European Commission

BEST LIFE NATURE PROJECTS

Best LIFE Nature projects 2015

LIFE *Nature*

Environment

EUROPEAN COMMISSION
ENVIRONMENT DIRECTORATE-GENERAL

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Foreword

Photo: Naturvårdsverket

Josefin Olsson
LIFE Nature Best of the Best coordinator 2015
Policy Implementation Department, Swedish Environmental Protection Agency

This is the eighth year that the LIFE Nature Best Awards have been granted to the most exemplary projects financed within the framework of the European Union's LIFE programme. The awards were again presented at a high-profile ceremony during EU Green Week in Brussels.

It was a great honour to be asked to coordinate the process by which the national contact points for the Member States selected the 'Best of the Best' LIFE Nature projects. For the third year in a row, the winners included LIFE Information and Communication (LIFE INF) projects with a nature conservation theme, as Markéta Konečna explains below. We would like to thank our fellow National Focal Points for their contribution. The Best of the Best projects - from Spain, Finland, Hungary, Poland and Cyprus, as well as a Polish LIFE INF project - demonstrate exemplary ways of using LIFE funding to restore habitats, conserve species and support biodiversity, in line with the goals of EU nature and biodiversity policy.

Photo: European Commission

Markéta Konecna
LIFE Information and Communication Best of the Best coordinator 2015
Department of Economic and Voluntary Instruments, Ministry of the Environment of the Czech Republic

As national contact point for the Czech Republic, I had the privilege of coordinating the process of selecting the "Best of the Best" LIFE Information & Communication (LIFE INF) projects completed by the end of 2015. LIFE INF projects with a nature conservation theme were assessed according the following criteria: nature conservation impact; environmental relevance; quality of communication actions; the multiplier effect; networking activities; innovative campaigning methods; impact on the target group; and their regional, national, or international impact.

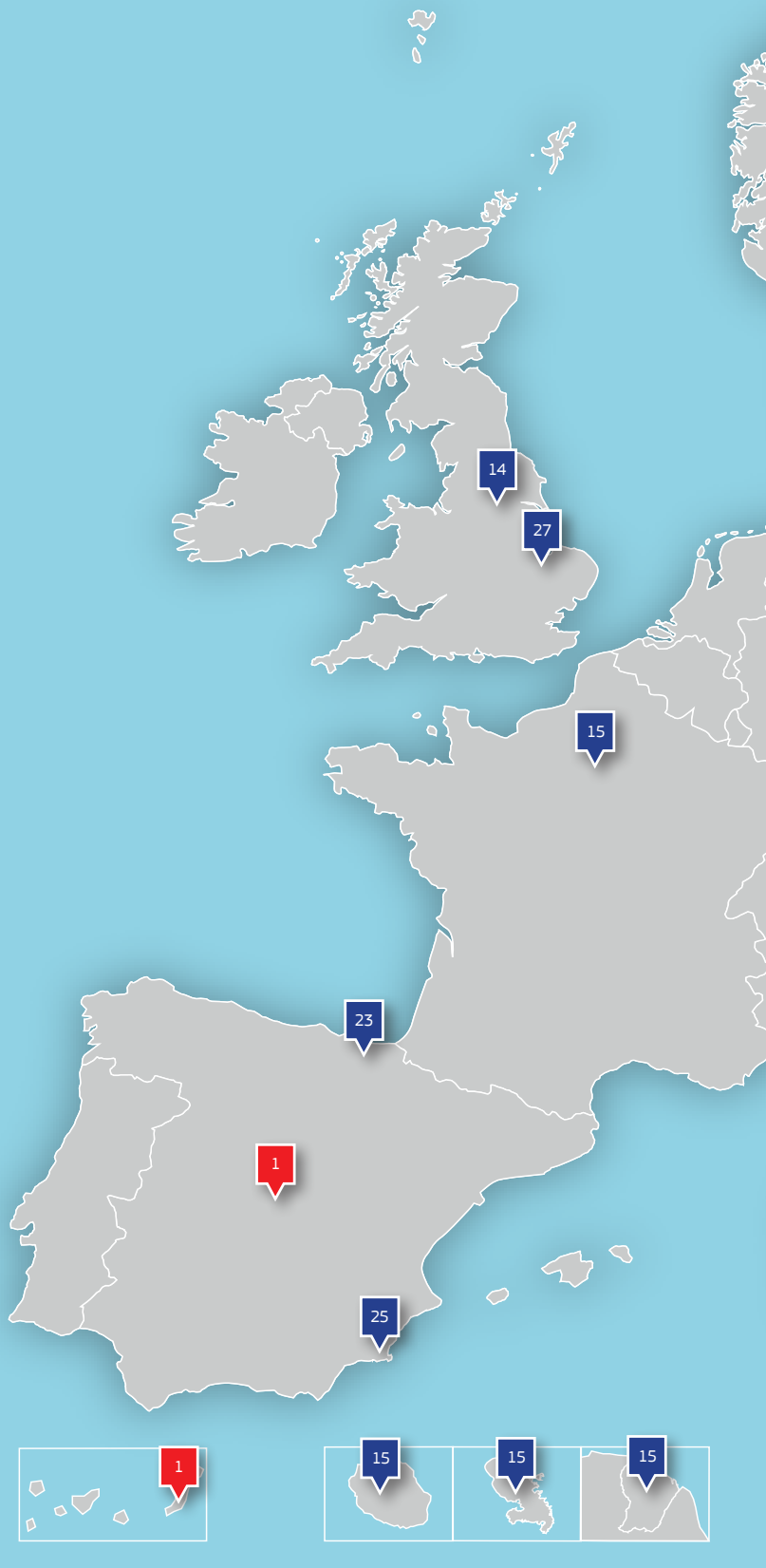
Amongst the many outstanding projects, we identified four of particular note. Three Best projects successfully communicated the importance of land stewardship as a conservation tool (Spain), boosted public awareness of biodiversity loss and its negative impact on freshwater ecosystems (Slovenia) and promoted landscape-scale conservation initiatives and green infrastructure (United Kingdom). The fourth was selected as a Best of the Best project: a far-reaching education campaign about forest biodiversity that included a television series watched by more than 8 million viewers in Poland.

These projects are great examples of the cost-effective contribution to nature conservation that LIFE Information & Communication projects can make.




BEST LIFE NATURE PROJECTS

LIFE NATURE BEST AWARD WINNERS 2015



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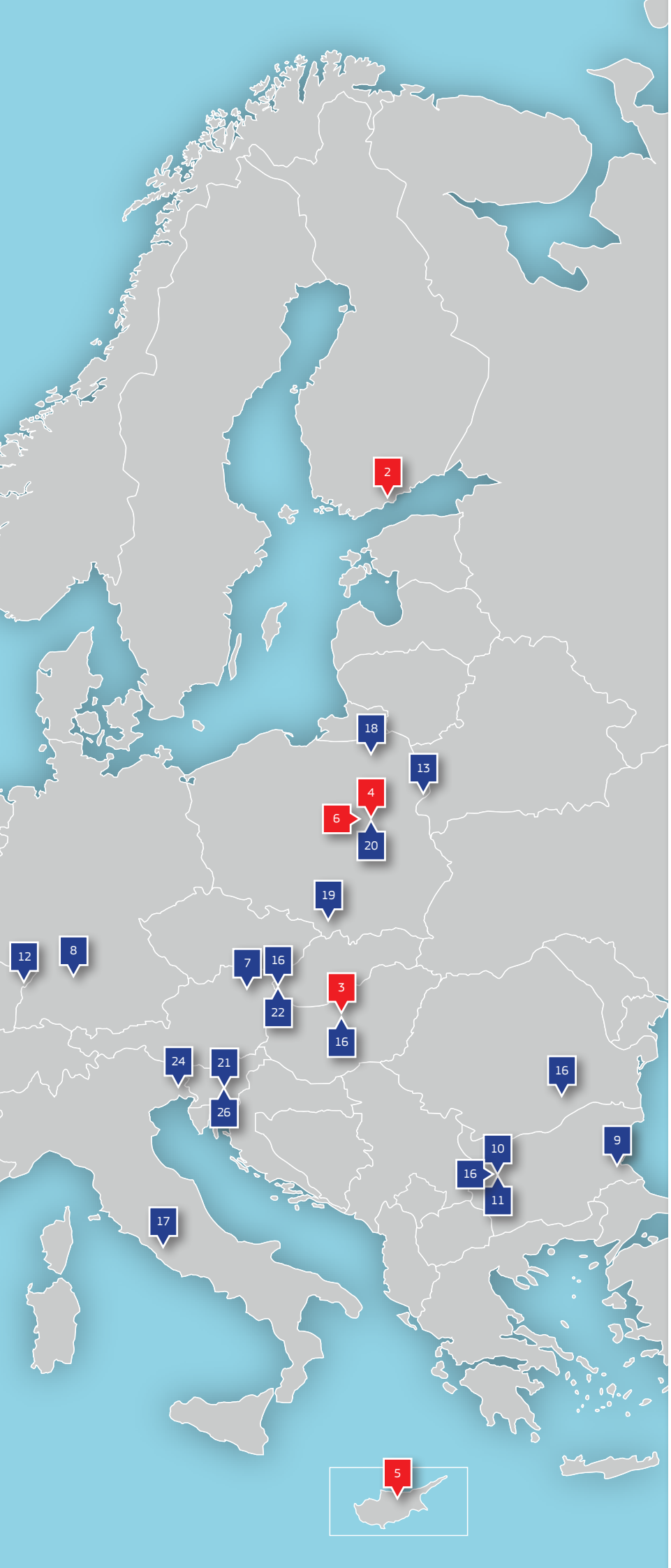

BEST OF THE BEST PROJECTS

1 **LIFE08 NAT/E/000062**
VENENO NO
Action to fight illegal poison use in the natural environment in Spain

2 **LIFE08 NAT/FIN/000596**
Boreal Peatland Life
Restoring the Natura 2000 network of Boreal Peatland Ecosystems "Boreal Peatland Life"

3 **LIFE08 NAT/H/000288**
HUSEEDBANK
Establishment of the Pannon Seed Bank for the long-term ex situ conservation of Hungarian vascular wild plants

4 **LIFE09 NAT/PL/000260**
Biomass use for Aquatic W
Facilitating Aquatic Warbler (Acrocephalus paludicola) habitat management through sustainable systems of biomass use

5 **LIFE10 NAT/CY/000717**
JUNIPERCY
Improving the conservation status of the priority habitat type 9560 (Endemic forests with Juniperus spp.) in Cyprus*

6 **LIFE10 INF/PL/000673**
BEST FOR BIODIVERSITY
Biodiversity Protection in Forest Areas, Including Nature 2000 Areas - Promotion of Best Practices

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Mostviertel- Wachau
Living space in the rivers of Mostviertel- Wachau

8 **LIFE07 NAT/D/000236**
Streuobstwiese Albvorland
Protection of Wild Birds in Traditional Orchards of the Central Swabian Alb Foothills and the Central Valley of the Rems River

9 **LIFE08 NAT/BG/000277**
LIFE FOR THE BOURGAS LAKE
Ensuring Conservation of Priority Bird Species and Coastal Habitats at the Bourgas Natura 2000 Wetland Sites

10 **LIFE08 NAT/BG/000278**
VULTURES' RETURN
Recovery of the Populations of Large European Vultures In Bulgaria

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LIFEAQUILA
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MoorLIFE: Active blanket bog restoration in the South Pennine Moors

15 **LIFE09 NAT/FR/000582**
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17 **LIFE09 NAT/IT/000183**
COORNATA
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18 **LIFE09 NAT/PL/000253**
ochrona bociana białego
Protection of the white stork population in the OSO Natura 2000 Ostoja Warmińska

19 **LIFE09 NAT/PL/000259**
Pustynia Błędowska
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20 **LIFE09 NAT/PL/000263**
Polskie Ostoje Ptaków
Protection of water and marsh birds in five national parks - reconstructing habitats and curbing the influence of invasive species

21 **LIFE09 NAT/SI/000374**
WETMAN
Conservation and management of freshwater wetlands in Slovenia

22 **LIFE09 NAT/SK/000396**
APOMARINA_SK
Conservation of Aquila pomarina in Slovakia

23 **LIFE10 NAT/ES/000579**
SOIL-Montana
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24 **LIFE10 NAT/IT/000239**
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Futurescapes : promoting the development of green infrastructure in 34 priority areas throughout the UK

BEST LIFE PROJECTS

Winners of the Best LIFE Nature awards for 2015

VENENO NO: *"There is general agreement that poison baiting is not the way to go, which wasn't the case at the beginning of the project."*

David De La Bodega

Riparian Habitats in BG: *"This project undoubtedly serves as a model for the successful management of riparian habitats, both in Bulgaria and in the rest of the European Union."*

Katerina Rakovska, WWF-Bulgaria

AWARD CEREMONY ★ 2015

*"**Boreal Peatland Life** will be remembered as a real success story in Finnish nature conservation. And it is the reason why Metsähallitus wants to keep living LIFE."*

Jouni Penttinen (pictured: Mikko Tiira)

LIFE FOR THE BOURGAS LAKES: *"We built permanent connections between local communities, stakeholders and project partners to benefit conservation of the priority bird species and habitats."*

Konstantin Gospodinov

Falco cherrug B-H-R-S: *"The main achievement of the project is that there are 14 breeding pairs of Saker falcons in north-west Romania this year (2016), whereas we found only 1 pair at the beginning of the project."*

József Fidlóczky

WETMAN: *"Thanks to LIFE we were not only able to revitalise six different types of wetlands but we also prepared the groundwork for the future restoration of similar types of wetlands in Slovenia."*

Nika Debeljak Šabec

The LIFE Best Awards

The LIFE Nature Best Awards raise awareness of those projects whose results, if widely applied, could have the most positive impact on the implementation of EU nature and biodiversity policy. The 8th edition of the awards took place during EU Green Week in Brussels in May 2016.

The LIFE Nature Best Awards highlight the important investment in natural capital being made by the LIFE programme and towards implementing the Birds and Habitats Directives, establishing and maintaining the Natura 2000 network, and achieving the EU's Biodiversity Strategy to 2020. The 8th edition of the awards took place during EU Green Week in Brussels in May 2016.

The LIFE programme has funded more than 1 500 Nature and Information projects since 1992, providing 1.8 billion euros in co-funding and mobilising a total of some 3.2 billion euros in favour of nature conservation.

Most LIFE Nature and Biodiversity projects now focus on practical on-the-ground nature restoration, on one or several Natura 2000 network sites, targeting various species and habitats for which these sites were designated.

While all LIFE Nature projects strive to benefit Europe's flora and fauna, some projects merit special attention. Each year the LIFE Nature Best Awards seek to celebrate the most exemplary LIFE Nature and LIFE Information & Communication projects with a nature theme completed by the end of the previous calendar year.

"To show to the world what Europe has been doing…it's not enough just to do it, we have to let others know that it has been done," said Joanna Drake, Deputy Director-General of the European Commission's DG Environment, who presented this year's awards.

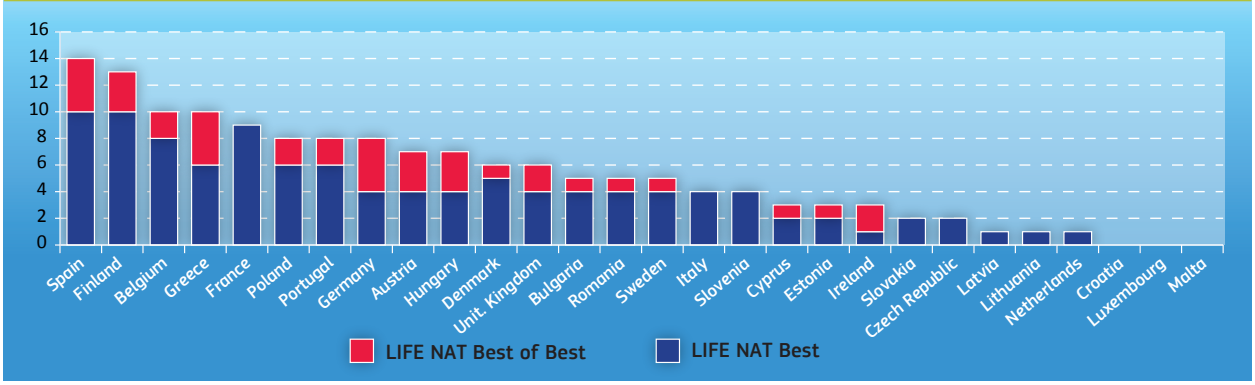
Project selection is based upon scoring of both short-term and long-term benefits. The former include conservation status improvement and short-term leverage effect; the latter: long-term sustainability, leverage effect, and regional/national/international impact.

The 27 winning projects featured in this publication come from 13 different EU Member States and benefit nature in myriad ways. They include actions to restore rivers, coastal habitats, bogs, mountain pastures, forests, traditional orchards, inland dunes and other important and vulnerable habitats and the ecosystem services they provide.

Projects are also helping to maintain or improve the conservation status of a wide range of species; they are helping control and eradicate the threats posed by invasive alien species or poisoning; establishing breeding programmes and seed banks to safeguard the future of the most threatened species; creating networks, publishing guidelines and communicating the benefits of landscape-scale conservation and biodiversity.

From the list of 27 Best projects, the six most outstanding projects completed in 2015 were recognised as Best of the Best LIFE projects at the awards ceremony in Brussels. These projects are featured on pages 8-25.

Fig. 1: **LIFE Nature Best Project winners 2008-2015 by Member State**



N.B. Data includes INF projects with a nature theme since 2013

Photo: LIFE08 NAT/H/000288/Research Centre for Agrobiodiversity

BEST LIFE NATURE PROJECTS

BEST OF THE BEST PROJECTS

Spain: **Building capacity to tackle illegal poisoning of wildlife**

VENENO NO developed effective and innovative methods for tackling illegal wildlife poisoning in Spain. Obtaining criminal convictions, it helped raise awareness of the problems – and the consequences for poisoners of this environmental crime.

Photo: UNIVE Toledo

Agents from UNIVE and Seprona investigate a suspected case of poisoning

Using poison baits in response to real, or perceived, threats to certain rural activities, mainly hunting, livestock farming and agriculture, was once a standard countryside practice in Spain. Although illegal since 1983, the practice persists with, until recently, few prosecutions sought for the poisoning that indiscriminately kills wildlife, including endangered raptor species. The VENENO NO ('no poison') project (**LIFE08 NAT/E/000062**) however, changed this - instigating 24 criminal court proceedings, resulting in 11 guilty judgements. In particular, through design of action plans and protocols for the country's 17 autonomous communities, it acted to implement the national strategy against the illegal use of poisoned bait in the countryside.

The overall objective of this exemplary project was to significantly reduce illegal poisoning incidents affecting protected species in Spain. Species targeted included the Spanish imperial eagle (*Aquila adalberti*), bearded vulture (*Gypaetus barbatus*), red kite (*Milvus milvus*) and Egyptian vulture (*Neophron percnopterus*), all of which of listed as priority for conservation in Annex I of the EU Birds Directive. In particular, the project targeted the use of poison baits, laid to kill predators such as wolves and bears in farming and livestock rearing areas.

The project also established a poisoning investigation unit (see box – UNIVE: A day in the field) and ran 19 training

UNIVE: A day in the field

Angel Pro is in charge of UNIVE's Toledo patrol. An investigation typically starts, he says, when someone, "often a member of public walking or cycling, or a park ranger, discovers a poisoned bird or bait." The samples are then put into bags and secured with tags, each with a unique identification number. These are then sent to one of two fauna recovery centres, where an initial examination is carried out to try to determine cause of death. If poisoning is suspected, "some parts will then be sent on for expert laboratory toxicological report to confirm the cause of death."

"This report is crucial to any legal case," explains David de la Bodega, the LIFE project manager.

With an investigation underway, the officers need to gather as much information, as quickly as possible. They often deliberately arrive together – sweeping down on the investigation scene in their clearly identified UNIVE vehicles and accompanied by the specially-trained dogs. "This helps to make a clear statement that we mean business, and to make people aware that they could be investigated for using poisons," explains Mr Pro, adding that at other times, they may need to operate discreetly, and in these situations they use unmarked cars.

Carefully following the project procedures, they note the exact location of any findings with the GPS equipment, take photos and search the area. They also look for cigarettes, clothing, tyre tracks and footprints, and clear the area of poisoned baits and traps. "The landowner or game manager's car or bags may also be searched, as well as nearby farm buildings," he says. Another area to search will be the municipal rubbish tip, again using the dogs: "we are looking for signs of poison used and, for example the rubber gloves worn to protect hands."

The poisoners may resort to all sorts of ploys to disguise their crimes, for instance, he says: "It may turn out to be a revenge case concerning a land or other dispute, where a deliberately poisoned animal has been placed on a neighbour's land." Another ruse is, "to place poisoned animals, usually birds, next to an electric pylon to try to make the deaths appear due to electrification." Accidental poisonings can also occur as an unintended consequence of pest control activities.

courses showing some 500 officers of seven Spanish regions how to detect and bring wildlife poisoning cases to court. In addition, it analysed all the instances of such poisoning occurring between 2005 and 2010. This study showed that many of the cases involved the use of banned substances, highlighting the need to strengthen controls on the marketing and use of various phytosanitary products and biocides.

Coordinating enforcement

In Spain there are two groups of environmental police: the national Service for the Protection of Nature (SEPRONA) and the environmental enforcement officials of the autonomous communities. "We provided an important coordinator role for the people working for the regions, the law enforcement officials of the regions and the SEPRONA officials. And we also worked with hunters and farmers," says David de la Bodega, the LIFE project manager who is an environmental lawyer with SEO/BirdLife.

VENENO NO worked to increase knowledge about substances used as poison. Notably, it produced two documents, in collaboration with IREC (Spanish institute of game and wildlife research). The first was a comprehensive report of the substances most commonly used in poison baits, which showed aldicarb (banned in 1984) and carbofuran (banned in 2008) to be the most used toxins (72% of cases), indicating the existence of illegal stockpiles. The second was a procedural protocol, for wildlife rescue centres and toxicological laboratories, to deal with cases of illegal poisoning.

In one of the most important cases in Spain, (see, LIFE and new partnerships for nature conservation p. 47-50) a farmer was convicted of laying out poisoned baits that killed at least, 11 red kites as well as other fauna. He was sentenced to two years in prison and ordered to pay monetary compensation of €90 270 plus an additional fine of €28 500 to be used specifically to monitor red kites in the local area.

