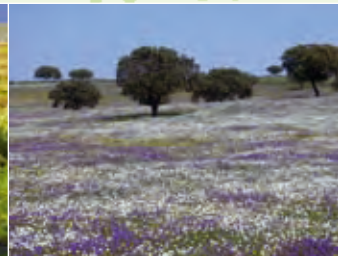




LIFE III

focus



LIFE and Europe's grasslands

Restoring a forgotten habitat



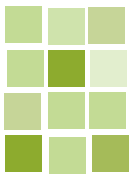
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Philip Owen

Grassland ecosystems hold an important part of Europe's biodiversity. They offer ideal conditions for a vast diversity of habitats and species, and are especially important for birds and invertebrates, providing vital breeding grounds. Grasslands are also the source of a wide range of public goods and services, ranging from meat and dairy products to recreational and tourism opportunities. In addition, they act as carbon 'sinks' and are therefore a vital asset in the effort to reduce levels of greenhouse gases in the atmosphere.

Except for very limited areas of special natural grassland types, most European grasslands are maintained through grazing or cutting. However, changes in agricultural practices and land use pressures mean that grasslands are disappearing at an alarming rate and are nowadays among Europe's most threatened ecosystems.

As a contracting party to the Convention on Biological Diversity (CBD), the European Community has taken decisive steps to fulfil its commitments and to meet the target defined by the Heads of State and Government, to halt biodiversity loss by 2010. In May 2006, the European Commission adopted a Communication on Biodiversity and an Action Plan that defines priority actions to meet this target. Many of the objectives, targets and actions are directly relevant to the conservation and wise use of grasslands.

The Habitats and Birds directives are the main pieces of legislation ensuring the protection of Europe's grasslands.

Since its beginning, the Commission's environment and nature funding programme, LIFE, has been contributing to projects with actions targeting grassland ecosystems within the Natura 2000 network. This brochure presents a selection of grassland projects that have received LIFE co-funding since 1992. The majority of projects focus on the restoration and management of grasslands, while a few also target key grasslands species.

Of particular importance is the link between agriculture and grasslands habitats, which is being developed through LIFE and will be strengthened by the Rural Development Programme. EU Rural Development Policy aims to reconcile agriculture with the objectives of EU nature conservation policy. This goal is achieved by financing agri-environmental measures that go beyond the usual good farming practices and that have a direct impact on the conservation of European grasslands, particularly through the maintenance of extensive systems and support for agriculture in Natura 2000 sites.

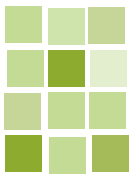
Looking to the future, it is hoped that Member States will take advantage of new opportunities for the funding of grassland projects under the Commission's LIFE+ programme.

Philip Owen

Head of Unit – LIFE

Directorate-General for the Environment

European Commission



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Europe's grasslands

– definition, status and threats

Europe's grasslands are one of our most important biotopes. In this section, we define what is meant by 'grasslands', examine the status of this habitat-type and look at the threats it is facing.

What are grasslands?

In its narrow sense, 'grassland' may be defined as ground covered by vegetation dominated by grasses, with little or no tree cover; UNESCO defines grassland as "land covered with herbaceous plants with less than 10 percent tree and shrub cover." According to FAO¹, grasslands (*sensu lato*) are among the largest habitat type in the world; their area is estimated at 52.5 million km², or 40.5% of the Earth's landmass.

In Europe there are various types of grasslands, ranging from almost desertic types in south-east Spain through steppic and mesic types to humid grasslands/meadows, which dominate in the north and north-west.

Since almost all European grasslands are more or less modified by human activity and have to a major extent been created and maintained by agricultural activities, they could be defined as "semi-natural grasslands", although their plant communities are natural. These grasslands are maintained through farmers' grazing and/or cutting regimes. There are also some more natural 'permanent grasslands' that occur in Europe. The distribution of these is determined by natural conditions including climate, topography and soil structure.

Grasslands are among the most species-rich habitats in Europe. Indeed calcareous (chalky) grasslands are Europe's most species-rich plant

¹ *Grasslands of the World*, eds J. M. SUTTIE, S. G. REYNOLDS & C. BATELLO. xxii+514 pp. Rome: FAO (2005)

Area under grassland in utilised agricultural area (UAA) in some European countries in 1995



Source: EEA, Copenhagen, 2004

communities² (up to 80 plant species/m²). This extremely high plant diversity gives rise to high arthropod diversity (e.g. butterflies) and can support grassland-adapted birds – bustards,

² WallisDeVries MF, Poschlod P, Willems JH. (2002). Challenges for the conservation of calcareous grasslands in Northwestern Europe: integrating the requirements of flora and fauna. *Biol. Conserv.* 104, p. 265–273.

falcons, etc – and other species such as rodents (souslik, voles, etc).

Current status

According to FAO (2006)³, the area of grasslands in the EU declined by

³ FAO (Food and Agricultural Organisation of the United Nations) 2006: *FAO Statistical Yearbook*. – FAOSTAT



12.8% from 1990 to 2003; only a few Member States managed to buck this trend.

According to EEA (1999):

- Except for very limited areas of special natural grassland types, all European grasslands are maintained through grazing or cutting, the continuation and intensity of which are crucial for the protection of the grasslands and the species they harbour.
- Pressure on grassland habitats is increasing steadily. Some 60% of the newly afforested area in the EU was formerly permanent pasture or meadows, 37% was arable land and only 3% was permanent cropland.

Threats

- **Changes in land use and land abandonment / abandonment of traditional activities** – The conversion of grasslands to arable land has mainly been driven by increased demands for agricultural products and a generally higher profitability of arable farming. More recently, increased pressure on farmland from biofuels production is exacerbating the situation. On the other hand, those more traditional farmland areas where socio-economic conditions for extensive agriculture are generally unfavourable tend to be abandoned. This situation is particularly worrying in central and eastern Europe, where political and economic changes have negatively

Typical "montado" or "dehesa" semi-natural grassland of the Iberian peninsula



Photo: LIFE02 NAT/P/008-476

Types of grasslands in Europe¹

- **Natural grasslands** – includes nine grasslands habitats that thrive without direct human intervention and are limited by specific ecological, soil and climate conditions, e.g. Alpine grasslands
- **Semi-natural dry grasslands and scrubland facies** – includes 12 grasslands habitats that are to some extent managed, ranging from Mediterranean grasslands to Pannonic steppe and Fennoscandinavian grasslands.
- **Sclerophyllous grazed forests (dehesas)** – includes only one grassland habitat known in Portugal montado and in Spain as dehesas – semi-natural savanna-like open woodlands with scattered oak trees and extensive grazed grasslands.
- **Semi-natural tall-herb humid meadows** – includes six grasslands habitats that have some soil water presence.
- **Mesophile grasslands** – includes three grasslands habitats comprising all meadows.

¹ Adopted from Annex 1 of the Habitats Directive

affected the conditions for farming (e.g. EEA 2004a). For example, a survey of Estonia in 2000 found that some 25% of the arable land was abandoned and the corresponding figure for permanent grasslands was as high as 56% (EEA 2004b).

- **Afforestation** – In several Member States, deliberate afforestation, e.g. with poplars *Populus sp.*, is a significant threat to permanent grasslands. For the EU-15 as a whole, a breakdown of newly afforested land according to previous use revealed that 60% was formerly permanent pastures or meadows while only 40% was cropland (EEA 2001).
- **Changes in livestock density** – The presence of grazing livestock is often essential for maintenance

of the grassland habitat. Therefore, changes in the number and distribution of livestock may profoundly affect the grasslands and their value for wildlife. According to FAO (2006), the numbers of cattle and sheep in EU-25 declined by 10.3% and 11.4% respectively from 1990 to 2003.

- **Intensification of grassland management and mowing** – Intensification of grassland management includes the use of fertilisers, pesticides and phytocides, re-seeding with improved or alien grass varieties, and faster, more efficient, mechanical mowing techniques. This change in management increases plant density and biomass, but also reduces the structural and floristic diversity of the sward. In general,

Figure 1: Change of area in grasslands EU-25 (1990-2003)



Source: FAO, 2006 (FAO Statistical Yearbook. – FAOSTAT)

Grasslands goods and services

Food, foraging and livestock

Above all, grasslands are used for the production of domestic livestock. From cattle, sheep and goat herds, to horses and water buffalo, grasslands support large numbers of domestic animals, which become the source of meat, milk, wool, and leather products for humans.

Biodiversity

Grassland biodiversity encompasses a wide range of goods useful to humans. Grasslands have been the seed beds for the ancestors of major cereal crops, including wheat, rice, rye, barley, sorghum, and millet. They continue to provide the genetic material necessary to breed cultivated varieties that are resistant to crop diseases. Grasslands also provide a habitat for plants and animals – soil microfauna and large mammals alike. Grasslands also support large numbers of wild herbivores that depend on the biotope for breeding, migratory, and wintering habitat, and share the land with domestic herds. An EU-funded research project (BIODEPTH)* has shown that the loss of biodiversity in European grasslands would make them less productive, reducing the amount of energy available to the rest of the food chain and threatening the overall health of the ecosystem.

Biodiversity and Ecological Processes in Terrestrial Herbaceous Ecosystems – The report was published in 1999 at "Plant Diversity and Productivity Experiments in European Grasslands" by A. Hector et al. published in the peer-reviewed journal, Science Vol. 286 Issue 5442, 1123-1127

Carbon storage

Grasslands store approximately 34% of the global stock of carbon in terrestrial ecosystems, whilst forests store approximately 39% and agro-ecosystems approximately 17%. Unlike forests, where vegetation is the primary source of carbon storage, most of the grassland carbon stocks are in the soil. Cultivation and urbanisation of grasslands, and other modifications of grasslands through desertification and livestock grazing can be a significant source of carbon emissions. Biomass burning, especially from tropical savannas, contributes more than 40% of gross global carbon dioxide emissions. Some alien grassland plant species may decrease total carbon storage because they have less extensive below-ground root networks for storing organic matter than native grassland plants.

Soil protection in ecosystems endangered by erosion and desertification

Soil restoration following forest fires.

Tourism and recreation

People are attracted by the birds, diverse plant life and open-air landscapes of grasslands.



Photo: LIFE00 NAT/S/007118

invertebrate abundance and diversity are reduced, the nests of birds such as corncrakes and bustards are damaged and their movement interfered with.

• Other:

- **lowering of water tables** – Drainage and control of winter flooding pave the way for agricultural intensification, either as conversion to arable land or as improvement of grasslands (cf. above). However,

prevention of flooding and lowering of the water table on the meadows have per se profound effects on the suitability of the area for many species;

- **deposition of airborne nitrogen (ammonia)** – Such deposition encourages the growth of competitive plant species, favouring species-poor mesotrophic and eutrophic communities and reducing the structural diversity of grasslands.

Annex I grasslands habitats conservation status

More than 75% of the grasslands habitats are in an unfavourable conservation status, according to draft data provided by Member States under Article 17 of the Habitats Directive. For more information on the assessment visit: http://ec.europa.eu/environment/nature/knowledge/rep_habitats/index_en.htm#csa



EU grasslands policy

Grasslands in Europe are an integrate part of pastoral and mixed-farming systems and have traditionally been used for haymaking, livestock grazing, or both. The EU is committed to reconciling the demands of agriculture with a commitment to biodiversity in these important habitats.

European heads of State agreed at the 2001 summit in Gothenburg to halt biodiversity loss by 2010. The following year, the parties to the Convention on Biological Diversity (CBD) and some 130 world leaders committed themselves to a significant reduction in the rate of biodiversity loss by the same target date. A Commission Communication of May 2006, "Halting the Loss of Biodiversity by 2010 – and Beyond" [COM(2006)216] reconfirmed Europe's commitment to implementing the CBD target.

Two particular threats to EU biodiversity are highlighted in the Communication. Firstly, "spatial development", for which Member States have a particular responsibility, through improved planning, to reconcile development needs with the conservation of biodiversity and maintenance of ecosystem services. The second threat is the potential impact of climate change, where rising temperatures are already having a biological impact, including earlier timing of spring events and poleward and upward shifts in ranges in both plant and animal species.

The EU approach recognises that biodiversity is not evenly spread, and that certain species are more at risk than others. Consequently, it affords special attention to the protection of sites of highest nature value and species most at risk included in the Habitats and Birds directives. However, this approach also recognises that much biodiversity resides outside these sites, and that effective conservation and sustainable use of biodiversity, and the maintenance of essential ecosystem services, also require action in the wider countryside. For plants, such action is provided for by spe-



Photo: LIFE02 NAT/P/008476

Biodiversity-rich grasslands habitats in need of conservation are situated in, or close to, agricultural land

cific requirements in the EU Habitats Directive (92/43/EEC), and more generally by the integration of biodiversity concerns into agricultural and other policies.

The 2001 Biodiversity Action Plan for Agriculture (COM/2001/0162) aims to reduce the negative impacts of farming practices by promoting the sustainable use of biological resources. It is one of the four biodiversity action plans, covering 1) conservation of natural resources, 2) agriculture, 3) fisheries, and 4) economic and development co-operation outside Europe, included in the EU's Sixth Environmental Action Programme (6th EAP), approved by the Council of Ministers in 2001. It also has the goal of stemming biodiversity loss by 2010. Many of the biodiversity-rich habitats in need of conservation are situated in, or close to, agricultural land, where inappropriate agricultural practices have reduced biological diversity. The presence of some plant species and habitats that are dependent on

extensive farming, for example, has declined in recent decades.

Natura 2000 and grasslands

Natura 2000 is a European network of areas, proposed under the Birds Directive and the Habitats Directive, where human activity must be compatible with the conservation of sites of natural importance. The Habitats Directive has focused on the requirement of Member States to establish a network of special areas of conservation (SACs) that, together with the special protection areas (SPAs) designated under the Birds Directive (79/409/EEC), make up the Natura 2000 network.

Annexes I and II to the Habitats Directive list the habitats and species whose conservation requires the designation of SACs. Some of them are defined as 'priority' habitats or species (in danger of disappearing).

With a proposed coverage of almost 21% of the Community's land area at

the beginning of 2008, the Natura 2000 network has been a source of much concern among the public, especially farmers. Their concerns are understandable since, apart from marine and freshwater areas and high-altitude rocky land, most of the natural habitats covered by Natura 2000 are in agricultural or forest areas. However, Natura 2000 does not prevent human activity, but rather is committed to conserving threatened and/or outstanding species and habitats in Europe by having them coexist in a balanced way with human activities.



Photo: LIFE02 NAT/P/008476

Grasslands as high nature value farmland

Large areas of present-day or former grasslands were originally created by the clearing of forest. Consequently, these areas will rather quickly (within a few decades) become overgrown with trees and scrub if left alone. Natural grazers nowadays play an insignificant role in keeping the grasslands open. Thus, the majority of semi-natural grasslands depend on regular farming activities for their continuous existence as open habitats (the main exceptions being alpine meadows above the treeline). These areas are therefore semi-natural grasslands habitats, created and maintained by human activity. In many cases their natural characteristics would disappear if agricultural work or animal rearing were to cease.

For example: without grain production, the great bustard (*Otis tarda*) would desert central Spain or Hungary; without humid hay- or grazing-meadows, the corncrake (*Crex crex*) would abandon the banks of the Loire; without the guaranteed pastures of open wooded meadows, the hermit beetle (*Osmoderma eremita*) would disappear from southern Sweden.

The management needs of grasslands

Grasslands in Europe are an integrated part of pastoral and mixed-farming

Farming and the protection of Natura 2000 sites have everything to gain from coexisting

systems and have traditionally been used for hay-making, livestock grazing, or both. In broad terms, high biodiversity values coincide with low agricultural inputs, low stocking densities and often labour-intensive management practices. Particularly important are the small-scale farming systems that are responsible for creating and maintaining the species-rich semi-natural grasslands, which are often true hot spots for biodiversity (EEA 2004b).

In general, livestock species, stocking densities, and timing of grazing and mowing have a strong influence on the grassland habitat and its wildlife. Overstocking is generally harmful to biodiversity, but the optimum livestock density, timing of grazing/mowing etc. strongly depend on the local conditions and conservation targets.

EU Rural Development Policy (Council Reg (EC) No.1257/1999) aims to reconcile agriculture with the objectives of the EU nature conservation policy. This goal is achieved by financing agri-environmental measures that go beyond the usual good farming practices and that have a direct impact on the conservation of European grasslands, particularly through the maintenance of extensive systems and support for agriculture in Natura 2000 sites. By paying farmers for a service they pro-

vide to society, this type of support helps to diversify agricultural income, particularly in animal-rearing areas and areas of diversified farming. It therefore contributes to managing potential Natura 2000 sites.

The recent reforms of the Common Agriculture Policy (CAP) have also enabled further integration of biodiversity concerns into agricultural policy and the 2008 review of the CAP provides an important opportunity to further strengthen and support measures for farmland and forest biodiversity. For example, national statutory requirements derived from EU directives covering birds, habitats, nitrates and pesticides are now included in the accepted standards for good farming practice.

Accordingly, farming and the protection of Natura 2000 sites have everything to gain from coexisting on the same land:

- The sites are farmed in a way that is better suited to the land and there is a continuous human presence which is often less costly than management by an external body;
- Farmers are remunerated for the environmental services they provide in a transparent way that their fellow citizens can understand;
- Regions of the Union with the greatest biodiversity are generally farmed the least intensively. They therefore receive preferential Community support.
- Related activities become more attractive, e.g. the direct sale of meats, cheeses or wines labelled as coming from Natura 2000 sites, the promotion of rural tourism linked to the discovery of nature, etc.

Several Member States and regions are now giving priority to Natura 2000 sites by co-financing agri-environmental measures. Several projects co-financed under LIFE have been used to establish farming practices best suited to maintaining or even enhancing the natural value of sites and grasslands habitats or species.



LIFE's contribution to grasslands

Since its beginning in 1992, LIFE – the financial instrument for the environment – has been a cornerstone of grassland conservation efforts in Europe, especially within the boundaries of the Natura 2000 network. Now with the launch of LIFE+, the new financial instrument for the environment, with an overall budget of €2 billion, LIFE will continue to offer robust support to the protection of plant species in Europe.

In total, from 1992-2006 some 970 projects received EU co-funding under the LIFE-Nature component of the LIFE programme.

More than 370 projects directly or indirectly targeted grasslands habitats or species listed under the annexes of the Habitats and Birds Directives.

Under LIFE+ Nature and Biodiversity (2007-2013), projects targeting grasslands habitats within and outside Natura 2000 may be financed. 'LIFE+ Nature' will co-finance best practice or demonstration projects contributing to the implementation of the Birds and Habitats directives; and 'LIFE+ Biodiversity' will co-finance innovative or demonstration projects contributing to the implementation of the objectives of the Commission's 2006 Communication "Halting the loss of biodiversity by 2010 – and beyond".

