dam to increase its useful life.

An additional 50 bigger stone dams were also put in at the bottom of the gullies.

Further gully blocking, totalling 310 dams, took place in winter 2014/15 on Bleaklow to finish works in this area and complement existing dams on the other side of the watershed line.

4.1.6.7 Modifications:

The gully blocking specification has been continually amended over the last ten years. As part of the MoorLIFE project, MFFP created a set of gully blocking specifications for stone, timber, plastic and heather bale dams which have been widely used by our partners and other moorland practitioners. Modifications over the course of the project include the use of top-up dams as well as the larger dams at the bottom systems.

As gully blocking works come under the Construction (Design and Management) Regulations (2007) (CDM) MFFP created a CDM template to enable the easy completion of all the required paperwork under the regulations. This CDM template has also been used by other practitioners undertaking gully blocking works.

4.1.6.8 Issues:

During our initial gully blocking surveys, signs of water voles were seen around our work areas. As a protected species under Schedule 5 of the Wildlife and Countryside Act 1981, MFFP amended their surveys and work plans to identify and accommodate any water voles in the area. This caused only minor problems for the project, as it was only necessary to adjust our planned works in a couple of gully systems.

Gully blocking works on the southern part of Bleaklow were delayed as one of the stakeholders on a moor we had to over-fly did not permit flying over the moor. To accommodate this request, the work schedule was revised to complete works on the northern part of Bleaklow first. Works on the southern part of Bleaklow were completed in spring 2015. This has had no detrimental impact on the outcomes of the project and working with the stakeholder led to an improved relationship, allowing the works to take place at a later date.

4.1.2 Complementary actions outside of LIFE

The MoorLIFE project operates within a programme of works delivered by MFFP, as well as the wider programme of works delivered by partners across the Dark Peak Nature Improvement Area and South Pennines Special Area of Conservation (SAC).

Conservation work taken place on MoorLIFE continuously complements other conservation works in several ways.

- Knowledge from the works taking place is regularly shared and disseminated with other practitioners ensuring that the MoorLIFE project continually informs the practice of blanket bog conservation.

- Information about changes in best practice is shared with partners. For example:

    - Our specifications and Construction (Design and Management) Regulations documentation for gully blocking works are used by partners;

    - our methodology for applying spot-treatments of brash (as used on Bleaklow) is now being rolled out by the National Trust Higher Level Stewardship scheme;

    - other organisations – including the National Trust, RSPB and Yorkshire Water – are now using *Sphagnum* beads on their project sites;

    - our work on *Sphagnum* application is discussed at the *Sphagnum* Technical Advisory Group, which is the key national forum for discussion and dissemination of *Sphagnum* reintroduction techniques.

These actions benefit the work done through MoorLIFE by ensuring best practice conservation techniques are used across the South Pennines SAC.

Furthermore, over the past five years, the MoorLIFE project sat within a wide programme of conservation works and monitoring activities, as listed below. These works have complemented each other by sharing best practice and by using monitoring across projects to inform work activities. Furthermore, they ensure that the MoorLIFE sites sit within a network of restored sites, improving ecological integrity.

- Initiatives with Natural England to undertake bare peat stabilisation work through agri-environment schemes. Work has been undertaken on 13 holdings across the Peak District and South Pennines SAC, predominantly undertaking bare peat re-vegetation work.

- A demonstration multiple benefit catchment project called ‘Making Space for Water’ and a Catchment Restoration Fund project to revegetate bare peat on Kinder Scout and Bleaklow. Both of these projects are Defra-funded, Water Framework Directive supporting projects and have re-vegetated 254 ha of bare peat within a wider blanket bog matrix of 700 ha focussing on water quality and flood alleviation through bare peat restoration, blocking gullies and applying *Sphagnum* mosses. Empirical monitoring and modelling the impact of these actions has identified a significant impact of the

stabilisation actions on flood risk through increased storm lag times and reduction in peak storm flows (Pilkington *et al* 2012[i]).

- Various peatland restoration projects, on owned and non-owned catchments funded by Yorkshire Water \services. Currently, 660 ha of bare peat have been re-vegetated, within 12,000 ha of damaged active blanket bog.

On a more localised scale, MFFP has carried out conservation works on the following adjacent sites.

- Landscape scale works on Wessenden and Close Moss by Yorkshire Water Services, which adjoins Rishworth Common;
- Natural England works on the South Pennines project neighbouring Turley Holes and the northern Rishworth Common sites;
- Yorkshire Water SSSI works on sites adjacent to Turley Holes and Rishworth Common;
- Natural England works (run by National Trust) on moors adjacent to the Bleaklow work sites.

4.1.3 Continuation of works after LIFE

The future works requirements of the South Pennine Moors SAC were identified by Natural England in the IPENS project, funded by the LIFE+ Programme (LIFE11 NAT/UK/000384 IPENS).

4.1.3.1 MoorLIFE 2020:

The MoorLIFE project has been very successful at protecting areas of Active Blanket Bog and a new project has been developed which will deliver similar works to other areas of the South Pennine Moors SAC. In addition, there is considerably more work involved in reducing the risk of wildfires across the SAC. This project has been funded by the EU LIFE 2014 Programme and is due to start in October 2015 (LIFE14 NAT/UK/000070).

4.1.3.2 Private Lands Partnership Project:

All of the MoorLIFE sites have a requirement for additional works. However, in accordance with the original MoorLIFE agreement, these are not included within the MoorLIFE 2020 agreement but are in receipt of funding from the Rural Development Plan for England (RDPE) Higher Level Stewardship Scheme (HLS). In addition, there are other sites which are also in receipt of funds from HLS schemes, which MFFP are delivering through the Private Lands Partnership. This is complementary to the LIFE scheme and uses tools and techniques developed further through MoorLIFE.

4.1.3.3 Additional moorland works sites:

Significant areas of the South Pennine Moors SAC are also protected as Drinking Water Safeguard Zones (DWSZ) through the Water Framework Directive (WFD) and have potential to reduce the risk of flooding. As a result, management is desirable in accordance with the Flooding Directive. MFFP has had preliminary discussions with three water companies

(United Utilities, Severn Trent Water and Yorkshire Water Services) to deliver moorland conservation works which are outside of the scope of the LIFE Nature programme. These will tie into the other projects that MFFP is delivering, ensuring efficient use of resources.

4.1.3.4 Clough Woodland Project

In addition to the works on Active Blanket Bog, MFFP has an additional project which is developing schemes, again through the RDPE, to fund the creation of new native woodland within cloughs (steep sided valleys which run off the moors). These formerly wooded valleys have become denuded due to historic clearances and more recent levels of sheep grazing. Wooded cloughs are an important feature of the southern portion of the SAC (Dark Peak SSSI) and are also beneficial for improving water quality under the WFD and to reduce the impact of flooding.

4.2 D Actions: Dissemination Actions

4.2.1 Actions D1-D4 are included in Section 5.1

4.3 E Actions: Project Management and Evaluation

4.3.1 Action E1: Manage project

This has been discussed in Section 3: Administrative Part.

4.3.2 Action E2: Monitor vegetation and succession

4.3.2.1 Outline of task:

Fixed vegetation plots were established to monitor the success of restoration works (Actions C1, C2 and C3). Trained surveyors then undertook a survey of the plots once a year in late summer to record data on:

- vegetation cover;
- species composition;
- levels of grazing;
- presence of animal droppings.

This work was required to determine the level of success of the restoration works and to inform understanding of the successional processes from nurse crops to native vegetation on blanket bog restoration sites.

To assess the impacts of all restoration techniques, monitoring was undertaken on:

- moorland sites restored under actions C1-C3
- control sites, including:
    - bare peat with no restoration actions;
    - intact moorland.

See Annex 4, Maps 1c to 1f for locations of the monitoring sites.

4.3.2.2 Target:

Two reports

4.3.2.3 Status:

Both reports have been written and are available for download on the MoorLIFE website (www.moorsforthefuture.org.uk/moorlife-reports) and included as Annex 9a and 9b.

Example photographs of the impact of works, taken as part of the monitoring surveys are included in Annex 10c.

4.3.2.4 Work undertaken by:

The research programme for vegetation surveying was set up by the MoorLIFE Science Officer. The plots were then set up and monitored annually by the MoorLIFE Science Officer, MFFP fixed term staff and a team of trained casual staff and volunteers. The data was compiled by the field surveyors. This data was then analysed, interpreted and presented in the interim and final reports by the MoorLIFE Science Officer.

4.3.2.5 Project management:

Following setting up of the sites at the beginning of the project, the vegetation surveys were planned for late summer, between July and September. These surveys took place as planned; the only exception to the work was where consents for surveying were not given. Surveys were not undertaken on treatment sites in 2012 because of the weather conditions experienced

in the UK in late summer/autumn 2012. 2012 was the second wettest year on record, and the conditions were such that completing all of the vegetation surveys was not possible.

4.3.2.6 Overview of work:

MoorLIFE treatment sites were set up with 150 quadrats between winter 2010 and spring 2011. Surveying of the vegetation works took place in the summer of 2011, 2013 and 2014. Previously re-vegetated sites were monitored using 117 existing quadrats, bringing the total number of quadrats monitored to 267 quadrats. These pre-existing quadrats were monitored in summer 2010, 2011, 2012, 2013 and 2014.The results of the data were analysed and reported in the mid-term and final reports.

Baseline *Sphagnum* transects were also set up on Black Hill, Turley Holes, Rishworth Common and Bleaklow prior to *Sphagnum* applications.

The Interim Report was submitted at the EU Monitor Desk Officer visit on 25 September 2014, and is included in Annex 9a. The Final Report is included in Annex 9b. The main results from the report are detailed in Section 6.

4.3.2.7 Modifications:

The only modification to this action was the addition of *Sphagnum* transects, which were not included in the original bid. These were added to the monitoring programme because *Sphagnum* was not being properly represented in the quadrats. Transects are a more appropriate method of determining whether *Sphagnum* is present on sites or not, and so these were used to conduct baseline surveys for areas with planned *Sphagnum* applications.

4.3.2.8 Issues:

Adverse weather resulted in some of the monitoring days being cancelled. However, overall this did not affect the ability to monitor the success of works as data on the early success of nurse crop – representing one year post-seeding for Turley and Rishworth, and two months after seed application on Woodhead.

Permission to access sites on Turley Holes for monitoring was delayed in 2012. Although this should not have been a problem as the surveys could have been carried out at the end of the 2012 monitoring season, as described above poor weather for the mid-late part of the survey season resulted in limited surveys being taken.

4.3.3 Action E3: Monitor water table and carbon budgets

4.3.3.1 Outline of task:

The overall aim of the action is to assess the impact of the restoration works (Actions C1-C3) on the hydrology and carbon budget of the restored areas. Specifically the monitoring will be undertaken in three ways.

1. Measure the water table: Ultimately, functioning blanket bog is determined by its hydrology, and the long-term recovery of the sites hopefully leads to, and is aided by, raised water tables. As part of the MoorLIFE project water tables were monitored using manual dipwells and automatic data loggers.

2. Peat loss/accumulation: Peat capture and accumulation were due to be assessed through the use of a network of peat pins installed at dipwell sites. In the long-term, restoration should lead to the recovery of peat formation and carbon sequestration. The first stage, however, is to stop erosion and the associated considerable soil carbon loss.

3. Water samples: During the project, water samples will also be taken from plots to monitor changes in the loss of carbon through water colour (dissolved organic carbon) and turbidity (particulate organic carbon).

To assess the impacts of all restoration techniques, monitoring will be undertaken on:

- moorland sites restored under actions C1-C3;
- control sites, including:
    - bare peat with no restoration actions;
    - intact moorland.

See Annex 4, Maps 1c to 1f for locations of the monitoring sites.

4.3.3.2 Target:

Two reports

4.3.3.3 Status:

Both reports have been written (Annex 9a, and 9c) and are available for download on the MoorLIFE website (www.moorsforthefuture.org.uk/moorlife-reports).

Example photographs of the works undertaken as part of the monitoring surveys, are included in Annex 10c.

4.3.3.4 Work undertaken by:

Dipwell clusters were installed by the MoorLIFE Science Officer and casual research assistants. Water table measurements were undertaken by teams of casual research assistants and volunteers. Data was input by casual research assistants and analysed by the MoorLIFE Science Officer.

4.3.3.5 Project management:

Dipwell clusters were established on the conservation sites, and were set up between summer 2010 and March 2011. Dipwell clusters consisted of one automated dipwell and 15 manual dipwells within a 30 x 30m area. 12 peat pins were also installed at the dipwell cluster sites.

Water samples were collected from gullies and/or streams on each MoorLIFE site. The catchments chosen to sample drained areas consisted of different restoration scenarios:

- treatment areas;
- intact previously re-vegetated sites, and;
- untreated bare peat.

The sites were then visited on 12 occasions between October and December annually by casual research assistants and volunteers as part of MFFP's annual dipwell campaign. The data collected was then interpreted to establish the impact of conservation works on the hydrology of the sites. The results are reported in the mid-term and final reports.

4.3.3.6 Overview of work:

The following data was collected through the project.

- Water table: 26 dipwell clusters were established across the four sites. Data was collected from the sites in 2011, 2012, 2013, 2014.

- Peat loss/accumulation: After monitoring in the second year of the project it was established that peat pins were not an accurate way of measuring carbon loss. This was because the pins were subject to a high level of disturbance through freeze-thaw as well as human activity. As a result, measurements on peat pins were discontinued. This was reported in the 2012 Progress Report. Improved methods of measuring peat flux have been established using peat anchors (rods inserted into the peat all the way to the mineral substrate) have been installed for other projects and will eventually be used as a proxy for the MoorLIFE sites. This is a long-term monitoring method and as yet no results are available.

- Water samples: Water samples were collected during the dipwell campaigns in 2011 and 2014. Water samples were taken from gullies/streams rather than plots. Samples were sent to external labs in 2011 for direct measurement of dissolved organic carbon and particulate organic carbon. In 2014, this analysis was carried out internally.

4.3.3.7 Modifications:

The methods undertaken were modified versions of those proposed in the original bid.

Due to the time taken to monitor the number of dipwells, the dipwell campaigns changed from a two-three day campaign per year to 12-week campaigns every year. It was also originally proposed that Peak District National Park Rangers would be used to undertake the dipwell campaigns. However, changes to the pay structure for volunteer Rangers meant that an honorarium could not be paid for the work. As a result, casual research assistants were used.

As discussed above, peat pins were not used after the first year of monitoring as it was found that they were easily disturbed, and therefore did not provide accurate measurements of peat loss or accumulation.

