LIFE Project Number
LIFE02 NAT/IRL/8490

TECHNICAL FINAL REPORT

Covering the project activities from 01.07.2002 (project starting date) to 31.12.2007

Reporting Date
31/03/2008

LIFE PROJECT NAME
Restoring Active Blanket Bog in Ireland

Data Project

Project location	Ireland
Project start date:	01/07/2002
Project end date:	31/12/2007
Total Project duration (in months)	66 months
Total budget	€4,195,693
EC contribution:	€3,146,770
(%) of total costs	75%
(%) of eligible costs	75%

Data Beneficiary

Name Beneficiary	Coillte Teoranta [The Irish Forestry Board]
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2. KEY-WORDS AND ABBREVIATIONS

(I) Key Words:

Active blanket bog restoration, Ireland, tree removal, water level monitoring, vegetation monitoring, raising water levels, drain blocking, fencing.

(II) Abbreviations:

FSC	Forest Stewardship Council
IPCC	Irish Peatland Conservation Council
NPWS	National Parks and Wildlife Service
PAP	Project Advisory Panel
PMG	Project Management Group
SFM	Sustainable Forest Management

3. EXECUTIVE SUMMARY

Project objectives

The principal project objectives were to restore up to 1,989.0ha of blanket bog on 20 sites to a favourable conservation status and, in particular, to extend the area of blanket bog by means of tree removal, so that the area free from the effects of afforestation would be enlarged by up to 982.27ha thereby increasing the likelihood of recolonisation with ANNEX 1 habitat type species. This objective was to be further facilitated by the blocking of drains on up to 1,556.7ha of cleared or open bog areas. Additional project objectives were to reverse the effects of overgrazing through the fencing of 555.4 of open bog areas, and to remove naturally regenerated trees from open bog areas on an as required basis. Broader objectives were to demonstrate and interpret the techniques of bogland restoration on afforested sites, principally tree removal and drain blocking, to as wide as possible an audience but particularly to the foresters who are managing these areas and to increase current knowledge in the area of afforested bogland restoration through the dissemination of project results in Ireland and internationally.

Summary of each of the following chapters

Chapter 4: Introduction

The Coillte estate contains many blanket bog areas within SACs that were partially or wholly afforested in the past for socio-economic reasons.. This project covered 20 of these sites, selected in conjunction with NPWS, that had potential for restoration. The overall objective was to restore up to 1,989.0ha of blanket bog on these 20 sites to a favourable conservation status. Site Nos. 2-16 comprised the originally approved proposal (Site Nos. 1 and 12 had been dropped prior to approval); Site Nos. 4(a), 14(a), and 17-20 were added under the first and only additional clause. The project was to serve as a hands-on demonstration of the best approaches to restoration of active blanket bog habitats.

Chapter 5: Life-Project Framework

The essential features of this project were the removal or felling to waste of conifer plantations on blanket bogs together with the blocking of forestry drains in order to restore blanket bog water levels and facilitate the growth of blanket bog vegetation. The project was structured according to the standard LIFE-Nature action categories A-F. The beneficiary was Coillte Teoranta/The Irish Forestry Board. There were no partners or co-financiers. Under modifications approved in the Commission's letter dated 9th February 2006, arising from operational efficiencies, the original project objective of restoring 1,212.3 ha of active blanket bog was extended by up to 776.7 ha (64%) to give a total of up to 1,989.0 ha to be restored within the original approved budget of €4,195,693 (with EC contribution at 75%).

Chapter 6: Progress, Results

Details have been supplied on each project action, following the standard LIFE-Nature action categories A-F, including activity description, achievement table and explanatory comments as necessary. In particular, detailed site by site achievement tables have been provided for the main physical works "C" actions. The table below shows achievement to end of project for the main physical restoration works.

Action	**Area programmed (Ha)**	**Area achieved (Ha)**	**% achieved (Ha)**
C1 – C3 Tree Removal	982.27	955.27	97
C4 – Install dams	1556.1	1544.8	99
C5 – Erect/Repair fences	555.4	586.4	105

Note: the project modification allowed for the restoration of up to 776.7ha of additional blanket bog area in addition to the original project area of 1212.3ha. Additional Site No. 19 (Kingarrow, 45.8ha) had ultimately to be left out of the project due to NPWS concerns for the freshwater pearl mussel (though it was possible to partly offset this loss by restoring additional area at Site 17). Overall, the main physical targets were almost entirely achieved.

Chapter 7: Evaluation and Conclusions

The project focused on the restoration of up to 1,989.0ha of active blanket bog habitat, through the removal of forestry plantations and the blocking of drains to restore hydrological levels. The main successes were (1) the felling/removal of coniferous forestry from 955.27 hectares (out of a target of up to 982.27ha) which has initiated the recovery of blanket bog vegetation and habitat; (2) the trialling and use of the wind-rowing technique as an ecologically effective and cost-effective way of clearing trees felled to waste off the majority of the bog surface and (3) the monitoring of the vegetation recovery at sites which has provided important data regarding the recovery potential of blanket bog areas which support differing ages of conifer crop. The only failure was that the chipping of conifers proved to be much too expensive and most of the area programmed for this technique had to be added to the area programmed for wind rowing (Although establishing this fact could also be viewed as a success). Overall, the main physical restoration targets were achieved. There has been an improvement in the conservation status of 1967.0ha of priority active blanket bog habitat within the Natura 2000 network. The project, with its five demonstration sites, has acted as a flagship demonstration of what can be achieved on a wider scale in Ireland and other Member States subject to the availability of funding. Every effort was made to involve local people as much as possible in the project. The project sites will be incorporated into Coillte's biodiversity programme and will continue to be managed with nature conservation as the primary management objective.

Chapter 8: Layman's Report and After-LIFE Plan

The Layman's Report (Appendix 14) and After-Life Conservation Plan (Appendix 22) are supplied on the CD accompanying this report.

Chapter 9: Comments On Financial Report

97% of the total approved modified budget (as per the first additional clause) was spent. "Other Costs" was the only budget heading exceed by more than the permissible 10%; this was because the lowest fee that could be agreed with the external auditors was greater than the amount allocated for this purpose when the project application was submitted. Overall, the level of expenditure arising under each budget category reflects the achievement of project deliverables, objectives, milestones and outputs. These are outlined in detail in Chapter 6 of this report.

Chapter 10: Annexes

The titles of all appendices supplied on the accompanying CD have been listed in this chapter.

4. INTRODUCTION

Description of background, problems and objectives

Ireland began a reforestation programme in the early 1900s following centuries of exploitation of native woodlands and deforestation for agriculture. Successive governments supported a programme of plantation establishment but a strong farming lobby ensured that this was confined mainly to sites marginal, or unsuitable, for agriculture. Peatlands (both blanket and raised bog) were one of these site types and until their ecological value was fully appreciated they were regarded as wasteland to be converted to more productive uses. Forestry was one of these uses and, particularly in the western seaboard regions, following research trials, large scale annual afforestation programmes were undertaken and extensive areas of blanket bog were drained, fertilised and planted with conifers (mainly Sitka spruce and lodgepole pine), the only tree species that would provide an economic return on these sites. Farm and forest management systems were developed to meet the primary objective of production with little attention being paid to biodiversity or the impact of operations on environmental receptors. This work provided employment for local people as well as the prospect of income and a growing industry into the future. Overall, 150,000ha of western blanket peats were afforested until the planting programme on these peats culminated in 1993. Today, in a European or even global context, Ireland's blanket peatlands constitute a vital resource which is acknowledged as:

- A museum of past civilisations, climates and environments
- A habitat for organisms adapted to extreme environments
- Areas of educational and amenity value
- Reserves of genetic resources
- An essential part of the biosphere.

These facts have resulted in new management options for afforested peatland areas. One such option is restoration where suitable of peatland habitat. Such was the focus of this LIFE-Nature project which is now at the end of its five and a half years of implementation.

Overall and specific objectives

- To restore up to 1,989.0ha of blanket bog on 20 sites to a favourable conservation status.
- To extend the area of blanket bog, so that the area free from the effects of afforestation is enlarged by 982.27ha thereby increasing the likelihood of recolonisation with ANNEX 1 habitat type species.
- To block drains on up to 1,556.7ha of cleared or open bog areas.
- To reverse the effects of overgrazing through the fencing of 555.4 of open bog areas.
- To remove naturally regenerated trees from open bog areas on an as required basis.
- To demonstrate and interpret the techniques of bogland restoration on afforested sites, principally tree removal and drain blocking, to as wide as possible an audience but particularly to the foresters who are managing these areas.
- To increase current knowledge in the area of afforested bogland restoration through the dissemination of project results in Ireland and internationally.

Sites involved

There were 20 sites, all owned and managed by Coillte Teoranta, that had been partially or wholly afforested. The project sites covered 1,989.0ha within 14 SACs, spread over 8 counties as shown in the table below. Site Nos. 2-16 comprised the originally approved proposal (from which Site Nos. 1 and 12 had been dropped prior to approval); Site Nos. 4(a), 14(a), and 17-20 were added under the first and only additional clause.

Table of project sites

LIFE Project Site No.	LIFE Project Site Name	County	SAC Number	LIFE Site Total Area (Ha)
2	Garrane	Kerry	000365	17.9
3	Dromalonhurt	Kerry	000365	102.0
4	Pollagoona	Clare	002126	16.2
4(a)	Pollagoona	Clare	002126	38.9
5	Emlaghdauroe	Galway	002031	90.3
6	Bellaveeny	Mayo	000534	344.3
7	Eskeragh 1	Mayo	001922	12.3
8	Eskeragh 2	Mayo	001922	28.3
9	Owenirragh	Mayo	000500	166.0
10	Glencullin		000476	28.6
11	Shanvolahan	Mayo	001922	76.6
13	Croaghonagh	Donegal	000129	33.0
14	Carrick Barr	Donegal	001125	22.2
14(a)	Carrick Barr	Donegal	001125	41.9
15	Sessuegilroy	Sligo	002006	23.6
16	Slieve Blooms	Laois/Offaly	000412	252.0
17	Corravokeen	Mayo	001922	89.7
18	Derry	Mayo	001922	196.6
19	Kingarrow	Donegal	002047 002301	45.8
20	Cappahoosh	Galway	002034	363.8
Total				**1989.0**

Habitat types targeted

Active blanket bog priority habitat (Natura 2000 Code 7130) under *Annex I of the Habitats Directive.*

Main conservation issues being targeted (including threats)

This project addressed the main ecological threats which affect active blanket bog habitats through the following actions:

- Removal of 982.27ha of plantation forest
- Blocking forestry drains on up to 1,556.7ha in order to elevate water levels and hence restore the hydrological balance of the peatland areas
- Reversal of the effects of overgrazing by fencing 555.4ha of open bog areas
- Removal of naturally regenerated trees on an as required basis.

How the project came about

The project came about in the overall context of Coillte's adoption of SFM and achievement of FSC certification for well managed forests. Sites were selected in conjunction with NPWS Research Branch, Coillte's company ecologist and a contract ecological survey; the project application was prepared by Tom Kavanagh, Philip Murphy and Aileen O'Sullivan.

The socioeconomic context of the project

The principal threats addressed by the project (afforestation and associated drainage) arose from previous social forestry established to provide employment and economic added value in remote rural areas. In recent times, an increasing social awareness of the importance of nature conservation has prompted national efforts to conserve the best remaining active blanket bog habitat. In line with this, Coillte selected, for this major restoration project, those sites which were identified as having the best nature conservation value. Every effort was made to involve local people as much as possible in the project, from working on sites to setting up interpretative meetings and demonstrations.

Expected results

- During the period of the project it was expected that there would be a significant improvement in the quality of the open bog areas.
- This would be due to measures taken to gain control of areas and the re–establishing of natural water levels brought about by the removal of trees, drain blocking and clearance of invasive conifer regeneration.
- Up to 1989.0 hectares of active blanket bog would be improved using these measures. There would be a measurable increase in actively growing raised bog species since monitoring began at the start of the project.
- These improvements would be demonstrated using data from dipwells monitoring changes in water levels and data from vegetation transects.
- The area of blanket bog would be increased by 982.27 hectares through the removal of conifers. Maps and field inventory would record this process.
- Natural water levels on the raised bog area cleared of trees and on the open bog area would be re–established resulting in an improvement in habitat quality.

This was the largest single active blanket bog restoration project to be undertaken in Ireland. By the end of this project, significant habitat restoration work would have been completed on up to 1989.0 ha of active blanket bog conserved in SACs – a significant contribution to conservation of the most valuable blanket bog habitat in Europe. The project would serve as a hands-on demonstration of the best approaches to restoration of active blanket bog habitats.

5. LIFE-PROJECT FRAMEWORK

Description and schematic presentation of working method, including overview of: (i) project-actions, and (ii) planning

The essential features of this project were the removal or felling to waste of conifer plantations on active blanket bogs together with the blocking of forestry drains in order to restore bog water levels and facilitate the growth of bog vegetation.

(i) Overview of project actions:

A1-A5 preparatory actions

C1-C7 once-off management interventions e.g. tree removal/drain blocking

D1-D3 repeat management interventions e.g. remove natural regeneration

E1-E7 public awareness/dissemination e.g. project brochure and website

F1-F9 project management e.g. PMG, reporting, monitoring, expert advice.

(ii) planning

Action A2 provided for the elaboration of action plans while time planning was detailed at Form 22 of the approved project proposal, as were deliverables at Form 23 and milestones at Form 24. Achievement was continually monitored against planning at quarterly PMG meetings and annual site plans were prepared for each calendar year as part of Coillte's own computerised Integrated Planning System.

Presentation of Beneficiary, partners and project-organisation

The beneficiary was Coillte Teoranta/The Irish Forestry Board. There were no partners or co-financiers. All actions were carried out by Coillte or its contractors. At project end, the PMG was comprised as follows (all Coillte except where stated otherwise).

