LIFE04NAT/IE/000125

TECHNICAL FINAL REPORT

Covering the project activities from 01.09.2004 to 31.01.2010

Reporting Date
30.04.2010

LIFE PROJECT NAME

BurrenLIFE

Farming for Conservation in the Burren

Project location	Burren, County Clare, Ireland
Project start date:	01/09/2004
Project end date:	31/01/2010
Total Project duration (in months)	65 months
Total budget	€2, 230, 487
EC contribution:	€1, 672, 865
(%) of total costs	75%
(%) of eligible costs	75%

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(I) Key Words

conservation, Ireland, Burren, priority habitat, orchid-rich calcareous grassland, limestone pavement, turlough, grazing management, winterage, concentrate feed, monitoring.

(II) Abbreviations & Definitions

Abbreviations	
BBLPG	Burren Beef and Lamb Producers Group
BFCP	Burren Farming for Conservation Programme
BFFC	Burren Farmers for Conservation
BLP	BurrenLIFE Project
DAFF	Department of Agriculture, Fisheries and Food
EFNCP	European Forum for Nature Conservation and Pastoralism
EFT	Electronic Fund Transfer
GD	Grazing day
HEP	Heritage Education Programme
HNV	High Nature Value
IFA	Irish Farmers Association
LU	Livestock unit
MU	Management Unit
NFS	National Farm Survey
NPWS	National Parks and Wildlife Service
PAG	Project Advisory Group
PSG	Project Steering Group
REPS	Rural Environmental Protection Scheme
SAC	Special Area of Conservation
TD	Teachta Dála (member of Dáil Éireann, the Irish Government)
pSCI	Proposed Site of Community Importance
Definitions	
Dry stock	Cattle reared for beef
Heifer	A young female that has not had a calf
Modified or Approved Application	The revised project application post acceptance of the modification request which was approved by the EC in a letter dated 4 August 2009
Monitor, project or BurrenLIFE Farm(s)	Term used to describe the 20 selected farm sites on which main project actions were implemented and monitored over the course of the project
Project Team	The personnel with direct responsibility for the implementation of the project (Dr Brendan Dunford, Dr Sharon Parr and Mr. Ruairí Ó Conchúir. Aisling Keane joined as Administrative assistant in December 2008). Dr James Moran, seconded to the project by Teagasc, is also considered part of the project team for technical reporting purposes
Silage	Fermented, high moisture fodder usually made from grass crops
Steer	A castrated male bovine
Suckler cow	Cow that is part of the beef production farming system, a suckler cow rears its own calf for up to six months
Winterage	Winter Grazing Areas

3. EXECUTIVE SUMMARY

Project Objectives & Mechanism of Delivery

The main objective of the BurrenLIFE project was to 'develop a new model for the sustainable agricultural management of the Habitats Directive Annex I priority habitats of the Burren'. This was necessary to address the problem of changing farm practices which are threatening the future status of the priority and other Annex I, habitats located in the three principal terrestrial pSCIs in the region.

In order to do this a range of diverse but complementary actions were undertaken including:

- Implementation of best-known management practices on 2,000ha of the Burren incorporating new evidence-based activities such as new supplementary feeding systems, implementation of new grazing regimes through the redeployment of existing stock and targeted scrub removal.
- Instigation of a practical programme of environmental/ecological, agricultural and socio-economic monitoring designed to increase understanding of the relationship between land management practices and the natural heritage of the Burren.
- Development of a range of support mechanisms for the sustainable management of the Burren's priority habitats through research, advisory services, marketing initiatives, co-operative structures and the revision of existing agri-environmental and conservation-oriented schemes.
- Enhancing awareness of, and skills relating to, the heritage of the Burren and its management through education, demonstration and dissemination activities aimed at farmers, local communities and the wider public.
- Dissemination of information relating to the agricultural management of the Burren to other High Nature Value areas locally, nationally and internationally through attendance at conferences and workshops, visiting other projects and hosting visits to the BurrenLIFE project, production of project-specific literature, the internet and other media e.g. DVD.

Chapter Summaries

Chapter 4: Introduction

The Burren is an important European landscape due to the wealth and diversity of its natural and cultural heritage. The maintenance of the landscape and its habitats are dependant on the continuation of the traditional winter grazing practices but changes in agricultural policies and global economics have undermined farm viability leading to a reduction in agricultural activity in the area. This threatens the future of the priority habitats present, especially the orchid-rich grassland - limestone pavement mosaics. The BurrenLIFE project set out to address the problem of farm polarisation (simultaneous intensification on productive land and neglect or abandonment of traditional winterages) and the loss of traditional management knowledge and skills, by working with 20 Burren farms to develop a series of practical farm management techniques that could benefit the environment, the habitats and the farmers of the Burren.

Chapter 5: LIFE-Project Framework

The beneficiary and project sponsor was the National Parks and Wildlife Service of the Department of the Environment, Heritage and Local Government. They were responsible for overall management of the project and employment of the project scheme (excluding Dr James Moran). Teagasc, the Agriculture and Food Development Authority, were partners and co-financiers of certain agriculturally-related Actions. The third partner was the Burren IFA, the main representative body for the farmers of the Burren. The project employed a three person team to carry out the Actions and these were complemented by a fourth member seconded to the project from Teagasc. Project activities were overseen by a Project Steering Group with additional technical input and advice from the Project Advisory Group. Specific agricultural advice and assistance came via the Teagasc Advisory Group.

Chapter 6: Results

Details are provided regarding the methodology and outcome for each project action. The preparatory actions (A Actions) resulted in the publicising of the project, the selection of 20 farms on which to test new feeding and grazing systems, extensive farmer liaison, the drawing up of 20 farm-specific management plans, the inclusion of 2,485ha of land designated SAC and the compilation of a Burren land use database.

The C Actions (non-recurring management) led to the enhancement of management facilities on all 20 project farms including the restoration of c.15km of stone wall on 18 farms, the installation of 21 new gates, the purchase of seven mobile fencing units; the construction, upgrading or extension of c. 5km of vehicular access track on nine farms and improvements in water provision on 11 farms via installation of pumps, piping, storage tanks or new drinking troughs. Scrub was controlled on c.100 ha of priority habitat and c.54km of animal access paths were opened or restored to aid livestock movement and herding. New grazing regimes based on a system of grazing days were implemented which saw a doubling in the area described as well grazed over the course of the project. The introduction of the new concentrate-based feeding systems led to a 61% reduction in the amount of silage fed on the project farms. A Burren Beef & Lamb Producer Group was established following the carrying out of a feasibility study on the potential of developing new markets for Burren produce. Findings from the BLP were incorporated into the new REPS IV and formed the basis for the new 'Burren Farming for Conservation Programme', Ireland's first evidence-based, area-specific agri-environmental scheme which is due to start in April 2010.

As part of the recurring management (D Actions) the forage quality of different vegetation types on the Burren winterages was elucidated and the data used in the formulation of the BurrenLIFE concentrate feed. The feed, 25% of the cost of which was subsidised by the project, was used by 17 of the project farms and satisfaction levels were high. All farms were visited regularly in order to advise, check compliance, carry out assessments and share information which ensured a good two-way flow of knowledge and refinement of the work programmes. The scrub retreatment programme resulted in kill rates in excess of 75% on conventional farms but demonstrated the difficulty of scrub control on organic farms.

The public awareness and dissemination programme (E Actions) saw a great number of interactions between members of the project team and other interested individuals/organisations from Ireland and around the world thus ensuring the wide dissemination of information concerning the project. A very strong media profile was built up through publication of a large number of general interest articles. Locally, the very successful Heritage Education Programme ensured the involvement of local schools and reached the wider community. A website, DVD and various publications including a series of best practice guides were also developed and widely distributed.

Section F (overall project operation and monitoring) saw the establishment of the BurrenLIFE office in the village of Carron, right at the heart of the Burren. The environmental/ecological monitoring programme led to the development of the innovative Risk of Nutrient Transfer Model which indicates that the BurrenLIFE approach to farming in the Burren is better for the sensitive wetland ecosystems. It also provided evidence for improvements in the conservation status of the priority habitats and the positive impact of the improved grazing levels on the vegetation in terms of increased species diversity. The agricultural monitoring programme indicated that the stock fared well under the new grazing and feeding regimes and gave agricultural credibility to the farming for conservation programme. Analysis of farm finances via the National Farm Survey showed that, for the greater part, farming in the Burren is not capable of supplying an income equivalent to the average industrial wage, but an additional socio-economic study demonstrated the added value provided by farming for conservation in terms of externalities generated and proved that the public are willing to contribute financially to sustaining the landscape and biodiversity of the Burren. The final Action under this heading saw data generated by the project incorporated into a Burren GIS database.

Chapter 7: Evaluation & Conclusions

Technically, the BurrenLIFE project has been an overwhelming success having achieved its main and subsidiary objectives. It reality, it has exceeded expectations as it not only resulted in the development of a model for farming for conservation in the Burren but also in the Departments of the Environment, Heritage and Local Government, and of Agriculture, Fisheries and Food, signing a ground-breaking memorandum of understanding. This led to funding for the forthcoming 'Burren Farming for Conservation Programme' which aims to bring 100 Burren farmers into this new agri-environmental programme thus expanding the area of the Burren that will be effectively managed for the benefit of the Annex I habitats present.

Chapter 8: AfterLIFE Conservation Plan & AfterLIFE Communications Plan.

Copies of the AfterLIFE conservation plan and AfterLIFE communication plan are supplied with this report and in electronic format on the accompanying CD. The conservation plan covers the project history, analyses the current situation, outlines the AfterLIFE objectives and proposed methodologies including the Burren Farming for Conservation Programme, Burren REPS Measures and the draft Burren National Park Management Plan.

Chapter 9: Comments on Financial Report

The overall costs incurred by the BurrenLIFE project exceeded the approved provisional budget by 7.2% or €160,595. This over-spend, €90,102 of which was personnel related, reflects the very significant additional contribution made by the project partner, Teagasc, largely through the secondment of a full-time staff member to the project, as well as significant additional time inputs by the project sponsor, NPWS. The full cost of this extra input has not been captured in the Financial Report but is reflected in the success of the project in delivering its objectives. This over-spend does not impact on the budgeted EC contribution of €1,672,865. A detailed commentary on the financial report can be found in Section 9.

Chapter 10: Annexes

The titles of the annexes supplied are listed at the start of this document and are supplied electronically on the accompanying 'BurrenLIFE Final Report' CD. They include more detailed reports on the Actions, examples of data capture forms, the type of data collected, analysis of the data, project-generated literature and dissemination materials. The second 'Deliverables' CD includes electronic versions of all deliverables.

Chapter 11: Layman's Report

The layman's report provides a non-technical overview of the project including the habitats involved, the threats, the methods used to address the threats and examples of the results and dissemination activities. A hard copy is supplied with this report and electronically on the accompanying 'BurrenLIFE Final Report' CD.

List of Key Deliverables and Outputs

Deliverable	Action	Deadline	Date Achieved	Delivery
BurrenLIFE-Nature website	E2	1 Jun 2005	Oct 2005	www.burrenlife.com
European Contact Database	E1	1 Jul 2005	Aug 2005	Updated version containing full contact list supplied electronically on the accompanying 'Deliverables' CD
GIS Database for the Burren & Integrated database	A1 & F7	1 Aug 2005 & 31st Jan 2010	31st May 2009 & 31st Dec 2009	GIS datasets file with hyperlinks to examples of data & example outputs in 'Burren GIS database' folder on the 'Deliverables' CD
Project newsletters	E7	31st Aug 2005	Dec 2005	Printed copies supplied with this report & electronically on 'Deliverables' CD
Baseline Surveys of	A3	30th Sept	30th Aug	Copies of survey & questionnaire sheet

Deliverable	Action	Deadline	Date Achieved	Delivery
Project Sites		2005	2007	submitted with PR2 Annexes 8, 9, 10, 13. Data from the surveys entered into a range of relevant spreadsheets e.g. grazing data, feeding data, farm selection etc and is thus in disparate form. Hard copies of the original sheets will be supplied on request
Management Agreements for Project Sites	A4	1st Oct 2005	31st Oct 2006	Example of farm plan & agreement submitted with PR 2. This is included on 'Deliverables' CD – contents of plan also cover deliverable products for D4
Formula for feedstuff to be used on project sites	D2	1st Dec 2005	1st Dec 2005 (initial) Sept 2008 (final)	Subsequently modified & then finalised (2008). Final formula given under Action D2
Progress reports from project farms (first of)	D4	1st May 2006	1st July 2006	Printed example (as part of farm plan) submitted with Interim Report Annex 29). Electronic example included in 'Deliverables' CD (see plan under A4)
Report on marketing potential of Burren produce	C6	30th Sept 2006	Aug 2006	Copy previously submitted with PR2 - Annex 30. Electronic version on 'Deliverables' CD
Profile report for forage quality of Burren grassland	D1	31st May 2007	Aug 2009	Supplied electronically on 'Deliverables' CD
Report on conference proceedings	E6	1st April 2008	1st April 2008	Supplied electronically on 'Deliverables' CD
Scientific paper	E8	31st Dec 2007	31st Dec 2009	Those published supplied electronically on 'Deliverables' CD
Report on Burren Beef & Lamb Producers Group*	C6	-	-	Not delivered – see report in Part 6.
Set of best practice information sheets	E9	31st Jan 2010	31st Jan 2010	Printed copies supplied with this report & electronically on 'Deliverables' CD
New (draft) model of BurrenLIFE-based farming for conservation programme	C7	31st Jan 2010	31st Jan 2010	Supplied electronically on 'Deliverables' CD
Independent Audit	F9[a]	31st Jan 2010	Apr 2010	Copy accompanies this report.
Farming for Conservation DVD	E4	1st Jan 2009	Nov 2008	Copy accompanies this report.
Draft management plan for the feral goats of the Burren	F5[b]	31st Dec 2009	Jan 2010	Supplied electronically on 'Deliverables' CD

PR = progress report

* omitted in error from list of deliverables in modified application

[a] F7 in modified application is an error [b] F4 in modified application is an error

4. INTRODUCTION

Description of background, problems and objectives

The Burren is one of the most important and best-known landscapes in Europe due to the wealth and diversity of its natural and cultural heritage. Much of the Burren region lies within the Natura 2000 Network. Five pSCIs covering 47,000ha have been designated: Galway Bay Complex, Ballyvaughan Turlough, The East Burren Complex, Moneen Mountain and, Black Head-Poulsallagh Complex. The last three are the focus of the BurrenLIFE Project and contain expansive mosaics of high-quality limestone pavements and orchid-rich calcareous grasslands.

The Burren landscape has been shaped by the hand of man for over 6,000 years. Intensive exploitation of the landscape by generations of farmers and their livestock has ensured that large areas of limestone pavements remained free of scrub. Research has shown that traditional pastoral systems, in particular 'winter grazing' regimes, are integral to maintaining the unusual plant assemblages found in the region.

Recent years have seen a withdrawal, restructuring or reduction of farming activity in the Burren. This has led to the visible degradation of priority habitats through undergrazing, abandonment and the loss of important land management traditions.

Changes in policy have facilitated a move away from the production-driven mentality towards a more multifunctional approach to land use that incorporates the concept of 'farming for conservation'. To ensure that this opportunity is seized will require the research and development of a new integrated system for the agricultural management of the Burren, one that will secure a bright future for the people and their heritage.

Overall and specific objectives

The BurrenLIFE Project was established to develop practical solutions to agricultural issues that threaten the priority habitats of the Burren. Its specific objective was 'to develop a new model for the sustainable agricultural management of the Habitats Directive Annex I priority habitats of the Burren'. Twenty 'monitor' farms covering more than 3,000ha of farmland, including 2,485ha designated as SAC, are directly involved in the BLP. The practical measures implemented as part of the BLP aim to encourage and support the grazing of winterages. These include facilitating livestock movement and herding around sites, increasing water availability and restoring internal stone walls.

Main conservation issues being targeted

The priority habitats which feature prominently in the Burren, and which are the focus of this project include: limestone pavement, orchid-rich calcareous grasslands and a range of wetlands including turloughs, petrifying springs and *Cladium* fens. These priority habitats are being threatened by a number of factors largely related to changes in land management practices. These include farm polarisation which sees the intensification of agriculture on the more productive areas of the farm whilst the more marginal 'winterage' lands are neglected or abandoned altogether, as well as the loss of traditional husbandry systems and knowledge.

How the project came about

The need for a large-scale, action-based conservation initiative was identified following completion of research on the 'Impact of Agricultural Practices on the Natural Heritage of the Burren'[1]. The publication of the book by Dr Brendan Dunford 'Farming and the Burren' based on this research highlighted the urgency of the situation and stimulated local and research staff from the NPWS to seek funding. Dr Dunford was awarded a contract to draw up a proposal for LIFE funding which would involve Teagasc and the Burren IFA as partners with the NPWS. This formed the basis for the LIFE application.

[1] Dr Brendan Dunford, Unpublished PhD thesis (2001)

The socio-economic context of the project
The Burren has a long tradition of pastoralism but changes in markets forces, agricultural policies and socio-economics led to significant changes in farming practices. The combination of lower labour availability and the poor return from farming led to many farmers taking off-farm employment to supplement their income. This encouraged a further shift in the focus of farming activity from extensive winter grazing to winter housing or the widespread feeding of silage. These changes are at the root of many of the present day problems relating to land management in the Burren. Apart from agriculture, the main land use of the Burren is recreation and tourism is an important local industry. However, tourism is heavily reliant on the quality of the Burren's natural and cultural landscape and thus on the traditional grazing practices that maintain it.

Expected Results

- The maintenance or enhancement of the conservation status of the priority habitats on 2,000ha of Burren farmland and of the priority wetland habitats associated with the project sites
- The development and support of a new model for 'Farming for Conservation' in the Burren
- Greater awareness and understanding of the heritage of the Burren and how to manage it
- Better understanding of issues relating to the management of areas of high nature value in Europe.

5. LIFE-Project Framework

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

The essential feature of this project is the development of a costed model for the sustainable agricultural management of priority habitats in the Burren.

(i & ii) Overview of project actions and sub-actions

A1-A4	Preparatory actions, elaboration of management plans e.g. baseline farm survey
C1-C7	Non recurring management e.g. implementation of new grazing regimes on priority habitats through stock redeployment.
D1-D8	Recurring management e.g. repeated scrub control assessments and re-treatments.
E1-E9	Public awareness and the dissemination of project results e.g. best practice guides and project website
F1-F9	Overall project management and monitoring e.g. ongoing agricultural surveys

(iii) Planning
A detailed calendar for the implementation of actions was submitted as part of the approved project proposal. Also submitted were project deliverables and project milestones. Achievement was continually monitored against planning at regular project team meetings, project steering group meetings and project advisory group meetings.

Presentation of beneficiary, partners and project organisation
The beneficiary and overall co-ordinator was the National Parks and Wildlife Service of the Department of the Environment Heritage and Local Government. The project partners were Teagasc and the Burren IFA. A three person team comprising Project Manager (Dr Brendan Dunford), Scientific Co-ordinator (Dr Sharon Parr) and Finance & Operations Officer (Mr Ruairí Ó Conchúir) was employed by NPWS to carry out the project actions. Dr James Moran of Teagasc

was seconded to the project to co-ordinate their input. All actions were carried out by the BLP team or contractors to the project. Diagram 1 outlines the project-organisation.

Modifications

Several minor technical and financial adjustments were made following approval (letter from the EU dated 19 February 2007) which included a reduction in the area of scrub to be removed and a reduction in the number of forage samples to be analysed. A subsequent review of project activities in 2008 identified several new areas of activity that had the potential to add value to the BLP. The resultant new actions included:

- The appointment of a coordinator for the Burren Beef and Lamb Producers Group
- Burren Goat Management Plan
- Socio Economic Analysis
- Production of a DVD

These actions were approved by the EC in a letter dated 11 June 2008 and subsequently incorporated into the modified application. A modification request was made in July 2009 seeking a prolongation to 31st January 2010 to help with the development of an appropriate structure for the roll-out of a new programme of work that would include other farmers in the Burren. This request also included a neutral budgetary modification based on moving funding between some of the major cost categories. The modification was approved in an EC letter dated 04 Aug 2009.

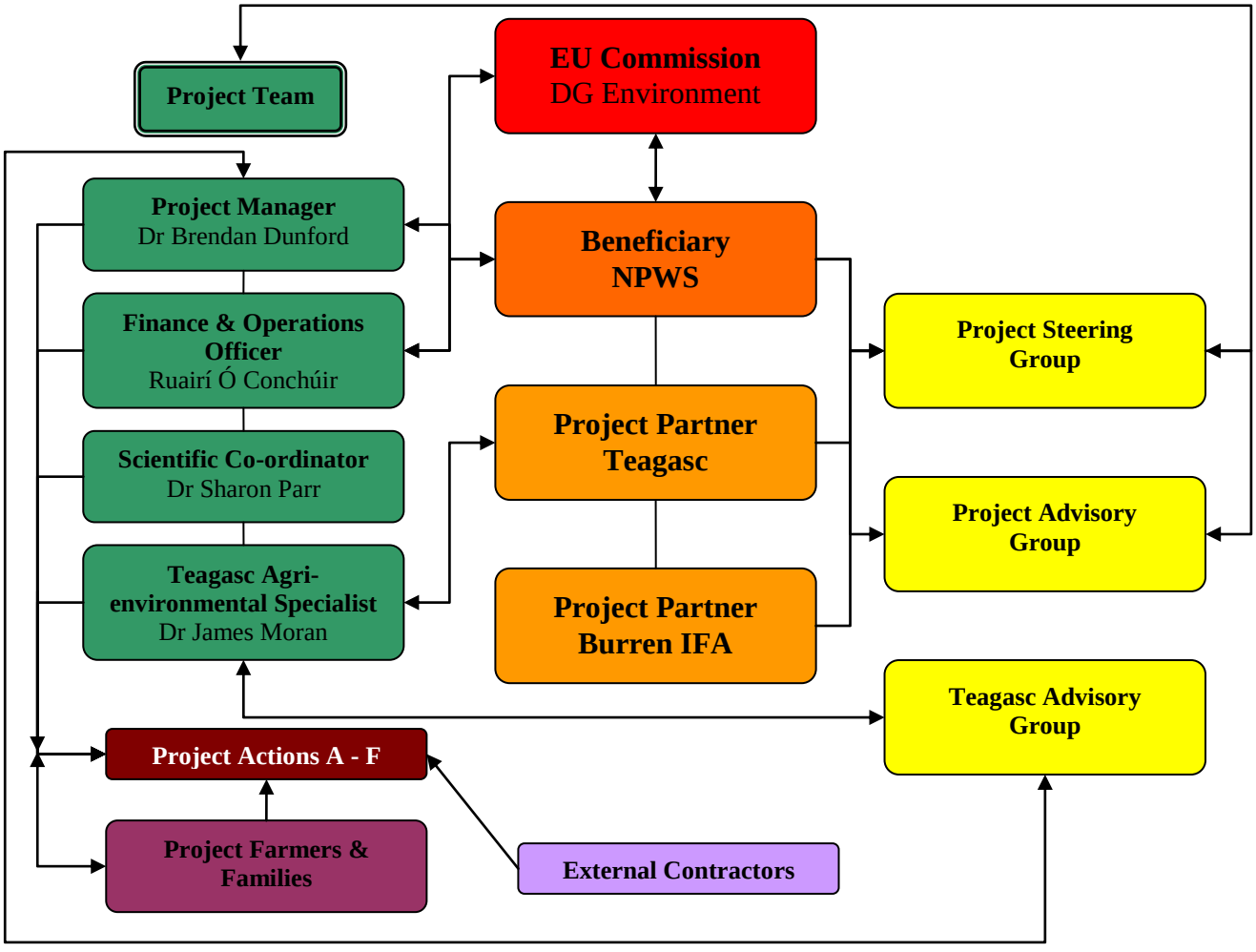


Diagram 1: Project Management and Organisation

6. RESULTS

A. Preparatory Actions, elaboration of management plans and/or of action plans

A Actions: Summary of Achievements against Targets

(project milestone indicated **MS**, target end date in italics if later than **MS** date)

Action Code	Activity	Implementation Period	Completion Date	Comments
A1	Compilation of Burren land use database (**D**)	Feb - May 05 & Nov 08 - May 09	31 May 2009 *(1 Aug 05)*	**Action complete.** Extensive updating Nov 08 – May 09 to incorporate newly available and updated externally sourced datasets.
A2	Site selection (A) & farmer liaison (B)	Jan 05 - Jan 10	A = 31 Oct 2006 *(31 Dec 05)* B = 31 Jan 2010	**Action complete.** Exceeded proposed minimum of 2,000ha of designated land (2,485ha). Delay due to late start of project.
A3 A3 **MS**	Baseline survey of 2,000 ha of project sites (**D**) Above completed	Feb 05 - Aug 07 1 Sept 05	30 Aug 2007 30 Aug 2007	**Action complete.** Delay due to late start of project & knock-on late selection of final project farms.
A4 A4 **MS**	Drawing up of management plans & contracts (**D**) All site management agreements signed	Mar 05 - Oct 06 30 Sept 05	31 Oct 2006 31 Oct 2006	**Action complete.** 20 contracts signed & 20 farms plans drawn up. Plans updated annually.

D – see table of deliverable products in Executive Summary (p.8)

Action A.1: Compilation of Burren Land Use Database

The purpose of this Action was to begin pulling together information that exists on various aspects of the Burren from the many disparate sources and integrating them into a BurrenLIFE GIS in order to:

- Facilitate farm selection (A2).
- Assist in the development and refinement of farm management, and act as a planning tool to aid the delivery of the project Actions (A4 and all C Actions).
- Act as a source of information for farmers e.g. the nature and extent of conservation designations or the location of known monuments on their land.