LIFE grasslands project actions

From 1999 to 2006 LIFE co-funded more than 45 projects directly targeting grasslands habitats around Europe (see fig. 1.). The projects cover almost all grasslands habitats with a particular focus on calcareous and dry grasslands habitats, which were targeted by two-thirds of the projects (see fig. 2).

Financed actions vary considerably, depending on the characteristics of the grasslands habitats. But in general, the projects include:

- Preparatory actions: the preparation of habitat surveys and grasslands species composition, habitat mapping, definition of management techniques, etc.

These actions help to further knowledge of the grasslands to improve conservation measures. As a result, projects often proposed implementing Natura 2000 site management plans, including the design and adoption of agri-environmental measures with the aim of securing the grasslands' conservation status after LIFE.

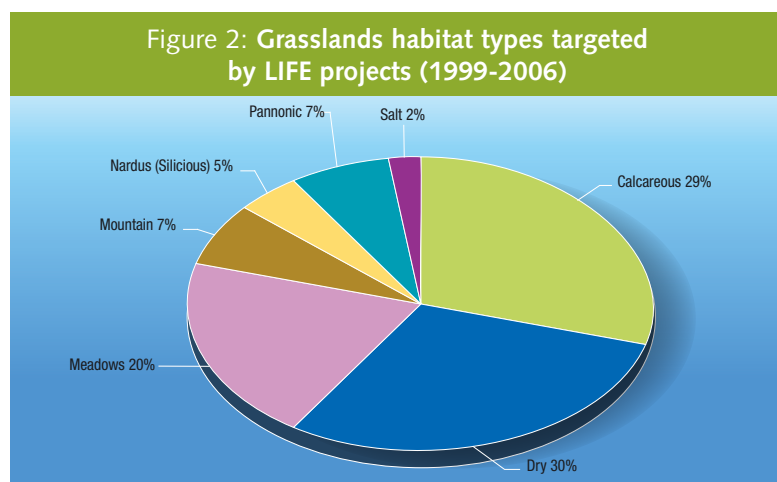
- Land or rights acquisition: actions targeting the protection of grasslands habitats species (e.g. invertebrates) and habitat conservation through correct management in certain areas.
- Direct conservation actions: steps taken to re-establish traditional farmland activities that support grasslands habitats. These include: elimination of trees, mowing, recovering degraded areas, habitat restoration, alien species eradication, establishment of fences and the reintroduction of grazing.
- Monitoring: scientific monitoring was conducted during the project periods and after-LIFE in order to assess the

longer-term impacts. Some projects also included species and habitats surveillance (forest fires/collecting/grazing).

- Networking: several projects organised meetings with farmers and rural organisations to develop management and conservation plans with local support. Some of these plans included financial mechanisms as agri-environmental measures to provide future sustainability for the conservation of grasslands habitats within the Natura 2000 network.
- Awareness-raising: several projects produced leaflets, monographs or manuals, or implemented traineeships. These actions served to raise awareness of grasslands among local stakeholders (farmers, environment agents, etc), schools and the general public.

LIFE also co-funded the purchase of equipment needed for grassland conservation actions, such as mowing machines, livestock shelters, transport and fencing.

Figure 2: Grasslands habitat types targeted by LIFE projects (1999-2006)



Source: LIFE projects database

Dry and calcareous grasslands

Dry and calcareous (chalky) grasslands are one of the most biodiverse habitats in Europe. The plant types that occur on calcareous grassland are typically short and hardy, and include grasses and herbs such as trefoil. Sometimes these types of grasslands are rich habitats for various orchid species. Calcareous grasslands are also an important habitat for insects, particularly butterflies, reptiles, and many birds.

Dry and calcareous grasslands are defined as grassland vegetation that occurs, around almost all EU regions, over basic to neutral substrate associated with basic soil, such as chalk¹ and/or limestone. In the Atlantic, Continental and Mediterranean biogeographical regions most of the dry and calcareous grasslands areas are represented in the Annex I Habitats Directive habitats by:

- Semi-natural dry grasslands (*Festuco-Brometalia*) (6210*) (important orchid site)
- Pseudo-steppe with grasses and annuals of the *Thero-Brachypodietea* (6220*)

¹ Chalk grasslands only occur in north-western Europe, so surviving examples are exceptionally rare

These habitats are considered priority for conservation (*denotes priority), although *Festuco-Bro-*

metalia is only considered as such when it is an important orchid site as defined in accordance with the

Skylark (*Alauda arvensis*) – a once-common bird species dependent on dry grasslands habitats



Photo: LIFE03 ENV/E/000161

Dry and calcareous grasslands

Interpretation Manual of European Union Habitats².

Large grassland areas have disappeared in the last century, causing severe fragmentation of the remaining habitat areas and a consequent drop in populations of certain species by as much as 20-50% across Europe.

Between 1999 and 2006, LIFE co-financed 26 projects around Europe directly targeting dry and calcareous

² Interpretation Manual of European Union Habitats. Version EUR 27. European Commission http://ec.europa.eu/environment/nature/legislation/habitatsdirective/docs/2007_07_im.pdf

grasslands habitats. Certain LIFE Nature projects targeted particular calcareous grasslands habitats, such as the Nordic alvar and precambrian calcareous flatrocks (6280*) habitat targeted by the project LIFE00 NAT/S/007118 ("Restoration of alvar-habitats at Stora Karlsö"). This project successfully restored more than 200 ha of alvar.

This section presents some recent projects targeting these particular habitats.

For descriptions of practical management techniques (several of them

based on LIFE nature projects) that are designed to help Natura 2000 site managers to prepare their own site-specific management plans for these habitat types and species, see:

- http://ec.europa.eu/environment/nature/natura2000/management/habitats/pdf/6210_Seminatural_dry_grasslands.pdf
- http://ec.europa.eu/environment/nature/natura2000/management/habitats/pdf/6220_Pseudo_steppe.pdf

Birds and invertebrates benefiting from LIFE

Many birds depend on dry and calcareous grasslands habitats. Normally, such species require large, open areas for hunting with suitable nesting and feeding sites. For example raptors (see pp. 46-47) and other birds of prey – *Circaetus gallicus* (short-toed eagle) and *Circus pygargus* (Montagu's harrier) – rely on dry grassland for an abundant food supply during winter. Many passerine species including *Emberiza hortulana* (ortolan bunting), *Sylvia nisoria* (barred warbler), *Lullula arborea* (woodlark) and *Lanius collurio* (red-backed shrike) also use these habitats. The LIFE project, "Protection of habitats and raptors in M. Labbro and Upper Albegna Valley" (LIFE04NAT/IT/000173) implemented actions targeting the grassland habitats benefitting these bird species. A range of actions were carried out such as removal of invasive shrubs and alien trees and fencing of overgrazed grasslands, with the aim of reversing the effects of changes in agricultural practices during recent decades.

Other birds also breed in these grasslands, for instance, *Burhinus oedipnemos* (stone curlew). The habitat type is also a breeding ground for the marsh fritillary butterfly, which is dependent on a single host plant, the devil's-bit scabious: *Succisa pratensis* thrives in extensively managed and grazed grasslands. The LIFE project, "Improving the management of Salisbury Plain Natura 2000 sites" (LIFE00 NAT/UK/007071), brought together all of the main stakeholders in the Salisbury Plain area – conservation groups, the military and farmers – to produce a workable conservation action plan and to improve the habitat potential for both the stone curlew and the marsh fritillary butterfly.

Salisbury Plain: military and farmers working together on grasslands species conservation



Photo: Natural England/LIFE00 NAT/UK/007071

Germany: Restoring and conserving xeric grasslands

The dry grasslands of Rhineland-Palatinate are home to rare and endangered orchids, birds and butterflies. However the richness and biodiversity of this habitat is threatened by invading shrubs and human actions. Thanks to LIFE Nature, 76 ha of xeric grasslands have been successfully restored and a long-term management plan put in place to preserve a unique natural resource.

The state of Rhineland-Palatinate in Germany has many arid locations that are the natural basis for dry grassland communities. In total, there are some 1 215 ha of dry and semi-dry grasslands in the state, or 2.2% of its total area.

These xeric grasslands are of special bio-geographical importance since they straddle the divide between the sub-Mediterranean/Atlantic and Continental climatic zones. Rhineland-Palatinate represents the northern limit of propagation for many species that are otherwise more native to the Mediterranean area or the Balkans.

The dry limestone grasslands of the Eifel ranges constitute the western boundary for the sub-Atlantic climate zone. Up to 25 species of orchid can be found here, including *Cypripedium calceolus*, *Ophrys insectifera*, *Orchis mascula* and *Himantoglossum hircinum*. The eastern part of Rhineland-Palatinate includes the western outpost of continental Pannonic feather grass steppes and the largest and most coherent calcareous sand drift area in Germany, on whose dunes the Annex II priority plant species *Jurinea cyanooides* can be found.

Fringed gentian (*Gentiana ciliolata*) - a typical dry grasslands species



Calcareous poor grasslands rich in flowers in Schönecken / Eifel

The state's grasslands also house a wealth of endemic animal species, including protected species such as the stag beetle (*Lucanus cervus*) and the butterfly *Euphydryas aurinia*. Among the seven species of protected birds that can be observed are the eagle owl (*Bubo bubo*), the European honey buzzard (*Pernis apivorus*) and the red-backed shrike (*Lanius collurio*).

However, the richness and biodiversity of the subcontinental *Koeleria glauca*, porous limestone pioneer grasslands and mining area *Nardus stricta* grasslands are under threat from shrub invasion, afforestation and orchard-planting, as well as the inappropriate behaviour of some visitors using the sites for rambling, rock-climbing or mountain-biking.

What did LIFE do?

The LIFE Nature project in Rhineland-Palatinate was one of three associated projects designed to restore and conserve Germany's dry grasslands (the

others were in Saarland and Schleswig-Holstein). **LIFE02 NAT/D/008461** aimed to incorporate additional dry grasslands into the European Natura 2000 network by restoring their favourable conservation status and provide long-term protection of calcareous grasslands, juniper heathlands, steppe grasslands and other xeric grasslands habitats covering 355 ha in four distinct project areas (Rhine-Hesse; the Nahe valley; the Eifel mountains; and the heaths of Gönnersdorf and Lissendorf, as well as Üxheim).

Over a four-year period, the project planned to safeguard these valuable habitats through land purchase agreements and the development and implementation of new management plans.

Depending on the cultivation history of each area, this could involve clearance, maintenance care with mechanical treatment or through grazing and the establishment of a droving pasturage system.



Sustainable management of grasslands - Sheep grazing at the Mäuerchenberg site

The management plans developed for the project sites included care and development plans, and grazing schedules, since the preservation of the habitats was seen as closely linked to the development of an agricultural use compatible with the environment. To this end, local shepherds and farmers were involved in managing and implementing the care measures, supported by volunteers from the regional nature conservation associations as well as school children and the Federal Army.

What was the outcome?

Bushes and thickets were removed from over 76 ha of grasslands, or 40% more land than initially planned. Furthermore, in order to promote the more sensitive species, such as orchids, in some areas a felt-like cover of leaves and dry grass was cleared.

To stop bushes growing back, stumps were also removed. This project action also served to prepare the ground for the subsequent, and carefully controlled, grazing of sheep and goats. Sheep grazed on 70 ha for two years. Additionally, mobile pasture

fences were purchased, buffer strips and 'stepping stone' biotopes laid out and hedges restored in the respective project part areas.

Some 26.5 ha of land was purchased (rather than the 21.2 ha originally planned). This made it possible to network isolated residual biotopes with outstanding success.

An inventory of species was compiled in 2003 and 2005. Positive trends were determined in the number of species and individuals for all the part areas within the scope of the monitoring.

The project was based on successful cooperation with local stakeholders, experts and volunteers. It demonstrated the importance of partnership and cooperation in overcoming initial opposition to the designation of Natura 2000 sites for fear of falling land prices and land-use restrictions. It also showed innovation in cooperating with the German military for the clearance and burning of trees.

To increase the efficiency and attractiveness of grazing schemes, efforts were made in the Nahe region to clear areas that promoted the interconnectivity of sites. This made it feasible to introduce grazing contracts for shepherds and farmers and made long-term grazing more sustainable. This was a good example of combining the interests of traditional land users – by providing service contracts for the continual management of valuable grasslands – with ecological objectives.

A number of dissemination activities were also carried out to promote the long-term objectives of the project to local stakeholders and the public. These included 10 information meetings and 14 guided tours; setting up 33 information boards in the project areas; creating a project website and printing 20 000 information brochures; plus 10 000 leaflets and 2 500 posters about the animal and plant species of the grassland habitats.

Life after LIFE

The State of Rhineland-Palatinate is continuing the work of preserving the dry grassland biotopes that were successfully restored by the LIFE Nature project so that future generations can admire this unique landscape and its variety of species. To ensure the long-term effects of the project's work, the authorities responsible for the sites have subcontracted management control to local experts for several years. Local tourism is likely to benefit from the measures undertaken during the project. To cope with the impact of this, volunteer organisations have taken on responsibility for keeping visitors on footpaths and dogs under control.

German army soldiers during clearing works at Pinnert



Project Number:
LIFE02 NAT/D/008461

Title: Restoration and conservation of xeric grasslands in Germany (Rhineland-Pfalz)

Beneficiary:
Stiftung "Natur und Umwelt Rheinland-Pfalz"

Contact: Moritz Schmitt

Email:
Moritz.Schmitt@umweltstiftung.rlp.de

Website:
www.life-trockenrasen.com

Period:
Apr-2002 to Mar-2006

Total Budget: €1 095 000

LIFE Contribution: €766 000

Denmark: From timber to biodiversity

With the aid of LIFE funding, the Danish Forest and Nature Agency has begun restoring dry grassland habitats at 11 sites around the country, work that will bear fruit 40 or 50 years from now. As well as providing a home to rare flora and fauna, the project sites demonstrate a successful blending of agricultural and ecological demands.



Photo: Justin Toland

The grasslands of Høvblege on the island of Møn house many orchids, butterflies and day-flying moths

As in most parts of Europe, Denmark's dry grasslands are under threat from the combined effects of scrub encroachment, lack of grazing and invasion of non-native species.

The LIFE Nature project **LIFE04 NAT/DK/000020** has launched a national strategy to restore the most valuable Danish grassland sites within Natura 2000 to a favourable conservation status. The 11 project sites house some 70% of the xeric and calcareous grasslands (habitat type 6120*), 25% of semi-natural dry grasslands (6210*) and 20% of species-rich *Nardus* grasslands (6230*) in Denmark.

The project targeted an increase in the area of Annex I dry grasslands from 715 ha to 983 ha. A total of 178 ha of plantations and arable land would be reconverted to grasslands, with scrub clearance taking place on over 900 ha. In addition, grazing would be introduced on 599 ha, bringing more than 1780 ha in total under conservation management by the end of 2008.

By the chalk cliffs of Møn

The LIFE project site at Klinteskov, on the island of Møn, borders the famous 100 m high chalk cliffs of the Høje Møn. The site includes two

outstanding areas of dry grasslands, Jydelejet and Høvblege. The latter is home to 18 species of wild orchid, as well as rare day-flying moths and butterflies, including the Large Blue butterfly (*Maculinea arion*), which is found nowhere else in Denmark (see box).

Clearance work of spruce plantations began in 2005. "It is vital we have animals to prevent regrowth," explains Project Manager, Søren Rasmussen. "Getting farmers to participate is very important, but sometimes there is a contradiction between what we want and what the farmers want – sometimes the cattle weigh less after grazing grasslands."



Heath Spotted-orchid (*Dactylorhiza maculata*)

Photo: Justin Toland

At Klinteskov, many of the cattle are owned by a cooperative. This association of nature-loving city dwellers supports the aims of the grasslands restoration programme. Helpfully, its members care more about nature restoration than the weight of their cattle.

The 20 ha Høvblege site is being divided (by fencing) into three areas: a lowland area for summer grazing, a hilltop area for late summer/early autumn grazing, and an area from which cattle are excluded (here the regrowth of shrubs is removed by hand by local volunteers). The aim is that, within 40 or 50 years, the whole area will resemble the small area of mature dry grasslands today housing the rare orchids, butterflies, etc.

At nearby Havrelukke, the project team has been recreating the conditions of 100 years ago – removing

pine forest to return the land to a hay meadow.

Galloway cattle have been introduced to graze the cleared areas at Jydelejet. There is also a special fenced area containing the rare Pyramidal Orchid (*Anacamptis pyramidalis*). The LIFE beneficiary is also attempting to reintroduce *Maculinea arion* at Jydelejet (the species was present at the site until 1986), and has taken special measures to this end. "One male was spotted there this summer," enthuses Mr Rasmussen. The project manager points out that clearing of the plantations lets people see the contours of the land. Not all trees have been removed, however – some stands of ancient woodland containing multi-stem beech trees have been preserved. As Mr Rasmussen explains, "100 years ago there was a demand for timber; now there is a demand for biodiversity".

The Large Blue butterfly

If the reproductive cycle of Lepidoptera is one of the wonders of the natural world, that of one of its rarest species, the Large Blue butterfly (*Maculinea arion*) takes fascination to new levels.

The Large Blue mainly lives in heaths, sand dunes and calcareous dry grasslands. The female of the species lays its eggs on wild thyme (*Thymus pulegioides*) buds and (less commonly) on the buds of wild marjoram (*Origanum vulgare*).