4.3.3.8 Issues:

A potential issue for the 2014 dipwell campaign was the battery life on the automatic dipwells. The batteries on around 11 of the 26 units failed 18-24 months earlier than anticipated, resulting in a short gap in the data collected. Replacement batteries were installed and the dipwells were returned to sites for the final autumn/winter monitoring period. The lapse in data did not have a significant impact on the ability to analyse temporal changes in water tables over the five year project.

4.3.4 Action E4: Knowledge transfer and dissemination

4.3.4.1 Outline of task:

Monitoring the 'reach' and effectiveness of our knowledge transfer, education and awareness-raising work is critical to assess success of our work and to inform the work undertaken, so that changes can be made to the communication and dissemination actions, if necessary.

4.3.4.2 Target:

Two reports

4.3.4.3 Status:

Both reports have been written (Annex 9d, and 9e) and are available for download on the MoorLIFE website (www.moorsforthefuture.org.uk/moorlife-reports)

4.3.4.4 Work undertaken by:

The data has been collated and reports written by the MoorLIFE Communications Officer.

4.3.4.5 Project management and overview of work:

Data was collected throughout the project on the following dissemination actions:

- Website usage statistics
- Facebook statistics
- Twitter feed statistics
- Downloads of podcasts, audio trails, field guide apps and Be Fire Aware games and maps
- Presentations and presentation of posters at industry events
- Published articles referencing MoorLIFE works
- Published reports referencing MoorLIFE works
- Feedback from conferences and seminars.

The results have been discussed in Section 5 and in the two reports included as Annex 9d and 9e.

4.3.4.6 Modifications:

Data capture has been a key part of the project, and various methods to collect data have been used over the course of the project. This information has been used to adapt how work is carried out and prioritised. For example, Facebook statistics showed that we had a lot of outdoor enthusiasts following our work. This feedback meant that we were confident that putting information into Harvey's Maps about the conservation work would be a beneficial way to promote the project to a key target audience.

4.3.4.7 Issues:

In the case of the audio trails, it was not possible to obtain accurate download figures. This was because the additional analytics tools to monitor downloads were not installed on our website when the first trails were released (although data on page views was available). This was rectified for the following two trails (Rishworth Common and Turley Holes). To keep the data consistent, page views has been used to analyse the success of the trails.

4.3.5 Action E5: Carbon audit

4.3.5.1 Outline of task:

An audit of carbon consumption across the MoorLIFE project was undertaken for capital works actions. This was to ensure that the project was carbon efficient and to identify where carbon savings might be made.

4.3.5.2 Target:

Two reports

4.3.5.3 Status:

Both reports have been written (Annex 9f, and 9g) and are available for download on the MoorLIFE website (www.moorsforthefuture.org.uk/moorlife-reports).

4.3.5.4 Work undertaken by:

The scope and methodology for the carbon audit was established by the MoorLIFE Science Officer. Data was collated by a casual member of staff, with analysis and reporting undertaken by the MoorLIFE Science Officer.

4.3.5.5 Project management:

Data collation began in 2012 for the first two years of the project. Data was then collated at the end of the financial years in 2013, 2014 and 2015. Analysis for the first report was undertaken in 2014 following the first four years of work, and then at the end of the financial year 2014/15 when all the conservation actions had been completed.

4.3.5.6 Overview of work:

Due to the complexity of conducting a carbon audit, the activities included in the carbon audit report were limited to the conservation activities. These activities were chosen for three reasons:

1. Those activities are likely to emit the highest levels of carbon.
2. Those activities are those that are most commonly queried as they can often seem counter-productive to the aim of the conservation works (ie the use of helicopters does not seem very environmentally friendly).
3. Those activities that MFFP can accurately document as it has a high level of control and supervision over the works.

Therefore, the following actions were included in the audit.

- C1: Stabilising bare peat and halting erosion through planting nurse grasses.
- C2: Increasing stability and resilience by introducing structural blanket bog species.
- C3: Gully blocking to stop peat erosion and restore hydrological integrity.

Carbon data was collected on 'Scope 3' emissions, as defined by the UK Government's Department of Environment Food and Rural Affairs (Defra). Most of the conservation works fall under Scope 3 emissions, which are defined as: "Emissions that are a consequence of your actions, which occur at sources which are not owned or controlled, and which are not classed as scope 2 emissions".

Information for the carbon audit was gathered using works plans, interviews with contractors, invoices and GIS data. The data collected included staff and contractor mileage, flying and

delivery of materials. Defra guidelines and the Defra / Department of Energy and Climate Change (DECC) Greenhouse Gas Conversion Factors tool was then used to calculate the carbon emissions. The total amount of carbon saved from undertaking the works was calculated by estimating the amount of bare peat restored and using work carried out by Worrall *et al* (2011)[ii] to provide information about the carbon benefit of undertaking restoration works.

4.3.5.7 Modifications:

The main modification to this action was to exclude Scope 1 and Scope 2 emissions from the audit. These emissions included indirect emissions such as the production of lime, seed and fertiliser, and emissions from office-based activities. In the final carbon audit report, some of these figures have been estimated to give an indication of their effect, but in general they have been excluded.

The reason for this modification was to allow a thorough analysis of the key carbon-emitting elements of the project, and those elements which MFFP had a high level of control over.

4.3.5.8 Issues:

When compiling the data required for the audit, it was found that a higher level of detail than originally anticipated was needed in the documentation recording the conservation works that had taken place. This finding is not uncommon for organisations undertaking a carbon audit for the first time, and allowed MFFP to make improvements over the course of the project in what information was collected and how it was recorded. In doing so, MFFP has developed a model that can now be applied to any project involving the activities measured through MoorLIFE.

4.3.6 Action E6: AfterLIFE Plan

4.3.6.1 Outline of task:

As required under the Common Provisions, an AfterLIFE conservation plan has been produced to set out how MFFP proposes to build on the actions initiated during the project, and how the long-term future of the project sites will be secured.

4.3.6.2 Target:

One report

4.3.6.3 Status:

The AfterLIFE report has been written (Annex 9j) and is available for download on the MoorLIFE website (www.moorsforthefuture.org.uk/moorlife-reports).

4.3.6.4 Work undertaken by:

The AfterLIFE report was written by the MoorLIFE Project Manager with input from the MFFP management team.

4.3.6.5 Project management and overview of work:

The AfterLIFE report was scheduled to be written at the end of the project once the majority of the conservation and dissemination actions were complete, and once monitoring results had been confirmed. The report was written in consultation with MFFP's management team, and includes work to be conducted by MFFP, as well as partner organisations such as Natural England.

4.3.6.6 Modifications:

There were no modifications to this action.

4.3.6.7 Issues:

There were no issues to report for this action.

4.3.7 Complementary Actions outside of LIFE

The Environment Agency and United Utilities funded a monitoring programme on Woodhead to study the effects of MoorLIFE and Natural England Conservation Plan Project (NECPP) gully blocking on water flow and water quality. This study began in 2012. It involved the installation of nine flow stations, from which discharge was monitored using data loggers, and water samples were collected every two weeks. In addition, surveys were undertaken of gully blocks to assess sediment accumulation.

The Woodhead Gully Block Monitoring project took place on MoorLIFE sites, and so provided evidence of the impact of the works under the MoorLIFE project. MFFP also have a wider monitoring programme on other works sites that can be applied to MoorLIFE sites and help provide further evidence of the impacts of the works.

Having a landscape-scale monitoring programme enables us to monitor a wider range of restoration outcomes. Other projects that help provide a proxy and comparison for MoorLIFE works include:

- Making Space for Water – project funded by Defra that provides evidence of the impact of works on flood risk.
- Moscar Science Project - project to investigate the impact of grouse moor restoration on grouse moor economics, biodiversity and ecosystem services
- Dark Peak Nature Improvement Area - Project management of the success of the Dark Peak Nature Improvement Area in achieving its land management works and biodiversity targets.
- Kinder Catchment Monitoring – monitoring of vegetation, water tables and water quality changes as part of a National Trust capital works project.
- Catchment Restoration Fund – works and monitoring programme for the catchments of the rivers Alport and Ashop in the Upper Derwent Valley

4.3.8 Continuation of works after LIFE

To date, no MoorLIFE monitoring sites have been decommissioned. The equipment has minimal impact on the moors and so has remained in place. Data loggers are continuing to collect data on water table and arrangements are currently being made to enable continued access to MoorLIFE sites for long-term monitoring.

Moors for the Future are currently assessing a wider monitoring strategy to best understand which sites should continue to collect data to best inform our understanding of the long-term benefits of capital works. Confirmed monitoring works include the collection and analysis of vegetation data on Black Hill and Bleaklow, directly building on MoorLIFE monitoring work. This work is being funded by Natural England.

In addition, a number of MFFP's partners are interested in continuing monitoring works to provide continued evidence of the benefits of conservation actions. For example, Woodhead is within a Water Safeguard Zone, and there is keen interest in continued monitoring on this site.

5. Dissemination Part

5.1 D Actions: Dissemination Actions

5.1.1 A note on project management

The MoorLIFE communications officer was recruited and appointed to the MoorLIFE project at the end of November 2010.Work immediately began on a number of project deliverables scheduled for the start of the project, as noted in the inception report. A Communications Delivery Plan was submitted as part of the 2012 Interim Report.

In May 2012 the Communications Officer was seconded to the post of Information Officer at MFFP, while a restructure of the MFFP staff team was completed, with the Communications Officer being appointed as Communications Programme Manager in June 2012. During this time, the work of the MoorLIFE Communications Officer was backfilled by members of the MFFP casual Administrative Assistant pool (with an honorarium to bring them to the Communications Officer grade). A new Communications Officer (who had been working on the project as outlined previously) was appointed on 21 October 2013. Impact on deadlines has been noted in the individual sections below.

5.1.2 Action D1a: Establish and maintain a project website

5.1.2.1 Outline of task:

The aim of the website content was to provide information about moorland restoration techniques and the project's achievements and activities. The site is also the delivery vehicle for many of the education, awareness raising and dissemination work activities.

5.1.2.2 Target:

One project website to be created.

5.1.2.3 Status:

The website is in place at www.moorsforthefuture.org.uk/moorlife. An agreement has been made with Moors for the Future to maintain the website for the next five years, until 2020. This is detailed in Annex 11a, and will include all MoorLIFE deliverables that are currently hosted on the website. The website includes the MoorLIFE reference, EU LIFE+ logo, and Natura logo as required by the Common Provisions.

5.1.2.4 Work undertaken by:

The website was set up and development work was carried out by sub-contractors. The content of the website is managed by the MoorLIFE Communications Officer and updated using the website's content management system.

5.1.2.3 Project management:

The MoorLIFE section of the website was created in September 2010. Work on updating the site content has been ongoing and was completed in August 2015.

5.1.2.4 Overview of work:

The MoorLIFE website contains 15 sections as follows:

1. Title page: The main page includes summarising the key achievements and outputs of the project.
2. Project Sites: This area has separate sections and maps for each of the sites, as well as information about why each site is important and the figures on works completed.
3. Conservation: Contains information about the key methods of conservation, including links to other areas of the website where more information can be obtained. An additional page is dedicated to *Sphagnum* reintroduction along with the *Practitioners' Guide to the Reintroduction of Sphagnum*.
4. Monitoring: Contains information about the monitoring work that took place on the sites, including downloadable reports on the mid-term and final results from the monitoring programme and sub-pages on water and vegetation monitoring.
5. Layman's report: With links to download, read online or order a copy.
6. Be Fire Aware: Contains online versions of the Be Fire Aware games and interactive Be Fire Aware map and a description of the ground-breaking fire risk map.
7. MoorAPPS: Contains links allowing members of the public to download each of the apps, as well as the accompanying PDF.
8. Page with information about and links to download the four MoorLIFE audio trails.
9. Page with links to the project promotional video and the video podcasts on conservation and monitoring techniques.
10. Page with links to all the project photo galleries.

11. Page for the MoorLIFE education resources, with videos from the winning entries for the competition and downloadable lesson plans and teaching packs.
12. Page with links to all press releases and news items produced by the project.
13. Page dedicated to conferences with sub-pages for the project launch event, opening MoorLIFE conference, seminar and final conference. Each page has links to download or watch the presentations.
14. Page with links to download all the reports produced by the project.
15. Page dedicated to project partners.

All other deliverables from the project are held on the main MFFP website, including the interactive project map that shows the size of the project within the context of the wider work of the Partnership and the location and proximity to major cities. It is available at www.moorsforthefuture.org.uk/project-map/moorlife

Alongside the website, the MoorLIFE project has a strong presence on MFFP's Facebook, Twitter, You Tube channel and Instagram accounts.

- Facebook: https://www.facebook.com/moorsforthefuture
- Twitter: https://mobile.twitter.com/moorsforfuture
- Moors for the Future YouTube channel: https://www.youtube.com/user/MoorsForFuture
- Instagram: https://instagram.com/moorsforthefuture

5.1.2.5 Feedback from dissemination action:

There have been 436,500 page views to the site as a whole since August 2010 (the earliest data available). The MoorLIFE section of the website accounts for over 24% of these views, with an average 32,746 page views per year. See Annex 7a Google Analytics report for details.

The expected results as outlined in the bid were 5,000 website hits per month. This has been achieved and exceeded when dissemination via social media is taken into account. This reflects the huge shift in online behaviour over the past five years from websites towards social media, video and photo sharing sites and apps. Our social media accounts are managed by the MoorLIFE Communications Officer and tweets alone reach a monthly average of 15,000 impressions (number of time Twitter users saw our tweets). See Annex 7b for Twitter Analytics.

An example of this success is a campaign to promote our newly produced smartphone apps which reached over 56,000 accounts in one week.

Our Facebook posts reach a smaller audience, which can vary between 50 - 1,500 depending on the popularity of the individual posts, but we have higher levels of engagement in the form of likes, comments and shares. More detail and examples are available in our dissemination report (Annex 9e).

5.1.2.6 Modifications:

By incorporating the MoorLIFE pages within the MFFP website we have helped promote the project as part of a larger programme of works. The joint website also means that we provide

more information that is relevant to students and those interested in learning more about moorlands and uplands – for example, the research notes and publications information.

The original bid stated that a Restoration Manual, which was at that time in preparation, would be added to the MoorLIFE website to outline best practice techniques for the restoration of blanket bog in the uplands. This action had no budget associated with it and unfortunately, for reasons outside of the MoorLIFE project, the Restoration Manual was not completed and so could not be added to the project website.