The main Burren land use database has been created in, and manipulated with, ArcGIS 9.0 a specialist GIS software package (ESRI). Data, usually in the form of shapefiles, was assimilated from a variety of sources including: Government Departments e.g. Dept. Environment, Heritage and Local Government (conservation designations -NPWS and 'Record of Monuments and Places' – National Monuments Service); semi-state bodies e.g. Teagasc (soils and sub-soils) and Ordnance Survey of Ireland (aerial photographs and digital maps); and third level institutions e.g. University College Dublin (broad habitat map of the 'High' Burren). Whilst some of this information is publically available, datasets such as aerial photographs and maps are subject to a paid licence fee. In these cases, access was via licences held by the project beneficiaries or partners so costs were not incurred. Unfortunately, it was not possible to gain access to the Department of Agriculture, Fisheries and Food's 'Land Parcel Information System' that would have provided farm level information, due to issues of confidentiality.

Further datasets were created during the course of the project, e.g. project farm boundaries, management units, land use, location of monitoring points, etc which are discussed under Action F7.

A list of datasets, both obtained and potential, along with their availability, source and copyright details is included in Annex A1.1. This table and the sample screenshots of the type of data to

which it is hyperlinked are also available on the accompanying BurrenLIFE GIS CD.

The datasets were used to create maps at two levels, as and when required:

- Regional level – most commonly the wider Burren area but occasionally at national level. Examples of maps include: conservation designations, location of Recorded Monuments, hydrogeology, soils.
- Project Farm level
  Examples of maps developed for farm planning include: aerial montage with overlaying 6-inch maps and land use.

Samples of maps at both regional and farm level are included in Annex A1.2.

The farm maps were dynamic with additional data layers being generated during the course of the project (reported under F7).

Maps created using the BurrenLIFE GIS were used extensively during the site selection process (along with information provided by the applicant farmers) as a means of ensuring geographic spread, representation of the three major SACs and the covering of a broad range of habitats and topographies. The GIS was also central to the development of the individual farm plans whose actions were linked to specific management units.

The database was fundamental in the elucidation, development and preparation of the nutrient export model (F4). It was used to generate maps of key factors such as surplus nitrogen and phosphorus, feeding pressure, pathway sensitivities and pressure strengths, all of which were used to calculate the risk of nutrient export on sample farms (see Annex A1.2).

A considerable amount of useful information has been assimilated within the Burren database, but the rapid expansion of GIS as a tool, particularly in the last 5 years, means that potentially useful datasets will continue to become available as the data is digitised and made available by the holding bodies. Thus, whilst good progress has been made with this Action and it has been completed, it must be borne in mind that it has the potential to be developed further, as this is a very dynamic area.

One major disadvantage of the database is the technical dexterity and competence required to manipulate the information into a form from which the required information can be extracted. For this reason, few members of the farming and wider community will be able to utilise the Burren database directly and must rely instead, on the assistance of a third party. The ability to use the GIS varied even within the project team and whilst all could interpret the outputs, the preparation of shapefiles and maps rested with the Scientific Co-ordinator, the Conservation and Ecology Specialist seconded to the project by Teagasc and the GIS technician who was contracted to assist with the large amounts of data generated during the project (GIS technician reported and costed under Action F7).

Another disadvantage of the system is the need for complex and expensive software. However, an increasing amount of national and regional GIS data is being made available for consultation by individuals through interactive mapping accessed via the web, e.g. aerial photographs and maps on Google Earth and Google Maps, and conservation designations via the NPWS Map Viewer to name but two. In recognition of this developing area of GIS access, some representative sites have been included in the summary table in Annex A1.1. as this is the most likely manner in which the wider public will access GIS data in the future.

See Action F7 for dialogue on presentation of this deliverable.

ACTION A.2: Site selection and farmer liaison

This Action had two main objectives: to identify and shortlist potential Monitor farms and to engage the Burren farming community fully in the project and in the practice of farming for conservation. This Action was successful on both counts and met its proposed targets: a shortlist of

100 farms was drawn up and an estimated 300+ farmers were met individually by the project team while many more were engaged through public events. In almost all cases, the engagement was very positive.

The Official launch of the BurrenLIFE Project by Minister for Environment, Heritage and Local Government Dick Roche TD took place in July 2005. This launch, and a series of public meetings in March-April 2005, generated a lot of interest in the project. A list of interested farmers was compiled from the c.125 farmers who attended these meetings and this list was later enhanced by 'Expressions of Interest' made to the project office. At a local level, staff from Teagasc, NPWS and local farm planning agencies, as well as Burren IFA, actively promoted the project on the ground and local and national newspapers advertised that the project was open for business. The original intention of using a mailshot to contact farmers was abandoned in favour of the above due to difficulties in accessing an up to date address database.

A shortlist of 100 farmers who expressed some level of interest in participating in the project was compiled (Annex A2.1). As many of these farms as possible were then visited and a baseline ecological survey was undertaken by a member of the project team using a standard Habitat Assessment Form (Annex A2.2). A landowner interview was also conducted by the project manager using a short Scoping Questionnaire (Annex A2.3). The full 100 farmers could not be visited due to the time constraints imposed by the 5 month delay in starting the project, it being vital that as many farms as possible had management plans drawn up and agreed before the ensuing winter grazing season. The project team do not think that this shortened visiting list impacted on the final delivery or quality of the project in any way.

Information generated from survey work on 57 farms was inputted into a scoring sheet (Annex A2.4) which allocated scores to each farm based on a number of predefined criteria.
Mandatory criteria for selection included:

- that the farmer owned 15ha or more of SAC land in the Burren
- that the farmer had expressed an interest in participating
- that the proposed actions would be likely to have a positive impact
- that the farmer owned at least 10ha of priority habitat

Those applicants who met the mandatory criteria had their application scored based on the:

- willingness of farmer to participate in project
- extent of the SAC on the farm
- Annex I Habitats present
- grazing levels on priority habitats

Farms which scored highest were approached with a view to being part of the project. In most cases they were happy to accept. Initially, a batch of 12 farmers entered the project before the winter period of 2005/6 and an additional 8 farms were invited to participate in 2006. This batch of 8 farms was selected based on their score but where farms had similar scores efforts were made to ensure a good distribution in terms of geography, gender, farm system, off-farm work etc.

The project team were very satisfied with the level of farmer interest in participating in the project: a large number of potential 'substitute' farms were available as a result, but could not be included. In fact the only dissatisfaction the project encountered in its 5 years of operation was from a small number of disgruntled farmers who were not chosen for the project and who felt that other 'bigger' farmers were benefiting instead of them. The objective and transparent manner of the assessment and the broad popularity of the project within the Burren ensured that these minor rumblings never developed further.

In terms of broader farmer liaison, this has been a core activity not just of the project manager (as originally envisaged) but also of the project team through office calls and site visits. The fact that all four core team members resided in the Burren region also helped ensure a greater level of

awareness of, and trust and pride in, the project within the local farming community. All farmers who contacted the project, at public meetings or privately, were asked to meet with the project manager (Annex A2.5). Others farmer meetings occurred through Burren IFA events, Demonstration days, Educational events and other Public events including annual addresses by the Project Manager to REPS courses in the Burren. The central location of the project office was of key importance, and has increasingly become a centre for farmers with queries on their land and livestock. While this liaison work certainly helped promote awareness and understanding of the project, it also generated a lot of useful practical information on stocking levels, feeding regimes, stock types, grazing periods and so on.

A 'producers group' of sorts - the 'Burren Farmers for Conservation Group' - was established by the project in 2005. All Burren farmers were invited to participate in this discussion group and the local IFA network helped to ensure an excellent geographical representation from each of the eight parishes of the Burren. Evening meetings of the group were held in the project office 2-3 times a year. At each meeting a brief progress report was delivered by the project team followed by questions followed by a discussion during which farmers were able to find out more about the project and also to offer feed back from their parishes. This group was very useful to help identify emerging issues or potential problems and to address them proactively; it was also a useful way of fine-tuning and validating project actions and in garnering support for upcoming events.

Another important forum for liaison was the Burren Beef & Lamb Producers Group (C6), monthly meetings of which took place at the BLP offices. This group included 7 BLP farmers and 4 members of the BFFC Group. A BurrenLIFE team member attended all of these meetings.

While it is difficult to quantify the number and impact of the many encounters between the project team and the farmers of the Burren, formal and informal, once-off or multiple, fleeting or in-depth, an independent research project commissioned by the Heritage Council of Ireland in conjunction with the Burrenbeo Trust and Burren IFA offers strong evidence of the positive impact of this process of active engagement. Although this survey was not part of BurrenLIFE, its results are highly relevant as some of them offer an independent insight as to how the Project is viewed amongst the wider farming community of the Burren (Annex A2.6). The survey involved 245 people from 111 Burren farm families (an estimated '1 in 6' farmers from the broader Burren region). It found that BurrenLIFE was the programme which the majority of survey respondents had had direct contact with (61%), and it was also the programme that survey respondents believed to be the most relevant to farming (87%). Some 32% of respondents felt that BurrenLIFE best represented Burren farmers (more than that for Burren IFA at 24%). When asked whether or not they agreed with the statement '*The Burren LIFE project has had a positive impact on the conservation of the Burren'* 88% of respondents said they agreed and only 1% disagreed (see P31, Annex A2.6).

This indicates that Burren farmers have a strong sense of ownership of, and belief and trust in, the BurrenLIFE Project, matched by a determination to ensure that its positive work should continue. This, along with the new management information generated, are probably the most significant outputs of the project, as they reflect the sense of informed local pride and ownership which are the cornerstones of any future farming for conservation initiatives in the Burren.

ACTION A.3: Baseline Farm Survey

The purpose of this Action was to gather baseline data against which the project actions would be assessed as well as providing information that would be used in drawing up the Farm Management Plans (Action A4).

Twenty Monitor farms were selected from the shortlist of 100. Originally, it was estimated that c. 25 farms would be needed to deliver the target area of 2000ha whilst also providing the geographic, demographic and agricultural diversity desired. However, this was achieved very successfully with the 20 selected farms. The total area of the 20 farms was 3,097ha which included 2,485ha of land

designated as SAC and 612ha of undesignated 'improved' agricultural land. The figure for the target area (SCI's) is 24% (485ha) higher than the original target. The designated land included 247ha which is state owned. The farms were spread across the three major SACs of the Burren and all of the main farming systems – suckler beef (10), drystock (2), dairying (2), mixed (cattle and sheep) (6) - were represented. Four organic farmers were included, three of the farm managers were female, twelve were full-time farmers and the others were part-time. Age profiles varied from early thirties to late sixties.

Mean project farm size was 155ha (range: 40ha - 448ha). The average whole farm stocking rate was 0.43 LU/Ha (range: 0.19-0.81 LU/ha). The farms were stocked with a total of 583 suckler cows (average 34 per farm), 73 Dairy cows, 265 1-2 year old cattle and 450 sheep (average annual figures). Ecologically the selected farms represented a full range of habitats and the conservation status of these habitats ranged from favourable to very unfavourable – while some areas were overgrown with scrub, others (even on the same farm) were overgrazed.

Building on the initial 'scoping' surveys (Action A2), a series of more detailed and rigorous surveys and assessments of the farm and the farmer took place on each farm prior to the (and following on from the) development of the management plan (A4). These surveys included:

Environmental: This survey work fed into the environmental monitoring Action (see Action F4). As well as information on coarse habitat data and site condition, fixed point photography (focussing mainly on scrub) and aerial images (2000 & 2005) were used. Detailed vegetation data was recorded from 540 quadrats across 13 farms (later expanded to 772 quadrats across 18 farms in order to monitor specific actions) as was data from 34 monitoring plots containing 700 $1m^2$ permanent monitoring quadrats for scrub seedlings and saplings from 7 farms. Baseline soil samples (359 samples, 20 farms) and water samples (20 sites) were also taken from project farms (Action F4). This work was carried out by the scientific co-ordinator, project manager and Dr Moran of Teagasc.

Socio-economic: a detailed 17-page farm questionnaire (Annex A3.1) was conducted with each project farmer to capture agricultural and socio-economic profile of the farm. This survey was conducted by the project manager and Teagasc staff.

Agricultural: As well as conducting a baseline survey (Annex A3.1), baseline blood samples (n=80 animals), faecal Samples (n=34 samples), Forage (n=50 sites) and fodder (n=12 farms) samples were taken from a selection of project farms by the project team and Teagasc staff.

The baseline surveys were completed successfully. This was an essential Action as it:

1. Resulted in the generation of the baseline environmental, agricultural and socio-economic data for the project sites against which the impact of project Actions could be measured. This data is incorporated into, and reported on, under Actions F4, F5 and F6.
2. Facilitated the development of the farms plans by providing basic agricultural information and aiding the identification of target areas and appropriate work programmes.
3. Led to the development of a pioneering Nutrient Export Model for the Burren. The model, developed by consultant hydrologists and Teagasc staff, is reported under Action F5.

An additional development under this Action was the appointment of Mr. Michael Lynch, Field Monument Advisor with Clare County Council to work with the BLP in conducting a baseline 'cultural audit' of Monitor farms. This input was solicited by the project team in acknowledgement of the cultural value of the project sites and the implication of management changes thereon. It was a collaborative 'value added' venture that saw no actual costs incurred by the BurrenLIFE Project these being covered by the Heritage Council (75%) and Clare County Council (25%). The BurrenLIFE contribution was solely aiding introduction to the farmers and provision of information.

To date, the audit (which is ongoing) has focussed on five Monitor farms. The work entailed a

desktop audit of sites, followed by a detailed field survey including walking the land with the farmer and the measurement, drawing and photographing of all previously unrecorded sites. In all cases the farmers' response to this project has been very positive and of the 65 monuments visited approximately one third were previously unrecorded - most of these were highlighted by the farmers. A further 15 sites of historical and cultural interest have been identified and visited. The main threats to the preservation of the monuments were scrub encroachment and the non-recognition of sites, particularly in the case of field systems and mound walls.

As well as raising awareness of cultural heritage and identifying new sites, this audit will result in the production of a detailed cultural inventory and map of the farms surveyed (see Annex A3.2 for draft example). This project is an excellent example of the locally added value of the BLP in terms of supporting an integrated approach to the management of sites which are of exceptionally high natural and cultural value.

ACTION A.4: Drawing up Farm Management Plans and Contracts

Using the baseline survey information from Action A3, management plans were drawn up for each of the 20 project farms by the project manager, project scientist and Teagasc staff in close conjunction with the farmer and his/her family. A sample Farm Plan is provided in Annex A4.1. The plan contains six main sections. The first section details the farm layout (including a map of all management units (MU) along with a table detailing habitats present, area and land use for each MU) and farming system (numbers, types and breeds of stock). This is followed by a section detailing the heritage value of the farm – listing and describing habitats, highlighting geological and archaeological features - along with images and maps. This is intended to inform the land manager about the heritage values of the farm. It is followed by a short section summarising the agri-environmental (REPS) management requirements that apply thereon and listing the SAC area.

The fourth section introduces the BurrenLIFE project and outlines in general terms how it will apply on that farm in terms of changes to feeding, grazing and fertilization regimes as well as other proposed actions. Section 5 provides more detail on proposed changes to feeding, grazing and fertilizing regimes along with a summary of capital works required. Section 6 summarises project timeframes and payments (6A) and monitoring requirements (6B). They key Section is 6C which specifies the work programme for the upcoming season (winter or summer). This Section is revised twice annually in conjunction with the farmer. The final sections of the plan are composed of various Annexes which focus mainly on the collation and analysis of data.

Whole farm plans were developed in close conjunction with the farmer, often requiring multiple meetings. On average a plan took c.10 working days to complete. While these plans were valued by the farmers as significant resources, future planning will need to be more efficient and concise. Though plans were invaluable and often-used references tools for the project team, most farmers used them sparingly, preferring direct contact with the project team in the event of a query. All plans and data collected during the project will continue to be stored at the BurrenLIFE Office in Carron for the foreseeable future.

All farmers signed a non-legally binding management agreement upon entry to the project (Annex A4.2). This proved to be an adequate mechanism to ensure farmer co-operation as all of the farmers maintained their support for the project and stayed with it for the duration. Sadly, two of the signatories passed away during the project lifetime but their successors (in one case a wife, in another a son) took over the management of the farm and continued to engage fully with the BLP.

The outcome of this Action was that practical, farm-specific, relevant and effective work programmes were formulated for all project sites that addressed the threats to the priority habitats present, and these programmes enjoyed the full support of the landowners involved.

B. Purchase/lease of land and/or rights

Not Applicable

C. Non-recurring management

C Actions: Summary of Achievements against Targets

(project milestone indicated **MS**, target end date in italics if later than **MS** date)

Action Code	Activity	Implementation Period	Completion Date	Comments
C1	Restore damaged areas	Jul 05 - Dec 07	31 Dec 2007 *(31 Dec 05)*	**Progress limited.** Action overlapped with REPS & cross compliance. Low priority for farmers. Down graded and budget reduced in modified application.
C2	Enhance livestock facilities	Jul 05 – Aug 09	9 Aug 2009 *(31 Dec 05)*	**Action complete.** Enhancement work carried out on all 20 project farms. Some overlap between activities under this Action & Action D5. Action upgraded in importance.
C3 C3 **MS**	Scrub Removal Main phase of scrub removal completed	Nov 05 – Aug 09 1 Sept 06	9 Aug 2009 9 Aug 2009	**Action complete.** Scrub removed from c. 100ha of SAC and c.54k of paths opened. Delayed due to initial shortage of skilled labour and to allow greater experimentation with methods.
C4 C4 **MS**	Implement new grazing regimes 1st season grazing start Final adjust. to strategy End of grazing & feed	 1 Oct 2005 1 Sept 2008 1 May 2009	 1 Oct 2005 1 Sept 2008 1 May 2009	**Action complete.** Implemented on 12 farms by 1st **MS** and subsequently all 20 farms. Delay due to late start of project.
C5 C5 **MS**	Introduce new supplementary feeding systems Start new feed regimes Final adjust. to strategy End of grazing & feed	 1 Jan 06 1 Sept 2008 1 May 2009	 15 Jan 06 1 Sept 2008 1 May 2009	**Action complete.** Implemented on 17 project farms (2 drystock farms do not need supplementary feeding, 1 dairy farm feeds to dairy requirements).
C6	Original: Study on new markets for Burren produce (**D**) New: Co-ordinator for Burren Beef & Lamb Producer Group (**D**)	Jan 06 - Aug 06 Aug 08 – Dec 08	30 Aug 2006 *(30 Sept 2006)* 31 Dec 08 (part)	**Original Action complete**. **New Action partially complete.** Co-ordinator employed but technical report on the BBLPG not available so expenditure for new Action not charged to the project.
C7 **MS**	Revision of existing agri-environmental scheme (**D**)	Oct 05 – Jan 10 Jan 10	31 Jan 2010	**Action complete.** Revisions incorporated into new REPS IV programme. New 'Burren Farming for Conservation Programme' drafted.

D – see table of deliverable products in Executive Summary (p.8)

ACTION C.1: Restore damaged areas

This Action was envisaged as a way of addressing historical damage to priority habitats on project farms. Sites where damage occurred (dumping, old feed sites etc) were noted during the farm surveys (A3) and in the preparation of the farm plans (A4) and were brought to the attention of the farmer. However, the uptake of this Action was poor on the whole so the budget for this Action was redeployed.

The low uptake can be explained by a number of factors. First, it was very difficult to convince farmers to address issues that they felt were a low priority when set against the prevailing context of their farms where scrub encroachment was increasing and the water, fencing and access infrastructure were poor or lacking. Second, in most cases damage related to either minor instances of littering which were usually dealt with directly by the farmer at no cost to the project or major historical reclamation works, the resolution of which was neither realistic nor of very high priority

in the context of the BLP. Third and very importantly, most of the project farmers were in REPS (agri–environmental scheme) under which they were both compelled and paid, to clean up feeding and dumping sites on their land. As such the BLP could not pay for these works as it would equate to double-payment.

As a result, the main work paid for under this Action was the removal of a large amount of rubbish from areas of the Burren National Park and Slieve Carron Nature Reserve grazed by project farmers. This rubbish consisted mainly of 'fly-tipped' material and other litter and was collected by BLP workers and disposed of with the co-operation of Clare County Council (BLP supporters). These sites have been monitored by BLP staff and no further dumping has taken place. In addition, project farmers have done a lot of work themselves under this Action, particularly the removal of feeding debris and other rubbish, in some cases in preparation for farm demonstration events (Action E5).

A potential under-spend on this Action was identified early in the project and as a result the budget for this Action was reduced from to €19,000 to €4,319 following the modification. The actual final spend was even lower at €1,476.

ACTION C.2: Enhance livestock management facilities on Project Sites

One of the main objectives of this project was to enhance grazing levels on the limestone grasslands and pavements of the Burren. Achieving this goal required effective stock deployment but it became apparent during the baseline surveys (A3) and drawing up of the farm plans (A4) that the existing infrastructure was not sufficient to enable it on many of the project farms. Consequently, remedial action was crucial.

In the event, this was a key Action on many of the project farms, so much so on some that its impact was transformative. The implications of this work in terms of improved grazing levels and easier herding were seen during the project but more importantly, they will continue beyond the lifetime of the project. A more detailed report on this Action is provided in Annex C2.1 and a breakdown of the costs involved is found in Annex C2.2.

During the baseline farm surveys (A3) and while drawing up the farm plans (A4) the project team and the individual project farmers agreed on a list of priority tasks to be undertaken under this Action. Ideas, projects and suggestions continued to develop over the course of the project and were addressed where possible. There was a strong interest in, and response to, this Action and in general project farmers felt that investing in grazing and feeding 'infrastructure' was the most practical and best value for money investment that could be made to enhance the management of project farms.

The BLP spent €99,250.84 on this Action and D5[2] which covered three main areas of activity:

Fencing (including wall restoration)**:**
Stone wall restoration was funded at a rate of 80% from the BLP and 20% from the farmer. Approximately €55,910 of project funding was spent on repairing internal stone walls on 18 project farms to enable better livestock management on these fields. The farmer's contribution was c. €13,978 giving a total cost of €69,888. External 'boundary' wall restoration was excluded from the BLP as it was covered under REPS.

While the amount of repair work required and the standard of work completed varied widely, an estimated 15,280m of wall were restored to some degree. The average cost of wall repair was €4.57 per metre.

In addition, 21 gates (plus posts) were purchased and installed at a cost of €1,361.2 to the project in order to facilitate improved grazing by controlling animal movement and ease herding. The gates were 50% funded by the BLP with the remaining 50% being paid by the farmer. Other works under this Action included the purchase of seven mobile fencing units (50% funded) to subdivide fields

[2] Separating the C2 & D5 costs proved difficult as the work overlapped, hence the combined spend.

where restoration of internal walls was not an option.

Access provision (excluding opening paths through scrub – covered under C3):
Approximately €27,300 of project funding was spent on this activity, which was funded at a rate of 50% and capped at €8,500. This Action entailed the construction, upgrading or extension of 4,931m of access tracks on nine project farms. This work greatly improved vehicular access to these areas which was important for herding, feeding and treating animals. Derogations for this work were secured in all cases, usually with the assistance of the Project Scientist (for example see Annex C2.3 and 2.3a), and the work was done in accordance with systems of best practise / minimal damage developed by the BurrenLIFE team. A significant additional length of track was built by farmers without BLP financial support but with advice and support from the project team. This was a key Action on some farms and generated very strong interest among Burren farmers who are continually seeking ways to improve farm efficiency. It was particularly popular with part-time farmers.

Water provision:
Approximately €11,943 of project funding was spent on this activity, which was funded at a rate of 50% (durables e.g. troughs) or 80% (related labour). Works done included the installation of 6 pumps, piping, storage tanks and 26 drinking troughs spread over 11 project farms. A number of alternative solutions were researched and some were piloted including the use of pasture pumps and Hydram pumps. This work was vitally important in ensuring a reliable supply of drinking water on project sites thus enabling better grazing and reducing pollution at springs. It was particularly important to supply water to fields which had been subdivided by wall restoration, fields where concentrate feeding took place (increased water demand) and fields where late summer grazing was required.

Other Activities
In addition to these main work areas, the BLP invested €17,880 (80% of cost) in the construction of a 2.5m high electrified fence around a 20-acre enclosure in order to contain a breeding population of the 'Old Irish' feral goat which were rescued from a cull on a nearby mountain. As well as providing a safe haven for this rare and culturally important breed which is not protected under wildlife or animal welfare legislation, the enclosure is also providing useful information on the role of these native browsers in controlling scrub (see Action D6) albeit under artificial conditions of containment.

Under Action C2, 80% funding was provided for actions such as wall repair because farmers were otherwise reluctant to undertake them given their high cost. Other work such as the construction of tracks and the provision of watering facilities were only 50% funded as farmers were generally happy to invest in these items as they added value to the farm. All Durables purchased with BLP funding under Action C2 were individually labelled and kept on a Durable Goods Register (Annex C2.4).

Work under this Action was carried out by the farmers themselves or by local workers listed in the Burren Register of Workers (D7). Thus the estimated total spend of €170,712 (BLP contribution of c.€99,250 plus farmers contribution of €71,462) was largely recycled within the Burren region. All workers completed sheets detailing their time worked under different actions (wall work, scrub work, water provision etc) and these were submitted to the BLP office for approval. External contractors were hired by the farmer and were paid by the farmer following approval of their invoices. The farmers were reimbursed the invoiced amount less any monetary contribution they were required to make toward the total cost e.g. their 20% contribution toward wall restoration. The project team supervised completion of the work before sanctioning payment to the farmer/contractor.

The benefits accrued under this Action will continue beyond the project. The investment in the basic infrastructure needed for conservation grazing has had, and continues to have, a major impact on the positive management of project sites and also on the lifestyle of the farmer. Access to winterages for farmers and livestock stock has been improved. The repair of walls and provision of

water has enabled farmers to deliver more targeted grazing regimes to the benefit of the priority habitats. Lessons learned in the delivery of this Action were used to inform the BurrenLIFE Best Practice Guide No.3 'Sustainable Grazing of Burren Winterages' (E9).