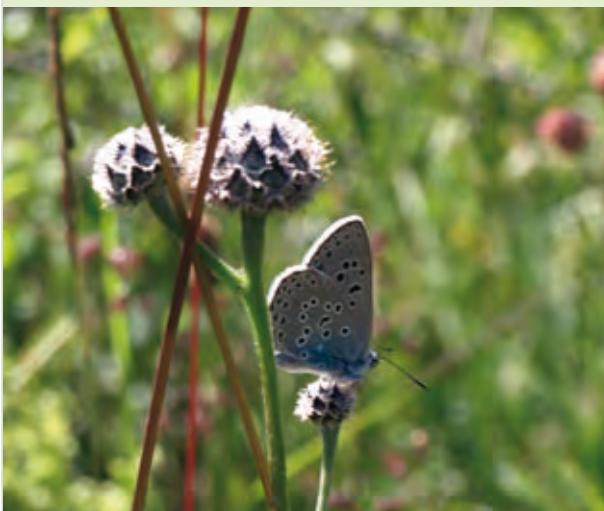
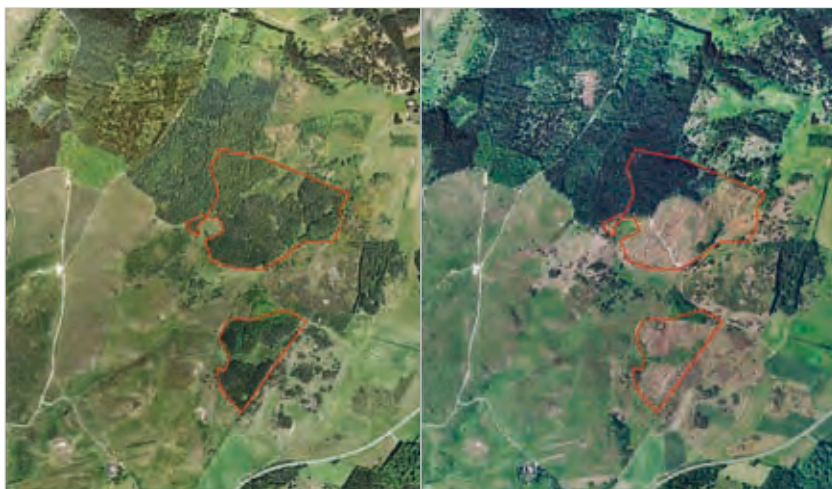


Photo: Justin Toland

The young caterpillars feed exclusively on these plants until after the third moult. At this point the caterpillar drops to the ground and waits to be picked up by a red ant of the species, *Myrmica sabuleti*. The ant collects the caterpillar and takes it to its nest because, when stroked ('milked') the caterpillar produces honeydew on which the ant and its larvae feed. As winter draws near, the caterpillar hibernates inside the nesting chambers and, upon waking, feeds on red ant eggs and larvae, all the while mimicking the behaviour of the ants in order to maintain its position. Three weeks after waking, the caterpillar forms a chrysalis on the roof of the nest. Once its transformation into a butterfly is complete, *Maculinea arion* is escorted to the surface by the red ants, which encircle it and ward off any predators while it dries out. The ants return to their nest when the butterfly is ready to fly off.

The adult Large Blue has a wingspan of up to 5 cm. Its wings are speckled with black dots.

Maculinea arion's very restricted home range and inability to migrate over longer distances makes it extremely vulnerable to fragmentation of its habitats. The population in Denmark is restricted to 100-300 specimens in Høvblege on the island of Møn.



These satellite images from 2004 (left) and 2006 (right) show the extent of the clearance of pine forests at Mols Bjerge

Photo: Danish Forestry and Nature Agency

Mols Bjerge

Mols Bjerge, situated on the south coast of Djursland in eastern Jutland, is the largest of the 11 LIFE Nature project sites. Rising to a height of more than 130 m, this hilly (by Danish standards) area consists of a mosaic of old, dry grasslands, heathlands and plantations. Species-rich *Nardus* grasslands on siliceous substrates (*6230) account for an estimated 359 ha within the 962 ha pSCI. Underscor-

ing the importance of the site is the fact that Mols Bjerge is to form part of Denmark's second national park.

The state forest district owns some 250 cattle and 200 goats, which graze the grasslands. "The cattle have been selectively bred over 25 years. "We want cattle that are hardy and like to eat shrubs and which pay little or no attention to people," explains Mr. Rasmussen. "We are trying grazing with differ-

ent animals – including sheep and horses – to see which work best for different areas," adds the Project Manager. "One of the big topics for the next 10-15 years is how to keep shrub vegetation down. We are considering buying some hard-working sheep. Combining different animals would also be good."

Working with landowners

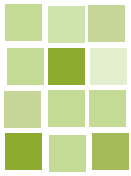
Since 53% of the total area covered by the 11 project sites is in private ownership, co-operation with landowners is essential to its final success, particularly with regards to preventing fragmentation of grasslands area. The project has therefore placed a strong emphasis on stakeholder dialogue and awareness-raising, and also on activities to encourage landowners to sign agri-environmental contracts (obliging them to keep the area grazed for a period of normally 10 years), as implemented in Denmark under the Rural Development regulation. The LIFE project has provided the basis for using grazing as a management method in the pSCI (through provision of fencing, material, shelter, water and power). As the beneficiary stated in its LIFE application, in order to motivate farmers to enter into agreements on grazing, "it is necessary to provide the basic infrastructure to allow grazing to take place. The clearing of various degrees of overgrowth will support this rationale."

Galloway cattle grazing the project site at Jydelejet



Photo: Justin Toland

Project Number: LIFE04 NAT/DK/000020
Title: Restoration of Dry Grasslands in Denmark
Beneficiary: Ministry of Environment, Danish Forest and Nature Agency
Contact: Søren Rasmussen
Email: sra@sns.dk
Website: www.lifeoverdrev.dk
Period: Jul-2004 to Dec-2008
Total Budget: €4 245 000
LIFE Contribution: €2 151 000



Belgium: Local involvement in limestone grassland management

A Belgian partnership of NGOs and local municipalities has successfully restored over 200 ha of chalk grassland hillside habitats in the Ardennes region that host a rich variety of flora and fauna.

The dry limestone grasslands bordering Belgium's upper Meuse River and its three main tributaries, the Viroin, the Lesse and the Molinee have been well-known for their high nature value, as a result of the local orchid and insect populations that live on the limestone hills. These include fragrant orchids (*Gymnadenia borealis*), greater butterfly orchids (*Platanthera chlorantha*) and the marbled white butterfly (*Melanargia galathea*).

The area's rich blend of flora and fauna was attributed to a history of traditional farming practices, involving extensive hay meadow mowing techniques and livestock grazing. However, modernisation of agricultural methods and a general trend towards intensification led to the introduction of new land management systems and as a result many of the grasslands' characteristic heliophilic flora, and associated fauna, disappeared, being replaced by more common species.

Efforts by local voluntary sector bodies to conserve biodiversity in key pockets of this Ardennes limestone landscape have been ongoing for a number of decades. A LIFE Nature project was developed, in partnership with local authorities, to build on this work and establish a strategic programme of grassland conservation measures dedicated to improving the threatened biotope's conservation status.

Grassland conservation plan

A strong and constructive collaboration between NGOs and public authorities was forged during the design of a conservation plan that targeted some 200 ha of dry, chalk grasslands for special

attention. Invasive shrubs were cleared from 121 ha followed by further clearing and grazing on 173 ha to encourage the return of characteristic wildlife. Long-term conservation management measures were introduced on 200 ha. This involved, amongst other things, the acquisition of 13 ha of land and leasing of another 21 ha for up to 50 years, in order to facilitate a return to traditional land-use systems based on mowing and grazing by itinerant sheep flocks.

Much of the high value flora and fauna was fragmented across the LIFE project area and so initial work focused on improving the physical integrity of the limestone grasslands. Large areas of brush woods were removed to create corridors that connected previously isolated grassland patches and allowed a more cost-effective sheep grazing regime. Some 165 ha of limestone grassland are now managed via extensive grazing methods by a flock of 300 sheep and goats in the Viroin area.

Since the dry grasslands are highly sensitive to climatic conditions, a flexible approach was required when implementing the LIFE project plan. This has succeeded in generating a significant increase in the surface area, connectivity and quality of limestone grassland habitat. Mobility of targeted species has improved, as has the size of their populations. Furthermore, spectacular changes in landscape quality have also been noted along several kilometres of the Viroin valley

Local communities have been involved in the project from the outset, both via membership of the LIFE project partnership and through a series of awareness-raising measures undertaken

during the four years of conservation work. Residents and businesses alike have reacted positively to the project's impact on the landscape, which has helped improve the area's identity as a green tourism destination.

Long term maintenance of the LIFE project's legacy is expected to be sustained via EU financed agri-environmental measures, and the project played a significant role in making a specific measure available for the high nature value chalk grasslands of Wallonia.

Montagne-aux-Buis after tree and scrubs removal



Photo: J. Duchesne

Project Number:
LIFE02 NAT/B/008593

Title: Restoration and sustainable management of upper Meuse dry Grasslands

Beneficiary: Ardenne & Gaume asbl

Contact: Willy Delvingt

Email: delvingt.w@fsagx.ac.be

Website: <http://users.skynet.be/life.hautemeuse>

Period: Sept-2002 to Aug-2006

Total Budget: €1 934 000

LIFE Contribution: €967 000

Slovenia: Conservation at the Karst Edge

This LIFE Nature project developed a management plan for the diverse, mosaic landscape of the Kraški rob (Karst Edge) region, restoring more than 300 ha of dry grassland habitats in the process. These actions were the first step towards the project area's designation as a potential Site of Community Importance (pSCI).

The Slovenian Karst region, on the north-western ridge of the Dinaric Mountains, between Trieste, Gorizia and Postojna, is one of the richest areas in Slovenia in terms of biodiversity. A flat to hilly limestone area, with a rich diversity of karst features such as caves, sinkholes and canyons, the region is a mosaic of dry and rocky meadows and pastures. The area includes three types of priority habitats, with semi-natural dry grasslands extending over 20% of its surface. The region contains six species listed in Annex II of the Habitats Directive, including the butterfly *Calimorpha quadripunctaria*.

As in the rest of Europe, the advent of farm mechanisation, together with the gradual abandonment of agricultural land, has drastically reduced the presence of semi-natural habitats and of the species that depend on them.

The site contains over 200 karstic ponds that are resting and feeding places for migrating birds, amphibians, mammals, dragonflies and other species. It has been recently designated as an Important Bird Area and the Slovenian Parliament intends to include 58 000 ha of the territory within the future Karst Regional Park. The designation is however a complicated, long-term process, heavily dependent on the understanding and support of the local population.

What did LIFE do?

This project aimed to provide a first contribution to the designation proc-

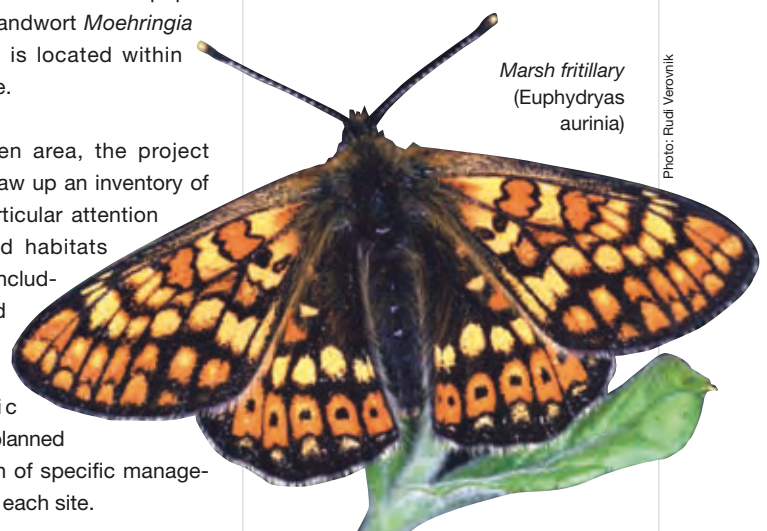


Dry calcareous grasslands cover extensive areas of the mosaic landscape of Kraški rob

ess of the Karst Regional Park by concentrating on one pilot area within the Karst site – Kraški rob. This 7 000 ha area was chosen as the most important of all of the sub-sites in terms of biodiversity. For instance, most of the world's population of the sandwort *Moehringia tommasiniana* is located within the Karst Edge.

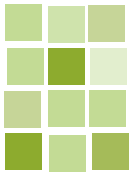
For the chosen area, the project intended to draw up an inventory of sites, with particular attention to endangered habitats and species, including natural and semi-natural grasslands and karstic ponds. It then planned the elaboration of specific management plans for each site.

It foresaw the signing of stewardship agreements with landowners, who would receive subsidies for implementing the plans. It was estimated that 30 micro-areas would be part of the network, resulting in the



Marsh fritillary (Euphydryas aurinia)

Photo: Rudolf Verovnik



restoration of at least 150 ha of dry grassland habitats, rocky slopes and four karstic ponds.

The project, which envisaged the preparation of all legal requirements for the proposal of the pilot area as a future SCI, planned an extensive public awareness campaign, with meetings, newsletters, videos and a website aimed at residents and policy-makers of the Karst region.

What was the outcome?

This successful project led to the recognition of the ecological importance of the diverse, mosaic landscape of Kraški rob and its many endangered habitats and species and the value of classifying it as a Natura 2000 site.

Habitat mapping of a 7 000 ha area was carried out from April-December 2003. Each habitat type was drawn on the orthophoto map (DOF-5) in a scale of 1:5000.

The inventory was then submitted to the Slovenian Ministry of the Environment and Spatial Planning in early 2004, which used these data in May 2004 to put forward the project area as a pSCI. Kraški rob was also listed as an Ecologically Important Area according to the Slovenian Nature Protection Law.

The project mapped the habitats of the project area and developed 50 site-specific management plans for micro areas. Detailed and clear guidelines were written for the landowners of the micro-areas with an emphasis on

Ophrys fusca a rare orchid species



Removal of scrubs from grasslands habitats

the dry grasslands and karstic ponds of highest conservation concern. For the first time in Slovenia, stewardship contracts were signed with landowners to commit them to managing the land according to the plans.

The project restored four karstic ponds, which are important habitats for endangered amphibians. The ponds were cleaned and the exotic vegetation and animals removed. The bottoms of the ponds were deepened and then sealed with a layer of clay. The original vegetation was then re-planted, resulting in restoration.

More than 400 ha of endangered dry meadows, rocky slopes and karstic ponds were maintained and/or restored through the removal of bushes and tall herbs and subsequent mowing. The enthusiasm of land-owners and farm communities for the land management schemes produced within the project and national agri-environmental schemes not only took the geographical scope of this work beyond expectations, but also promises long-term, sustainable management of these habitats.

An information centre for tourists and visitors was established in the village of Rakitovec, opening in October 2004. The centre features a permanent exhibition about karstic ponds.

Life after LIFE

Good communication with local inhabitants was key to the successful implementation of the project actions. Several workshops and presentations were organised and information disseminated via leaflets, a newsletter, media interviews, a website and a book. Such actions meant the project was broadly accepted by local citizens, some of whom started to think of future activities, such as the establishment of an Eco-park – this also bodes well for the continuation of this conservation work.

Project Number:
LIFE02 NAT/SLO/008587

Title: Conservation of endangered habitats / species in the future Karst Park

Beneficiary:
The Science and Research Centre of Koper within the University of Primorska

Contact: Andrej Sovinc

Email:
Andrej.sovinc@guest.arnes.si

Website: www.zrs-kp.si/projekti/LIFE/index_a.html

Period:
Oct-2002 to Sept-2005

Total Budget: €477 000

LIFE Contribution: €358 000

France: Emergency measures benefit dry grasslands

Introducing a package of emergency measures for 29 sites within the Natura 2000 network, this ambitious and multi-site project was able to increase the conservation status of more than 1 000 ha of dry grassland habitats over 10 regions in France.



Dry grassland with *Stipa* spp. at Vallée aux Lièvres

Generally created by ancient forest clearances and preserved until modern times by traditional agricultural practices, dry grasslands have been dramatically declining all over Europe. France, at the crossroads of different biogeographic zones, has a significant heritage of dry grasslands – including six habitat types listed as priority under the Habitats Directive. However, with the abandonment of agri-pastoral practices, these habitats, dispersed over a large number of sites, now occupy only a restricted area and are threatened with complete disappearance.

Aims and activities

The LIFE Nature project aimed at the restoration and lasting preservation of these habitats by means of a package of emergency measures for 29 Natura 2000 network sites representing different kinds of dry grassland over 10 regions¹ (ranging from limestone and rocky habitats grasslands to sand and siliceous grasslands).

¹ Île de France, Centre, Lorraine, Alsace, Franche-Comté, Poitou-Charentes, Limousin, Rhône-Alpes, Auvergne, Provence-Alpes-Côte d'Azur

The project was implemented by the project beneficiary, Espaces Naturels de France, a national NGO that coordinates and leads a network of 21 regional NGOs, or 'CREN' (*Conservatoires Régionaux et départementaux d'Espaces Naturels*). Project partners included the Ministry of the Environment, the *Ligue de Protection des Oiseaux* and several of the beneficiary's regional NGOs.

Management plans were drawn up, or completed, under the four-year project period (1998-2002) for all the sites and the protection



of 1 520 ha of dry grasslands was targeted through land purchasing, leasing or management contracts. Various appropriate management patterns (mowing and grazing) were introduced to each of the sites to maintain the habitats in a favourable conservation status. Restoration actions for grasslands that had recently deteriorated were carried out by applying different techniques for manual or mechanical biotope work on 754 ha. This work was designed both to contribute to the conservation of these habitats and to help establish a national conservation strategy for dry grasslands.

On some sites, specific measures were undertaken to improve public

Project info panel at Meulières de Claix (Charente)



access; these were enhanced by providing information to visitors. A national awareness campaign was also launched.

There were a number of difficulties involving (i) the purchasing/renting of land, (ii), re-establishing mowing or grazing on agricultural land abandoned because of its poor agricultural value, and (iii) as a result of the decline of the sheep-breeding sector in France. Nevertheless, despite these setbacks, the project met its overall objective – restoration and conservation of the dry grassland habitats – over three-quarters of the 29 sites targeted. The project succeeded in restoring 261 ha of dry grassland habitats of Community interest, in managing 721 ha of dry grassland by appropriate agricultural practices, and in stopping degradation caused by uncontrolled access by people and vehicles.

All in all, the conservation status of more than 1 000 ha of dry grassland habitats was increased. Their long-term management was reinforced by the fact that 293 ha were purchased by the project or benefit from long-term renting (18 to 99 years) and/or by long-term management agreements signed with the farmers.

Outcomes, dissemination and demonstration value

One of the project's most significant successes concerned the re-establishment of appropriate management practices on 571 ha of dry grasslands through economically-viable grazing activities at 13 locations. These successful experiments show the possibility of restoring environmentally friendly and economically-viable grazing activities on sites that were no longer of interest agriculturally. Other positive outcomes of the grazing schemes have included the extension of existing farms, the creation of three new jobs for shepherds, the sub-contracting

of management to farmers, and the setting up of three new farmers with the support of the Community Rural Development Fund.

Furthermore, the creation of new nature trails and the presence of herds of grazing animals have led to a noticeable increase in 'micro-tourism' at the LIFE project sites.

The project produced two excellent technical documents on dry grassland management. These (French only) documents: "Recueil d'expériences de gestion et de suivi scientifique sur pelouses sèches"; and "Pâturage sur pelouses sèches – Un guide d'aide à la mise en œuvre" have been validated by the scientific authority – INRA, National Institute of Agronomic Research. Available from the publications section of the beneficiary's website, they are now widely sourced as reference tools for grasslands management in France.

In order to establish a framework for a long-term programme for dry grasslands preservation, the beneficiary set out a 110-page proposal for a national conservation strategy, also publishing 1 000 copies of a concise version of this proposal. Finally, the LIFE project also encouraged the municipality of Wildenstein to propose the creation of a new National Park at one of the sites involved.

