focus NATURE

NATURA 2000

LIFE and European Mammals

Improving their conservation status

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Europe is home to a wide range of mammals from the smallest shrew to the massive European bison, which can weigh up to 920 kg and is the largest land-based mammal native to this continent. Maintaining stable and healthy populations of mammals is an essential part of conservation. Many mammals are 'umbrella' species and actions targeted at these species can have a positive impact on the populations of a whole series of other species and a range of habitat types. These include emblematic species such as the Iberian lynx, the Abruzzo chamois and the monk seal, which also catch the imagination of the public, and thus help to raise awareness of biodiversity and nature conservation.

Though strategically important for Europe's rich biodiversity, many mammals have suffered as a result of habitat degradation and loss, in addition to other direct threats such as excessive hunting and human disturbance. While many species remain endangered, EU conservation policy has addressed threats to mammals, and some positive results have been achieved.

LIFE is an excellent programme for demonstrating the effectiveness of conservation measures. The Habitats Directive has been a major tool for the conservation of mammals in Europe, and right from the outset of the LIFE programme, mammal species have received substantial attention and funding.

This brochure highlights many of the actions that the EU has supported and offers a valuable overview of what has been achieved and how we, together with a wide range of stakeholders, can succeed in securing the future of Europe's diverse range of mammals, both great and small.

LIFE supporting European mammals

According to the latest IUCN European Mammals Assessment (2007)[1], nearly one in six (15%) of Europe's 231 mammal species is under threat. Although several conservation policies have been introduced at European level (see pages 47-50) the conservation status of mammal species continues to deteriorate. A notable exception is the recovery of some large carnivore species such as the brown bear (*Ursus arctos*) and the wolf in certain areas of Europe. The main threats include intensive farming, urban sprawl, and an expanding network of roads and other infrastructure, which have led to the destruction, deterioration or fragmentation of many of the habitats of mammals. Some species are threatened by persecution and exploitation.

1 Temple, H.J. and Terry, A. (2007): The Status and Distribution of European Mammals. – Luxembourg, Office for Official Publications of the European Communities.

The main financial instrument for nature conservation in the EU is the LIFE programme, which was launched in 1992, and is now known as LIFE+. In total more than one billion euros have been allocated to nature conservation. LIFE supports the implementation of the EU Birds and Habitats directives and the establishment of the Natura 2000 network, as well as EU biodiversity policy (under the LIFE+ Nature & Biodiversity component).

The LIFE programme has contributed to the conservation of many mammal species in Europe. Projects throughout Europe have focused on a variety of conservation actions, such as the implementation of species action plans, habitat restoration and management, captive breeding programmes, reintroductions and/or population reinforcements. Other actions have included land purchase, awareness-raising among stakeholders (e.g. farmers, hunters and fishermen) and communications, building infrastructure in protected areas (e.g.

Iberian lynx cubs

Photo: J. Andalucia/ M. Medio Ambiente

Figure 1: **Mammal species specifically targeted by LIFE since 1992**

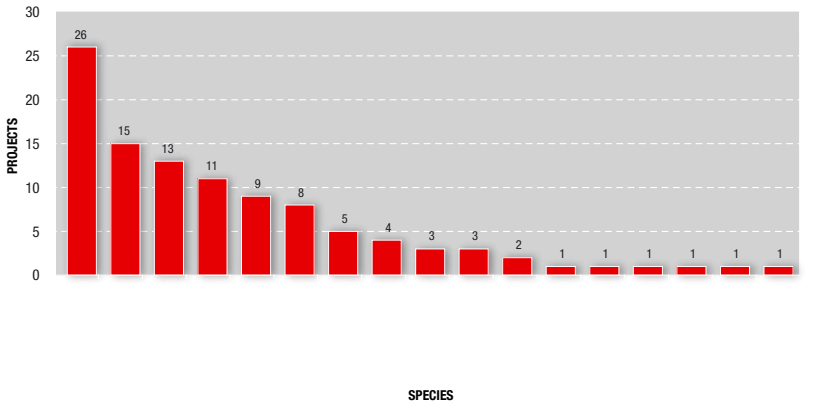
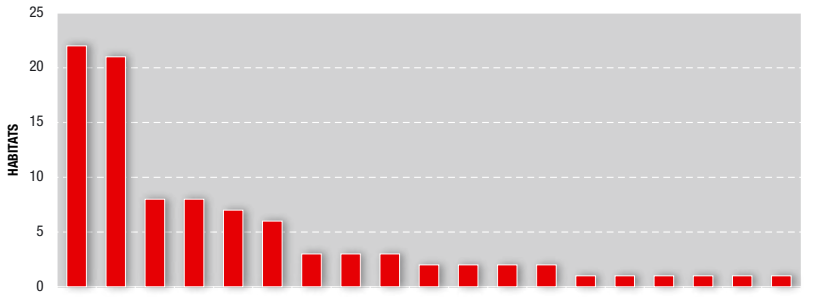


Figure 2: **LIFE mammal projects by country**



Source: LIFE projects database (1992-2010)

information centres, observation towers and feeding places) and conservation planning (e.g. Natura 2000 network site proposals and management plans).

The aim of this LIFE Focus publication is to highlight a number of exemplary projects that focus on marine, freshwater or terrestrial mammal species in the EU. From the European bison (*Bison bonasus*) and the monk seal (*Monachus monachus*) to small rodents, LIFE has targeted more than 25 mammal species. Some180 projects focused on, or benefited mammal species as a result of direct or indirect conservation actions. Of these, 105 projects specifically targeted mammal species. Figure 1 shows the breakdown of these projects by species. Almost half of the projects targeted the brown bear and the wolf – highlighting the importance of actions to conserve large carnivores in Europe.

However, there are several endangered mammal species, protected at EU level, that have not been targeted by the LIFE programme, despite their unfavourable conservation status (see page 45). Two species out of the 14 species of bats included in Annex II have not yet been targeted (*Rousettus aegyptiacus and Rhinolophus blasii*). Similarly, the bottlenose dolphin (*Tursiops truncatus*) and the harbour porpoise (*Phocoena phocoena*) are the only two cetacean species targeted by LIFE projects, although all Cetacean species are included in Annex IV[1] of the Habitats Directive. (For more information, see pages 12-13.)

In terms of the geographical distribution, almost half of the mammal projects were located in Spain and Italy (Figure 2).

In spite of the amount of support and number of projects, and despite the successful recovery of some species such as the brown bear and wolf, many species still have an unfavourable conservation status. One of the possible constraints of the programme has been the localised impact of the project actions, as projects are usually located within existing Natura 2000 sites. This means that actions to support connectivity between sites have been limited. Such actions are, however, very important for widely ranging mammals.

Several bat species were targeted by LIFE project actions (Lesser Noctule Nyctalus leisleri)

Photo: LIFE00 NAT/A/007055

1 Annex IV of the Habitats Directive includes all the species of Chiropterea present in Europe (c. 40 species)

MAMMALS

SPECIES CONSERVATION

Mammals are a significant part of Europe's biodiversity. Bears, wolves, bison and several cetaceans, though widely known, are endangered. LIFE co-funding has made a major contribution to preventing these species from becoming extinct.

LIFE and **the Iberian lynx**

Since 1994, several LIFE Nature projects in Spain and Portugal have taken steps to halt, or reverse, the dramatic decline in the population and distribution of the rare Iberian lynx (*Lynx pardinus*).

Photo: Jesús Rodriguez-Osorio

The Iberian lynx (*Lynx pardinus*), a geographically restricted 'sister species' of the widespread Eurasian Lynx, was once common all across Spain and Portugal. However, over recent centuries, and particularly in the last decades of the 20th century, its population and distribution dropped dramatically. In 2009, it was estimated that only 250 lynxes survived (plus 74 in captive-breeding centres) in the wild south-western corner of the Iberian Peninsula. The Iberian lynx had become the most threatened feline species in the world.

This medium-sized feline weighs 8-14 kg. It is a heavily spotted, solitary animal, whose young are born in March, usually with two cubs in a litter. Its home range is comparatively small, and its preferred habitat is areas characterised by a mixture of dense woodland, Mediterranean scrub and pasture, especially areas with an abundance of rabbits (which make up 95% of its diet) and where interference from humans is minimal. Such ideal lynx areas should be located far from main roads and be free of traps and poisons. In the 1980s, road accidents accounted for 7% of Iberian lynx mortalities.

Several project's actions included Iberian lynx habitat restoration

Photo: LIFE02 NAT/E/008609

The main causes of the decrease in lynx numbers, however, have been damage and fragmentation of habitat through interference, and a massive depletion in the numbers of rabbits, first through epidemics of myxomatosis and then viral haemorrhagic pneumonia. Other principal threats are a high unnatural mortality rate (by leg-hold traps, snares, poaching, road kills, etc.) and a lack of awareness of the species' plight.

LIFE Nature has co-funded most of the lynx conservation initiatives in Portugal and Spain, either directly or indirectly. Main actions supported have been habitat restoration (in particular rabbit habitats), the involvement of stakeholders (mainly farmers and hunters) and awareness campaigns. Collaboration with private owners has been essential, as 75% of the current lynx territories are located on private land (mainly game hunting estates).

SURVIVING POPULATIONS

Surviving populations in Andalusia, Spain, are clustered in small groups that have limited opportunities to mix genetically. Currently, the species has only two known breeding populations – in Sierra Morena and in Doñana. Moreover, the Sierra Morena population is split into two sub-populations that are not connected.

Two projects by the regional government (Junta) of Andalusia have been key to the protection and enhancement of these lynx populations. The first project, "Population recovery of Iberian lynx in Andalusia" (**LIFE02 NAT/E/008609**), succeeded in stemming the decline, stabilising populations in Doñana and increasing the number of individuals and breeding territories in Sierra Morena. The follow-up project, "Conservation and reintroduction of the Iberian lynx in Andalusia" (**LIFE06 NAT/E/000209**), is attempting to increase the genetic diversity of the populations, both by improving connectivity between isolated sub-populations and by reinforcements – it is continuing to extend their territories by enhancing the existing populations and by undertaking the first reintroduction of captive-bred animals in territories where the lynx was previously found.

RECOVERY OF RABBIT POPULATIONS

The principal action for maintaining and restoring lynx numbers has been to increase rabbit populations. Sustainable populations of its principal prey in its (potential) distribution areas, and diminution of threats caused by poaching or road kill, allows the lynx sub-populations to expand naturally. Rabbit recovery was mainly achieved through artificial, protected breeding areas for new populations, which naturally grew and spread.

Important management actions for both projects were agreed with stakeholders (mainly farmers and hunters). These were aimed at conserving key habitats, particularly in areas linking sub-populations of lynx. These areas have restrictions on land-use and hunting practices, which could directly or indirectly affect the lynx. Temporary feeding actions were carried out when prey was scarce.

Photo: J. Andalucia/M. Medio Ambiente

The in situ captivity breeding centre provided individuals for reintroduction

ROAD SAFETY

The problem of animals being incidentally run over was also addressed through measures to make roads safer. Actions here included installing fences, underpasses and overpasses to reduce fatalities. The projects also repaired or walled up dangerous wells to prevent accidents. A publicity campaign raised public awareness of the plight of the lynx and its needs. This included the erection of numerous warning signs for drivers and specific campaigns for hunters.

Apart from these Andalusian projects, other Spanish LIFE projects in adjacent regions such as Castilla-La Mancha, Extremadura and Madrid, and several ongoing LIFE projects in Portugal are paving the way for the expansion of the lynx in their former territories.

A particularly important project was the "Conservation of the Iberian Lynx in Montes de Toledo-Guadalmena" (**LIFE02 NAT/E/008617**), which was located in 17 000 ha of privately-owned land in two areas of the Castilla-La Mancha region – areas where it was thought likely there was a remnant population of the species. The project sought to improve lynx habitat and to increase the

availability of prey through the leasing of hunting rights over rabbits. The team also carried out monitoring of the lynxes and introduced patrols of the project areas. Working with the earlier Andalusian project, an awareness-raising campaign was also launched, targeting all the sectors involved in the management of the species (hunters, public authorities, private owners, etc.), as well as the general public.

SPORADIC SIGHTINGS

Over the course of the project (2002-06) there were sporadic sightings in the two targeted locations of the mountains of Toledo and the Guadalmena river basin, and thanks to the analyses of lynx excrement, it was possible to confirm that there were individuals inhabiting both zones. This finding is very significant for the conservation of the species, as each of the groups holds a genetic variability that could be of vital importance for the survival of the animals.

Projects introduced measures to make roads safer for animals

Photo: LIFE02 NAT/E/008609

Photo: J. Andalucía/M. Medio Ambiente

New born Iberian lynx cubs

Another key result was the establishment of a lynx recovery plan for the autonomous region. The project helped combine the efforts of the public and private sector in improving the state of conservation of the Iberian lynx, and demonstrated how this objective could be compatible with the maintenance of traditional uses of privately owned land. It resulted in 16 collaboration agreements between the project beneficiary, the CBD foundation (a non-governmental organisation devoted to the protection of endangered species), and the owners of a total of 15 000 ha of land.

The project also improved the scrubland habitat of rabbits in order to boost the lynx populations. More than a hundred watering holes and 12 pools were also established and five enclosures were set up for the supplementary feeding of lynxes. Around 150 artificial rabbit warrens were installed as well as more than 400 refuges for the animals. Supplementary feeding and repopulation of rabbits was also carried out.

The results from these measures were assessed to evaluate their effectiveness and suitability. Conclusions were set out in a manual on managing the habitat of the lynx and its main prey, the rabbit. This was distributed to landowners, managers and all those with an interest in recovering the lynx's habitat.

MONITORING

Another major part of the project was the monitoring of the lynx populations. Such work included the use of photo-traps to take photos of the lynx whenever they trod on a metal plate acting as a trigger. Over the project life-time, 160 photo-trap stations were installed, with more than 35 000 night-photos snapped.

Elsewhere, GPS tracking devices fitted to individual animals has enabled an ongoing (**LIFE06 NAT/E/000209**) Andalusian project to monitor individual lynx movements. This has revealed some surprising insights into their habits. For example, that it can cover distances of up to 200 km (travelling 50 km in just one day) – as illustrated recently by the unexpected dash into Portugal of one of the males moved by the LIFE team from Sierra Morena to Doñana.

The project has also started to reintroduce captive-bred animals into territories where the lynx was previously found. For example, in early 2010, three pairs were released into a region near Cordoba, in southern Spain – where the species had disappeared. The eventual long-term aim is that these efforts will lead to new lynx territories. The experience will also help design additional reintroductions in different areas of Spain and Portugal in the future.

On the other side of the border, LIFE co-funded management actions in Portugal (where the lynx is extinct in the wild), similar to those mentioned in Spain, have identified areas with good rabbit densities that could serve as natural corridors for the species. Another ongoing project, "Recovery of Iberian Lynx habitat in Moura/Barrancos Site" (**LIFE06 NAT/P/000191**) is aiming to establish a natural corridor for the recovery or reintroduction of the species in the medium to long term.

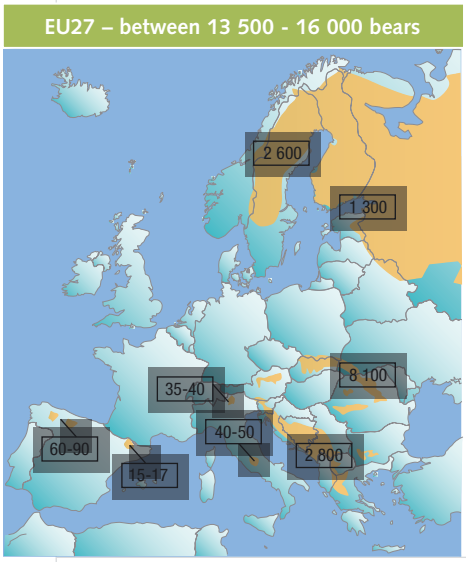
LIFE projects have succeeded in stabilising and even increasing lynx numbers in the important remaining populations of Sierra Morena and Doñana. The experience gained in habitat management and the preparation of good habitats in Andalusia and other Spanish and Portuguese regions allows for some optimism about future recolonisation of part of the former distribution area by this extremely endangered animal.

Brown bear conservation in Europe

The LIFE programme has made a significant contribution to ensuring the long-term conservation of the brown bear in the EU through numerous projects in several countries. In particular, by promoting efforts to reconcile conflicts between human needs and those of bears, much progress has been made in reducing threats to the species.

