



# Best LIFE Nature projects 2012



Environment

LIFE Nature



## EUROPEAN COMMISSION ENVIRONMENT DIRECTORATE-GENERAL

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## Foreword

This is the fifth year that the LIFE Nature Best Awards have been granted to the most exemplary projects financed within the framework of the European Union's very successful LIFE programme.

The selection procedure for the projects completed by the end of 2012 was implemented in a similar way to previous years: the external monitoring team evaluated the contenders first and then the European Commission compiled the list of the most excellent projects, whose execution, innovative approach and design can provide models for other beneficiaries or applicants.

Being the LIFE Programme's National Focal Point for Hungary, this year I had the honour of coordinating the selection of the "Best of the Best" projects among the National Focal Points of the Member States. As a result of the review by the Member States and the external monitoring team, two particularly outstanding projects of eight "Best" projects, chosen from seven different Member States, obtained "Best of the Best" status (see p. 5).

I would like to thank the other National Focal Points and members of the external monitoring team for their help in assessing the candidates for the Best Awards. I would also take the opportunity to congratulate all winners and to thank the exemplary work in support of nature conservation and biodiversity.

The evaluation process was a very interesting exercise and I learned a lot about some excellent LIFE projects that targeted a broad range of endangered species and habitats in support of the implementation of the Birds and Habitats Directives and the Natura 2000 network.

The two "Best of the Best" projects respectively focused on the restoration of the Obere Drau (Upper Drava) river in Austria and the conservation of the Iberian lynx in Spain. In both cases success revolved around an integrated approach to project management, incorporating a number of different partners.

As is now traditional, the LIFE Nature Awards 2012 were presented at a special event held alongside Green Week in Brussels in June 2013. The ceremony highlighted the significant value of LIFE, a comparatively small funding programme, but one whose projects can have a big impact, leading to long-term benefits for nature and society.



BEST LIFE NATURE PROJECTS

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 Corredores oso  
 Corridors for cantabrian brown bear conservation

 **LIFE06 NAT/E/000209**   
 Introduccion Lince Andalucia  
 Conservation and reintroduction of the Iberian lynx in Andalucia



## BEST AWARD WINNERS 2012



BEST OF THE BEST PROJECTS



BEST PROJECTS



LIFE05 NAT/DK/000150

RERABOG-DK

Restoration of raised bogs in Denmark with new methods



LIFE07 NAT/LT/000530

WETLIFE

Restoring Hydrology in Amalvas and Žuvintas Wetlands



LIFE05 NAT/B/000091

Dommeldal

Transboundary habitat restoration in the valley of the Dommel



LIFE06 NAT/H/000098

HUNSTEPPICOAKS

Conservation of Euro-siberian steppic woods and Pannonic sand steppes in "Nagykörsi pusztai tölgyesek" pSCI



LIFE06 NAT/A/000127

LIFE Obere Drau II

Life in Upper Drau River



LIFE06 NAT/IT/000060

LIFE FRIULI FENS

Conservation and restoration of calcareous fens in Friuli



LIFE NATURE BEST AWARD WINNERS 2012

# The LIFE Best Nature Awards

The LIFE Best Nature Awards 2012 illustrate the LIFE programme's demonstration value, its long-term impact and its vital contribution to nature conservation in Europe.

The objective of the LIFE Nature Awards programme is to help improve the transmission of project results by using a set of criteria to identify those projects with the highest potential for long-term maintenance of "favourable" conservation status of natural habitats and species, and support for the implementation and management of the Natura 2000 network. Thus, for the last five years, EU Member States represented on the LIFE Committee and the European Commission's LIFE Unit have acknowledged those projects that are just a little bit more outstanding than the rest by awarding them "Best of the Best" and "Best" project status.

Projects are judged against a set of criteria developed by the Commission in cooperation with the Member States. These include: Short-term improvement in conservation status; short-term leverage effect; long-term sustainability of improved conservation status; long-term leverage effect; and long-term regional / national / international impact.

The eight winning projects all contribute to LIFE Nature's main objectives: supporting the implementation of the EU's Birds Directive and Habitats Directive and the establishment and management of the Natura 2000 network of protected sites.

## Exemplary actions

The two most exemplary projects were awarded the title, "Best of the Best" LIFE Nature Project 2012. These focused on the restoration of the Obere Drau (Upper Drava) river in Austria and the conservation of the Iberian lynx in Spain. Obere Drau II (**LIFE06 NAT/A/000127**) combined water engineering, nature conservation and flood defence, in the process defining innovative management solutions to a set of challenges identified by an earlier LIFE project. The Introduction Lince Andalucia project (**LIFE06 NAT/E/000209**) made an important contribution to the survival of an emblematic, endangered large carnivore through by priming a strategic programme of nature conservation works.

Actions carried out by the six "Best" LIFE Nature Projects 2012 ranged from the conservation of individual species to projects targeting several species and habitats across one or more sites. For instance, the DOMMELDAL project restored a range of habitat types in Belgium's Dommel Valley, in the process creating a series of stepping stones for species migration. The RERABOG-DK project in Denmark helped restore a unique ecosystem of raised bogs and also enabled the beneficiary to build nature conservation capacity. Other projects provided support for the revival of Hungary's steppic oak forests, an important fen habitat in north-east Italy and biodiverse wetlands within a Lithuanian biosphere reserve. Another emblematic large carnivore - the brown bear - was the subject of a "Best" project in northern Spain that pioneered a new approach to solving problems of human-bear coexistence.

In presenting the awards, the retired Dutch MEP, Hemmo Muntingh, who played a key role in the creation of the first LIFE Regulation in 1992, explained the 15-year genesis of this European environmental fund. "I am pleased to see the very good work it has been doing for nature conservation. I can only hope that this continues in the future," he added.

Winners of the LIFE Nature Awards 2012



Photo: 2013 EU - Patrick Mascart



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# BEST OF THE BEST PROJECTS

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# Austria: LIFE returns to the Upper Drava

**Building on an earlier LIFE Nature project, this river restoration project demonstrates the successful cooperation between water engineering, flood protection and nature conservation. Importantly, it gained the approval of the local community.**

Over 60 years ago, Herbert Rittlinger, an Austrian travel writer, wrote about his experiences paddling by canoe in the Obere Drau (Upper Drava) river in Carinthia, Austria – a free-flowing glacial river in the Obere Drau Valley. In his book, “The soon [to be] lost paradise”, Rittlinger tried to draw people’s attention to the loss and destruction of the river and floodplain from imminent structural developments.

Few heeded his warnings and the Drava – once a natural watercourse, with many side streams and water meadows – met the same fate as many other Alpine areas: the river bed was channelled, bends were straightened out, branches cut off from the main stream, dams and turbines built and intensive farming extended right down to the river banks.

## Catastrophic floods

Eventually, faced with catastrophic floods, erosion of the river bed and a falling groundwater level, people began to

see the error of their ways: In the early 1990s the authorities started work on an environmentally-oriented hydrological development scheme and began restoring the river to a semi-natural state. This marked the beginning of efforts to preserve and improve what was left of the rich natural environment, such as the significant surviving grey alder and ash forests along the river bank, the small populations of Annex II (Habitats Directive) fish species, the Danube salmon (*Hucho hucho*) and crayfish (*Austropotamobius pallipes*), both threatened with extinction, as well as staging areas for migrating birds.

LIFE has played an important part in the continuation of the restoration of the Drava – in partnership with river and flood protection authorities and, more recently, joined by new partner, the Austrian Service for Torrent and Avalanche Control. Following on from an earlier project (LIFE99 NAT/A/006055), which ended in 2003, the LIFE Obere Drau II project (2006–2011) was coordinated by the department responsible for

On 27 October 2009, the first water flowed through the new Drau tributary branch near Amlach



Photo: LIFE06 NAT/A/000127 - Revital Untere Drau





Photo: LIFE06 NAT/A/000127 - Revital Unterecher

As part of the project's visitor management actions, the water adventure area at Dellach was opened in 2007

rivers within the regional government of Carinthia, the project beneficiary. It used engineering measures such as river widening and removal of hydraulic structures and embankments at local river reaches to allow river bank erosion to occur and return a targeted stretch of the river to its former natural structure; and create new or reactivated old, water meadows.

The overall objective of the Obere Drau II project was to continue and extend the successful river-revitalisation measures to establish the Upper Drava as a 'lifeline' for the region. Its efforts would be focused on improving habitats that are typical for alpine rivers and their adjacent floodplains. It also hoped to improve public awareness and acceptance of the Natura 2000 site.

Specifically, the project sought to define innovative management solutions to solve the challenges that were recognised, but not yet solved under the first LIFE project. These included:

- Further stabilisation of the river bed and groundwater level through increasing the input of bed load material;
- Continuation of management measures for improved river habitats;

- Improved information and visitor management on-site; and
- Cooperation with specialist agencies from countries within the Drava river basin (Italy, Slovenia, Croatia and Hungary) to propose cross-border strategies to solve water management tasks and ecological problems that affect the river.