Project Number:
LIFE98 NAT/F/005237

Title: Programme for the conservation of the dry grasslands of France

Beneficiary:
Espaces Naturels de France

Website:
<http://www.enf-conservatoires.org/>
(go to 'Espace Librairie' for documents)

Period:
Sept-1998 to Dec-2002

Total Budget: €3 348 000

LIFE Contribution: €1 674 000

Mountain and steppe grasslands

The area of mountain and steppe grassland habitats in Europe has declined in recent decades, mainly through intensification of agriculture or, conversely, land abandonment. Several LIFE Nature projects have contributed to the restoration and improvement of the conservation status of these habitats.

The most common European mountain grassland habitat, included in Annex I of the Habitats directive, is the species-rich *Nardus* grasslands habitat (6230*), which occurs in almost all the EU member states, except for Estonia, Malta and Cyprus. There are several other very geographically restricted and endemic mountain grasslands habitats, such as those found in Cyprus and the Iberian Peninsula, but these are less extensive.

Habitat 6230* is most commonly found within the Alpine bioregion (Alps, Pyrenees and Carpathians). It also occurs relatively frequently in the Mediterranean, Continental and Atlantic bioregions. *Nardus* grasslands host many species included in the Habitats Directive Annexes II and IV, ranging from butterflies (such as the *Maculinea alcon*), grasshoppers

and crickets, e.g. *Pholidoptera transsylvanica* (Orthoptera), and mountain-specific bird communities, the most significant of which are the black grouse (*Tetrao tetrix*), rock ptarmigan (*Lagopus mutus*) and rock partridge (*Alectoris graeca*).

The area of mountain grasslands habitats in Europe has declined in recent decades with the intensification of agricultural practices on the one hand and land abandonment and too low an intensity of use on the other. Tourism (hiking and

Gentiana acaulis: typical plant species of mountain mat grass (*Nardus stricta*) grasslands



Photo: LIFE02 NAT/IT/006574

Mountain and steppe grasslands

skiing) and more recently climate change are other threats to these habitats: there is evidence that the timber line is “climbing” in the Alps and Pyrenees, permanently affecting grasslands.

Mountain grasslands often require several restoration measures – the most frequently employed being the removal of trees and shrubs (by machines or by hand) and the reintroduction or management of grazing.

A number of LIFE Nature projects have contributed to the restoration and improvement of the conservation status of mountain grassland habitats. Among the projects LIFE has co-funded:

- **LIFE06 NAT/D/000008** (“Conservation and regeneration of Nardus Grasslands in Central Europe”) – the objective is to restore the Nardus grasslands on 32 Natura 2000 network sites located in northern Luxembourg, the Belgian Ardennes and in two regions of western Germany (Saarland and Rheinland-Pfalz).

- **LIFE02 NAT/P/008478** (“Serra da Estrela: management and conservation of priority habitats”) – the main project actions targeting Nardus grasslands (“cervunal” in Portuguese) included scrub elimination, pasture control and management, fire control, and installation of fences.

Grasslands of the steppes

With the enlargement of the EU to the east, new grasslands habitats were included in the Habitats directive that are characteristic of the Pannonian, Steppic, and Black Sea biogeographical regions. Habitats such as Pannonic sand steppes (6260*) and Ponto-Sarmatic steppes (62C0*) are characterised by natural, open grassland communities usually dominated by tussock-forming grasses of the genus *Festuca*. As yet, very few LIFE projects have targeted habitats of this type. One that did was **LIFE04 NAT/AT/000002** (“Pannonic steppes and dry grasslands”), which restored small remnants of steppe habitats in various sites in Lower Austria to make them fit for the application of agri-environmental measures.

In northern Thuringia, Germany, another project – **LIFE03 NAT/D/000005** (see p. 32) – targeted a special habitat type, the inland salt steppe grasslands (1310, 1510*).

For descriptions of practical management techniques (several of them based on LIFE nature projects) that are designed to help Natura 2000 site managers to prepare their own site-specific management plans for these habitat types and species targeted, see:
http://ec.europa.eu/environment/nature/natura2000/management/habitats/pdf/6230_Nardus_grasslands.pdf

LIFE and grassland habitat management in Natura 2000



Active management of certain habitats is considered necessary for the conservation of Natura 2000 sites. Documents in the semi-natural grasslands library (see below) contain detailed descriptions of practical management techniques to help site managers prepare their own site-specific management plans for the habitat types and species targeted, and to implement these ‘in the field’, taking local constraints into account.

http://ec.europa.eu/environment/nature/natura2000/management/habitats/models_en.htm

Semi-natural grasslands library

The semi-natural grasslands electronic library is designed to make it easier to share knowledge about the management of Natura 2000 sites.

http://ec.europa.eu/environment/nature/natura2000/calendar/index_pubs.htm

Italy: Pastureland and peat bog conservation in Piedmont

This LIFE-Nature project introduced sustainable management and carried out conservation initiatives in the first regional nature park of the Piedmont region of Italy, which is home to valuable peat bogs and pasturelands.

The Alpe Veglia – Alpe Devero Park was founded in 1978 and is located in the mountain valley of Val d'Ossola on the Italian-Swiss border. It is made up entirely of high-altitude mountain habitats, dominated by two Alpine valleys that have for thousands of years been used as summer pastureland. It has been designated a Site of Community Interest (SCI) and a Special Protection Area (SPA) in recognition of its ecological importance. The sites host 18 habitats (including various types of peat bogs, Alpine Nardus grasslands and mountain hay meadows) and many plant and animal species listed in the European Birds and Habitats Directives.

The lack of sustainable pastureland management and the irregular mowing of meadows, however, have led to some areas being invaded by shrubs and other areas being overgrazed.

Aster alpinus



Photo: F. Casale

Both these phenomena could lead to the disappearance of grasslands of community interest. The survival of the peat bogs is also under serious threat due to the drainage system operating in the area. The SCI is one of only two European sites where a rare butterfly, Raetzer's ringlet (*Erebia christi*), has been recorded. The first sightings were in the 1970s.

Objectives and results

The project's main objective was to carry out conservation measures in the mountain pastureland and peat bogs. Sustainable management of the pastureland, supported by specific shrub removal, would help restore the high-altitude meadows, while the peat bog environment could be conserved by shutting off the drainage system.

Efforts to fulfil the goals of the project were highly successful. In all the habitats, the processes of degradation (including the erosion processes and/or trampling) were halted.

As a result of the project, the floral richness of the area was improved and damage was reversed on the species-rich Nardus grasslands and the siliceous substrates. In the mountain areas, excess Nardus was removed through grazing and the amount of dry residual old Nardus was reduced. The project also improved the amount of nutrients thanks to the presence of cattle and enlarged the area of the habitat (91 ha) by mowing invasive shrubs.

Lesser Butterfly-orchid
(*Platanthera bifolia*)



Photo: P. Pirocchi

Typical alpine scrubland habitat



Photo: F. Casale



Benefit to wildlife

The project also had a beneficial impact on the fauna of the area. It helped stabilise the breeding population and the breeding success of black grouse (*Tetrao tetrix tetrix*) and also stopped the decline in recent years of ptarmigan (*Lagopus mutus helveticus*). Moreover, new data about the conservation status of Raetzer's ringlet was collected. The scarcity of information on the ecology and state of conservation of the species, as well as its restricted distribution, had posed a real threat to its survival.

The main innovative value of the project concerns the successful implementation of a new methodology for cattle and horse grazing using temporary electric fences to improve the conservation status of the Nardus grasslands. This methodology was used over large areas with the coordination of the park authorities and the support of local farmers. According to the beneficiary, this is the first such case in the Alps. Its results can be transferred and used in other Natura 2000 sites with large areas of grasslands that are currently dependent on cattle or horses for grazing (for example, sites in the Alps, Apennines, Pyrenees and Balkans).

Such engagement of local farmers was a key aspect of the project. Project activities enabled farmers to become directly responsible for preserving the territory, bringing them closer to the problems of conservation and showing them that maintaining traditional agricultural activities helps protect the environment. This project paved the way for greater dialogue between the park and local people, allowing the park authority to show that the preservation of biodiversity is compatible with economic development. Moreover, it demonstrated a new way of working that will continue after the project in the spirit of Natura 2000.

In the short term, the results of the project are assured by the available financial funds of the Regione Piemonte and of a LEADER project. The regional authorities are currently planning to introduce a new regional law that will further aid protected areas. When it is approved, the regional park will have an annual financial budget for sustainable management. Increasing numbers of tourists and the abandonment of traditional agricultural activities, however, remain a threat to the area. Continued efforts must be taken to raise awareness among the local population and visitors.



Photo: F. Casale

Temporary electric fences help with Nardus grasslands horse grazing management

Black grouse (Tetrao tetrix) – left, and alpine marmot (Marmota marmota) – right, benefited from the project actions



Photo: R. Bionda



Photo: Ighidoli

Project Number:
LIFE02 NAT/IT/008574

Title: Alpe Veglia and Alpe Devero: actions of conservation of mountain grasslands and peatlands

Beneficiary: "Ente Parco Naturale Alpe Veglia e Devero" (Alpe Veglia – Alpe Devero Park)

Contact: De Negri Ivano

Email:
parco.vegliadevero@cmvo.net

Website:
www.parcovegliadevero.it/life/LIFE_home.htm

Period:
Jan-2003 to Dec-2005

Total Budget: € 611 000

LIFE Contribution: € 306 000

Italy: Managing Tuscan mountain grasslands

Tuscany's mountain grasslands have received a significant boost from a dedicated package of LIFE support that successfully restored sustainable grazing patterns and improved the conservation status of biodiversity within *Nardus* grassland (*Nardus stricta*) areas.



Typical Apennine mountain grasslands landscape in Pratomagno Natura 2000 site (visible fence for the protection of *Caltha palustris*)

Italy's Apennine mountain range stretches along much of the country's east coast and supports a wide range of grassland habitat types throughout the 1 000 km upland region. In Tuscany, the Apennine vegetation is characterised by primary summit grasslands that grow at some 1 400 m above sea level and form the southernmost limit for a number of central European plant communities.

Livestock grazing has traditionally played a key role in maintaining the

diversity of these high-altitude grassland areas. However, modernisation of local agricultural systems over recent years has led to an intensification of grazing regimes. Overgrazing seriously threatens the survival of some of the area's important grassland species. The composition of local flora has also been badly affected by the abandonment of traditional farm practices and the increase in afforestation.

Botanists from Tuscany's Forests and Agro-forestry Property Service recog-

nised these problems and applied for LIFE Nature support to help restore these important grassland areas. Particular attention was paid to boosting biodiversity on three proposed Natura 2000 Sites of Community Importance (Pratomagno, M.Tondo-La Nuda and M.Castellino-Le Forbici), which between them hosted the priority species Apennine primula (*Primula appennina*), as well as the most extensive and well-preserved concentrations of *Nardus* grasslands in the Northern Apennines.



Sustaining upland species

An integrated programme of habitat restoration activities was approved for LIFE support, including preparation of dedicated management plans for each of the three proposed Sites of Community Importance. The plans set out strategic objectives based on conserving and sustaining the mountain grasslands' animal and plant communities through a combination of activities covering: land acquisition and management on particularly sensitive sites; clearance of invasive plant species from traditional grassland areas; construction of fences and watering places in order to control grazing; and geo-engineering works on slopes at risk from erosion. These practical habitat restoration works were complemented by a stakeholder consultation initiative, aimed at gaining long term support from local communities and livestock farmers for the grassland conservation plans.

Wooden grids have successfully limited soil erosion. This picture shows the growth of vegetation 2.5 years after the project ended



Despite severe climatic conditions and wild fires during the LIFE project, a beneficial range of outcomes was achieved, resulting in the restoration of sustainable grazing patterns on around 750 ha of mountain grassland.

Specific successes included improving the conservation status of more than 330 ha of Nardus grasslands, whilst some 12 ha of thin Juniperus formations were also restored. Beechwood clearance targets were exceeded by over 50% and LIFE funds helped purchase 12 ha of semi-natural grassland for active conservation management, to which the beneficiary added a further 6 ha using its own public sector funds.

In addition, the geo-engineering work stabilised 1,350 m² of grassland habitat threatened by erosion. A large number of access gates were included in the project's fencing programme as a response to feedback from the stakeholder consultation process.

Agreements have been reached with 12 graziers in the Pratomagno SCI (resulting in 85 cattle and 44 horses grazing the area in 2007). Some 60-70 cattle are regularly browsing in a 32 ha area of the Monte Tondo-La Nuda SCI. In the M. Castellino-Le Forbici SCI, agreements with four graziers have been established for a total of 465 sheep. Shrub cutting and thinning activities have been regularly implemented after the project end, as well as maintenance of gates, drinking troughs, and other infrastructure installed thanks to LIFE.

The conservation of the mountain grasslands has allowed the local population to live in these environments and to increase the production and sale of local products such as beef, lamb and cheese. Work to increase tourism, such as restoration of mountain huts, is ongoing.

Demonstrating the value of LIFE

The elaboration and approval of the management plans of the three separate SCIs is the main success of the project. The best results were obtained in the Monte Tondo-La Nuda SCI, mainly because of the business acumen of the local grazer. From a technical point of view, the best results were obtained in the Pratomagno SCI.

The management plans drawn up by the project are a binding tool for the future management of the SCIs. The Tuscan mountain communities are legally required to include the actions foreseen in the management plans in their annual planning for the management of the Regional Agriculture and Forest Estate. As a result, no after LIFE conservation plan was elaborated because it was not needed.

The project also had an important demonstration value, since similar works were carried out in other areas outside the project, both by private stakeholders and public bodies. The Casentino mountain community intends to replicate the LIFE project activities in other areas of the Tuscan Apennines in Arezzo province.

Project Number:
LIFE00 NAT/IT/007239

Title: Conservation of Tuscan Apennines mountain grasslands

Beneficiary: Regione Toscana

Contact: Giovanni Vignozzi

Email: giovanni.vignozzi@regione.toscana.it

Website:
www.rete.toscana.it/sett/agric/foreste/life/progetto.html

Period: Nov-2001 to Dec-2005

Total Budget: € 1 122 000

LIFE Contribution: € 561 000

Hungary: Restoring grasslands and marshes in the Hortobágy

The steppe-like Hortobágy region of eastern Hungary has been adversely affected for many years, particularly as a result of being cut off from the life-giving Tisza river. Several LIFE-Nature restoration projects, however, have revived this famous region.

The broad, wind-swept Hortobágy holds a special place in the imagination of the Hungarian people. The region is part of the Alföld, or Great Hungarian Plain, and was designated the country's very first national park in 1973. Modern farming practices and development have put great strains on the region, however, over the past 200 years. Sections have been drained and several puszta (prairies) have been cultivated and cut off from the Tisza river.

Other threats have included: the conversion of its marshlands and sodic lakes to fish ponds; the creation of vast paddy fields in its alkaline grasslands and meadows; the introduction of invasive alien species; the transformation of natural rivers into channels; the building of settlements and farmhouses foreign to the landscape; the destruction of the ancient grazing system; the displacement of traditional domestic animal types; the mowing of the grass; the bombing of southern sections by Soviet aircraft during military drills; the construction of power lines above the puszta; and the encroachment of cropland on the pristine grasslands.

In spite of these factors, the Hortobágy puszta remains an important habitat for millions of birds, and the region is steadily being restored through the efforts of three LIFE nature projects.

The project dubbed "Habitat management of Hortobágy eco-region for bird protection" focused on restoring habitats for the high number of bird species found in the region. The beneficiary, the Hortobágy Environmental Association (HEA), engaged in three main activities:

the elimination of unused channel networks; the removal of woody growth from the puszta and the creation of artificially flooded wetland habitat. Nearly 300 water control structures were removed from the puszta (these were later recycled into roads for local villages), and more than 100 km of channels and banks were eliminated with heavy equipment, resulting in rainwater forming shallow pools of about 200 ha in the puszta (some irrigation channels that are still in use, however, could not be removed.) In addition, nearly 3 000 woody plants, (bushes and shrubs) – most of which were low-value, invasive species introduced to Hungary – were removed.

Several shallow ponds that had formed in old riverbeds have been left with an insufficient catchment area even in wet years. To remedy this situation, in Nagy-Vókonya, the project flooded a 200 ha area. Shallow-water habitats were enlarged from 37 to 295 ha overall, by inundation and the elimination of channels. Work to eliminate paddy fields and irrigation systems in the puszta of Hortobágy continues, protecting wetland habitat and facilitating rainwater retention.

Return to traditional grazing

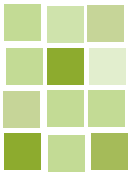
The long-term continuation of the results, however, is best assured by a return to traditional grazing. The grassy meadows of the Hortobágy steppe can best be preserved and used by applying grazing stock of indigenous breeds. Moreover, re-establishment of the traditional grazing system serves both the interests of conservationists and people living near the Hortobágy.



Hortobágy steppes (puszta) remain an important habitat for millions of birds

To ensure the conditions for traditional herding of grazing stock, the shelters and sweep wells were renovated. Also, due to the increased livestock population, traditionally designed summer shelters and windbreaks were constructed from natural materials. Winter fodder for the animals was produced outside the grazing area. By the end of the project duration, the number of native livestock (Hungarian Flecked and Hungarian Grey Cattle, Mangalica pigs, Racka sheep and goats) was increased by 1 040.

Favourable changes to the flora occurred, and most of the damaged, dried out parts of the wetland habitat were transformed into valuable alkaline meadow and marshland vegetation. Rare aquatic (*Lemnetea*) and mudflat (*Nanocyperion*) plant assemblages appeared in the area, with one species endemic to the Carpathian Basin, namely the Hungarian Elatine (*Elatina hungarica*). On the project site, 288 plant species were recorded over the course of the project period.



Additionally, between 2002 and 2006, around 225 bird species were observed on the project site. It is noteworthy that 13 of the recorded bird species are included in the IUCN Red List Species published in 2004. By 2006, a total of 96 breeding species were recorded, 11 of which are strictly protected by national legislation, including the bit-tern (*Botaurus stellaris*) and aquatic warbler (*Acrocephalus paludicola*). Following the restoration work, up to 56 pairs of EC Bird Directive Annex I species water birds were nesting in Nagy-Vókonya. In 2005, the number had increased to 63 pairs. Furthermore, while in 2003 only around 7 600 water birds were estimated to have appeared on habitats in place of the former, damaged paddy fields, following the restoration works, in 2004, some 61 000 and in 2005, some 97 000 individuals found a roosting, foraging and stop-over habitat on the project site.

Steppe and marsh rehabilitation

An earlier LIFE Nature project in the region (**LIFE02 NAT/H/008634**) focused on restoring the salt steppes and marshes. The beneficiary, the Hortobágy National Park Directorate aimed to restore these habitats across 10 000 ha of the Hortobágy National Park. The project planned to eliminate the artificial factors altering the natural micro-topography of the flood plain area by levelling or filling in a total of 360 km of artificial dykes and irrigation channels.