ACTION C.3: Scrub Removal

Scrub encroachment, predominantly hazel (*Corylus avellana*) but also Blackthorn (*Prunus spinosa*), is a major concern for both farmers and conservationists alike in the Burren. It is spreading at an unprecedented rate, the situation having gone from one where scrub was very scarce 150 years ago to the current situation where 14% of the Burren is covered by relatively dense scrub and at least another 5-10% (conservative estimate) is scrub-affected. The reasons for the spread are complex and multifactoral. Addressing this problem is an essential part of Ireland's obligations under the EU Habitats Directive but one that has been severely hindered not only by the dearth of knowledge as to how best to control hazel in particular, but also by the constraints imposed by the difficult and surprisingly fragile terrain.

This Action set out to address the lack of information and, at the same time, began to tackle the issue by controlling scrub on 75ha of priority habitat spread across the project farms, via a pioneering experimental programme that had the flexibility to learn lessons quickly and respond accordingly. We looked at different methods of removal, how and where they were best employed, their efficacy and costs. The knowledge gained, along with that from the scrub retreatment programme (D6), enabled us to write the best practice guide 'A Guide to Controlling Scrub on Burren Winterages and Other Areas' (Annex E9.1). This is the first time comprehensive, evidence-based information for controlling scrub in the Burren has been available to farmers and conservationists alike and it should go a long way in assisting the protection of the threatened priority habitats into the future.

The main approaches to scrub control were:

- Removing early encroaching scrub from, or killing *in situ* on, areas of priority habitat.
- Removing scrub to improve access by opening paths through areas of denser scrub to increase cattle movement within sites and improve grazing levels while also facilitating herding. Also managing encroachment on some existing paths.

Areas Removed:
Scrub control work was carried out on 19 of the 20 LIFE farms, scrub not being an issue on the SAC land of the omitted farm. Most of the work was carried out during two periods of intense activity (Jan - April 2006 and January - March 2007) but control, mainly in the form of wiping, continued until mid-July 2009. In total, scrub was removed from 99.03ha of orchid-rich grassland/limestone pavement/limestone heath mosaics and 54.26km of paths were opened or managed which is in excess of the 75 ha and 15km proposed in the amended application (following modification request). This excess was due to difficulties in estimating the amount of scrub removed due to the patchy nature of distribution and spread of removal areas across various parts of the project farms. The actual area only became known once the rather time-intensive activity of mapping removal on the ground using GPS and then digitising the data to create maps was completed. The breakdown of scrub removed per farm is shown in Annex C3.1 section 1.

Methods:
Control methods tested included: cutting with chainsaws, strimmers, tractor-mounted brush-cutter, topper, pulling and wiping with a glyphosate-based herbicide. The activities carried out and lessons learned have been incorporated into BurrenLIFE Best Practice Guide 5 'A Guide to Controlling Scrub on Burren Winterages and Other Areas' (Annex E9.1). This includes details of the suitability of the methods for different situations, how to carry out the work, advantages and disadvantages, controlling regrowth and required permissions.

The work was carried out by both the farmer and contractors on 11 of the farms whilst all of the

work was contracted out on six farms. Only two farms did the work without outside (non-family) assistance. The contractors were drawn from the 'Register of Workers'(D7) and employed by the farmer with payments being made using the same system as that outlined under C2 'other activities'.

The nature of the work programme meant that it was not possible to calculate the efficacy of the different methods. Instead, the data are presented as an amalgamation of that for the individual methods and the subsequent retreatment programme (reported in D6).

Overall Costs:
Initially, BurrenLIFE paid the full cost of scrub control but after the first year farmers were asked to contribute 20% as a way of getting them to take greater responsibility for the scrub control works on their land. The contribution could be as work done or monetary. The daily rates for scrub removal work were based on figures obtained from Teagasc and the Farm Relief Service and as such, reflected the market rate for the work. A total of €206,695.58 was spent on removing encroaching scrub which is made up of the BurrenLIFE spend of €179,489.77 and €27,324.61 contributed by the farmers. The BurrenLIFE spend is €37,666.77 above the estimated cost for external assistance that was budgeted for the Action (€141,823) but this more than covered by the under-spend on retreatment (D6). The average spend per farm was ~ €8,550 (range €0-20,870). The breakdown of the costs and BurrenLIFE spend per farm are shown in Annex C3.1 section 2.

Indicative costs for Scrub Control:
Indicative costs and time taken were calculated for the different removal/control methods using a combination of: the time sheets used to invoice for payment, the area from which scrub was removed (calculated by mapping each individual area using GPS and GIS), estimated scrub cover and field notes. The overall cost of scrub removal based on total area cut over and total spend (BurrenLIFE + farmer contribution) was €2085 per ha, which is in keeping with estimates in the original application (Tier 2 @ €1000/ha, Tier 3 @ €6000/ha, average €3500/ha[3]). However, as this is based on the total area cut over it does not recognise the variation in cost resulting from different levels of scrub cover or the different methods. In order to obtain figures that can be applied to any site, irrespective of the level of scrub cover, indicative costs have been calculated for each method on the basis of the actual area of scrub cut and are expressed as cost/ha of scrub rather than per ha of land (i.e. equivalent to 100% scrub cover which is not the case in reality). Indicative time requirements to carry out the work have been calculated in the same way and are expressed as the area of scrub controlled/man day. The derived costs for each method are shown in the following table (further base data showing how these figures were calculated is provided in Annex C3.2).

	Chainsaw	**Wiping**	**Brushcutter/Topper**	**Pulling**
Indicative Cost/ha of Scrub	€13,200 to €15,800	€5,700 to €8,050	€4,700 to €5,200	€5,500 to €6,700
*Indicative area (sq. m) of scrub per man day**	120 to 125	250 to 260	720 to 745	510 to 520

* 8 hour day with 1 hour break.

This cost and time data will be used to develop a 'scrub calculator' for the new Burren Farming for Conservation Scheme which will allow individual elements of future scrub control to be costed prior to starting work e.g. 1ha with 10% scrub cover will cost c.€470 - 520 to clear using a brushcutter/topper or c.€1,320 – 1.580 using chainsaws. 1ha with 30% scrub cover will cost c.€1,410 - 1,560 using a brushcutter/topper or c.€3960 - €4740 using chainsaws.

[3] NB. These figures are for total area from which scrub removed NOT total area of scrub removed.

Individual maps showing scrub removal areas on each farm can be found in Annex C3.3.

Comments:
This Action has successfully delivered the majority of the expected results. However, a number of difficulties were experienced in its execution:

1. Harvesting of scrub saplings: The combination of few farmers willing to try this, the difficulty of pulling saplings over one-year old and the difficulty of spotting young seedlings hidden in the sward, compromised its viability as a control method. Instead, wiping the saplings once large enough (approx 30cm) was seen as a more practical approach and this replaced harvesting on most farms.
2. Baseline sapling counts for 100ha of priority habitat: On reflection the validity of this activity was questionable so it was modified in such a manner as to provide data that would be of greater use in determining the behaviour of hazel seedlings in grazed situations. The resultant 'hazel seedling monitoring' programme is reported under F4.
3. Delay in completing the scrub removal programme: The original proposition was that the scrub removal programme would be completed by September 2006. In reality the bulk of the work was completed by the later date of March 2007 although some work continued until July 2009. The following contributed to the delay:
    a. The need for experimentation, including the flexibility to refine the different methods e.g. to fully evaluate the potential of the herbicide wiping technique.
    b. The maximisation of the amount of scrub controlled following confirmation of the potential of the wiping method once it was shown to be so effective.
    c. The unforeseen difficulty of a lack of skilled people to carry out scrub removal work. This was overcome by setting up a register of workers (D.7) and through discussion with a local training agency on the instigation of a number of chainsaw training courses which increased the skill base.
    d. The complexity of regulations. Scrub removal is a highly regulated area, often governed by out-dated legislation. The need for derogations prior to carrying out certain types of work further slowed the delivery of this Action, although the situation improved as lessons were learned by both the applicants and the permission granting bodies.

Technical modification in the Proposed Area of Scrub Removal and Reduction in Costs:
The proposal in the original application was to remove scrub from 175ha of priority habitat as follows: Tier 1 - harvesting of scrub saplings from 100ha, Tier 2 – encroaching scrub from 50ha and Tier 3 – bands of dense scrub from 25ha. However, in light of experience, the possibility of a technical modification reducing the area and cost was mooted in Progress Report 2 and approved in a letter from DG Environment dated 19 Feb 2007. This was realised in the modified application which revised the expected control/removal work to 75ha and at least 15km of access paths and reduced the overall cost from €234,302 to €153,448.

In the end, the revised area targets were exceeded substantially as reported under 'areas removed' but at approximately 100ha, the total area from which scrub was removed was still 75ha less than the original target. As the scrub removed consisted of both encroaching (Tier 2) and dense (Tier 3) we exceeded the original target for these by 25ha. The deficit was created by the decision to drop the sapling harvesting once it became evident that it was not a viable proposition.

The results of the work carried out under this Action demonstrate that the reduction in the target area did not affect the expected results in terms of acquiring the knowledge and data that form the basis of the best practice guide or the derivation of costs for scrub removal. Nor did it have a significant effect on the benefits accrued in terms of the conservation status of the priority habitats, as the area of the most damaging phase of scrub encroachment that was removed was 25ha higher than originally planned. Information gained from the ecological monitoring programme supports

this as the study on the population dynamics of hazel seedlings (F.4) indicates that proper grazing management will restrict their growth and they can be controlled by wiping if they reach the minimum target size.

ACTION C.4: Implement new grazing regimes on priority habitats through stock redeployment on a site-by-site basis

The Burren is a pastoral landscape which relies on grazing to maintain the conservation status of its priority habitats. The objective of this Action was to match grazing levels on project sites to the natural carrying capacity of the site in question. In some cases this required a reduction in grazing, in others an increase. A summary report on this Action is contained in Annex C4.1.

The BLP achieved significant success under this Action with minimal cost. This was done by convincing project farmers of the economic, agricultural and environmental benefits of sustainable grazing regimes as identified through the BLP monitoring programme (F4, 5 & 6). The BLP also provided farmers with the infrastructure (C2, C3), technology (D1, D2) and in some cases the moral support required to realise this change. The BLP secured derogations from the DAFF to ease grazing restrictions on project farms so the winter grazing season was extended by one month to include September and late, light summer grazing (including grazing with sheep) was permitted on designated areas, neither of which were permissible under REPS. This Action was carried out by the project team in conjunction with Dr James Moran of Teagasc.

This Action also succeeded in generating some vitally important information on target stocking rates for various types of Burren winterages. This information was generated in a number of ways. First, through farmer liaison (A2) from which information on traditional stocking levels was recorded when available. Second, data generated through forage analyses (D1) was used to predict the agricultural productivity of a winterage and once this was related to the average intake of a grazing cow, it provided an estimate of the carrying capacity of the management unit. Third, all project farmers recorded actual grazing and feeding levels on their winterages over three to four grazing seasons. The actual grazing level per management unit was calculated using the latter data and this information, combined with a visual assessment by the project team of the site condition, was used to refine the proposed stocking regime for the following year. By a process of iteration over 3-4 grazing seasons, accurate grazing levels were determined. The information generated through these various approaches was highly consistent and the information can now be applied more widely across the Burren to better inform grazing levels on winterage areas.

An innovative approach was adopted in the collection of grazing data. This involved devising a system of 'Grazing Days' which offers greater flexibility for the farmer in attaining optimal grazing levels than the traditional method of stocking rates. One GD = 1LU for one day. By listing a number of GDs for a field, the farmer just had to divide this number by the number of livestock units available to graze that field in order to determine the optimal number of *days* required to graze the field well.

The overall impact of Action C4 over the 3-4 grazing seasons was very significant and included:

- An increase of 25.2% in overall grazing levels (GDs) on winterages
- A 40% reduction (by 856.4ha) in the amount of land classed as undergrazed and a 31.9% increase (by 677.2ha) in the amount of land classed as well-grazed
- 67.4% (by area) of all Management units from which information was recorded (n=73) had grazing levels within 20% of target levels by the end of the project
- Accurate information on winter stocking levels for weak (0.14LU/ha), middling (0.28LU/ha) and strong (0.56LU/ha) winterages was generated.

The impact of improvements in grazing levels on priority habitats is also discussed under Action F4. The data generated was used to inform the BurrenLIFE Best Practice Guide No 5 'Sustainable

Grazing of Burren Winterages' (E9) and will be critical in the delivery of the new BurrenLIFE Farming for Conservation Programme (C7).

Though this Action was very successful, some problems persist with excessive grazing (resulting from over-feeding) on some management units while some others remain undergrazed, usually where the farmer is pre-occupied with off-farm activities. Annual fluctuations in stocking levels due to external factors such as weather, drought, disease and markets continue to present challenges, as do the poor market returns and high labour costs involved.

The implications of improved grazing levels are many. Better utilization of winterages by grazing at maximum carrying capacity reduces animal feed costs for the farmer and maintains optimal agricultural and ecological conditions. Information generated on target grazing levels for different winterage types is invaluable in determining optimal grazing systems across the Burren.

ACTION C.5: Introduce new supplementary feeding systems

The purpose of this Action was to implement new concentrate-based feeding regimes on the project farms and to persuade farmers to reduce both their silage feeding and silage production levels.

In recent decades farmers have supplemented the diet of their outwintering livestock with silage. Although this provides the additional nutrients required by outwintered suckler cows it creates problems, namely undergrazing as the stock remain near the feeder and stop foraging more widely, leading to localised 'point-source' pollution. These have negative impacts on both priority grassland and wetland habitats. Recognising that a level of supplementary feeding is required in the dominant suckler cow system, the BLP and Project Partner Teagasc set out to develop a new concentrated feed ration tailored to the needs of in-calf suckler cows on Burren winterages (reported under Action D2).

The resultant feed (D2) supplies the required minerals and nutrients without the bulk roughage and thus encourages the livestock to forage more in order to assimilate the required roughage. The added benefit is that this approach reduces feed-point damage and reduces the risk of nutrient transfer to the sensitive, low nutrient wetland ecosystems (F4).

The introduction of the new supplementary feeding systems and the related Actions (D1, D2, D3) were a major success. The new systems were successfully piloted by project farmers (D3) with significant positive economic, agricultural and environmental benefits. As the above Actions are so closely related they have been combined in to a single, more detailed report which is provided in Annex C5.1.

The BLP concentrate-ration was fed on 17 of the project farms although the extent of its use has varied. Three farms did not to use it for valid reasons: two were dry stock farms (beef steers) on which there was no supplementary feeding at all and the third was a dairy farm whose cows were fed with a specialist ration designed to meet the higher nutritional requirements of the commercial dairy cow. All Organic farmers used the BLP feed until restrictions on using non-organic feed were tightened in 2008.

The impact of this Action was very significant. Over 400,000kgs of ration were subsidised over the course of the project, most of which (c.330,000 kg) was BLP ration. This was a 171% increase in ration-feeding compared with pre-BLP figures for roughly the same number of stock (c. 484 cows per winter) and over a somewhat extended feeding season (longer by 15.9%). This new system clearly displaced silage and hay based systems: the amount of silage fed annually was reduced by an average of 61.3% (by 655,695kg) while the amount of hay fed fell by 35.6% (by 26,377kg). This enormous amount of bulk fodder (almost 700 tonnes) was sourced instead from winterage grasslands every winter via the natural grazing process resulting in significantly higher grazing levels and in most cases enhanced levels of biodiversity.

As a result of this Action the farmer saved on the production costs (contractors and fertiliser required for silage production), machinery costs, and had more summer grazing land available.

Alternatively, in some cases the farmer was able to sell excess silage. Feeding ration instead of silage also ensured less feed site damage and ensured farmers would avoid penalties to their REPS and Single Farm payments. The Nutrient Export Model (F4) confirmed the potential benefits to the Burren's hydrology of a ration-based feeding system and reduction in silage feeding. In addition, on some sites with undergrazing problems, targeted use of the BLP ration was useful in encouraging grazing of unpalatable vegetation.

Farmer's opinions on the new feeding system were monitored and the response was very positive (Annex D3.2). Feeding costs were reduced by an estimated c.40%, and though there was an increase in time involved in feeding for some, farmers found that the new feeding system was easier to implement. Farmers noted that cows tended to forage more with this ration compared with silage feeding where cows waited around for more silage to be delivered. Animal health, condition and calving intervals were maintained or improved. Less time and machinery was required for feeding. A significant number of farmers found that feeding the ration directly on the ground worked well as it cut out the need for troughs, allowing feeding locations to vary. Although it has not been quantified, the project team are aware that the concentrate feed system has been adopted by a number of farmers outside of the project farms as a result of the information provided through the demonstration events (E5) and the positive experience of the LIFE farmers.

In terms of budget spend, Action C5 focussed primarily on the provision of feeding infrastructure: €2,906 was spent across 11 farms on the purchase of:

- 8 vermin-proof feed bins (50% funded) to store BLP ration close to feeding sites on Burren winterages
- 26 feeding troughs (50% funded) to distribute feed to livestock

This equates to an underspend on the allocated durable goods budget of €9,594 and is due to the fact that many farmers already had sufficient troughs and chose to store the feed on the home farm rather than the winterage thus dispensing with the need for the feed bins. This Action was carried out by the project team in conjunction with Dr James Moran of Teagasc.

Overall, this Action was very successful. Other High Nature Value areas have expressed an interest in the outcomes with regard to addressing issues of undergrazing in their areas. Lessons learned from this Action have been incorporated into a BurrenLIFE Best Practice Guide No 4 'A Guide to Feeding livestock on Burren Winterages' (E9).

ACTION C.6: Conduct study on potential for developing new markets for Burren produce & market 'conservation grade' Burren beef & lamb

The Burren has a long-standing reputation for producing quality food. This has been documented in historical references over 700 years and while the Burren continues to produce quality livestock, very little beef is finished in the Burren today and much of the lamb is exported. This means that few Burren farmers fully realise the potential of their distinctive, quality produce and the consumer has limited opportunities to purchase or consume locally-sourced Burren meat.

Initially this Action set out to assess the feasibility of developing new markets for Burren meat by commissioning a Feasibility study. The study was completed in August 2006 by Insight and Blue Sky Consulting following a detailed consultation and research process including a stakeholders workshop (a copy of the report is included in Annex C6.1). It painted a very positive picture with regard to the feasibility of a small, gradually expanding local producers group for the Burren. Arising from this, the Action progressed when a small group of local enthusiasts undertook training supported by the local Leader Company and established the Burren Beef and Lamb Producers Group (BBLPG) in March 2007. This group was chaired by a local farmer.

Approval was given for a new project Action involving the employment of co-ordinator for a period of 6 months (acceptance of this technical change was signalled in a letter from DG Environment

dated 11 June 2008 in which it was allocated to Action D7; it was reallocated to C6 in the modified application as it relates to a new phase of development under this Action). A co-ordinator, Joanne Brannigan, was appointed in August 2008. Her role was to help with the development of producer protocols, a code of practice and pledge as well as the co-ordination of lamb and beef production, administration, media work and liaison with potential support agencies and organisations. This activity should have resulted in the provision of a technical report detailing the activities of the BBLPG but unfortunately this has not been received. As a result the cost of this activity is ineligible for support and has been excluded from the BLP financial report.

The BBLPG has achieved a great deal since its inception. Officially launched by Mr. Trevor Sargent TD, the Minister for Food & Horticulture, in September 2007 the BBLPG sold produce at several farmers markets as well as supplying several major events including the BLP Conference, the BLP final seminar and Farmfest 2008. It has also supplied a number of local high-end restaurants and hotels and sold directly to the wider public via box-sets. The public response has been excellent and the BBLPG won a National taste award for its meat in 2009.

Operationally, the support of a local, organically certified, abattoir was critically important in minimising food miles and ensuring prompt delivery of fresh produce to customers. The group generated wide media exposure in national newspapers, on national radio and television. Members of the group met on a monthly basis and visited other farm groups in other areas. Farmer members ran the BBLPG's market stands during which time they also helped promote and explain the work of the BurrenLIFE project.

However, despite the success the group has struggled to survive and it is a testament to the determination of those involved that they still do. The lack of external support, particularly from likely sources such as the Leader programme which has been inactive for much the Group's existence, was keenly felt. Logistical difficulties such as the need for refrigerated transport and display units were further problems. The lack of a full-time co-ordinator (other than for the short period when this position was funded by BLP) meant that increasing customer demand and reaching new markets was difficult to achieve. The group continues today but its operation has become even more challenging with the recession and with recent flooding which has put the local abattoir temporarily out of business. In addition, the long term sustainability of the initiative in its current form remains uncertain particularly in terms of the return on the time and energy input and its overall contribution to the viability of the farms involved.

The expenditure on this Action was €25,000 less than the provisional budget of €45,000 for external assistance as €20,000 was spent on the original feasibility study but the €25,000 allocated for the co-ordinator for the BBLPG has not been included in the Financial Report.

The Action has been successful in that the BBLPG created high levels of public support and media interest both in its produce and in farming for conservation, thus introducing the BLP to audiences it would not otherwise have reached. This achievement would not have been possible without the commitment of the BBLPG members and the support of the BLP's Finance and Operations officer who gave a great deal of time and energy in a voluntary capacity. It has also proved very useful in terms of information generated and experience gained. While the long term future of the group is uncertain the members can be proud of their achievements.

ACTION C.7: Revision of existing agri-environment schemes

This Action was intended to integrate the findings of the BLP into a revision of the Burren Measures contained in the National agri-environmental scheme known as REPS as well as the National Parks and Wildlife Service Farm Plan Scheme. However, the BLP has exceeded all expectations in this regard in that a totally new scheme, built upon the findings of the BLP and funded by the Dept of Agriculture and Food (DAFF) and the NPWS, has been developed (see below).

In late 2005 the BLP made a written submission to the DAFF regarding the new REPS 4 Scheme and how it might apply in the Burren. Following this initial submission the BLP were contacted by the DAFF and asked to revise the wording of the Burren Agreement. This new wording was revised in April 2007 and adopted fully in the REPS 4 programme when it was launched in late 2007. All Burren farmers in REPS 4 (an estimated 220 in north Clare, (DAFF *pers. comm.*) will be subject to this new set of conditions (Annex C7.1). While these new conditions should help improve the management of priority habitats in the Burren, they are unlikely to fully meet the needs of these habitats as REPS is not suitably structured to achieve the high level of management required.

Recognising the multi-dimensional nature of the BLP and the significant potential benefits generated in terms of food production, tourism and conservation, the BLP answered a call for applications to the National Rural Development Programme in June 2008 and made a comprehensive application for funding (Annex C7.2). This application was compiled by the Project team in conjunction with two consultants appointed with funding from the NPWS. Unfortunately this pioneering application, which had the strong support of the local community, failed. Among the reasons were the sense that it was too agricultural in nature (its basis being farming for conservation) and that it went against the principle of 'cohesion' which sought to amalgamate existing rural groups rather than creating new ones.

In 2009, the BLP made an application for funding to the Dept of Agriculture, Fisheries and Food for funding under the unspent Single Payment Scheme funds. On July 8th, 2009, the Minister for Agriculture announced an allocation of '€1 million each year for three years to support high environmental value farming, with tourism spin-off, in the Burren, continuing and mainstreaming the pilot scheme operated by the Dept of the Environment Heritage and Local Government'. Following notification of this to the EC (Annex C7.3), the BLP team drafted a proposal for a scheme (Annex C7.4). This Draft has been discussed with the project sponsors, partners and others including the Project Steering Committee and Dept of Agriculture Officials. As a result, a new programme, called the Burren Farming for Conservation Programme, has been developed and will begin in April 2010. This will be the first evidence-based, locally tailored, agri-environmental Programme in Ireland.

Coinciding with the July 2009 announcement for the Burren 'After-LIFE' programme the National REPS was closed to new applicants. A new National scheme is to be launched in 2010 and again BLP have made a submission (Annex C7.5). The closure of REPS will have a profound impact on Burren farmers and their incomes, and this emphasises the need for a new, more targeted scheme such as BurrenLIFE, to support the important role of farmers in the region. The NPWS Farm Plan scheme remains open but no Burren farmers currently participate. The NPWS have undertaken to include recommendations from the BLP for any Burren farmers entering their scheme.

In addition to the above Actions, farm advisors (Teagasc and others) in the Burren as well as REPS participants were briefed on the findings of the BLP through REPS courses, demonstration events and through the final workshop of the project. The Project Manager had the honour of addressing participants at the National REPS Conference in 2005 and 2009.

Overall, this Action has been a great success and, as hoped for in the original application, the BLP have ensured that 'lessons learned through this project are spatially and temporally extended, and form the basis for a new model of sustainable, multifunctional agriculture for the region'.