Title	Name
Chairman	George McCarthy
Project Manager	Kevin Donnellan
Project PR/Administration Manager	Caroline White
Project Accountant	Liz Tiernan
EU Affairs Manager	Philip Murphy
Company Ecologist	Pat Neville
Contract Ecologist	John Conaghan
Region Director	Gerry Riordan
National; Parks and Wildlife Service	Caitriona Douglas

Modifications

Arising from operational efficiencies in the implementation of the project actions, modifications were submitted on 12 December 2005 – principally

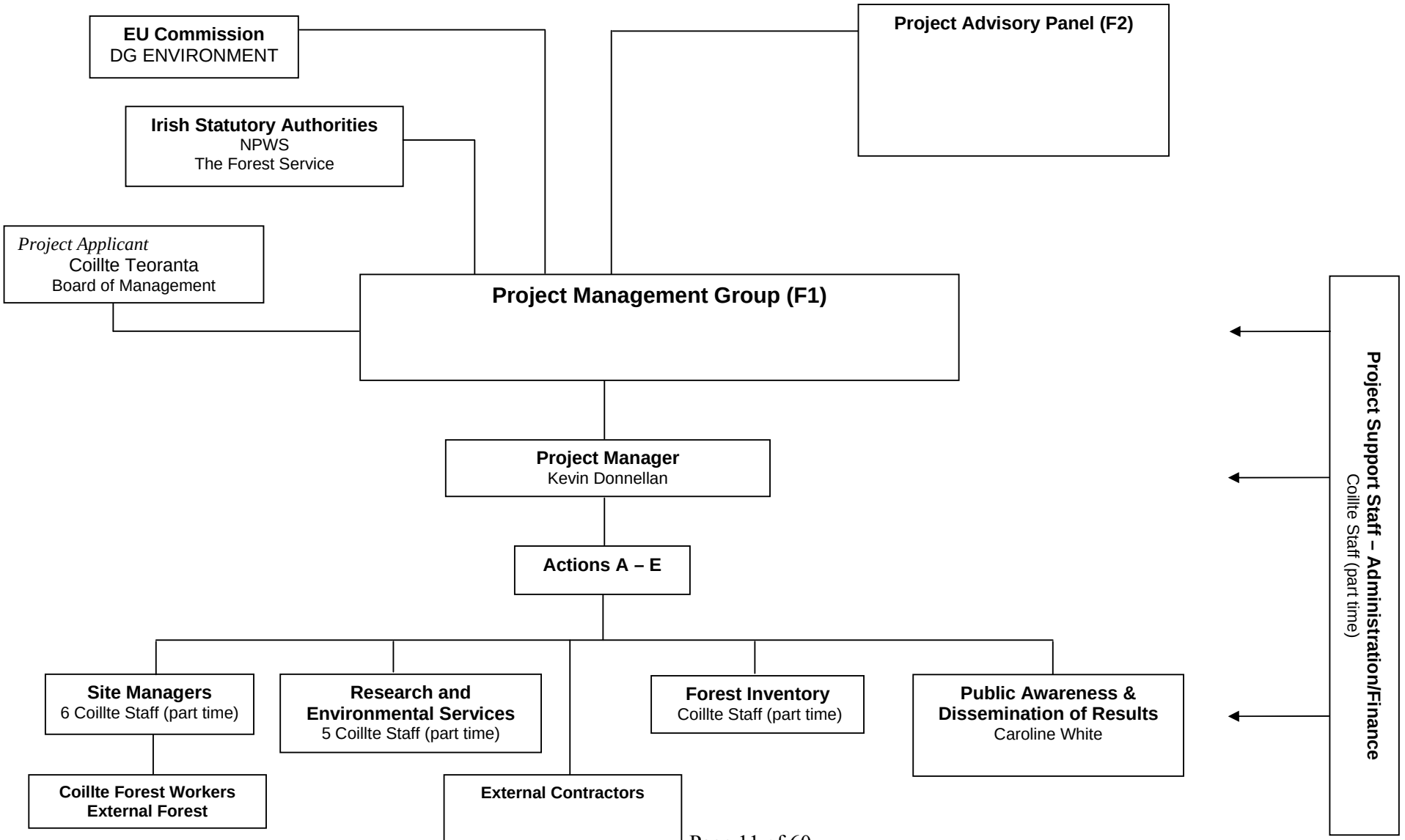
- the utilization of an underspend of some €1,004,889 for the restoration of up to 776.7 ha of extra blanket bog areas;

- a time extension from 30th June 2006 to 31st December 2007 to allow these extra areas be restored; and

- a re-allocation of the original budget to facilitate these proposed modifications**.**

Under these modifications, the main project objective of restoring 1,212.3 ha of active blanket bog would be exceeded by up to 776.7 ha (64%) to give a total of up to 1,989.0 ha restored within the original approved budget. The new area to be cleared of trees (487.1 ha) would be almost 100% of the corresponding area in the original project (495.17 ha). Detailed technical and financial justifications for the proposed project modifications were submitted. The relevant modified forms and maps, using the same format as in the original approved application, were provide (including the appropriate replacement Forms 4 and 28, and Forms 26(2) and 27 from the NPWS). A letter of support from the NPWS was also provided. The Commission accepted these modifications in a letter dated 9th February 2006.

LIFE-NATURE Project LIFE02NAT/IRL/8490: Restoring Active Blanket Bog in Ireland
Project Management Structure



6. ROGRESS, RESULTS

As there were no project partners, all actions were implemented by Coillte and/or its contractors.

"A" Actions – Preparatory Actions, Elaboration of Management Plans

A1: Site Visit to see another LIFE sponsored project

Activity Description
The main purpose of this action was to give project staff experience of similar LIFE projects already in existence. However we felt it would be more beneficial to split visits by project staff over the duration of the project to see a variety of other LIFE projects. We also extended invitations to other LIFE projects to visit our project.

Year 1

- 4 project staff attended the Border Mires Project Conference (LIFE98 NAT/UK/005432) in early October 2002.
- A further 6 Coillte project staff and 5 staff from the National Parks and Wildlife Service visited the Border Mires project later in October 2002 (the staff from the National Parks and Wildlife Service were not charged to the LIFE project budget).

Year 2

- Staff from the Border Mires Project subsequently visited our project in September 2003.
- 4 Coillte project staff attended the Restoration of Scottish Raised Bogs Project Conference (LIFE00 NAT/UK/007078) in October 2003.
- A group from the "Restoring active blanket bog of European importance in North Scotland" Project (LIFE00 NAT/UK/007075) visited our project in March 2004. This group included staff from the Forestry Commission Scotland, Forest Enterprise and the Royal Society for Protection of Birds, Scotland who are all partners in this project.
- Lorcan O'Toole, project manager for The re-introduction of Golden Eagle into the Republic of Ireland project (LIFE00 NAT/IRL/007145) and team visited our project in September 2004.

Year 3

- 6 Coillte staff and 2 staff from the National Parks and Wildlife made a return visit to the Life Peatlands Scottish project in October 2004.

Year 4

- Public Relations Manage. attended the "Farming for Conservation in the Burren" (LIFE04/NAT/IE/000125) project launch in July 2005.
- Staff from the Finnish Aapa Mires Life Project Team (LIFE02/NAT/FIN/008469) visited our project, knowledge and experience were shared and discussed in September 2005.
- Project staff visited work completed by Fermanagh District Council in February 2006 to view work completed on a Life project Conservation of active blanket bog in Scotland & Northern Ireland (LIFE94/NAT/UK/000802) over 14 years ago.
- Project staff also visited the Irish Life project, "Farming for Conservation in the Burren" (LIFE04/NAT/IE/000125), in May 06.

Year 5

- The PR/Admin Manger attended the Scottish Life Peatlands (LIFE00 NAT/UK/007075) "end of project conference" – The Peatlands – A Brighter future, held on 4th/5th October 2006 in Thurso, Scotland. See Appendix 1 – Photographs showing visits over the years.

Comments
These visits proved very successful for information exchange and networking. Our project team also found these visits most useful for gaining knowledge of techniques which had been tried out on other projects.

A2: Elaboration of Action Plans

Activity Description
The main thrust of this action was consultation with key stakeholders in relation to operational work on all sites.

Consultation formed a key part of our action plans during the project, and continued with NPWS, FS and other key stakeholders on each site as required. In addition to having a member of research branch (NPWS) specialising in blanket bog ecology on our Project Management Group (PMG), we invited a local NPWS ranger to each of our PMG meetings from Year 2 onwards. At our end of project conference, 2 key staff from NPWS, and the Chief Executive of IPCC (Catherine O'Connell) made presentations and were very complimentary towards the work which was completed by the project. As part of our After-LIFE management plan, it is envisaged that our consultation procedures will continue and NPWS have also indicated that they are interested in doing some monitoring work on the restored sites in future years.
See Appendix 2 - Consultation procedure and group photographed on site.

<u>Progress on the extension of cSAC designation where required by the end of the project</u>

The NPWS commitment is that the areas covered by the project proposal adjacent to the current cSACs will be incorporated into each relevant pSCI by the end of the project (unless the restoration project has clearly failed). By definition, this could not take place until near the end of the project. Coillte has had ongoing contact with NPWS on this issue and letters, confirming that outstanding areas of some sites have been added to the relevant cSACs, have been received. We are awaiting further letters of confirmation that the balance of outstanding areas from the rest of the sites have been added to the relevant cSACs.

Comments
Our consultation activity was an integral part of our continuing work on the project's additional sites. This action has been most useful in developing good working relationships at local level between Coillte, NPWS, Forest Service and IPCC. Our links with the COFORD/Coillte project have continued throughout the project also.

A3: Identify Safety Hazards and draw up a general safety plan for all sites

Activity Description
The requirement of this action was that Safety plans were drawn up, hazard identification risk assessment forms (HIRA) completed for all sites.

The company's safety officer reviewed and updated the blanket bog Safety Plan for all project sites before sites became operational. HIRA forms were completed for all operational work and safety regulations adhered to on all sites during the project. This action has been shown as completed on 31.12.2007 in the table "List of key deliverables and outputs", but it was ongoing from the beginning of the project.
See Appendix 3 - Sample HIRA form.

A4: Survey of fence lines and enclosures

Activity Description
The boundaries on open areas on Sites 3 (Dromalonhurt), 5 (Emlaghdauroe) and 6 (Bellaveeny) were unclear and needed to be surveyed before fencing commenced.

Survey work is complete on all original project sites where it was required.

A5: To produce plan accurate photographs of all project sites

Activity Description
All original project sites were to be surveyed to determine levels for blocking drains. Following on site discussion with Coillte engineering staff and external contractors, it became apparent, that the agreed budget was insufficient to complete this action as originally set out. We therefore devised an alternative method to achieve this action which is outlined below.

In order to counteract the budgetary problem and to progress work, a decision was taken to purchase an engineer's automatic level. During Year 1, A field day was held at Site 5 (Emlaghdauroe), at which a Coillte engineer carried out a levelling survey training course utilising this level. This course was attended by the project manager, site manager and a number of key project site staff. A practical approach was taken towards achieving this action considering there was a wide and varied range of topography across the project sites. The following steps summarise the methodology used to date to determine the levels for drain blocking on the original project sites…

1. When the ground was cleared a visual assessment of each site was undertaken to determine the water outflows, intensity of blocking required, depths of peat, and slopes.
2. On flat sites the agreed procedure was to block drains at a range of approximately 6.5 – 20m apart. The exact position of the dams depended on a number of local factors, such as tree roots, and small depressions or rises along the ditch profile.
3. Some of the sites were steep sloping and it was not practical or beneficial to block drains on these areas at all.

4. On sites where areas of peat depths were less than 1 metre, it was not practical or beneficial to block drains on these areas either.
5. On sites which had parts both sloping and some parts flat, viewing of the site would indicate the distances for drain blocks to be installed.

A similar approach was adopted towards defining drain blocks needed for our extension sites, but with experience gained from our work on the original project sites, an improved methodology was developed, See Appendix 4 – Contract engineers survey report and photograph of peat dam. This method incorporated the use of machines in peat blocking as opposed to mainly recycled plastic dams. The following points outline what was done…

1. When trees were felled and windrowed, a visual assessment of a selected site, site no: 18 Derry was undertaken by a contract engineer, to determine the water outflows, depths of peat, and slopes.
2. The site was then divided into plots, and only the relevant plots which needed to be blocked were concentrated on. Some plots were sloping, very shallow peat depths, or already had a high water table level. These plots which required blocking were then surveyed to determine the block intervals.
3. Machine operators were then subsequently trained and supervised by this contract engineer, in this methodology of peat damming and the visual assessment of locations for drain blocks.
4. Machine peat blocks were then put in at pre determined varying intervals dependent on the assessment. This approach was adopted for the remaining sites where applicable.

See also Action C4 (Install dams) for site specific detail on areas drain blocked.

<u>"C" Actions - Non-Recurring Management</u>

Changes were made to the original plan through the 1st additional clause of the projects modification, to allow for the restoration of up to 776.7 ha of additional blanket bog area. The following tables for each action outline progress to date against the additional clause.

C1: Fell mature trees non-commercial felling

Activity Description
In relation to the work completed under this action different methodologies were used, the two main ones being fell to waste and fell and windrow and their effectiveness varied which is explained below.

Fell to waste – Conifers were felled by chainsaw and simply left where they fell. Though relatively inexpensive this technique does have a number of drawbacks relating to the amount of dead tree material left on the ground. A thick layer of trees left on the ground will significantly retard the recovery of bog vegetation, and the presence of trees on the ground makes areas very difficult to traverse. At sites where the crop was heavy, the bog vegetation will take a much longer time to re-establish, however at sites where the crop was light, purple moor-grass (*Molinia caerulea*) has returned.

Fell and windrow – In this methodology felled trees are put in windrows (long lines of felled trees) with the use of an excavator. In doing this large areas of ground surface are cleared. The regeneration of bog vegetation in these inter-windrow areas is much enhanced and it is much easier to carry out follow up operations. At most sites where this treatment was used the regeneration of bog vegetation, especially purple moor-grass (*Molinia caerulea*) has been spectacular, with 90% ground cover achieved at some sites within 2 years of felling. For more details on these methodologies see Appendix 5 – Vegetation Monitoring Report.