Photo: János Oláh

Black-tailed Godwits (Limosa limosa) are dependent on alkali meadows grazed by cattle

This project also encouraged intensive grazing methods, this time to recreate the unique mosaic of alkaline wet and dry grassland patches. Intensive grazing of cattle keeps the grass short and gives the weak plant associations such as the *Puccinellio-Salicornetea* (habitat 1310) the space to spread into suitable solonetz soil areas (alkali soils).

The project improved the habitats of 37 species of birds listed in Annex I of the Birds Directive and increased the populations of many important species. It also reconstructed small areas of special soil surface microforms, which are a special habitat type of salt steppes. In 2003, some 500 dotterels

(*Charadrius morinellus*) were observed on these patches, the highest number ever recorded.

Ongoing restoration

The Hortobágy National Park is also currently implementing a LIFE Nature project in Egyek-Pusztakócs, an area of dry and wet grasslands, marshes and arable land. River regulations and drainage for intensive agricultural practices have dried up and fragmented much of the area, and as a result the valuable pannonic steppic grasslands have almost completely disappeared. Although the largest marshes have been revitalised following the construction of a water system between 1976 and 1997, the restoration of grasslands has been neglected to date because of lack of funds.

The project is engaged in the transformation of arable land to pannonic loess and salt steppes, grazing with grey cattle and racka sheep, and reed bed management, in order to restore priority habitats on a total area of 1 500 ha. It is expected that the overall conservation impact of this action will be felt over a much larger area (5 000 ha) thanks also to the establishment of ecological corridors and buffer zones; in addition, important 'islands' of wooded areas should protect marshes from agricultural contaminants. In the long-term, grasslands and marshes are expected to reach a favourable conservation status.

Project Number:
LIFE02 NAT/H/008638

Title: Habitat management of Hortobágy eco-region for bird protection

Beneficiary: Hortobágy Environmental Association

Contact: Zoltán Ecsedi

Email: hortobagy.te@chello.hu

Website: www.hortobagyte.hu

Period: Jul-2002 to Jun-2006

Total Budget: € 830 000

LIFE Contribution: € 622 000

Project Number:
LIFE02 NAT/H/008634

Title: Restoration of pannonic steppes, marshes of Hortobágy National Park

Beneficiary: Hortobágy National Park Directorate

Contact: Szilvia Göri

Email: szilvi@www.hnp.hu

Website: http://life2002.hnp.hu/

Period: May-2002 to Nov-2005

Total Budget: € 780 000

LIFE Contribution: € 547 000

Project Number:
LIFE04 NAT/HU/000119

Title: Grassland restoration and marsh protection in Egyek-Pusztakócs

Beneficiary: Hortobágy National Park Directorate

Contact: Zoltán Ecsedi

Email: szabolcs@www.hnp.hu

Website: www.hortobagyte.hu

Period: Sept-2004 to Dec -2008

Total Budget: € 1 040 000

LIFE Contribution: € 700 000

Sweden: Converting spruce plantations into grasslands

This ambitious project aimed to restore limestone grasslands habitats by clearing afforested areas and reintroducing grazing. It has created the conditions for long-term management and conservation of Kinnekulle's habitats with the participation of farmers and the local population.



Photo: Jan Töve

Early purple orchid in limestone grassland on Österplana hed (Kinnekulle mountain)

Kinnekulle is a raised plateau in the province of Västergötland, Sweden, on the eastern shore of Lake Vänern. Its highest point is 306 m above sea level. It features a varied geology composed of several different rock layers, sandstone and limestone being the most abundant. The characteristic flat summit and shape of the "mountain" was sculpted during the last Ice Age.

The region has seen human activity at least since the Bronze Age, as evinced by various archaeological traces on the hill. The benign local

climate, the varied geology and centuries of grazing and mowing activities have created the conditions for an unusual concentration of biodiversity. The landscape was characterised by large areas of hay meadows, open pastures and grasslands containing large ancient oaks and other deciduous trees spread out over the limestone pavements that favoured a very rich plant and animal life in a landscape that remained more or less unchanged until the 19th century. This rich variety of habitats and species that stand out from the surrounding plains was noticed by many

visitors, including Carl Linnaeus, who in 1746 described the site as "A place among the most remarkable in the country".

As a result, the area has been included in the Natura 2000 network and classified as a Site of Community Importance (SCI) – no less than 17 habitat types included in Annex I of the Habitats Directive are to be found here, including nine priority ones. These range from calcareous grasslands and natural grasslands on the thin soils of the limestone-layer, which constitute the largest area of "alvar"



habitat on the Swedish mainland, to wooded pastures and deciduous and coniferous forests. Also found here are species included in the Habitats Directive, such as the lady's slipper orchid (*Cypripedium calceolus*), *Tortella rigens*, *Osmoderma eremita* and *Triturus cristatus*, as well as one bird listed in the Birds Directive: the red-backed shrike (*Lanius collurio*). Additionally, Kinnekulle hosts about 200 species that are rare and threatened at the national level.

With the modernisation of agriculture (mechanisation and use of artificial fertilisers) and the implementation of the land parcelling law at the end of the 1800s, many of the meadows and pastures were abandoned or converted to arable land or planted with spruce. The more unproductive soil areas that once were covered by hay meadows were abandoned and as a result became covered with scrub vegetation and forests. Some of these areas have developed into rich deciduous woodlands. As a result, in Sweden, only 2 500 ha meadows remain, representing a loss of 99% of the original area.

In order to restore and maintain this important habitat, quick intervention was needed, based on boosting grazing by creating new pastures and structures to help sustain livestock (e.g. fences and barns for winter feeding), together with the creation of management tools that



Photo: João Pedro Silva

Sheep grazing was reintroduced

could guarantee the sustainability and conservation status of the area in the future. With the help of LIFE funding, the Västra Götaland County Administrative Board (CAB-Västra Götaland) proposed an ambitious project with the overall objective of restoring Kinnekulle and, maintaining a favourable conservation status of the Natura 2000 species and habitats at the site. These aims would be achieved through cooperation with landowners, the local community and other interested parties.

Restoring limestone grasslands

One of the main objectives of the project was to restore open and wooded grassland habitats, clearing, fencing and re-opening for grazing

and/or haymaking areas previously covered with trees, scrubs or spruce plantations. The targeted habitats concerned were mainly rupicolous calcareous or basophilic grasslands (6110*), semi-natural dry grasslands on calcareous substrates (6210), Nordic alvar (6280), Molinia meadows on peaty or clayey-silt-laden soils (6410) and Fennoscandian wooded pastures (9070).

It is not easy to convince landowners to change from an intensive forest production system based on spruce to an extensive grazing system. The LIFE funding created the opportunity for a radical change in land use. The first step was to convince the owners. This was done through continuous dialogue and meetings with the landowners, the Swedish Farmers' Association and the Swedish Forest Agency.

These areas were cleared of all young trees, shrubs, and spruce plantations. The majority of the clearing work was done in winter and carried out manually with chainsaws and brush-cutters. The work was done by landowners, tenants and local contractors. The spruce logs were mainly delivered for paper production, while stumps and other residues were turned into wood chips for home heating. Despite mild winters, rainy summers and two severe storms, the

This illustration of the restored grasslands landscape was used in project brochures



Photo: Nils Forshed (illustrator)



Photos: Ulf Wiktander

In October 2003 (left), this area was covered with spruce and scrubs; by June 2007 (right), after clearing and three grazing seasons, some plants and the red-backed shrike had returned

aim of the project has been achieved and more than 600 ha of land has been cleared.

With the first step accomplished, the project had to establish the conditions for the reintroduction of grazing livestock. To this end, more than 70km of electric fences were erected and three sheds built to protect and provide feeding stations for some 250 cattle during winter.

The 1 540 ha covered by the project were defined as nature reserves (17 in total) under Swedish law, and are now subject to specific management plans. All the nature reserves are now included in the Kinnekulle Natura 2000 site. The County Administrative Board is responsible for managing these new nature reserves, but it is the landowner or tenant who carries out the majority of the management work.

Grasslands, farmers and visitors benefit

As a result of the project actions the area of limestone grasslands and pavement (alvar) has more than doubled. The differences in the landscape before and after the restoration are notable (see pictures), especially in those areas where spruce plantation has, after only three grazing seasons,

been converted to open grassland. As a result, some indicator species have now returned, such as the red-backed shrike (*L. collurio*).

“The immediate reintroduction of grazing after clearing was crucial for the success of the action,” believes Ulf Wiktander, who was in charge of the restoration work. Surveys indicate that plants not previously present at the site – early purple orchid, fragrant orchid, sandwort (*Arenaria gothica*) and thyme – have become established after restoration.

Kinnekulle is also a very important tourist destination with more than 100 000 visitors per year. The project created three new car parking areas, information signs and leaflets. New footpaths have made the nature reserves more accessible for visitors while at the same time controlling access.

According to project manager Maria Thordarson, farmers have been supportive of the restoration work, which has created a new income stream for them: high-quality meat from herds grazing the project areas is now being sold in shops locally and in Stockholm as ‘Kinnekulle beef’.

The majority of grazing and hay cutting in the nature reserves is financed

by agri-environmental subsidies. This guarantees both the habitat conservation and economic sustainability of the area. “Without LIFE financing it was impossible to kick-off this process, and at the same time make it sustainable after its end,” stresses Ms Thordarson. The beneficiary will continue to draw up contracts with farmers regarding clearing work, grazing etc. with the aim of gradually getting more pastures into the environmental scheme. “There is a continuous interest from farmers who want to join in the measures implemented by the project as they see the possibilities of production along with nature conservation work,” emphasises Ms Thordarson.

Project Number: LIFE02 NAT/S/008484
Title: Kinnekulle plateau mountain - restoration and conservation
Beneficiary: Länsstyrelsen Västra Götaland
Contact: Maria Thordarson
Email: gsesto@parcodellemadonie.it
Website: www.o.lst.se/projekt/kinnekulle
Period: Nov-2001 to Sept-2007
Total Budget: € 5 730 000
LIFE Contribution: € 2 860 000



Germany: Conserving the inland salt marshes of Thuringia

Northern Thuringia is home to some outstanding inland salt marshes – the result of a special hydrogeological situation, in combination with appropriate land use. With the support of LIFE, local farmers are playing a key part in the conservation of this delicate grassland habitat.

The salt marshes around the Kyffhäuser mountains are the largest and most biodiverse in Thuringia. The typical salt marsh vegetation is currently distributed over four project areas of varying size, covering some 75 ha in total. The LIFE Nature project **LIFE03 NAT/D/000005** targeted an expansion of the area of salt marshes to 110 ha.

Depending on humidity levels, most land within the project area is nowadays used agriculturally, ranging from relatively intensive, over extensive grassland farming, to natural succession on abandoned land.

The main threats to the continental salt marshes are abandonment of grassland farming or a lack of grazing activities in habitats with halophile vegetation, the displacement of salty conditions by freshwater influence, or the loss of hydraulic regulation traditionally ensured by the irrigation and drainage system.

Regaining control over the water regime in the Esperstedter Ried is crucial to the development of saline habitats of varying humidity and conditions. Targeted land purchase is a necessary preliminary measure (requiring regular contact between the LIFE office and the local farmers' association), followed by actions including the clearing of ditches and the construction or renovation of weirs. The construction of a connecting channel is necessary to enlarge the sites suitable for halophile vegetation.

Another key objective is the introduction of extensive grassland farming across the entire project area. As well



Salt marsh in Thuringia

as improving the continental salt marsh vegetation itself, this would also benefit the conservation of the avifauna of managed grassland habitats.

A delicate balance

Finding the right management concept for the delicate plant community is not easy, however: if too much water is on site for too long, salt-tolerant reed will thrive in place of the rare salt plants and prevent mowing or grazing of the priority habitat; if there is too little salt water on site, the tiny and light-demanding salt plants are simply out-competed by more robust grassland species. The grazing intensity also needs to be finely balanced: if grazing is too light, more competitive plant species will grow in place of the salt-adapted species; at the other end of the scale, overgrazing can also be a problem.

The project has been very active in seeking the optimal grazing intensity for halophytes on the one hand and meadow breeders on the other. Following the acquisition of fences by the

beneficiary (and after mowing of the reed), relatively intensive grazing of the project area started in November 2005. Grazing is being carried out by herds of Heckrinder cattle (*Bos taurus primigenius*) and Konik horses. These species have different eating habits, thereby allowing the formation of a mosaic grassland structure, as successfully implemented in the Hungarian Pannonic Steppes project (**LIFE02 NAT/H/008634**).

By October 2006, the first salt indicator plants were seen growing, including *Aster tripolium*, *Halimione pedunculata* and *Suaeda maritima*. Results also show that the breeding rates of *Gallinago gallinago* and *Vanellus vanellus* have increased since the project started.

As well as the conservation benefits, farmers are generally positive about the project because it allows them to manage their land in a more effective way.

Project Number:
LIFE03 NAT/D/000005

Title: Conservation and development of the inland salt marshes of Northern Thuringia

Beneficiary: Thuringian Ministry for Agriculture, Nature Conservation and the Environment

Contact: Stephan Pfütenreuter

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Website: <http://www.thueringen.de/de/tmlnu/themen/naturschutz/binnensalz/index.html> (German only)

Period: Sept-2003 to Aug-2008

Total Budget: € 2 440 000

LIFE Contribution: € 1 830 000

Grasslands as high biodiversity farmland areas

High nature value farmland – usually characterised by low-intensity agriculture that allows wildlife to flourish – is recognised as having a crucial role to play in achieving the goal of halting the loss of biodiversity by 2010. Although extensive mixed arable systems may also support high biodiversity, most high nature value farmland consists of semi-natural grasslands (EEA, 2004), dehesas, montados, steppe and mountain grasslands habitats, most of them included in Annex I of the Habitats Directive.

Particularly important for biodiversity are small-scale farms in central, eastern and southern Europe, which are responsible for creating and maintaining species-rich semi-natural grasslands. The abandonment of these small farm systems results in the loss of dependent grasslands species and habitats.

The LIFE programme has made an important contribution to mountain habitat restoration and to establishing actions that guarantee the sustainability of traditional agricultural activities, such as grazing and mowing.

Several LIFE projects have resulted in proposals for new agri-environmental measures (CAP) or for the adaptation of existing agri-environmental measures. In some cases, this has helped to secure ongoing payments

to support farmers in less favoured areas – normally mountainous terrain (see box). A good example is the project, **LIFE02 NAT/UK/008539** (“Yorkshire Dales Limestone Country”), which promoted management

LIFE has been supporting the establishment of agri-environmental measures under CAP with the involvement of farmers

Photo: LIFE04 NAT/IE/000125



Grasslands as high biodiversity farmland areas

and restoration of grasslands by extensive farming with hardy native cattle breeds. It also gave advice to farmers on funding sources available for the subsequent grasslands management through agri-environment measures, as well as on new marketing opportunities for conservation-oriented farms with traditional breeds.

LIFE has also promoted the development of partnerships with farmers and found ways of continuing land use and farm practices that guarantee a favourable conservation status of the grasslands habitats and other Natura 2000 assets. As a direct result of such intensive cooperation with local stakeholders, including local farmers, the project **LIFE00 NAT/D/007058** ("Regeneration and preservation of dry grassland in

Germany") succeeded in restoring and conserving over 100 ha of dry grasslands on chalky soil habitats at 14 sites in the Saar Region and Schleswig-Holstein.

The following section presents a series of examples of LIFE projects

that have contributed to the implementation of management and restoration measures in high biodiversity farmland areas inside Natura 2000.



Photo: LIFE00 NAT/D/007058

LIFE, Natura 2000 and agri-environmental measures



Since 1992, several LIFE projects have provided valuable information and experience on how agri-environmental measures could be deployed and adapted to contribute to nature conservation. Moreover, by reorienting existing agri-environmental measures towards a sustainable management of Natura 2000 network sites, LIFE has helped to promote a Community perspective, supporting both Agriculture and Nature conservation EU policy.

Many of these LIFE projects have demonstrated how local agri-environmental schemes can be adapted to reconcile farming interests with nature protection, with a special focus on grasslands species and habitats that are heavily dependent on traditional agricultural activities. In a number of cases, LIFE projects have revealed conflicting situations and illustrated the need to adapt current agri-environmental measures to the real needs of farmers in Natura 2000 areas.

The main LIFE contribution with regard to agri-environmental measures is:

- Launching ("starter") of long-term habitat management through agri-environment
- Promotion of wider use of agri-environment in the Natura 2000 network
- Design/adaptation of new agri-environmental measures for habitat (especially grasslands) conservation
- New markets for conservation-oriented farming (such as certification of local beef breeds)

For more information on and LIFE project examples, see the brochure:

http://ec.europa.eu/environment/life/publications/lifepublications/lifefocus/documents/agrienvironment_en.pdf

Ireland: farming for conservation in the Burren

Burren LIFE is the first major farming for conservation project in Ireland. Based on a pilot scheme for 20 farms covering over 3 000 ha, the € 2.23 million project (75% funded by LIFE Nature) aims to develop a blueprint for sustainable agriculture for the whole Burren region.



The goat is also closely associated with the Burren, where large herds of feral (once farmed, now wild) goats are commonly seen

The Burren – from the Gaelic word Boireann (place of stone) – is one of Europe's most remarkable limestone areas. Extending over 30 000 ha of Ireland's mid-western coastline, this dramatic glaciated karst landscape supports a variety of habitats listed under Annex I of the Habitats Directive, including five priority habitats.

The exposed limestone slabs make an excellent building material, which has been exploited by humans to create the region's famed megalithic tombs, stone forts and dry stone walls. Some 60% of Ireland's total area (30 000 ha) of this priority habitat is found in the Burren.

Orchid-rich calcareous grasslands (*Festuco-Brometalia*) are also closely associated with the Burren. The grasslands within the project area are of very high quality, harbouring species such as blue moor grass (*Sesle-*

ria caerulea), bird's-foot trefoil (*Lotus corniculatus*), tormentil (*Potentilla erecta*) and bloody cranesbill (*Geranium sanguineum*) among many others. Orchid species include the frog orchid (*Coeloglossum viride*), bee orchid (*Ophrys apifera*), and fly orchid (*Ophrys insectifera*).

A small area of the Burren is protected as a National Park, but the rest is privately owned. Its boundaries encompass five Special Areas of Conservation¹ within the Natura 2000 Network, covering a total of 47 000 ha. Special areas of Conservation are the focus of the Burren LIFE Project (BLP), which

¹ Galway Bay Complex, Ballyvaughan Turlough, The East Burren Complex, Black Head-Poulsallagh Complex and Moneen Mountain.

O'Kelly's spotted-orchid (*Dactylorhiza fuchsii* ssp. *okellyi*), a white variety of the common spotted-orchid

includes the five priority habitats: the stunning limestone pavements, turloughs², orchid-rich grasslands, petrifying springs and cladium fens.