Public relations work (see box) was also important as the project team wanted people to see for themselves the positive aspects of their work. According to hydrologist Norbert Sereinig, the project coordinator, a key aspect is that "people were at the centre of this project". This was not just a project for nature conservation, he explains, but one that would also provide a real benefit for the community – for farmers, local residents and schoolchildren and visitors.

### Achievements

The project was successfully completed, not only meeting, but even surpassing its original objectives. For example, actions to improve the river course along a total length of 5 km benefitted both the river ecology and flood protection. It also helped extend the Natura 2000 site, which was



enlarged by 470 ha along a river section and now covers almost 1 000 ha.

The project purchased or swapped some 50 ha of land - 20 ha more than originally planned - to enable interventions to be carried out in key locations. These focused on replacing hard embankments with gravel banks, restoration of a sediment retention dam, river widening and the connection of side channels, oxbows and standing waters in key places.

In total, some 42 ha of additional Alpine river habitats were created, including new side branches; this was 22 ha more than anticipated. The new habitats include dynamic gravel banks and German tamarisk and willow pioneer communities, which will further develop into alluvial forests and provide improved spawning habitats for amphibians and fish such as the Danube salmon and varione (*Leuciscus souffia*).

The measures also extend the habitats for 140 bird species, including 51 red-listed species - notably as a resting place for migrating birds crossing the Alps. Typical species that are already benefiting are the common kingfisher (*Alcedo atthis*), the sandpiper (*Acitis hypoleucos*) and the lesser spotted woodpecker (*Dendrocopos minor*). Habitats for two plant species that were nearly extinct in Austria were also extended: German tamarisk (*Myricaria germanica*) and dwarf bulrush (*Typha minima*).

Herbert Mandler: "It is very satisfying to have done something that is good news for the region"



Photo: LIFE06 NAT/A/000127 - Wendy Jones

## Popular PR tools

### LIFE film

"Rittlingers Dream - A New Life on the Upper Drava". This unusual 29-min project DVD compiled by Austrian film producer, Thomas Miklautsch, is a philosophical and scientific reflection about the restoration of the Upper Drava River in Carinthia. It is available, free-of-charge in German or English: [abt8.postsp@ktn.gv.at](mailto:abt8.postsp@ktn.gv.at) or can be viewed at: <https://vimeo.com/54437131>

### LIFE Drau postcard with hologram

Marking the river widening work carried out near Amlach/St. Peter, the postcard can be tilted to show the completed work (2010) in contrast to the original state (2006).

### Folding map "People & Nature"

In pocket-sized format, this practical folding map gives valuable tips for nature-compatible leisure activities and local recreation areas in the Upper Drava Natura 2000 site.

The project additionally created 20 ponds - twice the number planned - which connect biotopes for amphibians, such as the Italian crested newt (*Triturus carnifex*) and yellow-bellied toad (*Bombina variegata*). They provide important habitat for small fish species, such as the amur bitterling (*Rhodeus sericeus*), and a valuable food supply for the white stork (*Ciconia ciconia*). The European otter (*Lutra lutra*) was also found to have benefited from the project and has settled once more in the region.

Meanwhile, for local recreation and for tourism, outdoor activities on the river such as barbecues, hiking, cycling, canoeing and fishing, are booming. Access has now been greatly improved with the aim of concentrating activities close to the river at two new suitable places, built by the project (e.g. with lookout towers, bathing and sunbathing areas and information points to inform visitors about the natural treasures along the river). In turn, access to ecologically-sensitive bankside zones has been restricted.

## Challenges

According to Mr Sereinig, who like the majority of the team, also worked on the earlier LIFE project, different challenges needed to be addressed: In the first project, he says, a key task was to "build up confidence among stakeholders and partners". With this confidence already secured, the main challenge during the second project was to secure the agricultural land areas needed in order to carry out the planned interventions down to the river banks. One potential problem, he explains, is that under the Austrian succession laws,



Photo: LIFE06 NAT/AT/000127 - Revital Untere Drau

The LIFE flag flies at the water adventure area at Dellach

farmland had over the centuries become divided up and separated between family members. However, the project was aided by a national land reallocation scheme (*Flurbereinigung*) which, with the consent of the majority of landowners, allows plots of land to be brought back together. "This helped us considerably and gave us the wide areas we needed right next to the river banks." It was also important as one of the goals of the project was to intervene as little as possible and let the river shape itself, or re-naturalise. Despite their success (eventually) in securing the land, he concedes, the negotiations with farmers were "very lengthy".

Herbet Mandler, the site manager, agrees. He says there were times during the first two years of the project, when he thought the talks had broken down: "This was very stressful," he says, adding that some farmers took advantage of the situation – knowing that this was an EU co-funded project, with a restricted time period (e.g. taking their time to agree to a sale, changing their minds, or pushing up the price).

In an ideal world, they both agree, these negotiations should be secured ahead of the project. This aside, they both have experience of other EU programmes and say they are impressed by the "flexibility of LIFE" compared with other EU funding instruments. As long as they fulfilled the overall objectives, by the end of the five-year period, they say there was considerable flexibility within the project to complete or modify tasks – and that this was "enormously helpful".

### 'Delighted'

Reflecting on their 'Best of the Best' LIFE Nature project award, they say they realised when they were compiling

the final report that this was a "good project". But, even though they thought it was good, they didn't think anyone else would necessarily realise this. They are, therefore, "surprised and delighted" that they did.

Mr Sereinig is most satisfied about the fact that the project achieved more than originally intended: "There was a positive dynamic and it shows the whole team was working well," he says, adding that the LIFE instrument was very important to them: "Without LIFE we wouldn't have been able to implement the measures, or at least not all of the measures."

Meanwhile, Mr Mandler says that in his day-to-day work in flood protection, he's often the first point of contact when things go wrong: "It is very satisfying to have done something that's good news for the region."

### Future sustainability

Looking to the future, many of the project's restoration actions were designed in such a way that the river can further develop through natural processes without management or maintenance works. According to latest monitoring (July, 2013) the riverbed remains constant in the project region and is even rising in some places: The increased water-retention capacity helps to protect downstream areas from floods and the increased stabilisation of the groundwater level is an important aspect for agricultural use in the river valley.

In terms of the wider catchment area management, an international Drava river meeting was held during the project in Slovenia. This led to a common declaration concerning future cooperation in river restoration with all the countries through which it flows.

Finally an important multiplier effect sees two further river restoration projects now underway in the region: **LIFE08 NAT/A/000613** and **LIFE10 NAT/AT/000017**.

**Project number:** LIFE06 NAT/A/000127

**Title:** LIFE Obere Drau II - Life in Upper Drau River

**Beneficiary:** Carinthia regional authority responsible for rivers (Amt der Kärnter Landesregierung)

**Contact:** Dr Norbert Sereinig

**Email:** norbert.sereinig@ktn.gv.at

**Website:** www.life-drau.at/

**Period:** 01-Sep-2006 to 31-Aug-2011

**Total budget:** €3 768 000

**LIFE contribution:** €1 531 000





# Spain: Integrating project actions to benefit the Iberian lynx

LIFE funding has helped to introduce and activate a strategic programme of joined-up nature conservation works that are successfully promoting the recovery of an emblematic, but still endangered, EU species.



Photo: LIFE06 NAT/E/000209 - Alva Sopena

Reintroduction area in Guadalmellato

The Iberian lynx (*Lynx pardinus*) has been classified as one of most threatened species of felines in the world. One of this year's "Best of the Best" LIFE Nature projects has played a pivotal role in helping the recovery of this European big cat.

Once found all across Spain and Portugal, where it thrived in habitats of Mediterranean woodland and maquis thicket, the Iberian lynx suffered a dramatic decline in its population and distribution range during the second half of the 20<sup>th</sup> Century.

Rabbits account for around 95% of the lynx's diet and the main cause of its population decline was a rapid reduction in the availability of prey following epidemics of myxomatosis (and subsequently hemorrhagic virus disease) among rabbits. This created an escalating array of difficulties for the lynx, as it both damaged and fragmented the functionality of the cats' favoured habitats.

Lack of prey was exacerbated by other threats – the increasing incidence of traffic collisions, diseases such as feline leukemia, and poaching.



Photo: LIFE06 NAT/E/000209 - Alva Sopena

*Iberian lynx (Lynx pardinus)*

The population declined sharply and in Spain the remaining numbers of Iberian lynx became clustered in small groups that had limited chances to mix genetically. By the turn of the century only two known breeding populations existed in Spain, in the Sierra Morena Oriental at the Parque Natural de la Sierra de Andújar and in south-western Andalusia around the Doñana area.

### Priority support

Nature conservation measures for the Iberian lynx were therefore prioritised by national, regional and European bodies, who used LIFE to help introduce a programme of actions to help test and clarify how best to launch a recovery plan for the species. This early LIFE project (**LIFE02 NAT/E/008609**) paved the way for the “Best of the Best” winner, *Introducción Lince Andalucía*, which started work in 2006 and has been highly successful in helping to support species recovery.