Site No.	Site Name	Detail of action	Revised area for Action (Ha)	Area complete to 31/12/07 (Ha)	Balance to complete (Ha)	Expected Completion date
2	Garrane	Fell to Waste	17.5	17.5	0.0	Complete
3	Dromalonhurt	Fell/Windrow	28.3	28.3	0.0	Complete
4	Pollagoona	Fell to Waste	11.6	11.6	0.0	See Comments
4 a	Pollagoona	Fell/Windrow	28.7	28.7	0.0	See Comments
5	Emlaghdauroe	Fell to Waste	10.0	7.6	2.4	See comments
6	Bellaveeny	Fell/Windrow	126.0	126.0	0.0	Complete
7	Eskeragh 1	Fell to Waste	10.3	12.3	-2.0	See comments
8	Eskeragh 2	Fell/Windrow	17.8	17.8	0.0	Complete
9	Owenirragh	Fell/Windrow	107.0	107.0	0.0	Complete
10	Glencullin	No Program	0.0	0.0	0.0	No Program
11	Shanvolahan	Fell/Windrow	25.8	30.8	-5.0	See comments
13	Croaghonagh	No Program	0.0	0.0	0.0	No Program
14	Carrick Barr	Fell to Waste	12.1	12.1	0.0	Complete
14 a	Carrick Barr	Fell to Waste	25.9	25.9	0.0	Complete
15	Sessuegilroy	Fell/Windrow	8.5	3.8	4.7	See Comments
16	Slieve Blooms	No Program	0.0	0.0	0.0	No Program
17	Corravokeen	Fell to Waste	36.0	41.00	-5.0	See Comments
18	Derry	Fell/Windrow	181.4	181.4	0.0	Complete
19	Kingarrow	Fell/Windrow	25.9	0.0	25.9	See Comments
20	Cappaghoosh	Fell to Waste	189.2	189.2	0.0	Complete
	Total		**862**	**841**	**21**	

Comments

- Sites 4 and 4a: Pollagoona: Felling to waste on these sites included felling of trees that encroached out onto open areas of the bog. Under action 02EF9: Ground Inventory, it was more practical to map these sites as one unit, due to the fact that site 4, totally surrounded site 4a.
- Site no: 5: Emlaghdauroe – 2.4ha less were completed at this site. While there was no non-commercial felling programme for this site originally, a programme of 10 ha of non-harvestable material became apparent during the 1st phase of the harvesting operation and was subsequently recorded as such in the revised programme. The material in this 10 ha ranged from very poor growing lodgepole pine to some possibly harvestable material. However during the 2nd phase of the harvesting operation, the outturn for the area of

non-commercial felling was only 7.6 ha and the balance of 2.4 was felled commercially under action C3.

- Site no: 7: Eskeragh – 2ha more which were programmed under fell and chip were subsequently felled to waste under this action due to very wet site conditions.
- Site no: 11 Shanvolahan, an area of 5 ha which was due to be commercially felled had to be subsequently felled under this action. This was due to the area being very wet, poor quality material and part of the area windblown.
- Site no: 15 Sessuegilroy, the balance 4.7 was unable to be felled due to FS restrictions on felling licences for material <10 years old. It is planned to restore this area under Coillte's biodiversity programme when felling licence is granted. See Appendix 6 – Letter from Forest Service regarding Sessuegilroy site.
- Site no: 17 Corravokeen – An extra 5 ha was felled to waste on this site as part of an overall area of 23. 8 ha added after discussion with Donald Lunan in November 2007 in place of the loss of the Kingarrow extension site due to pearl mussel issues. The balance of this 23.8 was felled commercially at Coillte's own cost, and as described in the comments under action C3: Commercial felling will constitute part of the overall project area into the future. This means that a total of 23.8 ha was cleared of trees at Corravokeen in place of the 25.9 ha which could not be done at Kingarrow which is explained below.
- Site no: 19 Kingarrow program could not go ahead due to issues with the Pearl Mussel after consultation with NPWS. See Appendix 7 – Letter from NPWS regarding Kingarrow site.

C2: Fell and chip conifers

Activity Description

The fell and chip methodology was used in order to reduce the volume of woody material on the bog surface. Trees were felled by chainsaw and then fed into a chipper by an excavator fitted with a grab. The regeneration of bog vegetation has been very good where it was used. Although this technique produces a very clean bog surface it proved both time-consuming in relation to achieving operational targets, very expensive and limited by extremely wet site conditions. While fell and chip was quite an effective technique in allowing bog species re-colonisation it was neither practical or cost effective. As our budget was limited we changed our plan and decided to do more by felling to waste/windrowing. For more details on this methodology see Appendix 5 – Vegetation Monitoring Report.

Site No.	Site Name	Detail of action	Revised area for Action (Ha)	Area complete to 31/12/07 (Ha)	Balance to complete (Ha)	Expected completion date
2	Garrane	No Program	0.00	0.00	0.0	No Program
3	Dromalonhurt	No Program	0.00	0.00	0.0	No Program
4	Pollagoona	No Program	0.00	0.00	0.0	No Program
5	Emlaghdauroe	Fell and chip	0.17	0.17	0.0	Complete
6	Bellaveeny	No Program	0.00	0.00	0.0	No Program
7	Eskeragh 1	Fell and chip	2.00	0.00	2.0	See Comments
8	Eskeragh 2	Fell and chip	8.00	8.00	0.0	Complete
9	Owenirragh	No Program	0.00	0.00	0.0	No Program
10	Glencullin	No Program	0.00	0.00	0.0	No Program
11	Shanvolahan	No Program	0.00	0.00	0.0	No Program
13	Croaghonagh	No Program	0.00	0.00	0.0	No Program
14	Carrick Barr	No Program	0.00	0.00	0.0	No Program
15	Sessuegilroy	No Program	0.00	0.00	0.0	No Program
16	Slieve Blooms	No Program	0.00	0.00	0.0	No Program
	Total		**10.17**	**8.17**	**2.0**	

Comments

- Site no: 7 Eskeragh 1 – 2 ha which were due for fell and chip were subsequently felled to waste.

- In terms of overall ecological effects the end-result of fell and chip is broadly similar to that of fell and windrow. Both approaches result in the clearing of woody material from the peatland surface and allow a more rapid recovery of the bog vegetation. Although felling and chipping results in the production of more clear ground, the wind-rowing is much quicker to carry out. For example 1 hectare of felled conifers can usually be wind-rowed in half a day while the chipping of one hectare usually takes around 5 days. In addition, the wind-rowing of conifers is substantially cheaper than chipping (€1000-1500/ha as compared to €3000/ha) and thus represents a subsignificant saving.

C3 : Commercial Felling

Activity Description

This action involved the mechanical felling and extraction of premature conifers. A plan was drawn up for Sites 2 (Garrane), 5(Emlaghdauroe), 11(Shanvolahan) and 15(Sessuegilroy). These trees were felled by machine, debranched and the trunks then transported to the roadside by forwarder machines. This leaves the ground covered by brash mats, which are necessary to keep the harvesting machines from (sinking) bogging in the soft peat soil. The recovery of bog vegetation is generally slow at these sites, mainly due to the initially low cover of bog species under the mature conifer canopy. Areas where commercial felling took place are also prone to the invasion of plant species not typical of ombrotrophic blanket bogs in Ireland such as

soft rush (*Juncus effuses*) and seedlings of tree species such as lodgepole pine. Although commercial felling as a methodology is the least expensive, the recovery of blanket bog habitat is slow due to severe drying out of the peat soil. For more details on this methodology see Appendix 5 – Vegetation Monitoring Report.

In addition to the overall C3 commercial felling action, as indicated in the modification request and approved in the first additional clause, some commercial felling on three of the additional sites nos. 4a(Pollagoona), 14a(Carrick Barr) and 17(Corravokeen) took place outside of the project budget as part of Coillte's normal harvesting operations. Accordingly, there is no charge against the project budget for

this non-project activity. However these areas cleared of trees constitute part of the overall project area into the future.

Site No.	Site Name	Detail of Action	Revised area for Action (Ha)	Area complete to 31/12/07 (Ha)	Balance to complete (Ha)	Expected completion date
2	Garrane	No Program	0.0	0.0	0.0	No Program
3	Dromalonhurt	No Program	0.0	0.0	0.0	No Program
4	Pollagoona	No Program	0.0	0.0	0.0	No Program
5	Emlaghdauroe	Fell/Extract	62.0	64.4	-2.4	See comments
6	Bellaveeny	No Program	0.0	0.0	0.0	No Program
7	Eskeragh 1	No Program	0.0	0.0	0.0	No Program
8	Eskeragh 2	No Program	0.0	0.0	0.0	No Program
9	Owenirragh	No Program	0.0	0.0	0.0	No Program
10	Glencullin	No Program	0.0	0.0	0.0	No Program
11	Shanvolahan	Fell/Extract	41.0	36.0	5.0	See comments
13	Croaghonagh	No Program	0.0	0.0	0.0	No Program
14	Carrick Barr	No Program	0.00	0.0	0.0	No Program
15	Sessuegilroy	Fell/Extract	7.1	5.7	1.4	See comments
16	Slieve Blooms	No Program	0.0	0.0	0.0	No Program
	Total		**110.1**	**106.1**	**4.0**	

Comments

- Site no 5: Emlaghdauroe – 2.4ha more were felled under this action because it transpired that this material was harvestable see action C1- Fell mature trees (un-commercial).
- Site no 11: Shanvolahan – 5 ha less than planned was harvested because the material was windblown and poor quality, the ground was also very wet. This 5 ha was felled under action C1-Fell mature trees (un-commercial).
- Site no 15: Sessuegilroy – 7.1 ha were initially returned as completed on this site and reported in progress reports 3 and 4 . At ground inventory stage the actual area felled under the project was 5.7 hectares. The other 1.4 ha was actually part of the same inventory area as the project site but was not in the SAC.

C4: Install Dams

Activity Description

This action involved blocking drains on nearly all of the project and extension sites. After action A5 (produce plan accurate photographs) was carried out, the number and levels of drains became apparent at each site and work began accordingly.

Site No.	Site Name	Detail of Action	Revised area for Action (Ha)	Area complete to 31/12/07 (Ha)	No. dams installed To 31/12/07	Balance to complete (Ha)	Expected completion date
2	Garrane	Install dams	17.5	17.5	1372	0.00	Complete
3	Dromalonhurt	Install dams	28.3	28.3	3328	0.00	Complete
4	Pollagoona	Install dams	12.03	12.03	1101	0.00	Complete
4a	Pollagoona	Install dams	38.9	38.9	400.00	0.00	Complete
5	Emlaghdauroe	Install dams	72.17	72.17	14900	0.00	Complete
6	Bellaveeny	Install dams	126.0	126.0	15279	0.00	Complete
7	Eskeragh 1	Install dams	12.3	12.3	823	0.00	Complete
8	Eskeragh 2	Install dams	25.8	25.8	3200	0.00	Complete
9	Owenirragh	Install dams	107.0	107.0	5173	0.00	Complete
10	Glencullin	No Program	0.0	0.0	0	0.00	No Program
11	Shanvolahan	Install dams	66.2	66.2	1964	0.00	Complete
13	Croaghonagh	Install dams	33.0	33.00	1770	0.00	Complete
14	Carrick Barr	Install dams	12.1	22.2	604	0.00	See Comments
14a	Carrick Barr	Install dams	41.9	41.9	0.0	0.00	See Comments
15	Sessuegilroy	Install dams	15.6	15.6	570	0.00	Complete
16	Slieve Bloom	Install dams	252.0	252.0	1040	0.00	Complete
17	Corravokeen	Install dams	89.7	113.5	780	-24.1	See Comments
18	Derry	Install dams	196.6	196.6	11000.00	0.00	Complete
19	Kingarrow	Install dams	45.8	0.0	0.0	45.8	See Comments
20	Cappaghoosh	Install dams	363.8	363.8	0.0	0.00	See Comments
	Total		**1556.7**	**1544.80**	**63304**	**21.7**	

Comments

- Site no 14: Carrick Barr – It was discovered that there was a typographical error under "revised area for action" in this table, (which went in with our modification) the area should in fact be 22.2ha. This was the area drain blocked at this site. We did not change the figures in the table.
- Site no 14a: Carrickbarr - No dams were required at this site, because when site surveys were completed, it showed that the water table was very high, this site had blocked up naturally. We have returned this site as complete in terms of hectares.
- Corravokeen no 17: - An extra area of 23.8 was drain blocked at this site to replace some of the area lost by the exclusion of site 19: Kingarrow due to pearl mussel issues. This was agreed with Donald Lunan (Astrale)

- Site no 19: Kingarrow - no work was carried out at this site due to issues with the Pearl Mussel as advised by NPWS, see Appendix 5 – Letter from NPWS.
- Site no 20: Cappaghoosh – No dams were required at this site, because when site surveys were completed, it showed that the water table was very high, this site had blocked up naturally. We have returned this site as complete in terms of hectares.
- This action was completed on all other sites where there was a programme. As part of the after life management plan for these sites, dams will be monitored to measure success of operation and any necessary remedial action take as appropriate.

C5: Erect/Repair Fences

Activity Description:
On some sites, in order to restore sites to a favourable state of conservation, it was necessary to protect the unplanted land and maintain the fences on the cleared sites.

Site No.	Site Name	Detail of Action	Revised area (Ha)	Revised Metres	Area complete to 31/12/07 (Ha)	Metres of fence erected To 31/12/07	Balance (Ha)	Balance metres	Status
2	Garrane	Erect fences	17.9	2000	17.9	2000	0.0	0	Complete
3	Dromalonhurt	Erect fences	28.3	3000	28.3	3000	0.0	0	Complete
5	Emlaghdauroe	Erect fences	71.0	4700	71.0	4640	0.0	0	Complete
6	Bellaveeny	Erect fences	165.0	5775	137.0	6830	0.0	0	Complete
7	Eskeragh 1	Erect fences	12.3	1500	12.3	1500	0.0	0	Complete
8	Eskeragh 2	Erect fences	28.3	2450	28.3	2450	0.0	0	Complete
9	Owenirragh	Erect fences	107.0	3795	166	4725	0.0	0	Complete
10	Glencullin	Erect fences	28.6	2690	28.6	2690	0.0	0	Complete
11	Shanvolahan	Erect fences	64.0	2240	64.0	3441	0.0	0	Complete
13	Croaghonagh	No Program	33.0	1155	33.0	1155	0.0	0	Complete
	Total		**555.4**	**29305**	**586.4**	**32431**	**0.0**	**0**	

Comments

This action is complete on all original project sites for which it was programmed. 5 sites had no programme originally but a programme was subsequently necessary on site 13: Croaghonagh. Fencing was not necessary on the additional sites.

- Site 6:Bellaveeney – As the fencing repairs element of the work could not be forecast with absolute accuracy, 1,055m more than envisaged in the revised target were needed.
- Site 9:Owenirragh – This site had a plan of 107 ha reflecting the felling target area. However this site required the entire area of 166 ha to be fenced to protect the unplanted area from overgrazing and this ultimately required 930m more than envisaged in the revised target. The need to fence the entire site was accepted in the Commission's letter of 18th February 2005.
- Site 13:Croaghonagh - The original project submission did not include fencing for this site. However, the adjoining land had changed land use to grazing, and it proved necessary to fence this site. This necessitated a programme be put in place for this site in order to conserve the bog.

Note: The targets for fencing in some cases do not reflect the entire site area which was in the original project submission. After evaluation of the sites, in some cases it would not have been practical to fence areas due to elevation, landscape and access.

C6: Build and repair roads onto sites for safe access and the removal of trees

Activity Description
This action was needed on some sites to facilitate the removal of tress for commercial felling, and to provide limited off road access and parking facilities for staff working on site and for staff visiting demonstrations sites.