According to Dr Brendan Dunford, project manager, farming is an integral part of the Burren landscape. Many

² Turloughs are temporary lakes, which flood with changes in groundwater. Unique to Ireland, they are typically grazed during the summer months.





generations have successfully farmed the region's rocky hills. The extensive, low input farming systems practiced by these farmers (mainly cattle, sheep and goats) helped preserve the Burren's natural heritage, particularly from the threat of scrub encroachment (mainly hazel and blackthorn). In addition, Dr Dunford explains, that farming practices such as use of the Burren winterages (winter grazing) have proven to be key to the survival of the diversity of plant and insect life in the region.

Despite this long tradition of agriculture, recent years have seen the withdrawal, restructuring and reduction of farming activity. Dr Dunford notes that changes in management practices have led to the slow degradation of priority habitats through under-grazing, abandonment and the loss of land management traditions. The area already had its own agri-environment programme (the Burren Rural Environment Protection Scheme³) but under CAP reforms there was an opportunity for the design of a new model for 'conservation agriculture' in the Burren.

The overall objective of the partnership-based project, implemented by the National Parks and Wildlife Service

³ The Burren Agreement (1995) under REPS 1 and the Burren Agreement (2007) under REPS 4



Animals' hooves also create patches for seedling establishment and grazers redistribute nutrients and seedlings, further enhancing floral diversity

(the project beneficiary), is to develop a new model for the sustainable agricultural management of the priority habitats of the Burren. The project has the support of the Burren Irish Farmers Association and Teagasc – the Irish Agriculture and Food Development Agency (both project partners), as well as local communities.

A pilot project of this nature requires a considerable amount of preparation and monitoring in order to ensure that the new mechanisms are transferable to the whole 60 000 ha of Burren farmland. These preparations (covering the first three years of the project) included: (i) talking to the local farmers and generating support

for the scheme, (ii) selection of the pilot farms, and (iii) the drawing up of farm management plans for each of the selected sites. Visits to other limestone areas in Europe e.g. to the Lowland Limestone Pavement Rehabilitation project in Cumbria, England – **LIFE99 NAT/UK/006094** (see case study on p. 42) were also carried out to compare notes on site-selection. Studies addressing the impact of the land use stipulations on habitat quality, soils and water quality were also carried out and matched with data on the condition of livestock and the costs of management.

BLP finance and operations officer Ruairí Ó Conchúir explains that a key aspect of the project is that it is "farmer-led". This was reflected in the 100 plus 'expressions of interest' from farmers who attended numerous public meetings held in 2004-05 to inform the wider Burren community of the project.

Twenty LIFE monitor farms are now actively participating in the scheme. In addition, there has been an ongoing interest from other farmers in the area. Mr Ó Conchúir says that due to the "very strong interest", it was possible to be selective. This was important in ensuring a good diversity of farms – from 40 ha to over 400 ha and including suckler beef, dairy and

High biodiversity in The Burren: water forget-me-not (Myosotis scorpiodes) – left, and the transparent Burnet (Zygaena purpuralis) – right





The thin, nutrient-poor, unimproved soils and winter grazing regimes serve to stop the more invasive plant species and litter from monopolising the vegetation, while the absence of animals in the flowering season allows often minute herb flora to thrive unhindered

mixed (beef and lamb) – and in conservation status from “favourable” to “very unfavourable”.

As the project enters its final year, most of its ambitious programme of works (targeting almost 40 diverse, but complimentary actions) has already been successfully implemented. Notably, the farm management plans were completed at the end of 2006 – enabling specific works to be carried out on the targeted farms.

Key ‘farming for conservation’ actions:

Scrub control

Encroaching scrub has been cut from an area of up to 80 ha and approximately 30 km of pathways have been opened up to allow access for cattle herding. This task has been carried out by local contractors (from a database of workers developed by the project). According to Dr Sharon Parr, project scientific coordinator, the dual benefits are already clear – it has resulted in a significant impact on the Burren

habitats: (already there appears to be a big increase in number of orchids observed in sampled areas) and has had a significant impact in terms of supporting the income of the local farming and non-farming community.

Livestock management, access and water provision

The Burren is difficult terrain to farm, with many areas only accessible on foot. This can make herding and livestock management particularly difficult, especially where the number of part-time farmers is increasing. “Improving access onto winter grazing areas is probably one of the key issues we are addressing,” says Ms Parr. In the past, many farmers resorted to bulldozing tracks to improve access, which causes considerable damage to the priority habitats. The project solution has been to pilot a system of best practice access routes on six LIFE farms using “minimal impact” construction with local limestone chip. Derogations for the work had to be secured from wildlife, monuments and agricultural authorities.

The karst nature of the Burren means that water is often in short supply, as most of the water flows underground and in a very unpredictable manner. Water provision is a huge issue for farmers, and the project funded a range of solutions from the use of ‘hydram pumps’, pasture pumps, piping and tanks, to cleaning out old springs and walling new ones.

Another key action concerns the rebuilding of areas of stone walls. One of the characteristic features of the Burren, internal boundary walls, were traditionally critically important to manage stock and land, usually dividing a farm or winterage in order that targeted grazing could take place. Using local workers, boundaries have been restored on more than 15 LIFE farms.

Grazing and feeding

Getting the grazing and feeding systems right is another significant aspect of conservation and agricultural production on the Burren farms. Led by Dr James Moran (seconded to the project by Teagasc) and working closely with



the farmers, new feeding regimes have been implemented through the management plans. The main changes have included extended winter grazing in traditional winterage areas, adjustment of winter grazing levels, the reintroduction of light summer grazing of winterages and the summer grazing by sheep (on one farm).

In a bid to encourage farmers to cut down on the use of silage, a special supplementary feed has also been formulated, tailored to suit the area and to animals' mineral and nutritional requirements. This is available to all LIFE farms, and to other Burren farmers, with special feed bins and water troughs supplied as required. According to Moran, farmers have reported high satisfaction with the feed, and a major improvement in the level of grazing by animals, which in turn will lead to enhanced biodiversity.

A recent meeting with vets from the Burren region highlighted the potential animal health benefits of switching from silage to concentrate feeding, and noted the general good health and calving success of outwintered animals. Moran adds that one vet joked that if this continues, he'll soon be out of business!"

Farm Demo Day, July 2008, involved farmers in discussions on grasslands management



New markets for Burren producers

The Burren Beef and Lamb Producers Group is a new initiative launched in March 2007. Involving 16 Burren farmers, its members actively farm for conservation in the Burren. Lamb was launched in June 2007, with beef following in September 2007 – generating, in just over 12 months, sales of €50 000-€60 000.

Support for the LIFE farmers

Involvement in the project is voluntary – farmers receive an annual payment of up to €750, but this covers all of their time spent on the project. Any additional LIFE support is for works carried out on the farms such as the special feed (funded 25%) purchase of some special equipment e.g. cattle troughs (50%), and scrub removal and stone wall works (up to 80%).

Mr Ó Conchúir emphasises that these grants have little bearing on the strong support for the scheme among the LIFE farmers. For them, he says, the most important aspect has been the technical support offered by the project, in particular the agricultural monitoring and support with derogations.

Looking to the future, the project team is optimistic that the majority of the farmers will continue the work started under LIFE, irrespective of whether or not they receive future additional

[financial] support because: "They value what has taken place, and in particular the impact this has had on their environment."

Finally, according to Dr Dunford, there are already indications that the project's findings could also influence farming in other areas of the country. Earlier on in the project, the team was asked by the Irish Department of Agriculture and Food to submit its experiences, incorporating best practice identified through the farm work programmes, into revisions for the Burren of the national Rural Environment Protection Scheme (REPS 4⁴). More recently, Dunford notes that the National Parks and Wildlife Services (the beneficiary) is looking to utilise the BLP final results in order to develop a blueprint for future farming for conservation measures on areas of high nature value across Ireland.

⁴ These cover payments to farmers under the Rural Development Programme 2007-2013



Project Number:

LIFE04 NAT/IE/000125

Title: Farming for conservation in the Burren

Beneficiary: National Parks and Wildlife Service, Dept of Environment, Heritage and Local Government

Contact: Ruairí Ó Conchúir

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Website: www.burrenlife.com and www.npws.ie

Period: Sept-2004 to Aug-2009

Total Budget: € 2 230 000

LIFE Contribution: € 1 673 000

Latvia: Protecting floodplain meadows in partnership with farmers

A LIFE Nature project in Latvia is undertaking a nationwide programme to restore priority floodplain habitats. This innovative scheme has developed close ties with local landowners to ensure the continuity of habitat management actions when the project ends.

The Baltic State of Latvia contains a significant resource of floodplain habitats. The LIFE Nature project "Restoration of Latvian floodplains for EU priority species and habitats" (LIFE04 NAT/LV/000198) targeted 16 of these areas covering 14 085 ha in total. These areas feature the best floodplain meadows in the country, including 50% of the national resource of fennoscandian wooded meadows and over 6 530 ha of alluvial forests. Nine habitat types listed in Annex I of the Habitats Directive are recorded in the project sites. The project areas host the highest breeding densities of the priority species corncrake (400-685 individuals) and lesser spotted eagle (59-120 individuals) as well as one-third of the Latvian snipe population (59-120 individuals) and the only two recorded sites of spotted eagle in Latvia. Five of the project sites are among best areas in the country for *Osmoderma eremita*. The project targets a total of 23 species listed in Annex 1 of the Birds Directive and three species listed in Annex II of the Habitats Directive.

As in other parts of Europe, the main threat to the floodplains comes from a lack of management and fragmentation; most have been abandoned



Photo: Latvian Fund for Nature

Geese on restored areas in the Seda project site

and are gradually being invaded by scrub. Changes in the water regime from past drainage works are also taking their toll, as is the overall lack of awareness of the natural and socio-economic value of these areas.

A nationwide restoration programme

The aim of the LIFE Nature project was to restore the biologically most important and currently abandoned floodplain areas and to ensure subsequent

continuous management for the benefit of species and habitats (e.g. Fennoscandian wooded meadows 6530, Fennoscandian lowland species-rich dry to mesic grasslands 6270, Species-rich *Nardus* grasslands 6230). Through its actions the project would also contribute to the further development and establishment of the Natura 2000 network in the country.

To achieve the project aims, the beneficiary – the Latvian Fund for Nature, in partnership with 22 other organisations and the 19 municipalities where the project sites are located – planned to initiate a coordinated nationwide programme for the restoration and long-term management of these important floodplains, drawing up management plans for 15 sites and undertaking urgent restoration works on some 2 400 ha of meadows.

Cattle grazing in restored areas in the Sita project site and Pededze floodplain



Photo: Latvian Fund for Nature



Photo: Latvian Fund for Nature

Konik horses grazing in restored meadows in Sita and the Pededze floodplain

Getting farmers involved

Since long-term management is highly dependent on agricultural stakeholders (more than 90% of the target area is privately owned), the project has gone to great lengths to involve local farmers. More than 400 of them have been contacted and study tours, educational seminars and one-to-one discussions organised as appropriate to incite interest and active participation.

This approach has proved quite effective: by November 2007, a total of 226 contracts had been signed with landowners, for the restoration of 4 112 ha of habitats. This has been achieved despite the incorrect and outdated land ownership data available in municipalities and the fact that some of the project areas have a large number of landowners owning small plots. Both of these factors make the preparation of management agreements a time-consuming and complicated process.

To ensure the continuity of the project management activities, the contracts are signed on condition that the land manager (landowner) will apply for funding under national and interna-

tional agri-environmental programmes for at least five years after the end of the LIFE project – grasslands management activities will be continued under the Rural Development plan for Latvia.

Practical steps

Restoration actions carried out to date in the project areas include the construction of a 2 km long fence in the Burtnieki meadows and a 1 585 m fence in the Lielupe floodplains site. Sixteen Konik horses (a hardy breed) are grazing the 80 ha fenced area at the latter site.

To enable grazing, it is first necessary to remove overgrowth of shrubs. The LIFE project has signed contracts for shrub removal on 796 ha, with shrub cutting finalised at the interim stage across a total of 313 ha. To promote this action, the project held a habitat restoration event in the summer of 2006. The event took place in Jelgava, Pilssala (in the Lielupe floodplains project site). The event, which was very popular and provided much publicity for the project, involved the restoration of 0.5 ha of floodplain meadow by a

team of volunteers, together with students, journalists and the city mayor. The project planned to use the same approach for restoration (an open public event) in other areas where landowners do not have the capacity for restoration (no machinery, old age, no interest), but where it would be crucial for biological diversity.

Other dissemination activities planned include the publication of 100 000 copies of various information booklets, and a comprehensive best practice manual on grassland management, designed to be of interest internationally.

Project Number:
LIFE04 NAT/LV/000198

Title: Restoration of Latvian floodplains for EU priority species and habitats

Beneficiary: Latvian Fund for Nature

Contact: Inga Racinska

Email: inga@lanet.lv

Website: www.lidf.lv/pub

Period: Oct-2004 to Jun-2008

Total Budget: € 1 600 000

LIFE Contribution: € 1 144 000

Spain: La Serena – a farming model that lets birdlife flourish

Overgrazing, hunting and development are just some of the increasing threats to a host of priority bird species in La Serena, Extremadura: part of one of the largest grassland areas in the EU. This LIFE project provided a model for alternative, economically-viable management that can help sustain birdlife and win the support of farmers.

The La Serena y Sierras Periféricas Natura 2000 area in western Spain has some of the best-conserved steppe areas in the EU, containing priority habitats and significant populations of a whole range of protected birds, including the great bustard (*Otis tarda*), little bustard (*Tetrax tetrax*) and lesser kestrel (*Falco naumanni*).

These natural grasslands owe their biodiversity to traditional non-irrigated farming methods used in cereal growing and sheep grazing. But the habitats are coming under increasing pressure. In some cases resources are being over-exploited through intensive farming techniques, in others by overgrazing or through harmful hunting practices. The land is also in danger of being heavily built-on or abandoned, so destroying its delicate ecosystem.

This LIFE Nature project addressed these threats by establishing a demonstration management model to promote alternative farming-practices and achieve long-term conservation of habitats and species in the special protection area (SPA) without compromising economic success.

At the end of the project, pilot areas showed an increased number of species of conservation interest, and a higher abundance of game species.

The density of the following species was particularly seen to benefit: partridge, lesser kestrel, great bustard, little bustard, sandgrouse, corn bunting and hare.

The farm-management system

Two farming estates were managed using environmentally-friendly trial techniques, with two others monitored as they continued conventional modern methods.

On the project estates, livestock intensity was reduced from 3 sheep/ha to an average of 1.5 sheep. Chemicals were either not used at all or reduced to organic farming levels. Fencing systems were organised to rationalise the grazing. Changes in the rotational system were introduced for cereal dry farming and legumes were grown. Breeding requirements for bird species were taken into account when planning exactly when to plough and harvest. No fertilisers were used.

The whole area was “zoned” by bird species so that practices could be tailored according to the species within each zone. This will be hugely significant to the management of the La Serena SPA in the future.

On one of the estates, hunting – regarded by the local population as

important to the life of the area – was allowed to continue, while on the other it was banned for the duration of the project.

Compensation for economic loss was vital in achieving cooperation from the pilot estates' farmers and the study produced an analysis of possible future funding mechanisms to address this issue. Interest from other farmers in the area was high, however, and represented a change of mentality, showing that the sector is willing to practice sustainable farming if suitable aid schemes are in place. The beneficiary will continue to support economic viability by encouraging businesses such as organic cheese-making or bird-watching tourism.

Results from this and a similar project in Extremadura have been passed to the regional government and could be a model for future sustainable management in this and similar steppe areas.

Project Number:
LIFE00 NAT/E/007327

Title: Habitat management model of the SCI La Serena - Sierra de Tiros (Extremadura, Spain)

Beneficiary:
Sociedad Española de Ornitología

Contact:
Alejandro Alejandro Sánchez Pérez

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Website: www.seo.org/programa_intro.cfm?idPrograma=31

Period: Jan-2001 to Dec-2004

Total Budget: € 736 551

LIFE Contribution: € 552 413

Livestock intensity was managed and reduced in La Serena





UK: Limestone pavements - a restoration success story

This LIFE project provided an opportunity to help reverse a seemingly hopeless pattern of exploitation and neglect of habitats over a wide area of the English Lake District. The project's achievements helped to convince local communities that sites can be successfully restored to their former glory.

The Lowland Limestone pavements and other limestone habitats around the Morecambe Bay area in northern England are botanically the richest of their type in the country. They contain areas of yew-dominated woodlands, lime woodland, juniper, dry limestone grasslands, a calcium-rich, nutrient-poor lake and a sizeable population of the narrow-mouthed whorl snail (*Vertigo angustior*).

The site area contains a mosaic of Annex 1 listed habitats and is a candidate Special Area of Conservation (cSAC), but its rich ecosystem has come under increasing threat as a result of its exploitative past, including much removal of limestone pavement for domestic garden decoration. This has been reduced by recent legal protection and awareness, but heavy commercial afforestation with non-native species has resulted in equally serious deterioration of habitats, through needle-fall and gradual closing of the tree canopy.

The beneficiary, a small wildlife protection trust, had already had success in stemming the loss, but with funding from LIFE was able to achieve major restoration and establish a sustainable management pattern.

Work began with felling of conifers in some of the most badly affected areas. Rotational coppice cycles were reintroduced within the yew and lime woodlands. Low-intensity grazing was established on grasslands, preventing the expansion of woodland and bracken and increasing the number of flower species. Scrub and bracken clearance programmes were carried



Photo: English Nature

A lowland limestone pavement

out and deer controlled by fencing and culling to prevent destruction of tree re-growth. Water levels in the marl lake were restored to return marginal habitats to near-natural conditions.

A new area is born

The most dramatic result was the transformation achieved by early clearing of 100 ha of pine at Whitbarrow. In less than four years, the reclaimed limestone grasslands were being grazed by cattle. Project funds were used to purchase 204 ha of that area, benefiting the grazing and allowing public access to the spectacular area created – some of which had been under conifer cover for 30 years.

In all, 266 ha of non-native plantations were removed using techniques developed to preserve the habitat, including the disposal of woodchips; 300 ha of land was brought into sympathetic management through the land-purchase and through agreements with private landowners over deer management. Coppicing was carried out in eight areas, which became high-profile demonstration models. Grazing was

achieved on over 330 ha in addition to the Whitbarrow area, resulting in maintenance of species-rich grasslands.

Coppicing and scrub clearance produced an immediate response from ground flora, including violets and primroses. This resulted in greater numbers of butterflies, among them High Brown Fritillaries, which in one area increased by 400%. Habitats of the endangered whorl snail were restored through deer control and resulting numbers of the snail were estimated in the tens of thousands.

Recovery of some pavement areas may be slow, but by the project-end, maidenhair (*Adiantum pedatum*), spleenwort, and Hart's-tongue fern (*Asplenium scolopendrium*) were all recorded and juniper was responding.