"One of the main problems with poisonings was the high level of impunity. The legal proceedings and conviction sent

UNIVE's canine unit plays an important role in the fight against wildlife crime

out a clear message that the Spanish authorities would not tolerate such offences," explains Mr de la Bodega.

High-profile case

A case that concluded in October 2015 saw a farmer in Ciudad Real being convicted of laying out nine poisoned baits and of poisoning six Spanish imperial eagles. His crimes were uncovered following an UNIVE investigation. His sentence was 18 months imprisonment and a three-year disqualification from hunting (post release). In addition, monetary compensation of €360 000 was to be paid to the regional government for the estimated value of the six eagles.

For Mr de la Bodega, such cases provide an opportunity to communicate to those involved in poisoning that, "using poison has a cost, (in this case, the highest awarded for such a crime by the Spanish courts) and this acts as a very powerful deterrent."

"It's very apparent that the public is more aware of the problem of poisoning and of the [negative] impact on wildlife, which wasn't the case six years ago," says Carmen Fernandez, SEO/BirdLIFE's press officer. "The media coverage has been [and continues to be] very high, especially at the local level, with extensive coverage in local newspapers, and also radio and television," agrees her colleague, Olimpia García, in charge of project dissemination.

Indeed, a June 2016 report by SEO/Birdlife and WWF [*El veneno en España (1992-2013)*] shows that since 2010 there has been a decrease in the number of wildlife poisoning cases. "When we first started investigating, we had more cases, due to the increased visibility of the problem. Later this trend should start to reverse, which is what we are now observing," says Mr de la Bodega.

Reflecting on the project, he says that, "the reduction of impunity has been one of its main achievements." Also, he notes that, "there is general agreement that poison baiting is not the way to go, which wasn't the case at the beginning of the project."

One of VENENO NO's most notable actions was the creation of UNIVE, the specialist unit within the environmental police in Castilla-La Mancha (central Spain) to investigate poisonings. UNIVE is staffed by six members split into two three-person patrols: one in Toledo; and the other in Ciudad Real – both important hunting areas.

The LIFE project supplied UNIVE and enforcement officers from participating regions with equipment to investigate the illegal use of poison. These include sampling bags and analysing material, thermal (night-vision) viewers, camera traps and GPS digital cameras. The mobile patrols also work with a team of dogs specially trained to sniff out the toxins commonly found in animals and baits poisoned.

A dead vulture

Photo: ARurales-Cataluña

Waiting game

During an investigation UNIVE officers may have to wait around at a suspected crime scene for hours, hoping that the poisoners return to the site - perhaps to check the bait.

If after months of investigation, a case does not go to trial, or at the end the perpetrator receives only a very small fine, "I feel disappointed and frustrated of course", says Mr Pro, adding: "but, we have to carry on, it's our job and also, we can learn from our mistakes and improve. Each case is an opportunity to learn more about the substances used and about the poisoners." On the upside, when they do have a successful prosecution, "I'm pleased not just for us, but for everyone who has worked on the case," he says.

Project number: LIFE08 NAT/E/000062

Title: VENENO NO - Action to fight illegal poison use in the natural environment in Spain

Beneficiary: SEO/BirdLife

Contact: David de la Bodega Zugasti

Email: ddelabodega@seo.org

Website: www.venenono.org

Period: 01-Jan-2010 to 30-Mar-2014

Total budget: €1 672 000

LIFE contribution: €647 000

Finland: **Restoring vital peatland habitats**

The Boreal Peatland Life project blocked and filled drainage ditches on peatland in Natura 2000 network sites across Finland, restoring their hydrology and providing the conditions for habitats and species to recover.

Photo: Metsähallitus/Reijo Hokkanen

Filling a drainage ditch to restore the hydrology of boreal peatlands

Peatlands play an important role in conserving biodiversity and they provide ecosystem services, supporting many specialised species and unique habitats. These ecosystem services include acting as highly-efficient carbon sinks and retaining water. Finland is home to most of the EU's boreal peatlands. However, ecological degradation, habitat destruction and a lack of social appreciation threaten the peatlands within its Natura 2000 network. According to the most recent Article 17 Habitats Directive reporting, the majority of Finland's peatland habitats (mires and bogs) listed in Annex I of the directive have an 'unfavourable' conservation status.

The main culprit behind the ecological degradation of the country's peatland habitats is drainage, with drainage for forestry affecting almost two-thirds of the original peatland area. The most intensive habitat degradation has occurred in southern and central Finland, where only 25% of all peatlands remain intact. A large portion of this 25% is still negatively affected by drainage.

Draining peatland - by digging ditches in the land - alters the water table level, the flow path of water, the accumulation of peat, the acidity and the nutrients present, thus affecting the habitats and species supported by the land. In drained peatlands, flood water and rainwater drain quickly along ditches into water bodies downstream. As the land dries out, typical peatland vegetation declines and forest takes over; peatland species disappear and are replaced by common forest species. Meanwhile, as the dried-out peat

starts to decompose, the carbon stored within it is released into the atmosphere as carbon dioxide, thus contributing to climate change.

The Boreal Peatland Life project (**LIFE08 NAT/FIN/000596**) aimed to improve the habitat conservation status of 51 Natura 2000 network sites in the Finnish peatland network. The goal was to select a project area within each site and focus on enhancing the priority habitats listed in Annex I of the Habitats Directive. The three most abundant were aapa mires, bog woodlands and active raised bogs, representing over three-quarters of the 7 705 ha total project area.

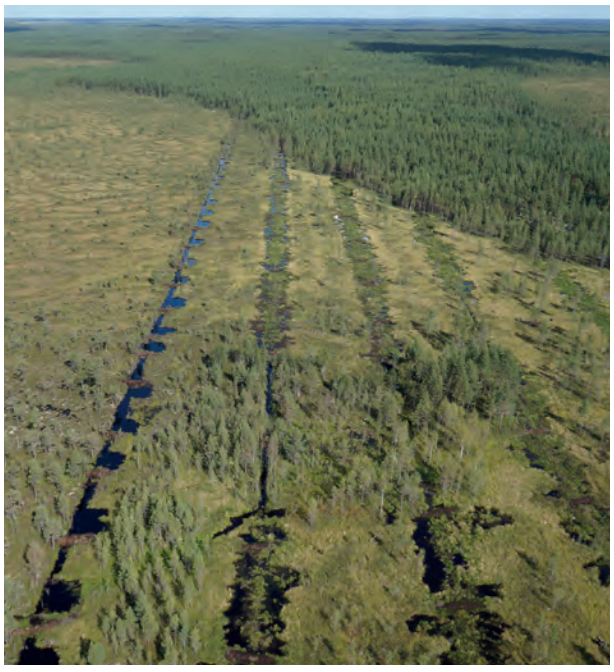
Restoration and conservation

The beneficiary, Metsähallitus Parks & Wildlife Finland, drew up 35 restoration plans, having already completed around 20 ahead of the project. Work to restore the peatlands was then carried out in 51 protected areas across Finland. Improving the condition of drained peatlands involves rewetting the land. Hence ditches are blocked and waters channelled to their original routes. Excessive tree cover is cut down and taken away from the site to decrease plant transpiration and to restore the original openness of the landscape. Restored peatlands retain rainwater and water from melting snow for longer. Consequently, the water level rises and peatland vegetation and species dependent upon it begin to recover. As the land becomes wetter, peat formation is restored and the peatland stores carbon again.

The Boreal Peatland Life project filled and dammed almost 1.2 million metres of drainage ditches at the 51 sites, thus restoring the hydrology on 4 790 ha, an area some 20% larger than foreseen. Blocking the ditches was generally managed using an excavator, unless the ground was too soft and/or the habitats too sensitive, in which case the work was done by hand. Where large amounts of water were flowing in the ditches, or the peatland was steeply sloped, dams were reinforced with geotextile and wooden supports in order to prevent drainage.

The restored Kauhaneva site seen from the air

Photo: Metsähallitus/Jari Ilmonen



Other conservation and restoration measures included removing trees at 46 sites covering a total area of 3 313 ha (exceeding the original objective of 3 143 ha). This comprised tree cutting on 1 295 ha and clearing of ditch lines on 2 018 ha. The bulk of the felled trees (around 900 truckloads) were sold, generating around €2 million that could be reinvested in nature conservation

“With the aid of this timber income, we were able to do more with the project than was originally anticipated,” explains project manager, Jouni Penttinen. For example, dead wood was created at six sites in an area of just over 100 ha, exceeding the target of 61 ha. This was accomplished by felling 10-30 trees per hectare, located on mineral soil in forest patches within the peatlands. “The goal was to create dead wood because in Finland there are some 4 000-to-5 000 species that need it, such as saproxylic beetles and polypore fungi,” he explains.

In addition, the project removed 3.59 km of forest roads at three sites, when the original target was 2.1 km of roads at two sites and it acquired for nature conservation nearly 600 ha of peatlands in six Natura 2000 network sites in central and eastern Finland. According to Mr Penttinen, “this land was already part of the Natura 2000 network but not classed as protected under Finnish law as compensation had not been paid to the landowners and the necessary restrictions on land use had not been designated.” Metsähallitus Parks & Wildlife Finland also drew up management plans for three sites: “these were sites with significant recreational use or other land use pressures but no management plans.”

Spreading information

Boreal Peatland Life used a range of methods to raise awareness of the diversity and value of peatlands, disseminating information about their flora and fauna, protection and restoration to a variety of audiences.

Peatland tours were organised for over 500 people with visual or physical disabilities and more than 3 500 schoolchildren. A portable mire exhibition for children was also created and continued to tour Finland in 2016. Online materials included a quiz on peatland issues aimed at schoolchildren

and a series of YouTube videos that provide information about the project as well as the history and current state of Finnish peatlands

For a more specialised audience, the project produced guidelines on restoring drained peatlands, comprising a handbook in Finnish targeted at restoration experts in Finland and a shorter version in English for use by interested parties in other countries. Both are available to download from the project's website, enabling its methods and results to be replicated elsewhere. Several restoration courses were also organised which attracted 380 participants; some were aimed at restoration experts and the others at forestry workers.

Peatlands recovering

The Boreal Peatland Life project was highly successful, exceeding many of its objectives. Metsähallitus Parks & Wildlife Finland's experience of carrying out restoration measures in a cost-efficient way was key to this success. "We have been restoring peatlands since the end of the 1980s," confirms Mr Penttinen. Monitoring of the restored sites has shown the project's positive impact on vegetation, hydrology (water table level and water quality), butterflies, dragonflies, the golden plover (*Pluvialis apricaria*) and rich fens. Natural habitats have already begun to recover as a result of the restoration work and the flora and fauna are expected to continue improving in the project sites.

Monitoring of the water table level is carried out using automatic water level loggers at 46 sites. Water quality is measured by analysing samples taken from the same sites, "mainly to get information on how restoration actions affect the water quality in lakes and rivers downstream", according to Mr Penttinen. The vegetation, birds, butterflies and dragonflies are also observed to track their changes over time. "Our goal is to continue the hydrological monitoring for at least 10 years," says the project manager. "It takes some time for the peat and vegetation to settle after excavation," he adds, and for water levels to stabilise.

Typical mosses of boreal peatlands

Photo: Metsähallitus/Maarit Similä

Photo: Metsähallitus/Mikko Tiira

Filming a TV documentary about the project's restoration work

The monitoring to date has revealed that peatland habitats start recovering immediately after restoration, with the growth of Sphagnum mosses increasing within a few years as the water level rises. Pioneer plant species, such as hare's-tail cottongrass (*Eriophorum vaginatum*) and white sedge (*Carex canescens*), rapidly exploit the peat surfaces of blocked ditches. Following restoration, the assemblage of peatland butterfly species begins to recover gradually, whilst dragonfly species do so within three years. Restoration also triggers the recovery process that re-establishes a habitat favourable for peatland bird species.

On top of its restoration and educational work, Boreal Peatland Life has helped to implement policy. It has made a significant contribution to implementing the EU Biodiversity Strategy to 2020 in Finland, especially the target of restoring at least 15% of degraded ecosystems. The project has also facilitated the Boreal Natura 2000 Biogeographical Process - being led by Finland - with its experiences and results shared among the participants of workshops and seminars from the EU's boreal region, including Sweden, Estonia, Latvia and Lithuania.

"Boreal Peatland Life will be remembered as a real success story in Finnish nature conservation. And it is the reason why Metsähallitus wants to keep living LIFE," concludes Mr Penttinen.

Project number: LIFE08 NAT/FIN/000596

Title: Boreal Peatland Life - Restoring the Natura 2000 network of Boreal Peatland Ecosystems

Beneficiary: Metsähallitus

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Period: 01-Jan-2010 to 31-Dec-2014

Total budget: €6 727 000

LIFE contribution: €3 363 000

Hungary: **Establishing a seedbank for the long-term conservation of wild plants**

The HUSEEDBANK project created a seedbank for the long-term conservation of Hungary's wild vascular plants. Seeds from around half the country's native flora were collected and stored. As well as storing seeds from around half the country's native flora, the project carried out trials designed to assess future habitat restoration potential.

The Pannon Seedbank is a resource for re-establishing populations of native wild vascular plants and restoring degraded habitats in Hungary. This vital resource was created with the support of the LIFE programme in a project led by the Centre for Plant Diversity in Tápiószele, in cooperation with two partners, the Institute of Ecology and Botany of the Hungarian Academy of Sciences and the Aggtelek National Park Directorate.

"The Centre was selected as the site for the Pannon Seedbank because of its long experience of storing and processing cultivated plant seed," says project manager Erzsébet Peti. She explains that although wild plant seed collections existed in Hungary before the LIFE project, they were not stored under cooled conditions. The project team therefore adopted modern gene bank technology for wild plants for the first time in Hungary.

The main goal of the LIFE Nature project HUSEEDBANK (**LIFE08 NAT/H/000288**) was to collect and store approximately 50% of the Hungarian native wild vascular flora. This involved compiling a list of species to collect. "In Hungary there are around 2 200 wild vascular plant species; nearly 1 800 of them suitable for long-term cold storage," explains Ms Peti. "We made priorities, focusing on species with nature conservation importance, indicator species or species of protected habitats, and crop wild relatives." The project then established and trained a network of seed collectors, and produced a seed collecting manual. "At first we worked with many professional and amateur botanists, as we had a wide range of species to collect, but by the end we needed specialists." Seeds were collected from the whole territory of Hungary, including from 9 of the 10 national parks. By the end of the project, seeds from 910 species had been stored.

Photo: Research Centre for Agrobiodiversity

Germinating seeds

Processing seeds

After collection, seed samples were first documented and checked at the Institute of Ecology and Botany, and then sent to the seedbank in Tápiószele. A team of four worked in the laboratory there processing seed samples. "The first step was taxonomic identification, which was a difficult part of the project," says Ms Peti. "We photo-documented seeds of most species collected during the project, and our plan is to produce a Hungarian seed atlas." After identification, the seeds were cleaned and weighed. Although the principles derive from cultivated plants, special equipment was acquired for the much smaller wild plant seed. For instance,

a seed-blowing machine helped separate small seeds from other material, although the time-consuming cleaning process is still mainly done by hand.

In a room off the laboratory, sub-samples of collected seed undergo 30-day germination tests in Petri dishes on a Jacobsen table, or in controlled-condition incubators, to confirm viability. Germination rates are lower and more variable than for cultivated seed, so modified protocols were devised. “Germination was one of the most difficult processes, because we did not have enough information for wild flower species. One of the most interesting parts of the project was finding the most appropriate germination methods,” says Ms Peti. For example, breaking seed dormancy could involve piercing the seed coat, simulating a cold snap (stratification), or changing the light-dark cycle.

The seed was dried for a month in a moisture-controlled cabinet. Dried seed was then sealed in foil bags using another machine, purchased with LIFE funds, which stamped the bags with identification information. These were taken along a corridor to the freezer rooms. “There are two cabinets, the base collection is stored at -20°C and the active one at 0°C,” explains Ms Peti. “In the base storage cabinet, seeds remain viable for hundreds of years. In active storage, seeds remain viable for 20 to 30 years and this material can be used for habitat restoration purposes.”

Long-term storage

Nearly 60% of the seed material collected is put into long-term base storage, at the Pannon Seedbank and in duplicate at an abandoned mine tunnel in Esztramos Hill, Aggtelek National Park. The Park already had some of the necessary infrastructure, because the mine is adjacent to a show cave. Daniel Swartz, marketing assistant for the park, says, “there are 280 natural caves on the Hungarian side of this Hungarian-Slovakian limestone karst area, of which six are open for tourism. One is under this hill, called the Rákóczi Cave, with beautiful underground turquoise lakes.”

Dianthus serotinus, a characteristic sand steppe plant grown from seed in trials at the reintroduction site near Fülöpházi

Photo: NEEMO EEIG/Stephen Nottingham

Photo: NEEMO EEIG/Stephen Nottingham

Katalin Török of the Institute of Ecology and Botany shows one of the reintroduction sites

Judit Galiczáné, the tour and project exhibition guide in the park leads a tour along 150 m of narrow mine tunnel to a chamber where the gleaming wild plant cold-storage cabinet is positioned (with a similar one for cultivated plants nearby). “The Pannon Seedbank established the cabinet here four years ago,” says Ms Peti. She recalls how after permission was obtained from the mining authority, the ground was prepared and the generator, electricity and cooling systems installed. The cabinet was designed by a specialist and built from separate panels, which were assembled down the mine.

Botanist Viktor Virók was one of two seed collectors in Aggtelek national park, who collected seeds from the karst area’s distinctive flora. This included a number of flowering plant species that are endemic to the area. The plants that he studies are among those now secure in the cabinet under the hill, as insurance against species extinction and environmental disaster.

Habitat restoration

The active collection is held both at the Pannon Seedbank and in Vácrátót, where the Institute of Ecology and Botany and the National Botanical Garden are located. During the project, seeds collected and stored according to the seedbank protocol were sown in reintroduction experiments in the Kiskunság National Park, on abandoned farmland adjacent to two target habitats of the EU Habitats Directive:

the Pannonic inland sand dune thickets; and the Pannonic sand steppes.

"This is the reintroduction area. We had six replicate sites, with ten seedling treatments at each site. The numbers refer to the seeding year and the year of seed collection. So the idea was to check whether seedbank storage influences seed germination," says Katalin Török of the Institute of Ecology and Botany. The first task was to remove exotic invasive alien species, especially milkweed (*Asclepias syriaca*), from the experimental plots, which were then sown with lines of stored and non-stored seed of ten selected species characteristic of sand steppes, over a four-year period.

"The results have shown that we are able to reintroduce the target species. During the four years we had only one year when the weather was good for the seedlings (2013), but the other years were successful, more or less. The year of sowing had a bigger effect on success than the treatment of the seeds in the seedbank," says Dr Török. "The seeds do not lose their capacity to germinate so much, but it is important to have the right amount of precipitation at the right time." In the most successful plots, vigorous lines of the sown grass *Festuca vaginata*, and clumps of the fragrant white-flowering *Dianthus serotinus*, yellow-flowering *Onosma arenaria*, and other vascular plant species have started to make this part of the abandoned field resemble the reference plot in the protected sand steppe nearby.

The plots are being monitored for five years after the end of the project. "Ideally, to restore habitat after seeding, we need to implement management practices, such as late mowing that is not too close to ground," says Dr Török.

Back at the Pannon Seedbank, further species are being collected, processed and stored. "We have started a new germination experiment with stored material. During the project we collected much laboratory information on seed germination, so we are now confirming this in the field,

Photo: Research Centre for Agrobiodiversity

Reference seed samples

because it is important to know if the seeds can be used for nature conservation purposes," adds Ms Peti. To this end, seed from nearly 60 species are currently being grown around the Centre for Plant Diversity site.

Raising awareness

Education was an important part of the project, which established three exhibitions about Hungary's plant biodiversity and the role of the Pannon Seedbank: in Tápiószele, at the National Botanical Garden in Vácrátót, and in a beautifully-restored Esterházy-era barn in the village of Bódvaszilas in Aggtelek national park. All these exhibitions have a focus on interactive displays for children.

"About 4 700 visitors have seen the permanent 'From Seed to Seed' exhibition at the Pannon Seedbank," says Pèter Rèdei Pomázi, who conducts tours in Tápiószele. "Many of the displays are mobile and have been taken to events, while the three exhibition spaces will continue to be visited for many years. "I think the LIFE-funded exhibition was a huge thing in the Centre's history," adds Ms Peti, "because it was established over 50 years ago but not many local people knew about the gene bank activities."

Packaged samples at the seedbank

Photo: Research Centre for Agrobiodiversity

Project number: LIFE08 NAT/H/000288

Title: HUSEEDBANK - Establishment of the Pannon Seed Bank for the long-term ex situ conservation of Hungarian vascular wild plants

Beneficiary: Research Centre for Agrobiodiversity

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Period: 01-Jan-2010 to 31-Dec-2014

Total budget: €969 000

LIFE contribution: €402 000

Poland: **Harnessing biomass for bird conservation**

A Polish LIFE project linked the production of biomass pellets with the large-scale mechanised management of aquatic warbler habitat thus creating a fourfold increase in an area of fen mires favourable to the species, as well as creating permanent and seasonal employment.

Photo: Zymantas Morkvenas

Aquatic warbler (Acrocephalus paludicola)

The aquatic warbler (*Acrocephalus paludicola*) is Europe's rarest migratory songbird and a globally threatened species (listed as 'vulnerable' by the IUCN and included in Annex I of the Birds Directive). The EU population is categorised as 'threatened' according to the most recent reporting under Article 12 of the Birds Directive. Some 20% of the world's aquatic warbler population breeds in Poland, principally at sites in the Biebrza marshes in Podlaskie, as well as at locations in Lublin, with a smaller population found in Pomerania, on the Poland/Germany border (see box – The aquatic warbler).

Once widespread and numerous on fen mires and wet meadows, the aquatic warbler has suffered from habitat loss and degradation. With its habitats now dependent on human land-use and extremely susceptible to land-use changes, it is effectively a conservation-dependent species.

Jarosław Krogulec, head of conservation of the Polish society for the protection of birds (OTOP), has been involved in aquatic warbler research and monitoring for 20 years. He recalls working in the fen mires of Lublin in the 1990s, "at that time the aquatic warbler was not even recorded in that area, it was only known in Biebrza."

The 60 000 ha of fen mires in the Biebrza marshes still include some remote fragments that naturally regulate themselves. However, the vast majority, "would quickly be overgrown if the mires were left to their own devices because of a very low water level and eutrophication due to nitrogen influx," explains Mr Krogulec. "Management is necessary."