As humans have occupied more and more land in Europe, the brown bear (*Ursus arctos*) has become much less common. Bears have been seen as a threat to human safety and to livestock. While bears were once found all over Europe, they are now extinct in many areas. The main populations are now concentrated in the Carpathian and Dinaric-Pindos ranges of central and southeastern Europe, and in the northeast of Europe, including Russia and Fennoscandia.

A few small populations, however, are scattered throughout central and western Europe – the Cantabrian Mountains of northern Spain, the Pyrenees, the Italian Alps and the Apennines, for example – but these are struggling to survive. Bears from Slovenia have been introduced to the Pyrenees and the Alps to enhance these populations and also to help interconnect the Slovenian, Austrian and Italian populations.



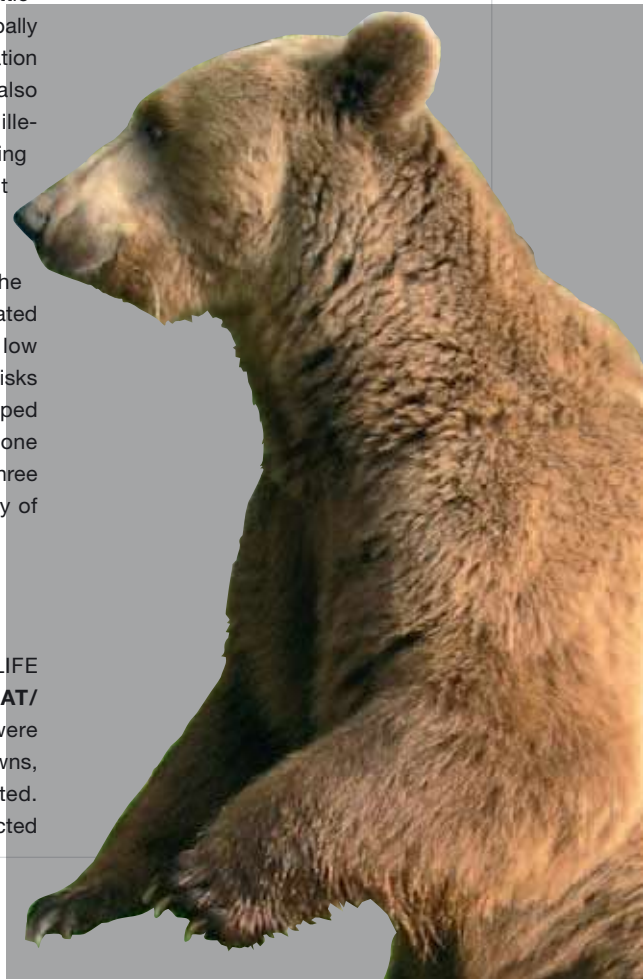
The EU bear population is estimated at between 13 500-16 000 and is classified as near threatened by the IUCN. The recent (2009) Article 17 conservation status assessment (without Bulgaria and Romania) resulted in an overall assessment for the Continental region as 'unfavourable-bad'. In the Atlantic and Mediterranean region its status is 'unfavourable-inadequate' and in the Alpine region it is 'favourable'.

The main threats to the bear come directly or indirectly from human activity. Direct threats include poaching, particularly by people looking to protect crops, livestock and human settlements. Indirect threats come principally from the degradation and fragmentation of important habitats. Bears can also be killed by traps and poison set illegally for other predators. An increasing number of fatalities occur as a result of traffic accidents – for example, on the recently constructed Egnatia highway that crosses through the bear habitat in Pindos, Greece. Isolated populations can also suffer from low genetic diversity, which increases risks to survival. The species is not helped by a low productivity rate of only one to three cubs once every two to three years, depending on the availability of food.

LIFE-FUNDED MEASURES

Conservation efforts include a LIFE project in Slovenia (**LIFE02 NAT/SLO/008585**), where measures were taken to direct bears away from towns, and where sanctuaries were created. Security fences were also constructed and rubbish dumps that attract bears were removed. Other measures included habitat restoration and the reintroduction of deer.

In general, LIFE projects have focused on the following themes: reconciling human and ursine needs; restoring crucial habitats and food sources; and increasing the genetic flow between populations by improving connectivity and reintroducing bears. Many projects have also monitored bears to improve knowledge and understanding of the species and its needs, and to implement bear-management plans.



All the projects looked to raise stakeholder awareness about the brown bear, especially with respect to farmers, livestock producers and hunters. Bears are often disliked, feared and attacked because of the damage they cause to livestock, beehives and crops. Along with other projects (**LIFE96 NAT/IT/003152, LIFE93 NAT/GR/010800, LIFE96 NAT/GR/003222**, for example), it also provided compensation to those who had suffered damage or loss caused by bears, in order to try to prevent the development of any anti-bear sentiment.

A common intervention is to erect (electric) fencing around fields and beehives to protect them from bears (**LIFE00/NAT/IT/007131**). Another common action is to provide guard dogs to livestock owners (**LIFE04 NAT/IT/000144** and **LIFE96 NAT/GR/003222**) and to create a livestock guard dogs breeding station (**LIFE07 NAT/GR/000291**).

Efforts to tackle bear poaching included the use of wardens or patrols, notably in Spain. These sought to monitor and prevent poaching, while simultaneously having an important role in educating people about the brown bear (**LIFE00 NAT/E/007352** and **LIFE98 NAT/E/005326**). Two Italian projects also aimed to capture stray dogs, which cause problems for the bears (**LIFE97 NAT/IT/004141**), as bears are sometimes killed by poisoned bait used illegally by local farmers against stray dogs.

Measures to restore important bear habitats have taken different approaches. These include forest restoration (**LIFE07 NAT/GR/000291, LIFE03 NAT/IT/000147** and **LIFE99 NAT/E/006371**), the planting of wild fruit trees (**LIFE96 NAT/GR/003222, LIFE03 NAT/IT/000151** and **LIFE07 NAT/GR/000291**) and the artificial supply of forage (**LIFE99 NAT/IT/006244**) to improve food supply for the bears.

Other habitat protection measures include preventing or reducing tourist access to sensitive areas, such as wintering sites (**LIFE07 NAT/GR/000291** and **LIFE99 NAT/E/006371**) and the removal of dumped waste from potential bear habitats (**LIFE98 NAT/IT/005114**). Securing migration routes (**LIFE00 NAT/A/007055**) or corridors between zones of suitable habitat (**LIFE99 NAT/E/006371**) were other measures taken.

Two Italian projects aimed to capture bears in Slovenia and release them into sites in the Italian Alps to restore numbers and improve genetic diversity (**LIFE96 NAT/IT/003152** and **LIFE00 NAT/IT/007131**). A Greek project (**LIFE93 NAT/GR/010800**) aimed to rehabilitate bears taken from travelling performers in a specially created bear sanctuary.

Several projects increased understanding of the bears and their movements through the use of radio tracking (**LIFE99 NAT/IT/006244** and **LIFE02 NAT/SLO/008585**). Wardens and other observers also contributed in this regard, and genetic fingerprinting was undertaken through the collection of fur samples in Italy (**LIFE03 NAT/IT/000151**).

Photo: LIFE02 NAT/RO/008576

LIFE increased understanding of the bears and their movements by co-funding radio transmitters/GPS devices

Apennine brown bear (Ursus arctos marsicanus)

Photo: LIFE99 NAT/IT/006244

Photo: Fundación Oso Pardo

The viability of the brown bear population in some areas of Europe is threatened by habitat degradation and fragmentation – Cantabrian mountains, northern Spain

Following awareness raising by the **LIFE93 NAT/GR/010800** and **LIFE96 NAT/GR/003222** projects on the impending Egnatia highway construction, which cuts through bear habitat, the European Commission obliged the Greek government to take mitigation measures. This safeguarded the bears along the first stretch of the highway. However, bears are being killed in the recently opened sections, which lack appropriate fencing and through-ways for the bears. Greek projects (**LIFE07 NAT/GR/000291** and **LIFE09 NAT/GR/000333**) currently in progress are pushing for the enforcement of appropriate measures.

In Italy, there are two bear populations with distinct genetic characteristics: the nominate subspecies of brown bear (*Ursus arctos arctos*) in the Alps; and the Marsican brown bear (*Ursus arctos marsicanus*) in the Apennines. The introduction of new bears into the Alps has had positive results, while numerous projects in the Apennines have improved knowledge and protection of the bear. Nevertheless, the conservation status of this subspecies is still critically endangered.

In Greece, LIFE projects have led to crucial improvements in the conservation status of the species. The bear population is showing slightly increasing trends at all sites and recolonisation has been noted in at least four sites. Spanish LIFE projects have contributed to wider efforts to improve the conservation status of the brown bear in Cantabria, which has seen increases in the population (from an estimated 80 individuals in 2000 to 105-130 individuals in 2007). A new project (**LIFE07 NAT/E/000735**) is aiming to link the two isolated Cantabrian bear populations.

Furthermore, the projects that have focused on improving cross-border capacity to protect bears have played an important role (**LIFE07 NAT/IT/000502, LIFE2003 NAT/CP/IT/000003, LIFE02 NAT/A/008519** and **LIFE99 NAT/GR/006498**). The protection of migration routes between countries (**LIFE00 NAT/A/007055**) is also essential.

Despite some improvements in the conservation status of the brown bear, however, much progress is still needed. A particular challenge lies in the expansion and linking of appropriate habitats and ensuring sustainable numbers and sufficient genetic diversity within individual populations.

Photo: COP Callisto

Bears were radio tracked to follow their movements and dispersal routes

Photo: LIFE98 NAT/P/005275 IFAW_IFAW

Nearly a dozen LIFE projects have directly targeted cetaceans such as dolphins, whales and porpoises, which are threatened by fishing practices and pollution. Conservation activities have focused on drawing up management plans, increasing knowledge of species and raising awareness.

Conservation of **cetaceans**

One of the main aims of a Spanish LIFE project (**LIFE02 NAT/E/008610**), which focused on the Andalusia and Murcia coast, was to develop marine management plans in collaboration with a wide range of local stakeholders. A vital first step was to inform these interest groups, which typically have little previous experience of marine conservation issues, of the potential impacts. This helped to remove resistance to marine conservation from groups that might have felt that their livelihoods would be unjustly threatened.

The beneficiary, the Spanish Cetacean Society, identified several potential marine Natura 2000 sites along the narrow sea that links the Mediterranean to the Atlantic. Local stakeholders were involved in discussions about the best ways to conserve these natural resources, while respecting the needs of local communities. These discussions addressed such threats to cetaceans as poor fishing practices, illegal fishing, noise and marine pollution. Where restrictions were likely, the project encouraged new economic ventures such as whale watching.

Stakeholder co-operation has been central to the success of several LIFE projects. The LINDA project (**LIFE03 NAT/F/000104)**, which focused on the bottlenose dolphin (*Tursiops truncatus*) in Corsica, involved local fishermen from the start of the project through meetings, a newsletter and the daily presence of a representative from the nature reserve. Such communication helped calm the growing tensions between the Corsican fishing community and the dolphin.

The project analysed the degree of interaction between dolphins and local fishing and assessed the impact on fishing revenues (whether on the catch or from damage to nets). The analysis led to clear recommendations on alternative fishing techniques, which aimed to reduce damage caused by the dolphin to the fishing gear. This included restrictions on mesh sizes and the length of hauls, and changes to equipment use. The project also recommended that fishermen were compensated for the loss

Photo: LIFE03 NAT/F/000104

Whale watching is becoming a major industry in some European countries and an important cetacean conservation tool

of revenue caused by dolphins and that dolphin watching as a tourist activity be developed as an additional source of income. The creation of whale-watching opportunities has been another positive outcome. In fact, the impact of whale watching practices in Corsica was also assessed and quantified. Around 35 interactions were analysed leading to the definition of a code of conduct for whale watching that included recommendations for responsible boating.

The Spanish project (**LIFE02 NAT/E/008610**) also addressed the issue of whale watching, which is becoming a major industry in the Canaries; worth more than €30 million a year. After studying the biological and socioeconomic aspects of the industry, the project developed a series of measures to regulate whale watching activities in order to ensure they do not unduly disturb the mammals. By the end of the project a new law had been passed, which tightened up the regulations for operating a whale watching business.

IDENTIFYING SITES

Several LIFE projects have identified key marine conservation sites, including the first project carried out by the Spanish Cetacean Society and the regional government of the Canaries in 1997. Surveys showed that waters surrounding the Canaries contain some of the most densely populated areas for bottlenose dolphins in the EU. Several new sites were identified to be of key importance to the species. As a result, the boundaries of existing Natura 2000 marine sites were adjusted and the standard datasheets updated to reflect the presence of dolphins in existing marine sites.

Identifying sites helps to better develop regulation, as one Romanian project (**LIFE00 NAT/RO/007194**) demonstrated. The project made significant steps towards the development of the technical and legal basis for strengthening the national regulatory and management framework for the effective conservation of three endangered dolphin species. Such an advance was made possible by the studies carried out by the project. Dolphin sightings, stranding and incidental takes were systematically recorded during the project, with the collaboration of a network of surveyors and volunteers operating along the Romanian Black Sea coast. Furthermore, a survey of the adverse impacts of marine and land-based economic activities on dolphins was undertaken.

As a result, the best areas for dolphin protection in the Romanian littoral were identified – the marine reserve of Vama Veche-Doi Mai and the Danube Delta Biosphere Reserve. A management plan has been drawn up for the former and the beneficiary received the custody for the management of this area from the Romanian ministry of the environment, in accordance with Romanian legislation regarding the management of protected areas.

Surveys also led to the expansion of the Marine Mammal Database for the Romanian Black Sea coast, which now contains all collected survey data. This information is shared with other regional databases such as MEDACES, the Mediterranean database used by the International Agreement for the Conservation of Cetaceans (ACCOBAMS).

Increasing knowledge was the main aim of the British project (**LIFE04 NAT/GB/000245**). It provided an opportunity to observe how distribution and abundance of cetacean populations has changed since the SCANS project of a decade earlier. It produced robust estimates of abundance for harbour porpoise, white-beaked, bottlenose and common dolphin, and minke whale for the entire European Atlantic continental shelf.

The project also developed a management model for determining safe limits for bycatch. Moreover, its 'After Life Conservation Plan', which recognises the difficulties involved in resolving possible conflicts of interest between fisheries and environmental stakeholders, outlines the necessary steps for achieving compliance with the Habitats Directive.

AWARENESS-RAISING

Finally, information campaigns have been a particularly important part of conservation initiatives. The Romanian LIFE project helped raise local awareness of the conservation of cetaceans, with the participation of local institutions such as the dolphinarium, schools and children's clubs. A dolphin week was organised every year that featured exhibitions, theatre performances and drawing contests, among other activities. Moreover, the project activities were regularly featured in the media, including on a TV spot that was shown on several TV channels.

The Corsican project also included an awareness campaign, reaching a wide range of target groups – children, pleasure boaters, fishermen, the local population and journalists. Its educational pack (which included a CD, a 3D model of a dolphin, photos, a cartoon story and a game) reached more than 7 000 children.

Though the future of the Mediterranean monk seal remains uncertain, LIFE projects have helped to improve the situation of this endangered species and have demonstrated effective conservation measures that must now be continued to ensure its survival.

Photo: MOm/P.Dendrinos

Safeguarding **the monk seal**

Europe is home to the world's most endangered seal, the Mediterranean monk seal (*Monachus monachus*). Only about 350-450 individuals remain in the wild – around 250-300 in Greek waters, about 50 in Turkish waters and some individuals (less than 10) spotted off the Algerian/Tunisian coast. The remainder inhabit the Atlantic: a small population (around 39 individuals) is found in the archipelago of Madeira (Desertas), Portugal, and around 130 seals currently inhabit the Cabo Blanco area (Western Sahara-Mauritania).

The main threats to the monk seal are linked to human activities. The main causes of fatalities are entanglement in fishing nets and deliberate killings. In the past, seals suffered heavily at the hands of fishermen, who were known to kill them because of their impact on fish stocks. Although these killings are now less recurrent than in the past, they still occur in places where the conflict with fishermen is more acute. Lack of knowledge and lack of co-operation with fishermen on this issue has been a serious problem. In addition, habitat destruction, uncontrolled tourism, marine pollution and the depletion of fish stocks are also responsible for the species, decline.

The monk seal is included in Annex II and IV of the Habitats Directive and is considered a priority for conservation. However, the monk seal's conservation status, as reported by the Members States according to Article 17 of the Habitats Directive, is 'unfavourable with bad prospects' for the Mediterranean region and for the marine Macaronesian region (Madeira, Azores and Canaries islands) is 'unknown', even though Portugal provided information on estimated population and habitat trends. Moreover, the species is rated as critically endangered on the IUCN Red List.