The work attracted considerable public attention, particularly where landscape change was dramatic. This resulted in many visits, increased awareness and support and encouraged one local parish council to purchase further land for conservation.

Project Number:
LIFE99 NAT/UK/006094

Title: The Lowland Limestone Pavement Rehabilitation Project

Beneficiary:
Cumbria Wildlife Trust

Contact: Kerry Milligan

Email:
mail@cumbriawildlifetrust.org.uk

Period:
Aug-1999 to Jul-2003

Total Budget: € 876 467

LIFE Contribution: € 438 234

Grasslands species



Grasslands are key habitats for many species: plants, butterflies and reptiles, many birds, as well as grazing mammals such as deer and rodents. However, the overall population trend is negative for characteristic grasslands species, such as the great bustard, corncrake and several species of invertebrates.

Several LIFE projects directly target grasslands species, and the programme has been actively contributing to the conservation of these species and their habitats. This section features a handful of projects that work across several Member States for the conservation of the same species or habitat. Here, we have

a look at the contribution made by LIFE projects to the conservation of the grasslands species: falcons and kestrels (*Falco naumanni*, *Falco vespertinus* and *Falco cherrug*); bustards (*Tetrax tetrax*, *Otis tarda* and *Chlamydotis undulata*); corncrake and invertebrates (butterflies and dragonflies).

Red-backed shrike (*Lanius collurio*)



Great bustard (*Otis tarda*)



Red-footed Falcon (*Falco vespertinus*)



Macromia splendens



Lesser Kestrel (*Falco naumanni*)



Little bustard (*Tetrax tetrax*)



Bustards: LIFE support for grasslands bird species

Europe's grasslands provide essential habitats for a wide range of important and endangered flora and fauna. Many bird species are particularly dependent on grassland environments and these include the bustards, which continue to be closely associated with grassland conservation activities supported by a collection of successful LIFE Nature projects.

Bustards are large terrestrial birds, forming the family *Otididae*, found primarily in dry open grassland habitats with low vegetation where they are able to look out over long distances. They are omnivorous, ground nesters and seldom use trees since they lack a hind toe that other birds use to grasp branches during perching.

Bustards are mainly resident in southern and eastern European countries, where they have suffered rapid population reductions across most of their range. This has been caused by the loss and fragmentation of traditional

Houbara bustard (*Chlamydotis undulata*) in the Canary Islands

grassland habitats following agricultural intensification.

LIFE funds have been used by an array of different beneficiaries from across the EU to implement active conservation measures in grassland areas to restore and manage bustard habitats. Three bustard species have been assisted. These are the little bustard (*Tetrax tetrax*), great bustard (*Otis tarda*) and houbara bustard (*Chlamydotis undulata fuertaventurae*). Each of these species is classified as vulnerable and all are included in Annex I of the Birds Directive.

Conservation success factors

More than 25 dedicated LIFE Nature projects have been supporting work with Europe's bustards. These initiatives have generated important knowledge regarding the different success factors involved in grassland conservation activities for Europe's bustard populations.

The LIFE project "Evaluation of bustard conservation best practice in Western Europe" (LIFE03NAT/CP/P/000008) examined the problems and opportunities linked to bustard conservation solutions in Portugal, Spain and France, with an emphasis on farming-sys-

tems and rural development strategies. No previous evaluation of bustard conservation measures had been carried out for over a decade and the LIFE project results, such as guidelines on farm grassland techniques and the establishment of a bustard-conservation contact group, have been acknowledged by stakeholders as making important contributions to conservation methodologies for bustard habitats. The project results have been widely used within the original beneficiary countries and also informed grassland management actions in Austria, Hungary, Turkey, Greece and Russia.

Little bustards

The little bustard was originally dependent on Europe's steppic grassland environments, but the loss of this natural habitat has led to a serious decline in the species. It has already disappeared from several countries in central and eastern Europe. Those remaining little bustard populations have now adapted to various kinds of traditional agricultural grassland landscapes, ranging from sheep pastures to extensive cereal farms.

Experts from the project LIFE04 NAT/FR/000091 ("Reinforcement of the migratory breeding populations of the Little Bustard in France") knew from previous LIFE work that lack of food resources and nest destruction during harvesting were the main causes for the dramatic decline in migrating populations of little bustards. Eight separate project sites were identified for conservation activities and a



Photo: Gustavo Peña

Photo: Juan M. Simón



Male Little bustard

programme for breeding, rearing and releasing bustards was implemented. The project also developed an innovative measure to prevent the destruction of nests during harvest. This involved drawing up 'emergency contracts' with farmers to stop the destruction of nests located on land not included in agri-environmental measures. The contracts compensated the farmer for delaying pasture/lucerne mowing for up to two months.

New grassland management measures in Portugal's Alentejo region have also been successful in enhancing little bustard habitats. There are estimated to be up to 20 000 little bustards in Portugal, but more than 90% of this population is endangered by threats to traditional grassland agricultural landscapes from abandonment, afforestation, increased irrigation, intensification and overgrazing. Project Tetrax (**LIFE02 NAT/P/008476**) was introduced to tackle these issues and succeeded in a variety of conservation measures including: the setting up of specific agri-environmental measures to promote pasture and fallow farmland mosaics; and the designation of new special protection areas (SPAs) for steppic birds in areas of importance to the little bustard.

Great bustards

The great bustard population is highly fragmented across Europe with much of the world's breeding population



Great bustard

(50%) now found in the Iberian Peninsula. Great bustards are also found in central European Member States, as well as Russia and Turkey. The species is now extinct in the UK, France, Poland and western parts of Germany.

As with the little bustard, loss of traditional grassland habitat represents the main threat to great bustard populations. Several different LIFE projects have been working towards improving habitat conditions, including Spain's **LIFE99 NAT/E/006350** ("Management of the habitat in the ZEPA of Villafáfila"). This project was based in an area that hosts the world's highest density of great bustards and contains a pseudo-steppe ecosystem set in a landscape of gently rolling hills, dominated by extensive cultivation of cereals. The LIFE project forms a second phase of a scheme that started in 1996 and has successfully maintained a minimum area of grassland planted with the forage crop alfalfa, that provides the bustards with their main food supply.

The LIFE Nature project "Conservation of Otis tarda in Hungary" (**LIFE04 NAT/HU/000109**) also recognised the importance of providing appropriate food supplies for great bustards and this formed part of an integrated set of habitat conservation measures to improve the breeding and wintering condition of great bustards. Positive outcomes have been achieved

Photo: LIFE00 NAT/E/007327

through management controls, such as extensive mowing regimes, that create favourable conditions with good year-round feeding opportunities and limited disturbance during the most critical periods of the bustards' life-cycle.

In Slovakia a similar LIFE Nature project (**LIFE05 NAT/SK/000115**) has been proactively working on grassland restoration and management activities designed to improve the conservation status of great bustards, including protection of key nesting and wintering locations.

Austria's **LIFE05 NAT/A/000077** also included collaborative work with local farmers in order to encourage active management of appropriate great bustard habitats in border areas, particularly those neighbouring the Czech Republic. The project featured guidance on pertinent grassland techniques and a considerable amount of effort was invested in restoring "open habitats", by marking and redirecting overhead power cables that had killed many bustards each year.

Houbara bustards

Habitat restoration work formed a key component of a Canary Islands LIFE Nature project set up to help conserve Europe's only populations of the houbara bustard. The LIFE Nature project **LIFE03 NAT/E/000046** aimed to redress threats associated with landscape changes following the archipelago's recent socio-economic development. Traditional grassland areas had been built on or were being overgrazed by goats. A package of actions was rolled out in support of the houbara bustard. These included purchase of land for management as a typical steppe environment conservation reserve, and the development of an agri-environmental programme in areas inhabited by the houbara that promoted traditional grass and legume crops.



Falcons and kestrels: Conserving these majestic hunters

The sight of a bird-of-prey soaring over a valley on a warm summer's day is something to savour. However, in recent decades this sight has become increasingly rare in Europe. Falcons and allies, including the lesser kestrel (*Falco naumanni*), the red-footed falcon (*Falco tinnunculus*) and the Saker falcon (*Falco cherrug*) are among the continent's most threatened bird species. A number of LIFE Nature projects have attempted to reverse the species' decline, with positive results.

The lesser kestrel is found in the Mediterranean region, principally in Spain, Greece, Italy and Portugal, with a migratory range that extends as far as Asia Minor and North Africa. It is usually a colonial breeder, often in the vicinity of human settlements in old buildings. It forages in steppe-like habitats, natural and managed grasslands, and non-intensively-cultivated-land.

There was a dramatic reduction in the lesser kestrel population between the mid-1960s and the mid-1990s, so much so that the species is now classified as 'vulnerable' at a European level.

The main causes of this decline are identified as:

- Habitat loss and degradation, primarily a result of agricultural intensification, but also afforestation and urbanisation

Lesser kestrel



Photo: Rui Cunha

- The use of pesticides. These may cause direct mortality, but are probably more important in reducing prey populations
- The abandonment or restoration of old buildings, resulting in the loss of nest-sites.

Iberian success

LIFE Nature projects in Portugal and Spain have had some success in reversing this negative population trend. The Portuguese project (**LIFE02 NAT/P/008481**) focused on the Special Protection Areas (SPAs) of Castro Verde, Vale do Guadiana and Campo Major with actions aimed at improving feeding opportunities and increasing the number of nesting sites favoured by lesser kestrels. Key actions included:

- The construction of walls or towers to provide breeding sites
- The purchase or lease of structures (e.g. ruined buildings) suitable for breeding in the Castro Verde SPA
- Increasing the quality of the feeding areas (e.g. by promoting alternative farming techniques)
- Monitoring power lines
- Drawing up zonal plans (EU agri-environmental measures – Rural Development-specific for a zone)

for the Vale do Guadiana and Campo Major SPAs.

This ambitious project met all of its main objectives. Specifically, by 2006, there were an estimated 427-462 breeding pairs of *Falco naumanni* distributed across 55 colonies. This compares with just 31 known colonies when the project started in 2002 and an estimated 340-370 breeding pairs in 2003. Results were particularly good in the Castro Verde SPA, where the species' population has risen 60% since 2001. In total, the LIFE Nature project created 817 new breeding places, of which 37% have been occupied, equating to 22% of the total Portuguese lesser kestrel population.

In neighbouring Spain, the LIFE project "Conservation of *Falco naumanni* nesting habitat in Aragon" (**LIFE00 NAT/E/007297**) set out to protect the lesser kestrel's nesting habitats in the Monegros SPAs of Aragon. The principal activities included:

- The repair of traditional rural houses
- Population monitoring
- Predator control
- Analysis of biological samples of individuals to determine contamination levels and reproductive failures
- An information campaign targeting the local population.

The project has contributed to a steep rise in the number of breeding pairs (from 589 to 1 041). Existing breeding colonies were consolidated and new colonies formed, in particular in the

county of Monegros. The restoration of 50 old agricultural buildings as breeding habitats also served to increase awareness of conservation among the local population.

Project **LIFE96 NAT/E/003102**, implemented in the Spanish region of Extremadura, aimed to improve the conservation status of the lesser kestrel, whilst also targeting the little and great bustards. Concerning the kestrels, the measures focused on the restoration of buildings and installation of artificial nests. These have been very successful, with high occupancy rates and productivity.

Ongoing conservation efforts

A third LIFE project targeting exclusively the lesser kestrel (**LIFE05 NAT/F/000134**) is currently running in two separate Natura 2000 sites in wine-growing regions, one in France and one in Spain. The project aims to improve the conservation status of *Falco naumanni* in Aude (France) and Extremadura (Spain). The beneficiary, the Ligue pour la Protection des Oiseaux (LPO), has imported both kestrels and know-how from the Spanish partner (DEMA), and has established a breeding centre in France. Some 50 chicks are now being released each year in Aude and work is ongoing there to manage the

habitats (so as to increase the availability of food), to install artificial nests, and to monitor the nesting and release sites. In Spain, new nests and other improvements are also being put in place so as to improve the breeding success of the nesting site (the roof and bell-tower of a church in the centre of Almendralejo). A national restoration plan is being drawn up for France, as well as guidelines for habitat management, based on studies to improve knowledge of the lesser kestrel's biology, feeding habits and causes of mortality. The project is already managing habitats in favour of the species thanks to partnerships with hunters and sheep farmers.

Falcons in Pannonia

The Pannonian bio-geographical region is home to two falcon species included in Annex I of the Birds Directive: the red-footed falcon (*Falco tinnunculus*) and the Saker Falcon (*Falco cherrug*).

Falco cherrug

There are only 450 known breeding pairs of Saker falcon, of which 40% are found in Hungary and Slovakia. Sakers prefer wooded and plain steppes and grazed grasslands with ground squirrel (*Spermophilus citellus*). The main objective of the LIFE Nature project "Conservation of *Falco cherrug* in the Carpathian basin" (**LIFE06 NAT/H/000096**), which began in October 2006, is to identify the principal reasons why the numbers of this bird have declined by more than 20% over the last 10 years. Steps will also be taken to create favourable conditions for the short-term stabilisation of the population, including installing nesting boxes and reintroducing the ground squirrel. As the result of the project, life conditions for Sakers are expected to improve in the Carpathian Basin. The number of breeding pairs is forecast to reach 180 in Hungary and 35 in Slovakia by 2010.

Saker falcon (Falco cherrug) ready to be released after marking

Photo: Balázs István



Falco tinnunculus

The red-footed falcon breeds in open areas with small wood patches, scattered trees, or windbreaks. Preferred habitats are steppe grasslands, but it can breed in agricultural habitats as well. Some 90% of the European red-footed falcon population is located in Hungary and Romania, where the number of known breeding pairs had fallen from 3 200 in 1990 to just 925 in 2003.

The LIFE Nature project "Conservation of *Falco tinnunculus* in the Pannonian Region" (**LIFE05 NAT/H/000122**) aims to create favourable conditions for the short-term stabilisation of the species' population, targeting 12 SPA sites in Hungary and 11 proposed SPAs in western Romania. The project will focus on securing current nesting sites and increasing potential nesting places by installing nest boxes. Practical measures are also being taken to reduce the key factors of mortality: insulating dangerous electricity pylons close to nesting, roosting and feeding sites; eliminating predators; and introducing speed limits to reduce road kills.

Female red-footed falcon (Falco tinnunculus) on breeding site

Photo: Péter Paláitz





Habitat restoration and management to aid the threatened corncrake

The destruction and poor management of its habitat – tall grasslands and herbaceous vegetation – has endangered the long-term survival of the corncrake (*Crex crex*). Several LIFE-Nature projects, however, have sought to protect this bird species through raising its status and safeguarding its habitat.

Since 1992, 28 LIFE projects have directly or indirectly targeted the corncrake, a globally threatened species, classified as 'vulnerable' at both world and European level and listed in Annex I of the Birds Directive.

Corncrakes breed in open or semi-open landscapes, mainly in meadows of tall grass. The species is in steep decline across most of its range because modern farming practices mean that nests and birds are destroyed by mowing or harvesting before breeding is finished. Other causes of the decline include habitat loss or degradation due to intensification of cultures, overgrazing, abandonment of land, and draining of wetlands.

In Slovenia, an important concentration of this species (around 250 singing males) can be found in the area surrounding Lake Cerknisko, in the flat fields of Ljubljansko barje and along the Nanoščica river. Here, a LIFE project (**LIFE03 NAT/SLO/000077**) introduced for the first time an essential management plan for these areas.

Mowing meadows for the corncrake

The three areas contained large tracts of grassland that were traditionally managed to provide fodder for livestock and hay for local farmers. However, with the decline of traditional agriculture practices, abandoned grasslands have developed vegetation that is too dense for corncrakes. In other areas, conversely, intensification of agriculture – conversion to crop production, early grass mowing (resulting in the destruction of nests and chicks) and the fertilisation of meadows – has led to problems for the species.

The project drew up an Action Plan for Corncrake 2005-2015 and a National Monitoring Scheme for the Corncrake for the long-term protection of the species in Slovenia.

Another significant result of the project was the introduction of a new agri-environmental scheme for the protection of the corncrake and other endangered wet grassland birds in priority Natura 2000 sites. This scheme falls within the Rural Development Programme for the Republic of Slovenia 2007-2013 and was introduced in cooperation with the Ministry for Agriculture, Forestry and Food. The new scheme offers fresh incentives to farmers for corncrake habitat management in key Natura 2000 sites.

Bird-friendly grasslands management

Land was leased and purchased to increase the potential habitat for the corncrake. The project also tested an innovative bird-friendly mowing technique. Initially the farmers were unresponsive to the new technique, but over time it became accepted and widely demonstrated in the project areas. In fact, the technique has become a symbol of bird-friendly grasslands management and was presented in the project's leaflet and brochure.

The implementation of similar techniques involving local farmers has also paid dividends in Germany and Latvia. The project in Germany (**LIFE97 NAT/D/004233**) successfully developed breeding habitats for the corncrake in the lower Elbe region. The beneficiary, the Lower Saxony regional authority, bought 33 ha of land, closing gaps in a network of specially managed land. The conversion of arable land to grassland was a specific project objective. Using special seed mixtures provided for by the beneficiary, farmers sowed former arable land sections for free.

In Latvia, the LIFE Nature project (**LIFE03 NAT/LV/000082**) raised the national protection status of the corncrake in the project area, the northern Gauja valley, creating the basis for its inclusion in the Natura 2000 network.

These are just three examples of how LIFE is linking conservation and rural development for the benefit of the corncrake and other threatened species.



Photo: LIFE03 NAT/SLO/000077

Invertebrates: an essential and oft forgotten element of grasslands

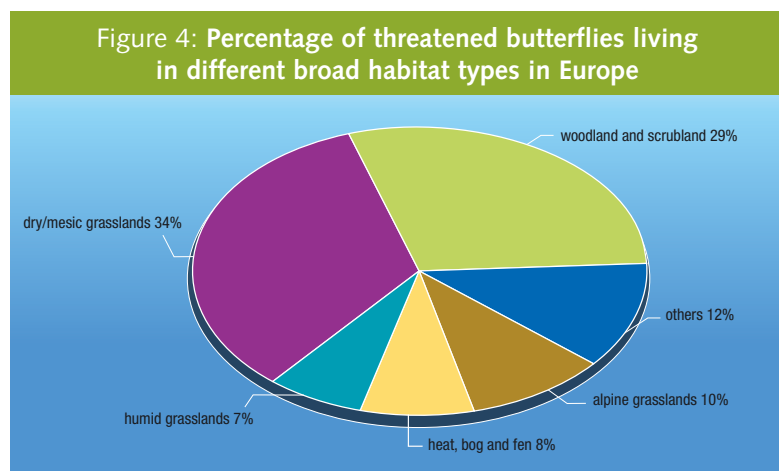
Butterflies and moths (*Lepidoptera*) and dragonflies (*Odonata*) fascinate us with their amazingly complex life cycles and graceful flight. Along with other invertebrates such as beetles (*Coleoptera*), these insects also play an extremely important role in grasslands and other ecosystems and are important actors in our economy. The EU Habitats Directive recognises the need for their protection and the LIFE programme has been actively contributing to the conservation of these species and their habitats.