Fen mire management traditionally involved hand scything of sedges and reeds to make hay. As these practices fell out of favour, large areas of fens were abandoned and started to become overgrown by bushes and trees in the 1970s, 80s and 90s," says Mr Krogulec. "In the 1990s, we noted that there was already very strong succession in parts of Biebrza Valley."

When Poland entered the EU in 2004, its first agri-environmental scheme included payments for hand scything, but although these were generous, the nature of the work meant there was "very low uptake," recalls Mr Krogulec.

Off-piste conservation

Around the same time, a potential solution came from an unexpected source. In the early 2000s, nature conservationists realised that, with some minor modifications, they could turn so-called piste-bashers, the caterpillar track vehicles that are used to groom snow on ski runs, into mowing machines capable of entering even the most difficult fens.

Based on the ideas and experiences of the BirdLife aquatic warbler conservation team, OTOP decided to test this 'ratrak' mowing technology on the Biebrza marshes as part of a 2005 LIFE project. The Aquatic Warbler project (**LIFE05 NAT/PL/000101**) also focused on the protection of the remnant Pomeranian population of the species. "Within the project we collaborated with the Ministry of the Environment to design proper agri-environmental schemes," says Mr Krogulec. "We prepared recommendations for different packages for ground-nesting meadow birds, including the aquatic warbler. These were included in the official Ministry of Agriculture agri-environmental scheme for the following programming period."

This first project, a Best LIFE Nature project 2013, proved that with the machinery and the financial incentives, large areas of fens mires could be made suitable for aquatic warblers to breed. "We removed shrubs, mowed and established recurrent management within agri-environmental schemes," says Mr Krogulec.

Jaroslav Krogulec in front of mown biomass at the OTOPellet plant

Photo: NEEMO EEIG/Justin Toland

Photo: Jaroslaw Krogulec

Mowing is essential to maintaining marsh habitat in a favourable status for the aquatic warbler

Reusing waste biomass

One of the issues that arose from the initial LIFE project was what to do with all the biomass generated by the habitat management. The hard sedges, shrubs, twigs and trees were unsuitable for cattle fodder or bedding. OTOP carried out a feasibility study which looked at three alternatives: composting, processing into biogas, or processing into different heating substrates (whole bales, briquettes or pellets).

Biomass use for Aquatic W (**LIFE09 NAT/PL/000260**), set out to expand on the success of the previous LIFE Aquatic Warbler project. As well as increasing the area under conservation management, it would build a plant to convert the biomass into solid fuel. The initial proposal was for a briquette factory, but when the beneficiary realised biomass pellets were a better option for the Polish market, the European Commission agreed to an amendment allowing it to instead build a pelleting facility.

Opened in 2013, OTOPellet is the first pelleting factory established by a bird conservation organisation in Europe. With a permanent, full-time manager, the plant at Trzcianne in the Biebrza Valley employs a further five people to transport and process the biomass on a seasonal basis. In 2015, it converted 1 800-2 000 tonnes of biomass into pellets with a calorific value of 15.8 MJ per kg (slightly higher than straw pellets, but a little lower than wood pellets). "What is important is it is cheaper than wood pellets. It is also much cheaper to collect the material," says Mr Krogulec. The fen mire pellets are used by a power station 100 km away in Ostrołęka, and also sold in 15 kg sacks for domestic pellet boilers. Uncertainty about tariffs for renewables in the Polish energy market has led OTOPellet to explore other commercial

The aquatic warbler

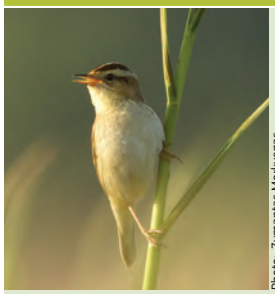

Photo: Zymantas Morkvenas

The aquatic warbler has an estimated global population of some 17 000 pairs. The species has very specific habitat requirements, being found only on fen mires or wet meadows on peaty soil covered by sedges. The water level must be above ground, but not by more than 10-15 cm, to avoid flooding the nest. Aquatic warblers do not form pairs; both sexes mate with a large number of partners – one brood may have up to five fathers. While the male spends the entire breeding season attempting to attract females with his evening song, the female raises the young alone. This makes the quality of habitat vital, since survival is dependent upon availability of an exceptional quantity of insects. "It feeds on large insects - mainly caterpillars, dragonflies, all types of insects. It needs good prey that can be delivered by a lone parent," says Mr Krogulec.

This migratory songbird mainly breeds at sites in Belarus (more than 10 000 pairs), Poland and Ukraine. There is a small breeding population in German Pomerania and a very small population (10-50 pairs) in western Siberia, Russia. "It's a very mysterious population - it's very far away; we don't know anything about the connectivity with the European population at all," explains Mr Krogulec.

The aquatic warbler winters in West Africa, at the delta of the Senegal River and at the Inner Niger Delta in Mali. "This is a Sahel zone, so drought is a threat. There are also human-induced threats such as development and conversion of wetlands to rice fields," says Mr Krogulec.

He believes that aquatic warbler conservation, "is a really good example of best practice, where the species is protected on nearly all sites within its whole range: starting from breeding sites in EU and non-EU countries (also sometimes with EU support - one of the projects in Belarus is within the Clima East programme); there have been several LIFE projects at stopover grounds in France, at least two LIFE projects in Spain; and now there are initiatives in West Africa, and in future in North Africa. It's a good example of how to save a really endangered species on breeding sites, stopover sites and wintering sites."

uses for the pellets, including as cat litter and food for pet rodents.

In addition to establishing its own pelleting facility for biomass from Biebrza Valley, the LIFE project established a partnership with two pelleting plants for material mown on aquatic warbler habitat in the Lublin region. In Pomerania, where volumes are lower, the biomass is used as fodder and bedding for animals and also to thatch roofs; when large-scale mowing next takes place in the region, OTOP plans to sell bales to a biomass combined heat and power (CHP) plant across the border in Germany.

More aquatic warblers

By successfully linking the production of biomass as a renewable energy source with the large-scale mechanised management of aquatic warbler habitat, the Biomass use for Aquatic W project has succeeded in enlarging the area covered by recurring land management favourable to the species from 1 551 ha to 6 344 ha. Furthermore, the area now occupied by aquatic warblers has increased on priority project areas by 7.71% (from 3 602 ha to 3 879 ha), with a 26% rise in population recorded from 2009 and 2014 (an increase of some 575 singing males in total).

"The first LIFE project stabilised numbers, and during the second LIFE project the population increased," notes Mr Krogulec. "By protecting fen mires for aquatic warblers, you also project other fen mire species, birds, animals and plants. The aquatic warbler serves as an umbrella species for such mires," he adds.

The project showed it was possible to adjust the management techniques and incentives for various aquatic warbler habitats – from mesotrophic mires and Cladium rushes to river floodplains. For instance, the number of singing males at Chełm calcareous marshes, a 2 000 ha site in Lublin, increased from 96 in 2011 to 252 in 2014. "This project is replicable. The methods used are also used in other aquatic warbler or fen mire areas: in Lithuania within a LIFE project (**LIFE09 NAT/LT/000233**) there were very good results, the population increased; and now it's used also in Belarus," says Mr Krogulec.

Project number: LIFE09 NAT/PL/000260

Title: Biomass use for Aquatic W - Facilitating Aquatic Warbler (Acrocephalus paludicola) habitat management through sustainable systems of biomass use

Beneficiary: Ogólnopolskie Towarzystwo Ochrony Ptaków (OTOP)

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Period: 01-Sept-2010 to 31-Mar-2015

Total budget: €2 731 000

LIFE contribution: €2 040 000<

Cyprus: **Restoring priority juniper habitats**

A LIFE project in Cyprus demonstrated a range of new conservation measures for juniper habitats that facilitate regeneration and protect planted saplings.

Juniper is a coniferous evergreen aromatic tree or shrub distinguishable by its berries. In the EU some areas dominated by Juniperus spp. establish medium altitude forest formations. These endemic forest habitats with *Juniperus* spp. are listed as a priority for conservation in Annex I of the Habitats Directive. In the Mediterranean biogeographical region this habitat has an 'unfavourable-bad' conservation status. It requires protection from threats such as forest fires, fragmentation and climate change.

In Cyprus, the juniper forest habitat occurs in four subtypes, according to the dominant *Juniperus* species. At lower altitudes, along the coastline of the Akamas peninsula, the habitat is dominated by the Phoenician juniper (*Juniperus phoenicea*) In the Troodos National Forest Park, the habitat is mainly formed by stinking juniper (*Juniperus foetidissima*) and to a lesser extent by prickly juniper (*Juniperus oxycedrus*), while in the area of Madari - Papoutsa Grecian juniper (*Juniperus excelsa*) woods are found.

The LIFE project JUNIPERCY (**LIFE10 NAT/CY/000717**) was the first project to have targeted this habitat in the island and focused on the three aforementioned Natura 2000 network sites. Cyprus is the southernmost limit of the habitat's distribution range in Europe. The habitats here have been particularly affected by overgrazing, fragmentation through forest fires, the dumping of rubbish and the spreading of dust created by vehicles on roads, especially four-wheel leisure buggies. Saplings are also vulnerable to trampling, off-road driving and skiing. Poor regeneration and competition from other vegetation including invasive alien species were other factors behind the setting up of the conservation project.

The JUNIPERCY project targeted juniper habitats in Cyprus such as this one

JUNIPERCY aimed to build on the knowledge gained from previous LIFE projects in Cyprus and the Mediterranean region, carrying out preparatory actions to further understanding of the pressures on the habitat type and just how they affect it. The detailed mapping of the habitat at the target sites showed that its range was almost three times that of previous estimates. For example, the targeted habitat type with *Juniperus foetidissima* that was believed to cover an area of 96.3 ha (87.3 ha pure stands and 8.9 ha mixed with other habitat types, i.e. black pine forest) was in fact shown to cover 263.4 ha (70.6 ha pure and 192.8 ha mixed). Furthermore, one hectare of *Juniperus oxycedrus* mixed with Calabrian pine (*Pinus brutia*) was found in Troodos National Forest Park. The new habitat area was used to update and revise the existing Standard Data Forms for the three Natura 2000 network sites.

Applying this inventory data, the beneficiary, the Department of Forests of the Ministry of Agriculture Rural Development and Environment, drew up a programme of conservation measures to address the main natural and anthropogenic pressures. Given that many of these measures were being tested and evaluated for the first time in Cyprus, the project would also play a useful demonstration role.

Additional preparation focused on the attitudes and practices of the local population which were canvassed in a questionnaire and through the holding of workshops. The views of visitors and hunters were also gathered to get a clearer picture of perceptions of the habitat and its protection ahead of attempting to alleviate pressures on it.

Action and assessment

While different measures were applied in different areas according to need, some common practices were carried out at the sites: the planting of saplings, the implementation of irrigation systems and protection through fencing off the plants or by erecting barriers to vehicles. Other typical measures included the clearing of competitive vegetation, the removal of dried biomass and the construction of firebreaks to prevent the spread of forest fires. In fact, one area in the Madari – Papoutsa Natura 2000 network site was still affected by a 1993 forest fire. The habitat here, composed of the Grecian subtype, must withstand the rocky conditions. Nevertheless, the new saplings require special protection to ensure that they establish deep roots. “After around five years of tending the plants, you no longer need to worry about them; they may grow slowly due to the harsh conditions of the site but they won’t go dry [and die],” says Dinos Dimitrakopoulos, a forester and independent contractor on the project.

Stinking juniper (Juniperus foetidissima)

A member of the project team collects Grecian juniper (Juniperus excelsa) fruits

A pipe was positioned on the south-facing slope that is able to irrigate the plants through the action of gravity. The project team also erected some nets to protect individual plants from potentially harmful summer solar radiation, and the impact of this additional measure is being monitored. “It is too soon to draw conclusions, but it does seem the shading nets have a beneficial effect on the saplings,” explains Mr Dimitrakopoulos.

Another key conservation measure carried out here and elsewhere on the island was the maintenance of fire breaks, which also serve as forest roads providing access to fire engines, both as a way of watering saplings and dowsing

fires. Though the annual growth of the plants in this area is small - around 1 cm a year, in line with what is expected for the Grecian juniper growing in such conditions - the project team is pleased with the results. "A 70% success rate in this area with constant unprotected exposure to the sun and local winds is a pretty good result."

At the Troodos National Forest Park, the project planted other species to restore the habitat. "You plant these accompanying species [such as wild strawberry tree or golden oak] with the junipers in order to create a more representative colony of plants," explains Charalambos Christodoulou of the Department of Forests of Cyprus. Here, habitat management also included the removal of competing vegetation and the non-native black locust tree (*Robinia pseudoacacia*). Around 246 metres of soft fencing was used to protect trees from being damaged by trampling. It was furthermore necessary to protect the landscape from erosion, especially on steep slopes, and small-scale relief modifications were made around juniper trees. "This allows water to accumulate so you have deeper water penetration," adds Mr Christodoulou.

Water tanks and seed banks

A very specific measure was taken in support of the habitat in the Akamas peninsula. Two giant water tanks capable of holding 90 tonnes of water were installed: one at Lara bay and one at Smigies picnic area. Pipes from the tanks help irrigate the land and boost the survival rate of the Phoenician juniper, while in the same time they serve as a fire protection measure by providing water to fire engines in case of emergency. Here, a total of 910 juniper plants and 25 accompanying species were planted and protected by three chain-link fences. The plantations are thus safe from grazing goats, which are a constant threat in the area. As with the other sites, the saplings used were grown at the nurseries of the project beneficiary. A particular challenge for juniper habitat conservation is the regeneration success rate. "It takes up to 18 months for seeds to germinate, so you have to plan carefully to make sure that you have the number of plants that you need," explains Mr Christodoulou.

A major milestone made possible by this LIFE project funding, was the creation of Cyprus's first seed bank for forest species. The Department of Forests purchased two freezing chambers where it can store seeds, a resource that will ensure the continued legacy of the project as well as providing support for future conservation initiatives. The conservation work is further facilitated by a drying chamber and a seed blower which separates the seed from the shell. The project was thus able to establish protocols for storage, germination, growth and planting. The seed bank established by the project will serve as a conservation means for all juniper species as well as other endemic, rare and endangered species of the island.

Consulting information boards installed by the project in the Troodos National Forest Park

Reducing tourist pressures

Given that two of the three Natura 2000 network sites are popular tourist spots, a final aspect of the project was awareness raising and the spreading of information. Display panels were erected not only to inform visitors of the project actions but also to alert them of the risk of forest fires and the need to restrict access to sensitive areas. Fire prevention measures are helping safeguard the juniper habitat, while new rubbish bins are keeping it litter free.

Project number: LIFE10 NAT/CY/000717

Title: JUNIPERCY - Improving the conservation status of the priority habitat type 9560* (Endemic forests with *Juniperus* spp.) in Cyprus

Beneficiary: Department of Forests, Ministry of Agriculture, Natural Resources and Environment

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Period: 01-Jan-2012 to 30-Jun-2015

Total budget: €1 184 000

LIFE contribution: €886 000

Poland: **Introducing ancient forests to an audience of millions**

The BEST FOR BIODIVERSITY project increased awareness among Polish citizens about nature conservation and the Natura 2000 network, and helped to identify good practices for biodiversity protection in forest areas.

Photo: C. Korkosz

White-tailed eagle (Haliaeetus albicilla): one of the protected species found in Poland's forests

Natura 2000 network sites extend over almost 20% of Poland's land area. The majority are in state-owned forests, which contain many habitats and species listed in the Annexes' of the Habitats and Birds Directives. Conserving these forests is therefore crucial for protecting biodiversity in Poland. In order to maintain and improve the conservation status of forest Natura 2000 sites, appropriate measures and management plans are required. However, despite the importance of this work, a Eurobarometer survey conducted in 2010 found that 47% of Polish respondents had not heard of the Natura 2000 network.

The main objectives of the LIFE Information and Communication project BEST FOR BIODIVERSITY (**LIFE10 INF/PL/000673**) were to promote best practices for the protection of forest species and habitats, and to raise societal awareness of the importance of forest biodiversity and the activities being conducted to protect forest ecosystems, especially in Natura 2000 sites. The beneficiary, the Coordination Centre for Environmental Projects (CCEP), is a dedicated unit for projects within the Polish Directorate General of State Forests, who initiated the project.

"There have been a lot of projects done in the forests, but no-one knows about them because there is a lack of information exchange," says project manager Łukasz Porębski, referring to the diverse work done by research institutes, foresters, national parks, NGOs and other organisations that is often only known about within those organisations. The project gathered together this information and promoted it to two target groups: the general public and experts (especially forest managers). "We wanted to focus on species

for which protection is important in Poland," he says. "We grouped our interests into 11 areas. The number 11 runs through the project." The categories comprise 9 species groups and 2 habitats (see box).

The information gathered on conservation actions by the project was therefore comprehensive and wide-ranging. Selected species range in size from small insects to large carnivores (wolf, lynx and brown bear) and the European bison. The actions to conserve rare reptiles focused on the Aesculapian snake, smooth snake and mud turtle, for example, though hare and partridge were mainly considered as being prey for raptors and carnivores. For forest wetland, best practices included restoring 19th century irrigation canal infrastructure.

A world preserved

"Generally, the most important and most complicated action of our project was the film series," recalls Mr Porębski. "We prepared 11 episodes, each on a species group or habitat." The documentary series A World Preserved was watched by over eight million people in Poland. It was first broadcast on TVP1 in May 2014, with repeat showings on other national television channels. The films showed the best practices for protecting selected species and habitats in forests, and introduced the people who do the conservation work.

Each 30-minute episode was hosted by the well-known presenter Grzegorz Miśtal and featured different guest celebrities, including actors, musicians and other TV personalities, to help draw in larger audiences. For example, much interest surrounded the owl episode ('mysterious nocturnal hunters'), in part because of guest Agata Kulesza's role in Ida, the Polish film that won the Best Foreign Language Film Oscar in 2015.

The project gathered information on conservation actions for the Aesculapian snake

Project activities focused on 11 topics

- European bison
- Large carnivores
- Bats
- Owls
- Wood grouse and black grouse
- Birds of prey
- Reptiles
- Saproxylic insects
- Hare and partridge
- Dry grasslands
- Wetlands

The response to the television series has been very positive, notes Mr Porębski. "Now in 2016, the series is still on air on some channels. It has been transmitted on television 11 or 12 times." In addition to being broadcast more times than originally foreseen, the series has been shown at several environmental film festivals, winning first prize at the Eko-film Festival in 2014. The films were produced on DVD, with 22 000 copies distributed among interested stakeholders. Anyone can now also watch the films, with English subtitles, on the National State Forests' YouTube channel.

A high level of awareness was also achieved through the publication of around 55 articles in national and regional newspapers, and specialist magazines (e.g. nature, hunting), which potentially reached more than 8 million readers. The media coverage emphasised the wider benefits of the Natura 2000 network and how the LIFE programme made it possible through co-financing. "People need information about nature protection and biodiversity. A good way to do this is to show the energy that is put into protecting something, such as European bison, so that people think of it has having more value," says Mr Porębski.

Bringing experts together

To consolidate the available information on best practices, the project started by establishing a Steering Committee comprising nine Polish experts from different governmental and non-governmental organisations. The Committee met once every three months to monitor the progress of the project and to make suggestions for improvements.

A key outcome from the Steering Committee, and a series of 30 working groups with 25 invited experts, was the production of 11 roadmaps - strategies for each of the selected species and habitats. The roadmaps were the first step to identifying best practices, based on the experiences of 60 projects conducted in Poland (including previous LIFE

The project produced best practice manuals for 11 species groups and habitats found in the Natura 2000 network

projects), with explanations of why they were best practices, and objectives for future conservation work. The roadmaps were transferred to the institutions responsible for managing Natura 2000 network sites, primarily the Directorate General of State Forests who manage the 90% of Polish forests owned by the state.

"A very important part of the project was networking. The networking which we promoted was based on really close connections with experts from different institutions," explains Mr Porębski. The project established links, for example, with state and private forest employees, staff from nature conservation and scientific institutions, hunters, farmers and amateur naturalists.

A key networking activity was organising 22 workshops, two for each of the 11 topics. The two-day training workshops, which involved indoor learning and outdoor practical demonstrations of best practices, were attended by representatives from many stakeholder organisations and also the general public. They were very popular, with many sessions attracting far more applications than the 50 available places. As with the 11 films, the workshops were located all around Poland. In total, over 1 300 people took part in training designed to implement the best practices advocated by the project.

Best practice manuals

In the light of extensive expert discussion, the project produced 11 manuals that presented best practice methods and guidelines for the sustainable management of the 11 species groups and habitats, especially within Natura 2000 sites.

"This was quite difficult. The 11 separate manuals had to be written by experts, but also had to be checked by other experts, so they took some time to prepare," says Mr Porębski. The manuals were widely disseminated at the workshops and other events, and sent to schools and libraries. The 3 000 printed sets of the manuals proved very popular. "There was a high demand, because there are very few of this type of publication for managing forests." The manuals, including English translations, are available to download from the project's website.

The project team organised six expert conferences, which proposed actions plans for selected species, in addition to its closing conference. Financial savings during the project enabled seven additional field training workshops to be conducted in 2014, and the further elaboration of methods for protecting wetlands, mud turtle, two snake species, osprey, black grouse and wood grouse.

The project concluded that there was a high demand for knowledge about nature conservation and biodiversity, based on the interest shown in the films, press articles, workshops and manuals, as well as the requests the beneficiary has received for the continuation of its activities. BEST FOR BIODIVERSITY increased Polish citizens' knowledge and understanding of practical nature conservation and the benefits of the Natura 2000 network.

Another key conclusion was that the input from a wide range of organisations and stakeholders is crucial for identifying best practices, and for understanding different points of view and preventing conflicts. The project helped fill a large gap in networking activities and enabled knowledge to be shared that would have otherwise remained within particular institutions. The greater sharing of knowledge and experience has enabled new projects to be initiated based on best practices, and has equipped practitioners in the field with the best tools available for ensuring the long-term sustainable management of valuable forest ecosystems.

Project number: LIFE10 INF/PL/000673

Title: BEST FOR BIODIVERSITY - Biodiversity Protection in Forest Areas, Including Nature 2000 Areas - Promotion of Best Practices

Beneficiary: Coordination Centre for Environmental Projects (CEEP)

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Period: 01-Jan-2012 to 31-Dec-2014

Total budget: € 2 094 000

LIFE contribution: €1 047 000






BEST LIFE NATURE PROJECTS

BEST PROJECTS

Austria: **Bringing fish species back to the Danube**

Using specialist landscape design, the ambitious Mostviertel-Wachau project carried out extensive river restoration measures on the Danube, thereby helping to bring back endangered fish species to the region and improve their conservation status.