D. Recurring management

D Actions: Summary of Achievements against Targets

(project milestone indicated **MS**, target end date in italics if later than **MS** date)

Action Code	Activity	Implementation Period	Completion Date	Comments
D1	Profiling of agricultural capacity of Burren grasslands (**D**)	Dec 05 – Aug 09	31 Aug 2009 *(31 May 07)*	**Action complete**. Longer sampling period plus delay in obtaining analyses results from laboratory which resulted in a delay in analysing full dataset.
D2	Formulation of supplementary feed (**D**)	Mar 05 - Dec 09	31 Aug 2009 *(31 Dec 09)*	**Action Complete.** Annual review allowed coarse ingredients to be adjusted according to availability whilst adhering to nutritional formula.
D3	Distribution of concentrate feed	Dec 05 – Jan 10	31 Jan 2010 *(31 Jan 10)*[1]	**Action complete.** Extended to 2010 in modification request.
D4	Advisory, compliance & information sharing visits (**D**)	Oct 05 - Jun 09	30 Jun 2009 *(30 Jun 2009)*	**Action complete.**
D5	Repair livestock management facilities	Jul 06 – Aug 09	9 Aug 2009 *(31 Dec 2009)*	**Action complete**. Repair work carried out on all 20 project farms. Activities under this Action difficult to separate from C2.
D6	Scrub retreatment & control assessments	Jun 06 – Aug 09	9 Aug 2009 *30 Aug 2009)*	**Action largely complete.** Completed on 14 of the 19 farms where scrub removed, partially on 3 and little or no action on 2. The failure to complete was the result of farmer inactivity – all were provided with the option and encouraged to comply.
D7 D7 **MS**	Burren agri-environmental co-operative Launch of agri-env Co-op	Oct 05 – Aug 09 1 Mar 07	30 Aug 2009 *(Sept 2009)* 15 Dec 2006	**Action complete**. Focus of Action changed from resource sharing to information sharing & launch of 'Register of Workers'.
D8	Annual payment to Burren farmers	Dec 05 – Jan 10	31st Jan 2010[2] *(31 Jan 2010)*	**Action Complete.** Delay due to late submission of claim forms by some farmers.

D – see table of deliverable products in Executive Summary (p.8)

[1] error -tick missing from revised calendar (form 2004-22)

[2] Error – D8 missing from revised calendar (form 2004-22)

Action D.1: Profiling of Agricultural Capacity of Burren Grasslands

This Action aimed to provide the project team and Burren farmers with more information on the nutritional value of Burren winterages so that a more informed approach to the agricultural management of these grasslands could be adopted. For the Burren farmer this information is important in determining how and when to graze these areas with maximum benefit for stock and land, while also improving awareness of potential mineral deficiencies and resultant animal health problems. For the BLP team this was particularly important to aid in the development of a targeted feeding regime for livestock on these grasslands.

Under this Action, which was coordinated and funded by Teagasc,

- 738 forage samples[4] were taken from 50 sites on 14 project farms. Samples were taken every second month during winter and late summer (i.e. the main grazing periods) from Dec. 2005 to August 2008. Roughly 500g of vegetation was harvested each time from the sites which

[4] Proposed reduction in number of samples & increased cost from original application approved in letter from D.G. Environment dated 19 Feb 2007.

represented five broad vegetation types.

- 50 samples of silage and hay were taken from 14 project farms to determine the feeding quality of these sources relative to that of the BLP feed and the grassland forage.
- Vascular plant species were recorded from 50 2 x 2 m quadrats at each sampling site and their cover estimated. These data were used to assign each sampling location into one of six main habitat types and subsequently into two main groups – strong and weak winterages.

The forage samples were analysed for ash, Nitrogen, crude protein, oven dry matter, acid detergent fibre and neutral detergent fibre at the Agri-Food and Biosciences Institute in Northern Ireland. Results showed that forage quality varies over the winter period and between winterage types, ranging in quality from that equivalent to good quality hay (October to December) to poor quality hay or straw (January to April). Results from analysis of actual hay and silage samples showed that there was high variability in silage and hay quality within and between project farms but the quality was generally sufficient for the maintenance of dry suckler cows.

Trace mineral analysis of the forage was carried out at the Macaulay Institute, Scotland, on samples collected in December 2006 and 2007 using inductively coupled plasma-mass spectroscopy (ICP-MS) to determine elemental concentrations (Cu, Mn, Mo, Se, Zn, Ca, K, Mg, and P). This showed that all winterages have low levels of copper and magnesium, while the less productive winterages are also below normal levels in selenium and zinc (important for animal fertility and immunity).

The data generated from the forage and fodder sampling as well as the vegetation analysis and findings from the agricultural monitoring programme (animal conditions etc) were assimilated into a report on 'Forage quality of semi-natural calcareous grasslands and heaths of the Burren' compiled by Dr. James Moran of Teagasc (Annex D1.1). This paper marries the agricultural and economic perspective on the grasslands and heaths of the Burren and shows that these grasslands can in fact continue to have a place in modern farm systems if appropriate grazing and feeding regimes are employed by the farm managers. This is a very important finding for the future of the priority habitats of the Burren and indeed for the future of farming for conservation in the region.

This Action was very successful in achieving its objectives and in 'reinvesting these habitats with a contemporary agricultural relevance' as originally envisaged.

Action D.2: Formulation of appropriate supplementary feedstuff rations

The intention of this Action was to ensure that appropriate feedstuffs were introduced onto the project farms to help displace the predominant but damaging silage-based feeding systems. It built on the information generated under Action D1 and resulted in the development of a concentrated feedstuff specifically designed to meet the mineral and nutritional requirements of outwintering suckler cows (the dominant livestock type) on the Burren whilst also addressing other important agricultural, environmental and socio-economic considerations. This Action was fundamental to the delivery of C5 'Introduce new supplementary feeding systems'.

The specifications for the BurrenLIFE ration were initially developed by Teagasc based on early results from forage data analysis (D1), discussions with farmers and with the Technical Advisory Group (F1). A Teagasc livestock nutritionalist used this information, in combination with information on the known nutritional requirements of the in-calf suckler cow, to produce an initial formula for the BurrenLIFE ration. The formula was then milled by Kerry Foods Plc using GM-free, largely Irish-sourced ingredients, mainly barley and rapeseed meal. This ensured a minimal ecological footprint, while the GM free status was an important principle for a number of the farmers involved and for members of the broader public. For further information on the development of the feed, see report in Annex C5.1.

The new concentrate ration was distributed to nine Burren farms (D3) in the winter of 2005/6. Farm managers were questioned about their feeding systems and in particular, about the BLP ration, following the first feeding season and stock were assessed over the winter grazing period using a

system of 'condition scoring' (F5). Based on this information, and that from ongoing forage sampling, the formula of the ration was adjusted by the Teagasc nutritionalist in 2006 and the new ration was distributed to the project farms for the winter of 2006/7.

This process of survey, livestock assessment and ongoing forage analysis was repeated in 2007 and 2008 and the final BLP ration was adjusted in accordance with the data obtained (e.g. increased protein levels) and other factors such as the availability of certain ingredients (Table D2.1). The final version of the formula has been tried and tested in the field and the animal response has been excellent, leading to a high level of popularity among project farmers.

Table D2.1. Final formula for the BLP concentrate ration

Ingredients	%	Minerals		Unit
Barley (all Irish)	69	Magnesium	1.5085	%
Rape Seed (Europe)	20	Bio.Copper	35	ppm
Sugar Cane Molasses	6.5	Copper	171.47	ppm
Magnesium Oxide	2	Selenium	2.25	ppm
Sodium Chloride	1	Zinc	263.962	ppm
Kerry Dry Cow Supplement (minerals)	1	Bio Zinc	50	ppm
Palm Oil 26/8/02	0.5	Vit A	15000	i.u./kg
	100	Vit D3	6000	i.u./kg
		Vit E	250	i.u./kg

ppm – parts per million i.u./kg – international units per kilogramme

<u>Action D.3</u>: Purchase and distribution of concentrate feedstuff to farmers

The purpose of this measure was to support and encourage the project farmers to adopt the new concentrate-based feeding system. It focussed on the ordering, distribution and subsidisation of the BurrenLIFE ration developed through Actions D1 and D2. More details on this Action are provided in the 'feed' report contained in Annex C5.1

Dr. James Moran from the BLP liaised with a number of mills in 2005 regarding the production of the BLP ration. Eventually the decision was made to go with Kerry Foods Plc as their rates were competitive, they could source the required GM-free Irish ingredients and they had a number of local distribution outlets. Subsequently, Dr. Moran liaised with Kerry Foods annually before the winter season with regard to the availability of suitable ingredients for the revised formula. He also made sure that this ration was milled in sufficient quantities and was made available through the local outlets at Ennistymon and Corofin on the southern edge of the Burren. The ration was provided either in 25kg paper bags or loose in bulk. It could be delivered or collected by the farmer.

Prior to each winter grazing season, an information note (Annex D3.1) was sent to project farmers regarding the feeding of livestock on winterages. This sheet outlined the composition of the BLP ration, the recommended feeding periods and quantities, the cost of the ration for that year and the procedure involved in securing suitable feedstuffs. The note also included advice on mineral feeding and on feeding options within an organic system. It also spelt out the levels of subsidy available through the BurrenLIFE project. The BLP ration was subsidised at a rate of 25% subject to invoices being produced by the farmer. While the BLP ration tended to be more expensive due to its GM-free, Irish based composition, the subsidy made its price very competitive while not overly attractive, so the level of subsidy was found to work very well.

Non-BLP ration was also subsidised for organic farmers and for dairy and drystock farmers as these farmers were not in a position to utilise the BLP ration which was non-organic and targeted at suckler cows, particularly in terms of its mineral content. Mineral licks were also subsidised – these were used mainly in early winter months when sufficient nutrients were available to grazing animals but minerals were lacking.

The amount of feed used varied widely between farmers. In order to disincentivise any excessive

use of ration, upper limits were placed on the amount of feed eligible for subsidy. This limit was based on stock numbers fed at a max rate of 2.5kg of ration per head per day. Members of the BBLPG were also allowed to claim the subsidy for the BLP ration as a way of broadening the use of the ration and the ethos of the BLP but this option was only taken up by one member.

€33,121 was spent by the BLP on this Action. The total spend (i.e. 25% from BLP plus 75% paid by farmer) on concentrate feeding was €132,484 (Annex D3.3). The total amount of feed distributed was c.402,000 kg over five winters (including 2009/10), an estimated 329,804 kg of which were the BLP ration. Feed was distributed to 17 project farmers (plus one farmer from the BBLPG). The maximum amount of subsidy paid was €6,105 to one farmer who was able to cease silage feeding on her farm. The smallest amount paid was €25 – to a farmer who does not normally feed his stock. The cost of the feed varied from €216/tonne (2005/6) to €320/tonne (2007/8).

A survey of farmer's attitudes (Annex D3.2) found a high level of satisfaction with the feed and its subsidised cost.

This Action has worked very well and has resulted in a major increase in ration-based feeding systems at the expense of silage based systems (Annex C5.1). By the end of the project it was notable that a number of other farmers were beginning to use the BLP ration or an alternative ration-based system, again a very positive result.

Action D.4: Advisory, Compliance, Assessment and Information sharing visits

This Action entailed liaising with project site managers and visiting project sites to assess work done thereon and to record information on the site condition.

A lot of liaison work took place with farm managers and their families in the development of the farm plans (A4) and in the subsequent planning, delivery and assessment of works over the five years of the project. The project manager met one-to-one with all farmers in early summer every year to review the previous winter with regard to grazing and feeding data (C4, C5) and to plan works for the season ahead. Group meetings of the project farmers also took place once or twice a year. This included one very successful larger meeting (May 2008) which was also attended by family members e.g. spouses, children etc. All project team members liaised frequently with the farmers as part of their duties and excellent relationships developed, and still exist, between the project farmers and the project team.

Site assessments by the project manager took place at least once a year, in early summer, to assess grazing levels and site condition. Information from over 70 management units (fields) was recorded on a standard Grazing Assessment sheet (Annex C4.1c). This was then combined with other information from the one-to-one meetings including stock record sheets (Annex C4.1b), feed recording sheets (Annex C5.1a) and herd health surveys (F4). From this, sheets were compiled for each farm for each year and integrated into the farm plan (A4). These sheets were very useful for recording information and for forward planning on these farms. Monitoring Data were also circulated back to farmers through one to one meetings and Data Summary sheets were made available to all farmers (Annex D4.1). There was particular interest from farmers in information on animal health (condition scoring and blood sampling), fodder and forage quality.

In reality there were many more farm visits during the year to assess planned works with the farm manager, to supervise contractors, to certify works completed prior to payment etc. The project scientist (Dr Parr) and agricultural specialist (Dr. Moran) were frequent visitors to the farms as part of their work collecting data and helping the farmer with the planning of work.

This Action was highly successful in meeting its objectives. The impact of this Action was the effective delivery of the work programmes on project farms, the generation of very useful data on site management and its impact and the development of a very positive and constructive relationship with the project farmers. This is confirmed by a short (26 question) multiple-choice survey conducted with BLP farmers before and after the project (report in Annex D4.2, results in

Annex D4.3).

This survey showed that farmers were very positive about the Burren and the importance of their role in its protection, and that they felt that the BLP offered a good way forward and gave them renewed confidence in the future. Respondents displayed a very strong sense of responsibility towards the Burren, with all farmers admitting that they could do more and than they were obliged to do so. There was a very positive attitude to the future, with most farmers confident that they could continue to survive in the Burren. This is of enormous importance to the future of farming for conservation as it shows that given the right support, these farmers will continue their role as custodians of the Burren.

Action D.5: Review and repair livestock management facilities

The aim of this Action was to follow-up on the works done under Action C2 in acknowledgement of the ongoing maintenance requirements of farm infrastructure. Over the duration of the project, however, the project team found that work done on stone wall repair, water and access provision required minimal subsequent intervention (other than passing attention by the farmer), unlike work under Actions C3/D6 (scrub control) which needs to be maintained at a significant level.

This is a very positive affirmation of the long-term value of investing in conservation infrastructure and in particular of the professional repair of stone walls which will last well if done properly. Small scale wall repair and cleaning out of watering points was done by farmers at no cost to the project and it is hoped that this will continue beyond the project lifetime.

Spend under this Action was difficult to separate from that on C2 as work on these two Actions were often carried out in tandem. Overall, the spend was limited to a small number of works, in particular the repair of walls on a small section of the Burren National Park. For more details see report in Annex C2.1.

Action D.6: Repeated Scrub Control Assessments and Re-Treatments

The purpose of this Action was to assess the efficacy of the original scrub control methods and to carry out retreatments where needed. No programme of scrub control is likely to be 100% effective so retreatment is an essential part of scrub control. As for C3 (scrub removal), little information existed regarding retreatment requirements or costs when trying to control hazel-dominated scrub so the work carried out under this Action was ground-breaking.

Methods for Controlling Regrowth: Three main approaches were used to control regrowth: stump treatment using glyphosate-based herbicides at the time of cutting, treatment of regrowth by wiping with glyphosate and, in organic systems, the regular cutting of regrowth. The recommendations for dealing with regrowth that were developed during this Action are included in the BurrenLIFE Best Practice Guide 5 ‘A Guide to Controlling Scrub on Burren Winterages and Other Areas’ (Annex E9.1).

An opportunity arose to look at the efficacy of ‘penned’ feral goats as a means of controlling scrub regrowth. They were introduced into an 8ha pen in 2007 and have proved very good at browsing back the regrowth of both hazel and blackthorn as well as having significant impact on sections of established hazel scrub. Eventually, their intensive browsing may kill the bushes. This situation is not replicated by free-ranging feral goats who appear uninterested in hazel regrowth.

Scrub Control Assessments: In most cases, regrowth assessments were done informally each year i.e. general level and strength of regrowth was assessed but there was no collection of numeric data. Decisions as to whether to re-treat or not were based on these observations. A more detailed assessment of the efficacy of the different control methods and retreatment programmes was carried out in the final field season (2009) to give a representative sample of the approaches used. The results for the kill rates achieved by the different removal methods and their retreatment programmes are shown below:

	Kill Rate Achieved by 2009 (%)			
	Chainsaw & chemical retreatment programme	**Wiping with Glyphosate (no retreatment)**	**Brushcutter & chemical retreatment programme**	**Chainsaw & programme of re-cutting (on organic farms)**
Hazel	77.7	79.5	77.2	1
Blackthorn	88.5	90	93.9	No data

The retreatment programme has been very successful in sustaining the reduction in scrub cover achieved following the original scrub control programme (see Annex D6.1 for a photographic example). The kill rates were affected by a number of parameters that reflect the fact that the research is based on 'real' work rather than on that carried out under tightly controlled experimental conditions. As such, it provides a true reflection of the kill rates that should be attainable in future farm-level control programmes. The kill rate was relatively good when chemical treatments were used, particularly for blackthorn, but insignificant in the organic systems. The fact that the kill rate was less than 100% 2-3 years after the initial scrub removal highlights the need for programmes of repeated retreatment, the frequency of which will be determined by the relative strength of the regrowth. Hazel is particularly hard to kill and treated stumps that have appeared dead for two growing seasons have been observed to re-sprout in the third.

Implementation of Retreatment Programmes: The retreatment programmes were well implemented on 14 of the project farms, with the majority of areas being retreated at least once. Three farms carried out partial retreatments only, two because the farmers wanted to do the work themselves but were busy with off-farm employment and the third because of a temporary cessation of farming activity. Of the final two farms, one carried out exceptionally little retreatment as he too wanted to do the work himself but was limited by his demanding farming enterprise which did not facilitate his working around the added restrictions imposed by the poor weather conditions. The final one did no retreatment.

Overall Cost: As for C3, farmers were asked to pay 20% of the cost of retreatment with BurrenLIFE covering the remaining 80%. The overall cost of retreatment was €72,669.91 comprising a BurrenLIFE spend of €60,972.82 and a farmer contribution of €11,441.72. The BurrenLIFE spend is only 57% of the modified estimated cost of €128,350 (labour & material costs only) for this Action and highlights the difficulty in costing this Action accurately in the absence of any previous work on the subject.

On the 17 farms that carried out at least partial retreatment the average cost of retreatment was €3,858. When expressed as a percentage of the original removal cost, the cost of the retreatment programmes ranged from 14.8 – 139%. The farms with the highest ratio of retreatment to original removal costs were generally organic farms or farms that did not want to use herbicides for personal reasons. This reflects the need for significant annual re-cutting when chemicals are not used and has implications for the extent of scrub control that is practicable on organic farms (see Annex D6.2 for a break down of retreatment costs by Project Farm).

Retreatment costs will vary according to the original control methods which are in turn dictated by the type of scrub thus making it more difficult to accurately factor in retreatment figures when planning scrub control programmes. However, the data for the farms that did use chemicals suggests that retreatment will be approximately 30-35% of the original removal costs.

Reason for Technical Modification of Costs: The original estimated cost for this Action was €123,457 which included an input of 25days by NPWS staff over the whole of the project. In the modified application, the cost had increased to €159,042 despite the proposed reduction in area and costs under the related Action C3. The majority of this increase was to cover the increased time input of the NPWS Conservation Rangers which was raised to 26 days per annum (104 days over 4 years) in recognition of their greater role in the delivery of the Action. Despite the reductions under

C3, the estimated cost of labour and materials increased by €13,350 rather than decreasing which does not appear logical at first sight. However, the increase was in recognition of the fact that the nature of the dominant scrub species (hazel), means that multiple retreatments are needed to kill it and sustain the original reductions in scrub cover. Therefore, we were cautious in reducing the budget in case it compromised our ability to deliver the sustained decrease in scrub cover before we had obtained the data from the on-going experimental programme.

Action D.7: Development of a Burren Agri-Environmental Co-operative

The original purpose of this Action was to establish a forum whereby farmers could share needs and resources, particularly labour which was in short supply at the beginning of the project, and also fodder, grazing land and information. While this Action did not evolve along planned lines, it did manage to make a meaningful contribution to addressing some of these needs.

The most important step to meet the objectives of this Action was the establishment of a project office (F2) in the centre of the Burren sandwiched between the school and church in the small farming village of Carron. This office was used not just by the project team but also by local farmers and organisations for meetings and to get information from the project team. Information was made available at the office through notice boards (inside and out) and leaflets including project updates. The office became, and continues to act as, an important information centre and meeting point for Burren farmers and local farming and community groups.

Meetings of the Burren Farmers for Conservation Group (A2), the Burren Beef and Lamb Producers Group[5] and the Burren IFA were all held at the project office. These groups and their meetings were very important in rebuilding a sense of place, of ownership and of co-operation among Burren farmers. Ideas and opinions could be shared and professional advice could be sourced at these meetings, which is the basis of working effectively together as a community.

A key achievement under this Action was the establishment of the Burren Workers Database (Annex D7.1). Originally established as a way to address labour shortages experienced by the project in carrying out farm works, the phenomenal response resulted in the creation (and ongoing updating) of a database of just over 80 workers. Contractors used for BurrenLIFE activities were drawn from this list which was also made available through the project office to Burren farmers who needed short-term help. It was also used by other organisations such as NPWS who employed several of the workers on short term contracts to work on Public land.

Following discussions within the project team and with the PSG, it was decided not to set up a formal 'co-operative' structure. The main reason for this was that there were already so many groups – the LIFE farmers, the Farmers for Conservation Group, the Producers Group – all of which were dependent to some degree on the project team for logistical and moral support and encouragement. Creating another group and additional dependencies was not thought to be a rational, sustainable investment in time or money. Thus the aims of the co-operative continued to be addressed in an informal way through the project team and the associated 'satellite' groups.

Action D.8: Annual payment to Burren farmers for project participation

The purpose of this Action was to make some recompense for the additional demands made on a farmer's time as a result of participation in BurrenLIFE. It involved payments to both BurrenLIFE project farmers and members of the Burren Farmers for Conservation Group (A2).

A total of €68,864.51 was paid to Burren farmers for participating in the BLP, the majority being under this Action but also under Actions E4, 5, 6 and 9. A full breakdown of these payments is given in Annex D8.1.

In order for payments to be made, project farmers submitted signed annual timesheets to the project

[5] BBLPG reported under C6

office using a standardised format (Annex D8.2). These detailed time spent at project meetings and events, compiling grazing and feeding records and participating in the National Farm Survey (F6). Timesheets also included additional time spent feeding and herding livestock, discussing proposals for actions such as scrub removal and on any additional herding and handling for blood sampling, condition scoring etc. All timesheets were checked by the project Finance & Operations officer and payment was made, up to a maximum of €750 per annum (40 hours). In reality most of the project farmers contributed multiples of this amount, as did many non-project farmers.

A total of € 51,367.01 was paid to project farmers for annual participation in the BLP. Total payments to individual farmers varied from €111 to €3,176. Three farmers claimed less than €1000 each; all others were over €2,000. It is interesting that these three farmers contributed least to the project due in large part to the fact that all three were employed full-time in off -farm work. This suggests full-time off-farm employment is sometimes incompatible with farming for conservation and although significant capital work was done on these farms, the ongoing management, and hence the final product, was quite poor.

In addition, €6,088.5 was paid to project farmers to cover their participation in a number of other actions i.e. the filming of the project DVD (E4), delivering educational programmes (E4), hosting demonstration days (E5) and attending project workshops (E6).

Payments were also made to members of the BFFC group (A2) for their time and travel costs. This was again paid out based on the submission of signed timesheets at meetings (Annex D8.3). Rates were calculated based on National IFA rates. A total of €11,409 was paid to 20 different members of the BFFC Group. It is clear that a significant number of farmers did not claim for a significant number of meetings.

The overall spend of €57,455.51 on D8 is €14,935 below the estimated 'other costs' in the provisional budget. Part of this is due to some project farmers not having claimed their full allowance and the rest due to fewer than anticipated meetings of the BFFC group. The reduction in the number of proposed meetings of the BFFCG was largely down to the difficulty of finding meeting times that suited the disparate members and their personal commitments.

E. Public awareness and dissemination of results

E Actions: Summary of Achievements against Targets

(project milestone indicated **MS**, target end date in italics if later than **MS** date)

Action Code	Activity	Implementation Period	Completion Date	Comments
E1	Initiate communication with other EU projects (**D**)	Mar 05 – Jan 10	31 Jan 2010 *(31 Jan 2010)*	**Action complete.** EU contact database. updated as new contacts made.
E2 E2 **MS**	Website (**D**) Website launch	Mar 05 – Jan 10 1 Feb 06	31 Jan 2010 *(31 Jan 2010)* Oct 2005 (live)	**Action complete.** Revamped in Jan 2010 as part of after-LIFE communications strategy.
E3 E3 **MS**	Media campaign Media launch	Mar 05 – Jan 10 1 Feb 06	31 Jan 2010 *(31 Jan 2010)* Jul 05	**Action complete.** Extensive coverage in press, on radio & television. (Media launch with project launch)
E4 E4 **MS** E4 **MS**	Education programme (**D**) DVD launch Completion of HEP	Feb 05 – Jan 10 26 Jan 09 8 Aug 09	31 Jan 2010 *(31 Jan 2010)* 26 Jan 09 Aug 09	**Action complete.** 146 events in Heritage, Education Programme plus additional team activities. Farming for Conservation DVD.
E5	Demonstration farms	Jan 06 – Aug 09	19 Aug 2009 *(31 Jan 2010)*	**Action complete.** 16 demonstration events held. 4 information signs erected.
E6 E6 **MS**	Conferences, seminars & workshops (**D**)	Jul 06 – Nov 09 24-27 Feb 08	9 Nov 2009 *(31 Jan 2010)* 24-27 Feb 08	**Action complete.** 1 conference, 4 workshops & 1 final seminar.

Action Code	Activity	Implementation Period	Completion Date	Comments
	Project conference			
E7	Project reporting (**D**)	Sept 06 – Apr 10	April 2010 *(30 Apr 2010)*	**Action complete.** 5 annual reports plus 1 final report. 5 annual newsletters printed & distributed.
E8	Publications & presentations (**D**)	Aug 05 – Jan 10	31 Jan 2010 *(31 Jan 2010)*	**Action complete.** 11 formal presentations and 4 publications (1 still in press)
E9	Information sheets & promotional material (**D**)	May 05 – Jan 10	31 Jan 2010 *(31 Jan 2010)*	**Action complete.** 5 best practice guides printed. Display stands, promotional posters & project information/media packs produced.

D – see table of deliverable products in Executive Summary (p.8)

Action E.1: Initiate lines of communication with similar EU regions/Projects

The BLP team has been highly successful in forging and retaining strong links with other projects (including those funded via the LIFE-Nature programme) and organisations in Ireland, the UK and the rest of Europe. These links have been made during visits by others to the project and by visits of members of the BLP to other projects and organisations, participation in conferences and workshops and via personal introductions.