PROJECT ACTIONS

To halt the decline of the monk seal, more than €4 million has been spent since 1992, through seven different LIFE Nature projects in Greece, Spain and Portugal. The species has also benefited from two projects in Greece (1992 and 1995), which were funded by the former funding programme for EU nature conservation actions, ACNAT (Council Regulation 3907/91).

The first ACNAT project created a rescue and information network run by the non-profit, non-governmental environmental organisation, The Hellenic Society for the Study and Protection of the Monk Seal (MOm). The network aimed to monitor the status of the monk seal on the Greek coast and islands, and to rescue animals in need. Moreover, the first ACNAT project supported the surveillance in the National Marine Park of Alonnisos-N. Sporades.

The first LIFE project beneficiary in 1992 was the WWF, which carried out a project that also aimed to improve the conserva-

Co-operation with fishermen is crucial for monk seal conservation

Photo: LIFE05 NAT/GR/000083/MOm

tion status of the loggerhead turtle. Since then, three consecutive projects have been run by MOm.

MOm's efforts in Greece over several years have led to the establishment of a strictly protected National Marine Park and 35 Natura 2000 network special areas of conservation (SACs), the development of a national action plan and the establishment of management bodies for two of the areas most frequented by monk seals.

LIFE project actions have included the monitoring and documenting of the distribution of the Greek population of the monk seal, the collection of data on its marine environment, the provision of support for the running costs of a rescue and rehabilitation centre, surveillance activities, lobbying of local, regional and national authorities, the presentation of management proposals, and information campaigns and educational programmes to increase public awareness of the significance of this rare seal.

During the projects, an improvement in the birth rate was noted in some areas, but mortality rates have continued to be high. To address this problem, MOm started a four-year project in 2005 focused solely on defusing the conflict between monk seals and fishermen. In the two most important breeding sites at Alonnisos and Kimolos, fishing boat activities were tracked.

Projects	Location	Country
LIFE92 NAT/GR/013800 LIFE96 NAT/GR/003225 LIFE00 NAT/GR/007248 LIFE05 NAT/GR/000083	(See Figure 3)	Greece
LIFE98 NAT/P/005236	Desertas islands, Madeira	Portugal
LIFE94 NAT/E/001191 LIFE96 NAT/E/003144	Canary islands and Cabo Blanco (Mauritania)	Spain

Moreover, the project identified the feeding preferences of the monk seal, for the first time in the EU, and provided of quantifiable evidence on the consumption of marketable fish species. Hence, it is possible to estimate the extent of the fishermen's loss of income.

From the examination of 29 monk seal fatalities, the main cause of death for adult seals was determined to be deliberate killing (44%), and for younger seals, entanglement in fishing gear (56%). Nevertheless, the involvement of all key target groups from the fishing communities (coastal fishermen, aquaculture owners, port police officers) in the project's activities (rescue procedures, field work on estimating the extent of the conflict, awareness raising), resulted in a softening of the negative attitude towards the conservation of the monk seal.

Thanks to the LIFE projects, MOm's Rescue and Information Network, has now more than 1 800 members from national institutional authorities to aquaculture owners, fishery societies, veterinary services, and societies of inflatable boat owners.

The Portuguese LIFE project also achieved its aim of protecting the Atlantic Monk Seal and its habitat: the population increased from 6-8 animals in 1988 to 23 in 2000. The current population is estimated to be around 39 individuals. All planned project measures were implemented successfully: surveillance, collection of ecological information, and re-definition of the management strategy for Desertas islands. The integral reserve status of the southwest area of Deserta Grande – confirmed during the project's lifetime as an important breeding and resting ground – proved adequate. An increasing number of observations have been made on the north and south coast of the Madeira island: the population was previously believed to be present and to breed in the Desertas islands only. Observations in the coasts of Madeira were rare and were restricted to specific points on the north coast. Now, however, individuals are being observed with increasing frequency in other spots, including the south coast near the highly used beaches around Funchal, the island capital. Though observations are still uncommon, they can be cautiously interpreted as a sign of population recovery and the improved condition of the area as a Monk seal habitat.

Figure 3: **Monk seal project location in Greece**

Photo: P. Dendrinos/MOm

The main cause of death for adult seals was determined to be deliberate killing, and for younger seals, entanglement in fishing gear

CABO BLANCO MONK SEAL COLONY

The monk seal colony targeted by the Spanish LIFE projects is located in the west of the Cabo Blanco peninsula, near the border between Mauritania and the Western Sahara. This is the last true colony of Mediterranean monk seal that exists. A first LIFE project (**LIFE94 NAT/E/001191**) aimed to breed captive specimens taken from that colony and reintroduce them in the Canaries (Fuerteventura and Lanzarote). This action was questioned by some conservationists, who argued that there was insufficient knowledge about the colony to take animals from it, and in 1994 the project ended without achieving its objectives. A second LIFE project, in 1996, attempted to eliminate the last obstacles for the reintroduction (opposition from some local sectors in the eastern Canary Islands) and proceed to an experimental translocation. The aim of this translocation was twofold: it would help create a metapopulation with the Cabo Blanco and Madeira populations, and it would reduce the risk of the population at Cabo Blanco becoming extinct as it was restricted to a small area. Moreover, the breeding caves were at risk of collapse or menaced by pollution (black tides).

The project finished at the end of December 1998 having failed to achieve its main objective of carrying out the experimental monk seal translocation from the colony of Cabo Blanco to the eastern Canary Islands (Lanzarote and Fuerteventura). In spring 1997, a massive mortality wiped out two-thirds of the Cabo Blanco population, so that from 350 seals in 1996, hardly a hundred had survived by autumn 1997. While opinion on the precise causes of this epidemic remains divided [the most likely cause being a morbillivirus (virus affecting aquatic mammals) or a toxic algae bloom], it prevented the planned translocation and emphasised the precarious status of a species already regarded as critically endangered throughout its range.

While still far below the early 1997 count, seal numbers in this all-important location have since begun to recover slowly. Currently, the population in this location is estimated at 150 individuals.

FUTURE PERSPECTIVES

Although the Mediterranean monk seal remains in an unfavourable conservation status and is considered by the IUCN as critically endangered, the situation would have been much worse without the contribution of LIFE. In particular, the Greek and Portuguese monk seal populations have stabilised in number and even show some slow recovery. The main achievement of these projects was the establishment of Natura 2000 sites to legally protect the seal's populations and the enforcement of legal protection. In Greece, the project led to the creation of 35 Natura 2000 network SACs, a National Action Plan, and the establishment of management bodies for two of the monk seal's most frequented areas. The Greek projects also revised the species national conservation strategy and introduced a national action plan to mitigate seal interactions with fishing activities. However, the population is being monitored systematically in three of the sites (Alonnisos, Kimolos, Karpathos) and is reported by the beneficiary to be stable. In Portugal the enforcement of disturbance-free areas and permanent surveillance prevented the extinction of the population, which is now showing signs of recovery.

Thanks to LIFE support the monk seal population is now stable

Photo: P. Dendrinos/MOm

Protecting **European bison in Poland**

An emblematic figure in Poland, the European bison is found in one of the last remaining primeval forests in Europe, the Bialowieza Forest. To ensure the survival of this magnificent species – the heaviest land-based mammal in Europe – conservation actions have focused on dispersing populations over a larger area and increasing its acceptance among locals.

Photo: Tomasz Kaminski

The European bison (*Bison bonasus*) faces several threats. It is located in small and restricted areas that are fragmented and isolated; a high concentration of individuals leads to low genetic diversity and a high susceptibility to diseases; and its food resources are often poor and declining, although managing meadows through reclamation, mowing and the creation of haystacks is improving this situation. In particular, EU subsidies to farmers for cutting hay have proved beneficial for the species.

A LIFE project, "BISON-LAND - European Bison conservation in the Bialowieza Forest, Poland", (**LIFE06 NAT/PL/000105**), identified the need to utilise the potential of the meadows, and other suitable habitats surrounding the Bialowieza Forest, for enlarging the range of the European bison in this target site. The Mammal Research Institute of the Polish Academy of Science, which co-ordinated the project, tagged individuals with GPS collars in order to track their movements – these were analysed to map out new sites for the bison, connect habitats and link populations (particularly the Knyszyn population to the north of the Bialowieza). The data acquired also allows the institute to assess how the bison responds to management actions and to determine whether the dispersion of the species is occurring in the desired directions.

The Bialowieza Forest, which is a key site for European bison, has been protected over the past few centuries as a hunting ground. Former Polish kings and Russian tsars have maintained the area, though much of it was destroyed for timber harvesting during World War I. Around 16% of the Polish part of the forest, which straddles the Belarussian border, is protected as a national park, a UNESCO World Heritage Site and a Natura 2000 site.

The population of bison in the forest has fluctuated over time. In 1784, the population was estimated at 283, by the end of the 19th century this figure had risen to around 1000. But the species was hunted to extinction from the area

as a source of food by the German army and local poachers during World War I. In 1929, restricted captive breeding was tried and in 1952 the European bison was reintroduced into the forest.

The bison is an umbrella species for the forest: maintaining open meadows, which are favourable to the species, also benefits the Eurasian lynx and the lesser spotted eagle (*Aquila pomarina*), as well as other flora and fauna. Today, there are around 30 free-ranging herds in Eastern Europe making up a total population of around 2 600 (of which 450 are found in the Polish part of the Bialowieza Forest).

This figure is increasing, but the population is still at risk. During the winter months, individuals congregate in large numbers around the five supplementary feeding sites. According to Rafał Kowalczyk, a member of the institute's 'Ecology of European bison' research group, "they become extremely lazy" and, moreover, should one individual become sick, the whole population risks contracting diseases such as bovine tuberculosis and foot and mouth, which have occurred in bison in breeding centres and in one of the free ranging herds in the south of Poland. If transmitted to Białowieża Forest population, it could have a "catastrophic" impact – as diseases spread quickly among dense populations.

Hay feeding

Photo: Jon Eldridge

Photo: LIFE06 NAT/PL/000105

Bison tracking

An important aim of the Polish project, says Kowalczyk, is "to reduce feeding to allow natural factors to shape the population". But it is not possible to completely stop this feeding, as the bison will then move to agricultural areas. "We want to keep the bison in the forest but the idea is to spread the feeding around, so that the bison moves from one area to another," he says.

Female bison tend to group together with their young, while males prefer to roam alone or in small groups. While the bison can cause considerable damage to property and crops – some electric fencing was donated as part of the project to counteract this problem – the team focused on removing conflict by educating the local population about the best way to 'coexist' with the species. It distributed easy-to-follow and attractive leaflets.

CONTRACT FARMS

One important way of avoiding conflicts and damage was to draw up agreements. Through LIFE funding, contracts with landowners were established to maintain meadows that are favourable to bison dispersal. The beneficiary intends to continue this measure after-LIFE, through funding from the EU agricultural programme.

In the wild, the European bison is timid: when it becomes too accustomed to human contact, it can become more demanding of food, for example, and problems can arise. Problem individuals, who repeatedly return to the same area, are captured and relocated.

As the animals have moved further south as a result of the project actions – in 2009 the bison's distribution range increased from 620 to more than 700 km^2 – Kowalczyk reports that locals were curious about the bison at first. But soon after the new arrivals, the locals started to believe they were the result of reintroductions, rather than natural population expansion. Increasing acceptance is a long-term goal, however, and for that reason, the project has given special focus to the next generation. Comic-strip books on the bison were produced and seminars for school teachers were organised. Public consultations were also held with local leaders and groups.

The project team were also eager to reinforce among locals the value of the European bison as a visitor attraction. Says Kowalczyk: "They just see it as a huge mammal that can do damage; they don't see that it can be a big boost to visitor numbers." While in summer the bison might be difficult to spot, the winter months provide many opportunities to observe the creatures as they forage for food on the meadows.

The beneficiary, however, had to confront much negative sentiment. According to Dorota Ławreszuk, project co-ordinator, some opinion-formers say that there are too many bisons now that the numbers are rising. "People should be proud of the bison," she says. The institute's knowledge of this important population of bison was greatly expanded by the project. In addition to satellite and telemetry tracking, genetic studies were carried out to provide necessary information for the sustainable management of the species. Delimitation and protection of ecological corridors will improve migration opportunities, not only for the European bison, but also for a variety of species such as wolves and lynxes. In this way, the project has helped increase the biodiversity of the region, and led to better protection of Natura 2000 areas.

Photo: Agnieszka Owca Kloch

LIFE projects are actively improving the long-term prospects for endangered small rodent species, such as the root vole, by co-financing works to increase habitat functionality, reduce fragmentation and restore appropriate wetland conditions in the Netherlands and Slovakia.

Supporting **small rodent species**

An estimated 40% of the world's mammal species are rodents, and they inhabit every continent except Antarctica. In Europe, common rodents include squirrels, mice and voles. Their collective name comes from the Latin word rodere, 'to gnaw' – which is a characteristic feeding trait of rodents.

European rodents represent some of the continent's smallest mammals, with species such as the harvest mouse (*Micromys minutus*) being around 6-8 cm in body length, with a tail of 5-7 cm, and weighing as little as five grams.

Some species thrive in agricultural land, but there are a few that occur only in natural habitats. By virtue of their abundance, rodents also provide an important source of prey for many species further up the food-chain, including owls, raptors, snakes and a host of predatory mammals. Hence, rodents can be considered as important alternative indicators for biodiversity and they play a crucial role in food-webs.

Despite their ecological value, rodents are one of the mammal groups most persecuted by humans, as many can become pests, and eradication programmes often fail to discriminate between target and non-target species. Other threats have also emerged from changes in land use patterns that alter and fragment rodent habitats. The effects of these population pressures can be seen in an analysis of the IUCN Red List Status of endangered species, which indicates that rodents comprise 85 of the 231 European mammal species noted as threatened.

Some of the rodents most at risk are the root vole subspecies *Microtus oeconomus arenicola* and *mehelyi* and a number of different LIFE projects have helped to strengthen the conservation status of this small, but important, European mammal.

DUTCH ROOT VOLES

The root vole is a Holartic species (i.e. distributed across continents), ranging from Alaska in the east, through northern Asia and as far as China and Mongolia. Regarded as a relic from the last European glacial period, and once much more widespread in Europe, the main range of the root voles connected with this area of distribution is northern Fennoscandia and northeastern Germany and Poland. Isolated subspecies populations exist in the Netherlands, Norway, Finland and Central Europe. Six subspecies are associated with the European part of the distribution area.

Although the species is not endangered and has a wide distribution, the isolated populations of two subspecies have an 'unfavourable' conservation status. The subspecies *arenicola* (from the Netherlands) as well as *mehelyi* (from Austria, Hungary and Slovakia) are both provided with legal protection under Annexes II and IV of the Habitats Directive.

LIFE support for these endangered mammals has focused mainly on restoring and reconnecting root vole habitats, which typically consist of damp, densely-vegetated areas along the edges of lakes, streams and marshes. Wet meadows, bogs, fens, riverbanks and flooded shores are also important habitats for the root vole, where it feeds on green vegetation. These wetland environments, with their variable water levels, are favoured due to a lack of competition from, for example, the common mole (*Microtus arvalis*) and the field vole (*Microtus agrestis*).

Root vole habitat and Microtus oeconomus mehelyi, Slovakia's 'Root Vole Conservation' project (LIFE08 NAT/SK/000239)

Photo: LIFE08 NAT/SK/000239

However, drainage schemes in many wetland areas have led to more stable hydrological conditions that encourage other voles and rodents to move in. Unable to compete with them, the root vole populations reached an all-time low. LIFE project teams are now helping to reverse these trends by restoring more favourable conditions for this endangered and protected species.

HABITAT FUNCTIONALITY

Habitat functionality is a key goal of the LIFE projects, which are involved in conservation work such as the restoration of the natural hydrological conditions of the wetland areas, and the creation of 'habitat stepping stones' that facilitate 'wildlife corridors' connecting and expanding root vole territories. Buffer zone establishment between wet and arable land is another technique being co-financed by LIFE funds, in order to help safeguard a more secure environment for the species' recovery.

Several LIFE projects in the Netherlands have set out with these kinds of conservation objectives in mind, to support the long-term revival of the root vole subspecies *arenicola*, which is found in lower-lying parts of the Dutch fens. As Jeroen De Maat, co-ordinator of a current LIFE project (**LIFE06 NAT/NL/000071**) aiming to restore brackish marsh for root vole, waders and terns explains: "Without the LIFE contribution, the small, scattered root vole population would remain at the edge of existence. The project provides an important ecological corridor between the root vole habitats bordering this project area in the north and the south."