Led by Andalusia’s regional government, the 2006 LIFE project focused its considerable financial and technical resources on a coordinated package of in-situ conservation actions.

These included: improving habitat functionality by increasing the availability of natural prey and improving connectivity between habitat features; reintroducing and monitoring lynxes in carefully selected sites; addressing problems in ‘black spot’ areas where threats and risks to the species were particularly

high; running awareness-raising campaigns to improve understanding of, and support for, lynx conservation by local residents, businesses and visitors; and establishing leasing agreements with key stakeholders, such as hunters.

*Installation of this drinking trough for rabbits was part of a package of in-situ lynx conservation actions*



Photo: LIFE06 NAT/E/000209 - Alva Sopena



As much as 75% of the Iberian lynx's territories were located on private land (mainly game-hunting estates) so the involvement of hunters and farmers in the LIFE project was crucial to its long-term successes. These included introducing appropriate management across more than 200 000 ha of target territory for the species.

### Success story

Speaking about the project's achievements at the LIFE Best Projects award ceremony in Brussels in June 2013, Luis Planas Puchades, Minister for Agriculture, Fisheries and Environment of the Autonomous Government of Andalusia, noted that "By the time this project had completed its operations in December 2011, a total of 312 animals were surviving and this figure represent a population growth of more than three times the numbers of lynx that were recorded in 2002."

Mr Planas also highlighted the importance of LIFE's financial support, which, he says: "Added European capacity to regional efforts involved in trying to reverse the decline of Europe's largest and most endangered feline species. Thanks to the LIFE projects' reintroduction techniques, two new population groups were reintroduced and established."

Other achievements of the project included helping to increase genetic variability in the lynx population, thereby supporting the long-term integrity, strength and overall sustainability of the species. It also played a part in reducing human-caused mortality (e.g. from traffic collisions or poaching). "We have also carried out a lot of useful work to raise awareness among society about mitigating Lynx mortality risks," said Mr Planas.

*The project carried out vaccinations to help counter mortality risks to the lynx's main prey, rabbits*



Photo: LIFE06/NATE/000209 - Aixa Sopena

### Wider importance

#### **Luis Planas Puchades, Minister for Agriculture, Fisheries and Environment of the Autonomous Government of Andalusia:**

"Farmers, hunters, and local government were all important participants in the project... Doing a project like this, to reintroduce the Iberian lynx, has not just been about the conservation of nature but it has been something that is important for the economic and social life of the region."

The minister also noted the need to protect the expenditure required to conserve key species such as the Iberian lynx, even during times of wider economic difficulty. "In fact," he said, "this LIFE project is proof of how we can not only protect our environment but also generate income and employment. "This has happened at different locations within the project territory where a great number of SMEs have benefited from the nature conservation activities because the Iberian lynx is a great attraction for nature lovers."

### Integrated action

Partnership work is acknowledged by the project's stakeholders as a key success factor for the recovery of the Iberian lynx. LIFE inputs helped to provide a catalyst for involving more partners in the overall recovery plan. These included different sources of EU, national and regional funding that have been coordinated so that they complement and add value to each other's actions.

In this way the Andalusian authorities have shown how agriculture and nature conservation can work together as partners with shared common goals within a context of sustainable economic development.

In the Introduccion Lince Andalucia project, an integrated set of LIFE actions were planned properly in advance and designed to align with associated lynx conservation actions being funded by other sources.

LIFE co-financing of the project's in-situ conservation work was designed to establish the conditions that were needed to halt the species's decline and set in motion its recovery. Ongoing, recurrent habitat management work was recognised by the Andalusian authorities as being essential for maintaining and building on this LIFE legacy, so funding support from the region's Rural Development Programme agri-environment measure was tailored to provide this key sustainability aspect of the species recovery plan.

In addition to the agri-environment payments that were made available from the European Agricultural Fund for Rural Development (EAFRD) to land users for managing their



Photo: LIFE06 NAT/E/000209 - Akva Sopena

*Release of a captive bred Iberian lynx*

farms and forests in lynx-friendly ways, further components of the recovery jigsaw have been assisted through the European Regional Development Fund (ERDF) Operational Programmes. These co-financed high impact conservation actions, including vital captive breeding centres as well as visitor facilities and nature-tourism promotions.

All of these elements fit together within a balanced integrated model as lynx reared in the ERDF's breeding centres are reintroduced into the habitats that now function more effectively thanks to the initial works by LIFE and recurrent inputs from the EAFRD. Similarly, visitors and businesses benefitting from the tourism investments rely on the habitat functionality to sustain the lynx population.

### Healthy horizons

Such successful integration of complementary funding support can be considered to represent one of the factors leading to the LIFE project's "Best of the Best" award. By expanding and reinforcing its circle of partners the LIFE team has set in place a robust nature conservation model that now offers the Iberian lynx a much brighter future. All of the EU support sources have been coordinated with funding from national and regional ministries and departments responsible for the environment, agriculture and public works. Private and NGO sector contributions were also included from hunting and farming associations as well as landowners, and the World Wide Fund for Nature (WWF).

Together they are showing how using LIFE as an incentive for activating joined-up thinking, taking advantage of synergies and delivering collaborative results can make a considerable difference to the recovery of one of the world's most endangered feline species.

"All the project partners deserve recognition and share the success of this "Best of the Best" award for their very positive work," concluded Mr Planas. "By working together we have improved the situation, but it is not solved yet and we still need to continue our endeavours through a new LIFE+ project (**LIFE10 NAT/ES/000570**) that is involved in tackling the challenges of the species recovery plan."

**Project number:** LIFE06 NAT/E/000209

**Title:** Introduccion Lince Andalucia - Conservation and reintroduction of the Iberian lynx in Andalucia

**Beneficiary:** Junta de Andalucía. Consejería de Medio Ambiente

**Contact:** Miguel Angel Simon

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**Website:** www.lifeline.org

**Period:** 01-Apr-2006 to 28-Feb-2012

**Total budget:** €25 971 000

**LIFE contribution:** €9 869 000





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# BEST PROJECTS

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# Belgium: Habitat restoration in the valley of the Dommel

**The Dommeldal project achieved its objective of large-scale transboundary habitat restoration, helping to establish ecological corridors, protecting rare species and making the landscape more attractive for visitors.**

**T**he Campine region of Belgium and the Netherlands was once covered in heathland, land dunes, grassland, fens, marshes and alluvial forest. These habitats have largely been lost or degraded as a consequence of the conversion of land to agriculture, river straightening and land drainage. However, remnants are protected within the Natura 2000 network, which includes three sites in the valley of the river Dommel. The main objective of the cross-border LIFE Dommeldal project was the restoration of habitats in the Dommel valley sites, helping to create a network of stepping stones for species migration that, in the long-term, would lead to the establishment of an ecological corridor between the heath habitats of Hoge Kempen in Belgium and North Brabant in the Netherlands.

Three regional divisions of Natuurpunt in Belgium collaborated with Natuurmonumenten in the Netherlands on the LIFE project, which funded actions in three locations. The main site, in terms of funding, was the cross-border Hageven-De Plateaux reserve, with a mosaic of habitat types; a second site, De Vloeiweiden in de Wateringen, featured a special type of irrigated grassland; whilst the third and most southerly site was an area of species-rich wet grassland and forest.

“The main result was the restoration of several habitat types. More species are now present and also more individuals of the target species. The habitats are improved but also a lot bigger,” explains Michel Hendrix, project coordinator for Natuurmonumenten. To achieve this, the first stage of the LIFE project was to acquire land in both Belgium and the Netherlands. “At Hageven-De Plateaux we were able to purchase around 60 hectares, including a large agricultural enclave in the middle of the area, and many smaller parcels of land that were like a kind of mosaic but now form a really big cluster,” adds Lou Buckinx of Natuurpunt Neerpelt. The project also acquired an area of irrigated grassland.

## Dramatic change

The project team began restoration of the agricultural enclave in De Plateaux (just inside the Netherlands) by removing the uppermost organic layer (about 45 cm) and chopping down stands of pine trees. Material from existing heathland containing seeds and fungal spores was scattered over the resulting bare sand to ensure a rapid and rich succession. The change from maize fields to dry heath has been dramatic. “The heathland is almost complete after five years,” reveals Michel Hendrix, “but it’s not just the vegetation you want, it’s

*Fen habitats at Hegeven-De Plateaux*



also thousands of trees. If you don't do anything you get yourself a nice forest and not the goal of heathland and fens." Removing young trees - by machine and by hand - has therefore been an important aspect of the work to manage this area. The LIFE project also created land dunes by piling up sand, to the benefit of grasses and flowering plants, solitary bees, reptiles and other species.

Also at Hageven-De Plateaux, the project team carried out precise sod-cutting ('plugging') down to the mineral layer on around 15 ha of degraded wet heath. This has enabled the older seed bank to come to the surface and germinate. They applied chalk to prevent the seeds of the new heathlands being burned by the ammonia peak that occurs when organic material is removed.