In place of the Restoration Manual, a *Practitioners' Guide to the Reintroduction of Sphagnum* has been produced, which is believed to be the first of its kind. This publication outlines the key methods in place for reintroducing *Sphagnum* in the uplands and will be a great tool in transferring knowledge within the conservation of active blanket bog community. This guide will be a unique and sought-after piece of reference and evidence work which will help promote the ground-breaking *Sphagnum* reintroduction work delivered through MoorLIFE.

5.1.2.7 Issues:

A facility to record the number of downloads in Google Analytics, (including audio trails and reports) was added to allow for better recording of project outputs. Unfortunately this was not in place in time for the release of the first audio trails but we have used this to track the success of our smartphone apps and project reports.

5.1.3 Action D1b/c: Design and erect project information boards and works noticeboards

5.1.3.1 Outline of task:

Project information boards have been put up at three key moorland gateway sites in the Dark Peak SSSI and the South Pennine Moors SSSI to reflect the two geographical areas of concrete conservation works. The aim of the boards was to provide visitors with engaging in-situ information on the special qualities of the area and the aims of the project.

Works noticeboards have been put up near restoration sites where works were taking place. These boards provided information on the project and act as a public service platform for providing up to date in-situ information on scheduling of restoration actions in the area.

5.1.3.2 Target:

Two A0-sized project information boards erected at two key moorland gateway sites (one in the Dark Peak SSSI, one in the South Pennine Moors SSSI to reflect the two geographical areas of concrete conservation works).

Two A3 restoration notice boards erected at each of the four restoration sites.

5.1.3.3 Status:

Three information boards have been erected, and three restoration notice boards.
See Annex 4, Map 1b and Annex 7c and 7d.

The notice and works boards include reference to the MoorLIFE project, EU LIFE+ logo, and Natura logo as required by the Common Provisions.

Moors for the Future Partnership will maintain the noticeboards for the next five years and remove them in 2020. A letter outlining the agreement is included in Annex 11b.

5.1.3.4 Work undertaken by:

Liaison with landowners and planning bodies was carried out by the MoorLIFE Communications Officer. The noticeboards were designed and installed by contractors. The content for the noticeboards and works updates was written by the MoorLIFE team, and managed by the MoorLIFE Communications Officer. Updates were designed, printed and installed by a contractor.

5.1.3.5 Project management:

Boards were delivered and installed as suitable locations were found in late 2011 and 2012. Works noticeboards were updated in June 2013 and September 2014. The second update was delayed slightly while the Communications Officer prioritised finishing and launching the Be Fire Aware displays. Final updates were installed in July 2015 once firm figures on conservation works were available.

5.1.3.6 Overview of work:

At key access sites to the MoorLIFE project areas we have installed information and works noticeboards. They are written in plain English and are aimed at the general public and recreational use of the footpaths and sites.

The noticeboards have been installed at access gateways, predominantly car parks, where visitors generally start and finish their moorland activity, and therefore are a prime opportunity to disseminate information to interested users.

The information boards are in the following locations (see Annex 4, Map 1b).

- Bleaklow: Torside car park which is close to the Pennine Way and Trans-Pennine trail, the start of hiking routes onto Bleaklow and includes an unstaffed information centre.
- Black Hill & Bleaklow: Crowden car park which is along the Pennine Way, next to an outdoor pursuits centre and campsite, and at the start of popular walking routes onto Black Hill.
- Turley Holes and Rishworth: Blackstone Edge Reservoir which provides access to both sites, is on the Pennine Way and is on a road popular with hikers, dog walkers and people enjoying a stroll after lunch in the nearby popular pub.

The works noticeboards are in the following locations (see Annex 4, Map 1b)

- Bleaklow: Torside car park
- Turley Holes: Blackstone Edge Reservoir
- Rishworth Common: Windy Hill Transmitter car park, close to the southern end of Rishworth

The works noticeboards have been updated three times since installation. The final update took place in July 2015 to include all works that have taken place. This brings the total number of versions of the works noticeboards to 12.

5.1.3.7 Modifications:

Some issues arose regarding gaining planning consent in the ideal locations. These issues were discussed with the EU Monitor and the approach taken was agreed in EC correspondence dated 30 March 2012.

5.1.3.8 Issues:

There has only been one instance of damage to the boards. The noticeboard at Turley Holes suffered minor damage and had to be taken down due to health and safety considerations. The board was reinstated in summer 2014 by the United Utilities ranger for the area. This did not impact on any other deliverable.

5.1.4 Action D1d: Undertake project launch event

5.1.4.1 Outline of task:

A project launch was held at Holme Moss on 21 July 2010.

5.1.4.2 Target:

One launch event

5.1.4.3 Status:

An event was held for staff, partners, stakeholders and the media in July 2010 to celebrate the project launch.

5.1.4.4 Work undertaken by:

The event was organised by the MoorLIFE team supported by MFFP.

5.1.4.5 Project management:

The work was initially planned for September 2010 and took place ahead of schedule in July 2010.

5.1.4.6 Overview of work:

The launch event took place on Black Hill with a keynote address from Poul Christensen, Chair of Natural England, a guided walk on Black Hill to explain bare peat restoration and a talk about techniques for reintroduction of *Sphagnum*.

Organisations represented included universities, Natural England, conservation bodies, charities and industry.

5.1.4.7 Feedback from dissemination action:

50 people attended the event.

5.1.4.8 Modifications:

There were no modifications to the action.

5.1.4.9 Issues:

There were no issues to report.

5.1.5 Action D1e: Produce promotional video

5.1.5.1 Outline of task:

A promotional video was produced during the project which can be watched by members of the public, and for release to the media. It was originally intended that the promotional video would include a before and after fly-over video of the restoration areas with details on the project, landscape and restoration techniques.

5.1.5.2 Target:

One promotional video

5.1.5.3 Status:

The promotional video is available on the MoorLIFE website at: http://www.moorsforthefuture.org.uk/moorlife-project-video and has been provided on the hard drive sent alongside the report.

It includes information on moorland sites, key achievements of the project as well as strategic outcomes and ecosystem benefits.

As a secondary outcome of the work, flyover videos for each of the sites have been compiled. These are available on MFFP's website at: http://www.moorsforthefuture.org.uk/videos

The videos all include the MoorLIFE reference, EU LIFE+ logo, and Natura logo as required by the Common Provisions.

5.1.5.4 Work undertaken by:

The before and after flyover videos were filmed by two separate contractors due to the length of time between the filming. The footage was then compiled by a contractor who specialised in film making. The MoorLIFE Communications Officer managed the delivery and sign off of the promotional video.

5.1.5.5 Project management:

Final completion of the video was initially planned for June 2014.

Filming took place in October 2010 and July 2014, ensuring that the final filming took place as late as possible to capture imagery of the sites in their optimum condition. Work on producing the final video was therefore delayed accordingly. The process of producing the film commenced in October 2014 with the selection and appointment of a supplier and the finished video was delivered in January 2015.

5.1.5.6 Overview of work:

The first flyover video was filmed at the beginning of the project to show what the moors were like prior to restoration works taking place. The 'after' video was shot in summer 2014, to demonstrate the changes that have taken place over the course of the project.

Footage taken from time-lapse cameras and filming for the podcasts was also included in the promotional video, along with photos and animations to allow the promotional video to tell the MoorLIFE story.

Flyover videos showing footage from before and after restoration were created at the same time and are also available for all four of the MoorLIFE sites as follows:

- Bleaklow
- Black Hill
- Rishworth Common North
- Rishworth Common South
- Turley Holes

The promotional video was launched at the Final MoorLIFE conference in March 2015.

5.1.5.7 Feedback from dissemination action:

The video was launched at the MoorLIFE conference and has been distributed to MoorLIFE co-financiers for use in their work. It has been used by the Peak District National Park Authority Chief Executive and the MFFP Partnership Manager at talks and presentations to give an overview of the project and an example of the work of the wider Moors for the Future Partnership. The Peak District National Park Learning and Discovery team have recommended it as an introduction to their outdoor learning activities and Moors for the Future staff show the video at external events. The video has also had 350 views on YouTube.

5.1.5.8 Modifications:

There were no major modifications to the scope of this action.

5.1.5.9 Issues:

When comparing the ‘before’ and ‘after’ footage, it became clear that the differences between quality of the filming available to the team in 2010 and 2015 were quite significant. This meant that it was very difficult to compare like-for-like shots of the moors, as the colour, resolution and differences in camera position and angles of the two videos was too significant to make a useful comparison.

For this reason, the promotional video used flyover shots of boundaries of work areas, as well as exclusion areas to demonstrate the changes that the project has made. So to fully utilise the ‘before’ and ‘after’ videos, clips have been made of each of the work sites showing the sites pre and post-restoration.

5.1.6 Action D1f: Undertake media events

5.1.6.1 Outline of task:

Media events were to be staged during the project, including a press conference and site visits to maintain a high public profile.

5.1.6.2 Target:

Three events.

5.1.6.3 Status:

Seven events took place over the course of the project.

Annex 7e lists all media coverage including the events listed below.

5.1.6.3 Work undertaken by:

Work to generate media interest and to invite the media along to events was carried out by the MoorLIFE Communications Officer.

5.1.6.4 Project management:

The work was initially planned to take place throughout the project and took place in tandem with MoorLIFE events and when media opportunities arose.

5.1.6.5 Overview of work:

The following media events have taken place:

- Project launch at Black Hill.
- Visit to Black Hill by eminent ecologist Professor Sir John Lawton and a journalist resulting in an article in Derbyshire Life magazine.
- Be Fire Aware launch July 2014 - resulting in an article in national fire services professional journal, Fire Times.
- Filming with BBC TV Look North – with an item broadcast on regional television.
- Site visit with Tom Heap – resulting in a feature on BBC Countryfile shown on national television.
- Filming for a documentary programme, Earth Rise, shown on global news network, Al Jazeera (English), covering environmental issues.
- Filming of our work on *Sphagnum* for cBBC Newsround, a national children's TV programme.

5.1.6.6Feedback from dissemination action:

We are regularly approached by media outlets including, newspapers, radio and television.

5.1.6.7 Modifications:

There have been no significant modifications to this action.

5.1.6.8 Issues:

There have been no negative mentions of the MoorLIFE project in the media.

5.1.7 Action D1g: Produce promotional material

5.1.7.1 Outline of work:

Display stands and printed/print-on-demand literature was produced to promote the project at targeted outlets and events. Environmental considerations were made when determining print-runs, and where suitable, literature is available to download.

5.1.7.2 Target:

- Four display stands
- Up to 30,000 leaflets and 30 posters (expected results outlined in bid)
- 6 press releases per year (expected results outlined in bid)

5.1.7.3 Status:

- One exhibition stand with a series of photos representing the conservation works of the project and three banner stands have been produced. See Annex 7f
- Two versions of the MoorLIFE leaflet have been printed (print run of 500 and 5,000 respectively). See Annex 7g and Annex 7h
- Promotional information has been included on Harvey's Map's Dark Peak Superwalker (2,200 copies printed) replacing a final project leaflet. See Annex 7i
- 6,000 leaflets to promote the audio trails. See Annex 7j
- Five Posters have been produced and displayed at conferences throughout the course of the project. See Annex 7k
- 28 press releases with a further 3 to be released in late 2015 to promote the results of the vegetation, carbon and water monitoring programmes.
- 100 Fire Ranger DVDs
- 100 Fire Danger DVDs
- 100 Fire Risk Tool DVDs

Copies of the DVDs are found in Annex 7q-7s.

All banners, leaflets, posters and press releases reference the MoorLIFE project and include the EU LIFE+ logo, and Natura logo as required by the Common Provisions.

5.1.7.4 *Work undertaken by:*

Work on the concept and content for the stands, leaflets and promotional information has been written by the MoorLIFE Communications Officer. Contractors designed and produced the stands and leaflets. The work with Harvey's Maps was written by the MoorLIFE Communications Officer, and designed, printed and distributed by Harvey's Maps and their sub-contractors.

Press releases have been written by the MoorLIFE Communications Officer with additional support from casual staff.

5.1.7.5 Project Management:

The work to produce leaflets and banners was initially planned for the beginning of the project with leaflet updates in September 2012 and December 2013. Project banners were due to be completed in September 2014.

An exhibition stand and banner were produced for the launch in July 2010. Two new banners were produced in May 2013.

Initial leaflets were produced in June 2011. Updated leaflets were delivered in July 2013.

Audio trail leaflets were produced in July 2012 and February 2014.

Harvey maps were produced in April 2015.

Press releases were issued throughout the course of the project, dependent on delivery dates of all aspects of project work, and therefore changed from the delivery plan of 2012.

5.1.7.6 Overview of work:

The banners and leaflets have been displayed at the visitor centres across the National Park and at the Peak District National Park Authority head office at Bakewell. They were also used and distributed at internal and external promotional events and will continue to be used at future events.

When attending conferences and external events, the MoorLIFE team have used every opportunity to promote the MoorLIFE project in poster sessions. The following posters have been produced:

- MoorLIFE Be Fire Aware
- *Sphagnum* Reintroduction in the South Pennines – A Partnership Approach
- *Sphagnum* Seminar: Identifying knowledge gaps and barriers
- Science Programme: Integrated Monitoring and Demonstration Catchments
- Restoration works: Conserving Active Blanket Bog

These have been taken to the following events:

- IUCN conference 2013 and 2015
- Peak District National Park members meeting
- MoorLIFE *Sphagnum* seminar
- Environment Agency drop-in session

The MoorLIFE Communications Officer also issued regular press releases relating to work done on the project. Throughout the course of the project, 28 releases have been sent out, with a further 3 releases planned to be issued by MFFP to publicise the vegetation, water and carbon audit reports.

Releases are targeted as necessary to local and national press, the scientific and practitioner community as well as trade and lifestyle publications. Press releases are also sent to the EU LIFE communications team and internal communications teams of partners who are keen to promote the work and benefits of the project.

The team has also worked with partners like Manchester Metropolitan University getting information out to a technical audience, as with an article in Fire Times; a monthly magazine for fire service professionals (average 29,500 readers).

The MoorLIFE Project Manager gave presentations at the Europarcs conference in 2012 and 2013.

A full list of press releases can be found in Annex 7l.

The project had significant success in attracting media coverage. The project has featured in the following places among others (see Annex 7e):

- Sunday Times, UK national broadsheet paper
- Geographical Magazine (due for publication in autumn 2015), national specialist magazine
- Costing the Earth, BBC4 Radio 4, respected national environmental radio programme
- Earthrise, international documentary on innovative environmental solutions
- The Scientist, national specialist magazine
- Local and regional radio interviews to promote our audio trails
- Yorkshire Post, Manchester Evening News, Sheffield Star, Oldham Chronicle have all featured the project's progress – enabling us to reach and inform large city conurbations surrounding the Peak District and South Pennines area.