Over time, urban development, increased river traffic and hydropower generation facilities have deprived much of the Danube's flora and fauna of their habitats. The objective of the Mostviertel-Wachau project (**LIFE07NAT/A/000010**) was to improve river habitats and restore a number of endangered fish species, included in the annexes of the Habitats Directive. River fish suffer from loss of habitat diversity and from the waves caused by vessel traffic. The project focused on reconnecting backwater systems (such as oxbow lakes), whose shallow bays and gravel banks just under the surface offer protection from wave force.

Restoring the Wachau valley

One of the first tasks of the project, which was led by the lower Austrian water authority, was to create a new mouth for the river Pielach, the main tributary to the Danube in the Wachau valley. Fish species like the nase (*Chondrostoma nasus*), barbel (*Barbus barbus*) and Danube salmon (*Hucho hucho*), now one of Europe's most endangered fish species, used to migrate unhindered up the Pielach to spawn in gravel banks. For a long time, however, this upstream migration activity so vital for reproduction, was blocked by the construction of a power plant. The project constructed new river side-arms and backwaters for the Danube to ensure the free passage of fish between a detached side-arm (the Lateiner) and the main river channel; and designated a nature protection area. The project therefore purchased several parcels of land, from private landowners to enable the river restoration work to proceed.

A second side-arm, next to Schönbühel was restored over 1.5 km and an island was created offering new habitats for fauna species like the common sandpiper (*Actitis hypoleucos*) and the little ringed plover (*Charadrius dubius*) where they can raise their offspring undisturbed.

The different measures ensured that numerous endangered species of Danube fish and aquatic birds made use of the new habitats created. Protected from boat waves, the two newly restored side-arms ensured the survival of juvenile fish. Dice snakes (*Natrix tessellata*), kingfishers (*Alcedo atthis*) and birds particularly sensitive to human disturbance such as white-tailed eagles (*Haliaeetus albicilla*) and black storks (*Ciconia nigra*) can once again be observed in the area. Special vegetation indigenous to muddy river banks and various willow species such as the purple willow and white willow were planted in the new sandy gravel zones to the benefit of bird species that live in this type of habitat.

The project restored sections of the Danube in Austria

The Lateiner side-arm was, for years, inaccessible to Danube fish despite offering a vital spawning habitat. When the mouth of the Pielach was reshaped, the project, in a bid to improve the ecological conditions and connectivity for fish in the area, connected an oxbow lake to the Danube via a stream thereby once again interlinking the two bodies of water. A total of 28 freshwater fish species have been shown to use this new migration route including freshwater bream (*Abramis brama*), northern pike, (*Esox lucius*) catfish (*Silurus glanis*) and carp (*Cyprinus carpio*).

Monitoring fish migration

The project also improved some terrestrial habitats and species conservation status. For example, it preserved 160 old trees on the island along a restored 2 km stretch between the Schallemmersdorf side-arm and the Danube. These trees were identified as being an important habitat for a rare Habitat Directive annex-listed flat bark beetle species (*Cucujus cinnaberinus*).

Rehabitating the river Ybbs

In the Mostviertel region work focused on the River Ybbs. Human intervention, which saw the river straightened with an armour stone bank revetment the full length of the river bank, has deprived the many typical species of flora and fauna of their habitat.

To improve the hydrological dynamics of the river Ybbs, the project reconstructed the river bed to recreate habitats such as gravel bars, kolks, fords, channels and calm shallow bays. The bed was widened in parts and side-arms and islands created while special measures were taken to facilitate fish passage. These successfully preserved endangered fish species like the grayling (*Thymallus thymallus*), the nase, the barbel and the Danube salmon. They also allowed the amphibian population of the river to flourish.

Results exceed expectations

The Mostviertel-Wachau project implemented all its measures within the planned project duration. Every forecast target was achieved. In the Wachau region, monitoring has demonstrated the positive effect on the conservation status of fish and birdlife and specifically on species listed in the Habitats Directive and Birds Directive.

The entire river side-arm system near the village of Schallemmersdorf is now over 4 km long and provides Danube fish with numerous areas protected from the disturbance of shipping traffic. This calm is essential for the survival of fish of various species in their juvenile stages.

In total, 43 species of freshwater fish - 14 of which are listed in the Habitats Directive - have been identified in the Danube and the newly-created structures. Particularly noteworthy is the reversal of the declining numbers of the common nase and barbel which was achieved as a result of the project's restoration actions in the Wachau region. These formerly prevalent fish species are of particular importance in this Natura 2000 network site, as they form part of the diet of the Danube salmon.

Other species have also benefited from project actions. The kingfisher (*Alcedo atthis*) has been identified as successfully breeding in the new gravel embankments while the dice snake, otters (*Lutra lutra*) and beavers (*Castor fiber*) can now be found in more areas. The fish migration facility built on the Ybbs has allowed the Danube salmon to return to the majority of the areas where steps were taken.

"The actions to improve habitat conditions for endangered fish species have created a significant amount of typical riverine habitats," says project manager, Erhard Kraus. "It is great to see how the different sites are developing once the initial measures have triggered the dynamic hydromorphological processes."

To reduce tourism pressures on the newly-created sites, particularly the mouth of the Pielach river, the project has set up a 'visitor steering concept' to guide people away from ecologically-sensitive areas and ensure these conservation actions have a lasting impact.

Project number: LIFE07 NAT/A/000010

Title: Mostviertel-Wachau - Living space in the rivers of Mostviertel-Wachau

Beneficiary: The Lower Austrian water authority

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Period: 01-Jan-2009 to 30-Jun-2014

Total budget: €6 685 000

LIFE contribution: €3 343 000

Germany: **New ways of conserving traditional orchards**

A LIFE project in south-west Germany targeted the conservation of traditional orchards and the birds that depend on them. It restored thousands of fruit trees, trained more than 700 people in ecological pruning techniques and tested new ways to support traditional orchards.

Traditional orchards contain fruit trees of different ages and varieties, old trees with hollows where bats and birds breed, grassland rich in species and borders with an abundance of insects. Such orchards have been grown on grasslands for centuries and are generally managed without pesticides.

The traditional orchards found in the foothills of the Swabian Alb and in the Rems and Murr river valleys in south-west Germany are some of the largest connected orchards in central Europe. They are an important habitat for several species protected by the Birds Directive, including the collared flycatcher (*Ficedula albicollis*), Eurasian wryneck (*Jynx torquilla*), grey-headed woodpecker (*Picus canus*), woodchat shrike (*Lanius senator*) and red-backed shrike (*Lanius collurio*).

However, such orchards are threatened by changing agricultural use and abandonment, precipitated by shifts in the way fruit is sold and consumed. Without traditional pruning and grazing, bird breeding sites are lost and the quality of the feeding habitat for the target species is reduced.

The Streuobstwiese Albvorland project (**LIFE07 NAT/D/000236**) set out to revitalise traditional orchards by safeguarding existing habitats and integrating the objectives of the Natura 2000 network into the management and conservation of the remaining orchards in Baden-Württemberg.

In order to conserve the targeted bird species the project focused on the maintenance of important habitat trees, on the creation of orchards that can be used in the future and on the development of alternate habitat models. It also helped to simplify the management of orchards and communicated the value of the Natura 2000 network and supported the development of new agri-environmental schemes.

Conservation actions

The project succeeded in pruning some 8 300 fruit trees on a total of 196 ha of municipal land. Thanks to intensive communication activities, take up of a funding scheme for private owners of small traditional orchards (*Gütlesbesitzer*) greatly exceeded expectations. Some 8 800 trees on a total of 1 736 parcels of land were entered in the 'tree care on private land parcels' scheme implemented by the LIFE project. The scheme developed and tested four different support models for paying private landowners to maintain the conservation value of trees on their sites. Results showed that simple funding procedures - such as the 'bundled orders' model - had a higher uptake and gave good results in terms of quality of pruning.

These trials served as a template for the regional ministry of rural affairs. As a direct result of the project, in August 2014 it established a programme for the restoration of traditional orchards for the whole state of Baden-Württemberg.

Sheep grazing in a traditional orchard

Photo: Rudolf Schwind

The LIFE project also developed a standard methodology for measuring ecological improvements in traditional orchards. This methodology has now been incorporated into the scheme for the evaluation of compensation measures used by Baden-Württemberg.

Profiting from traditional orchards

To ensure long-term grazing of traditional orchards, the project constructed a new sheepfold and supported innovative approaches to making a living from the orchards. For instance, collecting more than 2 000 m³ of wood chips derived from pruned tree clippings and transporting them to a local biomass heating plant. Ten project sites continue to supply biomass to the plant.

Another demonstration action focused on creating high added-value products from the fruit grown in the orchards. Project partner, Jörg Geiger Manufaktur, a producer of fruit-based alcoholic and non-alcoholic beverages, replanted 11 ha of land with traditional varieties of cider pear. Management of these meadow orchards followed the guidelines for nature conservation that had been developed at the beginning of the project. Pears from the demonstration orchard will be used to produce a high-end sparkling perry known as Champagner Bratbirne. "The project demonstrated that modern extensive fruit-growing can also work out economically under certain conditions," says project manager, Heike Seehofer.

Unusually, the project also explored options for conserving the target species in the event of further loss of traditional orchard habitats. This involved creating 46 ha of lightly forested semi-natural landscapes populated by wild cherry, walnut, sycamore, maple, oak and other species. From a nature conservation viewpoint, the planting of high, grafted fruit trees is not necessarily a decisive element for the quality of bird habitats. The key landscape elements are freestanding trees with large crowns and grassland rich in species and structures (with bushes, hedgerows or brooks on 10%-15% of the area).

A gem within our homeland

"The LIFE project has contributed to making people's minds and hearts aware of the fact that traditional orchards are a gem within our homeland and a valuable habitat for endangered species," says Ms Seehofer. "In total, 39 communities of the Swabian Alb Foothills and the Rems Valley as well as several organisations operating throughout the state of Baden-Württemberg participated in the project led by the Regierungspräsidium Stuttgart. It was only thanks to the strong and positive cooperation of all of these bodies and the support by a great number of individuals on the sites that such a broad-based project could be successfully implemented," she believes.

Photo: Daniel Hartmann

The traditional orchards of south-west Germany are home to protected bird species including the collared flycatcher (Ficedula albicollis)

As the first LIFE project to specifically address the conservation of traditional orchards, it has a very high demonstration value. More than 700 people were trained in tree care techniques relevant to traditional orchards. These techniques fed into training modules in use in other locations.

The project also created a network of around 50 *obstlers*, or cultural landscape guides. The guides organised some 500 events to raise awareness of traditional orchards, the LIFE project and the Natura 2000 network. They have since founded a club for traditional orchards. The success of this initiative has led to the establishment of similar training programmes in four other regions with traditional orchards.

"The project has laid the foundation and has initiated measures that can now be continued by other players. The maintenance of the once neglected fruit trees that were brought back to life by the project will be much easier in the future," concludes Ms Seehofer.

Project number: LIFE07 NAT/D/000236

Title: Streuobstwiese Albvorland - Protection of Wild Birds in Traditional Orchards of the Central Swabian Alb Foothills and the Central Valley of the Rems River

Beneficiary: Regierungspräsidium Stuttgart

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Period: 01-Jan-2009 to 31-Aug-2014

Total budget: €5 183 000

LIFE contribution: €2 592 000

Bulgaria: **Conserving priority bird species in the Bourgas lakes**

The LIFE FOR THE BOURGAS LAKES project conserved nesting, resting and feeding sites for five endangered bird species in coastal habitats in Bulgaria.

The western coast of the Black Sea forms a key part of one of Europe's most important bird migration routes. In Bulgaria, the extensive coastal wetlands around the city of Bourgas, a major Black Sea port and tourist destination, provide key migration rest areas, and breeding and wintering habitats, for over 300 bird species. Despite protection under the EU Natura 2000 network and national legislation, birds and their habitats are under continuous threat in the Bourgas lakes. The main pressures include loss of nesting and feeding habitats, disturbance by visitors, loss of juveniles to predators, mortality due to electricity infrastructure, poaching, and industrial accidents.

LIFE FOR THE BOURGAS LAKES (**LIFE08 NAT/BG/000277**) aimed to improve the management of coastal wetlands around the city of Bourgas. Project actions were concentrated in three Natura 2000 network sites (Special Protection Areas - SPAs), namely Atanasovsko lake, Bourgas lake and Mandra-Poda, to protect populations of migratory and resident bird species. In particular, the project focussed its activities on five globally-endangered species: the pygmy cormorant (*Phalacrocorax pygmeus*), Dalmatian pelican (*Pelecanus crispus*), white-headed duck (*Oxyura leucocephala*), ferruginous duck (*Aythya nyroca*) and great bittern (*Botaurus stellaris*).

Habitat restoration

The project restored key habitats favoured by the target bird species. In the Atanasovsko lake and Mandra-Poda SPAs, shallow, disappearing wetlands were deepened over an area of 40 ha to create and restore open water. As part of a reed bed management programme, the project team also selectively cut 18 ha of reeds, to create a mosaic of open water, and young and mature reed beds. This increased the availability of bird feeding, breeding and nesting areas. The project recorded positive impacts for all five target species following these actions.

In the Atanasovsko lake SPA, a lagoon where traditional salt extraction takes place, the project repaired 14.5 km of

Photo: Bogdan Boev

The Dalmation pelican (Pelecanus crispus)

destroyed dykes and barriers, to protect around 65 600 m^2 of habitat suitable for resting, roosting and perching. This will also allow continued sustainable salt production, important for preserving the diverse microhabitats of the lagoon. Six artificial islands were constructed, including one large island (70 m^2) in the Atanasovsko lake, to provide roosting grounds for pelicans and cormorants, and safe conditions for many ground-nesting bird species. The project also built six artificial platforms for use by pelicans and other birds. The threat to juvenile and nesting birds from predators, such as feral dogs, domestic cats, foxes and jackals, was removed by establishing safe roosting grounds on artificial islands and by preventing access to two key dykes in the Atanasovsko lake SPA. The project developed a non-lethal system to deter predators, using electrified fencing, ultra-sound dog repellents and other methods. Further improvements to habitats in the SPA are being made through the Salt of LIFE project (**LIFE11 NAT/BG/000362**).

Reducing multiple threats to birds

The project team reduced the mortality of birds from electrocution by insulating 60 electricity poles located across a known migratory route in the Atanasovsko lake SPA. For the

first time in Bulgaria, the team placed 760 diverters on 8.8 km of 20 kV power lines to make them more visible to flying birds, so preventing fatalities due to electrocution and collisions. This action was done in partnership with the energy company EVN. A further 36 diverters were deployed on 110 kV power lines in the Bourgas lake SPA, in partnership with the electricity system operator of Bulgaria.

The project launched a new joint approach against poaching. It established a common coordination unit to prevent poaching in partnership with hunters' and anglers' unions, fishing sport clubs and local nature conservation organisations. In 2012, this partnership led to the establishment of an association of environmental organisations, hunting and angling unions and fishing sport clubs in Bourgas. This represents a model partnership between organisations with different objectives but having one shared aim – to protect the biodiversity of the lakes. It has resulted in a 55% reduction in the number of registered poaching incidents. The project also initiated a process of cross-institutional cooperation and published a handbook to address the lack of adequate mechanisms for protecting birds in the event of industrial accidents.

Community engagement activities organised by the project raised awareness about wetland habitats among local communities and visitors to the Bourgas lakes. These included 15 clean-up campaigns, which removed a total of 1 100 bags of potentially hazardous garbage from breeding, roosting and feeding habitats of the priority species. A tourist route called 'The life of the Bourgas lakes' was created and equipped with information points and infrastructure (including a bird observation tower and picnic facilities), which helped reduce disturbance by guiding visitors to specific viewing points.

Cutting reeds to create a mosaic of suitable habitats for target bird species

Photo: BSPB

Photo: BSPB

One of the new water bodies created by the project

"Six strategic documents were developed under the project to ensure the long-term conservation of the priority species and habitats at a national scale," says project manager Konstantin Gospodinov. "These are the National Action Plans for the pygmy cormorant, ferruginous and white-headed ducks, the Dalmatian pelican and the great bittern. They define the necessary activities for species protection during the next ten years. Additionally, the National Action Plan for the conservation of wetlands of high significance in Bulgaria is an instrument for the protection and management of wetlands as characteristic areas with high biodiversity."

"The collaborations and partnerships established by the project to enhance public support and understanding for the protection of the lakes and the birds were amongst the most eminent project achievements," believes Mr Gospodinov. "These include partnerships between various stakeholders from business, state institutions, non-governmental organisations, hunters, fishers and the media. We built permanent connections between local communities, stakeholders and project partners to benefit conservation of the priority bird species and habitats."

Project number: LIFE08 NAT/BG/000277

Title: LIFE FOR THE BOURGAS LAKE - Ensuring Conservation of Priority Bird Species and Coastal Habitats at the Bourgas Natura 2000 Wetland Sites

Beneficiary: Bulgarian Society for the Protection of Birds

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Period: 01-Jan-2010 to 31-Dec-2014

Total budget: €1 775 000

LIFE contribution: €1 331 000

Bulgaria: **Aiding the recovery of Europe's large vultures**

A Bulgarian project carried out reintroductions to establish populations of the endangered griffon vulture in the Balkan mountain range.

Three large vulture species were once found in Bulgaria – the griffon vulture (*Gyps fulvus*), black vulture (*Aegypius monachos*) and bearded vulture (*Gypaetus barbatus*) – but only the griffon vulture has a small viable population left, based in the Eastern Rhodope Mountains. The black vulture is no longer breeding in Bulgaria but regularly visits feeding sites in the country, while the bearded vulture is extinct in Bulgaria.

The VULTURES' RETURN project (**LIFE08 NAT/BG/000278**) was set up in 2010 to re-establish a breeding population of griffon vultures in the Balkan Mountains. It managed to create two small colonies in the western and eastern Balkan Mountains by importing more than 260 griffon vultures and transferring them to a total of four adaptation aviaries. A total of 210 of these birds were then released, 40 of which fixed with different kinds of transmitters and all of them marked with wing tags. The project reported that around 70 of these vultures have settled and are permanently present at the four release sites.

The first attempt at breeding in the eastern Balkan Mountains occurred in 2012, just four years after the first vulture was released, and in 2015 the first griffon vulture born in the wild successfully fledged in Vrachanski Balkan Nature Park. Over the 2014-2015 breeding season, at least eight breeding pairs were recorded at the three project sites.

The national breeding population was estimated at 30-35 nesting pairs in 2013, according to Ekonekt. More recent monitoring in 2015 found 75 breeding pairs in the natural colony in the Eastern Rhodopes alone, as well as two additional small breeding colonies established in the Balkan Mountains. A year after the end of the project, the newly established colonies already represent more than 20% of the national population of griffon vultures.

The most significant area remains Vrachanski Balkan (the western Balkan Mountains), where more than 44 griffon vultures can be seen and at least 10 pairs have established two small colonies. In June 2016 the project team located at least four hatched young. The next key areas are Kotlenska Planina and the Sinite Kamani Nature Park in the eastern Balkan Mountains. Luchezar Bonchev of FWFF and Iliyan Stoev of Green Balkans report that some 35 birds are present in the area: seven breeding pairs in two colonies. At least four chicks

Released griffon vultures (Gyps fulvus) in the wild

Photo: www.greenbalkans.org

also hatched here in June 2016. Released birds are mostly juvenile, one-to-two years old, and given that griffon vultures reach sexual maturity around five years old, the conservation team expects to see a gradual increase of the newly established breeding colonies.

The project has also had a highly beneficial impact on Bulgaria's highly-threatened Egyptian vulture (*Neophron percnopterus*) population, providing a safe and abundant food source for at least two breeding pairs in Byala reka, in the eastern Balkans, which represents 7% of the national population. In addition, the sites maintained by the project in Bulgaria were visited by a record number of juveniles and non-breeding adults – around 11 individuals in August 2014.

Furthermore, the project established sheep, goat and cattle herds in Kotlenska Planina and Sinite Kamani Nature Park as part of its initiative to maintain 300 ha of high mountain pastures. It also identified threats to the vultures in and around the release sites. The main causes of death were from electrocution by power lines and poisoning. The project beneficiary, conservation NGO Green Balkans Stara Zagora, which has a long-term reintroduction programme for griffon and black vultures, closely cooperated with the electricity companies and provided them with detailed maps of dangerous spots, ahead of their insulation.

Improving attitudes towards vultures

One of the biggest challenges of the project was, "to combat the initial negative reaction of repulsion towards vultures and to educate the wider public on the unique role of these birds in ecosystems," says Elena Kmetova-Biro, project leader. The extensive information campaign targeted a wide range of different stakeholder groups, conveying the message that "vultures are an integral part of Bulgarian ecosystems and can even reduce costs, utilising the waste of livestock owners and slaughter-houses." Hundreds of farmers provided livestock carcasses as a food source for the vultures.

Furthermore, as a result of this campaign, the recognition rate of the griffon vulture in the target areas increased by more than 5%, while interest in becoming involved in vulture conservation rose by more 10%. Also, more than 75% of locals said in a survey that they view vultures as useful. To further promote the results and importance of its conservation work, the project held five vulture festivals as well as numerous other events around the country.

The beneficiary also worked closely with local farmers and communities to prevent poisoning. Sixty shepherd dog puppies were donated to shepherds to minimise conflict with human activities. A vultures and forests manual was produced to outline vulture-friendly sustainable maintenance of sub-Mediterranean pine forests with endemic black pines. The project management model, along with its methodology for protecting livestock from predator attacks, could be widely replicated.

Finally, the beneficiary submitted a formal letter to the Bulgarian Ministry of the Environment and Waters, requesting an update of the Natura 2000 network standard data site forms of five SPAs and five SCIs to reflect the changes in the population and status of the target species in these areas. The project also requested updates of the numbers and occurrence of the species in the forms for four Natura 2000 network sites.

The project represents the first successful reintroduction programme of large raptors in Bulgaria. It exemplified a model of close cooperation with all relevant institutions, such as the ministry, customs officers, food safety agency, veterinary authorities and electricity companies. "Many of the issues we encountered during the project implementation were appearing for the very first time," says Mrs Kmetova-Biro. "This cooperation has, however, become stronger and the role of every partner is much better understood and acknowledged, so that the team is currently determined to continue the vulture conservation efforts in Bulgaria."