To ensure the maintenance of the restored habitats, cattle were introduced (some 50 cows to graze the heathlands at Hageven-De Plateaux and further south at Dommel), with this action being supported by a further LIFE investment in 16 km of fencing.

### Photographic help

One interesting aspect of the project was the use of old photographs for exact restoration of conditions from the 1930s, before the area was developed for agriculture. The archive images provided a template for the location of 12 new ponds and the recreation of fens in their original locations.

In addition to wet heath, the conservation partners have restored other transition habitats, including mires and quaking bogs, forming a gradient of habitats from dry heath to marshes along the river Dommel. The insectivorous round-leaved sundew (*Drosera rotundiflora*) is among the plants recolonising the fens as a result of the project.

The Dommel marshes in Hageven are characterised by calcareous fens dominated by great fen-sedge (*Cladium mariscus*). The project team extended the marsh area by more than 11 ha during the project, using LIFE funding to install five sluice gates that control the water level. Within the Natura 2000 network site, reed beds were managed for the benefit of the protected European bittern (*Botaurus stellaris*) and western marsh harrier (*Circus aeruginosus*), as well as other species.



Photo: LIFE05 NAT/B/000091 - Stephen Nottingham

Ghis Palmans demonstrates the depth of organic layer removed at one of the project sites

LIFE Dommeldal's habitat restoration actions have already encouraged rare flora and fauna to re-establish itself, including the wet heath species marsh gentian (*Gentiana pneumonanthe*) and the alcon blue butterfly (*Phengaris alcon*). "During summer we avoid grazing on delicate habitats, especially for the alcon blue, so the cows do not eat the flowers on which the butterflies lay their eggs," explains Ghis Palmans, team coordinator at Hageven-De Plateaux. The alcon blue lays its eggs on marsh gentian, the only species on which the larvae feed. The butterfly's lifecycle is completed in the nests of certain ants. "Sod cutting is mainly by machine, but narrow pathways of wet heath have been cut by hand to help the ants find the alcon blue," says Mr Palmans.

### 'Vloeiweiden'

Vloeiweiden (literally 'flood-meadows') are a special type of irrigated grassland dating from the 1850s. Undulating meadows were created and sown with grass seed collected in the Italian Alps to produce hay for horses and cows. A system of small irrigation channels sends water into the meadows on the ridges, while a second system of channels in the depressions drains to the other side. The meadows are flushed with calcareous water from the River Meuse during one week in March. The cloudy chalk-laden water returns clear to the river system, depositing material as it seeps through the vegetation to the lower channels.

"There used to be around 2 257 hectares of vloeiweiden but only around 30 hectares remain, at Pelterheggen in the Netherlands and at Lommel-Kolonie in Flanders," says Luc

Farmland is fully transformed into fens and heathland (the same site before and after the works)



Photos: LIFE05 NAT/B/000091 - Michel Hendrikx



Some of the flora and fauna that will benefit from the work of the LIFE Nature Dommeldal project

Winters of Natuurpunt Noord-Limburg. "A unique grassland flora occurs due to the liming effect and the presence of some Alpine species, but irrigation needs to continue or it will be lost."

The LIFE project purchased 7 ha of flushing meadow at De Vloeiweiden in de Wateringen, bringing the total to 17 ha at this site, and set about restoring the historic infrastructure of dams and sluices, using newly-acquired tractors, hay-baling and ditch-digging equipment.

However, the work remains labour-intensive and Mr Winters stresses the important role played by knowledgeable and enthusiastic Natuurpunt volunteers, such as Gerald Jannis. "Due to the effort of all the volunteers, LIFE Dommeldal was a great success," says Mr Winters.

### Species-rich grasslands

The third Dommeldal project location was in the area where the upstream part of the Dommel merges with the Bolisserbeek, between Peer and Hechtel-Eksel. "The grasslands here are the most species-rich in the whole of Flanders," notes Mr Winters. Using specialist mowing equipment, the project partners were able to restore some 8 ha of molinio meadows fed by calcareous groundwater. Haymaking in the wet grasslands ensures a rich and unique flora throughout the year. Several rare orchid species are now flourishing, for example, thanks to the project.

Another key project intervention was the restoration of 15 ha of heath patches, to provide important 'stepping stones' for

species migrating between the Hoge Kempen National Park and habitats in North Brabant.

### A lasting legacy

The LIFE project has also helped to raise awareness of and increase access to the newly-restored sites, for instance by creating educational displays at the visitor centres at Hageven-De Plateaux and De Vloeiweiden in de Wateringen, as well as erecting information boards, footpaths, boardwalks and a new bridge over the Dommel, which also serves as 'green infrastructure' for species wishing to cross between the eastern and western sides of the nature reserve. "Now people can see more of the landscape, habitats and species," says Mr Hendrix.

For Ghis Palmans, "the LIFE project's legacy is the possibility of connecting protected areas in the whole region, providing better habitats and corridors for insects, birds and other species, and also promoting tourism."

**Project number:** LIFE05 NAT/B/000091

**Title:** Dommeldal – Transboundary habitat restoration in the valley of the Dommel

**Beneficiary:** Natuurpunt Beheer

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**Website:** www.natuurpunt.be

**Period:** 08-Jan-2005 to 30-Sept-2011

**Total budget:** €5 819 000

**LIFE contribution:** €2 677 000



# Denmark: Restoring raised bogs, a unique ecosystem

Under the RERABOG-DK project, the Danish Nature Agency conducted interventions on seven degraded sites to restore the conditions necessary for active raised bogs to develop. In doing so, it explored new methods of working and learned some valuable lessons.



Photos: LIFE05 NAT/DK/0001.50 - Ed. Thøgers

*Sphagnum mosses - the 'builders' of active raised bogs*

Active raised bogs are a special habitat that takes a long time to develop: Sphagnum mosses have a slow grow rate and are the “builders” of the bog habitats. The dormant layers accumulate underground to form peat, which does not decay. Each new layer of moss raises the ground level. The peat underneath becomes increasingly dense until water cannot penetrate. Since the surface becomes separated from groundwater supplies, the bog remains active by retaining rainwater.

Active raised bog habitats (a priority for conservation habitat included in Annex II of the Habitats Directive) are characterised by their wetness, a low level of nutrients and the acidic conditions created by biochemical processes of the Sphagnum moss. “Few species can survive in such an environment, but those that do create a unique and very stable ecosystem – one of the most natural in the world,” highlights RERABOG-DK project manager, Jesper Stenild, of the Danish Nature Agency. Unfortunately, these natural ecosystems were in many cases

destroyed when the bogs were drained to enable greater peat extraction or to turn the land over to agriculture or forestry. “We lost 95% of our raised bogs in Denmark,” explains Mr Stenild: “Even the sites that remain have been affected in some way.”

Many (potential) areas of raised bog have more recently been protected within Conservation Areas and the Natura 2000 network in Denmark. However, the prevention of further exploitation has not been enough to enable their natural (re-)development because the appropriate conditions no longer exist.

“We knew that we had to stop the drainage to restore water levels and remove excessive vegetation to allow light to reach the surface. However, every site is unique, so we were not sure how to do this in practice,” recalls Mr Stenild. The RERABOG-DK project arose from the Danish Nature Agency’s desire to find out which were the best methods to restore natural site dynamics.

### Methods for preventing drainage

The project tested different methods for blocking ditches and helped confirm that there is no one-size-fits-all solution. Plates - whether of smooth plastic, profiled plastic or waterproofed plywood - all proved useful for blocking shallow ditches. However, iron sheet piling was more useful for deeper channels as they could be driven down further into the impermeable layer.

At Brandstrup Mose, the project built a 135-metre-long wall along the whole southern edge of the bog, which kept the

*Iron sheet piling was a good solution for blocking deeper drainage channels*



water level in the wetland half a metre higher than would otherwise have been possible. In addition, peat itself can be used to create dams across drainage channels, or – particularly if raised banks are in place alongside – to fill channels entirely.

However, one somewhat unexpected challenge for the project was that because drainage systems are not always properly mapped, frequently overgrown and sometimes buried, site managers often do not know they are there. Claus Simonsen, site manager at Svanemosen, stresses that even now “it is an ongoing effort to identify where water is draining out of the bog so we can stop as much as possible.”

Christian Brix Søndergaard, manager at the largest site, Kongens Mose, recalls having to deal with the impact of a World War I prisoner-of-war camp in the heart of the bog: “We found a small area where the vegetation and aerial photos showed the land had been very carefully organised into strips for growing potatoes. We discovered clay pipes had been buried in the ground, which were still draining the area.” The project used a machine to cut them at different points along their length.

### Cutting and controlling vegetation

Jesper Stenild stresses that one of the biggest lessons of the project was that, “if birches are cut away, but the land remains dry, they grow back even more densely than before. This becomes an even bigger problem and can require even more costly interventions in the future.” Crushing stumps and roots with machinery after cutting was found to be an effective, but relatively expensive, solution.

“[At Svanemosen], we have tested grazing goats to restrict the regrowth of birch,” says Mr Simonsen. “However it is clear that this has to be started whilst the trees are just starting to grow and even then it can still be a losing battle.” The clear conclusion is that cutting should be focused on areas most likely to be saturated by hydrological restoration, which will naturally prevent regrowth.