The project has also attracted interest from other publications – including trade journals and magazines targeted at the public using the moors. Our work has appeared in the following publications:

- Biodiversity News, Defra newsletter targeting policymakers and leading conservation practitioners
- Biologist, national magazine
- The Great Outdoors, national recreation magazine

5.1.7.7 Feedback from dissemination action:

We were approached by Harvey's maps with an offer of inclusion on their maps because they believed our moorland conservation work would be of interest to their target audience of walking, hiking, rambling, running, cycling, climbing and orienteering communities. This was considered as an alternative to producing a final project leaflet as it would allow us to specifically target moorland users to inform them of the results of our work.

The inclusion of our work on Harvey Maps has attracted positive comments, including a review on the Outdoors Magic website which praised the use of space to inform users about the project and benefits of our work.

We have actively engaged with the press and media throughout the project, having media coverage on at least 133 occasions (this figure is based on coverage we have been notified of). All of our press releases can be found on our website. Our press releases are often picked up by national and local media. As online media consumption increases, our work is also frequently discussed online.

5.1.7.8 Modifications:

It was originally planned that a final MoorLIFE leaflet would be produced at the end of the project. Instead the MoorLIFE Communications Officer was offered space on Harvey's Maps to write about the work carried out by the MoorLIFE project. The maps are well used by people walking and running on the moors (they are often the favoured map for fell runners and orienteering), and so this opportunity was taken to promote our work directly to people walking and running over the areas that that been restored.

5.1.7.9 Issues:

There were no issues around this aspect of the work.

5.1.8 Action D1h: Produce educational material

5.1.8.1 Outline of task:

It was planned that two types of educational materials were to be produced:

1. Formal teaching resources - including lesson plans relating to a number of National Curriculum subjects and assembly ideas.
2. Comic book - presenting key messages in an informative and fun way and designed to break down possible resistance to traditional learning materials and to reach young people who may have problems in the existing educational system. These would be developed in conjunction with three schools neighbouring the moorlands through a series of cartoon workshops and feedback sessions.

The aim was to target school children, providing a way of them learning about how to care for the moors from an early age.

5.1.8.2 Target:

- Resources for schools
- Promotional educational videos (amended from the original target of producing 5,000 comic books).

5.1.8.3 Status:

- Assembly materials and lesson plans for primary and secondary schools have been produced and are available on the website: www.moorsforthefuture.org.uk/moorlife-learning.
- Two videos have been produced and are available for download on the MoorLIFE website: www.moorsforthefuture.org.uk/moorlife-learning.

The leaflet advertising the competition run for schools is included in Annex 7m.
The materials are included in Annex 7x.

The education materials and videos include the MoorLIFE reference, EU LIFE+ logo, and Natura logo as required by the Common Provisions.

5.1.8.4 Work undertaken by:

Content for the educational material was provided by the National Park Authority's Learning and Discovery team who also ran the competition for schools to submit stories, poems and drawings. The videos were produced by a contractor who was hired to work with the winning schools. The MoorLIFE Communications Officer oversaw the work.

5.1.8.5 Project Management:

The work took place from spring 2011 and was completed July 2013 with a screening of the winning videos.

5.1.8.6 Overview of work:

The lesson plans and assembly ideas were developed in 2011 and 2012 by the National Park Authority's Learning and Discovery team working with the MoorLIFE Communication Officer. There are separate topics covered for primary and secondary schools, covering the

ecology and ecosystems on the moors. The team worked with a total of 862 children in 11 schools to promote the materials, by holding 9 talks with students to promote the online resources and the competition. A follow up visit was held with one primary school, using the primary lesson plan with 3 classes.

We promoted the competition by targeting 607 schools in the Sheffield and Derbyshire area and via the Barnsley schools website, the Moorland Discovery Centre, Peak District National Park contacts list, word of mouth through National Park staff and rangers, the Babbling Vagabonds theatre group, MFFP's website and launch press release.

The competition attracted 105 individual entries from five schools, one of which was a secondary school.

An event was held to celebrate the winners on 10 July 2013, with an audience of 27 children and 32 adults. The prize was the opportunity to work with a professional theatre group to produce a film about the effect of fires on the moors. Two videos were produced by the winning school children, and are available to download on the website. The videos have had 278 views on YouTube.

The videos, lesson plans and assembly materials are available for download on the MoorLIFE website: www.moorsforthefuture.org.uk/moorlife-learning.

5.1.8.7 Feedback from dissemination action:

Materials were left at the 11 schools attended by the Learning and Discovery team for future use. In addition, there have been 1,760 page views for the educational materials and the videos produced have been viewed 294 times.

The learning materials have also been linked to by the BBC website, and the Environment Agency's website.

5.1.8.8 Modifications:

In the original bid, it was expected that a comic book would be produced to help promote learning through other, non-traditional, means. This was changed to producing a video to make best use of new media which would appeal to children and drive online traffic. This change was agreed in a letter from the EC dated 3 July 2013. It would also give this action online longevity that could not be assured with limited printed stocks.

5.1.8.9 Issues:

There were no issues to report.

5.1.9 Action D1i: Produce Layman's Report

5.1.9.1 Outline of task:

A layman's report was to be produced at the end of the project. The report would outline the project's objectives, actions and achievements. The report would be available as a printed copy and on the website.

5.1.9.2 Target:

One Layman's Report

5.1.9.3 Status:

1,000 copies of the Layman's Report have been printed and it is also available for download on the MoorLIFE website at:
www.moorsforthefuture.org.uk/sites/default/files/MFTF_Layman%27s_Report.pdf

It is included in Annex 9i.

The layman's report includes the MoorLIFE reference, EU LIFE+ logo, and Natura logo as required by the Common Provisions.

5.1.9.4 Work undertaken by:

The Layman's Report was written by the MoorLIFE Communication Officer. It was designed and printed by an external contractor.

5.1.9.5 Project Management:

The work was initially planned for completion in June 2015 at the end of the project.
The report was started in April 2015 and completed in July 2015.

5.1.9.6 Overview of work:

The report was designed to cover all aspects of the project. It has been written as a celebration of the achievements of the project, and to explain why the funding was so critical. The report was written in an accessible style in plain English so that is would be of interest to all, and easily understood by everyone. Furthermore, the design of the report was carefully considered so that it would be an attractive document to read and highly pictorial – so that the MoorLIFE story could be told in both pictures and words.

5.1.9.7 Feedback from dissemination action:
The report has been disseminated widely including to the following:

- Natural England
- Environment Agency
- Water companies
- Peak District National Park Authority Members
- Project partners
- 40 delegates to the Society for Ecological Restoration International Conference.
- Local businesses, including mountain guides.

Since it was uploaded on the 11 August 2015, the report has been viewed 87 times on the Issuu website, and downloaded 51 times from the MFFP website.

5.1.9.8 Modifications:

There have been no modifications to this action.

5.1.9.9 Issues:

Some of the analysis of the monitoring data had not been completed in time for the deadline for the layman's report. This meant that the report could not include information about all the outcomes from the project. Press releases will be sent out by MFFP in late 2015 when the monitoring results have been finalised to ensure that all the monitoring messages are promoted.

5.1.10 Action D2a: Audio and video podcasts

5.1.10.1 Outline of task:

To tell the story of the blanket bogs of the South Pennines Moors during its lifetime (including cultural heritage, threats past, present and future, ecosystem services and restoration) through a series of audio and video podcasts.

5.1.10.2 Target:

10 podcasts

5.1.10.3 Status:

- Four audio trails have been produced.
- A series of eight podcasts detailing the project overview, conservation works and monitoring have been produced
- Flyover videos showing footage from before and after restoration are available for all four of the MoorLIFE sites.
- Six podcasts produced as part of the Be Fire Aware work are available for download.

In total, this brings the number of podcasts produced to 26.

All podcasts and audio trails are available on the Moors for the Future YouTube account (https://www.youtube.com/user/MoorsForFuture) and the website at: http://www.moorsforthefuture.org.uk/videos

The videos and podcasts all include the MoorLIFE reference, EU LIFE+ logo, and Natura logo as required by the Common Provisions.

5.1.10.4 Work undertaken by:

The work on the audio trails was undertaken by a contractor and managed by the MoorLIFE Communications Officer.

The concepts, overview and organisation of the podcasts were managed by the MoorLIFE Communications Officer along with the final sign off and delivery. Filming and editing was undertaken by an external contractor.

The flyover podcasts and Be Fire Aware podcasts were produced by external contractors when delivering those pieces of work.

5.1.10.5 Project Management:

The work was initially planned for completion by March 2014.

Be Fire Aware videos were completed in July 2013 and audio trails completed by June 2014.

Work on the video podcasts was started in 2011 and the first video on monitoring was completed in November 2011. Work began on conservation videos in early 2013 but filming was delayed due to weather and time pressure in the busy winter works season. Filming took place during the 2013/2014 season and the videos were completed in February 2015.

5.1.10.6 Overview of work:

The audio trails are downloadable onto a smartphone or MP3 player and come with an illustrative map showing the trail route and stopping points along it. They are between 7-9 miles long and are of varying difficulty, so there is something for everyone. The MoorLIFE audio trails are part of a suite of audio trails produced by Moors for the Future Partnership and cover all four of the project sites, as follows.

- Rishworth Common – walk in the footsteps of Romans and learn about MFFP conservation works.
- Turley Holes – find out how water has shaped the landscape.
- Bleaklow – bringing nature back into balance after industrial pollution.
- Black Hill – how the MoorLIFE project is bringing *Sphagnum* moss back.

The podcasts tell the MoorLIFE story by detailing the conservation works that have taken place through MoorLIFE as well as information about the project and how we are monitoring works. Each video is less than five minutes long and can be viewed in isolation – as each video includes information about the project and puts the subject matter into context. They include key facts and deliverables from the project which are designed to demonstrate the size and impact the project is expected to have.

The following videos have been created:

- MoorLIFE Project overview
- MoorLIFE monitoring works
- Conservation techniques – lime, seed and fertiliser
- Conservation techniques – brash
- Conservation techniques – geotextiles
- Conservation techniques – gully blocking
- Conservation techniques – plug planting
- Conservation techniques – *Sphagnum* moss

Additional podcasts, produced when delivering the promotional video and Be Fire Aware displays, have also been included in this action as they have been used as standalone videos.

5.1.10.7 Feedback from dissemination actions:

Flyover videos are regularly used in events and talks, for example at an event with the Chair of the Environment Agency and his staff.

It has not been possible to obtain accurate download figures for the audio trails as the additional analytics tools were not installed on our website at the time when the first trails were released – therefore the figures for audio trails represent views on the website.

Audio trails		views
	Bleaklow	479
	Black Hill	578
	Rishworth Common	269
	Turley Holes	187
Total		1513

Podcasts		
	Project overview	376
	Heather brash	67
	Lime, seed and fertiliser	20
	Geotextiles	55
	Gully blocking	101
	Plug plants	50
	Sphagnum	85
	Monitoring	1,597
Total		2351
Flyover videos		
	Bleaklow	121
	Black Hill	84
	Rishworth (north)	28
	Rishworth (south)	38
	Turley Holes	33
Sub-total		304
Be Fire Aware videos		
	A gamekeepers view	84
	Monitoring conservation effectiveness	51
	Mapping wildfire risk	42
	Repairing the damage	20
	A fire services view	18
	Fire Operations Group	16
Sub-total		231
Total video views		2886

5.1.10.8 Modifications:

There have been no modifications to this action.

5.1.10.9 Issues:

The video podcasts proved challenging to complete due to external factors relating to the weather and availability of a filmmaker at short notice. By contrast the six Be Fire Aware videos were straightforward as they were filmed inside, with some location filming arranged separately.

5.1.11 Action D2b: Produce electronic field guides

5.1.11.1 Outline of task:

These field guides were designed to help members of the public identify *Sphagnum* mosses, blanket bog plants, animals, and landscape features. The guides were to be designed to be used out on the moors using mobile phones, and available for download in a print-friendly format.

5.1.11.2 Target:

Five field guides

5.1.11.3 Status:

Four field guides were developed on *Sphagnum* mosses (MoorMOSS), Moorland plants (MoorPLANTS), Moorland animals (MoorWILD) and landscape features found on moors (MoorSIGHTS).

In the six months since the apps were launched at the final conference, with a follow up press release issued in July to inform the public, we have achieved the following downloads:

App Name	iOs downloads	Android downloads	PDF	All versions
MoorMOSS	418	263	161	842
MoorPLANTS	364	283	109	756
MoorSIGHTS	320	243	89	652
MoorWILD	230	155	98	483
			Total	2,733

PDF versions of the apps are included in Annex 7n. A copy of the *Sphagnum* field guide is included in Annex 7o.

Links to where the apps can be downloaded can be found on the MoorLIFE website at: http://www.moorsforthefuture.org.uk/moorapps

The apps all include the MoorLIFE reference, EU LIFE+ logo, and Natura logo as required by the Common Provisions.

A maintenance agreement has been made with the contractor who delivered the work to continue to ensure the apps are available for download for free on their stores. If the contractor stops trading then the apps will be handed over to MFFP which will create a store for the apps to be hosted in. The maintenance agreement can be found in Annex 11c.

5.1.11.4 Work undertaken by:

The apps were written and developed by a contractor, with support for the content from external consultants, MFFP staff, and partners. The MoorLIFE Communications Officer oversaw the work.

5.1.11.5 Project management:

The work was initially planned to start in July 2012 for completion in October 2013.

The work started in August 2014, following on from the Be Fire Aware campaign launch and was completed in February 2015.

5.1.11.6 Overview of work:

The apps were designed with the intention of educating visitors about the moorlands. The series of field guides would help visitors with identification of their surroundings and provide background context to aid in understanding the importance of caring for these special places.

We believe that learning while out on the moors is a critical way to change behaviour, and is the reason these apps have been developed. The main aims of the apps were as follows:

- To help visitors identify a range of moorland attributes.
- To raise visitor awareness of the unique features on location of the moors of the Peak District and South Pennines.
- To provide information on a range of moorland attributes, increasing understanding of the fragility of this unique habitat and the work of the MoorLIFE project in protecting these areas.
- To influence visitor behaviour to help prevent further damage to these fragile spaces.

The guides were designed to appeal to people with no prior specialist knowledge of the wide range of wildlife, plants, heritage and unique landscapes of Peak District and South Pennine moorlands. They have been delivered in the form of smartphone apps (available on iTunes and GooglePlay) as well as in a print-friendly format.