Reed cutting as part of a project action on the restoration of root vole habitats

Photo: LIFE08 NAT/SK/000239

Brackish marshes, containing fluctuating water levels and winter floods, had previously provided particularly suitable habitats for remaining populations of Dutch root voles in the country's Eastern Scheldt region. Considerable land use changes, however, followed flood prevention work under a national water management plan several decades ago. This radically reduced the coverage of salt or brackish marshes that were also fragmented within the new dyked and dry farmland landscape.

The impact of such wetland drainage on the region's root vole population was significant, and LIFE support is being used as part of a longer term conservation initiative by Dutch authorities and local organisations to restore estuarine, river and inland habitats. The project concentrates on improving a wildlife corridor connecting the Eastern Scheldt population of root voles with its neighbouring populations.

Project actions are being deployed here to create an open habitat, containing small-scale transitional zones between salt to very brackish stagnant water, tidelands, salt grasslands and other corridors between wet (freshwater) meadowlands. Reinstalling native vegetation structures and species forms an essential part of the LIFE project's conservation activity. The aim is to increase the availability of root vole habitat from its pre-project size, of less than 10 ha, to around 107 ha by the end of the project in 2011.

This LIFE project is building on the experience gained from a similar Dutch LIFE Nature project at Alde Feanen (**LIFE04 NAT/NL/000203**), in the western and central parts of the Hoeksche Waard Island. Significant amounts of engineering works (excavation, filling existing ditches, reconstruction of a micro-relief, reinforcing canal banks in the surrounding area and securing roads and buildings) were involved in the Alde Feanen project, which successfully introduced and managed a variable water-level regime on acquired farmland. Works eliminated competition from field voles and produced a mosaic of ecological stepping stones and corridors. As a result, the project reduced habitat fragmentation problems and facilitated the reconnection of previously isolated populations of the Dutch root vole subspecies.

CENTRAL EUROPEAN SUPPORT

LIFE is also providing support in Slovakia to improve the conservation status of the central European root vole subspecies, *Microtus oeconomus mehelyi*. Operational since January 2010, Slovakia's 'Root Vole Conservation' project (**LIFE08 NAT/SK/000239**) aims to restore and improve habitats on selected sites. As Katarina Tuharska from the regional association for nature conservation and sustainable development in Bratislava explains: "The root vole population will benefit from restoration of wetlands (410 ha) and grasslands (100 ha), and from the reintroduction of the cutting of reed beds (150 ha), and the restoration of the 33 km of stream with adjusted wetlands."

Improved knowledge about the subspecies is expected to help fill gaps in understanding about the Central European root vole, which in some areas is recorded as being a dominant species among small mammal communities, while in other areas it occurs in low numbers and only sporadically.

Conservationists are aware that the species recovery programme will require the restoration of bio-corridors connecting important wetland, areas and buffer zone work is also planned between wetlands and adjacent farmland at the LIFE project target sites. Similar to their Dutch counterparts, the Slovakian LIFE team are primarily focused on reducing fragmentation, in order to enhance the functionality and range of habitats for this small and endangered rodent.

These LIFE project actions mirror good practice approaches for species recovery plans targeting many different fauna, and as such serve a useful demonstration purpose for other EU mammal species, both large and small.

Human disturbance and changes to their habitats that create feeding difficulties have caused many of the bat species found in Europe to become endangered. LIFE projects have sought to combat these threats by securing hibernation sites and conserving habitats, as well as increasing knowledge of species that are often not well understood.

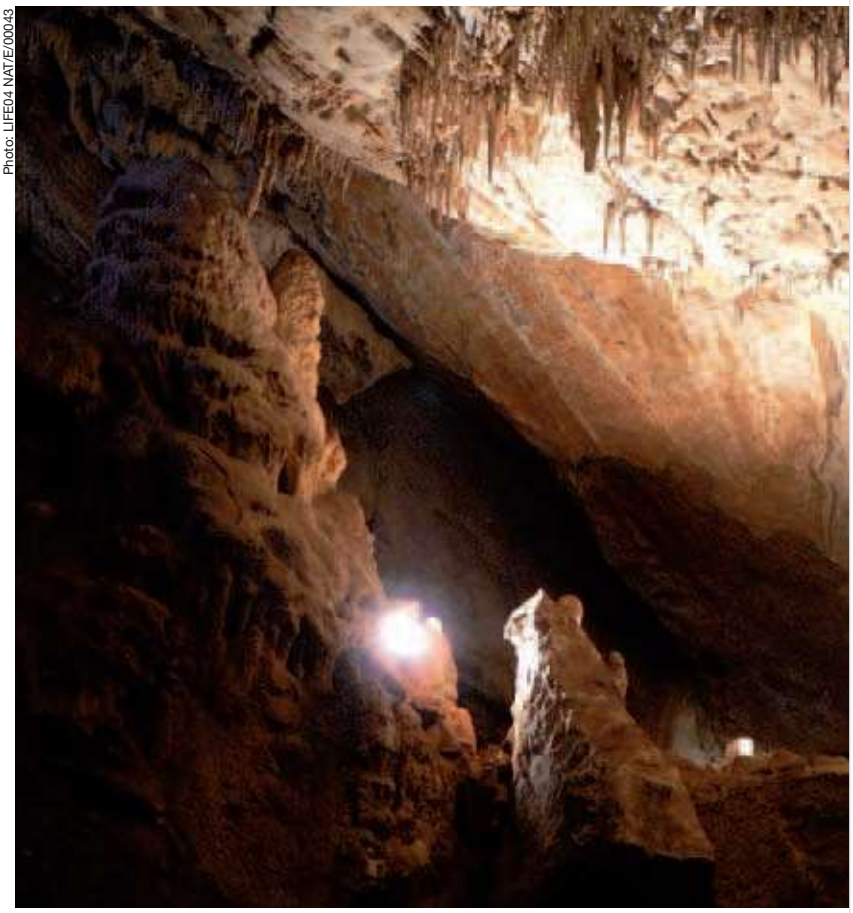
Protecting **endangered bat species**

If bats are disturbed during hibernation (typically between November and March) – by cave explorers for example – then they are often too weak to survive the winter. One of the main conservation actions is, therefore, to fence off entrances to caves and other sites where bats hibernate. Changes in agricultural practices have also altered the food supply of many bat species. Management of land that takes into account local wildlife is another main priority of conservation initiatives for bat species. However, in spite of such activities, the conservation status of many species remains unfavourable.

PROTECTION OF ROOSTS

One of the most effective ways to ensure that bats are not disturbed, particularly during hibernation, is to construct fences around sites and to block off the entrances using horizontal bars that allow the bats to fly between them. This action was successfully executed at several sites in the south of France as part of a LIFE project (**LIFE04 NAT/FR/000080**), aimed at the conservation of three species of bat: the Mediterranean horseshoe bat (*Rhinolophus euryale*), the long-fingered bat (*Myotis capaccinii*), and the Schreiber's bat (*Miniopterus schreibersii*). These species have all experienced a decline in their populations. Urbanisation, caving and modern agricultural practices have disturbed their roosts and adversely affected their natural habitats and feeding areas. Moreover, there was a lack of basic scientific knowledge and public awareness of the ecological requirements of these bats.

Photo: LIFE04 NAT/E/00043



Caves are one of the main wintering habitats for bats and should not be disturbed

The project covered 13 Natura 2000 sites (pSCIs) across five regions of southern France, which are home to more than 56% of the breeding Mediterranean horseshoe bats and 45% of the hibernating individuals; about 30% of the breeding long-fingered bats and 38% of the hibernating individuals; and about 15% of the Schreiber's bat breeders and 2% of the hibernating individuals. A total of 19 roosts were permanently protected in some form during the four-year project: 12 were blocked with horizontal bars to prevent people from entering the roosts, and another nine were protected by long-term management agreements with local representatives, landowners, associations and the municipalities. In addition, successful long-term partnerships were established between conservation and caving associations.

Photo: LIFE04 NAT/FR/000080/Yoann Peyrard

Schreiber's bat (Miniopterus schreibersii) is a species benefiting from LIFE project actions

The effect on bat populations of the project actions was significant: a record number of Mediterranean horseshoe bats (2 238) were observed in hibernation in 2005 at one site in Aquitaine, for example. Other sites saw the return of bats to previously abandoned roosts, such as a cave in Languedoc-Roussillon, which had been unused by bats for 15 years, but had a population of 80 long-fingered bats by 2007. The project also created a new roost by reopening an abandoned mine and securing it from public access. Around 650 Schreiber's bats were observed there in late 2007.

Moreover, the project is continuing to have an important role to play in conserving bat populations throughout France and in other countries of Europe, where the project beneficiary, *Société Française pour l'Etude et la Protection des Mammifères*, has presented its results. According to Mélanie Némoz, the project manager, the guidelines that the project produced are being used across France in similar conservation initiatives. "The classic way to protect a cave is to put up horizontal bars," she says, "but for some sites – particularly the smaller sites – it was first necessary to put up a false grid, using plastic bars, to see how the bats would react."

An ambitious project carried out in Spain by the regional administration of Extremadura (**LIFE 04 NAT/ES/00043**) also made a big effort in roost site protection. Apart from similar roost protection measures in 13 areas across the region, the project undertook actions for the stabilisation of abandoned mines and constructed new refuges for a colony that had to be relocated from the Yuste Monastery (former residence of emperor Charles V), as this building now forms part of the European Heritage network. This building hosted a major breeding colony of the greater horseshoe bat (*Rhinolophus ferrumequinum*). Bats are now gradually taking up the new places conditioned for them.

INFORMATION GATHERING

LIFE projects have also aimed to improve our knowledge of bat species. The south of France project used radio tracking with electronic tags to monitor its target species. It discovered that the horseshoe bat can travel up to 12 km away from its roost, far greater that the 3-4 km previously thought to be normal, thus raising questions about the size of designated Natura 200 sites.The Schreiber bat has a much larger range of 50 km. Némoz says that such a wide area is impossible to protect, and as a result, for this species, conservation activities focused on safeguarding roosts. "It was important to protect all the sites, because there are not many and they are heavily populated," she says. Greater understanding of the different species of bat allows for targeted use of resources and management plans that are regionally adapted.

Several other LIFE projects that have focused on bats have taken a similar approach. A project in Valencia (**LIFE00 NAT/E/007337**) aimed to provide valuable information on two vulnerable species: the long-fingered bat and Mehely's horseshoe bat (*Rhinolophus mehelyi*). Forest-dwelling bat species were monitored over a period of two years and cave-dwelling species were monitored over three years. The research provided

LIFE has been an important tool for improving knowledge of bats (Extremadura, Spain)

Photo: LIFE04 NAT/ES/000043

updated census data for both the long-fingered and Mehely's horseshoe bat in the project area (2 700 and 70 individuals respectively), and new data was obtained for some forest species.

Such data led to the enlargement of the Natura 2000 site network: 18 new pSCIs for bats were designated, and the project area was enlarged to cover 29 pSCIs. Five new refuges, two of them hosting important colonies of long-fingered bat, were identified. The research also identified feeding preferences and patterns, including knowledge of fishing techniques, to help identify the most likely causes of the sharp decline in numbers: the intensification of Citrus orchards has adversely affected the Mehely's horseshoe bat and inadequate management of riparian habitats has harmed the long fingered bat. This project's approach was also followed by a similar initiative in Extremadura (**LIFE04 NAT/ES/000043**), where knowledge of the distribution and presence of forest-dwelling bats was largely enhanced by intensive field surveys. The information gained for all the species targeted allows for the appropriate management of this group of animals. With these projects, recovery plans were officially endorsed for *Rhinolophus mehelyi, Rhinolophus euryale* and *Myotis beschteinii.*

Information gathered as part of a LIFE project in Brussels (**LIFE98 NAT/B/005167**) had a direct impact on conservation measures. The project made an inventory of all trees with potential bat-hosting interest in the Brussels

Bats boxes

Photo: LIFE04 NAT/E/00043

Photo: LIFE04 NAT/E/00043

Feeding and water points for bats were also part of project actions

Natura 2000 network and an agreement was reached with the services responsible for these public domains not to cut these trees. Similarly, an inventory and distribution atlas of bats in the region of Castilla y León was one of the main results of a Spanish LIFE project (**LIFE96 NAT/E/003081**). Such information enabled important refuges for bats in the region to be designated as SCIs, with their exact location, threats and protection needs being identified.

BAT BOXES

The Valencia project is a good example of a LIFE project that has introduced bat boxes to complement the natural bat habitat. This action was carried out in five forest pSCIs and two years after installation, 26% were occupied. A promising result despite the lack of actual breeding in the boxes during the project timeframe. Bat boxes were also installed – more than 200 in total – as part of the Brussels project, to provide extra roosting sites. This project also renovated several buildings as possible shelters.

AWARENESS-RAISING

Many of the projects highlighted the need for conservation measures to be taken with the full support of the local community. The Brussels project responded to this need by publishing a handbook for the managers of the public forests and parks covered by the project. It also produced an information brochure for owners of houses and other buildings, giving simple techniques to improve the survival of bats, and installed 30 information panels. Awareness-raising tools are also useful for helping disseminate project results to a wider audience. The south of France project produced a 31-minute film that won the nature conservation prize at the 2007 International Ornithological Film Festival.

As well as carrying out numerous general awareness raising activities, the Extremadura project targeted environmental agents in the region, and encouraged them to implement the project's actions. Co-operation with volunteers has greatly helped to continue the achievements of the project and will guarantee future monitoring.

LIFE projects have demonstrated that introducing the above conservation actions can help to stabilise and increase populations of endangered bat species on a local level. For the conservation status of such species to improve at European level, such actions must be adapted and replicated in other regions.

While gaps remain, since only nine of the 40 bat species known in Europe have been the subject of LIFE projects, the knowledge gained through these projects has increased our understanding of key species and has helped inform conservation measures and priorities. Through continued monitoring and habitat protection, LIFE is improving the status of several target species.

Co-ordinated efforts to safeguard the **European mink**

The European mink is one of the most critically endangered mammals in Europe. LIFE projects have explored ways to make breeding and release of the species more successful, improved riverside habitats and tackled the main threats, including the invasive American mink.

Photo: Tit Maran

The European mink (*Mustela lutreola*) was once found along riverbanks, streams and in wetlands across Europe. Today, this small carnivore, which has a typical body length of around 30-40 cm, occupies less than 10% of the area it once covered and has disappeared from more than 20 countries. Within the EU, less than 2 000 adult individuals survive in the wild – found mainly in northern Spain and southern France, but also in Romania and Estonia. In only a few decades, their EU distribution area has decreased by 70% to around 40 000 km^2, making the mink one of the most endangered mammals in Europe, along with the Iberian lynx. Outside the EU, the main population is a rapidly declining sub-population in northeast Russia and also possibly in the Ukraine and Belarus.

MAIN THREATS

Habitat degradation and fragmentation have been important threats, isolating and reducing the genetic viability of sub-populations. However, the main cause of its decline in many areas has been the invasion of the American mink (*Neovison vison*), which has managed to populate Europe after escaping or being released from fur farms.

Three of the first LIFE Nature projects targeting the European mink implemented a co-ordinated European mink action plan for Spain. The projects, which were located in Castilla y Léon (**LIFE00 NAT/E/007299**), La Rioja (**LIFE00 NAT/E/007331**) and Álava (**LIFE00 NAT/E/007335**), worked to enhance European mink populations, control the spread of the American mink, limit the occurrence of disease and pollution, and restore natural habitats. Many new habitats for the European mink were proposed as Natura 2000 sites.

Prior to these projects, knowledge of this species was scarce and no specific

actions were being carried out. Therefore, LIFE represented a turning point for the conservation of this species in Spain. A subsequent Spanish project in Catalonia (**LIFE02 NAT/E/008604**) pursued similar goals, while also including a captive breeding programme and establishing a reserve of individuals with which to start a recovery programme.

ESTONIAN RELEASES

An important Estonian project (**LIFE00 NAT/EE/007081**) sought to increase European mink numbers in an island sub-population by releasing animals which were bred in captivity under an existing programme, established in 1999, at Tallinn Zoo.