An additional lesson was that it can be beneficial to leave some of the cut trees in the bog. “By breaking the surface of the standing water, the fallen trees create smaller, stiller pools where the essential Sphagnum moss finds it easier to grow,” explains Mr Stenild. This was contrary to standard biological advice to remove all wood to leave a more natural state.

Nevertheless, most cut vegetation was indeed removed and sold to businesses burning wood chips for fuel. Another method for improving the economics of tree cutting demonstrated by the project and highlighted by Mr Søndergaard



Machines used an 'island of plates' to cost effectively move around the wetland with minimal impact

was "for the machinery to stand on an island of plates that it lays and removes for itself as it moves around the wetland." This method, which, in Kongens Mose, was primarily used by the machines building the peat dams, proved to be much less costly than building an access road or using more specialised wetland machinery.

### Working with landowners

A key challenge for the project was working with all the affected landowners. Historic land reform means many hectares of bog are still privately owned in small strips. At Kongens Mose, it became impossible to reach agreement with all the landowners for interventions in part of the proposed area, mainly because of rapidly increasing land prices. Public land nearby was included instead to achieve the project targets.

At another site at Brandstrup Mose, the project had to negotiate with an electricity company, whose pylons ran through the proposed site. Unfortunately, the company had not been included in the existing Conservation Order covering the land. Following negotiations however, it agreed on the solution of sending the cables underground and around the area to be restored to wetland.

The ownership of land surrounding a bog was also a crucial issue. The project developed a model to predict the likely impact of blocking ditches in Kongens Mose on the wider area. "The model was not perfect, but it identified which landowners we needed to negotiate with and where to build access roads," remembers Mr Stenild. When particularly high rainfall during one year of the project led to unanticipated flooding of neighbouring agricultural land, the project team had to intervene quickly to re-channel the water.

On the other side of the equation, Mr Simonsen laments that at Svanemosen, "We blocked as many ditches as we could find in the project site, but what we really need to do is block the large drainage channel that runs around three sides of the bog. Trying to seal the bog off from this channel is practically impossible." As a result, the agency is now working to establish a compensation scheme for the landowners who would be affected by the blocking of the channel.

Finally, water draining into bogs from neighbouring land can also be problematic in raising the nutrient levels inappropriately high. In Brandstrup Mose, the project built a drainage pipe to divert nutrient-laden water flowing from agricultural land around the bog. "With the right hydrology, the bog can get all the water it needs from rain," says Mr Stenild.

### Success factors

The full restoration of degraded raised bogs to active raised bogs takes many years and is beyond the scope of any individual project. However, RERABOG-DK has demonstrated successful interventions that have visibly raised water levels and extended the growth of peat mosses in the seven target areas. It has also improved understanding of which interventions may be more or less appropriate in different situations.

Jesper Stenild is clear that one of the reasons for the success of the project was good cooperation with the European Commission and the monitoring team: "When we had problems or circumstances changed, we were able to talk about it and find the right solutions together. People sometimes think the admin and regulations are too difficult, but you just have to make sure you understand them and get any clarification you need. The monitors can really help."

*At Brandstrup Mose, the project removed electricity pylons, cut down trees and built a dam to restore an active raised bog habitat*



LIFE05 NAT/DK/000150 - Ed Thorpe

**Project number:** LIFE05 NAT/DK/000150

**Title:** RERABOG-DK - Restoration of raised bogs in Denmark with new methods

**Beneficiary:** Danish Nature Agency

**Contact:** Jesper Stenild

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**Website:** www.raisedbogs.dk

**Period:** 10-Jan-2005 to 31-Oct-2011

**Total budget:** €2 947 000

**LIFE contribution:** €1 407 000



# Hungary: Reviving steppic oak forests

Valuable conservation lessons were learned during a project to regenerate the steppic oak forests of Hungary, and ongoing research is enabling scientists to get a better picture of the natural development of this endangered habitat type.

Once covering the vast Great Hungarian Plain, the steppe oak woods have a particular place in the history of the country. When the early Hungarians moved west into the Carpathian Basin, they followed the forested steppe zone – a navigational aid that would be sadly unavailable today. River regulation, drainage and increases in intensive forestry and agriculture have greatly reduced the extent of this valuable habitat, which is home to more than 100 protected species, and only a few small areas remain.

The habitats Euro-Siberian steppic woods with *Quercus* ssp. on sandy soil and Pannonic sand steppes are found exclusively in the Carpathian Basin. The last continuous mosaic area of oak forests and sand steppes is located near the town of Nagykőrös, in the part of Hungary between the Danube and Tisza rivers; much of it is managed by the Danube-Ipoly National Park Directorate.

In 2006, the Directorate joined forces with the local municipality and WWF Hungary (publicity and communications) to launch a LIFE project, HUNSTEPPICOAKS, that aimed to ensure the long-term future of this priority habitat for conservation in the 3 300 ha Natura 2000 network site Nagykőrösi pusztai tölgyesek. The habitat is seriously threatened there by the spread of invasive alien species, problems with natural forest regeneration, improper forest management practices, fragmentation and a lack of public awareness of its importance.

Several rare or endemic plant and animal species also depend on the habitat, including the European roller (*Coracias garrulus*), the European honey buzzard (*Pernis apivorus*), perennial bunchgrass (*Stipa borysthenica*) and long-lasting pink (*Dianthus diutinus*).

## Regeneration

One of the main activities of the project was thus habitat reconstruction, namely the removal of invasive species. The main threats are black locust (*Robinia pseudo-acacia*) and black cherry (*Prunus serotina*), but common milkweed



Counting saplings in August 2011

(*Asclepias syriaca*) and tree of heaven (*Ailanthus altissima*) also spread aggressively in the steppe wood. These were removed on a target area of 418 ha and saplings of native species, such as pedunculate oak, pubescent oak, white poplar and grey poplar, were planted in their stead. Planting of native trees occurred on 65 ha of former plantations of introduced species.

Regeneration, however, is not a simple process. The project carried out both total and partial soil preparation in one area to show the contrasting results. The 'total' technique involves the use of machinery to plough the land 70 cm deep. Though this method completely removes the stumps of cut invasive tree species, it has a high impact on the habitat and the restored area enjoys significantly less biodiversity than areas that have been partially prepared. This

'partial' method preserves the seed banks and doesn't destroy the grass layer – but patience is required. The new trees are grow more slowly than ones on land that has been fully prepared.

Whilst the park authorities prefer the less harmful method, lax regulations are an added complication. On government and privately owned land, forestry managers are inclined towards high-density timber production.

The removal of plants in an effective and non-harmful way is also complicated, and the project team learned from its experiences as the project progressed. Whilst mechanical means are preferred to chemical, the project has used chemicals in a controlled way. "We employ the most effective and precise methods to keep the use of chemicals to a minimum," explains project leader, György Verő. One such method is stem injection, which involves drilling a hole in the trunk, injecting the chemical pesticide and sealing the hole with silicone caulk or silicone rubber to ensure that the chemical doesn't evaporate.

Although this method is extremely precise, it is also expensive, notes Mr Verő, who adds that the extra cost will result in savings in the long run – it has been shown to be a very effective means of combatting black locust, the sprouts of which grow back quickly after cutting. However, this invasive plant species is very sensitive to the chemicals and the sprouts can be completely removed after the injections have taken effect.

*A fence protects these steppic oak forests from predation by game*



Photo: LIFE06 NATH/000098 – Jon Eldridge



Photo: LIFE06 NATH/000098

*Invasive milkweed after chemical treatment*

Black cherry invasion is a relatively new phenomenon, emerging over the past 15 years. The removal of this species was also vital for the regeneration of the area with native species, and efforts are ongoing. It is impossible to completely prevent new saplings from growing as birds spread their seeds, but this area is now 90-95% free of invasive plants. Common milkweed has to be treated two or three times a year, with a first treatment before it flowers in May.

## Protecting saplings

Another major threat to the growth of native saplings is 'big game', populations of which "have multiplied since World War II," says Mr Vero, leading the woods to become "overstocked", with adverse effects on the development of native species. The region has also become less humid following the regulation of rivers and the drainage of marsh lands, and this has also affected the woods' spontaneous regeneration.

Mr Verő acknowledges that fencing off areas is "costly and unattractive", but he also understands that it is necessary to ensure the survival of new individuals. Before the project, the majority of fresh oak saplings, for example, would not survive. The beneficiary erected information boards to explain the presence of the 'ugly' fences to visitors.

Just over 260 ha were fenced off during the project, using more than 27 km of game exclusion and electric fences.





Photo: LIFE06 NAT/H/000098

Fence erected at Strázsa-hegy in 2011, with forestation on the right

Boars, fallow deer and roe deer were driven out of these areas with the help of hunting associations and volunteers. The fences are expected to last for 25 years, and continuous monitoring will allow researchers to determine the extent to which these animals were affecting regeneration and the degree to which decreased water levels in the area also contribute.