Site No.	Site Name	Detail of action	Revised metres for Action	Metres complete to 31/12/07	Balance to complete (metres)	Expected completion date
2	Garrane	Build/Repair	0	0	0	Road not required
3	Dromalonhurt	Car Park Access	0	0	0	Complete (Car Park only)
4	Pollagoona	No Program	0	0	0	No Program
5	Emlaghdauroe	New Road	230	230	0	Complete
6	Bellaveeny	Repair	1800	1800	0	Complete
7	Eskeragh 1	Car Park Access	0	0	0	Complete (Car Park only)
8	Eskeragh 2	New Road	80	80	0	Complete
9	Owenirragh	No Program	0	0	0	No Program
10	Glencullin	No Program	0	0	0	No Program
11	Shanvolahan	New Road	750	950	-200	See Comments
13	Croaghonagh	Car Park Access	0	0	0	Complete (Lay-by only)
14	Carrick Barr	No Program	0	0	0	No Program
14a	Carrick Barr	Repair	1500	1000	500	See Comments
15	Sessuegilroy	Repair	1500	1750	-250	See Comments
16	Slieve Blooms	Car Park Access	0	0	0	Complete (Car Park only)
17	Corravokeen	No Program	0	0	0	No Program
18	Derry	No Program	0	0	0	No Program
19	Kingarrow	No Program	0	0	0	No Program
20	Cappaghoosh	Repair	1500	1500	0	Complete
	Total		**7360**	**7310**	**50**	

Comments:

- Site11: Shanvolahan – It was necessary to exceed the original plan at this site in order to progress operational work.
- Site 14a: Carrick Barr - Building of new turntable on existing road required less road repairs overall.
- Site 15: Sessuegilroy – It was necessary to exceed the original plan at this site in order to progress operational work.

C7: Install Dipwells

Activity Description
A total of 98 water level rain gauges were installed on project sites. These (walrags) operate mechanically and give maximum and minimum readings which allowed us to measure and quantify degrees of success.

Site No.	Site Name	Detail of action	Complete to 31/12/07 (No.)
2	Garrane	Install dipwell	10
3	Dromalonhurt	Install dipwell	8
4	Pollagoona	Install dipwell	10
5	Emlaghdauroe	Install dipwell	9
6	Bellaveeny	Install dipwell	8
7	Eskeragh 1	Install dipwell	3
8	Eskeragh 2	Install dipwell	7
9	Owenirragh	Install dipwell	12
10	Glencullin	Install dipwell	0
11	Shanvolahan	Install dipwell	0
13	Croaghonagh	Install dipwell	12
14	Carrick Barr	Install dipwell	12
15	Sessuegilroy	Install dipwell	7
16	Slieve Blooms	Install dipwell	0
	Total		**98**

Comments

This action is complete on the original project sites and was not carried out on the additional project sites because the timeframe to measure water levels was inadequate.

"D" Actions – Recurring biotope management

D1: Remove natural regeneration

Activity Description
This action was necessary to prevent the sites from drying out as a result of regeneration of non bog type species and has varied from site to site depending on the strike rate of the re-generating conifers. It was carried out as the need arose during the project. On most sites, there was no stated target area. This action will form part of the After-LIFE conservation plan into the future.

Site No.	Site Name	Detail of action	Revised Target for Action (No.)	Complete to 31/12/07 (No.)
2	Garrane	Remove regen	0	21.5
3	Dromalonhurt	Remove regen	0	48.0
4	Pollagoona	Remove regen	0	0.0
5	Emlaghdauroe	Remove regen	0	17.0
6	Bellaveeny	Remove regen	0	0.0
7	Eskeragh 1	Remove regen	0	10.0
8	Eskeragh 2	Remove regen	0	25.0
9	Owenirragh	Remove regen	0	49.0
10	Glencullin	No Program	0	0.0
11	Shanvolahan	Remove regen	0	40.6
13	Croaghonagh	No Program	0	0.0
14	Carrick Barr	No Program	0	0.0
15	Sessuegilroy	No Program	0	0.0
16	Slieve Blooms	Remove regen	252	252
	Total		**252**	**463.1**

D2: Removal of trespassing livestock

Activity Description:
This action was necessary to prevent large numbers of livestock trespassing onto the project sites which would inhibit the general restoration of the site.

Comments
On two sites a number of hours/lifts have been recorded, this action was not an issue on the majority of our sites.

Action D3: Measure nutrient flow from sites

Activity Description:
Site managers together with Coillte research staff took water samples on a monthly basis from sites 2(Garrane), 3(Dromalonhurt), 5(Emlaghdauroe) and 6(Bellaveeny). Due to the high level of national interest in the findings, this action continued on the original project sites up to the end of the project. A full report outlining data to date can be viewed at Appendix 8 - Water Monitoring Report.

Summary of findings:
To assess the efficacy of water protection measures adopted to minimise and/or avoid impacts of bog restoration measures, which included larger than normal felling coups, the use of non-commercial harvesting techniques, such as felling to waste, and wholesale blocking of forest drains, water monitoring was conducted at four out of the original fourteen project sites, namely; Dromalonhurt and Garrane, Co. Kerry, Emlaghdauroe, Co. Galway and Bellaveeney, Co. Mayo.

The aforementioned study sites were selected, during site visits in November and December 2002, on the basis of the environmental sensitivity of adjacent rivers/streams. In particular, Dromalonhurt and Garrane properties drained into the Carragh River, a Freshwater Pearl Mussel catchment. The Emlaghadauroe study site is adjacent to Ballynahinch Lake, an acid sensitive lake in Connemara, Co. Galway. While, Bellaveeney lies within the Owenduff River catchment, one of the most prolific salmon and sea trout fisheries in the country.

An autosampler was installed at each of the study sites at Dromalonhurt, Emlaghdauroe and Bellaveeney in the period March to June 2003 and monitoring continued until November 2007. Composite daily water samples (comprising of a tributary/stream sample taken every hour on the hour over a 24 hour period) were collected every week to ten days. This intensive sampling was supplemented where possible by spot (grab) sampling conducted approximately every month at locations above and below the study sites. In regard to Garrane, grab sampling only was carried out at this site. All water samples, both from the autosamplers and grab sampling were dispatched on the day of collection to the Coillte Research Laboratory and analysed for a wide range of parameters including total suspended solids [TSS], pH, ammonia, nitrate, soluble reactive phosphorus (otherwise known as ortho-phosphate [Ortho-P]) & total phosphorus [TP].

The key findings from water monitoring at the four Demonstration sites were as follows:

- The impact of bog restoration measures varied greatly between the four monitoring sites. Surprisingly, Bellaveeney, which had the largest felled area showed the least effect on water quality.
- The minimal impacts observed in Bellaveeney after bog restoration measures were completed, consisted primarily of periodic spikes in daily concentrations of Ortho-P and TP. These spikes, which were thought to be related to nutrient losses to surface water from the decomposing harvest residue, decreased in time becoming very infrequent two years after all operations had ceased onsite.
- The largely intact, well vegetated buffer zone (~20 to 50 m in width) adjacent to the tributary at Bellaveeney was considered to have played a major role in minimising the impact of harvesting at this site. The buffer zone ensured that:
    - The critical threshold for total suspended solids of 25 mg/l was never exceeded
    - The limits for Ortho-P (20 µg/l P) and TP (62 µg/l P) were exceeded on only 7 and 8 days respectively of the 287 days the autosampler was operation in 2005, the year where the most significant impacts on water quality were observed.
- Where significant impacts on water quality were observed, such as Dromalonhurt and Emlaghdauroe, they varied from being of short duration in the case of the former to more prolonged in the case of the latter.
- In regard to Dromalonhurt, notwithstanding the large increases in Ortho-P and TP for two weeks during harvesting period, overall water quality was considered highly satisfactory throughout the study period, bearing in mind the lack of a vegetated buffer zone and felled trees on either side of the tributary bank.
    - Only one sample, out of the 206 daily samples taken in the post-harvesting 2004 period, exceeded the critical limit for TSS of 25 mg/l.

The median concentration in this period was <2 mg/l. Therefore, leading one to conclude that silt loss from harvesting was not a significant issue at this site.

  - A marginal increase in both Ortho-P and TP, due to mineralisation of the harvest residue, was noted in 2004 and 2005 in comparison to that observed prior to bog restoration operations. By 2005, two years after all operations were completed, Ortho-P exceeded the tolerable threshold of 20 µg/l P on only five out of 300 daily samples taken in that year. The median concentration during this sampling period was 8 µg/l P.
  - Four years after the completion of bog restoration measures at Dromalonhurt, water quality at the autosampler sampling point was highly comparable to before the start of operations.
  - Apart from the impacts of the bog restoration measures on the tributary's water quality, the results from the grab sampling indicated periodic but highly significant bank erosion between the forest property, where the autosampler was located, and the outflow to the River Caragh.

- The water results at Garrane were confounded by the regular flooding of the site, resulting in inexplicably large concentrations of suspended solids and phosphorus at sampling locations considered outside the harvested area.
- That been said, the results from the Caragh River both at Dromalonhurt and Garrane indicated that natural erosion pressures in the headwaters of the river were a greater determinant on the river's water quality than bog restoration operations conducted at both sites. Thus, leading one to conclude that the impacts on the fresh water pearl populations located further down the system was minimal to non-existent.
- At Emlaghdauroe, arising from where the autosampler was located, it was impossible to distinguish the impacts from the felling of this demonstration site with that of resurfacing of a nearby road which co-incidentally took place at the same time.
- However, grab sampling of a natural watercourse draining Emlaghduaroe property did show consistently high P losses (both Ortho-P and TP) immediately after harvesting and continued to do so for at least another two years afterwards. The presence of high Ortho-P and TP in the absence of TSS would strongly suggest that the decomposition of the brash on this steep property was contributing to the chronic phosphorus losses.
- Finally, the distinct differences in type and duration of impacts observed at Emlaghdauroe, Co. Galway and Dromalonhurt, Co. Kerry are not readily explained but may be related to differences in site typography and gradient.

Comments

Two of the additional project sites, Cappaghoosh and Pollagoona, are being monitored at Coillte's own expense. This monitoring by Coillte will continue post felling to determine any impacts on water quality.

"E" Actions – Public awareness and dissemination of results

E1: Land manager training course

Activity Description
This action was necessary to disseminate the skills and experience needed to restore bogland and to promote awareness and understanding of the LIFE project. As well as arranging land managers days our team also sought opportunities to promote the objectives of the life project through organisation of information days, hosting specific interested groups and promotion at key publicity events etc. Please see listing of all occasions where the project was promoted and publicised and of visits by other groups to our project including monitoring mission visits.

2002

16th July	Courtesy visit by Micheal O'Briain, Kerstin Sundseth (EU) and John Houston (Ecosystems) to sites in Mayo area.
12th Nov	Key project staff held a consultation meeting on some of the project sites in Mayo area to outline project objectives and work required to Forest Service Staff.
17/18th Dec	A site managers information meeting and field training day, was organised by PR/Admin Mgr. and led by the Project Manager. Site Managers booklet compiled by PR/Admin mgr. which included relevant information about the project to enable efficient management was distributed at this meeting.
12th Dec	Interreg IIIB Workshop to develop projects, Inverary, Scotland, presentation by EU Affairs Mgr.

2003

28th Jan	Live radio interview with Radio na Liffe (Dublin Environment radio programme), given by Coillte Region Manager who outlined the objectives of the project and the planned work and benefits.
11th Feb	Life project information talk using project presentation given by PR/Admin Mgr. to Donegal District, Harvesting and Coillte Forestry team meeting.
13th Feb	Life project information talk using project presentation given by PR/Admin Mgr. to Sligo/Leitrim District, Harvesting and Coillte Forestry team meeting.
18th Feb	Project presentation given by PR/Admin mgr. to Coillte's Social & Environmental Panel (which are set up at District level to provide a forum for Coillte and environmental, social and community groups to discuss issues of common interest) meeting, Donegal District, which included a bog walk to Croaghonagh Life site.
5th Mar	Monitoring mission visit by Susann Pauli, Kyriaki Mandikou (EU Staff), and John Houston (Ecosystems) to meet with key project staff and discuss early project progress at our Coillte HQ office, Dublin.

6th-7th May	Project team attended a field day with NPWS on bog restoration at sites in the Wicklow area, a team meeting to discuss operational issues took place on the second day.
4th Jun	EU Green Day's promoted by organisation of education day with illustrated talk by project mgr. and pr/admin mgr. given to group invited. This day outlined Coillte's EU Life Nature Project and Coillte's Neighbourhood Scheme at Belleek Wood, Co. Mayo. A bog walk followed at Eskeragh Demonstration site.
13th Aug	Visit by Coillte Stakeholder Group to Slieve Blooms Life Site, this visit hosted by local site manager.
18th-19th Aug	Project team held a consultation meeting on blanket bog restoration project with staff from NPWS at Croaghonagh, followed by a bog walk
23rd-24th Sep	Monitoring mission visit by John Houston (Ecosystems) to Sligo office and sites Eskeragh, Owenirragh, Glencullin and Sessuegilroy.
31st Oct	Visit to Slieve Bloom newly build boardwalk by Coillte's Board of Directors, October 2003. This visit was hosted by local life site mgr and led by project manager
5th Nov	Researchers from the UK Forestry Commission visited the Slieve Bloom Life Site, visit hosted by local life site mgr, led by project manager.

2004

1st Mar	Visit by students from Dept. of Environmental Resource Mgt, University College Dublin, to Slieve Blooms Life Demonstration
25th Mar	Social & Environmental Panel meeting, West Cork/South Kerry District, presentation given by Project Manager
4th Mar	The Project Mgr. hosted a group from FWAG (Farming and Wildlife Advisory Group), North Yorkshire, UK, who had learned about the project, contacted us and were delighted to get the opportunity to visit site no. 5 Emlaghdauroe. They complimented the work completed at that stage.
30th Mar	Social & Environmental Panel meeting, East Galway District, presentation by Project Manager
24th Apr	PR/Admin Mgr. attended the "Graduate" Presentation Ceremony in the Regency Hotel, Dublin…..the following explains the "Graduate Treasure Trail"…….

What is the Graduate Treasure Trail?
The Graduate Treasure Trail on-line Quiz was aimed at primary and secondary level students throughout Ireland. The purpose of the quiz was to promote civic awareness, research politics, environment, EU Affairs, health and safety, the Irish language, government services and improve IT skills.
Many national and European institutions supported this initiative as they saw the quiz as an innovative way to get their message across to students in an engaging, fun and educational format.