One of four adaptation aviaries for vultures built by the project

Photo: www.greenbalkans.org

Project number: LIFE08 NAT/BG/000278

Title: VULTURES' RETURN - Recovery of the Populations of Large European Vultures In Bulgaria

Beneficiary: Green Balkans Stara Zagora Non-Profit Organisation

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Period: 01-Jan-2010 to 30-Jun-2015

Total budget: €1 332 000

LIFE contribution: €666 000

Bulgaria: **Restoring riparian habitats and tackling invasive alien species**

A Bulgarian LIFE project successfully restored riverine habitats in 10 Natura 2000 network sites. The team removed waste, controlled the spread of invasive alien plants, restored habitats for rare plant species and developed infrastructure to limit human impact at conservation sites.

More than one third of Bulgaria's land area is forested, and is home to an impressive array of flora and fauna. But until recently, Bulgaria had limited experience of the management and restoration of riparian forest and wetland habitats in the country's forests. And while Bulgaria's natural beauty and diverse topography make the country a magnet for tourists, the impact of visitors to many natural sites was apparent from the litter and damage left behind.

The executive forest agency sought support from the LIFE programme to enhance the conservation status of 10 Natura 2000 network sites (designated as Sites of Community Importance under the EU Habitats Directive and as protected nature parks by the Bulgarian government). Within these project sites, experts identified 11 riparian forest habitats covering around 21 000 ha.

Photo: Alexander Ivanov

The project tackled a decline in botanical diversity in Bulgaria's riparian forests, such as those pictured above

Nature's balance

The Riparian Habitats in BG project (**LIFE08 NAT/BG/000281**) was devised partly to address the consequences of human disturbance of riparian ecosystems, and in particular the impact on flora. Many riparian habitats across Bulgaria were suffering from a decline in botanical diversity. To reverse this, 13 rare plants, characteristic of riparian habitats, were introduced to four project sites, including Belene Island, which is situated in the Danube on the Bulgaria-Romania border. The island is home to more than 170 species of water birds. Belene's botanical and hydrological balance had been disrupted since the 1970s, when a dyke was built along the island. This resulted in the extinction and endangerment of many riparian plant species, and a subsequent deterioration of the area's biodiversity.

The project also focused on eliminating or stopping the spread of several invasive alien plant species that had colonised the Natura 2000 network sites. The Japanese knotweed (*Fallopia japonica*), a fast-growing plant similar in appearance to bamboo and native to East Asia, had spread along the banks of the Sivyak river in the Bulgarka site.

Permanent eradication of Japanese knotweed is prohibitively expensive and difficult, but by mowing the riverbank twice a month for three years, the project team was able to control the spread of this plant, thereby limiting its effects on the fragile riparian ecology. Other invasive alien species identified and tackled by the project's activities included black locust (*Robinia pseudoacacia*) and indigo bush (*Amorpha fruticosa*).

Meanwhile, restoration of forest habitats across 81 ha in seven of the project sites reintroduced tree and plant species typical of such areas whose presence had declined due to human activity, in particular through deforestation. Among the species planted were Turkey oak (*Quercus cerris*), silver lime (*Tilia tomentosa*) and European beech (*Fagus sylvatica*).

In Vitosha Nature Park, the oldest national park in the Balkans, strengthening the population of the dwarf pine (*Pinus mugo*) by planting saplings on slopes has led to encouraging results.

Inspiring local communities and visitors

A key element of the project involved including local communities in the ongoing process of managing and protecting the revamped sites. Project leaders decided that the best way to underline the importance of keeping riparian habitats in pristine condition was to enlist the help of local people in removing waste and litter. For example, the project instituted a one-day 'clean up nature' initiative over three consecutive years, which saw 9 400 people remove 36 tonnes of rubbish across various project sites. This initiative led to the formation of groups of volunteers working to build on the project's achievements by maintaining and enhancing the quality of the habitats.

The project's aim was not to limit human access to these sites, but to enable both members of the local community and tourists to enjoy nature in a sustainable way. Devising and implementing infrastructure improvements was therefore of great importance. The project team's priority was to maximise human engagement with the environment while protecting the most sensitive parts of the Natura 2000 network sites from interference and damage.

The project coordinated several measures to further this aim, including the construction of 27 small bridges across streams, raised wooden grates to prevent the ground being trampled underfoot and information boards, and signs to demarcate more clearly the areas accessible to visitors and to provide information on the diverse habitats. The project also deployed 735 m of fencing to protect the most vulnerable sites. This activity was combined with the development of a tourist trail and tourist sites along the way, which supported the project's goal of educating and informing visitors about the zones' spectacular biodiversity and the importance of maintaining and protecting it.

Planting water soldier (Stratiotes aloides), a riparian species native to Bulgaria

Photo: Persina NPD

Target plants

The LIFE project reintroduced several plant species that were very rare or had disappeared from the targeted zones, including: the white water lily (*Nymphaea alba*); yellow water lily (*Nuphar lutea*); water chestnut (*Trapa natans*); European waterclover (*Marsilea quadrifolia*); water soldier (*Stratiotes aloeides*); common yew (*Taxus baccata*); and Rila primrose (*Primula deorum*).

Photo: Vasselin Koev

Another of the project's notable achievements was the establishment of a gene bank of two important tree species in riparian habitats in Bulgaria: black poplar (*Populus nigra*) and white willow (*Salix alba*). The gene bank was created on a 2 ha site and can now provide cuttings for cultivation of saplings used for afforestation. The gene bank was used by other nature conservation projects in Bulgaria and remains available for the cultivation of cuttings today, securing another enduring legacy for the project.

"This project undoubtedly serves as a model for the successful management of riparian habitats, both in Bulgaria and in the rest of the European Union," says Katerina Rakovska, project coordinator from WWF-Bulgaria, the executive forest agency's partner in the project.

Project number: LIFE08 NAT/BG/000281

Title: Riparian Habitats in BG - Conservation and Restoration of 11 Natura 2000 Riparian and Wetland Habitats in 10 SCI's Bulgarian Forests

Beneficiary: Executive Forest Agency

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Period: 01-Jan-2010 to 30-Jun-2014

Total budget: €1 237 000

LIFE contribution: €615 000

France: **Restoring rare alluvial forest**

A LIFE project reconnected the Rohrschollen Island nature reserve with the river Rhine. The return of regular flooding will enable the island's rare alluvial forest habitats to recover.

Photo: DESCHBACH

Aerial view of a new connection between Rohrschollen Island and the Rhine

Rohrschollen Island, a nature reserve on the river Rhine close to Strasbourg, boasts a habitat which has become increasingly threatened in central Europe, namely alluvial forest. Such forests feature diverse habitats supporting many species of fauna and flora.

Over time, work on the Rhine resulted in the island becoming disconnected from the river. Consequently, areas that used to flood regularly began to dry out, threatening the habitats that depend on this flooding. These include two habitats listed as priority for conservation in Annex I of the Habitats Directive, i.e. alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior*; and riparian mixed forests along the great rivers (*Quercus robur, Ulmus laevis, Ulmus minor*).

With water courses silting up and ponds filling in as a result of being cut off from the main river, the alluvial forest was evolving into a hardwood forest. The LIFE project Rohrschollen island (**LIFE08 NAT/F/000471**) was conceived to reconnect and restore dynamic flooding and the alluvial forest habitats on the island, ensuring favourable conditions for dependent species such as the spined loach (*Cobitis taenia*). This small fish, listed in Annex II of the Habitats Directive, lives in slow-running or still sandy-bottom environments. The objective was to reconnect the island with the Rhine, putting in place the conditions to enable the environment to recover by itself via the return of regular flooding dynamics. The project aimed to show that such flooding can improve the character of alluvial and riparian forest habitats and restore the necessary conditions for plant succession and thereby improve the conservation status of these habitats.

Coordinated by the city of Strasbourg, the Rohrschollen island project involved substantial earthworks and civil engineering work. Several studies were carried out initially, on issues such as topography, sedimentology, river connectivity and water dynamics, as well as on the spined loach population. This research established that the project goals should be achieved by modulating the island's water supply, ensuring active water circulation, i.e. flooding beyond the natural bed of the island's water course, and by allowing flooding for several days in succession.

Earthworks

To connect the Rhine with the island's existing water course (the Bauerngrundwasser), a 1.2 km long earth channel was dug through the forest. It was deliberately undersized to encourage water to overflow and flood the surrounding forest. With successive flooding, the channel's shape was expected to evolve and form a more natural water course.

A key project action involved the construction of a water intake and regulation structure, on the southern part of Rohrschollen island. This work allows the supply of 5-80 m^3 per second of water directly from the Rhine, depending on the river's natural hydrological conditions. When the Rhine reaches a flow rate of 1 550 m^3 per second, a regulation gate below the water intake structure opens, injecting water into the channel and Bauerngrundwasser. Above a certain flow rate, water overflows their banks and floods the forest, to a depth of around 50 cm.

At the end of the Bauerngrundwasser, a structure has been installed to allow fish to move between the water course and the Rhine (previously there was no connection in this location). It also acts as a hydraulic gate, regulating the flow of water re-entering the river during flooding. The 22 metre-wide submersible has passages at different levels for upper and bottom-feeding fish, and features an integrated nozzle that removes the sediment accumulated during flooding. The structure is particularly beneficial for the spined loach, improving its existing natural habitat nearby and allowing it to re-colonise the Bauerngrundwasser.

Flooding returns

Thanks to the project, dynamic flooding has resumed on Rohrschollen Island, helping to restore alluvial forest habitats and thus provide favourable conditions for the species associated with them. Many of these are included in annexes I and II of the Birds Directive and Habitats Directive, such as the common kingfisher (*Alcedo atthis*), the great egret (*Egretta alba*), the great crested newt (*Triturus cristatus*) and, in particular, the spined loach. Monitoring of dragonflies has shown that typical running water species have appeared, for example the banded demoiselle (*Calopteryx splendens*), the pincer-tail dragonfly (*Onychogomphus forcipatus*), the common clubtail (*Gomphus vulgatissimus*) and the goblet-marked damselfly (*Erythromma lindenii*).

Photo: RNN Neuhof-Illk

The banks of the island's water courses have altered, creating new habitats, and mud that had accumulated in the riverbed has been evacuated, favouring colonisation by other species. These include Atlantic salmon (*Salmo salar*) and sea trout (*Salmo trutta trutta*) that spawn in gravel, whilst little plover (*Charadrius dubius*) can nest on the new gravel banks. In 2014, a number of young spined loaches were observed close to the structure at the end of the Bauerngrundwasser. The following year, an electro-fishing inventory found 12 spined loaches in the watercourse, as well as 208 European bitterling (*Rhodeus amarus*) and eight asp (*Aspius aspius*), both of which are listed in Annex II of the Habitats Directive.

To continue the reserve's restoration, six-to-eight induced floods are planned each year, giving an average of 50 submersion days annually. Scientific monitoring of the site continues; the results will be used to plan further actions on the island. An observation unit will be created to manage the biological and physical monitoring in partnership with the University of Strasbourg and other public bodies.

"With more than 10 years between the first studies and the first inundation, this project required the strong involvement of the Strasbourg city team," says project representative Frédéric Lonchampt. "Thanks to the LIFE programme, the system is now operational and monitoring is in progress, showing the first encouraging results. This experience will be useful for the realisation of new restoration projects of Rhine forest alluvial functionality by the city of Strasbourg or other managers of nature."

The water intake and regulation structure

Photo: C. Le Quang

Project number: LIFE08 NAT/F/000471

Title: Rohrschollen island - Restoration of the dynamics of Rhine alluvial habitats on Rohrschollen island

Beneficiary: City of Strasbourg

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Period: 01-Jan-2010 to 30-Jun-2015

Total budget: €2 080 000

LIFE contribution: €1 040 000

Poland: **Enhancing lesser spotted eagle populations**

LIFEAQUILA helped bolster lesser spotted eagle populations and breeding areas in the old-growth forests of Białowieża and Knyszyn. It also helped raise awareness of this rare bird of prey among locals, farmers and tourists.

The lesser spotted eagle (*Aquila pomarina*) is a bird of prey found in central, eastern and south-eastern Europe, as well as eastwards to Iran. More than 95% of its global breeding range (between 11 400 and 15 500 pairs) is in Europe. The lesser spotted eagle is listed in Annex I of the Birds Directive. The status of the species was assessed as being secure at EU level in the latest Article 12 report of the Birds Directive. However, detailed surveys by BirdLife International have highlighted an alarming decline in many European countries, especially at the western and southern boundaries of its range.

The lesser spotted eagle requires two types of habitat: mature, remotely situated forest for nesting and extensively managed meadows, farmland and pastures for feeding. The drastic fall-off in population appears largely due to intensification of farmland management practices and/or abandonment of land, crop monocultures, unsuitable mowing regimes, as well as the general loss of such landscape mosaics. Other problems are from large-scale drainage of riparian habitats, unsuitable natural regeneration and afforestation.

Main goals

The five-year LIFEAQUILA project (**LIFE08 NAT/PL/000510**) was carried out by the beneficiary, the regional directorate of state forests in Białystok, with the Polish Society for the Protection of Birds and other partners. The main goal was to stop the decline by increasing the populations in the two main breeding areas in the north-east of the country, the old-growth forests of Białowieża and Knyszyńska - both Natura 2000 network sites - as well as to develop and promote models of sustainable landscape management.

Since the early 1990s (following the collapse of the state farm system), unique landscapes have significantly deteriorated through loss of some habitats. The losses have been

LIFEAQUILA has enhanced habitats essential to the lesser spotted eagle (Aquila pomarina)

Photo: Agencja EkoSerwis/Rafał Łapiński

further exacerbated by low water levels in the Narewka river valley, one of the major river valleys in Białowieska forest, caused by canalisation. This has resulted in oxbow lakes and interconnected canals drying out earlier in the year, thereby decreasing the availability of amphibian prey. As a consequence, ecosystem productivity had decreased from 52% to 29% in the Białowieża site.

The project's principle conservation measures included: installation of artificial perches, to encourage nesting; removal of scrub; restoration of water levels; reintroduction of grazing; and the creation of small wetlands. To aid the implementation of these works, 51.3 hectares of land was purchased at the two sites. At the Knyszyńska site, the water table was increased and 50 small ponds were created, thus improving nesting and foraging conditions. Some 164 ha of Narewka river valley habitats were also improved and 47 ponds were created to serve as amphibian (prey) spawning sites.

Photo: PTOP/Adam Zbyryt

Working to restore water levels

Other works included the clearing of scrub on 750 ha (350 ha in Knyszyńska forest and 400 ha in Białowieska forest) of abandoned and overgrown meadows in order to restore the land for mowing under agri-environmental schemes. Additionally, 80 artificial perches were erected in 67 feeding grounds and 75 new nest protection zones were established to encourage better breeding success over the course of the project due to reduced human disturbance. All known nesting areas in the two sites were covered by this protection.

Native cattle grazing

To encourage the management of the land through grazing, 12 native-breed red cattle and 20 horses were bought, 18 064 metres of fencing was erected, and the cattle were made available to nine participating farmers. Moreover, 96.6 ha of formerly abandoned pastures were re-activated in 20 breeding territories of the target species.

Reintroduction of cattle grazing has helped improve conditions for the lesser spotted eagle

Photo: PTOP/Adam Zbyryt

Another important element of the project was to raise awareness among local communities, especially farmers, schoolchildren and tourists of the ecological importance of the lesser spotted eagle populations. To this end, a number of awareness-raising activities were carried out. These included organising local events, a photographic competition, educational trails, expert and non-expert seminars and the publication and dissemination of various pamphlets and project literature.

As well as successfully concluding its conservation work, the project continues to work to further its longer term goals of securing the conservation of the species at regional and national level. A management programme for Knyszyńska forest is now part of a legally-binding conservation action plan for the area. A species action plan drawn up during the project has now been officially endorsed. Moreover, LIFEAQUILA recommendations concerning management of the feeding grounds of the lesser spotted eagle have been integrated into forest operation plans for eight forest districts. Furthermore, landscape scale conservation models for the species have been developed for the two sites.

Project number: LIFE08 NAT/PL/000510

Title: LIFEAQUILA - Restoring populations of Lesser Spotted Eagle at chosen areas of Natura 2000

Beneficiary: Regional Directorate of State Forests in Białystok

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Period: 01-Jan-2010 to 31-Dec-2014

Total budget: €4 211 000

LIFE contribution: €3 159 000

United Kingdom: **Revitalising a degraded bog landscape**

The MoorLIFE project was one of the largest moorland conservation projects ever undertaken, restoring close to 2 500 hectares of the UK's moorland and helping breathe new life into a landscape damaged by the legacy of 200 years of industrial pollution and wildfires.

In Europe, active blanket bogs - a globally rare habitat - are listed in the Annex I of the Habitats Directive as priority for conservation. This habitat is typical of the Atlantic region in areas of high rainfall such as western United Kingdom and Ireland and very rare and localised elsewhere in northwest France and northwest Spain, western Austria, western Sweden and Azores.

In Alpine and Macaronesian regions such habitats are assessed as having a 'favourable' conservation status under Habitats Directive Article 17 reporting. In the Atlantic region, the favourable area is decreasing and the structure and function and future prospects are bad in the British Isles and Ireland which hosts the majority of this habitat, thus giving the overall assessment as being 'unfavourable bad'. This is mostly due to human impact. These areas are designated as Natura 2000 network sites, both for their active blanket bog habitat and the bird species that can be found there.

In the UK, the moorland areas in the Peak district and the South Pennines in northern England are included in the South Pennines Special Area of Conservation (SAC), a Natura 2000 network site, and are the second largest blanket bog in England. These bogs are habitat for several endangered bird species, such as the golden plover (*Pluvialis apricaria*), the dunlin (*Calidris alpina*, the red grouse (*Lagopus scotica*) the short-ear owl (*Asio flammeus*), the twite (*Linaria flavirostris*) and the merlin (*Falco columbarius*).

Historical damage to the moorlands, through atmospheric pollution, wildfires, peat extraction, overgrazing and high visitor pressure, mean that the bog vegetation has been degraded with vast areas of bare and eroding peat. Sphagnum mosses - essential to the formation of new peat – have almost completely disappeared. As peat forms, it traps carbon from the atmosphere, helping to mitigate climate change by locking up CO_2.

According to Chris Dean, partnership manager for the Moors for the Future Partnership, restoring those wetlands is, "as important as planting trees in fighting climate change." The moors also have a significant role in providing ecosystem services such as flood mitigation and water retention and for providing most of England's drinking water. Yet despite these essential services, the South Pennine Moors were inadequately protected for years and have become the world's most degraded active blanket bogs. According to estimates, erosion of bare peat by wind and rain destroy a year's worth of peat growth every two weeks.

Photo: Moors for the Future Partnership

These geotextiles protected bare peat from erosion and provided a stable base for plants to grow

In 2003, the Peak District National Park Authority became the lead body in the newly formed Moors for the Future Partnership, an organisation that works with a range of partners, including government agencies, conservation NGOs, utility companies and representatives of the moorland owner and farming community.

In 2010, the partnership launched the MoorLIFE project (**LIFE08 NAT/UK/000202**) in a bid to develop innovative conservation techniques to prevent the loss of active blanket bog, bring the area back to life and enhance the vegetation and bird communities that have given the area its protected status.

Helicopters enabled the project to deliver Sphagnum mosses to less accessible parts of the moors

By 2015, almost 2 500 hectares of Peak District and South Pennine moorland had been protected. The work stabilised damaged peat and reintroduced vegetation to restore and improve the conservation status of active blanket bog habitats and prevent further erosion. The amount of bare peat has reduced by between 90-99% following the conservation work.

Actions on a grand scale

The MoorLIFE project set out to restore some 886 ha of degraded blanket bog through a range of pioneering habitat restoration methods tailored to the specific demands of the different sites. The initial phase involved covering some 87 ha of bare peat with heather brash and geotextiles to create a barrier protecting the surface from erosion while providing a stable base for plants to grow.

Seeds, sphagnum, lime and fertiliser were dropped by helicopter to enrich the soil and protect it from further erosion by knitting the peat together with fast growing grasses. 200 000 plugs of native plants, of six different species to ensure diversification, were then planted by hand to increase the biodiversity of the sites and help stabilise the peat.

The blanket bogs will only start to regenerate if the conditions are just right and moisture is essential to allow the wildlife to thrive. The project therefore worked to re-wet the blanket bogs, blocking gullies using local materials. This was designed to improve conditions for the reintroduction of sphagnum mosses essential to blanket bog formation.

The MoorLIFE project applied knowledge, skills and experience gained from prior projects. Many of the techniques used – including the use of lime, seed, fertiliser and brash to stabilise the peat – were examples of best practice that had been trialled previously and were shown to be successful. The project explored different methods of moss distribution through the Sphagnum Technical Advisory Group, publishing an evaluation of these methods in a practitioners' guide to the reintroduction of sphagnum.

The MoorLIFE project was unique in the scale of the work carried out. In the early stages of the project, works across the MoorLIFE sites represented the largest scale operation of its kind in Europe. This was a significant opportunity to further develop conservation techniques as well as new methodologies, products and technology.

"We have made a huge difference in just five years to save these outstanding landscapes for the future. In five years MoorLIFE has saved 125 years of peat and halted the 200-year legacy of industrial pollution [...] this will have a very real impact on the life of the planet and on the quality of our drinking water," says Mr Dean.

Over the next five years the MoorLIFE 2020 project (**LIFE14 NAT/UK/000070**) will expand on the work already carried out and protect the integrity of some 9 500 ha of the target habitat.

Sphagnum. Each bead contains several small strands of moss

Project number: LIFE08 NAT/UK/000202

Title: MoorLIFE - MoorLIFE: Active blanket bog restoration in the South Pennine Moors

Beneficiary: Peak District National Park Authority

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Period: 01-Apr-2010 to 31-Aug-2015

Total budget: €6 691 000

LIFE contribution: €5 018 000

France: **Bird conservation in the outermost regions**

The CAP DOM project has helped conserve threatened bird species and their habitats in three overseas departments of France. As well as making an important contribution to stopping biodiversity loss in Reunion, Martinique and French Guiana, the project developed conservation management tools appropriate to the EU's outermost regions.

Photo: GEPOG/Maxime Dechelle

Guianan cock-of-the-rock (Rupicola rupicola), a species native to French Guiana

The overseas departments of Reunion, Martinique and French Guiana are especially rich in biodiversity. These three tropical outermost regions of Europe face particular challenges when it comes to safeguarding that biodiversity from the growing threat of invasive species, urbanisation and socioeconomic pressures. The EU's Birds Directive and Habitats Directive do not apply in these overseas departments and many conservation management tools in use in Europe are not adapted to the very specific conditions of these territories.