For the initiation and continuation of these activities, the chief beneficiary, the Danube-Ipoly National Park Directorate, negotiated with private landowners to manage forests formerly used for timber production. A total of seven landowners signed 90-year leases, for an area amounting to some 175 ha. This land is now dedicated to conservation and the owners were compensated for loss of income from logging.

Compensation payments represented a “huge proportion” of the project budget, but the contracts were necessary because the landowners did not want to sell. The Directorate, however, did purchase 28 ha of forest with uncertain ownership.

In addition, proposed forest management actions were communicated to the forestry authority and incorporated into the 10-year forestry management plans.

### Education begins early

Finally, a visible positive outcome of the project is the renovation of an abandoned ‘pioneers’ building (a youth camp dating from the Soviet era) into a very attractive educational centre in the Pálfája woods. This beautiful part of the forest once

more welcomes young people to experience first hand some of the country’s most valuable natural habitats.

The project leaders recognise that the continued regeneration of the oak forests depends on the future involvement of young people. As well as school visits, summer camps are held at the site, and every day the children go into the wooded areas to learn more about nature.

The property is owned by the local government and hot water is generated by solar panels installed in the building’s roof. “There was a real need for such a place in the region; the next one is far away,” explains Mr Verő.

A nature trail consisting of numbered points of interest relating to explanations on a printed guide was also created at the site. One of the stopping points is the magnificent oak tree, known as Pál’s tree. It is believed to be more than four centuries old and was used by the Red Army as a lookout post during World War II. In fact, Pál’s tree is just one of many in the region to have had legends grow up around it over the years. Local entrepreneur Tibor Kapás, who became actively involved in the LIFE project, has even written a book on the fabled trees.

More conventional publicity took the form of field visits for conservation experts, NGOs and forest managers, and in 2011 an international conference was held, attracting 139 attendees.

Monitoring activities took place continuously over the five years of the project, resulting in a draft Natura 2000 management plan. It is clear that the HUNSTEPPICOAKS project represented a huge contribution to the improvement of the conservation status of the site. Species believed to have been lost to the area for decades have now been recorded, such as the dwarf cherry, the wayfaring tree, St Bernard’s lily and grape hyacinth. Monitoring data also suggest that arthropod species such as beetles and spiders are now flourishing.

**Project number:** LIFE06 NAT/H/000098

**Title:** HUNSTEPPICOAKS - Conservation of Euro-siberian steppic woods and Pannonic sand steppes in “Nagykörösi pusztai tölgyesek” pSCI

**Beneficiary:** Duna-Ipoly Nemzeti Park Igazgatóság

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**Period:** 01-Sep-2006 to 31-Dec-2011

**Total budget:** €1 863 000

**LIFE contribution:** €1 397 000



# Italy: Restoring the Friuli Fens

LIFE has helped turned around the fortunes of two plant species endemic to an important fen habitat in the Italian Region of Friuli-Venezia Giulia.



Photo: LIFE06 NAT/IT/000060 – Justin Toland

The project targeted the return of formerly-cultivated land to nature

Fuelled by the emergence of underground calcareous water coming from the Eastern Alps, until the early twentieth century, the low plain in Friuli in north-east Italy was home to a large uninterrupted wetland of over 6 000 ha. Intensive land reclamation for agriculture, then later for aquaculture, as well as for human settlements meant that by the early 21<sup>st</sup> Century only 200 ha of these habitats remained, dispersed in small and fragmented patches.

In response to this situation, LIFE FRIULI FENS was a six-year project dedicated to the preservation of the last alkaline and calcareous fens in the region and to the creation of new ones on former agricultural lands, purchased with LIFE funds. The project expanded on the efforts of an earlier LIFE project (Stella - LIFE98 NAT/IT/005066), focusing its management and restoration initiatives on three Natura 2000 network sites, whose fens are home to 100% of the worldwide population of *Armeria helodes* and 98% of the worldwide population of *Ericastrum palustre*, plant species listed in Annex II of the EU Habitats Directive.

Both species are threatened with extinction as a result of a number of direct or indirect pressures: their small

populations – in some cases fewer than 10 plants, completely isolated from the rest of the population – with a consequent reduction in genetic variability; habitat fragmentation; lowering of the water table, including increasing episodes of prolonged drought; surface water eutrophication; and changes in land management.

The lack of habitat management, which exacerbates the effect of the lowering of the water table, is a consequence of socio-economic changes in the 1960s and 70s that led to the abandonment of traditional mowing methods practiced by small, family-owned stables that used the material as bedding for cattle and horses. As a result, the wetlands were progressively colonised by shrub and tree species, leading to the elimination of typical wetland species that need more light, space and water.

The goals of LIFE FRIULI FENS were fourfold: to greatly improve the ecological system of the spring waters in Friuli through extensive restoration of agricultural areas; the management of long-abandoned relict areas; the enlargement of a nursery for the cultivation and propagation of rare native species; and awareness and dissemination

activities targeting different segments of the population. In addition, says the project's Scientific Coordinator, Giuseppe Oriolo, "There is a lot of literature in northern Europe on this type of habitat, but in southern Europe there is not, so one of the aims was also in some way to find something like a best practice."

## Management and restoration

The project involved three Natura 2000 network sites and four habitats: alluvial forests, calcareous fens, alkaline fens and *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils. To manage the complex series of actions required, the project was divided into seven different sub-projects, explains Dr Oriolo.

Preparatory actions focused on the drafting of management plans for the three Natura 2000 network sites, including administrative acts necessary to enlarge two of those sites. In order to ensure its adequate management, the beneficiary acquired 25 ha of natural habitat. A further 23 ha of agricultural land was purchased to expand the marsh system to connect with existing fens.

Land purchase proved more complex and expensive than anticipated because of a doubling in the price of agricultural land throughout the region, during the course of the project. Despite the increased cost, for which the project beneficiary managed to mobilise additional funds outside the LIFE programme, the acquisition proved very important ecologically, since the restoration of farmland, including work on the network of drainage and irrigation ditches, has allowed the recreation of the variety of habitats that existed in the area before land reclamation. "We tried to build a mosaic, from areas always with water to drier areas," explains Dr Oriolo.

*Erucastrum palustre*



Exceeding a target of 27.9 ha, the project team returned 34.5 ha of formerly-cultivated land to nature, much of which enabled the enlargement or reconnection of existing patches of fen. Non-recurring management was introduced on a further 51.1 ha, leading to the overall improvement of more than 85 ha of wet habitats. This included the ecological improvement of some 16 ha of alluvial forest habitats via the removal of alien species and the conversion of coppice to high forest.

In the core areas, the project team removed 135 000 m<sup>3</sup> of topsoil to reach the water table and remodel the ground surface so as to create a gradient suitable for a wider array of typical wetland species, whilst also eliminating vestigial traces of non-native vegetation (e.g. seeds of agricultural crops).

One unexpected hitch was caused by the introduction of a new law in Italy that required soil that is dug up to be treated as waste. The regional administration of Friuli-Venezia Giulia (FVG) solved the problem of how to dispose of the topsoil through an accord with another public administration that needed earth for the remediation of an industrial area.

## The plant nursery

The project reconstructed typical vegetation cover for the target habitats by planting mixtures with seeds and by transplanting species grown in its plant nursery. The project expanded FVG's existing nursery (opened in 2005) in order to be able to produce all the plants needed for the restoration work – experience had demonstrated that it was better to use cultivated plants rather than seeds collected from the natural environment.

This ex-situ cultivation "was the most difficult part of the work," says Dr Oriolo, due to the sensitivities of the two rare endemic species, which made reproduction difficult.

Thus, one of the great successes of the project was its establishment of cultivation protocols for more than 80 herbaceous species, including both *Armeria helodes* and *Erucastrum palustre* and several others in the regional and national red lists.

With LIFE's help, some 100 000 seedlings of approximately 80 different species were produced in the greenhouse, with over 70 000 already planted for restoration purposes.

Specific microhabitats were created to enable the two most important species, *Erucastrum Palustre* and *Armeria Helodes* to take root. Monitoring of these species in the wild has helped to increase knowledge in a positive feedback loop.



Photo: LIFE06 NAT/IT/000060 - Justin Toland

Lucio Taverna explains how seedlings from the LIFE-backed plant nursery have been used to restore typical alkaline fen habitats

Lucio Taverna, who manages the plant nursery, explains that today half of the greenhouse is used for growing plants to go to areas targeted by LIFE FRIULI FENS, the other half is for a new project, LIFE MAGREDI Grasslands (**LIFE10 NAT/IT/000243**).

The nursery also produces its own seeds for use in the restoration areas, as well as cultivating seeds brought in from existing natural areas. "The average germination rate is only 30%; we are trying now to improve this," says Mr Taverna. "In time we hope to replace commercial seeds entirely."

### Increasing awareness

An important difference between LIFE FRIULI FENS and the earlier Stella project was the close coordination between the beneficiary and four local municipalities – Bertolo, Talmassons, Castions di Strada and Gonars. "This was a big improvement," says Dr Oriolo: "It was very important for the participation, information and dissemination processes."