In the early stages of the project these links provided access to the information and expertise built up by other LIFE projects which was very helpful to the BLP team. In May 2005, the BLP team made a scheduled visit to the Limestone Country LIFE Project in the UK on a fact-finding mission which included visits to sites actively managed by the project as well as to several limestone sites that were being managed by English Nature (now Natural England). This visit also provided the opportunity to discuss operational issues and formulate possible solutions. The BLP Manager was invited to address the Salisbury Plain LIFE conference in August 2005 and again this provided an opportunity for exchanging experiences and ideas. In September 2006, the BLP team, members of the project steering committee and project sponsors, undertook a five day study tour of two completed LIFE projects based in the Alvar grasslands on the island of Öland in Sweden as well as visiting other HNV areas and cultural sites on the island. This was particularly useful in terms of examining approaches to scrub removal and subsidisation of such activities, monitoring methodologies and in learning about the Swedish system of tiered agricultural and agri-environmental payments.

The BLP developed close links with the European Forum for Nature Conservation and Pastoralism (www.efncp.org) which acts as an umbrella group for farming for conservation projects throughout Europe. The BLP features on the EFNCP website www.efncp.org/hnv-showcases/ireland-the-burren/ and the BLP manager has been appointed as a Director of the EFNCP. The BLP also developed links with pan-European farming for conservation projects including the PAN Cultural landscapes project and the TRINET project (see below).

Recent links have been made with the Secretariat for the Convention on Biological Diversity following the BLP's successful submission of a case study for their forthcoming publication relating to the Satoyama Initiative (http://satoyama-initiative.org/en/).

The BLP's four day international conference held in February 2008 provided a good opportunity for further communication with its European partners. Members of LIFE projects from Sweden and the UK presented papers, while delegates from 10 EC countries and other HNV areas in Ireland, including Wicklow, Connemara, the Mourne Mountains and south Kerry attended. Communication with other Irish LIFE projects such as Coillte (Raised bogs project, Blanket bog Project, Priority woodland Project) and Birdwatch Ireland (Termoncarragh) has been ongoing throughout the Project.

A database has been created which includes contact details for individuals involved in relevant projects and organisations with whom the BLP has had contact (Annex E1.1). Links to the most relevant were included in the project's website (E2).

The BLP team has continued to form new links to other projects and organisations throughout the duration of the Project, many formally but often also informally. The latter makes it hard to quantify all the lines of communication but the majority are listed in Table E1[6]:

Table E1: Interactions with other relevant projects, organisations and individuals.

Date	Description	Approx. N° of People Involved
15-17 May 2005	BLP team (4 members) made a 3-day visit to the Limestone Country LIFE Project in the UK on a fact finding mission. Meetings and site visits were held with their project team and others involved in the work. Team also visited a nearby limestone area being managed by English Nature.	9
June 2005	BLP team met with the Project Manager of the Donegal based 'Golden Eagle Re-Introduction' LIFE Project.	4
June 2005	BLP hosted a field trip by delegates from the European Vegetation Conference held in Galway.	~40
20 June 2005	Michael O'Briain (EC, Directorate-General Environment, Nature and Biodiversity) visited the project. The meeting included a briefing session, field trips and afternoon workshop attended by local farmers and departmental officials.	~20
22 Sept. 2005	Ruairí Ó Conchúir and James Moran attended the closing workshop of the Termoncarragh LIFE Nature Project held in Belmullet, Co. Mayo.	30-40
April 2006	Hosted a visit by 20 Coillte staff from two LIFE project (restoration on raised bogs, restoration of blanket bogs). A slide presentation in the project office was followed by a visit to a project demonstration site (E5) sites owned by the state and grazed by a local farmer.	24
3-6 July 2006	Sharon Parr and NPWS members John Cross, Emma Glanville & Kathryn Hannon attended the Eurosite Karst Workshop held in the Yorkshire Dales, UK which brought together people from all over Europe including the new accession countries. Included visits to several limestone and wetland sites and a presentation on the BLP.	30-40
Sept. 2006	Hosted a visit from the Coillte LIFE-Nature Project. The visit included a talk and site visit by the LIFE Project team and forest managers to look at scrub removal.	15
Sept. 2006	The Project team (4), members of the project steering committee (4) and additional members of the project sponsors (3) completed a 5 day study trip to two completed LIFE projects based in the Alvar grasslands and coastal wetlands on the Swedish island of Öland.	15-20
Nov 2006	Meeting in Athenry, Co. Galway between Lough Melvin Nutrient Reduction Programme (N. Ireland) met with Brendan Dunford and James Moran re sharing information on respective projects with emphasis on nutrient export modelling.	4
March 2007	Hosted a meeting with the BioUp Project team – an upland conservation farming project based in Co. Kerry- included a slide presentation on BLP and a walk aimed at sharing ideas on a conservation grazing.	4
8 May 2007	Brendan Dunford addressed the inaugural meeting of the Bio-up Steering Group in Killarney, Co. Kerry including a presentation entitled 'Farming for Conservation – working together for a brighter future'.	25
June 2007	Brendan Dunford attended the conference entitled 'Can the Market Work for Nature?' organised by the European Forum for Nature Conservation and Pastoralism in Uppsala, Sweden.	~60
June 2007	Hosted visit from a MSc group from the Balkan region (in conjunction with NUI Dublin) included a presentation on the BLP and a discussion on karst conservation.	15
July 2007	Delegates from the International Association of Vegetation Scientists visited the project to look at activities on the ground.	6
27-28 Sept 2007	Brendan Dunford addressed the European Island Farm Landscapes LIFE + Transnational Project workshop on Inisbofin, Co Galway. The following day, 30 workshop delegates visited a project demonstration site (E5) owned by the state and grazed by a local farmer.	30+
Nov	Brendan Dunford facilitated a visit by a two-person delegation from the Hungarian Nature	3

[6] (Due to the nature of many of the engagements listed in Table E1 there was significant cross-over between this Action and E4).

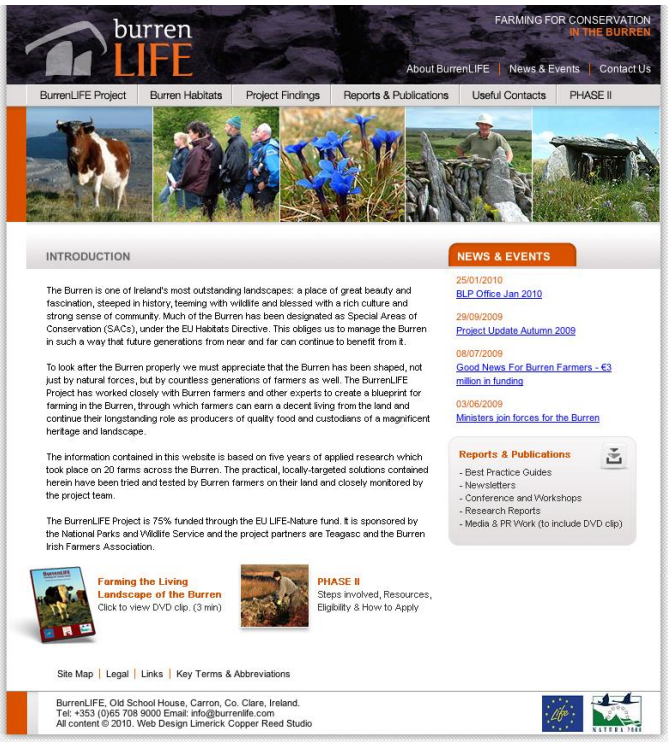
Date	Description	Approx. N° of People Involved
2007	Conservation Unit at the project office in Carron.	
Feb 2008	BurrenLIFE hosted a 4-day international conference attended by people from projects and organisations across Europe.	~140
March 2008	Sharon Parr and Ruairí O Conchúir attended the closing workshop of the 'Limestone Country' LIFE project in the UK.	80
17 Mar 2008	Sharon Parr visited the Arnside-Silverdale AONB in the UK to share information regarding scrub control and grazing practices on calcareous grasslands with staff of the AONB, Natural England, RSPB, Lancashire Wildlife Trust and Lancashire County Council.	15-20
Mar 2008	Brendan Dunford addressed a group of Finnish Farmers in Hyland's Hotel in Ballyvaughan, Co. Clare. The meeting was followed by a field trip in the Burren and a visit to a project farm owned by Roger & Lorraine Woods.	20
May 2008	The BLP team met with the Project Manager of the Burren Connect Project, Ms. Carol Gleeson. This project deals with visitor management and conservation issues in the Burren.	4
May 2008	Sharon Parr made a presentation to a delegation from Natural England. This was preceded by a visit to a BLP farm owned by Philomena Hynes.	24
16 June 2008	Brendan Dunford hosted a visit by two members of the Newfoundland Department of Environment and Conservation who were undertaking an international study on Pine marten population ecology.	3
Sept 2008	The BLP hosted a visit to the project office by a group of officials from the Agri-environmental section of the Croatian Agricultural service.	22
6 Oct 2008	Brendan Dunford made a presentation to the executive of the Irish Upland Forum, an organisation dealing with a range of upland issues.	7
Oct 2008	Brendan Dunford & James Moran attended the workshop 'The Future of European semi-natural grasslands' in Constance in south Germany. This workshop was organized by the Swedish Biodiversity Centre and the European Forum for Nature Conservation and Pastoralism.	60+
Jan 2009	Brendan Dunford met with Marcus Wilke at NPWS offices in Dublin and subsequently at the project offices in Carron, followed by a field trip to Philomena Hynes' farm. This was part of an EC LIFE ex post evaluation.	2
May 2009	Members of the BLP team attended an EU LIFE+ information seminar in Northern Ireland, where the BLP was the featured case study for LIFE Nature in Ireland. Prior to the seminar, Dr. Brendan Dunford and Dr. James Moran made a presentation to the executive of the Northern Ireland Agriculture Producers Association and to a group of approx 70 farmers in the Mourne Mountains, an area of high nature value in Northern Ireland.	120+
Oct 2009	The BLP hosted a visit by Gwyn Jones, co-ordinator of the European Forum for Nature Conservation and Pastoralism at the project offices in Carron.	4
Oct 2009	The BLP hosted a visit by a group of 12 Belgian Nature Conservationists and farmers (ANB Flanders) including a site visit to a project farm (AC)	16
18 Oct 2009	Sharon Parr hosted a group of delegates attending the Crop Wild Relatives Conference in Galway University on a field trip looking at the impacts of the BurrenLIFE Project	~30

Action E.2: Website Development

The BLP website www.burrenlife.com, managed by the Finance and Operations Officer, is an interactive, database-driven website which has been fully functional since October 2005. The website is one of the main methods used to disseminate information on the work of the BLP to a wider audience. The project also maintained a close working relationship with two other websites for information dissemination purposes, namely www.clarefocus.ie and the award winning www.burrenbeo.com. The latter is a very popular website and proved to be an excellent medium for information dissemination.

The website includes: background information on the Burren and the main habitats present; information on the project itself e.g. objectives, conservation issues, staff etc; downloadable material e.g. newsletters, workshop reports, conference reports; and information on the project partners including LIFE. The 'news and events' section was updated on regular basis with a variety of information including press releases and information relating to the BLP heritage education

programme.



The website will continue to be available as part of the after-LIFE communications plan. In view of this, it was revamped during the closing stages of the BLP to ensure that it remains a user-friendly, up to date source of relevant information on farming for conservation in the Burren. This includes the addition of further downloadable material including the best practice guides and layman's report. The site now contains a completely new section on the 'Burren Farming for Conservation Programme' spawned by, and the successor to, the BLP. It will be updated regularly.

Although the website has been a useful portal for information dissemination, it has not been without its problems. Initially, there was no broadband infrastructure available in the Carron area so the project was reliant on slow telephone exchange methods for internet access. This made updating the website very difficult and costly due to the slow transmission rates and the problem of broken connections during the uploading of large files. Broadband access finally became available in June 2007 which eased the situation but problems continued with the 'Progress to date' section where a technical glitch meant that it was not possible to upload new data or images. Despite many efforts and contact with the web designer, the problem remained unresolved until the revamp.

Costs: The total cost for the development and revamp of the website was €13,383 which was very slightly above the provisional budget of €13,000.

Action E.3: Media Campaign

From the outset of the project, the BLP team worked very hard on the PR and media front as it recognised the importance of creating and maintaining local and national awareness and using this to engender an understanding of the project and its objectives. To this end, a comprehensive database of local and national media outlets and contacts was developed (Annex E3.1).

The project has been successful in garnering extensive media coverage for various project events and activities. The official project launch, performed by the Minister for the Environment, Heritage and Local Government, Mr Dick Roche in July 2005 featured widely in local, national and international media. The event was covered in national newspapers and in magazines such as Bird Watch Ireland's 'Wings' and Teagasc's 'Today's Farm'. There was significant coverage in late 2007 and early 2008 which focused on the launch and staging of the BLP's international farming for conservation conference, attended by the Minister for the Environment, Heritage and Local Government. Aside from local reporting, the conference received coverage on national television (RTE & TG4), national radio (RTE) and in the national press (Irish Examiner, Irish Times, Irish Independent, Irish News and Farmers Journal).

Much of the media coverage in early 2009 was focused on the launch of the BLP's DVD 'Farming the Living Landscape of the Burren'. The DVD was officially launched by the Minister for the Environment, Heritage & Local Government, Mr. John Gormley TD, and resulted in extensive coverage in the national press. Further widespread coverage followed the announcement on the 8th

July 2009 by the Minister for Agriculture, Fisheries and Food, Mr Brendan Smith, TD, that his department was allocating €1 million per year over 3 years to enable the roll out of the BurrenLIFE project to a greater number of Burren farmers.

An example of media coverage over the course of the project is shown in Annex E3.2

Action E.4: Educational Programme including Public Information meetings

This Action set out to raise people's awareness of the Burren: it's natural and cultural heritage, its importance in terms of conservation and the Natura 2000 network, and the central role of agriculture and the people of the Burren in maintaining this internationally important landscape. To this end, BurrenLIFE commissioned a Heritage Education Programme (HEP) run by local consultant, Tony Kirby and following permission from D.G. Environment (in letter dated 11 06 2008) an educational DVD about farming for conservation in the Burren (new Action included in modification request[7]).

Heritage Education Programme: The 4-year HEP, launched in December 2005, targeted three main groups:

1. Local schoolchildren at both primary and secondary level via schools programme.
2. The local community of Clare via a series of public lectures and walks.
3. The wider public including visitors and tourists – as above.

A summary of the events is provided in Table E4.1 and a fuller description of the individual activities in Annex E4.1.

Table E4.1: Summary of activities held under the Heritage and Education Programme

Programme	No. of Events	Activity	Approx. Attendance
Primary Schools	24	Workshops held in 24 primary schools	540
Primary Schools	24	Field trips completed with primary schools	540
Secondary Schools	12	Workshops held in 9 schools. Held twice in 3 schools	261
Secondary Schools	12	Field trips completed with 9 schools. Held twice in 3 schools.	261
Public lectures*	66	Lectures delivered over 10 blocks in different venues around mid and north Clare, and south Galway.	1904
Public Walks (attendance sometimes capped)	12	12 walks on various topics within the Burren	264
Total	**146**		**3770**

*includes an additional 4 talks not included in the original programme

The schools programme proved very successful at introducing the issues of conservation and the importance of agriculture to school children of a wide-age range. This, and other local education initiatives aimed at primary schools such as the very successful 'Eco-beo' programme run by the BurrenBeo Trust, has opened the children's eyes and engendered a real enthusiasm for the Burren. It is hoped that the knowledge they have gained as a result of these initiatives will stay with them for the rest of their life, helping them to understand and appreciate the importance of their home place into the future. Excellent feedback was received from the participating schools and from parents, many of whose children insisted on taking them out into the Burren to show them the things they had learnt! The primary schools were particularly keen to take part and often lobbied to do so while waiting for their turn to come around. The secondary school programme was more difficult to manage: due to the tight timetables associated with State examinations, transition year

[7] *Unfortunately, there has been some confusion as to the Action under which this was to be reported (E9 or E4) but as the intention was for it to be a educational tool for farmers and the wider public it is reported under this Action after the HEP.*

was targeted for participation as this is meant to be a less academic year which provides students with opportunities not available in the mainstream curriculum and the BurrenLIFE programme seemed to fit the bill. Even so, the uptake was less enthusiastic and schools were prone to cancelling at the last minute. Despite this the full complement of planned school events was achieved.

The public lecture series and walks were similarly successful and were very useful for reaching people outside of the agricultural community who may not have come into contact with the project and its objectives otherwise. Although the majority of events were not focussed on the BLP itself, the consultant introduced each talk and walk with a vignette of the project, its aims, activities and sponsors i.e. EU LIFE-Nature, NPWS, Teagasc and the Burren IFA. On the whole the walks and talks were well attended although some venues were more successful than others and bad weather occasionally played its part.

In addition to the main Heritage Education Programme, the BLP team participated in a wide range of other educational events including: additional primary school visits (including 14 visits to show and distribute the BurrenLIFE DVD); in-service training for teachers on habitats, heritage, farming and the BurrenLIFE Project; illustrated talks for local community groups; lectures and field trips for visiting universities and for other interested parties. A summary showing the type of additional activities carried out under the educational programme are listed in Table E4.2 (The full list is provided in Annex E4.2).

Table E4.2: Some additional activities carried out as part of the Educational Programme

Date	Description	Approx. N^{o} Attending
Feb 2005	The BLP Project Manager made a presentation at the annual Burren Spring Conference in Ballyvaughan.	~100
14 July 2005	Official launch of BLP by Minister for Environment Dick Roche held in Carron, Co. Clare.	120-130
June 2006	The BLP had a stand at 'Agriculture & Food 2006' in Kildalton College, Co Kilkenny.	~5,000
Sept 2006, to 2008	The BLP had a stand at the 'National Ploughing Championships' held in Co's Offaly, Kilkenny and Kildare respectively.	~50,000 per day
Sept 2006, to 2008	NUI Cork Dept. ZEPS Early Start Programme - Sharon Parr gave a lecture and led a field trip to part of the National Park grazed by a BLP farmer.	25-35 students per annum
24 Oct 2007	Brendan Dunford presented at a workshop on 'Local involvement in countryside management – what is working?' organised by the Wicklow Uplands Forum. The talk was part of a session on 'Best Practice in Land Management' and also featured input from Michael Davoren of Burren IFA.	~100
Nov/Dec 2007	The BLP organised four public meetings with the aim of planning the process for the 'after LIFE'. The meetings were held in Ballyvaughan, Doolin, Carron and Tubber.	~200
Jan 2008	Heritage workshop for four Dublin schools (2nd level) held in the EU offices in Dublin followed by evening lectures for the general public.	60 students 50 (pm)
June 2008	The BLP participated in Farm Fest in June 2008 with an information stand on the project and also on the BBLPG. The event took place at the Teagasc Centre in Athenry, Co Galway.	~30,000
Sept 2008	The BLP Team organised three evening presentations on the Aran Islands for local farmers. The Aran islands are a geographical extension of the Burren so the work of the BLP was of great interest to them.	~100
Jan 2009	The BLP launched Ireland's first farming for conservation DVD entitled 'Farming the Living Landscape of the Burren'. The DVD was launched in Dublin by Minister of Environment Heritage and Local Government, Mr John Gormley, TD.	Dublin 30-40 Clare 250 - 300
March/April 2009	To celebrate the launch of the DVD, the BLP visited 14 national schools through the core Burren region. During each visit the DVD was shown and a copy of the DVD distributed to each family. A total of 575 families received a free copy of the DVD.	280-320
April 2009	The BLP hosted a visit from EcoEuropa TV. The work of the project and LIFE farmers James Howard and Roger Woods featured in a major documentary broadcast Europe wide on EcoEuropa TV.	6

The BLP held a number of information and awareness raising meetings with political

representatives from local to international levels. Highlights of these included meeting all of the Irish MEPs and being invited to address the Joint Oireachtas (parliamentary) Committee for the Environment, Heritage & Local Government. A list of information meetings held with political representatives can be found in Table E4.3.

Table E4.3: Information Meetings with International, European, National and Local Political Representatives

Date	Description	Approx. N° Attending
June 2007	The BLP hosted a visit by EU Ambassador to the US and former Taoiseach John Bruton along with his wife and two other people.	4
Sept 2007	The BLP hosted a visit by Minister of State, Trevor Sargent, TD. The minister officially launched the Burren Producers Group.	~100
Oct 2007	Ruairí O Conchúir made a presentation to the Minister for Community, Heritage, Rural & Gaeltacht Affairs, Mr Eamon O'Cuiv, TD on the work of the BLP & its support to the Burren Beef & Lamb Producers Group.	5
Jan 2008	Minister of the Environment, Heritage and Local Government, John Gormley TD, carried out a PR launch for the upcoming BLP Conference EC offices in Dublin. This was followed by a brief meeting with the Minister regarding the future of BurrenLIFE.	30-40
1 Feb 2008	The BLP hosted Marian Harkin, MEP, at their project office in Carron. Ms Harkin also visited the farm of Patrick McCormack (LIFE farmer).	6
May 2008	Brendan Dunford & Ruairí Ó Conchúir made a presentation at the Council Chamber, Ennis to the full membership and executive of Clare County Council.	~30
Oct 2008	The BLP team addressed a group of Local Political Representatives (County Councillors) at a meeting organised by Burren IFA.	~30
Jan 2009	The BLP hosted a visit by the Minister of Environment, Heritage and Local Government, Mr John Gormley, TD. The Minister met with Project Team and the various Project Partners at the project office in Carron and with c.15 BurrenLIFE farmers in the field.	~23
25 Feb 2009	The BLP hosted a delegation from the European Parliament's Transport Committee. The delegation composed of six MEPs as well as translators and officials from the European Parliament.	~15
Feb 2009	The BLP team held a meeting with Mr. Eamon O'Cuiv, TD Minister for Community, Rural & Gaeltacht Affairs and his officials in Carron.	6
July 2009	The BLP team accompanied by project partners, Dr Ciaran O'Keeffe (NPWS) & Michael Davoren (Burren IFA) presented to the Joint Oireachtas (parliamentary) Committee for the Environment, Heritage & Local Government, at Government Buildings in Dublin.	12
Nov 2009	The BLP met with local TD, Mr Tony Killeen, Minister of State at the Department of Agriculture, Fisheries and Food, to discuss the possible roll out of the BurrenLIFE Project.	5

Costs: The HEP came in slightly under budget: the total cost for the consultant and travel being €45,260.

DVD: The DVD 'Farming the Living Landscape of the Burren' focuses on the story of farming for conservation in the Burren from the perspective of the local farmers. It was developed as an alternative means of reaching audiences from local to international level and serves the combined purpose of increasing awareness, disseminating information about BurrenLIFE and as an educational resource for farmers, planners, conservation bodies, local schools and the public at large. The broadcast-quality DVD was made with considerable input from some of the LIFE farmers and the project team. It is divided into three sections:

1. Section 1 – a 3 minute overview of the work of the BLP as told by participating farmers.
2. Section 2 – a 15 minute review of the work of the BLP with input from participating Burren farmers, the BLP team and Project Partners.
3. Section 3 – a 30 minute detailed look at farming for conservation and the work of the BLP which has a strong training element.

Two thousand DVD's were produced and these have been distributed widely. The main distribution list is in Annex E4.3. Additional copies were distributed to the farming community at the launch and individual copies have been given to interested parties e.g. members of conservation

organisations outside Ireland. Approximately 1,750 copies have been distributed to date. The feedback on the DVD has been very positive and it has been a very useful tool in all its intended capacities. A copy is included with this report.

The DVD was filmed, edited and produced by GM TV Ireland Ltd at a cost of €27,691 with a further cost of €4,075.9 for the burning of 2000 copies and supply of cases with printed inserts. The total cost was €11,766.9 over the proposed budget of €20,000.

Action E.5: Demonstration Farms

The best way to convince farmers as to the efficacy and practicality of any proposed conservation measures is to demonstrate these measures in a real-time, local farm context. To this end, the project proposed to set up four demonstration farms (one on State land and three on private farms) and hold a series of four open days on each. In the event, this intention was modified slightly, with three main demonstration farms being established - one on State land and two on private land. These three farms were selected as they were all easily accessible and a good range of project actions had taken place on each. While farmer demonstration events did take place on these farms their main demonstration use was for groups visiting the area. In reality, all twenty project farms acted as demonstration farms and most have been used to display project actions and conservation issues to visiting groups at some point during the project: ten hosted farmer-targeted open days. This adjustment was made in order to take into account the variation between individual farms and farming enterprises and provided a far better opportunity to showcase different conservation issues and solutions. In addition, using a greater variety of demonstration farms kept things fresh and encouraged individual farmers to attend a larger number of events as they felt that new sites offered new insights. This was considered important given the value placed by the BLP on farmer-to-farmer knowledge and skills transfer.

In total, 16 official farm demonstration events (as originally planned) were held to highlight the work undertaken by the project farmers. All events had technical input from the BLP and Teagasc but the host farmer played the key role of explaining how the different project Actions had affected them, what they had found of most benefit and how practical they thought each Action was – this often included suggestions as to how things could be improved. Each event focused on a number of issues such as: general farming for conservation practices, grazing regimes and grassland management, use of supplementary feed, animal condition scoring and animal health, stock type and breeding, enhancing livestock management facilities, best practice in developing access tracks and a range of other wider project related issues including the Burren Beef and Lamb Producers Group, Heritage Education Programme, etc.

Over 750 people attended the events listed in Table E5.1.