Under this IUCN-supported programme, the captive breeding stock numbered around 100 individuals and a trial release programme was started on Hiiumaa Island in western Estonia in 2000. Building on the experience already gained with this species, the LIFE project launched a more substantial breeding programme to reinforce the size and the genetic status of the captive population at Tallinn Zoo. In addition, the project sought to establish a second population of wild European mink on the island of Saaremaa, with the planned release of 30-50 animals bred in captivity. However, once the project was up and running, it was decided to shift these planned releases to Hiiumaa Island to reinforce the existing captive-bred population surviving in the wild there.

By the end of the project, 149 animals had been released into the wild: this was higher than the numbers foreseen at the start of the project, and the surviving population was estimated to be 16-28 animals. The process launched under LIFE was not a total success (the team was over-optimistic with initial targets regarding the size and genetic pool of the surviving population in the wild). However, it helped highlight some of the challenges for future reintroduction programmes in Europe. One of the lessons learned was that success can only be expected in the longer-term, possibly in 10 years, considering the low survival rate among the released population. Efforts are continuing, however, beyond the end of the LIFE project. The project also helped to extend the Natura 2000 site network for the species.

An ambitious Spanish project (**LIFE05 NAT/E/000073**) focused on restoring and improving the connectivity between riparian (riverbank) forest habitats, crucial to European mink populations, such as riparian alluvial forests of alder and ash (a priority habitat for conservation according to the Habitats Directive). It created favourable habitat features for the target species, such as gullies and

New born European mink cubs at the captivity centre

Photo: Tiit Maran

Photo: Tiit Maran

Pre-release enclosures used for mink acclimatisation before full release

breeding areas and tackled 33 danger spots – mainly on roads – to reduce mink mortality rates. The project also monitored European mink dynamics and genetics, and ensured the absence of its rival, the American mink, from target areas. A broad and intensive awareness campaign was successful in engaging the public.

EUROPEAN PROTOCOLS

Finally, a co-operation project run from Barcelona (**LIFE03 NAT/CP/E/000002**) brought together different projects and experts to draw up and update European guidelines for the breeding and release of European mink. Important deliverables included an update of the "European mink captive breeding and husbandry protocol" – a basic tool for the handling of the species in captivity, and guidelines for the release and post-release monitoring of captive-bred animals.

In just a few decades, the European mink has become a flagship species for riverine habitats. The challenge of successfully introducing mink bred in captivity into the wild is one that LIFE projects have explored, but not yet overcome. Finding effective and viable introduction methods, controlling American mink populations and ensuring healthy, well-connected riparian habitats are key to the survival of the species. The collaborative approach encouraged by LIFE projects represents a clear way in which this goal can be achieved.

In Europe, the Arctic fox is found only in the northern parts of Sweden and Finland, and in Norway. While it is classified as critically endangered, LIFE projects have demonstrated best conservation practices for the species.

Securing a future for **the Arctic Fox**

The first LIFE project (SEFALO) was launched in 1998, when only about 40 adult arctic foxes (*Alopex lagopus*) were present in Sweden and only five litters were born. Towards the end of the second project (SEFALO+), during the summer of 2007, 24 Arctic fox litters were born in Sweden and 15 in Norway. Nevertheless, no litters were born in Finland, and the Finnish population (10 individuals) showed no signs of reproduction.

The initial decline in the Arctic fox populations was due to two main threats: the scarcity of food – the species feeds on lemmings (among other small rodents) whose populations fluctuate – and competition with and predation by the red fox (*Vulpes vulpes*), which has increased in number in the mountainous areas. As a result of population decline, young Arctic foxes have difficulty finding a non-related partner, which makes the situation worse. Hunting for fur has also been a major threat to the species in the past.

As a result, LIFE projects have been carried out with the aim of increasing reproduction and decreasing mortality. The main conservation actions – supplementary feeding and control of the red fox – helped achieve this aim and demonstrated the possibility of reviving a population threatened with extinction.

FEEDING

The first SEFALO project (**LIFE98 NAT/S/005371**), which was carried out in Sweden and Finland, helped stabilise the population of Arctic fox, but it was unable to increase numbers. A second (SEFALO+) project (**LIFE03 NAT/S/000073**), also including Norway, was considered necessary to build on the experience gained during the first project. The second project took a more individual-oriented approach rather than an area approach to conservation. The decision to shift focus was taken on examining the results of a monitoring programme launched by the first project, which tracked individuals with radio-transmitters.

Photo: Keith Morehouse

LIFE aimed to increase reproduction and decrease mortality of Arctic fox (Alopex lagopus)

The dens with litters were provided with extra food (commercial dog pellets) during the project in order to increase the survival of the juveniles. During wintertime, carcasses were hidden under snow as a complement to the dog pellets. This extra food helped to increase the number of breeding arctic fox pairs, increase the litter size and raise juvenile survival rates – all contributing to a faster population growth.

INFORMING LOCALS

Another measure that LIFE projects have highlighted is the need to inform the local population about the plight of the fox. Campaigns not only created an understanding of the aims of conservation initiatives, but also educated the local population about measures that could be taken to avoid disturbing the Arctic fox. For example, the first LIFE project emphasised that sites

with breeding dens should also be protected from hunting with dogs in early autumn.

Future conservation work was ensured by the SEFALO+ project through the development of tools and techniques for the management authorities. However, conservation efforts vary according to area, and despite the actions of this project, most of the threats against the Fennoscandian population remain. The low population size is still a difficulty, even if the number of litters has increased. Moreover, while a great many red foxes have been culled in strategically important sites for the Arctic fox, competition and predation by the red fox is still a threat and will remain so in the future. It is hoped, however, that extended actions will lead to a balance between these two species, lifting arctic fox populations up to a level where conservation actions are no longer needed.

Currently, about 200 individuals are found in Fennoscandia. The results of the LIFE projects demonstrate that conservation measures can halt population decline and even increase population size. In areas where intensive actions have been performed, the population has more than doubled over a four-year period. It is important to remember, however, that it is the combination of actions that have resulted in the positive population development during the project period. As all actions are completed together it is also difficult to distinguish which contribute most. Information and protection around dens are difficult to evaluate in a quantitative way, but they are important factors in the cumulative conservation efforts. Saving an endangered carnivore is a long-term initiative spanning several years.

Photo: LIFE98 NAT/S/005371/Alf Kjellström

Juvenile artic fox

The fox's natural habitat is also under threat from climate change. The distribution areas of the Arctic fox and its genetic variants have expanded and moved in the past as the climate has changed – the modern foxes in the target areas are believed to have migrated from Siberia. As a result, a key outcome of the project was the suggestion to explore the idea of constructing corridors that will allow the Arctic fox to migrate to more climate appropriate areas. Actions could focus on the migration further north to cooler regions or to Siberia.

Photo: LIFE03 NAT/S/000073

Dens with litters were provided with extra food (commercial dog pellets)

The conservation of the wolf (*Canis lupus*) often arouses controversy. Hunted to extinction in many parts of Europe in the 19th century, measures to protect its populations in France, Germany, Italy, Scandinavia and Spain, as well as large populations in eastern and south-eastern Europe are not always welcome by farmers concerned about their livestock. Many LIFE projects, as a result, have focused on demonstrating the possible of co-existence of farming practices and large carnivores (the wolf is the second largest carnivore in Europe).

Co-existing with **the wolf** at your door

Although the wolf is listed as a priority species in the annexes of the Habitats Directive – its sites need protecting in most of the EU and its populations need to be sustainably managed – conservation efforts in many European countries have been hampered in the past by a lack of information on the exact numbers and locations of wolf populations. LIFE-Nature projects to support wolf populations have aimed to provide such data, and also to assess the impact that wolf populations have on their surrounding environment. For example, a French project, 'Conservation of great carnivores in Europe: return of wolf in the French Alps' (**LIFE99 NAT/F/006299**), set up a network of 450 people to collect information, and a study was carried out on one pack's food foraging. Genetic analyses of hairs and excrements were also performed to verify the presence of wolves and to identify their origin.

Many effective monitoring tools are available, as LIFE projects have demonstrated. An ongoing Slovenian project, 'Conservation and surveillance of conservation status of wolf population in Slovenia' (**LIFE08 NAT/SLO/000244**), planned to employ a range of adapted techniques, including non-invasive genetic sampling and GPS-GSM telemetry, to monitor population size, reproductive success, habitat use and preying rate. The wolf-howling technique (imitation of wolf howls to which wolves respond) is another common method of estimating population size.

The French wolf network also reported on damage to livestock, thus aiding the allocation of compensation to farmers. In the case of an Italian project, 'Preservation and conservation of *Canis lupus* populations through biological surveys and non-poaching by hunters' (**LIFE96 NAT/IT/003115**), a new compensation scheme was adopted that radically improved on the previous cumbersome procedure.

Wolfs are not always welcome by farmers

Photo: LIFE02 TCY/CRO/00014

DAMAGE PREVENTION

The reduction of damage, however, has been the main focus of LIFE projects. Common actions have been the acquisition of guard dogs and the construction of fences. The aforementioned French project, for example, paid for 205 dogs and their first vaccinations, as well as installing 761 mobile enclosures for livestock and 37 permanent fences. These measures led to a significant decrease in damage caused, and thus to a reduction of compensation costs.

Research carried out by the Italian 'Project for the conservation of the wolf

in the Pollino National Park' (**LIFE99 NAT/IT/006209**) led to the donation of 30 mastiff dogs and 40 electric fences to livestock breeders in the Pollino region of southern Italy. Studies carried out by the project also underlined that the lack of knowledge among breeders of the availability of funds to compensate for damages increases the negative attitude they have towards the wolf. An information campaign directed at farmers, therefore, focused on the measures to prevent damages and on existing compensation procedures.

Such information campaigns are a common aspect of projects. Following decades of extinction in France, the project in the French Alps aimed to communicate to stockbreeders that the return of the wolf did not represent a threat to their livelihood and that indirect impacts were being monitored. Campaigns, such as the one carried out by an Italian project (**LIFE96 NAT/IT/003115**) have also targeted hunters, in order to reduce the threat posed to wolves by poaching. Finally, campaigns have also emphasised the potential benefits of wolves to the community and their value for eco-tourism.

HABITAT RESTORATION AND MANAGEMENT

Another effective project action has been to boost prey sources for wolves. Measures have included the reduction of poaching of their prey (**LIFE96 NAT/IT/003115**), which in Italy are wild ungulates (roe deer, red deer and wild boar), and the conservation of their habitats. Also in Italy, 28 roe deer were released in the area of Gran Sasso as part of the 'Conservation of wolf and bear in the new parks of Central Apennines' (**LIFE97 NAT/IT/004141**) project. The reintroduction of roe deer in this area represented a real improvement in the habitat of the wolf.

Wolf habitats are also the focus of the ongoing Italian project, 'Development of coordinated protection measures for Wolf in Apennines' (**LIFE08 NAT/IT/000325**). This project is carrying out restoration works to reduce a range of natural and human risks to wolf populations. These actions aim to limit disturbance at breeding sites and during reproductive seasons, as well as during other key phases of the wolf's biological cycle.

Photo: LIFE02 NAT/RO/008576

GPS telemetry is used to monitor population size, reproductive success, habitat use and preying rate – making it is possible to better manage conflicts with humans

Capacity building was the main focus of the LIFE Third Countries project, 'CROWOLFCON - Conservation and management of Wolves in Croatia' (**LIFE02 TCY/CRO/014**), which established a unit at the former ministry of environmental protection and physical planning in Zagreb, as well as two regional offices in the project area, to improve communication between national authorities and the local community. The project also aimed to improve the damage compensation system by hiring additional damage assessment experts to cover the entire territory of wolf distribution. As a result, all livestock breeders can now report damages and receive compensation.

The Croatian project also helped draw up a long-term management plan for the species in the country. It involved biologists, hunters, foresters, representatives of the competent ministries and state institutions and NGOs in a series of moderated workshops, which provided an opportunity to air problems and propose possible solutions. The plan was officially adopted and implemented by the ministry of culture, which is currently responsible for nature protection.

LIFE projects have facilitated an increase in the populations of wolves across Europe. With increased awareness of the need for conservation and improvements in compensation procedures, these populations should continue to thrive.

Electric fence funded by a Croatian LIFE-Third Countries' project

Photo: LIFE02 TCY/CRO/00014

SPECIES CONSERVATION

Conserving the genetic integrity of **threatened ungulates**

Support from the LIFE programme for the conservation of threatened ungulate species has not been limited to the European bison. Projects in France, Italy and Finland have also taken important steps to help conserve numbers of threatened reindeer, chamois and mouflon. These projects show that captive breeding and recovery programmes are not easy and success is not guaranteed.

Monitoring, genetic screening and (in some cases) captive breeding programmes have been important elements of LIFE projects dedicated to conserving and increasing populations of some of Europe's most threatened ungulates.

FINLAND'S WILD FOREST REINDEER

By the late 1990s, the global population of wild forest reindeer (*Rangifer tarandus fennicus*) numbered just 5 000, of which 1 500 were found in the EU, in three Finnish provinces (Kainuu, Lieksa and Suomenselka). The survival of these sub-populations was threatened by their isolation, the impact of human activities (hunting, collisions with vehicles) and hybridisation from cross-breeding with domestic reindeer.

A LIFE project (**LIFE98 NAT/FIN/005325**), however, aimed to maintain the genetic integrity of Finland's wild forest reindeer populations by keeping them separate from domestic reindeer.

Key to this was the reparation of an 83 km-long fence between the Kainuu wild forest reindeer population and a domestic reindeer herding area. The addition of eight cattle stops and seven gates to the fence has helped to significantly reduce intermingling of the two species. Fifty-six domestic reindeer were also removed from the 'wrong' side of the fence. In addition, LIFE funding paid for a full-time warden to check the fence and prevent poaching.

Some 300 wild reindeer were given yellow earmarks to ease recognition and seven were tagged with radio transmitters for tracking purposes.

Fencing off the wild reindeer helped reduce damage to agriculture and forestry, thus improving acceptance of the species among local farmers and the forestry industry. Where damage was caused, compensation was paid.

Local hunting clubs were supportive of the project and helped with the removal of domestic reindeer and hybrids from the wild reindeer habitat, and also with ground-level monitoring as a precursor to aerial surveys of the development of the three sub-populations in the project areas.

This aerial monitoring revealed that the Finnish wild forest reindeer population had grown to some 2 600 individuals by the end of the project, including 1 700 in the fenced area of Kainuu.

REINTRODUCTION OF ABRUZZO CHAMOIS IN THE CENTRAL APENNINES

The Abruzzo chamois (*Rupicapra pyrenaica ornata*) is a sub-species of chamois found only in the central Apennine mountains of Italy. Highly threatened, it is included in the annexes of the Habitats Directive and was the only mammal endemic to Italy listed in the 1996 IUCN Red List.

Two LIFE Nature projects have targeted the conservation of this rare ungulate in four of Italy's national parks.

Photo: Fabio Pierboni

Rupicapra pyrenaica ornata

The first project (**LIFE97 NAT/IT/004143**) was located in the Gran Sasso e Monti della Laga National Park, where just 25-30 Abruzzo chamois survived, less than the minimum viable population. Efforts focused on boosting the nucleus of the sub-species to ward off the consequences of possible epidemics from inbreeding. A thorough monitoring programme helped build up a comprehensive picture of the demographic and health status of the chamois. Actions were taken to regulate tourist flows and livestock grazing away from the most important and vulnerable areas for the species. This included the creation of hiking paths for chamois watching. The wardening service was also strengthened to tackle the threat of poaching. Following these steps to establish conditions favourable to the long-term survival of the sub-species, eight chamois were transferred from the Abruzzo National Park (the largest sub-population, numbering some 500 individuals) to Gran Sasso e Monti della Laga.

By the end of the project the population there had grown to an estimated 76 chamois.

In 2002, the beneficiary began a follow-up project (**LIFE02 NAT/IT/008538**) in order to continue the conservation and development of populations reintroduced to the Gran Sasso and Majella parks in the 1990s and to lay the groundwork for the reintroduction of the chamois to the Monti Sibillini National Park.

A key part of the project was the creation of a captive-breeding programme, which led to the release of five chamois into the wild. Genetic screening of the species was carried out not only to ensure the health of the existing chamois populations, but also to enable the best distribution of captive bred (and wild) animals to ensure maximum genetic diversity among the different populations.

To further ensure the long-term survival of the Abruzzo chamois, the project team established a health emergencies programme that will provide a rapid response in the event of a serious health problem being picked up by the ongoing monitoring activities.