Previously, water "was an enemy to try to fight" in this region, notes the Scientific Coordinator: "We were doing the opposite of what people had done for 80 years – going from corn plantation to wet meadows. This was difficult and the participation of the municipalities was very important." The project's strategy, adds Dr Oriolo, was "to work on all the levels" – from primary school children to senior citizens – to raise awareness of the ecological and cultural importance of the fens.

A total of 103 school classes – some 2 135 students – took part in environmental education activities, whilst 470 young people participated in the summer camps in the four

municipalities. For the wider public, the project partners produced a DVD and arranged 44 guided visits and 12 themed evenings, some of which were a joint collaboration with the Third Age University, a cultural organisation that provides cultural activities for the over-50s.

Also helping to foster greater public appreciation of the restored fen areas is a new, 3 km path, which was built using Objective 2 Structural Funds. "We tried to put together different financial axes for the same aim," explains Lorenzo Fogale from the FVG regional administration, who worked closely with project manager, Daniele De Luca. "In other biotopes they also used Interreg funds to do other activities. Putting all [funding sources] together can be a nice way to proceed," believes Mr Fogale.

The path has been "a great success", says Lucia De Colle of the regional administration, who was involved in drafting the management plans for the Natura 2000 sites that were requested by the LIFE project: "The population has appreciated the creation of this big area for environmental activities – it has got recognition; a very strong identity; and it is used more and more for outdoor activities on a territorial level."

### Life after LIFE

Ms De Colle highlights that the integrated approach to funding is also one of the key elements to create consensus on the management plans drawn up by the LIFE FRIULI FENS team, "trying to make connections to ensure that some measures, especially with these kinds of sites, can be financed by the Rural Development Programme (RDP)."

Finally, for Dr Oriolo, whilst the LIFE project has helped to increase public awareness of these rare fens and their endemic species, it is necessary to build on this work: "We have planted a lot of seeds in the population, but it's necessary to cultivate them," he concludes.

**Project number:** LIFE06 NAT/IT/000060

**Title:** LIFE FRIULI FENS - Conservation and restoration of calcareous fens in Friuli

**Beneficiary:** Regione Autonoma Friuli-Venezia-Giulia - Servizio Caccia, Pesca e Ambienti naturali

**Contact:** Daniele De Luca

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**Website:** <http://www.lifefriulifens.it/>

**Period:** 01-Oct-2006 to 31-Jul-2012

**Total budget:** €2 645 000

**LIFE contribution:** €1 058 000



# Spain: Linking bear populations in the Cantabrian Mountains

The **Corredores oso** project in northern Spain pioneered a new approach to the issue of human coexistence with large carnivores in inter-population corridors.

The Cantabrian brown bear is a population of Eurasian brown bears (*Ursus arctos arctos*) living in the Cantabrian Mountains in northern Spain. Once found throughout most of the Iberian Peninsula, brown bear populations have become increasingly restricted and reduced because of habitat degradation and fragmentation, poaching and poisoning, low social acceptance and low genetic variability.

Although Cantabrian brown bear numbers have been greatly reduced, over the last decade the demographic trend has been upward thanks to the impact of various conservation and dissemination projects, including several co-funded by LIFE.

“We have more bears in the Cantabrian Mountains – the population is increasing,” notes Corredores oso project manager, Fernando Ballesteros. As of 2012, there were an estimated 200 bears, divided into a larger western and smaller eastern sub-population. The project beneficiary, Fundación Oso Pardo (FOP), which participated in the bear census, also

calculates that the overall population is increasing by some 10% annually. This is “very good news,” says Mr Ballesteros, “but it means also new goals and new strategies for managing increasing population and trying to solve some problems, such as, for instance, fragmentation.”

To address the issue of fragmentation, and building on the success of two earlier LIFE projects – **LIFE98 NAT/E/005326**; **LIFE00 NAT/E/007352** – FOP developed the Corredores oso project with financial support from Fundación Biodiversidad and Fundació Catalunya La Pedrera (formerly Fundació Territori i Paisatge) and in partnership with 12 local municipalities and the regional administrations of Castilla y León and Asturias, in eight different Natura 2000 sites.

The aim of the project was to contribute to the present and future recovery of the brown bear in the Cantabrian Mountains by improving habitats in areas considered ecological corridors for bears.

*Corredores oso greatly contributed to the present and future recovery of the Cantabrian brown bear population*





Photo: LIFE07 NAT/E/000735 - Justin Toland

*The project addressed coexistence pressures in two bear corridors*

The project targeted two particular bear corridors:

- The 'Leitariegos' corridor – a narrow strip in the breeding ground of the western sub-population; and
- The 'inter-population corridor' – used for movement between the two sub-populations.

The 50-km wide inter-population corridor is particularly important as a means of ensuring the bears' gene pool remains in a healthy state. "Genetic variability of the eastern sub-population in particular is at levels dangerous for its survival," explains Mr Ballesteros, who notes that it has one of the smallest genetic variabilities of any bear population worldwide. At the start of the 2007 LIFE project, the corridor was only sporadically used by the bears because of obstacles such as roads, railways, mining and tourism infrastructure.

"We worked on habitat improvement, but mainly in this first phase we worked with people," says Mr Ballesteros. "We worked with local people, with cattle breeders, beekeepers, landowners, stakeholders, hunters, trying to create a good social environment for the bear to come and to use these corridors."

### Preparing people for bears

The implementation of prevention and preparation activities in a potential bear area before the establishment of bear populations was an important innovation of this project. It is one that has a significant demonstration value for the many other conservation organisations wrestling with the tricky issue of ensuring the coexistence of human civilisation with protected large carnivores. Pointing out that very little work of this

kind had been done at EU level, independent project monitor Audrey Thenard describes it as "a necessary premise to avoid future conflicts and risks that are very difficult to solve once bear populations are present."

The project was able to create a positive social and political atmosphere by reaching out directly to local stakeholders through formal and informal meetings, interviews and educational activities targeted at local groups, including schools. "The project team realised that informal meetings/interviews were usually the most effective means to reach the population and gain their confidence and interest," notes Ms Thenard.

"The idea was to explain to people - you have bears, bears are going to be more and more abundant and this is very good; and, very importantly, this is not a problem for you. As bears appear [the authorities] are not going to forbid you to hunt; [the bears] are not going to destroy your beehives if you protect them ... and things like that," says Mr Ballesteros.

Through its outreach work, the project was able to develop specific collaboration agreements with local authorities and cooperative actions with hunting societies, farmers and beekeepers. This cooperation showed improved understanding that bear conservation can be compatible with human activities, particularly economic activities.

One successful example of this was the provision of electric fences to beekeepers. These fences have proved very good at reducing bear damage to beehives, and have been widely acknowledged as a positive measure amongst beekeepers.

Stakeholder involvement was thus crucial to the success of Corredores oso, providing a useful example for the management of nature conservation projects elsewhere. "Involving people is one of the main conservation actions for nature in Europe," believes Mr Ballesteros.

*Setting up an electric fence around beehives*



One important bridge between the beneficiary, the local community and local authorities was the establishment of a “bear patrol” (Patrulla Oso), consisting of two local residents, which was present on a daily basis in the inter-population corridor during the project. The patrol’s work in detecting illegal traps and poisoned bait in cooperation with regional field guards and game reserve guards has helped reduce direct threats to bears. Although financial constraints mean that this patrol has been discontinued, many of its tasks have been taken on by other patrols organised by the FOP as part of its routine programme of work.

### Attractive habitats

As already indicated, the project also implemented some important habitat improvements for the bears through the purchase of nearly 90 ha of estates and woodlands and by planting more than 15 000 cherry and chestnut trees in the Leitariegos corridor, to increase food availability in areas next to the existing bear territories. These actions paved the way for suitable land management in the targeted corridor sites, although the real impact will only become apparent a few years from now.

However, according to Audrey Thenard, bear presence data gathered by the beneficiary indicates already a possible extension of the bear territory to the inter-population corridor area, with clear evidence that a growing number of bears are penetrating the corridor at least for feeding and resting, and passing from one sub-population to the other.

In addition, the management of these areas for bear conservation will indirectly favour other important species present in these sites, such as other protected mammals (*Myotis myotis*, *Lutra lutra*), reptiles (*Lacerta sp.*) and birds (*Tetrao Urogallus*, *Neophron percnopterus*).

### Long-term planning

To ensure the long-term continuation of these positive outcomes, FOP developed a general management plan for the purchased woodlands, intended as a “pilot plan” for the management of these kind of mountainous forests in northern Spain. Another useful reference document produced by the project team was a “Best Practices Handbook for the Management of Bear Corridors”. A third project publication – targeted at a key stakeholder group – was the “Handbook for Hunting in Bear Areas”. All three publications are available from the project website or via the LIFE projects database.

The best practices handbook is already informing the next phase of FOP’s work in the corridors, says Mr Ballesteros. Its lessons are also transferable to other European locations with large carnivores and similar connectivity problems.