Table E5.1: List of demonstration events held during the BurrenLIFE Project

Date	Description of Demonstration Event	Nº. attending
14 January 2006	**DD. No.1: Scrub removal.** Aimed at LIFE farmers & potential scrub removal contractors. It focused on scrub removal methods and health & safety issues.	20
18 & 19 August 2006	**DD. Nos. 2&3: Farming for Conservation** Two events (Friday pm, Saturday am) took place on the farm of Jim Nagle (LIFE farmer) and on the adjoining State land that forms part of the Burren National Park and is grazed by a LIFE farmer. These highlighted the principles behind farming for Conservation, the work of the BLP & the key role of the project's LIFE farmers. There was a notably strong presence of local farmers.	80-100
August 2006	**DD. No.4: Organic Farming & Farming for Conservation** A joint event with Teagasc held on the BLP farm of Patrick McCormack. BLP input focussed on general issues of farming for conservation and the activities of the BLP project and project farmers.	40-50

Date	Description of Demonstration Event	N°. attending
24 Feb 2007	**DD. No.5: Grazing levels and Concentrate Feeding Systems** This event took place on two adjacent project farms owned by Patrick Fogarty and Harry Jeuken. It focused on wide variety of topics relating to the BLP but particularly on getting the grazing levels right and the use of concentrate-based feeding systems instead of silage.	~45
5 May 2007	**DD. No.6: Access tracks, water provision & grazing levels** Organized for delegates from the Burren Law School. The farm of Joe Bruton was used to showcase best practice with regard to access tracks, options for water provision and grazing regimes	~60
28 & 29 June 2007	**DD. No.7, 8: Farming for Conservation** Events took place on consecutive days on State land that forms part of the Burren National Park and is grazed by a LIFE farmer. The first day focussed on farmers and the second, the wider public.	~80
July 2007	**DD. No.9: International Farm Managers Association** Brendan Dunford, James Moran and Life farmer, Harry Jeuken, hosted this event for a group of international Delegates attending the International Farms Managers Association (IFMA) World Congress. It outlined the conservation issues in the Burren and the work of the BLP in trying to find practical solutions.	~60
14 August 2007	**DD. No.10: Organic Farming & Farming for Conservation** A joint event with Teagasc held on the BLP farm of Patrick McCormack. BLP input focussed on general issues of farming for conservation and the activities of the BLP project and project farmers.	25
25 June 2008	**DD. No.11: Farming for Conservation** Sixty Teagasc and private agri-environmental planners visited the farm of Michael Keane to look at work carried out in conjunction with the BLP as part of their training in planning for conservation.	~60
10 July 2008	**DD. No.10: Organic Farming & Farming for Conservation** A joint event with Teagasc held on the BLP farm of Patrick McCormack. BLP input focussed on general issues of farming for conservation and the activities of the BLP project and project farmers.	~35
16 July 2008	**DD. No.13: Farming for Conservation** Approx. 50 Teagasc agri-environmental planners visited the farm of Philomena Hynes (LIFE Farmer) as part of a staff training workshop.	~50
17 July 2008	**DD. No.14: Showcasing BLP Actions and advising on whole farm management** Joint event between BurrenLIFE and Teagasc was held on the farm of Philomena Hynes. The focus was on the wide range of Actions designed to support conservation grazing including access tracks, water provision, concentrate feeding systems, scrub removal, wall restoration and grazing management both on the winterages and the summer land. Teagasc also focussed on breeding and getting the best return from stock.	50-60
9 April 2009	**DD. No.15: Practical Farming for Conservation** Held on the project farm of James Keane the focus was on the importance of proper planning of grazing regimes and grassland management, the use of supplementary feed, animal condition scoring and best practice in developing access tracks. (An exceptionally wet day)	18
19 August 2009	**DD. No.16: Practical Farming for Conservation** Held on the farm of Catriona O'Dea. The focus was on changes to her grazing regime, the use of supplementary feed, water provision using pasture pumps, the value of restoring internal walls, and enhancing local biodiversity.	~30

The demonstration days proved very useful for 'spreading the message' and the feed-back was good. As time went on, the attending farmers became more inclined to ask questions of both the hosting farmer and the project team which helped to initiate good on-site discussions. Many farmers having seen or heard about the project's various activities aimed at improving grazing levels began

to adopt them themselves (especially the switch from silage to concentrate feeding) and also spread the word to their neighbours thus ensuring that the farmer to farmer knowledge transfer that the project hoped to foster became a reality.

Four permanent information signs giving details about the project, its aims and sources of funding were erected at four locations, two at the northern-most part of the Burren National Park on land grazed by a LIFE farmer and two on the main Burren National Park Site, on land grazed by a second LIFE farmer. The signs also provide site-specific information regarding habitats and features of interest, grazing and project Actions carried out there such as scrub removal, wall restoration etc. (see Annex E5.1).

Action E.6: Conferences, seminars and workshops

The project fulfilled its commitment to hold a major conference and at least four workshops. In addition, a 'closing' seminar was held as a means of presenting some of the results from the extensive research programme.

In February 2008, the BLP staged a three day international conference entitled 'Farming for Conservation – Supporting the Future' which was attended by approximately 140 delegates. Both the Minister for the Environment, Heritage and Local Government, Mr John Gormley TD, and Dr Michael O Briain from DG Environment addressed the conference. The conference consisted of a series of invited papers, field trips to look at some of the conservation and farming issues and project Actions at first-hand, and a panel discussion. The conference programme, report and delegate list can be found in Annexes E6.1a, b & c respectively.

The four workshops covered a variety of issues relevant to Farming for Conservation in the Burren as outlined in Table E6.1. The reports produced for the technical workshops on animal nutrition and health, and the vets workshop are included in Annexes E6.2a & b respectively. The information and discussions from the workshop on the management of feral goats in the Burren form part of the report in Annex F5.5.

Table E6.1: Details of workshops held during the BurrenLIFE Project

Date	Description	No. Attendees
September 2006	**Workshop No.1 'Animal Nutrition and Health on Conservation Grasslands'** Held in the NUIG, Research station in Carron. Reviewed current knowledge in Ireland and UK, examined basic requirements and issues of forage and fodder quality, requirements for nutritional supplementation incl. initial findings from BLP forage analysis, and trace minerals and animal health issues.	~30
September 2007	**Workshop No.2. 'Animal Health & Welfare Issues in the Burren'.** Held in the BLP office in Carron. Attended by Burren veterinary surgeons and District Veterinary Office officials (DAFF). Purpose was to follow on from issues that emerged from workshop 1 and to share practical information and experience on animal health and welfare issues with particular reference to the Burren and the work of the BLP.	20
Jan 2009	**Workshop No.3. 'The Natural and Cultural Heritage of the Burren'.** Aimed at Burren Farmer's, their families and other interested parties, this workshop gave an overview of the Burren's heritage from geology, to flora and fauna, to the role of farming, to archaeology.	35
February 2009	**Workshop No.4. 'The Sustainable Management of Feral Goats in the Burren'** Attended by local and national stakeholders, this workshop set out to look at the emotive local issue regarding management of the feral goat population and especially, the sub-population of Old Irish Goats.	35

The BLP hosted its closing seminar in November 2009 and this was attended by approx. 60 delegates. Some of the results from the extensive research and monitoring programmes were

presented by the project team as well as details of the Socio-economic report and the Risk of Nutrient Export Model, the latter two by the consultants who had carried out the work. The seminar programme, list of attendees and a selection of the presentations can be found in Annexes E6.3 a-c.

Action E.7: Project Reporting

Annual progress reports have been submitted to D.G. Environment throughout the project as shown in Table E7.1.

Table E7.1: List of progress reports submitted to D.G. Environment.

Details	Submitted
Progress Report Year 1	August 2005
Progress Report Year 2	August 2006
Interim Report (incl. Progress Report Year3)	August 2007
Progress Report Year 4	September 2008
Progress Report Year 5	September 2009
Final Report	April 2010

As envisaged, five annual newsletters providing general information and updates on the BLP were produced and distributed both electronically to interested parties and as printed versions via the post (using the information held in the dissemination database provided in Annex E1.1), project partners and local outlets, the latter targeting the local communities of the Burren. A final layman's report which summarises the project and its outcomes in a very simple, photo-rich format that is aimed at non-specialists was prepared and distributed both electronically and in printed format as part of the after-LIFE communications plan. All of these are available for download on the project website and copies are contained in Annexes E7.1 a-f.

In addition, the project also presented updates to John Houston, Graham Hopkins and Lynne Barratt (total of 4 visits) from the BLP's external monitoring team. The BLP hosted a visit by Marcus Wilke, an evaluator conducting a LIFE ex post evaluation, on Jan 14th 2009 which included visits to some project farms.

Action E.8: Publications and Presentations

Members of the BLP presented papers at a number of workshops, conferences and seminars and had several papers, case studies and technical articles published during the project's lifetime. Thus the undertaking to present papers at two international conferences and publish two papers has been met. The main activities are recorded in Table E8.1. Samples of some of the conference paper presentations (PowerPoint and written text if available) and publications are included in Annexes E8.1a-l. Further scientific and technical publications are anticipated now that the research has been completed.

Table E8.1: Sample of conference papers, published papers and examples of general articles.

Date	Description	No. Attendees
17 August 2005	**Conference Paper 1.** 'Farming for conservation in the Burren': paper presented by Brendan Dunford at the Salisbury Plain LIFE Project Conference 'Restoration and management of Chalk grassland in Europe'.	~135
June 2006	**Conference Paper 2.** Brendan Dunford addressed the PAN (European Cultural Landscapes) Conference in Ballyvaughan, Co. Clare and took delegates on a field trip. This led to the participation of the BLP in the production of a DVD on European Cultural Landscapes.	~80
July 2006	**Conference Paper 3.** Karst Ecology, management issues and threats in the Burren': paper presented by Sharon Parr at Eurosite Workshop on 'Sustainable Management of Karst Landscapes for Biodiversity'.	30-40
20 Sept 2006	**Conference Paper 4.** Brendan Dunford addressed a Natura 2000 workshop in Mullingar on 'Financing Natura 2000' at which the BurrenLIFE project was used	~70

Date	Description	No. Attendees
	as a showcase of good practice..	
11-13 Oct 2007	**Conference Paper 5.** 'Building Bridges between conservation bodies and grassland farmers': paper presented by Brendan at the TRINET Workshop 'Partnership in Grassland Farming for Biodiversity' held in Sigulda, Latvia.	60+
25 Feb 2008	**Conference Papers 6 & 7.** 'Farming for Conservation – Research, Monitoring and Advisory Requirement': two papers presented by James Moran (Advisory) and Sharon Parr (Research & Monitoring) at the BurrenLIFE Conference ' Farming for Conservation – Supporting the Future'.	~140
29 Feb 2008	**Conference Paper 8.** Brendan Dunford addressed a seminar on Agriculture and Environment organized by GOB Menorca. This seminar targeted farmers on the island of Menorca.	60+
June 2008	**Published Paper 1 & Conference Paper 9.** 'Species-rich limestone grasslands of the Burren, Ireland: feed value and sustainable grazing systems. ' Paper presented by James Moran (Teagasc & BLP) at the 22nd General Meeting of the European Grassland Federation in Sweden, published as Moran *et al* in Grassland Science in Europe Vol. 13.	200+
May/June 2008	**Technical Article**. 'BurrenLIFE - delivering for farming and for conservation'. Article by James Moran published in Today's Farm , the widely distributed Teagasc publication.	
Summer 2008	**Technical Article**. 'The BurrenLIFE Project – Farming for Conservation in the Burren'. Article published in GAP News.	
November 2008	**Conference Paper 10.** 'Protecting Europe's Nature - Learning from LIFE' paper presented by Brendan Dunford at a conference dedicated to presenting the results of the LIFE Nature programme. The conference took place in Brussels 17-19 November 2008.	40
October 2009	**Published Paper 2.** 'The Burren – farming for the future of the fertile rock' Williams et al (2009) British Wildlife **21** (1), 1-9. **(Deliverable)**	
16 May 2009	**Conference Paper 11.** Brendan Dunford presented at the 2009 Conference of Irish Geographers, University College Cork under the theme of 'Upland Landscapes'.	30
November 2009	**Conference Paper 12.** 'Farm Planning in High Nature Value Farmland – The BurrenLIFE Experience' paper presented by Brendan Dunford at the National REPS Conference in Ballinasloe.	250-300
December 2009	**Published Paper 3.** 'Grasslands of the Burren, Western Ireland' Parr et al(2009). A peer-reviewed case study in 'Grasslands in Europe of high nature value' Eds. Veen et al, KNNV Publishing	
Dec 2010	**Published Paper 4.** 'BurrenLIFE – Farming for Conservation in the Burren' Parr et al (2010). BurrenLIFE – Farming for conservation in the Burren. In: Sustainable use of biological diversity in socioecological production landscapes. Background to the '*Satoyama* Initiative for the benefit of biodiversity and human well-being.' Eds. C. Belair, K. Ichikawa, B.Y.L. Wong, and K.J. Mulongoy. Secretariat of the Convention on Biological Diversity, Montreal. Technical Series no. 52, pp 118 - 124. (publication imminent).	

Action E9: Information Fact Sheets and Promotional Material

The main purpose of this action was to create a series of five information sheets to disseminate the findings of the BLP. A series of five 'best practice guides' were produced which fulfilled this objective. These high quality publications, based on the activities and results of the project, are as follows:

BurrenLIFE Best Practice Guide No.1 A Guide to Farming for Conservation in the Burren

BurrenLIFE Best Practice Guide No.2 The Agricultural Heritage of the Burren

BurrenLIFE Best Practice Guide No.3	Sustainable Grazing of Burren Winterages
BurrenLIFE Best Practice Guide No.4	A Guide to Feeding Cattle on Burren Winterages
BurrenLIFE Best Practice Guide No.5	A Guide to Controlling Scrub on Burren Winterages and Other Areas

Five hundred of each have been printed and these will be given to all farmers entering the new Burren Farming for Conservation Programme and distributed at information events as well as being available through the BurrenLIFE office. PDF versions (Annex E9.1) are available for download from the project website.

Additional promotional material was commissioned including two large, folding promotional stands for use as backdrops at events and a series of 6 information boards (Annex 9.2) all of which featured BurrenLIFE, LIFE and Natura 2000 logos along with those of the project partners. These have been utilised extensively at farm demonstration and educational events.

F. Overall project operation and monitoring

F Actions: Summary of Achievements against Targets

(project milestone indicated **MS**, target end date in italics if later than **MS** date)

Action Code	Activity	Implementation Period/Target	Completion Date	Comments
F1 F1 **MS**	Operation of Project Steering & Advisory Grp PAG established	Dec 04 – Jan 10 1 Sept 04	31 Jan 2010 *(31 Jan 2010)* 14 Jul 05	**Action complete.** 3 groups set up – Advisory, Steering & Teagasc Advisory. Regular meetings held.
F2 F2 **MS**	Establish Project Headquarters Opening of above	Mar 05 – Mar 06 1 Jun 2005	Mar 2006	**Action complete.** Initial difficulty in finding suitable office. Eventually est. in centre of Burren.
F3 F3 **MS**	Employment of Project Team Above in place	Dec 04 – Mar 05 Mar 05	14 Mar 2005	**Action complete.** Three full time staff employed.
F4 F4 **MS**	Environmental surveys Above - interim findings	Mar 05 – Jan 10 1 Sept 07	31 Jan 2010 1 Sept 07	**Action complete.** All monitoring complete. Risk of Nutrient Export Model created.
F5 F5 **MS1** F5 **MS2**	Agricultural surveys (**D**) Above - interim findings Forage analysis complete	Mar 05 – Jan 10 1 Sept 07 31 Aug 08	31 Jan 2010 1 Sept 2007 Aug 2009	**Action complete.** Including forage analysis & management strategy for Burren Goats
F6 F6 **MS1** F6 **MS2**	Socio-economic surveys(**D**) Above - interim findings Socio-economic Report	Jan 06 - Jan 10 1 Sept 07 31 Oct 09	Aug 2009 1 Sept 2009 Nov 2009	**Action complete.** National farm survey data collected & interpreted. Socio-economic report prepared.
F7	Collation of project information into GIS database (**D**)	Mar 05 - Jan 10	31 Dec 2010 *(31 Jan 2010)*	**Action complete.**
F8	Financial management	Sept 04 – Jan 10	31 Jan 2010 *(31 Jan 2010)*	**Action complete.**
F9	Independent Audit (**D**)	Jan 2010	April 2010	**Action complete.**

D – see table of deliverable products in Executive Summary (p.8)

Action F.1: Establishment and operation of Project Steering Committee & Project Advisory Group

This Action entailed the establishment of structures to support and guide the work of the Project team in the delivery of the project namely a 6 member Project Steering Committee (PSC) and a 12 member Project Advisory Group (PAG). In reality, three groups were set up, the PSC, PAG and a Technical Advisory Group (TAG) all of which operated successfully. A partners' agreement outlining the roles and obligations of the project beneficiary and partners was signed by all parties (Annex F1.1). A full list of meeting dates and locations, and members of the PSC, PAG and TAG is

in Annex F1.2. The form used to record partners' time and travel in attending these meetings is in Annex F1.3.

The PSC was a small working group composed of two representatives of the project sponsors (NPWS) and two from each of the project partners (Teagasc and Burren IFA). This group met 20 times over the duration of the project, six of these meetings being held jointly with the PAG. Meetings of the PSC and PAG were chaired by the BurrenLIFE Project Manager. Meetings normally entailed a summary of project progress, questions and answers, and a discussion. The PSC was an important sounding board for the project team particularly in the early phases of the project and also in planning for the After-LIFE. The PSC was also a very useful mechanism to strengthen personal and professional relations between the members of the three organisations. The number of annual meetings of the PSC reduced as the project evolved and more joint PSC-PAG meetings were held instead.

The PAG included members of the PSC with additional representatives from the project sponsor and partners and people drawn from the project supporters i.e. The Department of Agriculture, Fisheries and Food, The Heritage Council, Clare County Council, National University of Ireland Galway (NUIG) and Rural Resource Development Ltd (Leader). This group met ten times, usually bi-annually and often jointly with the PSC to facilitate the overlap in personnel, thus limiting their time commitment and cutting down on replication of information. The group operated somewhat differently from the PSC in that they were not as intimately involved in the project but were able to contribute valuable objective opinions and, in the cases of Clare Co. Co, Leader and the Heritage Council, bring concrete support to the project.

The Technical Advisory Group (TAG) was set up within Teagasc and acted as a steering group for Dr. James Moran, who was seconded by Teagasc to BLP for the duration of the project (to Sept 1st, 2009). This internal technical advisory group consisted of advisory and research staff including livestock specialists, nutritionalists, agri-environmentalists, economists etc. It was attended by the project manager and occasionally other BLP staff. Eight meetings of the TAG were held. This Group was chaired by Sean Regan of Teagasc and operated in a focussed way, providing insightful commentary and recommendations on the programmes of agricultural and socio-economic monitoring which were co-ordinated by Teagasc.

The BLP are greatly indebted to all of these Committee members for their input. The levels of support, commitment and positive enthusiasm that the BLP received from its project sponsors and partners, at all levels, is in itself noteworthy.

NPWS: as project sponsor provided unwavering support to what they consider a flagship project. Local rangers helped secure derogations for planned works, while technical and administrative staff supported the project operation throughout. Three NPWS directors visited the project, as did two of their Ministers – Dick Roche TD and his successor John Gormley TD (current Minister). Minster Gormley also signed the MOU between his Department and the Department of Agriculture, Fisheries and Food (DAFF).

Burren IFA: and its local farmer members have been stalwart supporters of the project as have the national IFA's Secretary General, Michael Berkery, and Head of Rural development, Gerry Gunning,. The local branch chairman, Michael Davoren, has been especially supportive.

Teagasc: National Director Prof. Gerry Boyle and former Chairman Tom O'Dwyer have been forthright supporters of the project and the Head of Environment, Sean Regan, played a major role in the original project application and in the securing of after-LIFE funding. Teagasc are part of DAFF, whose Minister, Brendan Smith TD, signed a ground-breaking memorandum of understanding between his Department and that of Environment, Heritage and Local Government in support of the BLP.

While some problems were caused by the high turnover of staff in NPWS and Teagasc due to decentralisation, restructuring and retirements, in general all groups worked very well together. The

legacy of the strong working relationship built up between the project partners and supporters has been of great importance in developing and securing funding for the new Burren Farming for Conservation Programme that will take the work of the BurrenLIFE Project forward.

Action F.2: Establishment of Project Headquarters

This Action related to the establishment and operation of a project office. Initially, major difficulties were encountered in securing an appropriate office in the Burren (a largely rural area). During this period Teagasc provided the project with a temporary base at its offices in Ennistymon, south of the Burren. Eventually, premises were found in the centre of Burren and were subsequently occupied by the project in March 2006.

The project office is located in an important heritage building, built in 1858, known as 'the old schoolhouse'. It was originally built as a school and was attended by Michael Cusack, founder of the Gaelic Athletic Association (the national organisation which manages and promotes Gaelic Games as well as the Irish culture and language). When a new school was built, the old schoolhouse became a community centre but had fallen into disuse as it became more dilapidated. In 2005, the Carron Community Development Group leased the building from the Church, secured a bank loan and refurbished the building into office space. This remarkable initiative was instigated by members of the community who wanted to ensure that the BLP offices were located in the heart of the Burren's rural landscape. The BLP signed a rental agreement (Annex F2.1) with the Community group and have occupied the building ever since. The same building will house the offices of the new Burren Farming for Conservation Programme thus providing a sense of continuity.

As well a providing a dedicated workspace for project staff, housing project equipment and facilitating PSC and PAG meetings, the Project Headquarters has acted as a centre for information distribution about the project. It helped to firmly establish the presence of the project within the local community. A meeting room within the offices is made available to the general public and local community groups free of charge. A list of the main items of office equipment purchased is included (Annex F2.2). A security system and broadband service were also installed in the office, the first for insurance purposes and the second to facilitate the running of the project in an area which had lacked any form of internet connection other than via an outmoded, expensive and extremely low-speed telephone system.

Action F.3: Employment of Project Team

The project team have been the key agents in the delivery of the work programme on the ground.

The main project team of Project Manager, Scientific Co-ordinator and Project Finance and Operations Officer were complemented by an Agri-environmental Specialist seconded from the project partner, Teagasc and by an Administrative Officer for the final year of the project. All project team members showed strong commitment to the project and to the Burren and the team remained intact until Sept 2009, the projected end-date of the project.

The Project Manager was the first member of staff to be recruited and he subsequently sat in on the interviews for the other two positions. Unfortunately there was a significant delay in the recruitment process: though the project commenced on 1st Sept 2004, the project manager only began work on Dec 14th 2004 followed by the Scientific Co-ordinator on Feb 7th 2005 and the Finance and Operations Officer on March 14th 2005. This amounted to a cumulative delay of 5 months which caused some knock-on problems particularly for the monitoring programme. These impacts have now been addressed.

All members of the project team undertook a range of tasks. Team meetings were held fortnightly to integrate the work of the team, to review progress and to plan works ahead. The Project Manager, Dr. Brendan Dunford, was responsible for the overall co-ordination of the project. Key functions included staff supervision, liaison with Burren farmers and project partners, selecting project sites, developing management plans, overseeing implementation of all project actions, assisting with site

monitoring activities, promoting the work of the project etc. In addition, the Project Manager sat on a number of committees and groups which were important in ensuring that the work of the BLP was integrated into developments at local, national and international levels. These included:

1. The Heritage Council, HC Wildlife Committee, HC Education Committee: 2005 onwards - allowed 6 days project time per annum for this participation with the remaining 10-12 days in own time (value added to BLP).
2. Steering group of High Nature Value Research Project based in Connemara and the Aran Islands: 2008 onwards on project time – opportunity to put lessons from BLP into practice elsewhere.
3. Directorate of the European Forum for nature Conservation and Pastoralism: 2008 onwards - in own time (value added to BLP).
4. Expert Group reviewing Ireland's Tentative list of World Heritage Sites (incl. Burren): 2008-2010 - in own time (value added to BLP).
5. Clare Biodiversity Group: 2005 onward - project time.
6. Steering group of the Burren Connect (a sustainable tourism project): 2007 onward - in own time (value added to BLP).
7. Secretary of the Burrenbeo Trust - in own time (value added to BLP).

The Scientific Co-ordinator, Dr. Sharon Parr, was responsible for monitoring the impact of project actions, in particular the ecological impacts. Dr. Parr also co-ordinated the GIS database, the delivery and monitoring of scrub control actions as well as other tasks including animal condition assessments and the securing of derogations for project actions.

The Project Finance & Operations Officer, Mr. Ruairí Ó Conchúir, was responsible for financial management and office administration, as well as the co-ordination of reporting, media and educational work, and helping co-ordinate the Burren Beef and Lamb Producers Group. Mr. Ó Conchúir was supported by Ms Aisling Keane from Jan 2009 onward, and Ms Keane assumed Mr. Ó Conchúir's role following his departure on December 11th 2009.

Agri-environmental specialist Dr. James Moran was seconded to the project by Teagasc and joined the team from 14th February 2005 to 31st August 2009 during which time he worked in close cooperation, spending 2-3 days a week in the project office. His duties included farm planning; developing the BurrenLIFE concentrate feed; co-ordinating the National Farm Survey, the agricultural monitoring programme (including the collection of samples) and the development of the nutrient export model, and assisting with the development of the project GIS.

The following organigramme provides an approximate breakdown of the time spent by members of the project team per Action. It is difficult to be precise as there was considerable overlap between many of the project actions which meant that it was difficult to assign a lot of work to a specific Action.