ACTIONS IN FAVOUR OF THE CORSICAN MOUFLON

Among the most endangered of European ungulates, the Corsican mouflon (*Ovis gemelini musinom*), a species listed in Annex II and Annex IV of the Habitats Directive, is found in the wild only on Corsica and neighbouring Sardinia. With only some 1 000 individuals (split into two sub-populations), the species faces threats from poaching, sporting and leisure activities, forest fires, and diseases spread by domestic sheep.

In 2003, a LIFE project (**LIFE03 NAT/F/000099**) set out to safeguard the entire population of the species on Corsica. The project planned to construct a captive breeding centre capable of housing a sire stock of 30 individuals caught in the wild. It was hoped that the breeding centre would produce 10-20 animals per year from the winter of 2006-07 for release into the wild. The breeding programme would be supported by monitoring of the wild population, the establishment of appropriate management agreements with wild boar hunters and other people using mouflon habitats for leisure activities, and by various awareness-raising activities.

Unfortunately, the captive breeding programme failed to achieve its aims. Two captive breeding enclosures were created (at Quenza and Asco), with a total of 41 individuals. Although 12 mouflon were born in captivity, conditions proved unfavourable to the species: of the 53 animals in captivity, 20 died and 15 escaped, leading to the indefinite postponement of the reintroduction. The captive breeding programme is still ongoing. However, for reasons as yet unknown no new animals have been born for the past 2 years.

However, this LIFE project did increase knowledge of the Corsican mouflon population thanks in part to its use of an innovative monitoring method involving helicopters. Threats to the species were identified and actions initiated to combat these. The project also suggested several potential sites for future reintroduction of the species. Furthermore, an awareness-raising campaign targeted the general public and special interest groups using posters, a website, a DVD and materials for schools (reaching 2 600 pupils).

Photo: LIFE03 NAT/F/000099 - Parc Naturel Regional de Corse

Water pollution, persecution and the fragmentation of habitats and populations has resulted in a decline in the numbers of otters found in Europe, but LIFE projects have demonstrated how to restore habitats and reconnect populations to the benefit of the species.

Photo: LIFE03 NAT/IRL/000107

Supporting **European otter populations**

Over the last century, development and changes in land use (i.e. canalisation of rivers, removal of river bank vegetation and the draining of wetlands) caused the western and eastern European sub-populations of the otter (*Lutra lutra*) to become separated and numbers to decrease – the otter is listed in Annex II of the Habitats Directive. In recent years, however, improved water quality, a reduction in persecution, and other measures introduced by initiatives to protect the otter, have increased its populations and range in several regions across Europe.

RECONNECTING POPULATIONS

In western Europe, efforts have also been made to link populations. One such initiative by the LIFE project "Loutre BeLu 2005-2006 - Restoration of European otter habitats" (**LIFE05 NAT/B/000085**), aimed to restore crucial habitats for the otter in the Belgian Ardennes and the neighbouring part of Luxembourg. These areas have a special role to play in joining the French, Dutch and German populations, which have been increasing in recent years thanks to conservation work and reintroductions.

The project addressed the fragmentation and low quality of habitats. Its target area included the basins of the rivers Our, Sûre and Ourthe, and covered roughly 300 000 ha. A key aim of the habitat restoration was to improve the possibility for contact and genetic exchanges between the expanding neighbourhood populations.

Reconnecting populations involved the protection of 55 km of embankments along streams and rivers to create corridors and also the digging of small ponds to aid the species' movement. Due to the scale of the project, it was vital to secure the approval of a wide range of local stakeholders. The project also worked in close co-operation with three other relevant nearby LIFE projects, and with an Interreg III A project concerning the protection and development of the ecological network in the area. The three LIFE projects were concerned with the conservation of pearl mussel (*Margaritifera margaritifera*) habitats (**LIFE02 NAT/B/008590**); the rehabilitation of natural habitats on the Tailles Plateau (**LIFE05 NAT/BE/000089**); and the restoration of raised bogs (**LIFE03 NAT/B/000019**).

Linking otter populations by restoring and reconnecting habitats

Photo: LIFE03 NAT/B/000019

RESTORING HABITATS

The north-east of Slovenia, along the border with Austria and Hungary, is one area in Europe where there is still a significant otter presence (more than 50% of the national population). The Slovenian government recently created the Goričko national park, which extends over 51 000 ha of hills, rivers, forests and traditional agricultural landscapes.

A LIFE project, "AQUALUTRA - Conservation of otter population in Goricko" (**LIFE04 NAT/SI/000234**), was carried out in the area by the local municipality. It aimed to restore the otters' habitats and migratory corridors. Measures included restoring streams and creating new wetlands. Similarly, the Belgium-Luxembourg LIFE project also implemented measures to create habitats that are more favourable to otters. It cut down 142 ha of spruce along river valleys and either replaced them with deciduous trees or left the land open. Invasive species were also removed from 108 ha. Furthermore, around 20 safe refuge zones were set up in areas favourable to reproduction and actions were carried out to increase the natural supply of fish.

Finally, both projects focused on the problem of road fatalities. In Slovenia, traffic signs were erected, while in the Benelux region several road bridges were equipped with passageways that allow otters to cross roads safely.

MAMMALS

MANAGEMENT OF POPULATIONS

LIFE co-funding has played an important role in establishing best practices for mammal conservation throughout Europe, such as in the development of captivity breeding techniques and protocols, and the reintroduction and reinforcement of populations. Moreover, LIFE has been crucial for the restoration of mammal habitats.

Demonstrating the co-existence of **humans and large carnivores**

Several LIFE projects have focused on demonstrating the possible of coexistence of large carnivores – in particular, bears and wolves – and human beings. Reducing poaching through close co-operation with farmers and hunters, and improving the protection of livestock and crops through the use of electric fences and sheepdogs, have shown how large carnivore conservation can have a beneficial socio-economic impact at a local level.

In the eastern Carpathian Mountains, a third Romanian 'co-existence' LIFE project is currently being carried out. The project aims to build on the experience gained by the first two projects in Vrancea County and to apply this to two neighbouring counties: Covasna and Harghita. The LIFE+ project, 'URSUSLIFE - Best practices and demonstrative actions for conservation of Ursus arctos species in Eastern Carpathians, Romania' (**LIFE08 NAT/RO/000500**), is focussing on tackling the threats to the region's brown bear (*Ursus arctos*) population, which was estimated at 2 300 at the start of the project.

Photo: João Pedro Silva

While the problem of poaching was nearly eradicated from some demonstration areas as a result of the previous project, bears continue to be threatened by changes to their habitats – a decline of traditional meadow farming, extension of croplands and disturbance of hibernation sites are all increasing infant mortality. As the country steps up its infrastructure rebuilding, including upgrading roads, traffic fatalities are another growing problem.

PROTECTING HABITATS

The Romanian bear population, however, is an important one, consisting of around 6500-7000 individuals and representing more than 40% of the European total. The overall aim of the LIFE initiatives in Romania has been to maintain the current conservation status of this 'umbrella' species in several Natura 2000 sites, by applying best practices and demonstrative activities and promoting them at national and European level. The beneficiary, the Vrancea Environmental Protection Agency, has drawn up management plans for key areas, in co-operation with stakeholders. One of the main results of the project, 'Carnivores Vrancea II - Enhancing the protection system of large carnivores in Vrancea county' (**LIFE05 NAT/RO/000170**), was the inclusion of eight sites – around 40 000 ha in total in the Natura 2000 network and their official approval by the Romanian environment ministry. In Vrancea, a national park was constructed around a network of bear sites, a development that had a positive impact on bear conservation and has raised awareness of the need to protect bear habitats, according to project leader, Silviu Chiriac.

Attacks on sheep flocks are one of the causes of conflicts between large carnivores and man

"Our project led to other initiatives that have developed the possibilities of eco-tourism. For example, the Environmental Partnership Association created nature trails in the park and a bear observation hide," he says. Around 80% of the land in the park is publicly owned and the creation of eco-tourism opportunities

Photo: LIFE04 NAT/F/000086

Habitat protection for wolves and bear populations is crucial for their survival

was developed in exchange for restricting areas that are favourable for making dens, such as oak forests. Through the initiative of the project team, it is now forbidden to carry out logging activities in the winter months so as to prevent disturbance to the dens.

Another significant socio-economic impact of the project was the creation of 20 paid positions linked to the project – the new management structure of the national park accounts for 14 of these jobs. Local manufacturers and craftsmen were also employed in the creation of signs and paths. The involvement of the public in bear conservation was a major feature of the project. The project's organisers recognise that public acceptance is central to the success of conservation initiatives. Putting in place a visible team of experts that work with farmers on protecting crops and flocks has radically reduced the incidence of poaching. Ioan Pop of the Environment Protection Agency says that "if there's a problem with bears, people now know who to call". The team's work ranges from freeing trapped bears (which might otherwise have been shot) and their rehabilitation in a special centre funded under LIFE, to conflict reduction and the monitoring of troublesome individuals. The LIFE+ projects aims to extend the area covered by the Animal Rescue Mobile Unit to the whole project area. The goal is also to improve monitoring and knowledge of bears in the three target counties by creating a GIS database.

Work with farmers on protecting crops and flocks has radically reduced conflicts

Photo: LIFE05 NAT/RO/000000170

ECONOMIC INCENTIVE

The area of the East Carpathians has a high natural capital value. Bears can be hunted in Romania under the strict provisions of the Habitats directive. In fact,

the Environment Protection Agency accepts the necessity of permitting some bears to be hunted as a trade off for co-operation in conservation activities. Also, shooting a bear requires the filling in of much paperwork, and it is easier now just to pick up the "green phone", as one local phrased it.

One farmer to have directly benefited from the project, Liviu Bălbărău, is also responsible for forestry management. He has suffered in the past from bears breaking into his plum orchard, which was previously only minimally protected by chained dogs. In fact, his father would even generate noise from the hayloft adjacent to the orchard to deter bears from entering at night. Now the recipient of an electric fence, Liviu is reassured that his valuable crop will not be wrecked by bears, which damage entire trees that can take up to six years to rejuvenate. The economic benefit to the farmer is not insignificant.

The project has been an educational experience for Liviu. As a member of the forestry department, which oversees hunting, he says that he didn't realise that there was a practical solution to destroying troublesome bears.

Photo: Jon Eldridge

Rehabilitation centre for poached mammals

The project has demonstrated that bear conservation is compatible with his need to protect his farming interests.

The project leaders believed that the best way to maximise this informative potential of the project was to target schools. Says Pop of the agency: "The biggest impact in the short term is with schoolchildren. They also teach their parents, who, even if they don't like what they are saying, will do it anyway to please their children." The educational material produced for children is impressive, ranging from a beautifully illustrated book of bear stories with complementary colouring book, to t-shirts and badges. Several competitions were also organised under LIFE.

In this part of Romania, the use of sheepdogs is less established than in other regions and countries. However, a sheep and goat farmer, Chirlă Costică, who has received electric fencing through LIFE funding, says that he has reduced the number of dogs he keeps from ten to five as a result of the project. Such a reduction represents a significant cost reduction, he says. Guards dogs require a lot of attention and care. In fact, the use of electric fences is also

Shepherds dogs are the most effective way of protecting flocks and avoiding attacks from bears and wolves – Umbria dog

Photo: Jon Eldridge

a great time saver. The electric fences are easier to move than wooden fences, and the farmer is now sufficiently convinced of their effectiveness that he no longer erects a wooden fence inside the outer electric fence.

Chirl 's traditional way of life – he produces his own cheese – is itself under threat, however, as the younger generation are moving away from the villages to the cities. But the project leader, Silviu Chiriac believes that farms like Chirl 's have a potential value as demonstration sites for visitors. One of the socio-economic legacies of the project is the strengthening of these long-term relationships with land managers and owners and the exploration of such possibilities.

Even in Romania, the long-term survival of bear populations is a concern. However, the good practices demonstrated by the project in Vrancea county and now being realised in neighbouring counties – with the ultimate goal of national acceptance – offer a realistic hope for peaceful co-existence between humans and large carnivores.

PROTECTING LIVESTOCK IN ITALY

'LIFE Coex' (**LIFE04 NAT/IT/000144**) was an ambitious, wide-reaching project that aimed to demonstrate that humans and carnivores can coexist. Co-ordinated by the Institute of Applied Ecology in Rome, it had partner organisations in Croatia, France, Portugal and Spain, as well as Italy, where it operates in the regions of Abruzzo and Umbria. In Abruzzo, its partners were the Gran Sasso and Monti della Laga National Park, the Majella National Park and the vast Abruzzo Lazion and Molise National Park.

Similar to the Romanian project, LIFE Coex supplied partner organisations with the means to build electric fences to keep out wolves and bears. In countries such as Italy, where compensation is paid for damages caused by large carnivores – the Province of Perugia, for example, pays farmers around €500 for each calf killed by a wolf – such protection represents a long-term cost saving.

While the total amount the authority pays out in compensation to farmers was substantial, the Province did not have the additional funds available for preventive projects. But thanks to LIFE funding farmers were able to receive fencing – a 7 ha fence costs €1 700 and some farmers reported losing 10 calves a year before the protection.

Compensation for wolf damage was also reduced by using LIFE funding to employ a vet in the Gran Sasso Park, to determine whether damage to livestock had been caused by a wolf or another animal such as a stray dog or a wild boar. The park says that the amount of compensation it has to pay has fallen "dramatically", by about 50% as a result. According to the project co-ordinator, Annette Mertens, however, compensation for farmers is "more of an emotional issue than an economic one". "The wolf has been used as a scapegoat," she says.

Another way to protect livestock from wolf damage is to use sheepdogs. The practice in some parts of Italy has disappeared. The project donated Maremma Abruzzo sheepdog puppies to sheep farmers. These dogs grow up alongside their flocks and form strong bonds with the sheep. A strong identification with its flock is essential to ensure that the dog does not run off and leave its flock vulnerable to attack. Mertens believes that such donations are a significant step forward and help create a good working relationship between the park managers and the farmers. "It shows that the park authorities are doing something for them," she says.

But the legacy of the LIFE Coex project, which ran from 2002 to 2008 was not simply the length of fences it built or the number of dogs it donated, but more a demonstration of the possibility to farm alongside the presence of carnivores. A follow-up LIFE+ Antidoto project being carried out in the Gran Sasso e Monti della Laga National Park (Italy), in the Andalusia Region (Spain) and the Aragon Region (Spain), is aiming to adopt and disseminate innovative measures for the fight against the illegal use of poison.

Photo: LIFE04 NAT/IT/000144

Mammals for birds: **reintroduction of rodents for raptors**

Rodents have been reintroduced in several countries in Europe as prey for raptors such at the imperial eagle, whose populations are in decline. Two LIFE projects have been carried out in the Carpathian basin of Hungary and Slovakia, where the remaining stronghold of the species in the EU can be found. Also in the same area, another LIFE project is managing the suslik (or ground squirrel) rodent as part of a range of measures aimed at securing the survival of the Saker falcon.

The imperial eagle (*Aquila heliaca*) has suffered from changes to its habitat and high mortality rates along its migration routes. As well as introducing direct measures to improve its habitats in Slovakia (including insulating power lines), a LIFE project in the Carpathian basin (**LIFE03 NAT/SK/000098**) reintroduced susliks, the imperial eagle's main prey species, to selected areas to increase survival prospects for the eagle. The suslik (*Spermatophilus citellus*), however, is a protected species in Slovakia, and it was necessary to first acquire permits showing that the actions were to be implemented on approved sites for its capture and reintroduction. The prey species were trapped primarily in the airfields of airports in Bratislava and Košice, where populations are stable. A total of 867 susliks were reintroduced in four different sites, and the success of this measure has led to its continuation.

Photo: Thurner Hof

Suslik is the main prey of eagles and falcons in central Europe

Moreover, good practice guidelines on reintroducing the suslik were drawn up and given to the Hungarian team carrying out a recent LIFE project targeting the conservation of the endangered Saker falcon (*Falco cherrug*) in the Carpathian basin (**LIFE06 NAT/H/000096**).

The Saker is an extremely rare raptor: its total European breeding population was recently estimated at just 450 pairs, 40% of which are found in Hungary and Slovakia. The conservation of the population in the Carpathian basin of these two countries is crucial to the survival of the species in Europe.

The main goals of the 2006-10 LIFE project were to understand the reasons for the decline of the Saker, to learn more about its habitats and feeding requirements, and to introduce measures to safeguard its future. To help meet these objectives, the project has also reintroduced susliks. As the project draws to a close, some 4 900 individuals have been caught and released into 15 Natura 2000 special protection areas (SPAs).