The project also contributed to a printed guide on *Sphagnum* and other mosses, working with the the Field Studies Council (FSC) and other partners including the Heather Trust to produce a laminated guide suitable for use in the field, without specialist equipment or prior knowledge. This FSC guide formed the basis of the MoorMOSS app. See Annex 7o.

The apps were programmed using PhoneGap technology in order to maximise the number of devices they could be used on and were compatible with the latest operating systems available at the time of development to ensure longevity.

5.1.11.7 Feedback from dissemination action:

Our apps have proved popular from their launch to the conservation community at the final MoorLIFE conference, with interest from other projects working on moorlands. The *Sphagnum* app in particular has attracted praise, however all apps have achieved broadly similar downloads with *Sphagnum* being the most popular. The apps have achieved a total of 2,700 downloads to date.

Our Community Science team has produced update to the MoorWILD app that will add a recording facility to the app so that people carrying out surveys (currently of birds, butterflies and mountain hares) are able to record their sightings straight from the app. This will increase

the potential audience for the app as well as providing valuable cross-promotion for the Community Science project to MoorAPP users who were previously unaware of the project. We designed the apps with this in mind, so it will be possible to add recording facility to the other apps if the need arises.

5.1.11.8 Modifications:

In order to make best use of the available budget it was decided to produce four apps instead of five. This meant that we could maximise the number of items included in each app, giving the user a better experience. We could also embed conservation and monitoring works into the app, by including a section on the project in each app as well as more detailed information and references to some of the benefits of the project within individual entries – allowing users to understand the importance of the project while they were identifying an item.
The move from five apps to four was discussed at the visit of the Desk Officer on 25 September 2015.

5.1.11.9 Issues:

The apps were developed using the latest operating platform for both Apple and Android smart phones. Due to the speed at which technology moves forward, there is no guarantee that the apps will continue to work on the latest operating platforms being used in five years' time. To counter this risk, the apps will always be available in a print-friendly format.

5.1.12 Action D3a and D3b: Produce ‘fire aware’ interactive displays and games

5.1.12.1 Outline of task:

The aim was to develop two initiatives that would raise visitor awareness of the risk, causes and damage caused by wildfires.

The first would be displays at the visitor centres showing spatial maps of wildfire risk that incorporate position (habitat and visitor traffic), weather and temporal factors to produce real-time maps of wildfire risk.

The second initiative was to produce interactive computer games with the aim of teaching a younger audience in a fun and enjoyable way about the factors affecting wildfire risk, suppression and damage. The outcome of both these pieces of work would be to help safeguard the future of moorlands – both within the project and elsewhere - from the effects of wildfire.

5.1.12.2Target:

Two displays
Two games

5.1.12.3 Status:

Two Be Fire Aware displays have been installed at two of the Peak District National Park’s visitor centres at the Moorland Centre in Edale and the Upper Derwent Visitor Centre at Fairholmes. These displays incorporate:

- the interactive map with videos, text and pictures covering the history, causes and impact of wildfires;
- the live fire risk tool that takes live weather data and interprets this to estimate the fire risk for the day as well as the ability to explore fire risk as far back as 2003 (when a wildfire burned for almost a week on Bleaklow);
- two computer games, aimed at children and families.

The games are also available as a hard copy on DVD for distribution to schools and fire services, and are available electronically on the MoorLIFE website along with the interactive map at: www.moorsforthefuture.org.uk/be-fire-aware

The fire risk map has been produced as a DVD and distributed to the Peak District Fire Operations group for use in their fire prevention work.

See Annex 7p – 7s for photographs of displays and Be Fire Aware DVDs.

A five-year maintenance agreement has been set up with the contractor who developed the maps and games. The agreement is included in Annex 11d and covers regular visits to back up the data from the weather stations and to maintain the displays so that they are properly functioning.

All the Be Fire Aware maps, games and tools include the MoorLIFE reference, EU LIFE+ logo, and Natura logo as required by the Common Provisions.

5.1.12.4 Work undertaken by:

The hardware and software to run the displays and games were delivered by an external supplier, who also provided the graphic design. The content for the games and interactive explorer map and text for the fire risk map was written by the MoorLIFE Communications Officer. The fire risk maps were provided by MFFP's GIS Technician with input, advice and guidance from the University of Manchester, who also provided the formulae that were used to write software to calculate wildfire risk levels, and provided vital support and advice for this aspect of the work.

5.1.12.5 Project management:

The work on the displays was initially due to start in July 2012 for completion in March 2013 and the games to start in January 2013 with completion in December 2013.

The work on producing the fire risk map was complex in nature, requiring collaboration with University of Manchester to develop the software to calculate fire risk as well as a set of fire risk maps. It was therefore decided to concentrate on deliverables that would ensure that fire aware interactive displays were on site in time for the following summer fire season. This meant that the games and procurement of equipment was prioritised and installed in two visitor centres in May 2013.

Following on from this, the interactive map was developed, with all written content and photos provided by the MoorLIFE Communications Officer. The interactive map was installed in February 2014. The fire risk map was installed for testing in May 2014 in time for the Be Fire Aware launch in July 2014.

5.1.12.6 Overview of work:

The live risk fire mapping tool takes real time data from weather stations and inputs this into bespoke computer software that calculates the risk of a wildfire based on anticipated visitor pressure, weather over the preceding days and months, and historic evidence of fires. The resulting risk map shows how wildfire risk varies across Peak District moorland and how it changes according to weather. Visitors can explore historic fire risks going back to 2003, along with simple graphs of temperature and rainfall. To add to the experience, a series of screens provide vital interpretation so that visitors can understand the crucial role that people play in causing or preventing moorland wildfires.

It is thought that this is the first time such a tool has been developed.

The interactive map has been designed to be highly visual, and include text, photographs and videos that detail:

- the consequences of wildfires
- wildfires in history
- how to minimise wildfire risk
- important conservation and monitoring work carried out by the project.

The displays also include the two games:

1. Fire Ranger: This game is aimed at younger children and is based on a snakes and ladders style format – players roll a dice and need to answer a question about wildfire correctly to move forward towards the trig point at the end of the game. Game icons, a

grouse and a mountain hare, were designed to help the children empathise with the plight of moorland wildlife. Feedback is given when each question is answered, whether correctly or not, allowing for learning to take place.

2. Fire Danger: This game is slightly harder and is aimed at the whole family. Players are asked to help a park ranger put up a pin board of wildfire risk by sorting items into high, medium, or low risk. Items relate to the three themes of people, place and weather and include items such as "Popular routes like the Pennine Way" and "A hot month but raining today". After each item is correctly placed feedback is given, so that the players understand why each item is given its risk rating.

The displays have been installed at the Moorland visitor Centre, Edale (40,000 visitors per year) and Fairholmes visitor centre, Derwent reservoir (41,000 visitors per year) to target the information at visitors seeking information before going out onto the moors.

The Be Fire Aware displays and games were launched on 31 July 2014 with talks by Simon Thorpe, Director of the Heather Trust, Alan Clarke, Area Commander, Surrey Fire and Rescue Service and Debra Wilson, MoorLIFE Communications Officer. The event was chaired by Jim Dixon, former Chief Executive of the Peak District National Park and included an outdoor exhibition from members of the Fire Operations Group, including Derbyshire Fire and Rescue Service, Peak District National Park Rangers, and the Peak District National Park Fire Operations Group. The launch was well-attended with around 50 people present.

The games were also road-tested on 18 July 2014 by school children from Edale Primary School. The afternoon was a huge success with children between the ages of five and twelve playing 'real life' versions of the games, as well as trying out the electronic versions at the end of the day.

5.1.12.7 Feedback from dissemination action:

An article about the Be Fire Aware campaign and fire risk tool was published in Fire Times and distributed at the Emergency Services Show, an international trade show in 2014. The games have also been distributed to the Manchester and Derbyshire Fire Services outreach teams for inclusion in their schools programme.

Since the launch, we have responded to enquiries from a project on wildfires in the Netherlands and a Countryside Ranger for Bracknell Forest organising a fire awareness day. The displays were also due to be included in a fire service best practice manual when it is produced (date not yet known).

5.1.12.8 Modifications:

Ideas for the games and displays were developed with the contractors, as well as external stakeholders and partners. This has changed some of the original concepts, for example the type of games developed. However, overall, the content and objectives of the Be Fire Aware displays has remained the same as that intended in the bid.

The number of games was reduced from 5 to 2 and the fire aware games were integrated with the displays to increase their reach, as reported in the Progress Report. This change was acknowledged in the EU's letter of 3 July 2013.

5.1.12.9 Issues:

The live fire risk tool has not been made available in order to mitigate against it being used maliciously. The tool is available to visitors at two moorland gateways in order to educate them and encourage responsible behaviour when visiting the moors. In general, more conscientious visitors will use the visitor centres, and so it is envisaged that the tools will be useful in preparing for a day's activities.

5.1.13 Action D4a: Disseminate results via website

5.1.13.1 Outline of task:

Dissemination of the project outputs are a vital element to the work and it was envisaged that a section of the project website would be dedicated to deliver this objective. Along with information about the project, the website would be used to present results from the project with all project reports available for download as electronic documents from the site.

5.1.13.2 Target:

2,000 website subscribers by 2015

5.1.13.3 Status:

Originally, the bid had aimed for 2,000 website subscribers by the end of the project term. This has been amended to reflect the number of social media followers.

Our strong presence on social media has given us over 3,000 followers, comprising of 577 Facebook and 2,674 Twitter followers by 31 August 2015.

The Facebook page can be found at: www.facebook.com/moorsforthefuture

The Twitter page can be found at: www.twitter.com/moorsforfuture

5.1.13.4 Work undertaken by:

All work to disseminate information through the website, Facebook and Twitter is carried out by the MoorLIFE Communications Officer.

5.1.13.5 Project management:

Twitter and Facebook accounts were set up in September 2010 and content has been added to these accounts over the lifetime of the project.

5.1.13.6 Overview of work:

The website is used very proactively to promote the work of the MoorLIFE project. New products, such as the apps, are promoted on the home page, along with links to news items or new developments on the project.

Similarly, social media, such as Twitter and Facebook is used to promote our work and drive people to the website. Where there are new developments, a Twitter and Facebook campaign is planned with regular updates sent out to let followers know what is going on.

These social media campaigns are run alongside the ad hoc Tweets and posts on Facebook. Staff who were out on site, or doing specific work of interest, were encouraged to Tweet and take photographs which could be used to promote MoorLIFE works. Social media is also used to generate interest and discussion during events, such as during the final MoorLIFE conference and the *Sphagnum* Seminar.

5.1.13.7 Feedback from dissemination action:

Through such active promotion, the number of people visiting the website and following the project through Twitter and Facebook has increased over the five years.

5.1.13.8 Modifications:

Initially, the bid anticipated the website having ‘subscribers’ who would sign up to the website for access to additional content – such as forums or e-conferences. The use of social media has rapidly grown since the bid was originally conceived, and many of these additional functions can be provided through sites such as Twitter and Facebook. These avenues are also much more popular, and reach a much broader audience than would be possible using the website alone making them a much better, and cheaper option for disseminating information.

5.1.13.9 Issues:

There have been no issues impacting on the delivery of this aspect of the project.

5.1.14 Action D4b: Hold two seminars and one conference

5.1.14.1 Outline of task:

Two conferences and a seminar were held during the project. The events during the project were geared to sharing, learning and implementing best practice during the project. The conference held towards the end of the project was to be a platform for dissemination of project results and lessons learnt to a wide, but relevant audience.

5.1.14.2 Target:

Two seminars and one conference

5.1.14.3 Status:

- An opening conference was held in November 2010.
- A seminar on the reintroduction of *Sphagnum* was held in Manchester in July 2014.
- A final conference to present the results of the project was held in March 2015 in Halifax.

Professional photographers were engaged to cover the final conference and field trip.

Annex 7t to 7v details the programme and feedback for each of the events.

Information about the conferences and seminars, including presentations can be found on the MoorLIFE website at: www.moorsforthefuture.org.uk/moorlife-conferences

5.1.14.4 Work undertaken by:

The opening conference was organised by the MoorLIFE team supported by MFFP's management team. The venue and catering were provided by Peak District National Park preferred contractors.

The seminar was organised by the MoorLIFE team and Manchester Metropolitan University, supported by MFFP's management team. The venue was provided by the university free of charge and the catering was provided by university caterers.

The final conference was organised by the MoorLIFE team, supported by MFFP's management team. The venue was selected by the Project Manager and Communications Officer. Catering was provided by the venue.

5.1.14.5 Project management:

There were no issues with the opening or final conferences.

The mid–project seminar was planned for spring 2014 but was delayed due to the workload of the MoorLIFE Project Manager and MoorLIFE Communications Officer. The seminar took place in July 2014. The final conference was originally scheduled for February 2015 to avoid a clash of dates with other conferences of a similar nature and took place in March 2015.

5.1.14.6 Overview of work:

The project opening conference "Conserving moorland biodiversity: what does the future hold?" was held on 15 -16 November 2010 at Losehill Hall, Derbyshire.

The conference celebrated the launch of the MoorLIFE project and the 2010 International Year of Biodiversity. It brought together experts from across sectors to help inform the delivery of a sustainable moorland biodiversity.

There were presentations from 15 organisations over two days. Organisations represented included universities, Natural England, conservation bodies, charities and industry. 80 national and international delegates attended over the two days.

The *Sphagnum* Seminar was held on 11 June 2014 at Manchester Metropolitan University. The day was split into a morning of talks with two workshops held in parallel in the afternoon. To encourage students as well as practitioners to take part a careers session was held in the evening.

Seminar presentations (with audio) have been published on the website along with an overview of the event: www.moorsforthefuture.org.uk/moorlife-seminar.
The seminar was geared towards sharing, learning and implementing best practice. The event was especially focussed on promoting work from a number of organisations and allowing all organisations to feed into the seminar through the workshops.

The final conference "An Integrated Approach to Upland Biodiversity Conservation" was held on 3 - 4 March 2015 in Halifax, close to the northern project sites in the South Pennines, to disseminate the results of the MoorLIFE project, hear from partners and the private sector, and learn about the vision for the future of upland conservation. The two-day event was structured to include the major themes of the project in such a way that would be interesting and relevant to moorland conservation practitioners. The days included sessions on:

- impact of conservation on vegetation biodiversity
- bird conservation
- habitat restoration works and results
- communicating conservation works
- ecosystem services
- a vision for the future.

Speakers included MoorLIFE project staff who disseminated the results of the project, as well as academics, representatives from the private sector, government bodies including the Environment Agency and Natural England, and the voluntary sector such as the RSPB.