Organigramme

(days per project team member per task)

	Project Manager	**Scientific Co-ordinator**	**Finance & Operations Officer**	**Teagasc (J. Moran)**	**Admin A. Keane**
A1	10	20	20	20	0
A2	210	25	20	25	0
A3	25	125	50	25	0
A4	35	25	50	125	0
C1	5	0	0	0	0
C2	50	10	0	0	0
C3	25	80	2	0	0
C4	25	0	0	0	0
C5	25	0	0	0	0
C6	5	0	25	10	0

	Project Manager	Scientific Co-ordinator	Finance & Operations Officer	Teagasc (J. Moran)	Admin A. Keane
C7	25	10	10	34	0
D1	20	24	1	58.5	0
D2	10	5	0	10	0
D3	20	0	20	5	0
D4	100	0	0	0	0
D5	2	0	0	0	0
D6	25	25	2	0	0
D7	90	0	25	0	0
D8	20	0	50	0	0
E1	25	12	25	20	0
E2	7	2	50	0	20
E3	15	2	50	20	50
E4	40	20	40	15	28
E5	48	16	40	66	0
E6	10	10	40	10	7
E7	50	50	105	30	75
E8	18	30	20	28	0
E9	25	16	16	20	35
F1	20	10	20	15	0
F2	10	0	20	0	0
F3	1	0	0	0	0
F4	30	500	40	180	0
F5	30	30	40	175	0
F6	30	0	40	100	0
F7	30	65	100	40	0
F8	10	0	140	0	32.5
F9	0	0	0	0	0
Total	**1126**	**1112**	**1061**	**1031.5**	**247.5**

Action F.4: Ongoing Environmental Surveys

The purpose of the environmental monitoring programme was to try to assess and evaluate the impact of the various management activities on the environment and the priority habitats of the Burren and in doing so, provide practical information regarding their effectiveness or otherwise. In conjunction with the agricultural monitoring work outlined in Action F5 and that carried out under Actions C and D, the environmental monitoring was important as a way of obtaining the relevant and directly applicable information that has enabled the best possible delivery of the BurrenLIFE Project. This information has been of great benefit in:

- Aiding the development of the farm management practices to deliver the conservation aims.
- Providing a solid basis for advising the wider farming community, agricultural agencies and Government Departments with reference to High Nature Value Farming in the Burren.
- Assisting the development of the Burren Farming for Conservation Programme - the proposed new agri-environmental scheme that is based on the findings of the BurrenLIFE Project - and fine-tuning the Burren Measures under REPS IV.
- Justifying funding for farming for conservation in the Burren by showing that the BurrenLIFE management recommendations can deliver the conservation aim.

The environmental monitoring programme can be divided into two broad areas. The first was the development of the conceptual Risk of Nutrient Export model (RoNE) and the second, the practical ecological monitoring of the project actions, particularly in terms of the impact of grazing on the orchid-rich grassland, limestone pavement and limestone heath mosaics that abound in the Burren

SACs.

1. Risk of Nutrient Export Model:

The RoNE model was developed by Dr James Moran of Teagasc in conjunction with hydro-geological consultants, Hydro-G (Annex F4.1 for full report). Its purpose was to provide a means of gauging the likelihood of potentially damaging nutrients being transferred from farms to the Burren's highly sensitive wetland habitats (including turloughs, petrifying springs, fens and hard-water oligotrophic lakes). By doing so, it would provide a means by which the level of risk associated with farms following the BurrenLIFE model of farming for conservation could be compared with more usual farming methods. A number of different activities were carried out that provided background data for this, including soil, water and faecal sampling.

Soil: 259 soil samples were collected from the 20 project farms and analysed primarily for pH, phosphorous, potassium and magnesium by an external lab. The main use of this data was in farm planning to ensure that the nutrient management on individual farms was carried out to the highest standard in order to help protect priority wetlands. However, it was also used to inform the development of the RoNE model (Annex F4.2 Results of Soil Analyses).The original intention was to take soil samples in Y2 and again in Y6. However, as we were advised by Teagasc experts that the time interval was too short for the detection of significant change, only one round of sampling was undertaken.

Water: Water samples were collected from 20 sampling points on 13 project farms. Samples were collected 4 times over two winter periods (Sept, Dec, Mar and May 2006/2007 and 2007/2008) from 5 private groundwater wells, 4 turloughs, 3 streams, 1 lake and a pond. Their pH, dissolved oxygen content, temperature and electrical conductivity were measured at the point of collection. Nitrate, potassium, phosphate and coliform levels were analysed by an external laboratory. The information generated was used as part of an overview of ground water quality in the Burren during the development of the RoNE model and forms part of the dataset included in Appendix A of the Report on the Risk of Nutrient Export Model.

Faecal: A total of 69 faecal samples were collected from cattle grazing on the winterages during April 2007 and again in April 2008. Samples were taken to cover the range of supplementary feeding practices taking place i.e. no supplementary feeding, concentrate only, hay and concentrate, silage only, silage and concentrate. Their dry matter, nitrogen, phosphorous and potassium contents were calculated by an external laboratory in order to see if N and P levels in the diet influenced N and P levels in the dung. Unfortunately, inter-herd variability meant that no clear pattern was evident (Annex 4.3 Results of Faecal Analyses).

The development of the RoNE model has been a major success as it provides, for the first time, a direct means of comparing the risk of nutrient transfer under different farming systems. It can also be used to determine whether proposed changes in existing farm management practices have the potential of lowering the risk of nutrient transfer to water or not. It must be noted that the model as it exists, is quantified for the Burren and cannot be applied elsewhere. However, the methodology used to develop the model is transferable and can be adapted and re-quantified for different farming systems in different regions. The implications of this are far reaching and the model may have wider uses in terms of the Nitrates and Water Framework Directives. Another interesting output was the development of excel-based calculators by Dr James Moran which can be used to calculate field surpluses of nitrogen and phosphorous (see Appendix B in the Risk of Nutrient Transfer Report).

Costs for RoNE Analyses: These analyses were funded through the financial contribution of Teagasc.

Comments: A Hydro-geologist (costed under Action A.3) was employed to develop the nutrient export model rather than a soil scientist as theirs was the requisite skill-set.

2. Ecological Monitoring:

The primary aim of the ecological monitoring programme was to evaluate the success or failure of the BurrenLIFE management changes in achieving the conservation aims (or management objectives) of the Project. The wide-ranging ecological monitoring programme was carried out at three different 'scales': landscape, field and micro- or species- scale - each of which gave a different but valid, perspective of the outcomes of the Project Actions. See Annex 4.4 for the summary report containing sample results from the Ecological Monitoring Programme.

A. Landscape Scale: Aerial photographs from 2000 and 2005 were used informally to look at large-scale changes at farm level.

Baseline fixed point photography (FPP) was carried out on 19 of the Project farms and, although often focussed on scrub removal activities, it sometimes provided information on sward condition or the greater landscape. In the case of the landscape, the BurrenLIFE fixed point photographs offer a historic baseline against which future changes such as scrub encroachment can be measured. The FPP programme was repeated fully on 16 farms and partially on another. The outcome is a photo record comprising an estimated 2000 – 2500 geographically referenced digital photographs, many of which demonstrate the significant changes wrought by the scrub removal programme.

***Example of fixed point photography**: Photo on left = pre-scrub removal (Jan 2006), on right = same site 3 years post scrub removal (Mar 2009)*

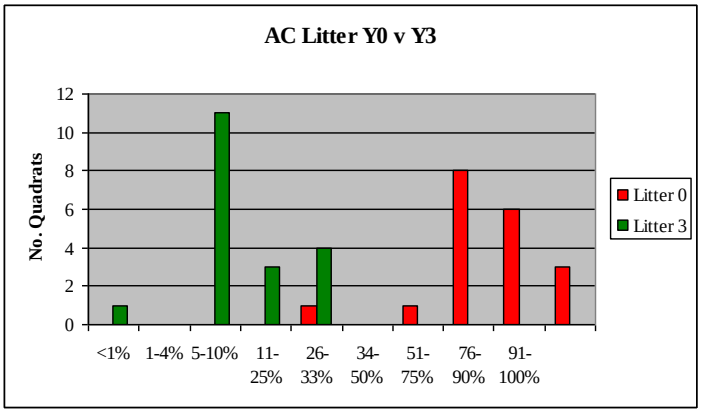
B. Field Scale: General condition assessments were carried out when assessing the grazing levels for each management unit within the SACs on the Project farms. Comments as to the relative improvements or otherwise, noted positive changes and noted problems allowed judgements to be made as to the change in overall condition of the mosaic of priority habitats within each management unit. Improved grazing levels, reduced feeding impacts and scrub removal meant that the improvements were overwhelmingly positive, with a much smaller proportion remaining unchanged and very few showing negative changes (see Action C4).

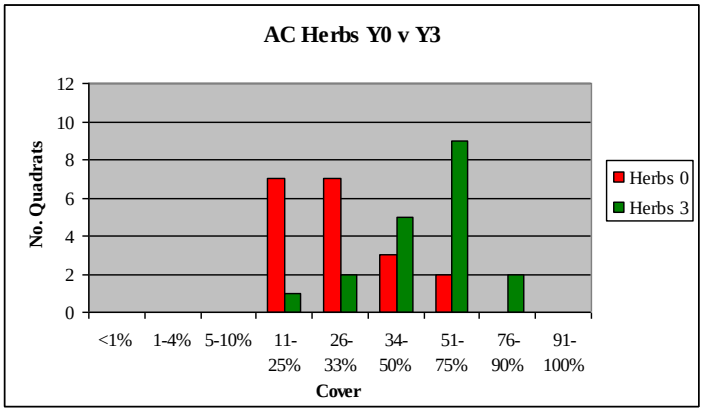
C. Micro- or Species-Scale: This approach looked at the detailed changes that cannot be seen without meticulous examination. It can be divided into two main areas: a very detailed, intensive programme of vegetation surveys and investigations into the population dynamics of hazel seedlings.

i) Vegetation Surveys: The vegetation surveys focused on the grazed priority habitats, predominantly orchid-rich calcareous grassland, and their mosaics. Thirty-two monitoring plots were set-up on 18 of the project farms and the vegetation within each plot sub-sampled using a series of quadrats. Nested quadrats were the most commonly used as these offer significant advantages over the 2x2m cover approach when looking to detect change in species-rich swards where the cover values of the majority of species are low. Baseline data was collected for 772 quadrats and all were resurveyed at least twice over the course of the project, resulting in 2116 quadrats worth of data. This vast dataset has been analysed to elucidate the trends.

The vegetation monitoring has successfully provided evidence which indicates that the management practices recommended by BurrenLIFE can deliver improvements in the conservation status of the grazed priority habitats although it does recognise that the level of success varies according to how well the management targets (i.e. improved grazing levels) were met. The level of detail collected lends itself to further analysis and it is hoped that this will be carried out in future to provide more detailed information on the ecology of the Burren's species-rich grasslands and heaths.

Furthermore, the monitoring set up under this Action could play an important role in assessing the condition of the Burren's orchid-rich grasslands and associated grazed habitats into the future. To this end, its continuation has been built into the new Burren Farming for Conservation Programme that is due to begin in April 2010.





Example of descriptive statistics obtained from the vegetation monitoring programme - Cover of litter & herbs in Years 0 and 3 for monitoring plots on Farm AC where grazing levels changed from undergrazed (Y0) to near optimal (Y3). Note marked decrease in litter and increase in herbs between Y0 & 3.

Further examples of the data and results obtained from the vegetation monitoring programme can be found in Annex 4.4.

ii) Population Dynamics of Hazel Seedlings: The original proposal (under A.3 and D.6) was to carry out hazel seedling counts on a total area of 100ha when pulling hazel seedling (under the original Tier 1 proposal in Action C3). However, as the results would have been subject to too many variables the data would have been unreliable, difficult to interpret and would have provided little information on the impact of grazing on the survival of hazel seedlings. Instead, a pilot hazel seedling monitoring programme was initiated which was capable of following the fate of individual hazel seedlings over a period of years[8]. By using this new approach to hazel monitoring, accurate data was obtained and this has provided an indication as to whether traditional winter grazing with cattle is capable of stopping the spread of hazel.

Thirty-four hazel seedling monitoring stations were set-up on seven of the project farms over a period of three years. All plots were resurveyed two years after set-up, some again three years after and the remainder four years after. The position of each seedling was mapped and its height, estimated age, presence of damage and growth form recorded. The results demonstrated that hazel seedling survival was relatively high and although seedling numbers did decrease on some farms, the overall trend was for the recruitment of new seedlings so the population actually increased over the course of the project. As increased grazing levels were recorded on six of the seven farms where hazel seedling monitoring took place, it would appear that the current practice of winter grazing with cattle only is unlikely to stop the spread of hazel. However, although the hazel seedlings multiplied, measurements indicate that their growth was minimal. Therefore, while it appears that winter grazing with cattle is unlikely to stop the spread of hazel, it may suppress seedling growth

[8] *This approach was proposed in Progress Report No.1 but was not flagged up as a proposed change in methodology as it should have been. However, the intention to drop the harvesting of hazel seedlings was signalled in Progress Report No.2 along with other amendments to C3.*

and this has important implications for any future reductions in grazing levels as a reduction in grazing intensity may be followed by a rapid increase in their growth.

Employment of Assistant Field Ecologists:
The level of ecological monitoring and restriction of the short field season (4 months end of May to end of September) was such that assistance was needed to ensure completion of the programme. To this end a field ecologist was employed for 15 days in 2008 at a rate of €300/day in order to train them so they would be up to speed for the full ecological resurvey scheduled for 2009. In 2009 the same ecologist was employed for 30 days at €300 per day and a second one for 32 days at €250 per day to carry out some of the less specialised monitoring e.g. fixed point photography, scrub regrowth assessments. The total spend on assistant field ecologists was €21,437.1 without which it would have been impossible to complete the ecological monitoring within the timeframes available.

Comment: The hold-up at the start of the project had considerable implications for the vegetation monitoring programme. The delay in selecting and signing up the project farms meant that monitoring could not be set up on a significant proportion in year 1 as we missed the 'field season' (late May to end September). This was rectified as soon as possible and the judicious choice of monitoring locations meant that the delay had no long term repercussions. This is borne out by the eventual success of the programme.

Action F5: On-going Agricultural Monitoring

The agricultural monitoring programme has been very important in terms of validating the outcome of the project actions undertaken by farmers with particular regard to impacts on agricultural productivity, sustainability and animal health. Negative findings or connotations in these areas would likely result in the failure of farmers to adopt the recommended 'farming for conservation' practices and thus seriously undermine the long-term prospects for conservation of the Burren's Priority and other Annex 1 habitats. Therefore, it was essential to have hard scientific evidence that would support the management recommendations or, in the case of negative outcomes, signal the need for adjustments or wholesale changes to rectify the situation. Having the backing of scientific data is also important in persuading other farmers to adopt management practices that facilitate conservation.

The achievements and outcomes of this Action have been excellent, the information being central to developing and promoting the BurrenLIFE 'farming for conservation' model.

Investigations into forage (grass) and fodder (hay and silage) quality: Reported under Action D1.

Cattle condition scoring: This was used as a means of seeing whether the management changes instigated were having an unacceptable or adverse impact on the condition (body fat) of the cattle on the participating LIFE farms (Annex F5.1 for report). Condition was assessed at 3 key points during the winter grazing period over 4 winter grazing seasons:

- Start of winter grazing period – at or near turnout on to the winterage (from Sept – Nov)
- Pre-main calving / during early supplementary feeding period (Jan – Feb)
- Late winter / main calving period – at or near removal from winterage (April – May)

Each herd was rated as excellent, good, fair or poor according to defined criteria as a means of showing how closely it had met the recommended condition score at each monitoring point.

The results of the condition monitoring were satisfactory in that they indicated that the changes implemented in the supplementary feeding practices (i.e. the reduction in silage use in favour of limited concentrates and in many cases, the reduction in the overall level of supplementary feeding) did not have a deleterious impact on stock condition. The finding was backed by the opinion of the farmers who felt that the condition of their cattle was within the normal range that they would expect and, in some cases, had actually improved. Another significant factor that supports the condition of the herds as acceptable is that there did not appear to be any reduction in their overall

fertility.

Blood Analysis: Eighty blood samples (8 herds, 10 samples per herd) were taken from cattle in 2006 and again in 2009 (total of 160 samples) and analysed for copper, selenium, calcium, magnesium, phosphorus and iodine (Annex F5.2 for report). The 2006 samples demonstrated deficiencies in copper, iodine and selenium that were in keeping with the national trend but indicated magnesium deficiencies that were higher than the national norm. In 2009, the proportion deficient in copper and selenium had decreased but magnesium and iodine deficiencies had increased. Although blood analysis can act as a guide to the trace mineral status of cows, there is a high degree of variation amongst individuals which makes the interpretation of the results difficult. So, while it appears that feeding the BurrenLIFE ration may have helped in counteracting shortages of copper and selenium, we cannot be certain. However, we can say that while the mineral contents of the BurrenLIFE ration as formulated may have helped there is still a need for vigilance and other more targeted means of mineral delivery may be needed. Although the blood analyses indicated that a proportion of the sampled cows had trace element deficiencies in both 2006 and 2009, the results of the herd health surveys show that this rarely translated into clinical disease. This situation mirrors the experience of local veterinary surgeons. When attending the workshop on health issues in cattle on Burren winterages the vets were unanimous in the opinion that clinical diseases associated with mineral deficiencies are very rare in animals out-wintered on the Burren.

The original cost projections for this Action were based on a total of 100 bloods samples @ €44.49/sample, giving a total cost of €4449. In reality, a total of 160 samples were taken, the increase being to give a better representation of the different management systems on the Project farms. The original cost per sample was that charged by Teagasc's own labs. However, these were closed before the Project got under way so the analysis had to be contracted out to another lab whose average cost per sample was approx €58. This meant that the total spend captured was €8,876.05, almost double the original estimate. The fees were paid in full by Teagasc as part of their financial contribution.

Herd Health Surveys: These were carried out with the individual farmers at the end of each winter grazing season / calving period (Annex 5.3). No major issues that were not in keeping with the regional norms were identified. In general, farmers reported good animal health responses under the BurrenLIFE grazing and feeding systems. There is some evidence that the reduced emphasis on silage feeding and its replacement by the BurrenLIFE ration has led to an improvement in the health of calves by reducing the incidence of scour. TB remains the major animal health issue in the area but this is the case for all Burren farms (Annex F5.4 for report on herd health).

The original intention was to carry out a detailed study of fertility and calving intervals but this did not happen on the scale envisaged. Difficulties in arranging access to the DAFF's on-line herd register facility delayed this work and any possibility of completing the task was ruled out by the departure of Dr James Moran at the end of August 2009 and the time constraints on the remaining team members. However, some less detailed data was gathered during the herd health survey.

Cattle Weighing: It was intended that cattle would be weighed on a limited number of farms as a means of gauging weight loss. However, problems with lack of infrastructure and equipment along with advice from experts in Teagasc that the results for suckler cows were likely to be meaningless, led to this being abandoned. The condition scoring programme largely negated this omission as it was a better way of assessing relative weight loss under the circumstances.

[9]Burren Feral Goats and Their Management: This technical change was agreed in a letter dated 11-6-08 and incorporated into the modified application. It was made in an attempt to address the emotive situation of the substantial feral goat population in the Burren. Raymond Werner, the

[9] *This action was wrongly put down against F4 in the modification request and then assigned to F5 in the Modified Application instead of A5 as in the letter of 11 06 2008. It is reported here under Action F5. All other references to goats are separate actions i.e. C4, D6, E6.*

leading expert on primitive goats breeds in Britain and Ireland, was commissioned to produce a report suggesting ways that the both the greater feral population and the small population of 'Old Irish' goats could be managed.

This resultant report is in five parts. The first is a draft management strategy that was devised to provide a framework for discussion at the Goat Management Workshop (Action E6). The second describes the probable origins and value of the Old Irish goat as a breed. The third part sees the draft management strategy being integrated with the outcomes of the workshop. The last two sections are the proposed management strategies: one for the Burren feral goat as a whole and another for the subset 'Old Irish' goat of the Burren. The report is presented in Annex F5.5.

Originally, a budget of €10,000 was allocated to this study but the actual spend, €2,700, was far less as the consultants fees were kept generously low.

Action F.6: Ongoing Socio-economic Surveys

This objective of this Action was to build up a socio-economic profile of the project farms and to ascertain the impact, positive or negative, of project participation. This Action was co-ordinated and financed by Teagasc through their National Farm Survey (NFS). Nationally, approximately 1,200 farms are surveyed as part of the NFS and the inclusion of project sites within this survey allowed socio-economic comparisons to be undertaken between the LIFE farms and other farms in the region and across the country.

The National Farm Survey entailed a trained farm recorder, Mr. Denis Kelliher, visiting each farmer 3-4 times per annum during which all farm records were collected using a standard format. Eighteen project farmers were surveyed in 2006, and 20 farms in 2007 and 2008. Information recorded included inventories of livestock, animal feeds, farm buildings and machinery as well as an account of labour input by the farmer and his/her family and other sources of income and expenditure. The level of detail involved in the NFS is enormous: 2256 different response variables are generated per respondent.

Results from the NFS were given to the BLP approximately a year after each survey was completed (time taken for data to be collation by Teagasc). These results were in the form of a detailed report per farm per annum. Three full years of NFS data (2006, 2007, 2008) were recorded and 58 individual reports generated (for sample report see Annex F6.1). Dr. Moran made this information available to project farmers and helped interpret it for them. This proved to be of major interest to the farmers involved.

Dr. Moran consolidated the results from the 20 farms over three years which showed that the viability of farming in the Burren is very poor (Figure F6.1) and is largely based on direct payments. In most cases actual farming activity was incurring a market loss i.e. income generated failed to meet the costs of production, and the only thing sustaining the farms economically was their Single Farm Payment.

To put this into context, for a BurrenLIFE cattle rearing system, a farmer would need 70 suckler cows in order to earn the average industrial wage of €36,800 (in 2007). This is twice the average herd size of the BLP's 20 farmers. On a more positive note, comparing variable costs on BurrenLIFE farms with those in the National Farm Survey shows that BurrenLIFE variable costs per livestock unit are €40 lower (€222 versus €262) and this is largely due to their lower outwintering costs. However the high labour input and the limited output quantities generated results in the overall viability of these low-cost systems being extremely poor.

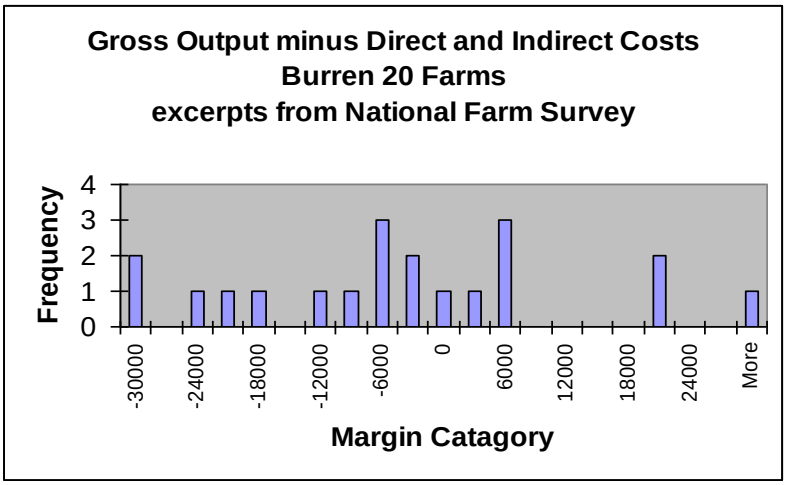


Figure F6.1: Adjusted Gross Margin Generated by BLP Agricultural Operation

In light of the negative *financial* perspective painted by the NFS results, an additional action was undertaken to further elaborate on the broader *socio-economic* perspective of farming for conservation. This new project Action, a 'Socio Economic Study of Farming for Conservation in the Burren', was conducted by a team of three researchers from the commerce and geography departments of the National University of Ireland, Galway. The results of the study were presented at the final seminar and a copy of their report is contained in the Annex F6.2.

The researchers used a survey-based valuation technique known as a Choice Experiment, as well as a relatively new valuation approach known as a 'prediction' technique, to estimate the value of some of the positive externalities generated by BurrenLIFE management practices. The aggregate benefits provided by the karst limestone pavements and the orchid rich grasslands (which the BLP seeks to protect) to Irish Nationals were estimated at €842 and €4,420 /ha/annum (lower bound and average survey based value). Other benefits of the BLP such as potential improvements in water and air quality were not taken into account. In addition, the role of the BLP in maintaining the Burren landscape which in itself is responsible for attracting tourists, helps support the local economy to an estimated value of €71.47 /ha/annum.

This data was incorporated into a Land Portfolio Allocation (LPA) model which suggested that the suckler beef and BurrenLIFE Project (BLP) payment systems are crucial for the 20 BurrenLIFE farms. These payments produce between €2,633,573 and €12,937,794 (lower bound and average survey based value) in positive cultural, karst landscape and biodiversity externality value and multiplied tourism income for the community. By including the entire direct payments and administrative costs of the BLP program the rate of return on government support for these systems was estimated at no less than 235%. Using the average estimate of the willingness to pay reported in the survey for the karst landscape with associated biodiversity and multiplied tourism income for the community, the rate of return per euro of government support was calculated to be as high as 1156%.

The implications of this study are fundamentally important for the future of farming for conservation in the Burren. Results from the National Farm Survey clearly indicate that the majority of Burren farming systems are not financially viable and are being sustained by direct payments, off-farm incomes and, in all probability, by the farmer's strong inherent connection with the land and livestock. The socio-economic study offers a broader perspective on this issue, highlighting the fact that society is willing to pay farmers for their non-market functions such as their role in maintaining biodiversity and landscape values of the Burren. While no effective system of payment exists to support this role, the study offers a strong argument for a targeted programme for the Burren through which farmers would be paid for delivering these public goods. The new Burren Farming for Conservation Programme is one such potential model.

Action F7: Collation of Project Information in GIS Database

The aim of this Action was to assemble the information and data generated by the project into a GIS database. This has been carried out within both the narrow sense of GIS, i.e. a system that includes software with mapping capabilities, and the broader sense of a geographic information system i.e. a means of storing, integrating, editing and analysing information that relates to a specified geographic location.