The project estimates that the average survival rate and the reproduction rate is around 50%. Based on its experiences, the team considers that the methodology has been successful. The main conclusion is that, ideally, a release of around 50 individuals is necessary to guarantee survival of the prey species over a three-year period. The site must also be well prepared in advance and requires adequate management.

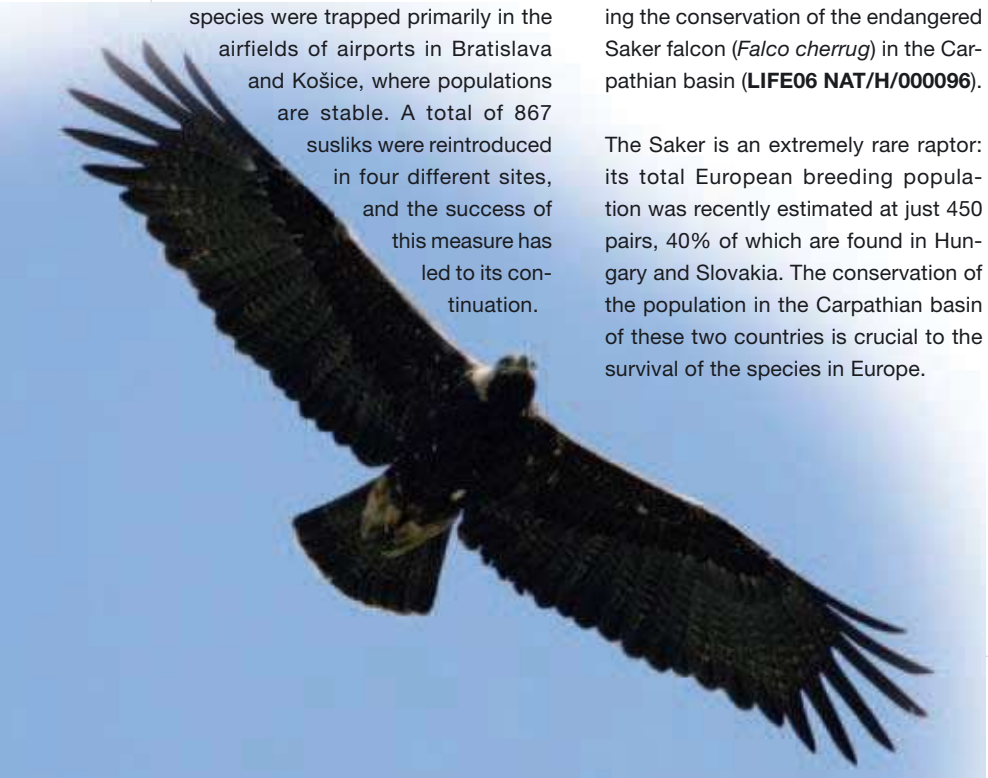


Photo: LIFE03 NAT/SK/000098 Jozef Chavko

Invasive alien species are non-native flora and fauna that disrupt the ecosystems that they enter. Invasions of non-native or 'alien' mammal species in Europe have had a significant negative impact on habitats, changing their character, food sources and directly or indirectly threatening indigenous species. Several LIFE projects have aimed to eliminate invasive species through a range of measures, demonstrating best practices and the beneficial effect such actions can have on native populations.

Eliminating **invasive mammal species**

According to the EU-funded DAISIE project[1], supported by the EU's 6th Research Framework Programme, nine out of the 100 "worst alien species in Europe" are mammals. One of these, the brown rat (*Rattus norvegicus*) was the focus of the UK project, "Canna seabird recovery" (**LIFE05 NAT/UK/000141**). The introduced rats have caused a sharp decline in seabird numbers on the Scottish Orkney islands of Canna and Sanday, as a result of predation of eggs and chicks. At the start of the project, the Manx shearwater (*Puffinus puffinus*) had almost disappeared from the islands as a breeding bird.

However, the eradication programme introduced by the project, which led to the island being declared rat free in 2008, will see Canna seabirds' populations return to the levels recorded in the mid-1990s, when the island was declared an SPA. The programme consisted of creating and maintaining a grid of bait stations containing poisoned bait to kill rats. Here, mitigating actions were required to reduce the threat of accidental or secondary poisoning of non-targeted mammals or birds, including actions to reduce the likelihood of scavenging on dead rats.

Similar measures are currently being implemented in the Azores by the "Safe islands for seabirds" project (**LIFE07 NAT/P/000649**). Along with over-harvesting and habitat destruction, seabird populations have suffered from predation from rats (as well as cats and weasels). One of the main aims of this ongoing project is to eradicate rats from the Vila *Franca do Campo* islet by the end of the project.

Photo: LIFE03 NAT/FIN/000039

Intensive trapping is one of the most effective ways of eliminating invasive mammals – American mink trap in a Finnish wetland

AMERICAN MINK AND RACOON

Bird populations are also threatened by invasive mink in Scotland. A LIFE project (**LIFE00 NAT/UK/007073**) here aimed to remove the problem of non-native American mink (*Neovison vison*) on the Western Isles of Scotland, where five SPAs covering almost 150 km² have been designated to protect the vast numbers of breeding birds present on the islands. The mink escaped from farms in the late 1950s and soon established themselves on the islands of Harris and Lewis, where the species was responsible for widespread breeding failure and losses of ground-nesting birds. The invasive mink then spread to the more remote islands of North and South Uist and Benbecula, and threatened the continued existence of many other bird populations.

Monitoring and a study into mink behaviour have helped to identify the most

1 DAISIE: www.europe-aliens.org/

effective, efficient and humane methods for their elimination. The project tested such techniques as the use of mobile traps, roadside traps and traps left unbaited until mink were known to be present, as well as the use of dogs. The project also tested methods of detecting mink presence from faecal material and from hair samples, although these proved to be very costly.

The outcome was the development of a cost-efficient model for mink control for the whole of the Western Isles. This model, which was central to the project's trapping strategy, favours the use of:

- scent glands as bait in all traps, which proved to be three times more effective than conventional fish bait;
- mobile traps to target areas where there are signs of mink;
- trapping at greater intensity in rutting and dispersal seasons;
- dogs to locate mink dens for subsequent trapping

The last mink was caught on the Uists in March 2005, a strong indication that the programme has eradicated mink from these islands. Mink numbers in Harris were substantially reduced, with trapping rates falling considerably. The project's successes suggest that future eradication could be achieved on this island too.

In Finland, the American mink has also been targeted in order to protect endangered bird species. The LIFE project (**LIFE03 NAT/FIN/000039**) aimed to stabilise a Natura 2000 site along the northern coast of the Gulf of Finland flyway, and to secure a favourable conservation status for the numerous bird species that rest or breed in this wetland area. While many of the project's actions concerned habitat restoration and creation, it was also necessary to reduce predation, especially during the breeding season. Small alien predatory mammals, such as the American mink and common raccoon, were trapped with the help of the regional game management districts and volunteers from local hunting clubs.

Habitat management actions were also carried out by a Spanish LIFE project (**LIFE04 NAT/ES/000036**) located in the Duratón River Canyon national park. The project carried out a range of conservation measures, including the control of American mink, to favour the site's otter population, as well as to protect birds during the breeding season.

Photo: LIFE03 NAT/FIN/000039

As a result of deliberate and accidental introductions in the mid 20th century, the raccoon dog (Nyctereutes procyonoides) is now distributed throughout several European countries

COYPU

The coypu (*Myocastor coypus*), is a large, herbivorous, semi-aquatic rodent native to South America. Two Italian LIFE projects have included eradication measures for the coypu, as part of overall conservation activities for the project wetland sites.

The San Genuario marshland biotope is a small pocket of land in the Vercelli province, in the Piedmont region of Italy. It is home to an abundant variety of birds and reptiles, including one of the largest regional populations of the marsh terrapin (*Pelomedusa subrufa*). In addition to the control of invasive plant species, the San Genuario LIFE project (**LIFE00 NAT/IT/007209**) included actions to control the non-native coypu.

A second Italian LIFE project targeting the coypu (**LIFE02 NAT/IT/008526**) focused on the Valle Santa and Valle Campotto, important wetland areas in the intensively-farmed Emilia-Romagna region of northern Italy. The significant presence of non-native plant and animal species, including coypu, as well as some invasive species of fish and crustaceans, were seriously disturbing the balance of the ecosystem and represented a major risk to the site. Measures to control these species were therefore central to the success of the project's overall aim of restoring the site's ecosystems.

American mink (Neovison vison)

Photo: LIFE03 NAT/FIN/000039

Photo: Tiit Maran

Mammal reintroductions

Reintroductions have been tried with varying degrees of success for several of the many mammal species in Europe that are threatened with extinction. The know-how and experience gained through LIFE projects has been invaluable for this type of conservation initiative.

More than 40 European mammal species are considered endangered, according to the latest IUCN Red List (2007). And more than 40% of the assessments carried out for the recently published 'Article 17' reports on the Habitats Directive [1] show that the conservation status of mammal species is unfavourable. Some European species are on the brink of extinction.

For some species, such as the Iberian lynx or the monk seal, there are fewer than 500 individuals surviving worldwide in the wild. For these species, it has been necessary to set up a captivity breeding programme (*ex-situ*) and to subsequently reintroduce individuals into the wild or reinforce the current endangered population. Some of these *ex-situ* programmes for EU mammals (see Table 1) have been supported by LIFE funding.

Usually, such breeding programmes run in parallel with LIFE-funded conservation actions in the field (*in-situ*), which aim to restore species habitats, stabilise and secure the remaining species populations, and prepare the ground for reintroduction/ reinforcement. Sometimes the source of individuals for reintroductions does not originate from captivity breeding operations, but from wild populations, as translocations to more favourable habitats or secure areas. This method of transferring trapped individuals from a healthy population (when available) is an effective way of reinforcing a threatened population, or of reintroducing a species back to an area from which it has vanished. LIFE has also funded the translocation of mammal species in Europe or in other countries supported by the programme, and it has supported several reintroductions and translocations of other endangered species, such as birds, reptiles and plants. However, Table 1 shows that captive breeding programmes are not always easy to implement.

EUROPEAN MINK: A CONTINUOUS EFFORT TO STABILISE EU POPULATIONS

The European mink (*Mustela lutreola*) is among the most critically endangered mammal species in Europe. Several LIFE projects have been trying to reverse its decline throughout Europe, especially in Spain and Estonia (see page 24). In Estonia, a LIFE project (**LIFE00 NAT/**

1 http://biodiversity.eionet.europa.eu/article17

EE/007081) has implemented a captive breeding programme with the release of individuals on Hiiumaa Island. To date, the project has released more than 400 individuals that were raised in the captive breeding centre at Tallinn Zoo. Over the course of the project, some 140 minks were released on the island. In 2010, the breeding centre held more than 100 individuals.

The project's European mink captive breeding programme posed various challenges for the project team. Nevertheless, the breeding has been effective in both its reproduction rates and the maintenance of genetic variability. Some 213 young mink were also reared. Good demographic parameters have been maintained and the genetic quality of the population has been improved. According to the project data, 96.35 % of the initial gene diversity has been maintained. However, some abnormal and very aggressive male behaviour shown by the animals born in captivity has prevented their normal reproduction. In order to assure the long-term sustainability of genetic diversity, new trapped animals must be added to the captive breeding population.

Photo: Tiit Maran

Monitoring mink movements with radio telemetry after reintroduction

In order to monitor the movements and survival rate of the released minks, 54 individuals were equipped with radio-collars between 2000 and 2003. A survival rate of 30-70% (see graph) was observed after their release, with the highest mortality rates occuring during the first two months after release. These figures are considered normal for such mammal reintroductions.

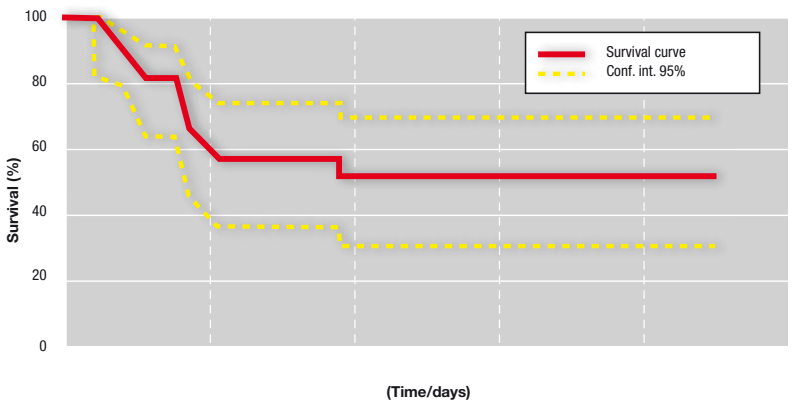
The cause of death among the released minks is mainly from direct predation (red foxes, domestic dogs, etc.) immediately after their release. In order to raise survival rates the project implemented 'soft' release methods (i.e. helping the animals to adapt before releasing them). The project therefore constructed large adaptation enclosures at Tallinn Zoo and on Hiimaa. This helps the released animals to learn to:

- Become accustomed to hunting prey (such as wild fish, amphibians, mice etc).
- Avoid human contact by gradually reducing the time they spend with keepers.
- Avoid predators with tests using domestic dogs.

Table 1: **LIFE projects involving *ex-situ* conservation actions and reintroductions**

Mammal species	Reintroduction/translocation and year	Captive breeding programme	Project
Brown bear *(Ursus arctos)*	5 (3 funded by LIFE) bears from Slovenia in the Adamello-Brenta regional park in 1997 and 5 more in 2002. A total of 10 bears were released	No (translocation)	LIFE96 NAT/IT/003152 LIFE00 NAT/IT/007131
	3 bears (1 male, 2 pregnant females) in 1996 from Slovenia in Central Pyrenees (Haute-Garonne), France – a second planned reintroduction was cancelled due to opposition from local people	No (translocation)	LIFE93 NAT/F/011805 LIFE96 NAT/F/004794
European mink *(Mustela lutreola)*	Since 2000, more than 400 have been released on the Hiiumaa Island, Estonia. (149 released during the course of the project)	Yes (partially funded by LIFE)	LIFE00 NAT/EE/007081
Iberian lynx *(Lynx pardinus)*	6 reintroduced in Guadalmellato, Cordoba from Sierra Morena in 2009 (1 male died in 2010)	Yes (not funded by LIFE)	LIFE02 NAT/E/008617 LIFE06 NAT/E/000209
Persian fallow deer *(Dama dama mesopotamia)*	A small herd (8) in the Hula Valley, Israel – 1997 and 1999	No (translocation from Nahal Kziv nature reserve in N. Israel)	LIFE97 TCY/IL/038
Monk seal *(Monachus monachus)*	From Cabo Blanco, Mauritania to the Canaries isles, Spain (not accomplished due to a high population mortality rate in 1997, see pages 14-16)	Yes (unsuccessful)	LIFE96 NAT/E/003144
Abruzzo chamois *(Rupicapra pyrenaica ornata)*	Maiella (28) and Gran Sasso (35) 1992-1998	Yes, but also translocations from Abruzzo population	LIFE92 NAT/IT/013002 LIFE97 NAT/IT/004143 LIFE02 NAT/IT/008538
Mouflon *(Ovis gmelini musimon var. corsicana)*	No reintroduction has been accomplished yet, due to slow progress of the captivity breeding programme.	Yes, but so far unsuccessful	LIFE03 NAT/F/000099

Figure 4: **Survival rate of released European mink on Hiimaa Island, Estonia**



Source: Titt Maran

In spite of these methods, however, survival rates and birth rates are low, indicating that the animals are not able to reproduce well in the wild.

This example illustrates that there is a need for further research regarding the conservation and reintroduction of mink, and that more long-term efforts are necessary to establish viable populations. The Estonian LIFE project underestimated the time needed to achieve this, and the unforeseen behavioural problems probably lead to low population recruitment. However, LIFE support was crucial for drawing up improved breeding guidelines, which should aid future reintroductions and prevent the extinction of the European mink in Estonia.

ABRUZZO CHAMOIS BACK FROM THE BRINK

Three LIFE projects targeted the Abruzzo chamois (*Rupicapra pyrenaica ornata*) an endemic sub-species only found in the Apennines, Italy. Originally the species was found in most of the central and southern Apennines, from the Monti Sibillini to Calabria. But, by the beginning of the 20th century, hunting had almost completely wiped it out. The last remaining population (around 40 individuals) was saved by the establishment of the Abruzzo national park in 1923. By 1990, 450 animals were thought to be in the national park. The population growth rate, however, has started to decline in recent years, exacerbating concerns that the genetic viability has diminishing. The survival of this small, homogeneous population, restricted to a single site, was therefore in grave danger of extinction from an epidemic or other external threat.