How did it work?
Each institution of which Coillte was one, involved in the project developed 36 questions about the background to the respective information on their website, in this case our EU LIFE-Nature Restoring Active Blanket Bog website. These questions were then supplied to the Graduate and would feature in the weekly quiz. The quiz was published online (www.graduate.ie) for 36 weeks running. Every question had a

link to the relevant institution website and students had to read the institution's website material to find the answer to the questions. Students registered online and were given a reference number to be eligible to participate in the on-line quiz. To qualify for prizes a student had to answer all questions correctly. The computer randomly selected prize-winners on a weekly basis.

Publicity gained

The project received national radio, and national newspaper publicity - See Appendix 9 showing sample questions given; publicity update; prize winners; and paper cutting , also details of award ceremony (Presentation Ceremony Booklet) which took place usually in April of each year which the PR/Administration manager attended on behalf of the project to present prizes to students, and lastly a newspaper cutting of a presentation.

5th May	PR/Admin Mgr. delivered an illustrated presentation on the project and distributed brochures to Education Officers at Glenveigh National Park, Co. Donegal to promote the project.
12th May	IPCC Information Day organised by PR/Admin Mgr, presentations given by Chief Executive Dr. Catherine O'Connell and project staff followed by a bog walk at the Eskeragh Demonstration Life Site
3rd Jun	Project launch held at Eskeragh Demonstration Life Site (Green Day)……..

A major event in the "Life" of the project was the official launch of the project which took place on June 3rd, 2004 in Co. Mayo in beautiful warm Summer sunshine. Mr. Joe Walsh TD, Government Minister for Agriculture and Food at that time officiated at the event which was attended by a large group of external stakeholders and Coillte staff. The launch allowed national publicity through articles appearing in local and national newspapers. The project also received national television coverage on RTE 1 as a result of the launch. Appendix 10 shows information relating to the launch namely - Copy of launch invitation; Press release; List of invitees; Ministers speech; Photograph of Minister at Eskeragh, and a video clip showing coverage on RTE national television news about the launch can be viewed.

11th Jun	Information day arranged by PR/Admin Mgr for a group from the Society of Irish foresters (comprising professional foresters, and non-technical personnel) who learned about the project and visited Eskeragh Demonstration Life Site
6th Jul	Visit by Coillte Stakeholder Group to Slieve Bloom Demonstration Site
8th Jul	Radio Interview for Sligo Community Radio - Green Calendar programme which focused on environmental initiatives given by PR/Admin Mgr.
21st Sep	PR/Admin Mgr. organised a Land Mgr. Training day at the Croaghonagh Demonstration site. A presentation was given to the group invited and a site visit to Croaghonagh demonstration site followed
28th Sep	Monitoring mission visit by John Houston (Ecosystems) to Sligo office and to see sites Croaghonagh Nth and Carrick Barr.
20th Oct	PR/Admin Mgr. organised a Land Mgr. Training day at the Dromalonhurt Demonstration site. A presentation was given to the group invited and a site visit to Dromalonhurt followed.

1st Oct	A day was organised by the PR/Admin Mgr. for Coillte's Raised Bog Project team to visit the Life Blanket Bog project Bellaveeney Site to see at first hand the work done
5th-8th Oct	LIFE Workshop on Raised Bogs and Sand dunes, Aalden, Holland, presentation by EU Affairs Mgr

2005

28th Feb	The Project Manager had a student from an Agricultural college specialising in forestry, working on the Blanket Bog Project for a couple of weeks. Each year Coillte take on students for practical experience and this proved a good opportunity to further promote the project through this educational institution.
20th Apr	PR/Admin Mgr. attended the "Graduate" Presentation Ceremony in the Regency Hotel, Dublin.
12th May	Visit by Life Blanket Bog Project Team to IPCC, HQ, Rathangan, Co. Kildare to discuss ongoing work and view the IPCC premises
31st May	PR/Admin Mgr. organised a Land Mgr. Training day at the Sessuegilroy site. A presentation was given to the group invited and a site visit to view work done followed.
22nd May	Students from UCD, Dept. of Environmental Resource, led by lecturer Dr. John Feehan, visited Pollagoona Life Site
21st June	Monitoring mission visit by John Houston (Ecosystems), to see Emlaghdauroe site and discuss possible extension sites while visiting Cappaghoosh which was one of the sites eventually selected
30th June	Green Day (Project Advisory Panel meeting), visit to Corravokeen, one of the extension sites.
19th Aug	Project Mgr. had a French student – Greg Decamps from the University of Agricultural, Engineering and Natural Resource Studies, in Montpellier working on an internship from 5th July – August 19th on the blanket bog project. This again promoted the project internationally and the student found the bog restoration work rewarding and educational.
22nd Aug	Field day arranged by PR/Admin Mgr for Belfast Women's Environmental Group, included project presentations and visit to Croaghonagh Demonstration Life Site
29th Sep	Visit by Northern Ireland Forest Service Staff to Blanket Bog Project, included visits to Bellaveeny and Eskeragh Demonstration sites
26th-27th Sep	Display stand manned by PR/Admin Mgr at National Ploughing Championships which is Ireland 's largest agricultural exhibition and one of Europe 's primary agricultural events. It attracts over 160,000 visitors each year.
5th Oct	LIFE05 kick-off meeting, Islington, London, UK, presentation on Coillte's LIFE projects by EU Affairs Mgr.

2006

19th Apr	PR/Admin Mgr. attended the "Graduate" Presentation Ceremony in the European Parliament Offices, Dublin
22nd Mar	Dr. John Conaghan, Contract Project Ecologist, gave a talk at University College Galway in the Department of Botany on "The Restoration of Afforested Blanket Bog Habitat in Ireland".
30th Mar	"An appreciation day for foresters and ecologists", field day organised and led by Project Mgr. and PR/Admin Mgr.
27th May	Promotion of project at "Clare Biodiversity Day", which is a day held each year in Co. Clare to celebrate biodiversity and its preservation. A stand was manned by PR/Admin Mgr, and a very good response received to our Life Blanket Bog project
4th May	The project team from the Coillte/COFORD Red Area's project "Management Options for forests on Western Peatlands", attended a field visit to the Bellaveeny Life Site, project objectives were discussed and work completed viewed.
23rd-24th May	Promotion of project at Donegal, Sligo/Leitrim District Public Consultation Meetings
25th May	Promotion of project at Mayo/Connemara District Public Consultation Meetings
2nd June	A Dissertation titled "A review of the methodologies used for restoring active blanket bog in the West of Ireland" was completed by a Coillte staff member, John Le Gear who was studying a BSc (Honours) Forestry Management course at the University of Central Lancashire, Cumbria Campus. This can be viewed on the projects website.
22nd-23rd June	Monitoring mission visit by Walter Cortellini (Life Desk Officer) and Graham Tucker (Astrale) to Castlebar office and sites Eskeragh, Shanvolahan, and extension sites Corravokeen and Derry.
31st Aug	The PR/Admin mgr. hosted a group from An Taisce who are the National trust for Ireland at the Croaghonagh Demonstration site. This visit was organised during "heritage week" which aims to build awareness of Irelands built, natural and cultural heritage to encourage its conservation and preservation. A project presentation was given by the PR/Admin Mgr followed by a bog walk on the Croaghonagh site.
26th-27th Sep	Display stand manned by PR/Admin Mgr at National Ploughing Championships, Tullow, Co. Carlow

2007

25th Apr	Attendance by Coillte staff member at Graduate Treasure Trail prize giving ceremony in Dublin
25th-26th Apr	"European Funding for Nature Conservation", workshop in Kampinoski National Park, Poland, project brochures distributed by EU Affairs Mgr.
24th May	Monitoring mission visit by Donald Lunan, Lynne Barrett and Jon Taylor (Astrale) to Cong, Co. Galway, with site visits to Emlaghdauroe and extension site Cappaghoosh.

25th Sep	Life project work promoted at Company display stand at National Ploughing, Tullamore, Co. Offaly.
25th Sep	National Ploughing Championships, Tullamore, presentation in the European Commission tent on "Experience and Lessons from Coillte's life projects" by EU Affairs Manager
4th-5th Oct	An end of project conference "Bringing the Bogs back to LIFE" was held on the 4th and 5th of October in Westport, Co. Mayo. This was held to mark the finale to Coillte's first LIFE Project - "Restoring active blanket bog in Ireland" which began in the Summer of 2002 and was completed at December end 2007. Delegates from Ireland, the UK and continental Europe attended the conference, which heard presentations on topics associated with the project results, blanket bogs generally, their restoration and conservation. Guest Speakers at the conference included Dr. Micheal O'Briain of the European Commission and Dr. Catherine O'Connell of the Irish Peatland Conservation Council, both who complimented highly the work carried out under the project and Coillte in general. As part of the conference a field day was organised and was attended by a large group of people. Appendix 11 shows Conference related data.
6th-7th Nov	Monitoring mission visit by Donald Lunan (Astrale) to Mullingar office and sites Pollagoona, Pollagoona extension site and Slieve Blooms.

Comments

These information days and visits proved most beneficial in terms of promoting the project and its objectives. Positive feedback was received from groups and individuals over the years, and a selection of photographs of some groups at various sites and thank you notes can be viewed in Appendix 12.

E2: Project Website

Activity Description

The project website www.irishbogrestorationproject.ie, lists information detail in relation to the project sites, the flora and fauna of blanket bog, facts about bogs for children, what "Life" is, and information in relation to project publicity over the years. Some pre restoration and post restoration photographs can be viewed, relevant reports, links to other projects, can all be downloaded. Information and presentations about our "end of project conference" can also be viewed and downloaded if required. Our website was linked with a schools educational programme "the Graduate Treasure Trail" previously explained under action E1.

Comments

The website is a valuable information tool, and is seen as a very beneficial way of disseminating the projects objectives and progress. This action is now complete but will continue to be available as part of the after life management plan.

E3: Project Information Brochure

Activity Description

The project brochure has been produced and distributed to a large number of stakeholders – a selection of stakeholders who received brochures are outlined in the following table.

Sample brochure distribution list	
Environment Section	Clare Co. Council
ENFO – Environmental Information Service	Dublin 2
Education Officers	Glenveigh National Park, Co. Donegal
All Coillte Staff	Countrywide
All National Parks & Wildlife Staff	Countrywide
All Forest Service Staff	Countrywide
National and Second Level Schools	Co. Mayo
National College of Ireland	Sandyford Road, Dublin 15
Dublin City University	Glasnevin, Dublin 9
Richard Watson – Director	Marble Arch Caves, Fermanagh BT92 1EW
Society of Irish Foresters	Ballintogher, Co. Sligo
John McLoughlin	Tree Council of Ireland
LIFE Raised Bog Workshop	Aalden, Netherlands
Aapa Mires Project Group	Finland
Northern Ireland Forest Service	Northern Ireland
Ballyhaise Forestry College	Co. Cavan
Burren Life Project Group	Co. Clare
Golden Eagle Life Project	Co. Donegal
University College, Cork	Co. Cork
Border Mires Project	United Kingdom
All Ireland Ploughing Championships	Co. Cork, Co. Carlow
Scottish Peatlands Project	United Kingdom
Forest Enterprise	United Kingdom
IALE 2007 – World Congress	International & World Audience
End of project conference Delegates	European Wide Audience

Comments

Approximately 20,000 brochures have been distributed to date, and arising from the distribution of the project brochure there have been expressions of interest from schools, non-governmental organisations as well as general queries and compliments from our stakeholders. See Appendix 13 - Project Brochure.

E4: Project results booklet

Activity Description

A project results booklet has been produced in lay mans language to show the key actions which have taken place throughout the project. Appendix 14 – Project Results Booklet shows a copy of this booklet which was given to delegates at the end-of-project conference and will continue to be distributed on suitable occasions hereafter. In addition, a DVD was produced "Bringing the Bogs back to LIFE", which gives the

viewer information about the restoration of blanket bog and raised bog on Coillte's estate under our two LIFE projects. This DVD was launched at ENFO headquarters in Dublin on 30th January, 2008 by Mary Wallace TD., Minister of State at the Department of Agriculture, Fisheries and Food with special responsibility for Forestry. The DVD will form part of the After-LIFE management plan in that, as well as some distribution since its production, it will continue to be distributed after the project has been completed. A copy of the DVD accompanies this report.

E5: Annual bog walk

Activity Description
Bog walks formed part of our information days at specific events organised under Action E1 – Land Managers days. See Appendix 15 – John Conaghan, project ecologist, explains bog species characteristics to a group at one of our information days.

E6: Media Publicity Campaign

Activity Description
Communication of the project objectives were seen as a key action. Publicity was gained through general, reference and technical articles put forward for print in appropriate publications, through newspaper articles, through promotion on websites e.g. Green week nature, blanket bog project website and Coillte website. The tables below itemise all such promotion and Appendix 16 – Media Publicity Material shows each article.