Photo: LIFE07 NAT/E/000735 – Justin Toland

Beehives in the interpopulation corridor in Spain’s Cantabrian Mountains

The management plan highlighted future possibilities for promoting the presence of bears in order to develop tourism and the local economy. Stakeholders from the inter-population corridor were able to visit Somiedo National Park, which was involved in the earlier LIFE Cantabrian brown bear projects, and which is already developing economic opportunities (e.g. ‘bear watching’) linked to the presence of the species.

In conclusion, thanks to the framework for collaboration with the municipalities in the inter-population corridor that was established during Corredores oso, there are “solid grounds for the future integration of the project objectives and bear conservation principles into local planning and policy-making,” says Ms Thenard.

**Project number:** LIFE07 NAT/E/000735

**Title:** Corredores oso - CORRIDORS FOR CANTABRIAN BROWN BEAR CONSERVATION

**Beneficiary:** Fundación Oso Pardo (FOP)

**Contact:** Fernando Ballesteros

**Email:** fop@fundacionosopardo.org

**Website:** <http://www.fundacionosopardo.org/index.php/proyectos/proyectos-life/proyecto-life-corredores-oso/>

**Period:** 01-Jan-2009 to 31-Dec-2011

**Total budget:** €1 100 000

**LIFE contribution:** €825 000



# Lithuania: Improving the status of biodiverse wetlands

Thanks to conservation measures undertaken by a Lithuanian project, large areas of wetlands in the Žuvintas Biosphere Reserve were restored, leading to the improved conservation status of its bog, swamp wood and lake habitats.

The Žuvintas Biosphere Reserve, which contains the vast Žuvintas and Amalvas mires, is located in the southern part of the central Lithuanian lowlands. The Žuvintas mire (6 847 ha), the largest in Lithuania, consists of bogs (71 %), transitional mires (17%) and fens (12%). The mire is also home to three large lakes and several smaller marshy lakes. In addition, forests cover some 6 000 ha of the reserve.

The area boasts a rich biodiversity: in total, 1 058 plant species are found in this biosphere reserve. Moreover, the Bukta forest contains important areas of broad-leaved forest with hornbeam and significant areas of swamp woods, whilst the mires mostly comprise bog woodland dominated by pine. Open areas are home to habitats consisting of common heather (*Calluna vulgaris*), hare's-tail cottongrass (*Eriophorum vaginatum*) and Sphagnum species. Large areas of reed marshes and sedge fens occur mainly in the south and south-east of the Žuvintas Lake. Moreover, lake vegetation is very dense – more than half of the lake surface is covered by aquatic plants such as bulrushes and reeds – and forms floating islands that are characteristic of the Žuvintas region.

The biosphere reserve is however best known for its bird species. Of the 300 registered species in Lithuania, 257 species are found in the reserve and 134 breed in the area. Every year numerous flocks of migratory birds use the area as a stopover location. The area also contains 44 species of mammal, five reptiles and 11 amphibians, as well as more than 2 000 recorded species of insect.

In short, conservation works stand to benefit a high number of flora and fauna species, and a LIFE project was launched to stop the degradation of these bog, swamp wood and lake habitats. During the second half of the 20<sup>th</sup> century, Lithuania lost more than two-thirds of former mire areas that covered around 10% of the country. The WETLIFE project combated this overall trend by improving the conditions of a target area of 1 158 ha of degraded bog in the Amalvas wetland and other mire areas.

In particular, the project helped conserve the EU priority habitats of active raised bog and bog woodland by optimising the conditions for peat formation. Such habitats provide crucial ecosystem services, such as important sinks for carbon dioxide (CO<sub>2</sub>) emissions. Improved conditions at the

Flooded Amalvas polder meadows



Photo: LIFE07 NAT/LT000550 – Argaudis Štoškus



mire along with significantly reduced emissions from the Amalvas polder mean that the total greenhouse gas emissions from degrading peat are expected to fall substantially from an estimated 10 000-15 000 tonnes/yr of CO<sub>2</sub> equivalent at the start of the project.

### Habitat restoration

As a first step, the project purchased 16 plots of land and obtained permits for blocking drainage of the target area in order to enable the conservation measures to be carried out. Other preparatory actions included technical drawings for reconstruction work, including a map of the water levels. The project then carried out a range of interventions to restore habitats, such as:

- Reconstruction of the Amalvas polder;
- Blocking of drainage channels in Amalvas and Žuvintas;
- Restoration of the natural wetland water levels in Amalvas and Žuvintas; and
- Support for grazing activities.

Specifically, the sluice gates were reconstructed at several sites to form overflow spill weirs; this cascade of spillways allows fish to pass through. The protective dykes in the wetlands of Amalvas (2 km) and Žuvintas (3 km) were reconstructed and extended, whilst the pumping station at the Amalvas polder was renovated with subsequent cost and energy savings.

Other specific actions included blocking with plastic piling poles all the drainage ditches on the 207 ha of the southern Amalvas wetland and 6 km of ditches in the Žuvintas raised bog; cutting trees on this southern Amalvas wetland and raising two sections of road to maintain its viability. Just one year after this restoration activity, peat moss cover in the centre of this area had increased by 30%.

*Reconstruction of Žuvintas sluice*



Photo: TOLAND Justin

*Project manager Argaudas Stoškus highlights the wider range of project actions using a maquette*

Furthermore, the restoration work undertaken at the Amalvas polder allowed for water levels on 638 ha to be maintained at a natural level during the autumn, winter and early spring. Water management rules were established to ensure maintenance of a ground water level in the peaty soils of 30-60 cm from the surface during the farming season. The work in the southern part of the Amalvas bog restored the water level to 0.0-0.3 m below the surface in the formerly drained area, whilst the natural water fluctuation in the Amalvas Lake was restored.

### Managing for biodiversity

The improved hydrological conditions in the Amalvas polder allowed grazing to be introduced on more than 30 ha of peatland. Electric fences were erected and a farmer was contracted for five years, receiving a starting herd of beef cattle of 15 heifers and one bull. Such a contract meant that compensation payments for newly rewetted land were not required. Restored water levels will also reduce peat degradation, improve conditions for meadow birds and reduce costs at the pumping station.

Argaudas Stoškus, the project manager, says that such a range of differently managed land is vital for the biodiversity

*Flooded meadows around Žuvintas Lake*



Photo: LIFE07 NAT/LI/000530 - Argaudas Stoškus



Photo: LIFE07 NAT/LT/000530 – Vytautas Knyva

*Flooded meadows are a perfect feeding ground for migratory geese*

of the region. “For birds it’s very important to have different conditions, especially so for waders, redshanks or godwits. They need to have ungrazed areas, mowed areas or extensively grazed areas...And of course it’s very important to do it on a large-scale: as large as possible.”

Moreover, the project led to new management regulations for the Žuvintas Lake as well as the Amalvas polder. Regulation of the lakes was introduced in the 1970s, reducing the average water level by 30 cm and water fluctuation to around 30 cm in Žuvintas. Water pollution increased as a result, and the typical vegetation changed. Restored natural water fluctuation in Žuvintas Lake is expected to improve conditions for submerged vegetation, especially *Chara spp.*, which is highly important for invertebrates, fish and waterfowl populations. It is also expected to increase spawning grounds for pike and amphibian species; facilitate the development of a boundary zone; and prevent the spread of reed and shrubs.

Agricultural practices have also adversely affected water quality in the region. In discussion with local farmers, guidelines on farming in peatlands were developed, and the ecological and economic benefits of more sustainable farming practices were emphasised. In fact, the involvement of farmers was

key to the success of the project. “There were a lot of conversations,” says Arūnas Pranaitis, director of Žuvintas Biosphere Reserve: “I hope we learned something from them.”

In addition, it is expected that after reconstruction of the polder most of the land will be maintained as grasslands because large areas will meet the criteria for higher agri-environmental EU Rural payments. The beneficiary believes that such an outcome will facilitate the development of alternative uses of grasslands, such as the production of grass seeds and grass biomass.

Finally, the project constructed a viewing platform at the Amalvas Lake on a 40 ha area of land purchased from a private landowner. An information board was also erected on a restored part of the Amalvas bog. Populations of migratory birds (especially waders) and wet meadow breeding birds are expected to increase as a result of the sustainable management of the Amalvas polder.

Other actions to communicate the importance and success of the project included the creation of a factual film about the project (‘Revival of Wetlands’) that was sent to regional TV stations and made available for viewing by visitors to the project website and the Žuvintas Biosphere Reserve visitor centre.

*Extensive grazing with cattle is essential to maintaining the habitat*



Photo: LIFE07 NAT/LT/000530 – Justin Toland

**Project number:** LIFE07 NAT/LT/000530

**Title:** WETLIFE - Restoring Hydrology in Amalvas and Žuvintas Wetlands

**Beneficiary:** Vsi Gamtos paveldo fondas

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**Period:** 01-Jan-2009 to 31-Mar-2012

**Total budget:** €1 603 996

**LIFE contribution:** €801 998



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