A third day of field trips took place:

- Black Hill: 10 years of conservation work in action. A science and monitoring-orientated trip to show the impact of conservation works on vegetation and biodiversity.
- Rishworth Common: what the EU can do for you. A site visit to review conservation works and actions undertaken by the MoorLIFE project.

5.1.14.7 Feedback from dissemination action:

The opening conference was attended by 80 delegates with both national and international attendees. Feedback was very positive, with 88% of delegates stating that their experience of the event was 'good-average' (the highest rating offered as part of the feedback survey).
There have been 854 page views of the page with presentations for the opening conference.

The one day *Sphagnum* Seminar was attended by 100 delegates, with both national and international attendees. Feedback was very positive, with 100% of delegates stating that the day met their expectations and 84% saying that the event was ‘above average’ (the highest rating offered as part of the feedback survey).

The two day final conference was attended by 130 delegates, with attendees from regulatory bodies, water companies, private sector and the conservation sector. Feedback was very positive, with all of the delegates who provided feedback stating it met their expectations and over 50% of delegates rating it as excellent.

5.1.14.8 Modifications:

There were no major modifications to this action.

5.1.14.9 Issues:

There were no major issues with this action.

5.2 Complementary actions outside of LIFE

The project has benefited from being run by the Moors for the Future Partnership and the Peak District National Park Authority in the following ways:

- Regular inclusion of items about our work in staff magazines - raising awareness among staff including public facing staff who can talk about our work.
- Promotion of apps and videos by the Peak District National Park Learning and Discovery team.

Be Fire Aware games have been produced as DVDs and the fire risk map has been produced as a DVD and distributed to the Peak District Fire Operations group for use in their fire prevention work.

MoorLIFE apps are being used and promoted by the partnership's Community Science Team, and the Learning and Discovery team.

The project has also benefitted from regular inclusion in the MFFP's quarterly email newsletter, MoorNEWS, circulated to stakeholders and partners, highlighting the work and achievements of the project.

We have also benefitted from cross-promotion of our work via the Peak District National Park Authority's social media feeds.

Our partners, including Yorkshire Water and United Utilities have also promoted our work in their newsletters and on their websites.

In addition, members of MFFP have also promoted the project through their work. For example:

- Moors for the Future's Partnership Manager and Conservation Programme Manager took part in a webinar organised by Europarc Atlantic Isles on How to run a successful LIFE project;
- The Partnership Manager took part in a UK National Parks Tweetathon, with a live question and answer session and tweets throughout the day;
- Project team took part in an event organised for the Chair of the Environment Agency, Lord Smith, and his staff. MFFP partners were also present to hear MoorLIFE staff give presentations and talks about landscape-scale conservation. This resulted in an article in the Huddersfield Examiner.

5.3 Continuation of works after LIFE

The website will be maintained by MFFP for at least the next five years with all the communications deliverables to continue to be hosted on the website so far as is practicable. Noticeboards will also be maintained by MFFP for 5 years, and removed at the end of the period or if they become damaged beyond use. Details of the agreements are in Annex 10a and Annex 10b.

When the field guide apps were being developed the contract included the costs for five days additional work to be used for updates. These will be used over the next five years, as

necessary. There is also an agreement with the supplier to ensure the apps are available for five years on their online stores (Google Play and iTunes), see Annex 10c.

The products developed through the MoorLIFE project have been designed to ensure they remain valid over the next five years, and as such will continue to be used and promoted by MFFP as part of ongoing communications work. This includes the use of the videos and podcasts at external events to describe the work – and impact of works – carried out by MFFP.

The Peak District Fire Operations Group will continue to use the Be Fire Aware games in their wildfire awareness work. There is a maintenance agreement in place with Wide Sky Design to ensure that the displays remain maintained for the next five years. See Annex 10d.

Moors for the Future's Community Science Project are continuing to use and promote the smartphone apps, and other products in their work.

Project leaflets and reports will be promoted through visitor centres at external events.

6. Evaluation of Project Implementation

6.1 Conservation works

The monitoring programme within MoorLIFE has shown that the re-vegetation of bare peat has been highly successful on the three sites treated with stabilisation works (Bleaklow, Rishworth Common and Turley Holes). Average decreases in bare peat cover were between 90% and 99% over the five year period. These results can be attributed to the conservation works, as bare peat and erosion persisted at the bare peat reference site which was not treated. In particular, this demonstrates that the stabilisation work (lime, seed, fertiliser application and brash/geotextile works) has been highly successful, and through this work, adjacent areas of active blanket bog will be protected from erosion.

Following on from the successful stabilisation of the peat, the diversification work undertaken through the project (plug planting, and introduction of seed through brash) has also shown a good level of success. Typical blanket bog species have been shown to colonise treatment areas just one year after seeding and the monitoring of untreated bare peat areas has demonstrated that these species would have not colonised without the conservation works. Blanket bog indicator species such as common heather, cotton grass, sedges and feather mosses have increased on all treatment sites.

Due to the amount of time it takes for *Sphagnum* to grow and develop once stabilisation has occurred it is not possible to fully determine the success of *Sphagnum* applications in the lifetime of the project. However, proxy surveys on Black Hill – on which bare peat was stabilised prior to the MoorLIFE project starting – suggested that six years after initial peat stabilisation works, *Sphagnum* cover had increased. On Black Hill, the amount of *Sphagnum* had increased to 3% of the surveyed area (baseline surveys of the other MoorLIFE sites show less than 0.1% cover).

Hydrological functioning of the moors is also improving due to the re-vegetation and gully blocking.

The manual dipwells (showing spatial changes in water tables) indicate that although one year after seeding the rise in water tables is not significant (11mm, taken from Bleaklow monitoring data), two years after seeding there is a significant rise (22mm, taken from Turley Holes data).

Automated data loggers (showing changes in water table over time) suggest that the behaviour of the water table has also changed following revegetation. Overall, the water table is higher over longer periods of time, and is more stable, showing less variation in the range of water table depths.

In terms of the quality of the water running off of the moors, the data does not provide an indication of long term results of re-vegetating and gully blocking. This is because over the short-term the liming treatment significantly improves water quality as it ‘locks’ the carbon into the peat. Because of these short term changes, the data only shows the direct impact of works on water quality, rather than any long-term trajectories.

However, data taken from other proxy sites indicates that the dams do have a direct impact on keeping carbon on the moors. Monitoring on the Woodhead Natural England Conservation Plans Project showed that of a survey of 68 stone gully blocks within one of the monitored systems, 100% of dams surveyed were found to holding water, and 82% were found to be holding peat when compared to survey collected prior to gully blocking.

These results are discussed in more detail in the vegetation and hydrology reports included in Annex 9a, 9b, 9c.

Other benefits of the works include improving the retention of water on the moors – and as such having a positive impact on mitigating the risk of flooding. Headline results from this work are included in Annex 9k.

6.1.1 Cost-effectiveness of conservation actions

The costs listed are one-off costs as these are capital works. The costs are based on costs for external assistance and consumables.

Action	Cost foreseen in bid	Actual cost	Comments
Lime, seed and fertiliser (C1a)	€1,017 per ha	€ 2,078.63 per ha	These costs were increased by the increased cost of using helicopters to spread the lime, seed and fertiliser. Costs also increased for materials when buying through the spreading contract, but this resulted in lower personnel costs for managing the sites, as well as reduced risk for MFFP.
Brash and geotextiles (C1b)	Between €11,955 (geotextiles) and €8155 (brash) per ha	€ 12,364.87 per ha	The cost of brash and geotextiles was higher than anticipated. This was partly to do with the area that could be covered with brash – the original estimates were based on bags being spread further than now deemed good practice. In addition, all sites have received a 'top-up' of brash to cover smaller areas which is necessary to complete works on site but is also proportionally more expensive.
Plug plants (C2a)	€2200 per ha	€ 2,669.52 per ha	These costs were roughly the same as the cost for plugs was well-established and did not change much throughout the life of the project.
Sphagnum application (C2c)	€710 per ha	€ 960.36 per ha	The cost of *Sphagnum* propagules was higher than anticipated making the cost of this action slightly more than originally proposed.

Gully blocking (C3)	No comparison as bid calculated cost for timber and peat dams	€ 130.93 Per dam	

6.2 Dissemination work

Dissemination work has been split up into two areas, dissemination to members of the public, and dissemination to a technical audience.

Statistics from the website usage show that dissemination to the wider public has been successful. The MoorLIFE section of the website accounts for over 24% of visits to www.moorsforthefuture.org.uk, an average of 32,000 views per year. This is a proportionally high number of views as the MoorLIFE pages account for 13% of the website.

Similarly, the original target of 2,000 website subscribers by the end of the project term has been exceeded, with more than 2,600 Twitter followers, including partners, stakeholders and peers who disseminate project messages through their networks. Facebook is used to discuss works and provide updates on events and restoration progress. The Facebook page had 577 'likes' by the end of the project.

Other notable areas of dissemination to members of the public include:

- The field guide apps which had 2,700 downloads in the first six months of being launched. Tweets about the field guide apps reached over 56,000 Twitter accounts, demonstrating the popularity of the concept.
- Media coverage on over 133 occasions over the five years of the project.
- More than 2,300 views of MoorLIFE video podcasts.

Disseminating information to a technical audience has also shown some significant successes. Feedback from the conferences and seminars run through the project has been very positive, with over 100% of all attendees stating the events met or exceeded their expectations. Members of the team have also been very active in speaking and presenting at external events, with over 40 talks over the five years (Annex 7w).

Other areas of dissemination that have been highly successful include:

- The Be Fire Aware work, which is used by the Peak District's Fire Operations Group, both Derbyshire and Manchester Fire Services, and was reported in the Fire Times (readership of 29,500).
- Collaboration with other stakeholders, including the *Sphagnum* Technical Advisory Group, the Upland Hydrology Group, and the Catchment Areas Group.

6.2.1 Cost-effectiveness of communication actions

As these deliverables will remain in place for at least the next five years, it is expected that the cost-effectiveness of these actions will improve over time. The figures include costs for external assistance and consumables.

Action	Total cost	Views	Cost per view	Comments
D1a: Project website	€ 4,196	116,000 visits to the webpage	€ 0.04	These costs were relatively low as there were no set up fees as the site was hosted as part of MFFP's website, allowing the team to concentrate on improvements that would help the project, such as the project map. The cost per view is considered to be good value for money.
D1e: Produce promotional video	€ 13,028	674 view on You Tube	€ 19.33	Output 370 views, plus dissemination to partners to use in their work. The video was shown to conservationists, policy makers and academics at the MoorLIFE final conference. Video clips of flyover footage achieved 304 showings on YouTube. They are also regularly used in talks, meetings and events by the partnership and the project partners. The team considered using interviews from the video podcasts combined with the flyover footage, producing a shorter version and a more in depth version of the videos. However, it was decided to use this action to create something different – a concise and self-contained guide to the project in 3-4 minutes.

D1h: Produce educational material	€ 2,489	618 schools were targeted	€ 4.03	See final report modifications – the team decided to change from a comic book to videos, in order to use new technology to appeal to children. It would also ensure longevity as the videos will be available after any printed stocks had run out. We took the materials directly to 852 pupils in 11 schools and promoted them via a competition to 607 schools. The cost per school targeted is therefore relatively low when considering the amount of material produced.
D1i: Produce layman's report	€ 1,101	1,000 copies were printed	€ 1.10	To promote the project into the future the layman's report was designed to be an attractive document that people will want to read and distribute. It has already been used in external meetings and events to promote the work MFFP does and as an example for MoorLIFE 2020.
D2a: Produce audio podcasts	€ 17,833	1,500 views	€ 11.89	The trails give an opportunity for engagement on location and enable the listeners to gain a good understanding. In addition the trails may be shared further by listeners so may have a greater reach than we can track.
D2a: Produce video podcasts	€ 7,396	2,351.0 views on You Tube	€ 3.15	Podcasts are also used in conferences and seminars in addition to downloads, and so may have a greater reach than we can track.

D2b: Produce field guide apps	€ 29,577	2,300.0 apps downloaded	€ 12.86	This unit cost will fall as the guides are downloaded in the future. The apps are being used and recommended by educators, outdoor activity centres and the partnership's Community Science project. The team decided to create 4 guides instead of 5 to allow us to embed information about the project into each trail. The apps also developed in such a way they could be used even when there was no mobile phone signal. We also considered how to ensure there was no barrier to access (i.e. the need to own and use a smartphone) and decided to offer PDF format as well. This will also add to longevity of the apps.
D3: Be Fire Aware displays and games	€ 58,815	16,000 users (assuming 20% of visitors to the centres look at the displays)	€ 3.68	We explored the option to put the fire risk map online but it was felt that it could be used maliciously. As an alternative we produced a DVD version of the map and games for use by the Fire Operations group. Lessons learned On discussions with supplier we realised that it would not be possible to track visitor numbers and get feedback as there are a number of different entry and exit points to the exhibit. (For example, asking for feedback at the end of each item – two games, explorer map and fire risk map could lead to visitor fatigue and discourage further engagement).

D4d: Two seminars and one conference	€ 22,227	312 delegates overall	€ 71.24	We considered holding the final conference as a seminar but decided to take the opportunity use the extra time of a conference to invite speakers from public and private sector to engage with policy makers and place the project and work of the wider partnership in a national and international context. It also gave us the opportunity to run field trips to two of our projects sites, enabling delegates to gain first-hand experience of the sites, and listen to talks from partners who have been working with us for the past 12 years.

6.3 Results achieved against objectives

An analysis of the results achieved against the objectives can be found below.