Media Publicity Material 2002		
Period	Type of publicity and where published	Title of Article
Autumn	General article - Coillte Contact Company Magazine	*Coillte secures major EU conservation project Pgs. 3 & 4*
Autumn	General article – Coillte Social and Environmental Report 2002 – Company external stakeholder report	*Special Feature- Restoration of blanket bogs underway Pg. 8* *Restoration of Croaghonagh bog Pg. 19*
Autumn	General article – Coillte Annual Report and Accounts 2002 – Company external stakeholder report	*Restoration of Blanket Bogs Habitats Pg. 14*
Winter	News Release - Coillte Company Website(www.coillte.ie)	*Coillte receives EU Funding to restore 14 Blanket Bog Habitats in Ireland*

Media Publicity Material 2003		
Period	Type of publicity and where published	Title of Article
Spring	General article – Coillte Contact Company Magazine	*Busy times ahead for the LIFE Project Team Pg. 6*
Spring	General Article – Peatland news – Irish Peatland Conservation Council Magazine	*Saving the Patterned Lands Pgs. 17 & 18*
Summer	General article - Coillte Contact Company Magazine	*Stakeholder Field Day held on Environmental Aspects of Forest Management Pg. 17*
Summer	General article – Coillte Contact Company Magazine	*A visit to a LIFE site Pg. 7* *Stakeholder Field Day a success Pg. 13*
Summer	General reference – Green Week Nature Events Website (www.eurosite-nature.org)	*Education Day held for Green Week*
Autumn	General article – Coillte Annual Report and Accounts 2003 – Company external stakeholder report	*EU LIFE-Nature Projects Pg. 14*
Autumn	General article – Coillte Social and Environmental Report 2003 – Company external stakeholder report	*Special Feature – Progress on restoration of Blanket Bogs Pg. 18*
Autumn	General article – The Irish Forester – The newsletter of the Society of Irish Foresters	*Coillte Blanket Bog Restoration Project Pg. 3*
Autumn	Technical Article - Irish Timber & Forestry - Timber Industry Magazine.	*The Restoration of Blanket Bog in Ireland Pgs. 24 & 25*

Media Publicity Material 2003 Continued		
Period	Type of publicity and where published	Title of Article
Winter	General article – Coillte Contact Company Magazine	*UK Forestry Commission visit Abbeyleix Pg. 16* *Board of Directors walk the boardwalk Pg. 16*
Winter	Technical Article – Roscrea People – Community 'good news' publication	*Restoring Active Blanket Bog in the Slieve Bloom Mountains Pg. 124*
Mar15th	Newspaper article – The Midland Tribune	*Bog Rehabilitation Planned for Slieve Blooms*
Mar 22nd	Newspaper article – The Midland Tribune	*Slieve Bloom Restoration is step in right direction*
July 9th	Newspaper article – The Sligo Champion	*Coillte brings "life" to the bogs*
July 10th	Newspaper article – Donegal Democrat	*Coillte brings "life" to the bogs*
July 15th	Newspaper article – Sligo Weekender	*Coillte aims to bring "life" back to bog at Ox Mountain*
July 16th	Newspaper article – Western People	*Coillte plans to bring "life" to bogs of Mayo*
July 18th	Newspaper article – Clare Champion	*Coillte brings life to the bogs*
Dec 19th	Newspaper article – The Longford Leader	*"Graduate Treasure Trail"*

Media Publicity Material – 2004		
Period	Type of publicity and where published	Title of Article
Spring	General reference – Walking World Ireland Magazine	*The Owenglin Horseshoe Pg. 13*
Spring	General article - Coillte Contact Company Magazine	*Life Update Pg. 8*
Spring	General reference – Coillte Company Website(www.coillte.ie)	*Stakeholder Field Days*
Spring	General article – Annual Report & Accounts	*EU LIFE-Nature Projects Pg. 14*
Summer	General article – Irish Timber & Forestry	*€4.2M Restoration Project Pg. 4*
Summer	Technical article – Crann Ireland's Tree Magazine	*The Restoration of Blanket Bog in Ireland Pg. 26*
Summer	General reference – Green Week Nature Events Website (www.eurosite-nature.org)	*"A Celebratory Launch" – Restoring Active Blanket Bog in Ireland*

Media Publicity Material – 2004 Continued		
Period	Type of publicity and where published	Title of Article
Autumn	General articles – Coillte Contact Company Magazine	*Minister launches Bog Life Pg. 6* *"Winners" through EU LIFE-Nature Blanket Bog Project Pg. 11* *Land Managers get out on the bogs!! Pg. 18*
Autumn	General article – Inspiring Excellence – Best Practice in Corporate Responsibility in Ireland – Vol. 2	*Coillte Teoranta restoring the peatlands of the west Pg. 24*
Autumn	General article – Irish Timber & Forestry	*The West Awake! Pg. 32*
Winter	General reference – The Organic Guide 2004-2005	*Environment and Community Pg. 21*
Winter	General article – Coillte Contact Company Magazine	*Finnish Foresters visit Ireland Pg. 18*
Winter	Technical article – The Irish Scientist Year Book	*The restoration of blanket bog in Ireland Pg. 42*
Winter	General article – Coillte Company Magazine	*Life Goes on Pg. 6*
Mar 11th June 2nd June 4th June 19th June 30th July 8th Oct 4th	Newspaper article - Irish Daily Star Newspaper article – The Sligo Champion Newspaper article – Irish Independent Newspaper article – Irish Times Weekend Review Newspaper article – Connaught Telegraph Newspaper article – The Irish Times Newspaper article – Irish Examiner	*Reference to project in Bonus Question* *Photograph showing presentation publicising project* *Bog restoration project unveiled* *Dragonfly thrive due to global warming* *Photograph showing presentation publicising project* *Bringing our ailing bogs back to life* *Woods well worth a visit to relax and savour*

Media Publicity Material 2005		
Period	Type of publicity and where published	Title of Article
Spring	General article – Coillte Annual Report and Accounts 2005 – Company external stakeholder report	*EU-Life Nature Projects Pg. 10 & 11* *Picture of Drain Blocking Pg. 16*
Spring	General article – Coillte Social & Environmental Report – Company external stakeholder report	*Bogs being restored Pg. 6 & 7*
Spring	General article – The Organic Centre – Course & Activities	*Restoring Active Blanket Bog in Ireland Pg. 28*
Spring	General article – North West Organic Guide 2004-2005	*Environment and Community Pg. 21*
Summer	General article – Coillte Contact Company Magazine	*Blanket bog restoration continues… Pg. 6* *Visit to new IPCC HQ…Pg. 6* *Project Advisory Panel Meeting …Pg. 6*
Summer	Green Day Eurosite Website (promotion during Green Week)	*Information Day 30th June 05*
Summer	Technical article – The Local Planet (the paper for sustainable living)	*The Restoration of Blanket Bog in Ireland Pg. 32*
Autumn	General article – Coillte Contact Company Magazine	*"Life" in Forestry Pg. 8 & 9* *Photograph at National Ploughing Championships Pg. 23*

Media Publicity Material 2006		
Period	Type of publicity and where published	Title of Article
Spring	General article – Coillte Annual Report & Accounts – Company external stakeholder publication	*Environment Pg. 11*
Spring	General reference – Peatland News (IPCC Magazine)	*Drain Blocks & Boardwalks DIY*
Spring	General reference – The Graduate online youth quiz presentation ceremony booklet	*Logo's published on booklet promoting project*
Spring	General article – Organic & Green Guide to Ireland	*The Restoration of Blanket Bog in Ireland check page*
Spring	Event listing – Department of Botany, NUI, Galway website www.nuigalway.ie	*The Restoration of Afforested Blanket Bog Habitat in Ireland*
Spring	Technical article – Lifestyle Green (Irelands sustainable Development Magazine)	*The Restoration of Blanket Bog in Ireland Pg. check?*
Autumn	Event listing – An Taisce North West Donegal Newsletter	*Visit by an Taisce to "Restoring active Blanket Bog in Ireland"*
Autumn	Event listing – Heritage Week Booklet (Events in County Donegal)	*An Taisce (NW Association) visit to An Coillte Blanket Bog Project (LIFE Nat/Irl/8490) Pg. 1*
Autumn	General Reference – Tim Robinson, Connemara, *listening to the wind*	*Walking the Skyline Pg. 363*
May 9th May 10th August 24th August 24th August 25th	Newspaper reference – Irish Independent Newspaper reference – Connaught Telegraph Newspaper article – Donegal News Newspaper article – Donegal Democrat Newspaper article - Tirconaill Tribune	*Woodland habitats* *Photograph with reference to the project publicised* *Restoration of Donegal bogland proving popular with visitors* *National Heritage Week gets underway* *Heritage Week in Donegal*

Media Publicity Material 2007		
Period	Type of publicity and where published	Title of Article
Summer	Poster display/brochure distribution at "IALE 2007 Landscapes for LIFE" Congress held Wageningen, Netherlands	*Life Blanket Bog Project Poster and Brochures*
Autumn	Radio interviews on "Mooney goes wild" – National radio RTE1	*Coillte Company Ecologist talks about all Life projects*
Winter	Newspaper article – Irish Farmers Journal	*Bogland restoration – back to the future*
Winter	DVD produced "Bringing the Bogs back to LIFE", which gives the viewer information about the restoration of blanket bog and raised bog on Coillte's property which is part funded by LIFE - DG - Environment under the LIFE-Nature programme.	*"Bringing the Bogs back to LIFE" – DVD (copy of this DVD accompanies this report)*

Comments
Publicity of the project, its objectives and actions continued throughout the project. Experience gained on the different techniques used to complete the restoration work, has been interesting and educational for our stakeholders to learn about.

E7: Interpretative displays and boardwalks

Activity Description
Interpretative display signs have been erected at all demonstration sites, and also at one of our extension sites (site no: 18 Derry) which the project team felt was very appropriate for visitor access. The signs display information about the project such as project background, pictures of work in progress, site specific details, overall site locations, the Life and Natura logo and the project website address. Study tours, university students, foreign visitors, community groups and the general public have to date enjoyed the benefits of hearing about and viewing the project and its benefits to nature conservation. See Appendix 17 – Photograph of Interpretative Display Sign.

"F" Actions – Overall project operation and monitoring

F1: Project Management

Activity Description
The project's supervision and administration costs came under this action which included project manager, site supervision and office administration. A project management group was also established to steer the project and evaluate progress over the years and was costed to this action. To this end, 19 successful Project Management Group (PMG) meetings were held. These meetings took the format of an indoor meeting followed by a field visit (weather permitting) to look at progress on various project sites. As well as the Project Management Group present at these meetings, local site managers led the field trips and elaborated on work progress. Local NPWS field staff were also invited to these field days from year 2 onwards. PMG meetings have been very useful forums for addressing issues, and for problem solving. The table below lists our project management group meetings.

Project Management Group Meetings	
Date	Venue and details
19th Nov 2002	Coillte HQ, Leeson Lane, no site visit
25th Mar 2003	Coillte HQ, Leeson Lane, no site visit
26th Jun 2003	Station House Hotel, Clifden with site visit to Emlaghdauroe
24th Mar 2004	Jackson's Hotel, Ballybofey with site visit to Croaghonagh
3rd/4th Feb 2004	Castlecourt Hotel, Westport with site visit to Bellaveeny, Eskeragh and Shanvolahan. Local NPWS attended site visits.
22nd June 2004	Hiney's, Crossmolina, with site visit to Eskeragh
21st Oct 2004	Manor Inn, Kilorglin with site visit to Dromalonhurt
1st Dec 2004	Coillte Santry Office, no site visit
7th March 2005	Bloomfield House Hotel, Mullingar – no site visit
29th June 2005	Great Western Inn, Mulranny with site visit to Corravokeen and Bellaveeny sites
12th Oct 2005	Killarney Court Hotel, Kerry with site visit to Dromalonhurt
14th Dec 2005	Belvedere House & Gardens, Mullingar - no site visit
26th Apr 2006	Hiney's, Crossmolina, with site visit to Derry and Corravokeen extension sites.
5th Sep 2006	Shannon Oaks Hotel & Country Club, with site visit to Pollagoona extension site
7th Dec 2006	Landmark Hotel, Ck-on-Shannon - no site visit
10th Jan 2007	Coillte Sligo Office - no site visit
28th Mar 2007	Coillte Newtown Office, Wicklow, with presentation by Birdwatch Ireland given to project team
3rd Oct 2007	Castlecourt Hotel, Westport, final preparation meeting for "End of project conference", followed by field day to Eskeragh and Derry sites
6th Dec 2007	Mullingar Park Hotel, Mullingar, no site visit.

F2: Project Advisory Panel

Activity Description

A Life advisory panel was set up to advise the project management group (F1) as necessary on specific aspects of the working of the project. Project advisory panel meetings and field trips were organised (see table below) at a variety of project sites, to give panel members an overview of the restoration methodologies and a forum to discuss issues raised. Liaison has been maintained with project panel members and information exchanged. See Appendix 18 - Project advisory panel listing and photograph.

Project Advisory Panel Meetings	
Date	Venue and details
26th June 2003	Clifden Station House Hotel, with site visit to Emlaghdauroe
22nd June 2004	Hiney's, Crossmolina, with visit to Eskeragh
29th June 2005	Great Western Inn Mulranny, with site visits to Corravokeen extension site and Bellaveeny
5th September 2006	Shannon Oaks Hotel, Portumna with site visit to Pollagoona ext site
4th October 2007	End of project conference attendance with site visit to Derry ext site

F3: Project Report

Activity Description
Progress reports have been submitted to the European Commission for each year of the project. All reports submitted to the Commission were distributed to all members of the Project Management Group and kept on file for reference; the reports are also available on the project website for download.

Activity reports delivered since the start of the project

Progress Report Year I	31.07.2003	Submitted 29.08.2003
Progress Report Year II with interim report	31.07.2004	Submitted 30.09.2004
Progress Report Year III	31.07.2005	Submitted 30.11.2005
Progress Report Year IV	31.08.2006	Submitted 15.09.2006
Progress Report Year V with Final Report	31.03.2008	Submitted 30.05.2008

F4: Procure the use of expert advice

Activity Description
A peatland ecologist, Mr. Russell Anderson, from the British Forestry Commission with extensive research knowledge of LIFE funded work on afforested sites was commissioned to do site surveys on the projects sites prior to operational work commencing. Mr. Anderson also attended the project's "End of Project Conference" in October 2007.

F5: To gain a scientific understanding of points of ground water discharge "flushes" and their surrounding ecology

Activity Description
Work to generate an understanding of how two "flushes" beside sites 7(Eskeragh), 8(Eskeragh) and 11(Shanvolahan) in North Mayo function was carried out in two phases.

Phase 1: Monitoring programme design and setup – including site survey, soil sampling, water sampling and installation of monitoring equipment has been completed.

Phase 2: Work including monthly measurement of flow, hydrochemistry and water levels and collation, plotting, and analysis has been completed.

The final report has been received (See Appendix 19) and a layman's summary by Eileen McCarthy MSc, Company Director & Senior Hydrogeologist, Minerex Environmental Ltd, is provided below:

> Minerex Environmental Ltd completed a environmental study at Shanvolahan, Co. Mayo. This work was undertaken between September 2002 and January 2004.
>
> The Shanvolahan site consists of a wide expanse of lowland blanket bog. On some parts of the site, there is interesting flora present that indicates movement of high mineral content water. The ecological term used for this unusual flora is a "flush". On other parts of the site, conifer plantations are present.
>
> The main purpose of Minerex's study was to understand how and why the "flush" occurs by understanding how the water flows and the nature of its chemistry at the site. The second purpose of the study was to monitor the change that would occur in water levels after the conifer plantation was removed by felling. In addition drain blocking would be undertaken to help elevate the water table at the site.
>
> The results of the study confirm that the two main reasons why and how the flush ecology occurs at its specific location at Shanvolahan are (a) change in elevation, which drives water flow from the edge of the bog towards the centre of the bog and (b) the distribution of sandy and gravelly sediments underneath and upslope of the flush, which allows the water to flow towards it. The sandy and gravelly sediment also imparts the high mineral content chemistry that sustains the flush ecology.
>
> Monitoring the change in water levels after the conifer plantation was felled and the drains were partially blocked, indicates that there has been a measurable and significant positive impact on the water table in those parts of the site affected by the conifer plantation. From this point of view, the LIFE Programme has been a success in improving the "water environment" for the general lowland blanket bog ecology.
>
> In the case of the flush ecology, this has not been impacted by the felling and drain blocking measures. This is due to its location relative to other key features such as a deep drain in between the flush and the conifer plantations. At the end of Minerex's study it is highlighted that the flush water environment is very much dependent on a source of high mineral content water and the flow path from high to lower elevation ground (difference in water levels that drives the water flow). In this context, care must be taken not reduce the difference in water levels from high to lower ground. That means that excessive raising of the water table in other parts of the site due to tree felling and drain blocking could in fact negatively impact on the flush ecology in the long term.
>
> Following the initial studies undertaken for Coillte for the LIFE Programme (2002 to 2004), Eileen McCarthy of Minerex Environmental Ltd is continuing to monitor water levels and chemistry as part of her part-time PhD studies on understanding flushes and blanket bogs.