During preparation of the farm plans, a series of maps were created for each individual farm using a combination of data layers created by the project as well as relevant data from external sources. Layers created by the project include - farm boundaries, management units and initial land use, and those from other sources - aerial photographs, 6-inch maps, conservation designations and Record of Monuments and Places data (see Annex F7.1 for examples). The project did make a start on creating detailed habitat layers for each project farm but this proved so time-intensive that it was abandoned. Instead, the habitat layers available from a previous research project were used in conjunction with aerial photographs to provide information on the broad habitats present.

As the project progressed, new layers were created that incorporated data generated and which recorded a range of project actions e.g. soil nutrient status, the location of new vehicular access tracks, areas of scrub removal and monitoring points (see Annex F7.1 for examples). Whilst it proved easy to incorporate data associated with points e.g. location of individual monitoring points, considerable time was needed to digitise the large amount of data generated when capturing the outcome of actions such as the areas from which scrub had been removed – something that was essential for calculating areas and subsequently, costings. In addition, actions such as the restoration of internal walls meant that changes had to be made to the original farm maps to reflect the creation of new management units.

Due to the large amount of work needed to digitise the data generated and manage the database, a GIS technician, Dr Bryony Williams, was employed for six months at a cost of €14,965 (this was included in the modified application). This was essential for the delivery of both Actions A1 and F7 and had important implications for the delivery of the Nutrient export Model (see F4) and calculation of costs for the scrub removal programme (C3).

Certain data, whilst linked to geographic locations, have not been incorporated into the GIS database in the strictest sense (i.e. that created using ArcGIS software). Instead, this data has been maintained in a series of separate databases (most commonly as excel spreadsheets) linked to individual farms and sites. These include geographic information, 'raw' data and analyses e.g. vegetation data for a series of quadrats (F4) or the relative grazing levels and stocking rates associated with different management units (F5). This method of data storage allows greater flexibility in the updating, manipulation and analysis of the data and has the major advantage of allowing anybody to access the data without need for recourse to expensive, specialist GIS software or Microsoft Access.

While progress on this Action has been excellent, the dynamic nature of information generation during such a diverse project, incorporating as it does both a significant number of practical actions and sub-actions as well as research and monitoring, means that there is always likely to be additional data that could be incorporated into a software-centred GIS. Under such circumstances, the benefits of including such information must be weighed against the available resources, and decisions made accordingly. As long as data is stored in an accessible manner, it can be added to a map-based GIS system as and when required.

Delivery: The physical delivery of this Action is quite difficult for two main reasons. First, the actual map outputs and the data are in a format that requires the specialised software (ArcGIS) it was created in to read and manipulate it. Second, many of the datasets e.g. ordnance survey maps and aerial photographs are licensed to the project or beneficiary and the licenses preclude distribution to a third party. As these prevent delivery of the actual database itself we are effecting

an alternative method of delivery, namely a list of the available external (non-project generated) and internal (project-generated) GIS datasets hyperlinked to examples of the data contained therein and a series of maps (exported as PDF files) showing various projects actions e.g. farm maps, scrub removal, access tracks, location of monitoring points etc. These are provided electronically in the 'Burren GIS database' folder on the accompanying 'Deliverables' CD. The actual database housed in the BurrenLIFE offices was shown to members of the External Monitoring Team (Lynne Barratt and Graham Tucker) during their visits.

Action F.8: Financial Management

The Project Finance & Operations Officer was responsible for the day to day financial management of the project at a local level, with support from the project manager. Invoices were processed at least once a week which involved checking the details, preparing cover sheets (Annex F8.1), and forwarding the paperwork for payment to a Higher Executive Officer in the Management Planning Section of the project sponsor (NPWS) where a second check took place. Payments were then made directly using Electronic Fund Transfer (EFT) from the Department to the payee. These were usually made within 7 days of receipt by NPWS and a notification of payment was issued.

The majority of Project transactions were processed through a Suspense Account within the Department of Environment, Heritage and Local Government (Account number 80877099, Ulster Bank, Ballina, Co Mayo). Payments were made via EFT by Departmental offices in Ballina (Salaries, T &S) and Dublin (all other invoices). While the Finance & Operations Officer was unable to have live access to the Department's 'Oracle' Accounts System, summary accounts were provided upon request. Project transactions relating to Teagasc's financial input including personnel, agricultural analyses, NFS etc were processed through their own financial system.

The Project Finance & Operations Officer's role also included maintaining up-to-date books of account and updated balances under Actions and cost categories and reporting on same to the EC. The F&O officer was also responsible for co-ordinating staff and partner timesheets as well as travel and subsistence payments for the project team.

Action F.9: Independent audit

This mandatory Action was required in order to verify the financial statements produced as part of the project and for verifying the respecting of national legislation and accounting rules, and certifying that all costs incurred respect the LIFE standard administrative provisions.

The independent auditing firm retained from the outset of the project, Moore Stephens Caplin Meehan Auditors, were taken over by Farrell Grant Sparks of Molyneux House in Bride Street, Dublin 8 (www.fgspartnership.com). Meetings were held with auditors in 2007 while preparing for the Interim report and the auditors received a full set of project accounts in Sept 2009 to allow the company to prepare for the final report and a full audit in February-March 2010.

7. EVALUATION AND CONCLUSIONS

a. The process:
Initially the BurrenLIFE project was implemented in accordance with the original approved project application. Several minor technical and financial adjustments were made following approval[10] which included a reduction in the area of scrub to be removed and a reduction in the number of forage samples to be analysed. A subsequent review of project activities in 2008 identified several new areas of activity that had the potential to add value to the BLP. The resultant new actions were approved by the EC in a letter dated 11 June. A modification request was made in July 2009 seeking a prolongation to 31st January 2010 to help with the development of an appropriate structure for the roll-out of a new programme of work that would include other farmers in the Burren. This request also included a neutral budgetary modification based on moving funding between some of the major cost categories. The modification was approved in an EC letter dated 04 Aug 2009.

A rigorous process was used to select 20 project farms that represented the diversity inherent in Burren agriculture whilst protecting the project against claims of favouritism or discrimination. Individually-tailored management plans were drawn up for each farm following the collection of baseline agricultural and environmental data, and extensive consultation between the project team and the farmer. The priority tasks identified in these plans were translated into the detailed project actions that were carried out on the project farms each year. The plans were reviewed regularly by the project team and the farmer and updated accordingly. The final outcome of this process was the series of trialled, costed management actions that form the basis of the new model for the sustainable agricultural management of the Annex I priority habitats of the Burren.

b. The project management:
Schematic and descriptive overviews of the project management and working structure are provided in section 5 'LIFE –project Framework'.

Although the overall management structure has been extremely successful in terms of carrying out the project actions, successfully achieving the project's objectives and in creating a new Burren Farming for Conservation Programme, it has not been without problems. The first significant problem was the 5 month delay in assembling the full project team which had knock-on effects re site selection, drawing up of management plans and contracts, and completion of the baseline surveys, especially the ecological monitoring. The impacts of these delays were overcome or minimised by the hard work and judicious planning of the project team and others to the extent that they had no discernable negative consequences on the completion or outcome of the project.

Another early difficulty was finding a suitable office for the project within the Burren itself, a location in which none of the beneficiaries had existing premises. The solution to this problem was a major success for several reasons. First, the location of the office in Carron gave the BLP a strong visible presence in the heart of the Burren's farming and rural community and acted as an identifiable focus point for farmers and others interested in the project. Second, the solution to the accommodation problem came from the local farming community themselves as they identified the building that became the project's home and took on the financial burden of renovating it into the office space that it now is. Hence, they signalled their commitment to the project and recognition of the potential importance of its outcome to their and their families' future.

Communication between the local project office and beneficiary's financial administrators was an on-going problem which was not helped by the disparate location of the project on the western seaboard of Ireland, the main beneficiary on the eastern seaboard and the accounting department in the north west. This did not facilitate regular face to face meetings between the local project, beneficiary head office and beneficiary financial administrators which made it difficult to form the

[10] Letter from DG Environment dated 19 Feb 2007

most effective working relationships. The communication problems were compounded by the high turnover of administrative staff which meant that working relationships and methods had to be renewed with unsettling regularity. Similar, but far less pronounced problems, existed with the project partner Teagasc, and were mitigated largely by the presence of Dr James Moran who was able to liaise more effectively within his own organisation.

In contrast, the technical support provided by the project partners has been excellent and strong working relationships have been built both between the project team and the three partners as well as between the partners themselves. The Project Steering Committee was the main vehicle through which these parties interfaced, offering valuable guidance to the project team while strengthening the relationship between the partners. BurrenLIFE was the first instance where the NPWS, Teagasc and the IFA have acted together as a cohesive unit. In the case of the NPWS and the Burren IFA, this marked a real shift in the mind-set that saw Partners, whose primary aims and methods were often seen as diametrically opposed in the past, begin to respect and understand each other. The result is that they have successfully worked toward the common goal of a sustainable management plan for the Burren that encompasses conservation, agriculture, local economy and community support.

Each partner brought something different to the project that facilitated and strengthened its delivery. NPWS research staff, especially Drs John Cross and Andy Bleasdale, have provided technical advice relating to conservation and conservation policy, acted as sounding boards, worked to find solutions to the communications problems mentioned above and facilitated meetings with other projects, organisations and individuals. In addition, the local NPWS Conservation Rangers and District Conservation Officer have facilitated the derogations needed for some of the pioneering work that was carried out and have assisted in the development of some of the methodology particularly in relation to scrub control. At a local level this co-operation has benefitted both the local NPWS staff and the farmers as the two parties, who were often at loggerheads, now have a better understanding of the other's needs and the fact that certain actions can deliver different but mutually beneficial end points. For example, granting permission for a vehicular access track helps the farmer to herd his stock thus ensuring that he carries on grazing his/her winterage and maintains or improves the conservation status of priority habitats such as orchid-rich calcareous grasslands.

Teagasc provided a wealth of agricultural and technical expertise and knowledge which underpinned many of the project Actions particularly those to do with the development of the concentrate feed, the profiling of the agricultural capacity of the grasslands, animal health and welfare, the revision of the existing agri-environmental schemes and evaluating the socio-economic status of Burren agriculture. Their participation and input added credibility to the idea of 'Farming for Conservation' which was important for the idea to gain acceptance amongst a farming community so long driven by the conventional 'production model' of agriculture. Furthermore, their secondment of Dr James Moran to the project was invaluable and it is unlikely that some actions would have been completed, or completed as successfully, without his input in terms of both time and expertise.

The Burren IFA are the closest to the reality of farming in the Burren and thus brought both a guiding hand and a critical eye to the project. They were crucial in providing sound advice and practical support to the project, making sure that the Actions and suggestions of the project were realistic. Their participation was also critical in facilitating the setting up, publicising and execution of the project and in ensuring acceptance by the wider farming community. In return, the project has provided them with valuable insights into alternative approaches that can help improve the viability of their farming systems thus helping to support them into the future.

c. Successes and failures

Overall, the BLP has been extremely successful. The successes include:

- The translation of the findings and methodology of the BLP into the new Burren Farming for Conservation Programme starting in April 2010.
- Improvement in grazing levels with the area classed as undergrazed decreasing from 1,534 to 679ha and the area classed as well grazed increasing from 572 to 1,239ha resulting in an improvement in conservation status of these areas.
- The shift from silage to concentrate-based supplementary feeding systems as shown by the 171% increase in the weight of ration and 61% reduction in the amount of silage consumed.
- Establishing the vegetation monitoring programme and collection of baseline data which will contribute to assessing future change and conservation status.
- The development of the Risk of Nutrient Export Model and demonstration of the potential benefits of the BurrenLIFE approach to farming for conservation in protecting the wetland habitats of the Burren compared to conventional production-based agriculture.
- The quantification of the potential socio-economic benefits of farming for conservation in the Burren and the confirmation of the high public willingness to pay for these benefits.
- A significant attitude shift – more farmers and their families viewing the Burren as a place to be proud of rather than being ashamed of.
- The high profile of the BLP on local, national and international levels and the fact that it is being held up by many as an excellent example of farming for conservation, of integration of traditional management[11] with modern technology and as the way forward for the development of effective evidence-based, locally-tailored agri-environmental schemes[12].
- The successful translation of scientifically derived data into a useable format for farmers via the development of the BurrenLIFE best practice guides.
- Investment in local economy both financially, through the subcontracting of conservation related work, and raising the local skill base through training and participation in such work.
- The Heritage Education Programme as both an educational vehicle and a means of ensuring broader engagement with people outside of the farming community.
- The increase in the level of expertise and knowledge regarding the theory and practice of farming for conservation from the ground (farmers) to research organisations and personnel to policy makers.

Failures

- Although there were significant improvements in grazing levels on much of the project area, some areas remain which are little or no better grazed than at the start. Sometimes this was down to lack of farmer engagement but in other situations it was due to unsuitable stock e.g. modern breeds of suckler cow cannot be 'pushed' as hard as the dry stock that would have dominated the winterages in the past due to the stage of pregnancy when on the winterage. In addition, there was an increase in the area deemed overgrazed during the project (from 13 to 192ha).
- Addressing damaged areas – this Action had very poor uptake and was further hindered by the potential for double payment as some aspects are covered under REPS and cross compliance.

[11] Case study accepted for forthcoming CBD Secretariat technical publication looking at sustainable, natural resource management as part of the Satoyama Initiative.

[12] See Lenihan & Brasier (2009), Scaling down the European model of agriculture: the case of the Rural Environmental Protection Scheme in Ireland. Agric.Hum. Values, 26 (4) 365-378

- Burren Beef and Lamb Producers Group – despite considerable support from the project the BBLPG has failed to move on to a sound footing both financially and structurally in order to ensure future viability. If it is to survive the group must evolve and identify someone who can take control and provide sound direction.

Overview of Farmer 'Buy-in': Some very interesting lessons were learned from the 20 diverse farms and farmers involved in the BurrenLIFE project in terms of how their circumstances affected their response to the project. For instance, some farmers proactively embraced the ideas and proposals put forward by the project team, others were much more passive and needed a lot of encouragement, while some never fully engaged with the project and were slow in, or even resistant to, taking advice. In general, full-time farmers tended to engage more with the project compared with their part-time counterparts who seemed to think it less relevant and were less inclined to invest time and money in the 'marginal' winterage areas of their farm through the project. However, some of the full-time farmers tended to over-stock winterages as farming was their main source of income and they felt that they had to maintain high stock numbers to maximise revenues or to be seen as 'good farmers'. One key factor for successful participation seemed to be the interest of the farmer in farming and the Burren in general. Those that delivered the most were those with a deep interest and involvement in farming and livestock and who had a better developed sense of 'pride of place'. Another interesting factor that affected level of participation was their family situation, active participation being lower on all farms to which children were born during the project!

d. Comparison against project objectives

Not only has the BurrenLIFE project achieved its objective 'to develop a new model for the sustainable agricultural management of the Habitats Directive Annex I priority habitats of the Burren' but the model also forms the basis for the new 'Burren Farming for Conservation Programme' (BFCP) that begins in April 2010.

Implementation of the project actions resulted in the development of methods for calculating sustainable grazing regimes for different winterage types. This, in tandem with the new supplementary feeding systems and elucidation of a range of infrastructural support mechanisms, provides the key to optimising forage utilization and, in turn, is the key to securing the favourable conservation status of the priority habitats of the Burren. The costing of the various project actions enabled the pricing of activities involved in farming for conservation e.g. wall restoration, scrub control, as well as allowing comparisons to be made between different farming systems e.g. the cost of feeding concentrate versus silage. As a result we know that the new feeding and grazing systems can minimise input costs compared to the widespread practice of winter feeding with silage but actions such as scrub removal are expensive so their on-farm sustainability can only be met through subsidisation.

e. Environmental benefits, policy and legislation implications

The activities of the BurrenLIFE project have provided several conservation benefits for the Natura 2000 (pSCI - denoted nationally as SAC) habitats of the Burren. Improved grazing levels resulted in the area described as 'well grazed' doubling from 572 to 1,239ha over the course of the project. This represents either maintenance or improvement in the conservation status of the priority habitats present. Whilst 679ha are still viewed as being somewhat undergrazed, much of the area is better grazed than it was at the beginning of the project so the conservation status is improving. The improvement in conservation status was confirmed by the findings of the vegetation monitoring programme particularly with regard to the widespread decrease in litter levels and oft-associated increase in the ration of herb to grass cover on sites where grazing levels improved.

The removal of hazel-dominated scrub from 100ha of priority habitat led to a direct improvement in conservation status and the suppression of hazel seedling growth on well grazed pastures will have long-term benefits as the seedlings are unlikely to produce seed (nuts).

The Risk of Nutrient Transfer Model (RoNE) developed during the project indicates that the BurrenLIFE approach reduces the risk of nutrients finding their way from farms to the Burren's sensitive wetland ecosystems and priority habitats i.e. turloughs, *Cladium* fens and petrifying springs. For example, the move from silage to concentrate-based feeding, which resulted in a 61% reduction in the amount of silage used, means that some farms have reduced fertiliser applications and in addition, the risk of nutrient transfer is lower when feeding concentrates compared to silage. The soil sampling carried out on the project farms also led to a reduction in fertiliser usage as the project was able to promote more targeted fertiliser use based on the results. Furthermore, the promotion of outwintering systems for cattle and the demonstration that this management method is more economically viable than housing them for the winter encourages farmers to move to the pastoral system with a concomitant reduction in the need to dispose of slurry which accumulated during the housing period.

The BurrenLIFE project has played a significant role in reshaping policy regarding the management of the Burren's habitats, forming as it does, the basis of the new Burren Farming for Conservation Programme. The project's recommendations were incorporated in to the Burren Measures of the National Agri-environmental programme (REPS IV). The sphere of influence extends beyond the Burren as organisations and groups in other HNV areas are applying the BurrenLIFE methodology and approach to farming for conservation to their own areas and situations. This may result in the elucidation of targeted agri-environmental policies for those areas in the future. The BLP team has been very active in mentoring communities in other HNV areas in Ireland and in working with organisations such as the EFNCP and the Heritage Council which are leading the promotion of HNV farming at a European and Irish level.

f. Innovation, demonstration value

The BurrenLIFE project has been innovative in the way it has approached a wide range of matters. In technological terms, the development and use of the new, specifically tailored concentrate-based feeding system represents a significant innovation in the area of farming for conservation as supplementary feeding is usually eschewed in such systems. This is further evidenced by the fact that the formula for the BurrenLIFE ration came about through the combination of existing knowledge regarding the nutritional needs of the suckler cow and the results of detailed analyses into the forage quality of the broad vegetation types found on Burren winterages. Another significant innovation is that the feed is formulated with a high protein content which not only supplies the nutrients missing from the forage between January and May but which specifically encourages the cattle to forage more by stimulating rumen activity, thus facilitating increased grazing levels. The rationale behind, and the approach taken in, developing the feed is directly transferable to other farming for conservation situations.

A second technological innovation was the development of the 'Risk of Nutrient Export' model. The impossibility of isolating the impacts of farming activities on individual farms (or even management units) on water quality from that of other farms, domestic residences etc meant that developing such a model was the only viable solution. Hence, the development of the RoNE model is a major success as it provides, for the first time, a direct means of comparing the risk of nutrient transfer under different farming systems. It can also be used to determine whether proposed changes in existing farm management practices have the potential of lowering the risk of nutrient transfer to water or not. Although the model developed is quantified for the Burren and thus cannot be applied elsewhere, the methodology used to develop it is transferable and can be adapted and re-quantified for different farming systems in different regions. The implications of this are far reaching and the model may have wider uses in terms of the Nitrates and Water Framework Directives. Two interesting additional outputs were the development of excel-based calculators which can be used to calculate field surpluses of nitrogen and phosphorous and these also have the potential for wider application.

Another novel approach has been a change in the perception of the role of certain activities and their impact on conservation status and the recognition of the importance of good farming infrastructure. For example, actions such as the construction of vehicular access tracks on Burren winterages would previously have been viewed only in terms of their negative impact. However, when done using strategies designed to negate or minimise damage to limestone pavement and orchid-rich grassland by selecting the most appropriate routes, using sympathetic construction techniques and locally represented materials (limestone chip), the benefits far outweigh the disadvantages with regard to ensuring that the land is not abandoned and grazing continues into the future.

Changes in perception also led to the establishment of successful partnerships that brought together groups that might logically be expected to work together towards a common goal but who have not actually done so before. The formation of a close, positive working relationship between NPWS, Teagasc and the IFA is unprecedented in Ireland and represents a very significant innovation and shift in thinking.

Another innovation employed during the BLP was the use of project farmers and other local farmers as communicators of project information. This form of communication was pioneered specifically because the project felt that the best way to convince farmers as to the efficacy and practicality of any proposed conservation measures was for the information to come from other farmers who they respected. Farmer-to-farmer knowledge and skills transfer was a central tenet of the BurrenLIFE project.

All of the above are transferable to other protected areas and member states either in their entirety or in terms of the underlying methodology/approach.

The BurrenLIFE project has demonstrated the value of the EU LIFE-Nature funding to the farming and wider community through demonstration events, the erection of four permanent signs, presentations, hosting visitors from around the globe and publications such as the project newsletters, best practice guides and layman's report.

g. Socio-economic effects

The scale and type of farming dictated by the topography of the Burren means that for the most part, farming in the Burren is not economically viable and is only sustained by direct payments. The majority of Burren farms are incapable of generating an income equivalent to that of the average industrial wage so many Burren farmers rely on off-farm work to provide them with a living and often to support the farm itself. Despite these problems, the continuation of farming is fundamental to the Burren as it is the foundation on which so many other things stand e.g. tourism, community structures and conservation. Farming contributes to the maintenance of the dramatic landscape and favours the habitats and unusual floral assemblages that attract many visitors and forms the basis for its inclusion in the Natura 2000 network. A well resourced farming for conservation programme, such as that developed as a direct result of the funding that the BurrenLIFE project, received could make a significant contribution to farm viability, help to support the rural communities of the Burren and ensure the conservation of its Annex I habitats into the future.

Through its Register of Workers, BurrenLIFE demonstrated that conservation works such as scrub removal, wall restoration and other infrastructural activities can provide an income for local people whether farmers or tradesmen. Furthermore, this money (c. €330,000 during the BLP alone) tends to stay in the local area thus increasing the viability of the rural communities. Another initially unforeseen benefit of the subcontracted conservation work was its ability to offset the social isolation that many farmers experience as the work was usually carried out by teams of at least two and provided an opportunity for social interaction.

The Heritage Education Programme has been very important for raising awareness of the many different facets of the Burren from geology to natural history, archaeology and folklore both within the farming and wider community. One direct outcome has been a reassessment by many farmers of

their role in the Burren; no longer do they see themselves as the poor cousins trying to scratch a living in a difficult area but more as the inheritors and custodians of a place that is the unique result of its past and current management i.e. something fashioned by their ancestors and maintained by themselves. Indeed, it could be said that the BurrenLIFE project has helped to restore a sense of pride amongst its communities.

By demonstrating the fact that society is willing to pay farmers for their non-market functions such as their role in maintaining biodiversity and landscape values of the Burren the socio-economic study (F6) showed that conservation can have economic benefits for the Burren. While no effective system of payment exists to support this role, the study offers a strong argument for a targeted programme for the Burren through which farmers would be paid for delivering these public goods. The new Burren Farming for Conservation Programme is one such potential model.

h. The future: sustainability
See the After-LIFE conservation plan in section 8.

i. Long term indicators of the project's success
One of the best long term indicators of the project's success will be the number of farmers and area of pSCI taken into the follow-on Burren Farming for Conservation Programme and whether that programme is expanded beyond the 3 years and 100 farmers currently proposed.

In terms of the Project farms, indicators of success will be:

- the number who continue to farm according to the BurrenLIFE principles with regard to grazing days and the use of concentrate feed rather than silage
- the proportion of management units falling into the undergrazed, well grazed and overgrazed categories compared to that at the start of the BLP and the conservation status of the mosaic of Annex I habitats present in each
- the status of the vegetation as indicated by the BLP's detailed vegetation monitoring, the continuation of which forms part of the new BFCP

8. AFTER-LIFE CONSERVATION PLAN (including After-LIFE communications plan)

The After-LIFE Conservation Plan is supplied both as a separately bound stand-alone document and electronically on the accompanying 'BurrenLIFE Final Report' CD.

9. COMMENTS ON FINANCIAL REPORT

The Financial Report and a detailed commentary on same are supplied both as separately bound documents and electronically on the accompanying 'BurrenLIFE Final Report' CD.

	Cost category	**Approved Provisional Budget (€)**	**Total Costs incurred (€)**	**% Diff**
1	Personnel	1,204,836	1,294,938.47	7.48
2	Travel	107,404	121,609.29	13.23
3.	External Ass.	554,773	580,170.94	4.58
4.	Durables	53,500	61,794.14	15.50
5.	Consumables	58,500	66,196.8	13.16
6.	Other costs	155,349	169,376.55	9.03
7.	Overheads	96,125	96,995.96	0.9
	Total	**2,230,487.00**	**2,391,082.15**	**7.2**

Table 9.1:Final incurred costs per category relative to provisional budgets

Table 9.1 shows that the BLP exceeded its budget by 7.2%, a sum of €160,595. This additional sum reflects some of the significant level of additional financial investment made by the project sponsor, NPWS, and main project partner, Teagasc, in the work of the BLP. This does not impact on the level of EC support provided (€1,672,865) as all additional costs have been covered by the project sponsor/partner.

10. ANNEXES

A list of annexes is provided in section 1. All annexes are supplied electronically on the accompanying 'BurrenLIFE Final Report' CD. Hard copies of project-generated literature are supplied where specified in list of annexes on section 1. Hard copies of annexes are available on request.

11. LAYMAN'S REPORT

The Layman's Report is supplied both as a stand-alone document and electronically on the accompanying 'BurrenLIFE Final Report' CD (in E Actions – Annexes: E9.1f).