Butterflies are one of the best studied insect groups, and, because of their short lifespan, are particularly vulnerable to environmental threats. A number of recent studies point to a dramatic decline in butterfly species throughout Europe as a result of intensive farming, habitat loss and climate change.

According to a 2005 study by the European Environment Agency (EEA)¹, population trends of butterfly species showed a dramatic (28%) decline across the EU-25 between 1990 and 2000. The highest number of species assessed, namely 206 butterfly species, occurred in farmland habitat – typically open grassy areas such as extensively farmed areas, grasslands, meadows and pastures. The EEA attributes this “very substantial” decline to loss of extensive farmland with low or no input of nutrients, herbicides and pesticides. Another key factor is agricultural intensification, leading among other things to a loss of marginal habitats and hedgerows and a higher input of fertiliser, herbicides and insecticides.

Xeric grasslands are the most threatened grassland habitat type in Europe, says the EEA, since they contain many specialist species that need dry, well-lit conditions to thrive. Although butterfly species are more specific to the individual plants that host them than to habitat types, it is possible to cat-

¹ EEA Species diversity CSI 009 – Assessment Nov 2005



Source: European Environment Agency (EEA) 2001 © Copyright. Data compiled from Council of Europe, 1999. Red Data Book on European Butterflies (*Rhopalocera*)

egorise the main habitat types where these plants, and therefore butterflies, occur.

According to another EEA study² (See figure 4), over half of Europe's 576 butterfly species are linked to grassland habitat types, of which 71 are under threat, and a larger proportion (34%) are limited to dry or mesic grasslands.

This article highlights a handful of exemplary LIFE Nature projects located in grassland habitat types that target, among other things, the protection and conservation of the highly endangered marsh fritillary butterfly. It also charts the progress of a project in the autonomous region of

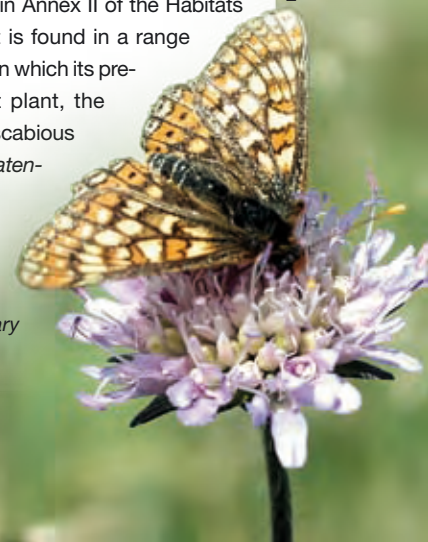
² Assessment of all known butterfly species in Europe (EEA 2001) http://themes.eea.europa.eu/Specific_media/nature/indicators/grasslands/natural_species

Extremadura in western Spain, which aimed at the conservation of several endangered insect species found in and around six Natura 2000 sites.

The marsh fritillary butterfly

The marsh fritillary butterfly (*Euphydryas aurinia*) has declined dramatically in Europe and is regarded as endangered or vulnerable in most of its European range. Listed as a priority species in Annex II of the Habitats Directive, it is found in a range of habitats in which its preferred host plant, the devil's-bit scabious (*Succisa pratensis*) occurs.

Marsh fritillary butterfly





Marsh fritillaries are essentially grassland butterflies and although populations may occur occasionally on wet heath, bog margins and woodland clearings, most colonies are found in damp acidic or dry calcareous grasslands. Sheep selectively graze devil's-bit scabious and are therefore detrimental to marsh fritillary populations. Burning and mowing are also known to have caused the extinction of populations.

Populations of the marsh fritillary vary greatly in size from year to year, and, at least in part, this is related to cycles of attack from parasitic wasps. Adults tend to be sedentary and remain in a series of linked metapopulations, forming numerous temporary sub-populations, which frequently die out and re-colonise. The sedentary behaviour of the adults and increasing fragmentation of their preferred habitats has led to the establishment of numerous endemic races. The marsh fritillary is an extremely variable butterfly, with 34 subspecies described in Europe alone.

LIFE project actions:

- Restoration of the mid-Cornwall Moors for the *Euphydryas aurinia* (LIFE03 NAT/UK/000042) – <http://www.midcornwallmoors.org.uk/>

- Conservation and upgrading of habitats for rare butterflies of wet, semi-natural meadows (LIFE06 NAT/PL/000100) – as well as *Euphydryas aurinia*, this project also targeted five other endangered butterfly species
- Action for sustaining the population of *Euphydryas aurinia* (LIFE05 NAT/DK/000151)

These three LIFE projects have been focusing mainly on conservation actions to bring the threatened and isolated populations of the marsh fritillary into a favourable conservation status. The main actions involve the establishment of mechanisms for the legal protection of the species and, on Natura 2000 sites, by the introduction of legally-binding management plans or the elaboration of national conservation or biodiversity plans. Additionally, there has been a great deal of work on-site to ensure good conditions for the larval food plant, the devil's bit scabious. The plant benefits from measures that prevent overgrowing, and the clearance work is also of value to many other listed species and habitat types. Typically, actions include mechanical clearing of overgrowth, including scrubs and trees, controlled burning, mowing, extensive grazing, and in some cases

removal of upper peat layers and restoration of natural hydrology. LIFE has also funded a range of awareness raising campaigns.

In the UK, one of the species' two main strongholds in Europe (the other is Spain) the marsh fritillary has undergone a dramatic decline in recent years, with a 66% loss in populations nationally since 1990. The mid-Cornwall moors, the location of the LIFE project, is a significant area for the species, supporting some of the larger populations in this region of England. Project actions have targeted habitat management over several sites, a strategy necessary for the long-term maintenance of populations of this butterfly.

The marsh fritillary butterfly has also suffered rapid decline in Denmark, due to fragmentation of habitats and populations. Together with a continuing decline in quality of existing and potentially suitable habitats, this has caused the conservation state of the marsh fritillary today to be highly unfavourable. Only eight small sub-populations remain, and thus the actions of the LIFE project were crucial to reverse this negative trend and to ensure the butterfly species continues to exist there.

Endangered arthropods of Extremadura

The Spanish project LIFE03 NAT/E/000057 has been targeting the conservation of several endangered species listed in the Habitats Directive – two beetles (*Cerambyx cerdo* and *Lucanus cervus*), four dragonflies (*Coenagrion mercuriale*, *Macromia splendens*, *Oxygastra curtisii* and *Gromphus graslini*) and one butterfly (*Graellsia isabellae*). Project actions took place over a network of seven Natura 2000 sites covering some 35 000 ha in northern Extremadura.

Studies were conducted, inter alia, on the distribution and population size of targeted species; on the location of breeding grounds; and on movements of individuals among populations. The data gathered show that the distribution of the target species is wider than initially thought and several new populations of many of the species have been found, which is good news. Management plans were drafted for the four dragonfly species.

Problems such as loss of habitat quality due to water pollution, changes in land-use or poor river bank and forest management were tackled so as to improve the conservation status of these invertebrates. In order to increase significantly the surface of favourable habitats, ditches and irrigation channels were restored, vegetation was managed and invasive flora species eradicated. These activities will also result in increased connectivity among the individual populations in the metapopulations of the various targeted species.

Southern damselfly
(*Coenagrion mercuriale*)



Projects focusing on grasslands habitats

The table below provides further examples of LIFE projects focusing on grasslands habitats.

For more information on individual projects, visit the online database at:

<http://ec.europa.eu/environment/life/project/Projects/index.cfm>.

The database provides useful, detailed search fields – for example under “habitats” users may search grassland habitats under “Natural and semi-natural grasslands formations”

Country	Number	Name
Austria	LIFE04 NAT/AT/000002	Pannonic Steppes and Dry Grasslands
	LIFE06 NAT/A/000123	Bisamberg habitat management
Belgium	LIFE00 NAT/B/007168	Restoring and Managing Calcareous Habitat types in the region of Lesse and Lomme
	LIFE02 NAT/B/008593	Restoration and sustainable management of upper Meuse dry Grasslands
	LIFE03 NAT/B/000023	Uitkerkse Polder: a surplus value for nature and people
	LIFE97 NAT/B/004206	Protection of the habitats of a number of priority species of wet grasslands in Belgium
	LIFE03 NAT/B/000020	Restoration and management of the lowland mire “Damvallei”
Czech Republic	LIFE04 NAT/CZ/000015	Restoration of thermophilous habitats in the Moravian Karst
Denmark	LIFE04 NAT/DK/000020	Restoration of Dry Grasslands in Denmark
Estonia	LIFE03 NAT/EE/000180	Conservation of NATURA 2000 biotopes in Rāpina polder
France	LIFE98 NAT/F/005237	Programme for the conservation of the dry grasslands of France
	LIFE99 NAT/F/006301	Safeguard of habitats and species of the Ardèche canyon and its plateau
	LIFE99 NAT/F/006309	Restoration of the dry grasslands of the limestone plateaux of the Aveyron
	LIFE99 NAT/F/006312	Dry grasslands and associated habitats of Quercy
	LIFE99 NAT/F/006318	The management of the xerothermic habitats of the North Harth
	LIFE99 NAT/F/006332	Priority species, chalk grasslands and screen in the lower Seine valley catchment area
Germany	LIFE00 NAT/D/007058	Regeneration and preservation of dry grassland in Germany
	LIFE02 NAT/D/008461	Restoration and conservation of xeric grasslands in Germany (Rheinland-Pfalz)
	LIFE03 NAT/D/000001	Medebacher Bucht – Building block for Natura 2000



Country	Number	Name
Germany	LIFE06 NAT/D/000008	Conservation and regeneration of Nardus Grasslands in Central Europe
	LIFE03 NAT/D/000005	Conservation and development of the inland salt marshes of Northern Thuringia
	LIFE06 NAT/D/000008	Conservation and regeneration of Nardus Grasslands in Central Europe
Hungary	LIFE05 NAT/H/000117	Habitat management on the Pannonian grasslands in Hungary
	LIFE06 NAT/H/000102	Restoration and grassland management of Felső-Kongó meadows
	LIFE04 NAT/HU/000119	Grassland restoration and marsh protection in Egyek-Pusztakócs
Ireland	LIFE04 NAT/IE/000125	Farming for conservation in the Burren
Italy	LIFE00 NAT/IT/007239	Conservation of Tuscan Appennines mountain grasslands
	LIFE00 NAT/IT/007266	Petrifying springs and seminatural dry grasslands in Valle S. Croce e Valle del Curone
	LIFE02 NAT/IT/008574	Alpe Veglia and Alpe Devero: actions of conservation of mountain grasslands and peatlands
	LIFE03 NAT/IT/000131	Habitat preservation in Dolomiti Bellunesi
	LIFE03 NAT/IT/000134	Safeguard Thero – Brachypodietea habitat SIC 'Area delle Gravine'
	LIFE98 NAT/IT/005136	Beigua: urgent interventions for priority grasslands
	LIFE99 NAT/IT/006237	Restoration of grassland habitats in the Monte Gemelli, Monte Guffone SIC
Portugal	LIFE02 NAT/P/008478	Serra da Estrela: management and conservation of priority habitats
Slovenia	LIFE00 NAT/SLO/007223	Management plan and urgent actions for Veternik and Oslica high dry meadows
	LIFE02 NAT/SLO/008587	Conservation of endangered habitats / species in the future Karst Park
Sweden	LIFE00 NAT/S/007118	Restoration of alvar-habitats at Stora Karlsö
	LIFE02 NAT/S/008484	Kinneulle plateau mountain – restoration and conservation
	LIFE03 NAT/S/000070	Natural pastures and hay meadows in Jämtland/Härjedalen
	LIFE05 NAT/S/000108	Natural meadows and pastures of Östergötland – restoration and maintenance
United Kingdom	LIFE00 NAT/UK/007071	Improving the management of Salisbury Plain Natura 2000 sites
	LIFE02 NAT/UK/008539	Yorkshire Dales Limestone Country Project
	LIFE99 NAT/UK/006094	The Lowland Limestone Pavement Rehabilitation Project

Available LIFE publications

LIFE-Focus brochures

A number of LIFE publications are available on the LIFE website:

LIFE on the farm: Supporting environmentally sustainable agriculture in Europe (2008 - 60p - ISBN 978-92-79-08976-3)

<http://ec.europa.eu/environment/life/publications/lifepublications/lifefocus/documents/agriculture.pdf>

LIFE and endangered plants: Conserving Europe's threatened flora (2008 - 52p - ISBN 978-92-79-08815-5)

<http://ec.europa.eu/environment/life/publications/lifepublications/lifefocus/documents/plants.pdf>

LIFE and Europe's wetlands: Restoring a vital ecosystem (2007 - 68 pp. - ISBN 978-92-79-07617-6)

<http://ec.europa.eu/environment/life/publications/lifepublications/lifefocus/documents/wetlands.pdf>

LIFE and waste recycling: Innovative waste management options in Europe (2007 - 60 pp. - ISBN 978-92-79-07397-7)

<http://ec.europa.eu/environment/life/publications/lifepublications/lifefocus/documents/recycling.pdf>

LIFE and Europe's rivers: Protecting and improving our water resources (2007 - 52pp. ISBN 978-92-79-05543-0 - ISSN 1725-5619)

<http://ec.europa.eu/environment/life/publications/lifepublications/lifefocus/documents/rivers.pdf>

LIFE and Energy: Innovative solutions for sustainable and efficient energy in Europe (2007 - 64pp. ISBN 978 92-79-04969-9 - ISSN 1725-5619)

http://ec.europa.eu/environment/life/publications/lifepublications/lifefocus/documents/energy_lr.pdf

LIFE and the marine environment (2006 - 54pp. ISBN 92-79-03447-2- ISSN 1725-5619) http://ec.europa.eu/environment/life/publications/lifepublications/lifefocus/documents/marine_lr.pdf

LIFE and European forests (2006 - 68pp. ISBN 92-79-02255-5 - ISSN 1725-5619) http://ec.europa.eu/environment/life/publications/lifepublications/lifefocus/documents/forest_lr.pdf

LIFE in the City: Innovative solutions for Europe's urban environment (2006, 64pp. - ISBN 92-79-02254-7 - ISSN 1725-5619) http://ec.europa.eu/environment/life/publications/lifepublications/lifefocus/documents/urban_lr.pdf

Integrated management of Natura 2000 sites (2005 - 48 pp. - ISBN 92-79-00388-7)

http://ec.europa.eu/environment/life/publications/lifepublications/lifefocus/documents/managingnatura_lr.pdf

LIFE, Natura 2000 and the military (2005 - 86 pp. - ISBN 92-894-9213-9 - ISSN 1725-5619)

http://ec.europa.eu/environment/life/publications/lifepublications/lifefocus/documents/military_en.pdf

LIFE for birds: 25 years of the Birds Directive: the contribution of LIFE-Nature projects (2004 - 48 pp. - ISBN 92-894-7452-1 - ISSN 1725-5619)

http://ec.europa.eu/environment/life/publications/lifepublications/lifefocus/documents/birds_en.pdf

LIFE-Nature: communicating with stakeholders and the general public - Best practice examples for Natura 2000 (2004 - 72 pp. - ISBN 92-894-7898-5 - ISSN 1725-5619)

http://ec.europa.eu/environment/life/publications/lifepublications/lifefocus/documents/natcommunicat_lr.pdf

LIFE and agri-environment supporting Natura 2000: Experience from the LIFE programme (2003 - 72 pp. - ISBN 92-894-6023-7 - ISSN N° 1725-5619)

http://ec.europa.eu/environment/life/publications/lifepublications/lifefocus/documents/agrienvironment_en.pdf

A number of printed copies of certain LIFE publications are available and can be ordered free-of-charge at: <http://ec.europa.eu/environment/life/publications/order.htm>

Other publications

Best LIFE-Environment Projects 2007-2008 (2008, 44 pp.-ISBN 978-92-79-09325-8 ISSN 1725-5619)

<http://ec.europa.eu/environment/life/publications/lifepublications/bestprojects/documents/bestenv08.pdf>

Best LIFE-Environment Projects 2006-2007 (2007, 44 pp.-ISBN 978-92-79-06699-3 ISSN 1725-5619)

<http://ec.europa.eu/environment/life/publications/lifepublications/bestprojects/documents/bestenv07.pdf>

LIFE-Third Countries 1992-2006 (2007, 64 pp. - ISBN 978-92-79-05694-9 - ISSN 1725-5619)

http://ec.europa.eu/environment/life/publications/lifepublications/lifefocus/documents/TCY_lr.pdf

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LIFE "L'Instrument Financier pour l'Environnement" / The financial instrument for the environment

Period covered (LIFE III) 2000-2006.

EU funding available approximately EUR 945 million.

Type of intervention co-financing actions in favour of the environment (LIFE projects) in the Member States of the European Union, in associated candidate countries and in certain third countries bordering the Mediterranean and the Baltic Sea.

LIFE projects

- > **LIFE Nature projects** improve the conservation status of endangered species and natural habitats. They support the implementation of the Birds and Habitats Directives and the Natura 2000 network.
- > **LIFE Environment projects** contribute to the development of innovative and integrated techniques or methods to support environmental progress.
- > **LIFE Third Countries projects** support environmental capacity building and initiatives in non-EU countries bordering the Mediterranean and the Baltic Sea.

LIFE+ "L'Instrument Financier pour l'Environnement" / The financial instrument for the environment

Period covered (LIFE+) 2007-2013.

EU funding available approximately EUR 2,143 million

Type of intervention at least 78% of the budget is for co-financing actions in favour of the environment (LIFE+ projects) in the Member States of the European Union and in certain non-EU countries.

LIFE+ projects

- > **LIFE Nature projects** improve the conservation status of endangered species and natural habitats. They support the implementation of the Birds and Habitats Directives and the Natura 2000 network.
- > **LIFE+ Biodiversity projects** improve biodiversity in the EU. They contribute to the implementation of the objectives of the Commission Communication, "*Halting the loss of Biodiversity by 2010 – and beyond*" (COM (2006) 216 final).
- > **LIFE+ Environment Policy and Governance projects** contribute to the development and demonstration of innovative policy approaches, technologies, methods and instruments in support of European environmental policy and legislation.
- > **LIFE+ Information and Communication projects** are communication and awareness raising campaigns related to the implementation, updating and development of European environmental policy and legislation, including the prevention of forest fires and training for forest fire agents.

Further information further information on LIFE and LIFE+ is available at <http://ec.europa.eu/life>.

How to apply for LIFE+ funding The European Commission organises annual calls for proposals. Full details are available at <http://ec.europa.eu/environment/life/funding/lifeplus.htm>

Contact

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