F6: Hydrology monitoring

Activity Description
Hydrological monitoring to record changes in water levels using water level rain gauges was carried out by Coillte staff. As already outlined under action C7, dipwells (Walrags) were installed on 11 sites. Readings were taken on approximately 90% of sites on a monthly basis and recorded. Appendix 20 – Walrag Reading Data.

F7: Vegetation Monitoring

Activity Description
Vegetation transects were laid down on cleared areas on all sites except sites 10(Glencullin Lr) and 13(Croaghonagh North) which were never planted. Vegetation was monitored closely over the years. Overall, the recovery of bog vegetation was very evident. Rate of recovery varied according to density of original tree cover and restoration methodology utilised on each site. Positive results can be seen on many sites, which is encouraging.

In the following sections of this report the vegetation survey results, restoration techniques trialled and Walrag results are summarized by Dr John Conaghan, Contract Project Ecologist. A fuller treatment of these results is presented in Appendix 5 and Appendix 20.

1. Recovery of blanket bog vegetation at blanket bog restoration sites.

The recovery of blanket bog vegetation at sites previously afforested by conifers is influenced by a number of factors however the most important appears to be the age and yield class of the conifer crop. As a conifer crop grows the combined effect of drainage, needle deposition and shading by tall trees all combine to kill off the native blanket bog vegetation over time. Therefore if an area can be restored before the trees have grown tall and achieved a closed canopy then it follows that the prospects of vegetation recovery are much better. On this basis, the restoration sites where trees were removed could be divided into two main types namely young plantation areas, where the trees were mostly between 13 and 20 years old, and older plantation areas, where the trees were mostly between 25 and 35 years old. The ground layer vegetation composition of these two plantation types, along with intact blanket bog, are outlined in the following table. The vegetation of the young plantation areas tends to be dominated by a dense growth of either *Molinia caerulea* (purple moor-grass) and/or *Calluna vulgaris* (ling heather) with plant species typical of intact wet blanket bog largely absent. The vegetation of the older plantation areas is typically dominated by a dense layer of conifer needles, accompanied by a sparse layer of mosses such as *Hypnum cupressiforme, Sphagnum capillifolium* and *Rhytidiadelphus loreus*. From this table it can be also clearly seen that the afforestation of blanket bog dramatically reduces the plant species diversity from 17.8 species per $4m^2$ (Intact blanket bog) to 7.0 species per $4m^2$ (Old plantation).

Table 1. The differences in vegetation structure and composition between the different types of tree cover within restoration sites.

	Intact blanket bog	Young plantation (13 to 20 years)	Old plantation (>25 years old)
Mean vegetation cover (%)	94	98	31
Mean bare soil cover (%)	6	3	0
Mean needle litter cover (%)	0	0	71
Mean dwarf shrub layer cover (%)	40	48	0
Mean herb layer cover (%)	64	51	5
Mean bryophyte layer cover (%)	69	52	31
Mean Ht. of vegetation (cm)	17	33	<5
Mean No. of species in 2x2m quadrat	17.8	9.3	7.0
Top 10 species in vegetation			
	Erica tetralix	*Molinia caerulea*	*Hypnum cupressiforme*
	Calluna vulgaris	*Potentilla erecta*	*Rhytidiadelphus loreus*
	Eriophorum angustifolium	*Hypnum cupressiforme*	*Molinia caerulea*
	Narthecium ossifragum	*Calluna vulgaris*	*Sphagnum capillifolium*
	Sphagnum capillifolium	*Sphagnum capillifolium*	*Hylocomium splendens*
	Sphagnum tenellum	*Erica tetralix*	*Polytrichum commune*
	Racomitrum lanuginosum	*Cladonia portentosa*	*Thuidium tamariscinum*
	Cladonia portentosa	*Pleurozium schreberi*	*Plagiohtecium undulatum*
	Pleurozia purpurea	*Erica cinerea*	*Pleurozium schreberi*
	Molinia caerulea	*Rhytidiadelphus loreus*	*Dicranum scoparium*

The following table (Table 2) shows the differences in vegetation composition and structure between young and old plantation areas three years after tree felling. Although the vegetation composition of the two plantation types are at first glance quite similar, there are substantial differences in the vegetation structure and the dominance of certain species. In areas where young plantation crops were removed, the main species to recolonize and spread is *Molinia caerulea* with the shrub *Calluna vulgaris* also locally common. In some sites, e.g. Bellaveeny, the cover of *Molinia* increased from *c.* 30% to >80% ground cover within three years. In areas where areas of older plantation were removed the vegetation recovery has been much slower with mosses such as *Hypnum cupressiforme* and *Polytrichum commune* typically dominating. It is also noteworthy, for example, that in older plantation areas which have been cleared of trees, plant species typical of disturbed/flushed blanket bog habitats e.g. *Polytrichum commune, Juncus effusus* (Soft rush), *Juncus bulbosus* (Bulbous rush)and *Campylopus* spp., have a high cover. While these species are present in the recovering young plantation areas they have a much lower cover which is due, in large part, to the absence of bare peat surface.

At Emlaghdauroe flushed areas within older plantation have been quickly recolonized by dense swards of *Juncus effusus* and it will be interesting to study the cover of this species over time. Unwanted natural regeneration of shrubs such as *Betula pubescens* (Downy birch), *Salix* sp. (Willows) and *Pinus contorta* (Lodgepole pine) is occurring at many sites however the problem is only thought to be significant at the two sites in Co. Kerry (Drumalonhurt and Garrane). At these sites *Betula pubescens* is regenerating within small drier areas of the sites where the peat depth is shallow and/or cutover.

Table 2. Vegetation composition of recovering plantation areas, 3 years after tree felling/removal. Species with an occurrence of 10% or less have been omitted for reasons of brevity.

	Older plantation	Young plantation
Mean number of species per quadrat	20.7	19.7
Species common to both types of plantation		
Hypnum cupressiforme	100 (3-5)	100 (4-6)
Polytrichum sp.	100 (3-5)	100 (1-5)
Erica tetralix	100 (1)	100 (1-2)
Campylopus sp.	100 (2-5)	90 (2-5)
Potentilla erecta	90 (1)	100 (1-2)
Calluna vulgaris	90 (1-4)	100 (2-4)
Dryopteris dilatata	90 (1-5)	80 (1-2)
Sphagnum capillifolium	80 (2-4)	100 (1-5)
Sphagnum palustre	70 (1-4)	60 (1-3)
Rhytidiadelphus loreus	50 (1-4)	70 (1-3)
Agrostis sp.	60 (1-3)	60 (2-4)
Sphagnum cuspidatum	50 (2-3)	50 (1-3)
Salix sp.	50 (1-5)	30 (1)
Epilobium angustifolium	30 (1-4)	40 (1-3)
Epilobium sp.	30 (1)	20 (1)
Pleurozium schreberi	20 (1-2)	40 (1-4)
Eriophorum vaginatum	20 (1-2)	20 (1-2)
Cladonia sp.	20 (1)	20 (1)
Sphagnum subnitens	20 (1)	10 (1)
Juncus squarrosus	20 (1)	10 (1)
Species more common in older plantation areas		
Juncus bulbosus	80 (1-5)	30 (1-2)
Juncus effusus	80 (1-6)	30 (1-1)
Eriophorum angustifolium	60 (1-3)	10 (1)
Thuidium tamariscinum	50 (1-3)	30 (1)
Plagiothecium undulatum	40 (1-3)	20 (1)
Rubus fruticosus	30 (1-4)	10 (1)
Species exclusive to older plantations		
Carex echinata	70 (1-2)	0
Luzula multiflora	50 (1-3)	0
Pseudoscleropodium purum	20 (1)	0
Leucobryum glaucum	20 (1)	0
Species more common in younger plantation areas		
Molinia caerulea	100 (1-5)	100 (6-7)
Hylocomium splendens	40 (1)	70 (1-3)
Erica cinerea	20 (1)	40 (1)
Dicranum scoparium	10 (1)	40 (1-3)
Cladonia portentosa	10 (2)	40 (2-3)
Sphagnum papillosum	10 (1)	30 (2-3)
Species exclusive to younger plantation areas		
Polygala serpyllifolia	0	40 (1)
Myrica gale	0	30 (1-4)
Rhytidiadelphus squarrosus	0	30 (1-3)
Peltigera sp.	0	30 (1-2)
Sphagnum magellanicum	0	20 (1-3)
Angelica sylvestris	0	20 (1)
Aulocomium palustris	0	20 (1)

This study has followed and documented the changes in vegetation composition at sites for the first 3/4 years following restoration. These observations suggest that blanket bog vegetation is returning to the sites, albeit at different rates, depending on the age of the conifer plantation. Although the main plant species which have initially recolonised are more typical of dried-out and disturbed peatland habitats it is anticipated that the cover of these species will decline in favour of plant species typical of wetter, more ombrotrophic conditions in the future. The monitoring of permanent plots within sites will reveal important information regarding the recovery of the blanket bog habitat in the future.

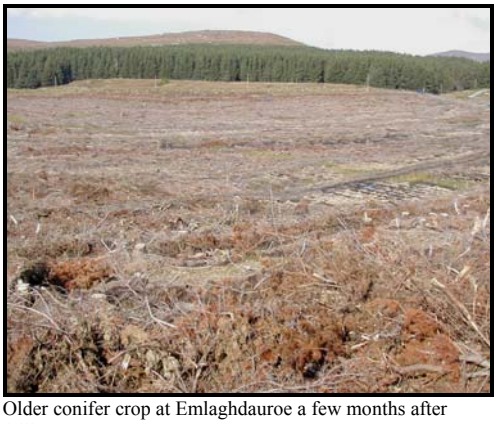
2. An evaluation of the various restoration techniques trialled during the project

A wide variety of restoration techniques were trialled during this project. It is felt that techniques such as chipping and the killing a conifer crop standing will have a limited use in future blanket bog restoration projects in Ireland as they are both relatively expensive and time consuming. When considering drain blocking it is felt that future blanket bog restoration projects should favour blocking with peat as plastic dams are prohibitively expensive to use on a large scale. It should be noted however that plastic dams may be preferred option in very hydrologically sensitive areas where machine access is not possible or desired. Specially strengthened plastic dams are also often the only alternative where wide and deep drains have to be blocked. Based upon the evidence of observations made during this project it is recommended that the following techniques are applied in future blanket bog restoration projects where tree removal is required.

(a) Fell trees manually using a chainsaw.
(b) If tree cover is heavy windrow felled trees using a low ground pressure excavator in order to clear the bog surface as much as possible.
(c) Block any active drains with peat, using a low ground pressure excavator.
(d) Remove any naturally regenerating conifers by hand pulling and/or strimming with a bush cutter. This should be carried out each year for at least two years after tree felling. Some sites may however need subsequent visits, depending on the severity of natural regeneration.

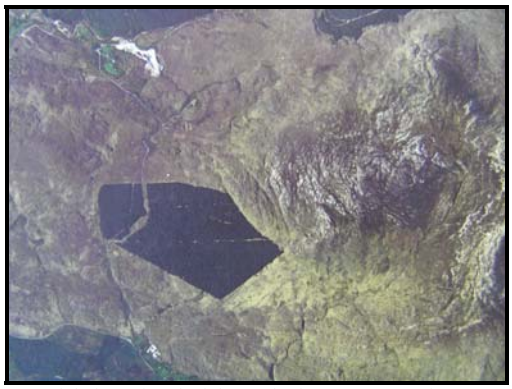

The typical ground layer of an older conifer crop with conifer needles dominant.


Younger conifer crops are often characterised by a species-poor flora dominated by *Molinia caerulea*.



Older conifer crop at Emlaghdauroe a few months after felling.

The same area c. 4 years after felling with regenerating *Juncus effusus* and *Molinia caerulea*.



An aerial view of Emlaghdauroe in the year 2000, prior to tree removal.

A view of the site in 2006, with the conifer crop removed.

Conifers felled to waste, lying on the ground.

At many sites such as Eskeragh the conifers were windrowed in order to clear the bog surface of trees.

3. Walrag results

At many sites within the project a number of Water Level Range Gauges (WALRAGS) were installed in order to document the changes in water levels within the peat prior to, during and after tree felling and drain-blocking. Observations from walrag readings generally show that in intact blanket bog areas the water level is generally within 5 cm of the peat surface for the greater majority of the time, only going below that level during short periods of very dry weather. Areas of well drained blanket bog however usually have water levels >30cm below the peat surface and again this level is usually lower during periods of dry weather.

The observed recovery of water levels within drained and afforested blanket bog areas after tree felling and drain blocking varies from site to site. At sites where peat depth is relatively shallow and/or drainage was already poor, e.g. Owenanirragh and Bellaveeny, there is little obvious improvement in water levels over time. However, at other sites such as Carrickbarr and Drumalonhurt there appears to be a gradual improvement in water levels following restoration activities. Another significant observation of the water levels at sites is that the hydrological recovery of blanket bog peats to pre-drainage levels appears to be a slow process which will probably take decades to achieve.

In conclusion it is recommended that the monitoring of water levels in walrags at sites in the future would be a useful way in which to monitor blanket bog recovery at restoration sites. This will be possible now that the water typical water levels for intact blanket bog systems are known. It is recommended however that water level readings should taken more often – at least once every 2 weeks – in order to build up a more accurate picture of water level fluctuations throughout the year.

F8: Aerial Survey

Activity Description
An aerial survey of all sites was scheduled to take place at the end of the project. However, it proved more cost effective to purchase aerial photographs from the Ordnance Survey of Ireland who had flown the entire country in 2006. Prior to this, NPWS had supported us in the provision of their aerial images taken in 2000 which show the project sites before restoration began. Samples of these photographs have been used to illustrate Appendix 5 – Vegetation monitoring.

F9: Ground Inventory

Activity Description
A ground inventory of all sites was undertaken on completion of all operational work in December 2007. The Company inventory database has been updated to take account of this project work and will include all these areas as part of Coillte's management units for nature conservation into the future.