The LIFE project, CAP DOM (**LIFE09 NAT/FR/000582**) set out to develop and test conservation tools tailored to the challenge of stopping biodiversity loss in these regions, with a particular focus on the cost-effective protection of threatened bird species and their habitats. These tools also have relevance for conservation management in other outermost regions of the European Union.

Invasive species control

In Reunion, the project implemented rat control methods in an area of more than 800 ha of habitat favoured by the Reunion cuckoo shrike (*Coracina newtoni*). These actions helped increase the population of this rare bird species from 27 to 42 pairs. Significantly, CAP DOM found a way to more than halve the cost of rat eradication methods (from €160/ha to €73/ha). These methods were used to successfully clear rats from an area of 250 ha.

In French Guiana, the project mapped savanna habitats (found in some 90 sites in total), analysed the impact of slash-and-burn management and used this information to develop techniques for controlling the invasive plant species, brown sapwood (*Acacia mangium*), in these tropical grasslands. The project's experience fed into a savanna development plan and was the basis for the design of an educational savanna trail.

Rerouting tourist trails

Tourism is an important contributor to the local economy in all three of the project territories. Recognising the need for conservation actions to coexist with this sector, the CAP DOM team rerouted trails in both Martinique and French Guiana to mitigate the impact of tourism. An initial survey identified 15 'hot spots' and two potential reintroduction sites for the white-breasted thrasher (*Ramphocinclus brachyurus*) on Martinique. This allowed the LIFE project to close or redesign footpaths to reduce disturbance to the birds. In French Guiana, a new viewing trail was created to avoid disturbing the breeding of the colourfully-named cock-of-the-rock (*Rupicola rupicola*) at a much-visited site, Montagne de Kaw.

CAP DOM also ensured that some logging roads in this area were closed and published a trilingual best practice guide for decision-makers, to enable them to take the needs of the nesting birds into account in development schemes.

"The project has generated many socioeconomic benefits in the territories and in particular in terms of employment, creating a sustainable dynamic for the future," says project manager, Anne-France Touveron.

Partnership takes off

By fitting tracking devices to eight Agami heron (A*gamia agami*) individuals nesting in French Guiana, the project was able to gather new information about feeding grounds and migration routes of this threatened heron species and to make use of that information in a species conservation plan drafted in collaboration with organisations in neighbouring countries.

This partnership approach was replicated in all participating overseas departments. "In each region, CAP DOM has not only strengthened the capacity of nature protection organisations, but also developed strong partnerships with policy-makers and instigated real communities of naturalists, in particular involving local people," says Marion Grassi from project beneficiary, LPO. For instance, in Reunion, an awareness-raising campaign by the project led to the establishment of a local patrol to find injured or poisoned Reunion harriers (*Circus maillardi*) and take them to a bird recovery centre. The patrol is mostly operated by more than 70 volunteers. Thanks to their efforts, 26 of 41 Reunion harriers transported to the centre were later returned to the wild, significantly higher than the project's target of 30% of birds.

Photo: Yabalex

The Reunion harrier (Circus maillardi), known locally as 'le papangue'

Photo: LPO/Anne-France Touveron

Training local volunteers to support the project's conservation goals

The CAP DOM project adapted the French common bird survey to the three participating overseas departments and developed a methodology to identify priority sites of biodiversity in overseas regions. It created a database, VISIONATURE, which is steadily being populated with data collected by local observers in each of the participating territories. One of the key outcomes of the project has been the development of enduring partnerships and a conservation network encompassing the three tropical regions of France.

"Beyond the real conservation success after five years of practical conservation action, the project has managed to unite some 38 technical and financial partners in the three overseas departments," notes Ms Grassi. This conservation network and the lessons of the LIFE project could be extended to other outermost regions of the EU.

Project number: LIFE09 NAT/FR/000582

Title: CAP DOM - Conserving French overseas threatened bird species and their habitats using demonstrative conservation tools.

Beneficiary: Ligue pour la Protection des Oiseaux (LPO)

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Period: 15-Sept-2010 to 20-Sept-2015

Total budget: €2 252 000

LIFE contribution: €1 112 000

Hungary: **Conserving the Saker falcon**

A LIFE project helped to strengthen the core population of Saker falcon in Europe, by installing artificial nests, ensuring the availability of prey species and reducing significant threats to birds, especially the risk of electrocution.

Photo: Péter Tóth

Installing a new, bird-safe crossarm on an electricity pylon

The Saker falcon (*Falco cherrug*) is a globally-threatened bird of prey species, which is listed in Annex I of the Birds Directive. The EU population status of Falco cherrug was assessed as threatened in the latest bird conservation status assessment in the Article 12 report of the Birds Directive.

The Saker falcon is migratory, with juvenile females wintering in Africa and the Arabian Peninsula before returning to Europe to breed. Around 47% of the European breeding population of Saker falcon lives in Hungary and Slovakia, equating to approximately 450 pairs. In Europe, open grassland with some trees is the preferred feeding habitat, with ground squirrel and pigeon the main prey. Although juveniles roam widely across Europe, monitoring has revealed that they spend most of their time over Bulgaria, Hungary, Romania and Serbia, where there is a greater availability of undisturbed feeding and breeding habitats. These habitats are potential expansion areas for the core European population.

The Falco cherrug B-H-R-S project (**LIFE09 NAT/HU/000384**) helped to safeguard the population of Saker falcon in central Europe through a series of concrete conservation actions. These included constructing artificial nests, enhancing prey populations, insulating electricity distribution infrastructure, rehabilitating injured birds, securing cooperative agreements with farmers and wind farm operators, and raising awareness of the threats facing the species.

Nest sites and food sources

The project significantly increased nesting and feeding opportunities for Saker falcon. The project team installed a total of 153 artificial nests: 20 wooden nest platforms and 133 aluminium nest boxes. These were mainly erected in Romania, to support an expansion of the breeding population in that country.

The project team analysed the availability of prey species, for example, using camera traps and remote online

cameras in Hungary and Romania. They found that small mammals comprise a high proportion of the Saker falcon's diet, though prey composition varies year-by-year and according to weather conditions. In peak years for voles (*Microtus arvalis*) they were the main prey, but when springs were wet, the proportion of mammals in the diet decreased. In average years, ground squirrel (*Spermophillus citellus*) comprise up to 23% of the diet.

Five colonies of ground squirrel were successful established during the project. These were monitored, with ear tags enabling them to be identified in bird nests. In Hungary, 235 ground squirrels were re-located from airfields to potential Saker falcon feeding habitats; whilst in Romania and Slovakia 350 and 450 animals respectively were re-located to more favourable feeding habitats in protected areas. A follow-on project, RAPTORSPREYLIFE (**LIFE13 NAT/HU/000183**), is working to further secure prey sources for Saker falcon and other birds of prey in the Carpathian Basin.

Photo: www.dravce.sk/Stanislav Harvancik

The Saker falcon (Falco cherrug) is listed in Annex I of the EU Birds Directive

Coexistence with farming and wind farms

The results of the prey survey informed discussions between nature conservationists, hunters and pigeon keepers about the extent of the impact of the Saker falcon on species of economic and recreational interest. The project developed guidelines and a subsidy system for managing ground squirrel habitats on agricultural land in Hungary. The guidelines were also used to improve agri-environmental schemes in Bulgaria, Romania and Slovakia. These ongoing cooperative agreements will ensure long-term improvements in Saker falcon habitats.

Guidelines were also prepared for authorities planning wind farms, with the aim of avoiding such developments in the most important areas for Saker falcon. The project fitted PTT satellite transmitters to 19 adult and juvenile Saker falcons in the 4 project countries, which made 3D visualisation of flight paths possible. These devices revealed that the birds fly over areas with wind turbines, which means that they do not use these areas as feeding habitat. The migration data, when analysed through a GIS database, contributed to knowledge of Saker falcon population dynamics, and informed the global action plan for Saker falcon adopted under the Convention on Migratory Species (CMS; the Bonn Convention) in 2014.

Bird-safe pylons

A total of 8 938 electricity poles and pylons were effectively made bird-safe (400 in Bulgaria, 6 700 in Hungary, 700 in Romania and 1 138 in Slovakia), with the project team establishing good cooperative partnerships with electric companies in all four countries. This has resulted in the companies conducting their own ongoing conservation activities. The project initiated the development of three innovative types of bird-safe cross-arms for electricity poles and pylons, which were first introduced on 800 insulated poles in Hungary.

The project built cages for the rehabilitation of injured birds: two cages in the MILVUS rehabilitation centre in Romania and two cages at Bratislava Zoo in Slovakia. Ten Saker falcons were treated using these facilities during the project, while two injured birds were also treated and re-released in Hungary. Public awareness about the Saker falcon was increased through a website, information boards, documentary films and other activities.

Project manager József Fidlóczky notes that, "the main achievement of the project is that there are 14 breeding pairs of Saker in north-west Romania this year (2016), whereas we found only 1 pair at the beginning of the project."

Project number: LIFE09 NAT/HU/000384

Title: Falco cherrug B-H-R-S - Conservation of Falco cherrug in Northeast Bulgaria, Hungary, Romania and Slovakia

Beneficiary: Bükk National Park Directorate

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Period: 01-Oct-2010 to 31-Dec-2014

Total budget: €4 033 000

LIFE contribution: €3 006 000

Italy: **Developing coordinated protection measures for Apennine chamois**

The COORNATA project established two new colonies of Apennine chamois to boost the survival prospects of this highly endangered species.

Photo: Antonio Antonucci

Apennine chamois (Rupicapra pyrenaica subsp. ornata) in the Majella National Park

The Apennine chamois (*Rupicapra pyrenaica* subsp. *ornata*) is one of the rarest species in Italy. Listed in Annexes II and IV of the Habitats Directive and, as a subspecies, classified as 'vulnerable' in the IUCN Red List, the Apennine chamois is threatened by the low number and small size of its populations, and their low genetic variability..

The LIFE project COORNATA (**LIFE09 NAT/IT/000183**) was set up to implement measures for the long-term conservation of the Apennine chamois along the Central Apennines in Italy. At the outset of the project the source population of the Apennine chamois in the Abruzzo, Lazio and Molise National Park was decreasing: just 518 individuals were recorded in 2009. Whereas, the two populations situated in the Majella and Gran Sasso Laga national parks, which have benefitted from reintroduction since 1992 thanks to the LIFE programme, were growing.

The COORNATA project represents a continuation of the activities started in two previous LIFE projects (**LIFE97 NAT/IT/004143** and **LIFE02 NAT/IT/008538**). The establishment of the geographically isolated Apennine chamois colonies is in line with the national action plan for the species and with the IUCN Caprinae Plan. The national plan was renewed thanks to the project's contribution. "I think that the monitoring activities and management protocols adopted during the project will help us better address the critical issues facing the Apennine chamois. I hope it has definitively turned the page on its history of decline that reduced its numbers to just a dozen individuals in 1900," says Teodoro Andrisano, the COORNATA project leader.

In the Monti Sibillini National Park, where preliminary reintroduction started in 2008, the number of released animals was lower than 30 - the number considered the minimum size for a self-sustaining population. Following the national action plan for this species, a fifth population would be created in the Sirente-Velino Regional Park.

In order to relocate animals, the project tested a range of different capture techniques some of which, such as box traps and up-net traps, were used for the first time on the Apennine chamois. By modifying box traps, the project team was able to capture individuals from herds at both the

Biometric measurements performed during monitoring of the Parco Nazionale della Majella Apennine chamois population

national parks in the project area. The use of alternatives to tranquiliser darts was, "indispensable" to limit the initial dispersal behaviour of the released chamois, thus increasing the success of the project, says Mr. Andrisano.

The number of Apennine chamois captured and then released in the Monti Sibillini National Park brought the colonising nucleus up to the minimum size of 30 individuals. Thirteen captured Apennine chamois were also released in the Sirente-Velino Regional Park to establish a new colony in this park. Newborn Apennine chamois were observed in the first summer season after the releases, proving the success of the operation.

Tackling threats

In addition to the capture and release measures, the project analysed the threats affecting the population in the Abruzzo, Lazio and Molise National Park. It monitored individuals using markings and radio-tracking with GPS collars, as well as checking faecal pellets for parasites and studying their interactions with red deer to see if there was any feeding overlap. A specific action plan for this park was drawn up and approved.

The project team put in place procedures to ensure the long-term sustainability of the results achieved. For example, all project partners committed to continuing release activities until the number of 30 individuals is reached in order to maintain the new colony in the Sirente-Velino Regional Park; while a framework for the shared management of the target species was established. For the first time, the parks involved in the conservation of Apennine chamois worked together sharing teams and technical documents, including a unique database. The parks are starting to adopt the same approach for other threatened Italian species.

Furthermore, in order to treat endo-parasitic infestations of livestock, phyto-therapeutic products were used for the first time in all the parks (except for the Abruzzo, Lazio and Molise National Park). Activities were carried out to avoid spatial and dietary competition between chamois and livestock and to improve the sanitary management of livestock, and thus protect the chamois. These also enabled the project to increase the awareness of livestock breeders of conservation issues. A local association of breeders (*Associazione allevatori del Parco*) was established in the Sirente-Velino Regional Park to help improve sanitary management of livestock.

The project also helped raise the environmental awareness of the general public, tourists and pupils in local schools. The project produced an educational 30-minute DVD (*Il camoscio più bello del mondo*), information boards and brochures, and also reached experts and scientific researchers through publications, workshops and conference presentations. The project publications were made readily available on its website (www.coornata.eu).

Finally, the conservation of Apennine chamois can help maintain secondary high mountain meadows, which benefit from the species' grazing as it prevents the encroachment of shrubs. Grazing moreover benefits a range of species including birds and orchids that rely on this meadow habitat.

An attractive and popular feature on the Apennine landscape, the enduring presence of the chamois can be considered a boost to tourism. Thanks to the project, the Monti Sibillini National Park introduced a so-called Chamois hotel offer. Accommodation discounts are available to volunteers taking part in chamois-related conservation activities, such as the annual census. The project's closing conference, which was attended for the first time by specialists in all the chamois subspecies, included a session on eco-tourism.

Project number: LIFE09 NAT/IT/000183

Title: COORNATA - Development of coordinated protection measures for Apennine Chamois (Rupicapra pyrenaica ornata)

Beneficiary: Ente Parco Nazionale della Majella

Contact: Teodoro Andrisano (project leader), Franco Mari (project manager)

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Period: 01-Sept-2010 to 30-Sept-2013

Total budget: €3 142 000

LIFE contribution: €2 262 000

Poland: **Protecting and reviving the white stork population**

A LIFE project in north-eastern Poland focused on minimising deaths of migratory white storks through measures to insulate electric power lines. The project also improved habitat and nesting sites for the birds.

The majestic sight of white storks (*Ciconia ciconia*) flying is a familiar sight in much of Poland. Every spring, as the birds migrate north from their winter sojourn in Africa, Poland becomes a temporary home for around a quarter of the world's estimated total of 168 000 pairs of white storks. The majority of the white storks that stop off in Poland congregate and pair in Warmia and Mazury. In these areas of north-eastern Poland which are known for their wetlands, massive white stork nests, often weighing hundreds of kilograms, are a familiar sight.

The white stork is a protected species under Polish legislation and listed in the Annex I of the Birds Directive. Despite this, however, white storks were increasingly colliding with power lines; accidents that invariably proved fatal. Research has shown that some large birds like storks have blind spots which effectively render power lines invisible because their heads are angled as they fly, scouting the ground for food and other birds. Furthermore, changes to the urban landscape have reduced suitable nesting sites, leaving power poles as the most attractive – and sometimes only – nesting option.

Photo: T.Baldyga

White stork (Ciconia ciconia)

Identifying problems and creating solutions

The white stork is an emblematic bird in eastern Europe and especially Poland. The regional environmental protection board in Olsztyn, the capital of the Warmia-Mazury province, joined forces with the Polish society for the protection of birds to safeguard the future of these magnificent birds in northeast Poland. The project they designed, Protection of the white stork (**LIFE09 NAT/PL/000253**), aimed principally to address the dangers posed to the white stork population by uninsulated power lines.

Additionally, the ornithologists and environmentalists working together on the project wanted to enable birds to feed and breed more easily. Afforestation, intensive agriculture and changes to aquatic environments have combined to reduce the feeding areas and food sources of the visiting white stork population. With less food available, birds have to fly further to find food, which puts their young in jeopardy.

"White storks are not only magnificent birds to see flying in the sky or perched on rooftops. They are a critical element of Poland's biodiversity, but they are at risk from power lines and other hazards," explains Roman Kalski from the Polish Society for the Protection of Birds, the partner beneficiary that coordinated much of the conservation activity.

The project was based in the Natura 2000 network site Ostoja Warmińska, which was established as a protected area under the Birds Directive.

With close to two thirds of white stork nests in the project area to be found on the top of power poles, the need to protect birds from flying into power lines was becoming urgent – especially as the problem was afflicting mainly young birds learning to fly and find food. The project worked with the local electricity service provider to upgrade the power

infrastructure in the part of the refuge where the density of white stork pairs was greatest.

The insulation of 20.7 km of low- and medium-voltage lines has led not only to a dramatic reduction in the number of electrocuted white storks, but has had the additional beneficial effect of reducing the number of power outages and repairs in the area. Another 11.2 km of medium-voltage power lines were fitted with high-visibility markers to divert birds away from the immediate vicinity. The project also coordinated the upgrading of disconnectors, transformer stations and insulators to limit the dangers to the local white stork population.

Improved habitat and nesting

The project complemented the goal of preventing white stork mortality on power lines by providing alternative nesting sites away from such hazards. The construction of 158 free-standing poles with platforms has encouraged nesting and breeding.

Some nests sites on farm buildings had to be dismantled because they had become too heavy or unstable and were causing damage to the buildings, but the project coordinated the repair and reinforcement of 16 barns in ten villages throughout the project site on which white storks were nesting, enabling the birds to remain in place. Volunteer fire brigades in the area received equipment to assist in the removal of excessively large nests on chimneys posing a fire safety risk.

Feeding possibilities were improved by the construction of six reservoirs and four dams, enlarging the area of shallow wetland habitat favoured by white storks hunting for prey. These water features were colonised within a year by amphibians and aquatic insects, providing a reliable and readily available food source for the birds. Observations showed an increase in the number of hatching white stork chicks, and improved survival rates into adulthood.

One of the shallow wetlands created for white storks by the project

Photo: E. Bałdyga,S. Menderski

White stork (*Ciconia ciconia*)

The bird's white plumage is the origin of its name, but its wings are partly black and its legs and beak are red. Adult white storks have a wingspan of up to two metres, and the heaviest birds can weigh 4.5 kg. White storks are carnivores, feeding mainly on beetles and earthworms. The species is monogamous but couples do not pair for life. White storks winter throughout Africa. Their breeding range varies from Morocco in the south to the Baltic states in the north, and as far east as the Indian subcontinent.

Photo: TBałdyga

Engagement with local communities was an important element of the project. An information and education centre was established in Żywkowo village as a resource for local schools, visiting ornithologists and tourists. The centre promotes organic farming and environmental responsibility as essential tools in securing the area's rich biodiversity – of which the white stork remains the most visible and characteristic sign.

"Everyone in this part of Poland has seen a white stork, but now many more people are aware of its habitat, its biology and the dangers it faces every day," says Mr Kalski. "Our public outreach activities have helped to engage the local community as partners in our efforts to ensure that our white stork population continues to thrive."

Project number: LIFE09 NAT/PL/000253

Title: Ochrona bociana białego - Protection of the white stork population in the OSO Natura 2000 Ostoja Warmińska

Beneficiary: Regionalna Dyrekcja Ochrony Środowiska w Olsztynie

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Period: 01-Jan-2011 to 31-Dec-2014

Total budget: €1 457 000

LIFE contribution: €705 000

Poland: **Restoring inland dunes with grasslands**

A LIFE project cleared an overgrown Natura 2000 network site of trees, shrubs, and military and metallic waste, to successfully restore the area's dune and sandy grassland habitats and improve its conservation status.

Photo: Gmina Klucze

Polland's inland dunes are an important and biodiverse ecosystem

Southern Poland is home to two habitats listed in Annex I of the Habitats Directive - xeric sand calcareous grasslands and inland dunes with open *Corynephorus* and *Agrostis* grasslands. Some 3.9% of the country's inland dunes and 6.3% of its priority for conservation sand grasslands are found in the Pustynia Błędowska Natura 2000 network site, a unique ecosystem of inland dune sands containing rare and protected species of fauna and flora.

Pustynia Błędowska, which translates as Błędów desert, is an area of sands between Błędów and the villages of Chechło and Klucze. Dubbed the Polish Sahara, it provides an important enclave of biodiversity in the highly urbanised Silesian region. However, both Annex I habitats were listed as having unfavourable conservation status.

The goal of the LIFE project Pustynia Błędowska (**LIFE09 NAT/PL/000259**) was to obtain a favourable conservation status for these two habitats, the largest Polish complex of such sandy grasslands. The coordinator, Klucze municipal authority, aimed to achieve this through carrying out restoration work on the Natura 2000 network site, returning the habitats to their conditions of 50 years ago. In particular, the planned work included clearing up part of the site that had previously been used as a military training ground, as well as removing trees and scrub that had overgrown much of the area.

Clearing up

Modern detection methods (inductive detectors, magnetometers and ground-penetrating radar) were used to find unexploded bombs and other metallic items, such as scrap and medical waste. It was the first time such techniques had been employed on a large scale in Poland. Consequently, 3 803 pieces of explosive items and dangerous military materials were manually cleared from 400 ha of land, as well as some 77 tonnes of waste. With the cooperation of the Ministry of Defence, the unexploded ordnance was removed and reprocessed by the army.

Trees and bushes were then mechanically cleared from a 335 ha area in the southern part of the site, including Scots pine (*Pinus sylvestris*), silver birch (*Betula pendula*), sharp-leaf

willow (*Salix acutifolia*), poplar and aspen (*Populus tremula*). The removed wood was processed into biomass and given to public institutions, providing them with a carbon-neutral energy source.

A detailed inventory was carried out during the clearing work of the site's flora and fauna and their locations, as well as the habitat types, to determine the best ways of protecting them. It found that the area contains some 350 species of vascular plants, 19 of which are protected by law. The results of the inventory and monitoring work, based on GIS technology, have been collected in a database.

The clearing work produced uncovered surfaces of purified sand, creating the conditions needed for the establishment of on-sand swards (expanses of short grass) and inland dunes. Trees and scrub were left in place on the remaining 100 ha of land, in order to provide buffer zones for protected plant species, such as dark-red helleborine (*Epipactis atrorubens*) and broad-leaved helleborine (*Epipactis helleborine*).