Task	Objectives	Achieved	Evaluation
Stabilisation C1a and b: Stabilise bare peat using nurse grasses and applying heather brash and geotextile	To create conditions on the peat substrate that will provide a structure for amenity grasses to grow with the objective of stabilising the bare peat.	In the surveyed areas, bare peat had reduced by 90-99%	The use of brash, lime, seed and fertiliser to provide a relatively rapid covering for the bare peat is an essential part of the restoration works. Including the heather seed as part of the amenity grass mix was a positive modification to this action as it removed the need for hydroseeding (action C2b), reducing costs and making the work programme more efficient. The use of heather brash became the preferred treatment over the use of geotextiles as it had a number of benefits. The success of the actions demonstrates that these modifications were valid alterations.
Diversification C2a, b and c: Improve diversification through plug plants, hydroseeding and use of *Sphagnum* propagules	These actions were in place to aid the plant communities on sites in diversifying towards typical blanket bog species. In the case of *Sphagnum* mosses, these are crucial to create blanket bogs that are actively accumulating peat.	Typical blanket bog plants were seen in all quadrats surveyed by the end of the project. The occurrence of *Sphagnum* mosses is a long-term aim of the project, and is not immediately visible within the project term. The occurrence of *Sphagnum* on Black Hill six years after stabilisation indicates that *Sphagnum* will be present on sites in the longer term.	The use of plug planting and seeding (completed through action C1a has allowed the flora on sites to diversity. Comparison with untreated reference sites demonstrates this. Although the *Sphagnum* propagules were a very efficient way of targeting the distribution of many different species of *Sphagnum* over a large area, over the course of the project other methods of distribution were explored through the *Sphagnum* Technical Advisory Group. These different methods offer differing advantages and an evaluation of the methods is

Task	Objectives	Achieved	Evaluation
			included in the *Practitioners' Guide to the Reintroduction of Sphagnum* included in Annex 9h. The long-term success of these application methods is still to be determined.
Improving hydrology C3: Gully blocking	To stop peat erosion and to restore hydrological integrity.	Results from water table monitoring show that two years after seeding there is a significant rise in water tables, and that water tables remain higher for longer. Proxy data taken from systems that have been blocked show that, of those dams surveyed, 100% hold water, locally affecting the water table, and 82% are holding peat.	Stone dams were built as stone has no maintenance requirements, meaning that once blocked, the gullies will need no further intervention. This method is ideal when the gullies are down to the mineral base, so there is no peat to 'key' in other types of gully blocking material (for example timber).
Fundamental project communications D1a-i	To have several project-wide communication channels that can be used to maximise public engagement and understanding of the project and its aims. For example, the website, information boards, podcasts and educational material.	These methods have seen a good level of success and there has been consistent interest in the work done. Through the promotional work done there has been a wide range of successes in reaching different audiences across different demographics, for example, the project has been promoted in at the following ways: - On television – through countryside programmes, children's programmes, as well as current affairs at a local, national, and international level. - Local and national press. - To tens of thousands Twitter accounts. - Lifestyle and technical/trade magazines.	Changes in how people use technology and how the Internet is used have altered how the team engages with the public. More attention has been given to social media as a tool to disseminate information, and this has resulted in a higher 'reach' for the work of the project. Traditional media continues to be important – particularly for the local press and magazines – and the project has seen success in getting several articles published on its work in addition to achieving coverage on local radio, and regional, national and international television.

Task	Objectives	Achieved	Evaluation
		- On maps used by outdoor enthusiasts.	
History Story D2a and b	To tell the story of blanket bogs of the South Pennines Moors during its lifetime; including cultural heritage, threats past, present and future, ecosystem services (the carbon, water and recreation stories) and restoration.	All aspects of this work (podcasts, audio trails and field guides) met or exceeded the targets set. They have all been developed so that they are not time-bound, allowing them to be useful tools that can be used and promoted by MFFP into the future. In particular, the podcasts (including information about moorland restoration techniques and the fly-over videos) have been used in talks and other promotional work done by MFFP, broadening the reach of the work. Overall, the number of downloads have been reasonably high, indicating that there is a demand for more information about the moors and the work done through the MoorLIFE project. The number of downloads is expected to increase over the coming years. The field guides have proved to be very popular, and there have been 2,700 downloads since their launch in March 2015. They are also being used by the MFFP's Community Science Programme – this will mean that they are promoted through this project, and will be used by volunteers across the South Pennines to identify and record species.	The podcasts are widely used in talks and advocacy work and will continue to be used and promoted by MFFP. The original estimated figures for downloads in the bid have not been realised by the end of the project, however they will continue to be used and promoted as vital tools to increase understanding of the conservation carried out by MFFP. The success of the apps also demonstrates the importance of producing tools that are current, and aligned with how people use technology.

Task	Objectives	Achieved	Evaluation
Fire Story D3a and b	To raise visitor awareness of the risk, causes and damage caused by wildfires to safeguard the future of the blanket bog restoration sites within the project as well as on other moorlands.	As well as proving to be popular exhibits in visitor services (based on daily observation by staff team and feedback from visitors) the Be Fire Aware tools have been widely adopted, by the Peak District Fire Operations Group and the Manchester and Derbyshire Fire Services and Peak District National Park learning and discovery team in their educational programme.	The work has been widely used by the Fire Services and has been supported by Peak District's Fire Operations Group, demonstrating that the work done is a valuable tool in fire prevention – and will continue to be used into the future. Producing the games and displays in conjunction and in consultation with the Fire Operations Group was important in ensuring the relevance and longevity of the work.
Promoting LIFE – the shared story D4	To disseminate project outputs through the website, social media, seminars and conferences to share knowledge of the issues tackled through the project.	Social media has been an increasing important channel for disseminating information (rather than number of website subscribers). The number of Twitter followers and Facebook subscribers has exceeded the target, and there are several examples where the use of these tools has allowed the project to disseminate information about its work to tens of thousands of accounts. All the conferences and seminars gave the MoorLIFE project a chance to disseminate information about the ongoing work, and were well attended. In all cases the overall feedback was very positive. A total of 330 people attended the conferences. Delegates ranged from academics, industry professionals, practitioners and scientists and included delegates from the UK and Europe. In	Social media has been a crucial tool in disseminating information to a wider audience. Feedback from the conferences and seminars has shown that networking, and having a space to discuss ideas is an important motivator for attending events – demonstrating the importance of this aspect of the work. Interest in conferences and events has been strong, with all events filling or exceeding target numbers.

Task	Objectives	Achieved	Evaluation
		addition live tweeting from the seminar and final conference allowed us to engage with a wider number of people who were not able to attend the events. Conference presentations and reports have been made available for download on the website, further extending the knowledge transfer from these events.	
Managing the MoorLIFE project E1	To establish a team and to manage the project.	The project has been delivered to budget and in accordance with the Common Provisions. There have been no major issues or modifications to the project, apart from a project extension from 31 April 2015 to 31 August 2015.	Lessons have been learnt through the project – including the adoption of better techniques for recording data. Over the course of the project, the use of casual staff has been critical to ensure work gets delivered. This was the case for seasonal and weather-dependant work (for example ensuring work using helicopters can be done in the limited windows of good weather), and also to allow work to continue while waiting for recruitment of permanent members of staff (for example, when the Communications Officer post was vacant).
Monitoring the success of the works E2, E3	Monitoring the success of vegetation establishment and succession, and changes to the water table and carbon budget of blanket bog	Monitoring sites were set up on: - Bare peat control sites (to remain untreated) - Treatment sites - Re-vegetated sites (to determine vegetation trajectories)	Undertaking the work as part of a wider science monitoring programme has been very beneficial as it has allowed the project to take advantage of results from similar works on other sites within the South Pennines SAC. This proxy information has allowed additional

Task	Objectives	Achieved	Evaluation
		The vegetation monitoring has allowed the project to show that the conservation works have had a positive impact on the establishment of vegetation and that the flora seen will continue on a favourable trajectory towards Active Blanket Bog. The water table monitoring has allowed the project to demonstrate that works have resulted in improvements to the hydrology of the sites. The water quality data showed the direct impact of the works, but long-term recording is needed to determine the overall impact of works on water quality. The loss/accumulation of peat could not be measured using the peat pins, which were not robust enough for use on the moors. However, proxy data from work on blocked gullies does show that gully blocking traps peat.	conclusions to be drawn from the results taken throughout the MoorLIFE project, and as such is an added benefit of the project being run as part of MFFP's programme of works.
Monitoring the success of knowledge transfer and dissemination actions E4	Monitoring the 'reach' and effectiveness of our knowledge transfer, education and awareness raising work package to assess success.	Many statistics have been compiled, including: • Website page views • Twitter and Facebook statistics • Number of views on You Tube • Number of views and downloads of field guide apps, podcasts • Feedback from conferences • Number of quotations in the media • Articles written by members of the	Over the course of the project, the collection of data has become better. For example, data could not be collected on the number of downloads of the first two field guides, but this was rectified for the second two audio trails and was in place for the podcasts, Be Fire Aware work, and field guide apps. Overall, the data collected has allowed the

Task	Objectives	Achieved	Evaluation
		MoorLIFE team, talks given at external events and posters presented. • Anecdotal feedback from stands at community events	project to collect data on the use of products produced, as well as the reach of promotional work.
Conducting a carbon audit E5	Conducing a carbon audit, to ensure that the project is being carbon efficient and identify where carbon savings might be made	An assessment of the carbon produced through the project was conducted at the end of 2014, as well as the end of the project in 2015. The audit identified areas where savings could be made in future – for example staff travel – and overall showed that the carbon benefit of the work outweighed the carbon cost.	This is a ground-breaking piece of work, and there was no existing methodology at the start of the project. Therefore the project developed an entirely new methodology that is based on the Defra toolkit to ensure consistency with other sectors. We have produced the first ever carbon audit of a moorland conservation project. Valuable lessons have been learnt in how best to collect and analyse data. The carbon audit also provided very useful lessons in data capture for the project – for example, the information included on invoices. Data capture was improved throughout the project as part of this learning and will be taken forward in future projects.

7. Analysis of long-term benefits

7.1 Conservation benefits and species/habitat type targeted

The MoorLIFE project sites sit within the South Pennine Moors Special Area of Conservation (SAC; UK0030280) a European level protected area designation. The SAC has been designated largely for its importance for Active Blanket Bog, a recognised priority habitat for nature conservation action under the EC Habitats Directive.

The sites also overlap with the South Pennine Moors Phase 1 (Peak District Moors; UK9007021) and South Pennine Moors Phase 2 (UK9007022) Special Protection Areas (SPAs).

Qualifying features for Phase 1 are as follows:

- A098 *Falco columbarius*; merlin (breeding).
- A140 *Pluvialis apricaria*; European golden plover (breeding).
- A222 *Asio flammeus*; short-eared owl (breeding).

Qualifying features for Phase 2 are as follows:

- A098 *Falco columbarius*; merlin (breeding).
- A140 *Pluvialis apricaria*; European golden plover (breeding).

The South Pennine Moors also supports a rich upland breeding bird assemblage and in summer support a diverse assemblage of breeding migratory birds of moorland and moorland fringe habitats.

At a national level, the project area is designated as two Sites of Special Scientific Interest (SSSI) under the Wildlife and Countryside Act 1981; the Dark Peak SSSI and the South Pennines Moor SSSI. These SSSIs are designated due to their features of biological and geological interest.

The work done on the sites has direct conservation benefits for the Natura Network. Monitoring work has shown that the amount of bare peat has reduced by between 90-99% following conservation works, which has a direct impact on protecting the Active Blanket Bog on the Natura Network.

7.2 Issues that may have policy implications on Natura 2000 Network

As protected sites under the Habitats Directive, Birds Directive and the Wildlife and Countryside Act 1981, the sites are afforded protection into the future.

Natural England has a statutory responsibility to monitor the condition of the SSSIs and to protect those sites from damage. Blanket bogs have been identified as a habitat that will make a contribution to the targets set in the UK Government's Biodiversity 2020 Strategy by ensuring that the UK maintains 90% (by area) of priority habitats in favourable or recovering condition, and at least 50% of SSSIs in Favourable Condition while maintaining at least 95% in favourable or recovering condition.

To recognise the role that blanket bogs play within the aims of Biodiversity 2020, Natural England has undertaken the following work:

- Produced a strategy for the restoration of blanket bog in England: *Natural England (2015) A Strategy for the Restoration of Blanket Bog in England*.
- Produced a Site Improvement Plan for the South Pennine Moors SAC, through the LIFE-funded IPENS project (LIFE11 NAT/UK/000384).
- Produced Favourable Condition reports that identify what individual sites need in order to ensure that sites are on the right trajectory.

The sites are also covered by the following Directives, further securing their protection into the future:

1. Directive 2000/60/EC (Water Framework Directive): Under the Water Framework Directive, Protected Areas as defined within River Basin Management Plans are required to meet certain environmental objectives. These objectives apply in addition to the requirement to maintain or restore Favourable Condition (under the Habitats and Birds Directives). The sites fall under this category, and are currently in Unfavourable Condition.
2. Climate Change Act: Under the UK's adaptation policy, blanket bogs are important habitats that require protection as they store water and carbon. Although there are no specific targets for the protection of blanket bog under this legislation, work on protecting blanket bog plays a role in supporting the UK's adaptation policy.

7.3 Long-term benefits and sustainability

By stabilising bare peat, areas of Active Blanket Bog have been protected from further erosion. Monitoring work from the project has shown that across the sites the amount of bare peat has reduced by between 90% and 99%. The resulting stabilisation of the peat surface has protected active blanket bog and enabled increases in several blanket bog indicator species such as common heather, cotton grass sedges and feather mosses; these increases continue to stabilise the peat soils as the facultative nurse grass crops die off, and move the areas of bare peat towards a functioning blanket bog with more typical blanket bog communities and towards achieving Favorable Condition status. The work undertaken by the project has therefore been essential to improve the conservation status of the sites and stop the sites from degrading.

On Turley Holes, the fence around the conservation sites will remain in place for a minimum of six years, ensuring that the improvements on the site are not undone by overgrazing. All sites have Higher Level Stewardship Agreements in place, with appropriate reductions in grazing levels (for Bleaklow and Black Hill this is a total stock exclusion) and will therefore be managed appropriately and with sensitivity towards the works that have already been done.

All of these outcomes will ensure that sites are maintained in Unfavourable – Recovering Condition.

The work on MoorLIFE will also help protect the MoorLIFE sites and the wider landscape in the following ways.

- Best practice developed through the project is being used in similar scenarios across the South Pennines to conserve areas of Active Blanket Bog adjacent to the MoorLIFE sites.
- Relationships built with stakeholders, landowners and other partners will be critical in influencing and managing the sites into the future now that work has been completed.
- Work through MoorLIFE has helped cement the importance – and success – of the conservation work completed, encouraging further work on the sites under other agreements and funding.
- The Be Fire Aware displays and work will continue to be used in visitor centres and by members of the Peak District Fire Operations Group helping to educate visitors to the area and helping to safeguard against the risk of wildfire.
- The field guide apps and audio guides will be available on the website, educating members of the public and helping to build an awareness of these unique landscapes. The field guide apps will also be used by the Learning and Discovery team, as well as by the Community Science Project and will continue to be used by the MoorLIFE 2020 team.
- The carbon audit will help illustrate the benefit of the works in terms of carbon cost and saving to a wider audience, helping to further support the benefits of the work.

7.3.1 Work undertaken by Moors for the Future Partnership

MFFP, funded by its partners (Natural England, the Environment Agency, The National Trust, RSPB, United Utilities, Yorkshire Water, Severn Trent Water) will continue to work towards the conservation needs of the South Pennines Moors and the MoorLIFE sites in the following ways.