Mapping of drain blocking action
Maps show the overall progress on the restoration of the hydrological system of each site. The number of dams required for each site varied greatly depending on a number of factors including the blocking of open drains, strategically blocking key points of outfall and where it was necessary to raise water levels. Thus, in some cases the installation of a small number of dams can restore the hydrology over a relatively large area.

In addition on site 13, Slieve Blooms, drain blocking was largely required along the perimeter drains and only intermittently within the site. This blocking ensures the restoration of the complete hydrological system. See Appendix 21 – Maps showing work completed on each site.

List of Key Deliverables and Outputs

Product	No. of Action	Deadline	Achieved
Project Information Brochure	E3	31.10.2002	Finalised brochure produced 25.08.2003
Safety Plan and Hazard Identification	A3	31.10.2002	Ongoing through project, completed 31.12.2007
Produce plan accurate photographs of project sites	A5	31.10.2002	See action A5
Training Pack year II	E1	30.05.2003	04.06.2003 to coincide with EU "Green Day"
Study of flush areas (Report)	F5	28.11.2003	Submitted with interim report on 30.09.2004
Nutrient Flow Study (Interim Report)	D3	30.10.2004	Submitted with interim report on 30.09.2004
Training Pack Year III	E1	28.05.2004	12.05.2004
Training Pack Year IV	E1	28.05.2005	31.05.2005
Aerial survey is completed	F8	30.06.2007	30.11.2007
Project Results Booklet	E4	31.12.2007	04.10.2007
Nutrient Flow Study (Final Report)	D3	31.12.2007	Study - 31.12.2007 Report - 30.05.2008

TIME PLANNING - Action activity during project by quarter year (project year = 1st July - 30th June)

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Number/name	QI	II	III	IV	QI	II	III	IV	QI	II	III	IV	QI	II	III	IV	QI	II	III	IV	QI	II	III	IV
A. Preparatory actions, elaboration of management plans and/or action plans:																								
A1 Site visit to see another LIFE sponsored project.	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓				✓	■						
A2 Elaborat-ion of action plan.	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	▼	✓ ▼	▼	▼	▼	✓ ▼	▼	▼	▼	■		
A3 Identify Safety Hazards and draw up a general safety plan for sites.	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	▼	✓ ▼	▼	▼	▼	✓ ▼	▼	▼	▼	■		
A4 Survey of fence lines & enclosures.	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ■	✓	✓	✓	✓			✓	✓								
A5 To produce plan accurate photographs of all project sites.	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	▼	▼	✓ ▼	✓ ▼	▼	▼	▼	■		

TIME PLANNING - Action activity during project by quarter year (project year = 1st July - 30th June)

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Number/name	**QI**	**II**	**III**	**IV**	**QI**	**II**	**III**	**IV**	**QI**	**II**	**III**	**IV**	**QI**	**II**	**III**	**IV**	**QI**	**II**	**III**	**IV**	**QI**	**II**	**III**	**IV**
C. Non-recurring biotope management:																								
C1 Fell mature trees non-commercial felling.	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓▼	✓▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	■		
C2 Fell and chip conifers	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ■												
C3 Commercial felling.	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ■												
C4 Install dams.	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓▼	✓▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	■		
C5 Erect enclosures on unplanted areas & repair fences on cleared areas.	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ■												
C6 Build and repair roads onto sites for safe access & the removal of trees.	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ■	✓	✓	✓	✓	✓	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	▼			■		
C7 Install dipwells.	✓ ▼	✓ ▼	✓ ▼	✓ ■	✓	✓	✓	✓	✓	✓	✓	✓												

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Number/name	QI	II	III	IV	QI	II	III	IV	QI	II	III	IV	QI	II	III	IV	QI	II	III	IV	QI	II	III	IV
D. Recurring biotope management:																								
D1 Remove natural regeneration.	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ■		
D2 Removal of trespassing livestock.	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ■		
D3 Measure nutrient flow from sites.	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	▼	■		

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Number/name	QI	II	III	IV	QI	II	III	IV	QI	II	III	IV	QI	II	III	IV	QI	II	III	IV	QI	II	III	IV
E. Public awareness and dissemination of results:																								
E1 Land manager training course	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	▼	▼	▼	✓ ▼	▼	▼	▼	✓ ▼	▼	■		
E2 Project website	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ■		
E3 Project information brochure	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ■		
E4 Project results booklet																					✓ ▼	✓ ■		
E5 Annual bog walk				▼	✓	✓	✓	✓ ▼	✓	✓	✓	✓ ▼	✓			▼	✓				✓	■		
E6 Media publicity campaign	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ■		
E7 Interpretative displays and boardwalks	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼	✓ ▼				✓ ▼	▼	▼	▼	▼	▼	■		

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Number/name	QI	II	III	IV	QI	II	III	IV	QI	II	III	IV	QI	II	III	IV	QI	II	III	IV	QI	II	III	IV
F. Overall project operation and monitoring:																								
F1 Project management	✓▼	✓▼	✓▼	✓▼	✓▼	✓▼	✓▼	✓▼	✓▼	✓▼	✓▼	✓▼	✓▼	✓▼	✓▼	✓▼	✓▼	✓▼	✓▼	✓▼	✓▼	✓■		
F2 Project advisory panel	✓	✓	✓	✓▼	✓	✓	✓	✓▼	✓	✓	✓	✓▼				✓	▼			✓		■		
F3 Project Report	✓	✓	✓	✓	✓▼	✓	✓	✓	✓▼	✓	✓	✓	✓	▼			✓▼				✓	✓	✓	■
F4 Procure the use of expert advice	✓▼	✓▼	✓▼	✓■											✓	✓	✓							
F5 To gain a scientific understanding of points of ground water discharge 'flushes' etc	✓▼	✓▼	✓▼	✓▼	✓▼	✓▼	✓▼	✓■																
F6 Hydrology monitoring.	✓▼	✓▼	✓▼	✓▼	✓▼	✓▼	✓▼	✓▼	✓▼	✓▼	✓▼	✓▼	✓▼	✓▼	✓▼	✓▼	✓▼	✓▼	✓▼	✓▼		■		
F7 Vegetation monitoring.	✓▼	✓▼	✓▼	✓▼	✓▼	✓▼	✓▼	✓▼	✓▼	✓▼	✓▼	✓▼	✓▼				✓▼	▼			✓▼	■		
F8 Aerial survey.																					✓▼	✓■		
F9 Ground inventory.					✓▼	✓▼	✓▼	✓▼													✓▼	✓■		

7. EVALUATION AND CONCLUSIONS

a. The process

The restoration of active blanket bog habitat, through the removal of forestry plantations and the blocking of drains to restore hydrological levels.

b. The project management

Coillte were the sole beneficiaries, there were no project partners. The PMG (including a representative from the NPWS) held quarterly meetings which were productive and positive, always proceeding on the basis of consensus. Day to day management involved various meetings of core project staff, particularly the project manager, PR manager, project accountant, project ecologist, EU affairs manager and site managers. A major added value aspect of the project has been the improvement of communications and cooperation between Coillte and NPWS at both local and national level.

c. Success and failures

Successes
(1) The felling/removal of coniferous forestry from 955.27 hectares of ground which has initiated the recovery of blanket bog vegetation and habitat.

(2) The trialling and use of the wind-rowing technique as an ecologically effective and cost-effective way of clearing the majority of the bog surface of tree cover. This clearance of the surface facilitated important follow-up actions such as drain-blocking and removal of regenerating conifers.

(3) Monitoring of the vegetation recovery at sites has provided important data regarding the recovery potential of blanket bog areas which support differing ages of conifer crop. This information could be used to inform future strategy regarding blanket bog restoration in Ireland and further a field.

Failures
(1) Chipping of conifers proved too expensive for large scale application. Windrowing was much cheaper and achieves a similar overall result. However, finding establishing this fact could also be viewed as a success.

d. Comparison against the project-objectives

Table below shows achievement to end of project for the main physical restoration works.

Action	Area programmed (Ha)	Area achieved (Ha)	% achieved (Ha)
C1 – C3 Tree Removal	982.27	955.27	97
C4 – Install dams	1556.1	1544.8	99
C5 – Erect/Repair fences	555.4	586.4	105

Note: the project modification allowed for the restoration of up to 776.7ha of additional blanket bog area in addition to the original project area of 1212.3ha. Additional Site No. 19 (Kingarrow, 45.8ha) had to be left out of the project due to NPWS concerns for the freshwater pearl mussel but the area lost there was partially made up by extra area at Site 17. Overall, the main physical targets were almost entirely achieved.

e. Environmental benefits, policy and legislation implications

The conservation benefit for the Natura 2000 (pSCI/SPA) and habitat type targeted is that there has been an improvement in the conservation status of more than 1989ha of priority active blanket bog habitat within the network. The project has acted as a flagship demonstration of what can be achieved on a wider scale in Ireland and other Member States subject to the availability of funding.

f. Innovation, demonstration value

General signage acknowledging EU LIFE funding was erected at each project site. Five of the project sites (No's 3, 5, 7, 13 and 16) were selected as project Demonstration Sites where detailed information panels were erected, car parks provided and boardwalks constructed. These sites have been the focus of a public awareness programme over the five and a half year period of the project and will continue to provide a demonstration value thereafter. Techniques used/developed on the project (e.g. windrowing of timber felled to waste, plastic/peat damming of drains) have clear potential for transfer within Ireland and other Member States. The project has been visited, in this context, by the IPCC and LIFE projects from Ireland, Northern Ireland, England, Scotland, Finland and Wales (after project end).

g. Socio-economic effects

In recent times, an increasing social awareness of the importance of nature conservation has prompted national efforts to conserve the best remaining blanket bog habitat. In line with this, Coillte has selected, for this major restoration project, those sites on its estate which have been identified as having the best nature conservation value. At all stages during the project, the work carried out on each site was offered to local contractors/Coillte forest workers. Every effort was made to involve local people as much as possible in the project, from working on sites to setting up interpretive meetings and demonstrations. In carrying out this work the local contractors/forest workers have also gained some understanding of the reasons for blanket bog restoration.

h. The future

Coillte is a private limited company in which all the shares are held by the State, so the long-term ownership of the project sites is assured. Coillte secured FSC certification for well managed forests in 2001, and has maintained this status since. In this context, ecology surveys took place to identify 15% of the estate to be managed primarily for biodiversity. All of the LIFE blanket bog project sites will be managed within this 15% of the company's estate into the future. Measures are also being taken to maximise the academic value of the project sites by facilitating their use by third level educational institutions for research purposes. Coillte is also interested in carrying out further blanket bog restoration works on its estate if funding can be secured through the Rural Development Programme or LIFE+. Although not mandatory for projects financed in 2002, an After-LIFE Conservation Plan has been submitted with this Final Report at Appendix 22.

i. Long term indicators of the project success

- It is expected that there will be a continued significant improvement in the ecological quality of the open bog areas.
- This will be due to project measures taken to gain control of areas and the re–establishing of natural water levels brought about by the removal of trees, drain blocking and clearance of invasive conifer regeneration.
- The ecological quality of over 1,989.0 hectares of blanket bog will have been improved using these measures. There will have been a measurable increase in actively growing blanket bog species since ecological monitoring began at the start of the project.
- These improvements will have been demonstrated using data from 98 dipwells monitoring changes in water levels and data from 70 vegetation transects.
- The area of blanket bog will have been increased by 955.27 hectares through the removal of conifers. Maps and field inventory will have recorded this process.
- Natural water levels on the blanket bog area cleared of trees and on the open bog area will be re–established resulting in an improvement in habitat quality.

8. LAYMAN'S REPORT AND AFTER-LIFE PLAN

The Layman's Report and After-Life Plan are stand-alone documents which have been supplied at Appendix 14 and Appendix 22 respectively. Hard copies can be supplied if required.

9. COMMENTS ON FINANCIAL REPORT

The Financial Final Report is a separately bound document. The following table gives a summary of the project finances including the standard eight budget items, the modified budget (as per the first additional clause), the final outturn and the percentage spend on each budget item.

Budget Item	Modified Total Costs €	Final Outturn €	% of Modified Total Costs Spent
1. Personnel	1,749,533	1,907,312	109%
2. Travel	188,221	164,654	87%
3. External assistance	1,168,050	1,142,874	98%
4. Durable goods	795,804	657,572	83%
5. Land purchase/lease	0	0	0
6. Consumable material	109,637	66,484	61%
7. Other costs	42,440	48,371	114%
8. Overheads	142,008	90,775	64%
TOTAL	4,195,693	4,078,042	97%

97% of the total approved modified budget (as per the first additional clause) was spent. "Other Costs" was the only budget heading exceed by more than the permissible 10%; this was because the lowest fee that could be agreed with the external auditors was greater than the amount allocated for this purpose when the project application was submitted Overall, the level of expenditure arising under each budget category reflects the achievement of project deliverables, objectives, milestones and outputs. These are outlined in detail in Chapter 6 of this report.

10. APPENDICES (supplied on CD-ROM)

Appendix 1	-	Photographs showing visits over the years (Action A1)
Appendix 2	-	Consultation procedure and group photograph on site (Action A2)
Appendix 3	-	Sample HIRA (Hazard Identification Risk Assessment) Form (Action A3)
Appendix 4	-	Drainblocking methodology with photograph showing peat dam (Action C4)
Appendix 5	-	Vegetation Monitoring Report (Action C1,C2, and C3)
Appendix 6	-	Letter from FS re Sessuegilroy Site (Action C1)
Appendix 7	-	Letter from NPWS re Kingarrow Site (Action C4)
Appendix 8	-	Water Monitoring Report (Action D3)
Appendix 9	-	Publicity gained via Graduate Treasure Trail (Action E6)
Appendix 10	-	Launch Information (Action E6)
Appendix 11	-	"End of project conference" information (Action E6)
Appendix 12	-	Photos of groups at various information days and thank you notes (Action E1)
Appendix 13	-	Project Brochure (Action E3)
Appendix 14	-	Project Results Booklet (Action E4)
Appendix 15	-	John Conaghan, Project Ecologist, explains bog species characteristics (Action E5)
Appendix 16	-	Media Publicity Material 2002 – 2006 (Action E6)
Appendix 17	-	Photograph showing Interpretative Display Sign (Action E7)
Appendix 18	-	Project Advisory Panel Listing & Photograph (Action F2)
Appendix 19	-	Copy of Minerex Final Report (Action F5)
Appendix 20	-	Walrag Reading Data (Action F6)
Appendix 21	-	Maps showing work completed on each site (Action F9)
Appendix 22	-	After-LIFE Conservation Plan (Action F1)