Restoring habitats

The scrub and tree removal led to the restoration of favourable conservation status on 335 ha of the site's two target habitats. Tourist facilities were established in a 100 ha area of Pustynia Błędowska, close to the desert. These include 2 nature trails/education routes (of around 5 km length, in total) and 10 wildlife interpretation stations, which provide information about active conservation methods and explain ecological processes. A desert information centre was also created in Klucze, featuring a permanent interactive exhibition promoting the Natura 2000 network site and the project's achievements. In addition, a guide to protecting sand grasslands was published, in Polish and English, to enable others to benefit from the project's results.

A scientific workshop in the Bledowska Desert enabled knowledge exchange about the active conservation of sand priority habitats

Photo: Krzysztof Florys

Photo: Gmina Klucze

The project cleared trees and bushes from a 335 ha area

Klucze municipal authority continues to monitor the site following the completion of the project. It actively protects the desert, maintaining the swards and on-sand dunes by removing any trees and shrubs that start to grow. Pustynia Błędowska was an experimental project, which aimed to find the optimal methods of actively protecting on-sand habitats. Its full impact on the desert environment will take some time to emerge, but the effects are expected to be clearly visible in around five-to-ten years' time.

The project has, however, already improved public awareness about the need to protect the Pustynia Błędowska target habitats and increased interest in visiting the area. As a result, Klucze municipal authority will further develop the tourist infrastructure of the Natura 2000 network site, which is becoming a major tourist attraction. "The LIFE project gave us back the lost Błędów desert. The completed project is a combination of the values of nature conservation and the creation of a large-scale tourist attraction in Poland and Europe," concludes project manager Kamil Wolek.

Project number: LIFE09 NAT/PL/000259

Title: Pustynia Błędowska - Active conservation of priority sand habitats complex (6120, 2330) in the Natura 2000 site „Błędowska Desert"

Beneficiary: Klucze municipal authority

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Website: www.pustynia-bledowska.eu/

Period: 01-Jan-2011 to 30-Nov-2014

Total budget: €2 595 000

LIFE contribution: €1 297 000

Poland: **Optimising habitats for rare wetland birds**

Restoration of habitats, genetic analysis and GPS tracking of invasive alien mammal predators helped this LIFE project optimise breeding conditions and increase numbers of rare and threatened wetland bird species inhabiting five national parks.

The 'Polish Important Bird Areas' project (**LIFE09 NAT/PL/000263**) was situated in wetland areas of five national parks: Biebrza (*Biebrzański*), Drawa (*Drawieński*), Narew (*Narwiański*), Słowiński and 'Warta Mouth' (*Ujście Warty*). All the sites are Natura 2000 network SPAs, that is, designated as special areas of protection for rare and threatened European bird species. However, the populations of many of the bird species living in the wet and marshy areas of these national parks were in decline. There was a need to increase the level of knowledge about the birds, their habitats and threats posed by invasive alien species.

Started in 2011, the four-year LIFE project was coordinated by the mammal research institute of the Polish academy of sciences. Its overall objective was to implement and improve measures for the protection of targeted wetland bird species within the five national parks – all of which were project partners.

Specific aims were threefold: to improve the habitat conditions necessary to maintain the water/marsh bird populations, especially those species that had decreased in numbers in recent years; to introduce measures to reduce pressures on them from invasive alien predatory species, particularly the American mink (*Neovison vison*) and the common raccoon (*Procyon lotor*); and to identify other potential threats, while at the same time focusing some project activities on education and increasing knowledge about the birds.

Return to mowing

A number of active conservation measures were identified and implemented to help preserve biodiversity and boost overall bird numbers at all five sites. These included extensive grass mowing and bush removal to rebuild and conserve breeding sites. Over the project period, these practices were carried out on almost 400 ha of land in key areas. In some areas land purchase and/or leasing was also required. For example, in Narew National Park, mowing was contracted out with land lease agreements; and in the river valleys of Narew and Biebrza a total of 278 ha of private land was bought.

Another important part of the project was to control the number of invasive predatory mammal species. To this end, mink (829) and raccoons (171) were caught in over 300 live-traps (used to minimise the impact on other native species). At the same time, the main routes colonised by the predators in the parks were determined using genetic and GIS analyses.

The project restored wetlands in five national parks in Poland

Photo: Piotr Tałałaj

Nest predation was another problem. This was tackled by limiting the access of predators to breeding colonies and bird nesting-boxes by fencing breeding colonies off and fixing collars on trees to limit access by predators.

Monitoring effectiveness

Monitoring of these measures was carried out in all five national parks. Invasive predator reduction and the pace of colonisation in protected areas were assessed using photo-traps and floating rafts to record predator tracks. In most parks, the monitoring carried out in 2011-2013 showed a strong downward trend in the share of the platforms visited by mink. The most significant difference was noted in Narew, where 61% of rafts were penetrated by predators in 2012, while in the following season this had fallen to 25%.

Regular monitoring of breeding success was also carried out, with regular inspections of nests. Different species and nesting places were monitored depending on the various parks. Causes of hatching losses were determined with the help of photo-traps, (i.e. recording the presence of predators during the day and night). In addition, DNA analysis was carried out to determine the influence of location of American mink farms on the population numbers in the parks, and GIS analysis was carried out to show the spatial extent of the problem.

Breeding success

According to its final report, the project is already showing positive results. The number of invasive predators has dropped and the number of targeted birds has increased in the areas where action was taken. For example, the breeding of species previously not observed for many years has been recorded, namely pied avocet (*Recurvirostra avosetta*) and marsh sandpiper (*Tringa stagnatilis*). A spectacular increase in numbers of black headed gulls (*Chroicocephalus ridibundus*) breeding in Słowiński National Park has also been recorded, as well as of the northern shoveler (*Anas clypeata*), in Warta Mouth. Moreover, the monitoring data indicates the average density of waders has almost doubled in Narew, and breeding lapwings (*Charadriidae*) and spotted crakes (*Porzana porzana*) have appeared by the river Drawa. There has been an eightfold increase in the nesting success of waders - northern lapwing (*Vanellus vanellus*), black-tailed Godwit (*Limosa limosa*), common redshank (*Tringa totanus*) - in Biebrza National Park.

On learning about the LIFE award, project manager, Andrzej Zalewski was very pleased that the European Commission recognised the project's work in developing best practices in bird protection. He attributes its success to, "cooperation between scientists, highly motivated nature managers and conservationists. This award has ensured the knowledge gained through research in nature conservation must be continued to improve our decisions and actions in the future."

Encouragingly, authorities responsible for national parks, forests and Natura 2000 network sites are following the LIFE project's lead and adopting the its methodology to control invasive alien predator species in other parts of the country.

Why do we protect wetland birds?

Changes occurring in wetland areas have a negative impact on bird biodiversity. Groups of water and marsh birds consisting of several dozen species are a major contributor to such biodiversity. Populations of such water and marsh birds are influenced mainly by the following factors: climate change, habitat transformation and predation of invasive alien species.

Source: "Polish Important Bird Areas" Layman's Report, 2014

Installing a nesting box for birds

Photo: M. Domaga

Project number: LIFE09 NAT/PL/000263

Title: Polskie Ostoje Ptaków - Protection of water and marsh birds in five national parks - reconstructing habitats and curbing the influence of invasive species

Beneficiary: The Mammal Research Institute of the Polish Academy of Sciences

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Period: 01-Jan-2011 to 31-Dec-2014

Total budget: €1 450 000

LIFE contribution: €725 000

Slovenia: **Rehabilitating damaged wetlands**

Thanks to a collaborative effort, the WETMAN project successfully restored over 4 400 hectares of Natura 2000 network sites, removed invasive alien species and re-established key habitat types and species in the country's most important wetlands.

Over the past 50 years, Slovenia's natural areas have suffered serious wetland loss and degradation. Wetland areas were drained to give way to agricultural land and forests and Slovenia lost some 40% of its reeds beds, marshes and ponds between 1950 and 1992. Although agricultural intensification was the main reason behind this phenomena, industrial development, urbanisation, the introduction of invasive alien species and the rise of tourism and outdoor leisure activities also played a role.

The WETMAN project (**LIFE09NAT/SI/000374**) successfully re-established a 'favourable' conservation status for eight targeted freshwater habitats and six wetland Natura 2000 network sites.

Pohorje bog ecosystems

The Pohorje is a mountain range in north-eastern Slovenia characterised by forests. The Pohorje bog ecosystems Natura 2000 network site are among the largest wetlands of this type in Slovenia. They represent a specific habitat upon which numerous plant and animal species are dependent. Yet in the past the Pohorje bogs were drained to be replaced by fields.

The project action in this site focused on improving the habitat of the capercaillie (*Tetrao urogallus*) and black grouse (*Tetrao tetrix*) as well as a number of habitat types, such as active raised bogs, transition mires, bog woodland and natural dystrophic lakes. The project team constructed wooden dams to improve the water regime in the bogs. This should slow down – and potentially stop - overgrowth in the area.. The project also cleared 11 ha of overgrowth and structured the forest edge to preserve individual habitat types. In a bid to decrease the impact of tourism on sensitive bog areas, the project installed infrared sensors to monitor visitor numbers and restored or extended some 2 km of boardwalks.

The project removed invasive alien fish species from the Mura oxbow lakes

Photo: Matjaž Bedjanič

Safeguarding wetlands, marshes and swamps

Zelenci is a picturesque wetland with small lakes, bubbling underwater springs, watering holes and a meandering stream bed, which is also the habitat of many rare and endangered plant and animal species. At this Natura 2000 network site, the project focused on building a gravel barrier as the area had been threatened by gravel deposition caused by torrential streams. It also cleared overgrowth from a 2 ha area.

The third Natura 2000 site, Vrhe, is home to several small marshy areas and a swamp forest. Work here focused on improving hydrological conditions through the construction of a dam and a gravel barrier. Overgrown areas were cleared to increase the non-forest bog land and a number of measures were taken to preserve rare plants such as the fen orchid (*Liparis loeselii*).

Conserving key flora and fauna

Work in the Planik region, a marshy karst depression with a subterranean stream, also focused on preserving fen orchid habitat. This meant raising the water level by installing new infrastructure to block drainage ditches and clearing overgrowth.

In the Bela Krajina region, work centred mainly on improving the habitat of the indigenous European pond turtle (*Emys orbicularis*). The project introduced four female turtles with eggs and one male turtle and developed banks and shallows in one of the karst ponds It also got rid of overgrowth and rehabilitated the other two karst ponds of the region which had been drained and used as illegal landfills.

The sixth project site was the set of three Mura oxbow lakes near Petišovci. Here the WETMAN team removed invasive alien fish species and improved the habitat of five target fish, insect and amphibian species: the European mudminnow (*Umbra krameri*), the large white-faced dater dragonfly

The project made karst ponds in Bela Krajina more habitable to the European pond turtle (Emys orbicularis)

Deepening oxbow lakes. The project restored six different wetland habitats to a 'favourable' conservation status

(*Leucorrhinia pectoralist*), the European pond turtle, the amphibian Italian crested newt (*Triturus carniflex*) and the European fire-bellied toad (*Bombina bombina*). Work also focused on preserving the habitat type natural eutrophic lakes with Magnopotamion or Hydrocharition-type vegetation.

Lasting project benefits

"Thanks to LIFE we were not only able to revitalise six different types of wetlands but we also prepared the groundwork for the future restoration of similar types of wetlands in Slovenia," says project coordinator Nika Debeljak Šabec.

The project's success in meeting – and in some cases exceeding its goals – was in part due to the networking impetus provided by LIFE funding.

"Well organised and well-managed networking elicits a positive response from all those involved who tend to be even keener at this stage to add their piece to the puzzle. Participants felt they were part of the story helping to make it richer and giving it a soul beyond the results measured with indicators," says Dr Šabec.

Project number: LIFE09 NAT/SI/000374

Title: WETMAN - Conservation and management of freshwater wetlands in Slovenia

Beneficiary: Zavod Republike Slovenije za varstvonarave (Institute of the Republic of Slovenia for Nature conservation)

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Period: 01-Fev-2011 to 01-Fev-2015

Total budget: €2 144 000

LIFE contribution: €1 072 000

Slovakia: **Protecting the lesser spotted eagle**

The APOMARINA_SK project improved the conservation status of the lesser spotted eagle in Slovakia by establishing protective zones that resulted in increased breeding success and by reducing mortality caused by electricity infrastructure.

The lesser spotted eagle (*Aquila pomarina*) is a migratory species that overwinters in eastern and south-eastern Africa and breeds mainly in Europe. In Slovakia, it inhabits highland areas with a rich mosaic of habitat types (woodlands, meadows, pastures and marshes), and it prefers to nest in undisturbed old forest.

This relatively small raptor is an EU priority for conservation species, listed in Annex I of the Birds Directive. According to the latest conservation status report for the species under Article 12 of the Birds Directive, there are 11 400-15 500 breeding pairs of lesser spotted eagles, with up to 800 of those in Slovakia, where the population is decreasing. The population is assessed as 'secure' at EU level.

The aim of the APOMARINA_SK project (**LIFE09 NAT/SK/000396**) was to enhance the conservation status of the lesser spotted eagle, by creating favourable conditions to stabilise the breeding population in Slovakia.

Protective zones

The project designated a total area of 4 593 ha as protective zones for breeding habitats of the lesser spotted eagle. The zones are located in eight Natura 2000 Special Protection Areas (SPAs) in Slovakia. They cover forest areas encompassing around 15%-20% of the bird's national breeding population. The project developed management agreements to ensure that no human activity takes place in the protective zones during the breeding season, thus avoiding disturbance to nesting birds. Forestry and other activities are allowed at other times, though older trees are preserved during logging activities. Already home to 172 recorded nests, the project team installed 70 artificial nests in the protective zones, using metal frames, twigs and leaves, in the locations of previously damaged or destroyed nests.

Overall, the project monitored 187 breeding territories of the lesser spotted eagle, confirming the presence of 170 breeding pairs. This included 122 pairs in the protective zones. A total of 277 chicks successfully fledged during the project's lifespan. Average reproductive success was found to be 0.69 juveniles per breeding pair. Monitoring confirmed that the protective zones had a significant impact on the breeding success of lesser spotted eagle, with around a 20% increased likelihood of raising young in the protective zones compared to equivalent areas outside the zones.

A lesser spotted eagle rescued by the APOMARINA_SK project team

Photo: Miroslav Dravecky

Bird-safe power lines

A network of electricity power lines criss-cross the lesser spotted eagle's feeding territories, and electrocution on pylons is a significant cause of mortality. The project insulated a total of 5 520 electricity pylons in two SPAs (Laborecká vrchovina Uplands and Horná Orava), in collaboration with three energy companies that operate in different parts of Slovakia. This insulation was predominantly in the form of plastic barriers that allow birds to safely sit on the pylons; though in one SPA (Horná Orava), 207 newly-designed steel consoles were installed. Monitoring confirmed a nearly 100% efficiency of the plastic barriers. A total of 57 581 ha of feeding habitats for the lesser spotted eagle was therefore made safe from electrocution in the two SPAs, which host around 10% of the national breeding population. The project team also recovered six injured lesser spotted eagles, treated them in animal rescue facilities, and released them back into the wild.

The project created technical reference documents for the long-term conservation of the lesser spotted eagle, habitat management plans for the eight SPAs, and a national lesser spotted eagle management plan. It also contributed to the draft recovery plan for the species at the EU level. In Slovakia, the project also helped develop a forest-environment scheme that was incorporated into the Rural Development Programme, to give landowners the opportunity to apply for funding if their activities contribute to the protection of 24 endangered bird species, including the lesser spotted eagle.

An umbrella species

The lesser spotted eagle is considered to be an umbrella species because protecting it will indirectly protect many other species in the same habitats. Thus efforts to protect lesser spotted eagle help prevent a general decline in biodiversity. The forests where the lesser spotted eagle breeds are mainly managed for commercial forestry. Modifying forestry practices to preserve the older trees that are suitable for nesting not only improves breeding success, but can also contribute to protecting ecosystem services, for instance, by reducing soil erosion and increasing the water-retention capacity of the landscape, which helps to minimise the risks of rapid floods that are predicted to increase due to climate change.

Photo: Boris Maderic

The project focused on making power lines safer for eagles and other raptors

Through its monitoring activities, the APOMARINA_SK project increased the available knowledge about the lesser spotted eagle and its habitats in Slovakia. This included data on reproductive success, the tree species preferred for nesting, and the height the birds build nests above the ground. These findings were disseminated through a website, reports and a documentary film. Environmental education was an important part of the project, and 265 education events involved a total of 7 169 participants.

"Cooperation at all levels was key to the success of the project," says project manager Zuzana Guziová. "The project developed intensive cooperation with stakeholders, including the State Nature Conservancy, the Slovak environment inspectorate, state forests, private landowners and hunting associations that have direct impacts on the status of the lesser spotted eagle habitats and thereby on the species' population." This unique partnership was reflected in the project's slogan: Together we can Save the Lesser Spotted Eagle.

One of 70 artificial nests installed by the project

Photo: Miroslav Dravecky

Project number: LIFE09 NAT/SK/000396

Title: APOMARINA_SK - Conservation of Aquila pomarina in Slovakia

Beneficiary: Raptor Protection of Slovakia

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Website: www.dravce.sk/apomarina/

Period: 01-Jan-2011 to 30-Jun-2015

Total budget: €854 000

LIFE contribution: €640 000

Spain: **Ensuring the health of mountain pastures**

The SOIL-Montana project developed Agroecosystem Health Cards. These are a simple and practical way to assess the health of any pastoral ecosystem through analysis of soil microbial diversity and surface vegetation.

The economy of mountainous areas of the Basque Country remains wedded to traditional farming activities based on transhumance - the movement of livestock to higher pastures in summer and to lower valleys in winter. Many of these grazing areas are part of the Natura 2000 network, including sites in and around the Gorbeia Natural Park.

However, with diminishing economic returns, fewer young people in the region are becoming livestock farmers: 40% of farm owners there are now aged over 65. Abandonment is therefore a significant threat to the future of mountain and valley habitats.

The SOIL-Montana project (**LIFE10 NAT/ES/000579**) tested a new approach to habitat management in these sites that substituted the traditional focus on levels and types of vegetation with a new methodology designed to achieve the optimal conservation of both soil and vegetation biodiversity.

Agroecosystem Health Cards (AHCs) include microbiological indicators of soil quality, as well as standard physical-chemical indicators; they also take livestock into account. Their use thus gives a more complete picture of the health of pastoral ecosystems.

The SOIL-Montana project was led by NEIKER, the Basque agricultural development research institute, working in partnership with the Basque government and provincial council of Bizkaia, the Lorra cooperative, and farmers' associations in Orozko and Zeanury.

Healthy ecosystems by design

The first stage of the project involved the creation of a georeferenced environmental network that compiled information on the diversity of the most representative pasture areas and farms, taking into account both ecological factors (e.g. vegetation type, altitude, geology) and factors linked to livestock management (e.g. livestock density, breed).

SOIL-Montana analysed soil microbial diversity to develop a tool to assess the health of pastoral ecosystems

The project used NIRS (Near Infrared Spectroscopy) technology to quickly and cost-effectively measure soil parameters. It carried out a pyrosequencing analysis to identify the soil microbial diversity (at species level) of the Atlantic grasslands of the Iberian Peninsula and to determine possible relationships between indicators of soil and vegetation health. These were summarised in a catalogue of best practices produced by the project.

The information was used to inform the design of the Agroecosystem Health Cards, a manual produced by the project to explain in a simple and practical way how assess the health status of different pastoral ecosystems. Non-experts can make a basic health diagnosis without prior training by measuring a range of indicators with simple instruments and with the help of the manual. The manual also identifies advanced indicators that can be measured by experts with professional equipment and training.

Simulation of cessation (closure) vs. grazing (non-closure)

Methodology:
Enclosures for livestock of 10 x 10 m, with livestock mesh and barbed wire.

Production service:
Negative effect of abandonment. In the absence of livestock-raising activities, the value of this service is minimal according to the AHCs (1 out of 9), as the production of pasture is not used.

Biodiversity conservation service:
No significant changes in overall terms.
Slight increase in microbial diversity and decrease in botanical diversity.
Habitat 6170: The species *Brachypodium pinnatum* turns up as an indicator of cessation.
Habitat 6230*: The species *Nardus stricta* disappears in exclusions.

Soil resource conservation service:
Positive effect of cessation: increases penetrability in compacted soil.

Fight against climate change service:
Negative effect of cessation: emissions of CO_2 increase from the soil to the atmosphere.

Overall health diagnosis for an **ABANDONED AGRO-ECOSYSTEM: 4.4** Overall health diagnosis for a **GRAZED AGRO-ECOSYSTEM: 6.45**

"In the light of these results, we can deduce that the cessation of grazing in these areas would lead to a decline in its health in overall terms. On the contrary, the clearing of certain bushy areas would allow an increase in the surface area-pasture production and redistribution of stocking rates," says Mr Mijangos.

In each case, the AHCs diagnose the status of four key ecosystem services related to pastures:

1. Pasture production.
2. Conservation of biodiversity.
3. Soil conservation.
4. Fight against climate change.

"The overall health diagnosis of the agro-ecosystem will depend on the status of these services," explains project manager Iker Mijangos.

The project team implemented a number of activities to conserve and restore the target agro-ecosystems and used the health cards to assess their impact. In the course of the LIFE project, various clearing, fencing, fertilising and liming actions were carried out on more than 120 ha of pastoral mountain and valley habitats. These included bush clearance on 40 ha of dry heaths, control of 4 ha of ferns, comparison of the impact of organic fertiliser with the impact of non-application and comparison of grazing versus non-grazing (see box above).

Agroecosystem Health Cards can help conserve soil biodiversity

SOIL-Montana's legacy

The project demonstrated that Agroecosystem Health Cards could be a useful instrument at European level, for example, to guide the implementation of the Common Agricultural Policy. The health cards allow even untrained livestock farmers to make decisions that preserve the biodiversity of fragile agro-ecosystems, whilst helping their bottom line: healthy soils produce good-quality pasture.

The AHCs are already being used for grassland management of the Armañón Natural Park in Spain. "They can in practice be applied to any agroecosystem," says Mr Mijangos.

Project number: LIFE10 NAT/ES/000579

Title: SOIL-Montana - Agroecosystems health cards: conservation of soil and vegetal diversity in mountain and bottom valley grazing areas

Beneficiary: NEIKER - Instituto Vasco De Investigación y Desarrollo Agrario, S.A.