7.3.1.1 MoorLIFE 2020:

MoorLIFE 2020 will deliver similar works to other areas of the South Pennine Moors SAC. In addition, there is considerably more work involved in reducing the risk of wildfires across the SAC, by increasing the heterogeneity of the vegetation as well as through the vital communications work that aims to change behaviour by educating and nurturing an appreciation of the moors. This project has been funded by the EU LIFE 2014 Programme and is due to start in October 2015 (LIFE14 NAT/UK/000070).

7.3.3.2 Private Lands Partnership and Clough Woodlands Project:

The Private Lands Project will contribute towards the protection of sites by creating a network of restored habitats on adjacent sites through work on Higher Level Stewardship Agreements. This will mean that the MoorLIFE sites will increasingly sit within a network of restored sites and enjoy greater ecological connectivity. All of the MoorLIFE sites have a requirement for additional works and many are in receipt of funding from the Rural Development Plan for England (RDPE) Higher Level Stewardship Scheme (HLS).

In addition to the works on Active Blanket Bog, we have a project funded through the Rural Development Programme for England (RDPE) to create new native woodland within cloughs (steep sided valleys which run off the moors). These formerly wooded valleys have become denuded due to historic clearances and more recent levels of sheep grazing and are an important feature of the southern portion of the SAC (Dark Peak SSSI). These are also beneficial for improving water quality under the WFD and may also be beneficial to the Floods Directive.

7.3.3.3 Additional moorland restoration works:

Significant areas of the South Pennine Moors SAC are also protected as Drinking Water Safeguard Zones (DWSZ) through the Water Framework Directive (WFD) and have potential to reduce the risk of flooding. MFFP has had preliminary discussions with three water companies (United Utilities, Severn Trent Water and Yorkshire Water) to deliver moorland conservation works in relation to this scheme, outside of the works that they are Co-financing through MoorLIFE 2020.

7.3.3.4 Community Science Project:

The Community Science project is designed to inspire and encourage members of the public to get involved with monitoring wildlife on the moors. In doing so, the long term impact of works and the status of wildlife on our moors can be monitored, and there is a greater understanding of these important habitats.

More details on the plans for the sites and associated funding can be found in the AfterLIFE report, Annex 9j.

7.3.2 Ecosystem services:

There are many ecosystem services provided by the moors. Some of these are covered by Directives – such as Drinking Water Safeguard Zones (DWSZ) through the Water Framework Directive (WFD). Other services are listed below.

Recreation: The South Pennine Moors SAC is well used by walkers, fell runners, climbers and cyclists who enjoy the hills and spectacular scenery. Some 16.1 million people live within an hour's drive (or 40 miles) of the Peak District National Park boundary and it attracts millions of visitors each year. All four project sites lie on the Pennine Way, Britain's first long distance walking trail, which marked its 50th anniversary in April 2015. The restoration of the sites is crucial in helping create resilience to their use as recreational sites.

Drinking water: These moors are vital to water supplies and water from all four sites drains into reservoirs. The reduction in bare peat coming from the moors reduces the cost of removing peat from our drinking water – reducing processing costs, as well as keeping the peat on the moors as a carbon store.

Carbon storage: Peatlands store the bulk of the UK's land-based carbon – worldwide they store more carbon than the earth's forests, locking it in and preventing it from being released as a greenhouse gas. Bare peat releases carbon as it erodes – it is estimated that 20 million tonnes of carbon is stored in the Peak District. Reducing areas of bare peat on sites will directly help ensure that carbon is not lost from these valuable carbon stores.

Flood mitigation: The South Pennine Moorlands SAC is a landscape of high rainfall with many of the surrounding communities subject to flooding. Monitoring has shown that restoring bare peat has reduced flood peaks and slowed overland flow.

7.3.3 Best Practice Lessons

The following best practice lessons have been established through the project.

- Improvements in lime, seed and fertiliser application – In 2011 Moors for the Future, with MoorLIFE funding, set up a 4-year contract with SJ Contracting Services (HeliLift) for the aerial application of lime and fertiliser. Due to the certainty of works that a long contract offered, the contractor was able to invest in their equipment and throughout the four years they have developed their equipment to increase the efficiency of their operation. This allows works to be completed in a shorter time with less disturbance to the bird interest of the SPA.
- *Sphagnum* application – As with the lime and fertiliser application the LIFE funding provided the opportunity to offer a long term contract to Micro-Propagation Services for *Sphagnum* propagation. Micro-Propagation was able to offer MoorLIFE significant savings due to the bulk purchasing power the LIFE funding allowed. It also created a working relationship that has allowed us to develop application techniques to suit our requirements. All this is fully described in the Section C2C (see Section 9h) and the *Practitioners' Guide to Sphagnum Reintroduction*.
- *Sphagnum* Technical Advisory Group (TAG) – The procurement process set up for the award of the *Sphagnum* application contract extended the remit of the *Sphagnum* TAG. This group helped MFFP fully assess the tenders received and award the contract to the most suitable contractor. The *Sphagnum* TAG has been active since this time in discussing developments in *Sphagnum* application, allowing moorland practitioners to share best practice and apply it to their own situation.
- Brash Works – Over the course of the MoorLIFE project MFFP have developed and improved their working practices. These improvements have been shared across the moorland conservation community.
    - Brash Passports – The use of brash passports, created by MFFP, have been adopted by the Moorland Association and are being recommended for use across all moorland restoration works to avoid the transfer of diseases such as heather beetle, *Cryptosporidum baileyi* and *Phythopthora.*
    - Brash on slopes – At the start of the project the application of brash was limited to slopes shallower than approximately 40 degrees due to the belief that brash would not stay on steep slopes. However, over the course of the project anecdotal evidence has shown brash can be applied to slopes up to 55 degrees. This has increased the amount of bare peat areas available for treatment with brash instead of geotextiles, allowing these areas to receive the associated benefits that you get with brash, such as increased moss cover, mycorrhizal fungi and heather seed.
    - Spot treatments of brash and lime, seed and fertiliser – Under MoorLIFE one area of Alport moor (Bleaklow) was only scheduled for lime and maintenance fertiliser treatment as the area had been previously treated under another project. The survey work, undertaken as part of the MoorLIFE Project, identified gaps in the previous treatment where treatment had either been missed or had failed. It was decided that we should treat these areas in order to protect the blanket bog within that area. As the areas were very small (5 to $10m^2$ in places) the usual method of using a helicopter application of lime, seed and fertiliser was deemed to be not cost effective as the majority of the area being treated was recovering acceptably or intact. Small bags of lime, seed and fertiliser were packaged up, containing enough material to treat the area covered by a single bag of heather brash. These were flown up within the bags of brash and applied as part of the heather brash application. These areas

have been closely monitored and this development has proved to be successful (see Annex 10b). As bare peat re-vegetation work continues, and the larger areas get treated, these individual treatments will be utilised more and more to ensure that all areas receive the best treatment in the most cost- effective way.

- Gully Blocking – Over the course of the project, there have been several developments in the gully blocking works which now represent best practice.
- Specifications - During the MoorLIFE gully blocking works (Action C3) we were able to create a comprehensive package of specifications for all forms of gully blocking – including stone, timber, plastic, coir and heather bales. These have been shared with other organisations undertaking gully blocking projects.
- Construction (Design and Management) (CDM) Documents – Gully blocking comes under the CDM Regulations, which requires documentation to comply with specific health and safety requirements. In order to make this process as smooth as possible MFFP have created a CDM guide and associated template that can be followed and completed during the planning and development of any gully blocking project. As part of this package we have created a series of Designer's risk assessments for each gully block type. All this information has been disseminated within MFFP and to external organisations.

7.3.4 Innovations

Because MoorLIFE was a Best Practice project, innovations were predominantly limited to refinements of accepted Best Practice, as identified above. However, some of these included significant innovations, including:

- *Sphagnum* propagation and application;
- Carbon audit – through the project, information has been collated on the carbon expenditure of the project, identifying all of the carbon costs. This has been compared to the stored carbon and carbon losses, generating an overall carbon budget for the project. This is highly unusual for a project of this size.
- Wildfire educational tools – we have created the UK's first interactive real-time wildfire risk map of Peak District moorlands, to inform the public about the risks of moorland wildfires and educate them about their role in wildfire prevention. Reduction to the risk of wildfire is a key requirement of the Site Improvement Plan (Natural England, 2014) for the SAC.

7.3.5 Long term indicators of project success

Long term indicators of project success are expected to be seen in the following areas. Where results could not be seen within the project term (for example, the growth of *Sphagnum* and impact of works on water quality) baseline data has been collected and this could be used in the future to monitor long-term successes.

7.3.5.1 Vegetation:

- The continued development of more typical blanket bog communities on revegetated sites – as quantified by use of Centre of Ecology and Hydrology software: MAVIS (Modular Analysis of Vegetation Information System).

- An increased cover of *Sphagnum* on treated sites – measured from baseline quadrats and repeated transects data collected through the project.

7.3.5.2 Biodiversity:

- Improved value of the MoorLIFE works areas as a habitat for species of interest, for example for ground nesting birds such as golden plover. Natural England monitor breeding birds within the SPA, and could provide an indication of long term success for this.
- MFFP's Community Science Project includes surveys on moorland birds including curlew, bumblebees including the bilberry bumblebee, and hares. Data from this long-term project could provide an indication of success where public rights of way pass through MoorLIFE works areas.

7.3.5.3 Water table:

- There is little data to show what long-term trajectory water tables in revegetated areas might follow. However, a long-term indication of success would be no lowering of water table in works areas, and potentially, a further rise in water table could be observed. Both of these potential outcomes would be regarded as a success.

8. Comments on the financial report

8.1 Summary of Costs Incurred

The finances of the project have not exceeded the predicted spend as outlined in the original bid. All costs are within the allowed flexibility of €30,000 and 10% as outlined in the Common Provisions.

More details on deviations in spend are outlined in Section 8.5.

Table 1: Spend by budget category

PROJECT COSTS INCURRED				
	Cost category	**Budget according to the grant agreement***	**Costs incurred within the project duration**	**%****
1	Personnel	€ 1,042,122	€ 979,874	94%
2	Travel	€ 35,674	€ 25,675	72%
3	External assistance	€ 2,668,068	€ 2,693,269	101%
4	Durables: total non-depreciated cost	€ 61,915	€ 52,115	
	- *Infrastructure sub-tot.*			
	- *Equipment sub-tot.*	€ 61,915	€ 52,115	84%
	- *Prototypes sub-tot.*			
5	Consumables	€ 2,468,299	€ 2,509,097	102%
6	Other costs	€ 3,090	€ 4,506	146%
7	Overheads	€ 411,688	€ 268,641	65%
	TOTAL	€ 6,690,856	€ 6,533,178	

*) If the Commission has officially approved a budget modification indicate the breakdown of the revised budget Otherwise this should be the budget in the original grant agreement.
**) Calculate the percentages by budget lines: e.g. the % of the budgeted personnel costs that were actually incurred.

8.2 Accounting system

The project is managed according to the accounting system of the Peak District National Park Authority, and operates according to the Standing Orders adopted by the Authority.

The project conforms to the financial planning and management policies of the Peak District National Park, and has dedicated codes for all work.

The budgets are monitored regularly by the Project Manager, and are also subject to checks by the Peak District National Park Authority at the beginning, end and middle of the financial year.

The Standing Orders dictate that the following procedures should be applied and are included in Annex 8.

The accounting system is described in more detail in Annex 8b.

8.3 Partnership arrangements

All co-financiers met their financial commitments to the project. The monies were claimed by the Peak District National Park requesting a purchase order for each co-financier and raising an invoice on an annual basis.

8.4 Auditor's report/declaration

The Audior's report and declaration is included in Annex 12c. The name/address of the auditor is as follows:

George Hay Partnership LLP
Unit 1b
Focus 4
Fourth Avenue
Letchworth Garden City
SG6 2TU
UK

8.5 Summary of costs per action

Costs per action are outlined in Table 2. Differences when compared to the original budget are included in Annex 8b.

Table 2: Spend by project action

Action no.	Short name of action	1. Personnel	2. Travel and subsistence	3. External assistance	4. Infrastructure	5. Equipment	6. Prototype	7. Purchase or lease of land	8. Consumables	9. Other costs	TOTAL
A1-A4	Project delivery plan	€ 3,618	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 3,618
											€ 0
C	General conservation			€ 102,098		€ 12,943			€ 16,101	€ 1,502	€ 132,645
C1	Stabilisation	€ 249,376	€ 9,642	€ 1,747,929					€ 1,305,288		€ 3,312,235
C2	Diversification	€ 64,085	€ 2,703	€ 183,796					€ 1,113,323		€ 1,363,907
C3	Gully blocking	€ 56,177	€ 1,620	€ 452,786					€ 68,718		€ 579,301
											€ 0
D	General dissemination action			€ 624		€ 12,943				€ 1,502	€ 15,070
D1	Fundamental project communications	€ 52,565	€ 254	€ 42,588					€ 1,267		€ 96,673
D2	SPM - History Story	€ 17,980	€ 92	€ 57,243					€ 12		€ 75,327
D3	SPM - Fire Story	€ 9,969	€ 47	€ 58,815		€ 1,267					€ 70,098
D4	SPM - Shared Story	€ 14,771		€ 22,064					€ 163		€ 36,998
											€ 0
E	General project management action			€ 6,410		€ 13,030				€ 1,502	€ 20,942
E1	Project Management	€ 323,750	€ 4,718	€ 5,187		€ 398			€ 53		€ 334,107
E2	Vegetation monitoring	€ 82,035	€ 2,301	€ 362					€ 2,033		€ 86,732
E3	Carbon and water table monitoring	€ 67,456	€ 4,299	€ 13,365		€ 11,532			€ 2,139		€ 98,793
E4	Knowledge transfer monitoring	€ 24,737		€ 0							€ 24,737
E5	Carbon audit	€ 13,355		€ 0							€ 13,355
E5	After-LIFE Plan	€ 0		€ 0							€ 0
											€ 0
Over-heads											€ 268,641
	TOTAL	€ 979,874	€ 25,675	€ 2,693,269	€ 0	€ 52,115	€ 0	€ 0	€ 2,509,097	€ 4,506	€ 6,533,178

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[ii] Worrall, F., Rowson, J.G., Evans, M.G., Pawson, R., Daniels, S. and Bonn, A. (2011) Carbon fluxes from eroding peatlands – the carbon benefit of revegetation following wildfire. Earh Surface Processes and Landforms 36, 11, 1487 – 1498.