Contact: Iker Mijangos

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Website: www.soilmontana.com

Period: 01-Sept-2011 to 31-Dec-2014

Total budget: €1 649 000

LIFE contribution: €787 000

Italy: **Removing an alien threat to the white-clawed crayfish**

A LIFE project demonstrated several techniques for controlling a highly invasive alien species of crayfish to help conserve the native white-clawed crayfish at key sites in Italy.

Photo: S. Zanini

The invasive Louisiana crawfish (Procambarus clarkii)

The north-east Italian region of Friuli-Venezia Giulia is home to numerous perennial surface streams and natural lakes hosting an extremely rich and diversified fauna, including the native white-clawed crayfish (*Austropotamobius pallipes*) – the country's most widespread, indigenous crayfish species.

The region's stock of native crayfish populations, moreover, includes some endemic subspecies that are genetically significant. But these populations are seriously threatened and may even be at risk of local extinction, due to the recent and widespread appearance of a highly invasive, non-native species, the Louisiana crawfish (*Procambarus clarkii*). The conservation status of the species was downgraded by the IUCN from the vulnerable to risk of extinction category in 2010. It is listed in Annex II of the Habitats Directive.

The RARITY project (**LIFE10 NAT/IT/000239**) was launched to contain the spread of this invasive crayfish and improve the conservation status of native populations in the region. During the project, a total of 21 500 individuals of the invasive crayfish were captured and removed, resulting in the invasive species being eradicated from two sites. Furthermore, Early Detection Rapid Response Protocols for the invasive crayfish were implemented in ten sites. Monitoring of native and non-native crayfish was carried out over the whole of the region through a network of 238 monitoring stations. More than 60 volunteers, mostly fishermen, linked with the coordinating beneficiary – the regional authority, Ente Tutela Pesca del Friuli-Venezia Giulia – took part in this aspect of the project. It enabled the status, abundance and distribution for all crayfish in the region to be accurately analysed.

The project also restored two farm buildings for breeding the native white-clawed crayfish. Here, a total of 42 126 juveniles were produced during the project's duration, enabling the release of 34 806 crayfish in eight Natura 2000 network sites in the region from 2012 to 2014.

Photo: M. Zanetti

Monitoring actions on native and non-native crayfish in a mountain river

Innovative control

A key outcome of the project was the development of three innovative techniques for controlling the invasive crayfish; two were tested in the field. The sterile male release technique, which entails sterilising males using x-rays, was successfully applied in Casette, a closed lake. The released males were able to mate with the females, in competition with the non-sterilised males, resulting in a reduction in the number of fertile eggs being laid. This technique had already been tested in Italy, but the RARITY project enabled the optimum radiation dose to be determined. This technique, combined with intensive trapping, resulted in an 87% reduction in the population of the invasive Louisiana red swamp crayfish. The project showed how the sterile release technique can be replicated in other sites with characteristics similar to Casette Lake.

Another innovative technique involved the laboratory production of baits that contain compounds with similar effects to sex pheromones. These would attract mature males of the same species during the reproductive period. The sex pheromone mimicking compound was synthesised using a phage library from the RNA of crayfish tissues. This technique was tested in the field and confirmed to be species-specific, so has good potential for the baiting of traps. The third innovative technique, which was an addition to the original work programme, involves baiting food pellets with gonad-inhibiting hormones to reduce fertility. This was finalised and tested in the laboratory.

The project informed the public and interested stakeholders of these measures and the urgent need for conservation of the native crayfish. It produced a film, a book, brochures, handbooks, noticeboards and newsletters, along with the organisation of numerous public events and participation at scientific conferences, workshops and seminars. The engagement of stakeholders, such as anglers, fishing shops, public administrations, rangers and reclamation consortiums, is expected to reduce the damage caused by non-native crayfish.

The project represents good practice in the context of European Union Regulation 1143/2014 on the introduction and diffusion of invasive alien species. To encourage the replication of the project activities, all documents were made available on the project website. The website furthermore, "warns of the risks of the introduction of alien species and allows people to report their presence using their smartphones and computers," says Massimo Zanetti, project manager.

Finally, a regional regulation (no. 27 of 31/12/2012) for the protection of Austropotamobius pallipes was approved thanks to the project. This regulation prohibits the capture and release of invasive crayfish, setting penalties ranging from €25 to €500. The action plan for the protection of white-clawed crayfish drawn up the project was approved by the board of the Ente Tutela Pesca del Friuli-Venezia Giulia in July 2015. "We trust that the growing sensitivity of citizens to the problem of alien species and the new law can be crucial tools to prevent further releases of alien crayfish and allow better control of their populations," says Mr Zanetti.

The female white clawed crayfish stores eggs under her abdomen until the spring

Photo: G. De Luise

Project number: LIFE10 NAT/IT/000239

Title: RARITY - Eradicate Invasive Louisiana Red Swamp and Preserve Native White Clawed Crayfish in Friuli Venezia Giulia

Beneficiary: Ente Tutela Pesca del Friuli VeneziaGiulia

Contact: Massimo Zanetti

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Website: www.life-rarity.eu

Period: 01-Sep-2011 to 31-Aug-2014

Total budget: €2 675 000

LIFE contribution: €1 251 000

Spain: **Crafting strategies for land stewardship across Europe**

The LANDLIFE project bridged the gap between public authorities, conservation organisations and private landowners, developing and disseminating models of land stewardship for more effective management and enjoyment of Europe's natural spaces.

Many scientists believe the multiple threats to the integrity of Europe's natural environment could prove irreparable unless concerted action is taken to preserve and protect the continent's rich biodiversity. Intensive agriculture, urbanisation, the effects of climate change, land abandonment and pollution are all contributing to this uncertain outlook.

Public authorities are taking steps to address citizens' concerns about loss of biodiversity throughout Europe, but there is a limit to how much regulators and legislation can achieve. Much of Europe's land is in private hands, and without the active commitment of such landowners to proactive and sustainable land management, the continent's precious natural heritage is likely to suffer.

The LANDLIFE project (**LIFE10 INF/ES/000540**) was conceived to address the need to provide a platform for stakeholders in land ownership and management to work together. The project introduced and promoted the concept of land stewardship, with the intention of encouraging a greater sense of responsibility to protect the continent's flora and fauna. LANDLIFE was focused principally on the western Mediterranean.

Building bridges

The project team, led by Spanish NGO, Xarxa de Custòdia del Territori (XCT), whose name in English means the land stewardship network, focused on developing linkages between private landowners, public authorities and conservation bodies to foster a common understanding of the concept of land stewardship. Additionally, efforts were undertaken to highlight the way that land stewardship can contribute to new opportunities for rural development through the marketing of agricultural products and the nurturing of eco-tourism.

"We identified the need for coordination and dialogue as essential elements in land stewardship," explains Sergi Marí, coordinator of XCT. "The natural environment is a gift to all Europeans, and with careful management it's a gift that can be passed on to future generations."

Photo: Stephan Agnezy

A promotional image from the European Land Stewardship Week established by the LANDLIFE project

The project placed a special emphasis on networking and learning lessons from the Mediterranean countries of which the partner organisations were drawn, or had developed networks and expertise. LANDLIFE conducted several workshops to promote best practice and exchanges of know-how.

Communications activities to engage the public and promote the idea that we all have a stake in land stewardship formed a central component of the project's activities. LANDLIFE conceived and executed the concept of European Land Stewardship Week, which acted as a platform for landowners, authorities and civil society to start a dialogue with citizens about each other's roles and responsibilities in ensuring the preservation and protection of the natural environment. Through this flagship initiative, the project coordinated more than 400 events and activities in the beneficiaries' countries and beyond.

As part of the European Land Stewardship Week, LANDLIFE organised a 'connect with nature' campaign that encouraged people to enjoy nature and to communicate that enjoyment through photographs. This helped to raise awareness of the project's goals, in particular through the use of social media.

Communications tools

LANDLIFE developed four key publications. The first was a comparative study of different land stewardship practices across Europe and the political and legal context in which they take place. This was informed by responses to a questionnaire from almost 200 different organisations involved in aspects of land management and stewardship.

LANDLIFE drafted a toolkit on land stewardship to enable individuals and organisations active in this field to design and implement projects. The toolkit includes a self-assessment questionnaire and six basic technical tools to help shape land stewardship agreements between stakeholders. Additionally, a manual, Caring together for nature, was produced to assist current and future land stewardship projects with quality standards. Deploying information from 28 case studies (from 11 countries), it was produced in English and issued in shorter form in four other languages.

To encourage the next generation to take an interest in nature conservation issues, LANDLIFE produced a storybook, a flipbook and a song called, 'What's going on at the pond?', designed to appeal to schoolchildren and educate them about some of the land stewardship issues developed during the project cycle.

One of LANDLIFE's most innovative features was its use of land stewardship agreements, binding stakeholders to seek and implement common objectives to protect their shared natural heritage. In Italy, for example, 60 agreements covering a land area of 1 160 ha were signed, while in the French region of Languedoc-Roussillon – famed for its wines and rugged landscape – 73 accords were made, relating to around 7 100 ha. The success of this approach led to the Barcelona Declaration on Land Stewardship, forged at the end of the project cycle, which will further the project's aims by seeking to extend its principles across the European Union.

Training activities complemented the project's approach. More than 60 individuals were trained in land stewardship, and many organisations involved in nature conservation, both in the public and private sectors, were able to benefit from the manual, toolkit and an online helpdesk forum. The online training courses established by the project, requiring 30 hours of study over six weeks, reached an estimated 31 000 beneficiaries.

"Although this project was focused primarily on the Mediterranean, the strength of our work lies in its flexibility and adaptability for all parts of the European Union focusing on land stewardship as a mechanism for nature conservation," says Mr Marí. "The approach we have pioneered will be of immense value as Europe looks to develop economic strategies and opportunities based on the green economy."

LANDLIFE's legacy lives on. XCT, the main beneficiary, is building on the project's achievements to reinforce land stewardship principles across Europe by linking to the Natura 2000 network of protected sites.

"XCT is working in three strategic areas of land stewardship," says Mr Marí. "First, we boost the land stewardship network all across Europe as a continuation of the LANDLIFE project. Second, we keep working with local groups to carry out stewardship actions in Catalonia and other neighbouring regions. And third, we involve private landowners in the conservation of the Natura 2000 network, since most of the land in the network remains privately owned and open to human access."

The project organised workshops to promote knowledge exchange

Photo: Xarxa de Custòdia del Territori

Project number: LIFE10 INF/ES/000540

Title: LANDLIFE - Boosting Land Stewardship as a Conservation Tool in the Western Mediterranean Arch: a Communication and Training Scheme

Beneficiary: Xarxa de Custòdia del Territori

Contact: Sergi Mari

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Website: www.landstewardship.eu/

Period: 01-Sep-2011 to 31-Dec-2014

Total budget: €1 628 000

LIFE contribution: €814 000

Slovenia: **Demonstrating the importance of freshwater biodiversity**

An innovative media campaign based on a flagship EU species – the otter – helped the AQUAVIVA project increase Slovenian public awareness about biodiversity loss and its negative impact on freshwater ecosystems.

When carrying out the simple task of turning on a tap, people are often unaware that the quality of the water they're using depends on the conservation and maintenance of natural freshwater ecosystems. Raising awareness about the need to preserve everyday ecosystem services can be aligned with campaigns involving the habitats and species within those ecosystems. Effective public awareness campaigns that help to halt biodiversity loss frequently use flagship species to influence public attitudes. For example, otter conservation actions could have knock-on benefits for a wide range of other species in freshwater ecosystems.

Positive influence

Thus the main objective behind the awarded LIFE Information and Communication project AQUAVIVA (**LIFE10 INF/SI/000135**) was to positively influence people's attitudes to water biodiversity and nature protection issues using the Habitats Directive listed species the Eurasian otter (*Lutra lutra*) as a representative of aquatic life. The campaign emphasised the need to preserve freshwater ecosystems for a host of different species, as well as for important ecosystem services.

The project thus supported the implementation of European environmental policy and the nature directives, including the goals of the EU Biodiversity Strategy to halt biodiversity loss by 2020, as well as supporting the International Commission for the Protection of the Danube River (targeting improvements in water quality in the Danube and its tributaries).

The project was coordinated by LUTRA Institute, an independent environmental NGO devoted to the conservation of freshwater and riparian ecosystems that support the Eurasian otter. There were also two project partners: the Institute for Water; and communications company, HOPA.

The European otter (lutra lutra) was central to AQUAVIVA's campaign to raise awareness about freshwater biodiversity in Slovenia

Photo: Hrvoje T. Oršanič

AQUAVIVA's main communication and advertising campaigns included placing highly visible advertisements on public transport buses and in shopping centres, organising riverside exhibitions and promoting a collection of fashion knitwear illustrated with patterns of freshwater diatoms (tiny algae). The innovative designs have featured on catwalk models (and on fashion websites) in Ljubljana, Slovenia, the United States (New York) and also in Japan. The project also held 30 workshops for the general public and 59 education days for schoolchildren.

Among several other innovative actions, the LIFE team organised exhibitions of waste products (collected from rivers and springs) to act as a deterrent and to raise public awareness of the threats to aquatic biodiversity. Other notable successes included an art competition for schoolchildren and workshops for the general public. The latter events were typically organised alongside traditional events (fairs, river celebrations, etc.). Otter-themed nature education days were also popular as they brought nature conservation education out of the classroom and into the local natural environment, such as rivers, lakes and streams.

The project also set up info-points in the Technical Museum of Slovenia (in Ljubljana) and in the Aqualutra centre situated in Goričko Landscape Park. These featured outdoor models showing water flow and retention models under various conditions, natural and degraded.

Online communication activities were divided between the project website and social media channels, helping to encourage people to share their opinion about nature conservation issues.

An opinion poll, conducted in September 2014 on behalf of the project found that there had been a 34% increase in awareness of biodiversity loss in Slovenia compared with 2010 (when the project's objectives were being drawn up). Importantly, 71% of respondents agreed with the statement that, "biodiversity loss is a serious problem."

AQUAVIVA used innovative ways of interesting the public in its message, such as a partnership with a fashion knitwear company

AQUAVIVA's key messages

- Water is the most precious natural resource on our planet - important not only for people, but also for other living organisms, especially those living in water habitats.;
- Rich biodiversity enhances the quality of life. A rich biodiversity of water habitats means good water quality;
- Integrated water resources management means life for aquatic organisms, as represented by the otter.

A wetlands workshop held by the project

Project manager Marjana Hoenigsfeld Adamič attributes AQUAVIVA's success to teamwork. "Our experiences testify that connections with institutions and individuals developed over the course of the project work ...are much stronger and long-lasting than foreseen," she adds.

As a result, the project provides model that could be applied to the whole Danube river basin and beyond.

Project number: LIFE10 INF/SI/000135

Title: AQUAVIVA - Live Water - from Biodiversity to the Tap

Beneficiary: LUTRA, Institute for Conservation of Natural Heritage (private non-profit institute)

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Website: http://aquaviva.si/en

Period: 01-Sept-2011 to 31-Aug -2014

Total budget: €548 000

LIFE contribution: € 235 000

United Kingdom: **Supporting the Natura 2000 network**

The Futurescapes project promoted landscape-scale conservation initiatives and green infrastructure. Its practical conservation work and advice helped to support protected sites across the UK and conserve biodiversity.

Nature reserves and protected areas such as the Natura 2000 network are important for preventing habitat loss and conserving biodiversity. However, they are often too small and isolated for threatened and vulnerable species to survive and thrive. This is the case in the UK, where decades of habitat loss have left some species in a precarious state. Landscape-scale approaches to conservation and the development of green infrastructure can help combat the loss of biodiversity and associated ecosystem services. Such measures create ecological networks and corridors to enlarge, connect and strengthen reserves and protected areas.

The objective of the LIFE Information & Communication project Futurescapes (**LIFE10 INF/UK/000189**) was to support the Natura 2000 network in the UK by promoting landscape-scale conservation initiatives. Specifically, the project coordinator, the Royal Society for the Protection of Birds (RSPB), planned to work with partners to encourage the development of green infrastructure and conserve biodiversity in 34 priority areas (known as Futurescapes), located in all four regions of the UK. It also aimed to highlight the importance of green infrastructure and landscape-scale conservation to a wide range of people, from professionals to the general public.

Engaging people

A team of regional officers employed by RSPB led communications work targeting potential project partners and funders. The fundraising efforts with a range of partners were highly successful: with a total budget of some €3.8 million, the project helped raise €40.3 million for direct conservation delivery (i.e. habitat improvement) and €112.6 million for all other aspects of landscape-scale conservation, such as communications work.

Futurescapes was so successful that an additional four priority areas were added during the course of the project, raising the total from 34 to 38. The Futurescape officers carried out a mapping exercise for each priority area to identify key habitats and species, landowners and managers, current conservation activity and the potential for habitat improvements. In total, 144 different partnerships were developed to work on 198 individual projects, including practical conservation work on 108 500 ha of land and provision of conservation advice to landowners and farmers on over 168 000 ha.

The LIFE project's conservation actions encompassed 134 Natura 2000 network sites, which cover over 2.2 million ha that includes coastal habitats, wetlands, farmland, woodland and habitat mosaics. The work helped provide buffer zones for some areas and improve connectivity between sites, whilst some actions focused on habitat restoration and the potential to extend or create new Natura 2000 network sites.

The Futurescape officers were supported by public engagement staff who focused on communicating with the general public and schools. A community engagement plan was prepared for each priority area involving various activities, such

Inner Forth tidal pool at RSPB Skinflats nature reserve

Photo: www.photoscot.co.uk/David Palmar

as field visits for schools, local events (on RSPB and partner sites) and community talks. The LIFE project's key message was that landscape-scale conservation can provide major benefits for local communities as well as for wildlife. The engagement work proved to be a great success, reaching over 310 000 members of the public (60% adults, 40% children) through activities and events.

Teaming up

Futurescapes was an innovative project for RSPB, which used it to try out new approaches to mapping, forming partnerships and community engagement. It has made an important contribution to the development of landscape-scale conservation in the UK. In addition, the project's high-level advocacy work to promote such conservation and green infrastructure has supported UK government agencies in advocating the approach as well, during a time when landscape-scale conservation has started to come of age in the UK.

A major success for Futurescapes was an agreement reached between the four main land-owning conservation NGOs in the UK (RSPB, the National Trust, the Wildlife Trusts and the Woodland Trust) to develop common approaches to landscape-scale conservation. "Potentially, this is game-changing because you have the most control in landscape-scale conservation when you own the land to really manage the land well for the long-term benefit of wildlife," says Adrian Southern, Head of Landscape-Scale Conservation at RSPB. The NGOs aim to work together to share best practices and look into alternative sources of finance, such as from ecosystem services or other innovative funding approaches, to be able to do more landscape-scale work.

Many of the partnerships established during the project will persist and high-level advocacy continues. The RSPB staff will also continue developing projects and working in partnership with others. On top of that, RSPB has set up a

Photo: RSPB/Brian Reid

The project established partnerships to develop common approaches to landscape-scale conservation

Landscape-Scale Conservation Unit. With this, it is looking to embed landscape-scale conservation as a way of working across the whole organisation. "LIFE funding was catalytic in starting off towards this goal, which we hope to achieve by 2020," says Dr Southern.

RSPB has selected 11 Futurescapes where it hopes to work with partners to accelerate delivery and focus efforts to deliver more by 2020. They all have business plans, developed during the LIFE-funded project, which the NGO is now looking to deliver. RSPB hopes to develop another LIFE project to support this, focusing more on conservation delivery this time. "We want to demonstrate new ways of doing things, and the art of the possible, to help inspire others to do more," Dr Southern explains. Work is also continuing at the project's other 27 Futurescapes as part of RSPB's long-term ambition to support a suite of 83 Futurescapes across the UK.

"I'm proud of what we've achieved with LIFE funding," concludes Dr Southern. "It has been a catalyst in the way we are looking to approach landscape-scale conservation in the future, both within RSPB and, in particular, with our many partners."

Bunting produced as part of the project's community engagement

Photo: RSPB/Brian Reid

Project number: LIFE10 INF/UK/000189

Title: Futurescapes - Futurescapes: promoting the development of green infrastructure in 34 priority areas throughout the UK.

Beneficiary: The Royal Society for the Protection of Birds (RSPB)

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Website: www.rspb.org.uk/whatwedo/futurescapes/

Period: 01-Sep-2011 to 31-Mar-2015

Total budget: €3 855 000

LIFE contribution: €1 928 000

Available LIFE Nature publications

LIFE Nature brochures

LIFE and new partnerships for nature conservation (2015 – 80 pp. - ISBN 978-92-79-54059-2)

LIFE and freshwater fish (2015 – 68 pp. - ISBN 978-92-79-44027-4)

LIFE and Invasive Alien Species (2014 – 80 pp. - ISBN 978-92-79-38307-6)

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

The LIFE programme is the EU's funding instrument for the environment and climate action

Period covered 2014-2020

EU funding available approximately €3.46 billion

Allocation of funds Of the €3.46 billion allocated to LIFE, €2.59 billion are for the Environment sub-programme, and €0.86 billion are for the Climate Action sub-programme. At least €2.8 billion (81% of the total budget) are earmarked for LIFE projects financed through action grants or innovative financial instruments. About €0.7 billion will go to integrated projects. At least 55% of the budgetary resources allocated to projects supported through action grants under the sub-programme for Environment will be used for projects supporting the conservation of nature and biodiversity. A maximum of €0.62 billion will be used directly by DG Environment and DG Climate Action for policy development and operating grants.

Types of projects Action Grants for the Environment and Climate Action sub-programmes are available for the following:

> "Traditional" projects – these may be best-practice, demonstration, pilot or information, awareness and dissemination projects in any of the following priority areas: LIFE Nature & Biodiversity; LIFE Environment & Resource Efficiency; LIFE Environmental Governance & Information; LIFE Climate Change Mitigation; LIFE Climate Change Adaptation; LIFE Climate Governance and Information.

> Preparatory projects – these address specific needs for the development and implementation of Union environmental or climate policy and legislation.

> Integrated projects – these implement on a large territorial scale environmental or climate plans or strategies required by specific Union environmental or climate legislation.

> Technical assistance projects – these provide financial support to help applicants prepare integrated projects.

> Capacity building projects – these provide financial support to activities required to build the capacity of Member States, including LIFE national or regional contact points, with a view to enabling Member States to participate more effectively in the LIFE programme.

Further information More information on 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/life.htm

Contact

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European Commission – Directorate-General for Climate Action – B-1049 Brussels (clima-life@ec.europa.eu).
European Commission – EASME – B-1049 Brussels (easme-life@ec.europa.eu).

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