In order to reduce this risk, the WWF and the Abruzzo national park launched a LIFE Nature project in 1992 **(LIFE92 NAT/IT/013002**) to reintroduce the Abruzzo chamois into two mountain ranges where it was previously found: the Maiella and Gran Sasso.

The strategy was to firstly set up an "*area faunistica*" (wildlife refuge), in which chamois from the surviving population would be kept in semi-captivity in fenced-off areas in order to breed and to acclimatise to their new sites. These shelters would also play an important role in public information and awareness-raising, and were essential as genetic insurance policies. They enabled a small number of chamois to be kept safe from external risks. Animals could then be released at chosen sites, and also reinforced by individuals from the wild.

The reintroduction programme began with a preliminary operation in 1991 in the Maiella; followed by further releases (1992-1996) of 28 animals in the Maiella and of 24 animals in Gran Sasso. Most of the released animals were fitted with radio collars to monitor their movements.

The reintroductions supported by LIFE were successful. The released chamois have successfully reproduced and their numbers have steadily increased both in the Maiella and the Gran Sasso. Their presence also contributed to both sites being designated as national parks.

Another LIFE co-financed project was launched in 1997 (**LIFE97 NAT/IT/004143**), to release 10-15 more chamois in the Gran Sasso and to ensure conservation of the individuals already present. Coordinated by the Gran Sasso national park, this project also contributed to the park's future management plan, as the chamois is one of its most important features. Research also identified a further six suitable sites for reintroductions: in the Monti Sibillini and Sirente-Velino.

Reintroduced Abruzzo chamois (Rupicapra pyrenaica ornata)

Photo: Fabio Pierboni

Large herbivores graze the Cuxhaven coastal heaths

Many LIFE projects targeting Europe's threatened grassland habitats include actions to encourage the use of grazing livestock – in particular the use of endemic breeds of sheep, cattle, horses etc. – to maintain areas of valuable habitat. An innovative LIFE project in Germany, however, has gone a step further by piloting the use of wild, or semi-wild, large herbivores.

The "*Cuxhavener Küstenheiden*" Natura 2000 site, near Cuxhaven in Lower Saxony, is a unique coastal area. Located along the German North Sea coast, the area is characterised by a mosaic of habitat types such as dry heaths, sandy dunes, oak woodlands, raised mires and oligotrophic waters. There is no other area on the German mainland where this habitat composition occurs so close to the coast.

Part of what is now a Natura 2000 site had been used, up until 2003, as a military training ground for more than a century. Some of this area required restoration, having been subjected to intensive training activities. Since the ending of these activities, the open habitat types were threatened by overgrowth. Another problem was that the site is also a popular recreational area, used for sports such as motocross and horse riding, which threaten the natural habitats.

The overall goal of a 2005-09 LIFE project (**LIFE05 NAT/D/000051**) was to preserve the Cuxhaven coastal heaths and coppiced woodlands. A key innovation was the introduction of large grazing animals – Konik semi-wild horses, Heck cattle and European bison (*Bison bonasus*) – to maintain the open landscape and forest edges within the project area. The variations in size, ecology and behaviour of these three species reflect the mosaic of different habitats within the project area.

Koniks, an Eastern European breed of small horses, are very hardy and can spend the entire year out in the open.

Photo: LIFE05 NAT/D/000051

Reintroduced Konik semi-wild horses are crucial for keeping open grazed areas free from forest regeneration

Heck cattle are winter hardy and have been successfully used in other areas in landscape maintenance. The European bison is an endemic animal that used to belong to the natural wildlife fauna of Germany (see page 17). However, the destruction of its habitats and hunting caused the extinction of the populations living in the wild.

Twenty-five Heck cattle and 10 Konik horses were introduced to the project area to graze together on three separate pastures, covering a total area of 296 ha. Fencing and a network of trails with self-closing gates allows hikers and horseback riders to cross these areas safely. Five bison were also introduced (one bull and four cows) to graze a 45 ha area that included open landscape to forest.

SUCCESSFUL GRAZING

Even before the end of the project, the success of the grazing had become evident. Comparisons with aerial photographs taken before the animals were introduced clearly showed that the anticipated spread of new tree growth had been kept in check. The Heck cattle and Koniks have stopped most of the encroaching hard woods, through browsing and chafing and rubbing their horns against the stems. The European bisons, too, have been successful in reducing the spread of invasive black cherry (*Prunus serotina*), which they do by peeling the bark and thus causing the trees to die. A measure of the success of the species-appropriate animal husbandry is the fact that the three species have produced offspring.

Finally, experts believe that at least another five years of pasturing practice is needed in order to make significant, scientific conclusions about the use of such large herbivores on heaths and dry grasslands. Further monitoring during this time will show whether these large herbivores can guarantee a sustainable landscape management system, and whether the practices are transferable to other open landscapes.

Photo: Filipe Lopes

Since 1992, many mammals have been the focus of LIFE projects, and some species such as the brown bear, grey wolf, European mink and the Iberian lynx have received help from several projects. However, other species included in Annexes II, IV and/or V, of the Habitats Directive, have never been the target of a LIFE project, even though they have an unfavourable conservation status and are included on the IUCN Red List.

LIFE and 'forgotten' **mammal species**

The carnivores and some bats species included in Annexes II, IV and/or V of the Habitats Directive are among the species most targeted by LIFE. Even so, these projects are not evenly spread across Europe and do not cover the full distribution range of the species. For example, bat projects usually just cover some restricted areas (caves and habitats) in specific Natura 2000 sites.

Nevertheless, several rodent species, some carnivore species and two bat species (out of 14) included in Annex II of the Habitats Directive have not been targeted by LIFE project actions. And almost all bat species (around 25), all dormice (Gliridae: all species except *Glis glis* and *Eliomys quercinus*), and all the cetaceans (31 species) listed only in Annex IV of the directive have never been targeted by LIFE project conservation actions. Finally, some Annex II 'priority' species for conservation, such as the wolverine (*Gulo gulo*) and the Tatra chamois (*R. rupicapra tatrica*) have not yet been targeted by a LIFE project. The wolverine is, however, the only European large carnivore species that has not been targeted by the LIFE programme.

There are several reasons why these species have not yet been targeted by LIFE projects. Poor knowledge of the species, their ecology and their conservation needs is one of the main reasons. As a result, the implementation of direct conservations actions for these 'forgotten' species is very difficult to plan, as there is not enough scientific research to support the required conservation actions. In addition, quite often these species' distribution areas tend to be very small and localised and are not suitable for implementing conservation actions.

The call for proposals for LIFE+ Nature projects (open until 2013) could be an opportunity for these often forgotten species.

The large carnivore and priority species for conservation, the wolverine, has never been targeted by a LIFE project

Photo: Josh More

Table 2: **Endangered mammal species not targeted so far by LIFE**

Endangered mammal species not targeted by LIFE	Name	Conservation status - Article 17 Habitats Directive	IUCN Red List (EU-25)	Distribution in Europe
Insectivora				
Crocidura canariensis	Canary shrew	Unfavourable-inadequate	EN	Canary Islands (ES)
Crocidura sicula	Sicilian shrew	Unknown	LC	Sicily (IT) and MT
Erinaceus algirus	Algerian hedgehog	Unknown	N.A.	ES and MT
Chiroptera (bats)				
Rhinolophus blasii	Blasius's horseshoe bat	Unknown	DD	CY, EL, ES
Rousettus aegyptiacus	Egyptian fruit bat	Unfavourable-bad	N.A.	CY
Bats species listed only on Annex IV		Around 25 of the 40 species of bats that occur in the EU		
Rodents				
Microtus bavaricus		Not assessed, as it was thought to be extinct	CR	DE
Microtus cabrerae	Cabrera's vole	Unknown, but not favourable	VU	ES, PT
Microtus tatricus	Tatra vole	N.A.	LC	SK, PL, RO
Myomimus roachi	Roach's mouse-tailed dormouse	Unknown	EN	EL, BG
Sicista betulina	Northern birch mouse	Unknown	LC	AT, DE, PL, SE, SK, DK, FI, EE, LT, LV, CZ
Sicista subtilis	Southern birch mouse	Unknown	VU	HU, SK, PL
Cricetus cricetus	European hamster	Unfavourable-bad	LC	AT, BE, NL, CZ, DE, FR, PL, SI, HU, SK
Scirus anomalus	Persian squirrel	Unknown	n.a	EL
Mesocricetus newtoni	Romanian hamster	N.A.	NE	BG, RO
Hystrix cristata	Crested porcupine	Favourable	LC	IT
Carnivora				
*Gulo gulo**	Wolverine	Unfavourable-inadequate	VU	FI, SE
Vormela peregusna	Marbled polecat	Not assessed (Bulgaria and Romania not included)	VU	BG, RO
Mustela eversmanni	Steppe polecat	Unfavourable-bad	EN	SK, CZ, PL,HU
Phoca hispida bottnica	Baltic ringed seal	Unfavourable-bad	LC (*P. hispida* all subsp.)	EE, FI, LV, SE, PL
Ungulates				
Ovis orientalis ophion	Cypriot mouflon	Unfavourable-bad	N.A.	CY
Rupicapra rupicapra balcanica	Balkan chamois	Unfavourable-bad		EL, BG
*Rupicapra rupicapra tatrica**	Tatra chamois	N.A.	CR	SK, PL
Cetacea				
All cetaceans (except *Tursiops truncatus* and *Phocoena phocoena*)		31 species normally occur on EU waters		

**priority for conservation*

MAMMALS

STATUS AND THREATS

Europe's biodiversity is significantly enriched by its mammals. The EU is committed to the protection of biodiversity and to halting biodiversity loss within the EU by 2020. The Natura 2000 network is the main instrument for the protection of mammals in Europe.

Mammals in Europe – status and threats

Most of the mammal fauna of Europe has declined over the centuries due to persecution, exploitation, habitat loss and fragmentation, and invasive species. The overall downward trend continues in spite of some positive signs of recovery. In Europe, about 260 species can be found, most of which are small, flying or non-flying animals – this number is increased by a further 22 species introduced from other continents since 1500.

There are several reasons why humans (also mammals) are so interested in other mammal species: many herbivorous mammals such as deer are sources of meat and other animal products. Carnivores have provided people with fur, but have also been viewed as competitors for food and a source of menace. How to live alongside large carnivores, such as the wolf and the bear, remains a challenge in some areas of Europe. Other mammals such as small rodents are known to be, or can become, pests, causing damage to crops and property, and transmitting diseases.

In contrast, insectivorous mammals such as hedgehogs and shrews are considered to be 'friendly' and thus considered worthy of protection. The recent decline in bat populations – almost all European species prey on insects – has also moved us to protect them, following years of indifference. And after centuries of commercial fishing, which has resulted in some cases in almost complete local extinction in European waters, sea mammals are now protected. Sea mammals, however, continue to fall victim to unintentional adverse impacts of fishing activities. Last but not least, some European wild mammal species have been domesticated as important livestock, to work or simply act as companion species.

The conservation needs of mammals can also be viewed in terms of the roles they play in ecological communities, such as acting as prey species for other endangered species. The suslik rodent, for example, is the main prey of several highly endangered raptor species.

Photo: www.luis-ferreira.com/Centro de Recuperação do Lobo Ibérico (Grupo Lobo)

Mammals such as wolves play an important role in ecological communities through their action as predators

Finally, the conservation of mammals is multi-faceted and includes moral obligations to protect rare or endangered species, even when their geographic distribution is only over a very limited area.

STATUS OF SPECIES

A comprehensive assessment of the conservation status of mammals in Europe was recently carried out by the IUCN on behalf of the European Commission[1]. The status of terrestrial mammals was assessed at two regional levels: geographical Europe, and the EU-25 (the size of the EU at the time of the assessment). The assessment of the marine species was the same for Europe and the EU-25.

A total of 260 species of mammals were assessed, of which 41 were marine. The mammal fauna has been shaped by Eurasian and North African influences, but among the terrestrial species, 59 (26.9%) are endemic. These live mainly in mountainous regions and are important for European biodiversity. In contrast there are no endemic species among the marine mammals in European waters.

The relatively rich mammalian fauna of Europe is, however, under heavy pressure. Table 3 summarises the results of the assessments. Less than a third of the mammals in the EU (31%) have stable populations. Nearly a quarter (24%) have declining populations, and only 10% are increasing.

At the European regional level, 27 (14%) terrestrial mammals species are threatened, with three (2%) critically endangered, seven (3%) endangered, and 19 (9%) vulnerable. A further seven species were classed as 'data deficient'. In EU-25, the pattern is similar, with 28 (14%) of terrestrial mammals threatened, although a higher proportion of species (3%) are critically endangered (five species). A higher proportion of marine species were assessed as threatened: seven (22%) in total, split between the categories critically endangered, endangered and vulnerable. A large proportion of marine mammals (44.4%) were assessed as data deficient, hence the true proportion of threatened species may be even higher.

Overall, considering both terrestrial and marine species at the European regional level, 40 (15%) species are threatened, a further 9% are considered near-threatened, and 1% are already regionally or globally extinct.

Table 3: **Numbers of species of European mammals within each IUCN category of threat**

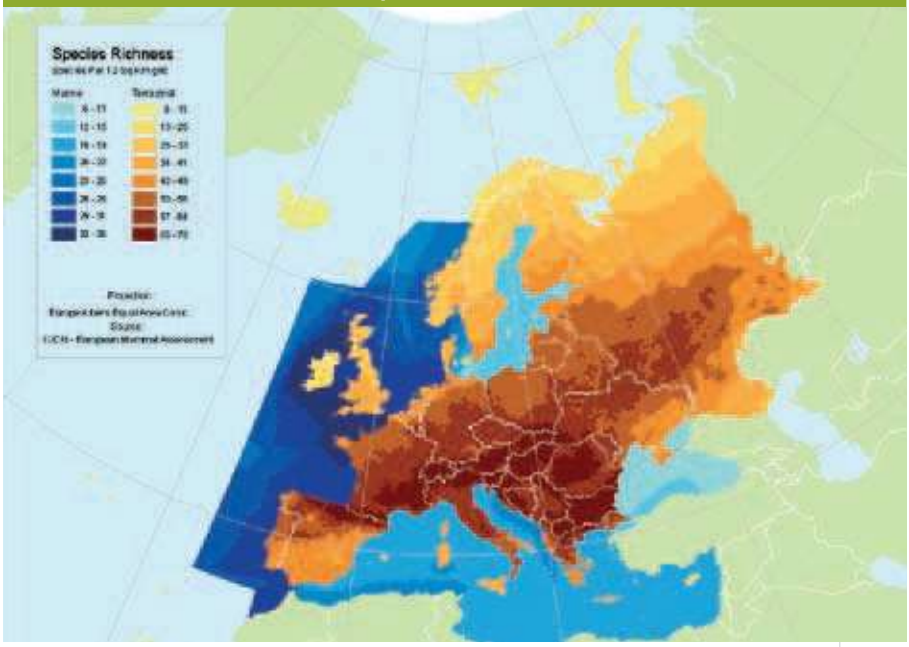
	IUCN Red List categories	No. species (Europe terrestrial)	No. species (EU-25 terrestrial)	No. species (marine)	No. species (Europe terrestrial & marine)
Threatened categories	Extinct	2	2	0	2
	Regionally extinct	0	0	1	1
	Critically endangered	3	4	2	5
	Endangered	7	5	2	9
	Vulnerable	19	15	2	21
	Near threatened	20	19	1	21
	Least concern	146	113	7	153
	Data deficient	7	9	12	19
	Total number of species assessed*	204	167	27	231
	Total number of extant species*	202	165	26	228

** Excluding species that are considered not applicable (introduced alien species, marginally occurring) - Source: IUCN European Mammal Assessment (Temple and Terry 2007)*

ARTICLE 17 REPORTS

In 2009, the European Commission published its first report based on data submitted by the Member States on the conservation status of habitat types and species of Community interest covered by the annexes of the Habitats Directive[2] (also see the LIFE publication).

Figure 5: **Distribution of species richness of mammals in the European continent and seas**



Source: Temple, H.J. and Terry, A. (Compilers). 2007. The Status and Distribution of European Mammals. Luxembourg: Office for Official Publications of the European Communities.

1 Temple, H.J. and Terry, A. (2007): The Status and Distribution of European Mammals

2 The web-based Article 17 Technical Report (2001-2006) http://biodiversity.eionet.europa.eu/article17

Photo: LIFE04 NAT/FR/000080 Yoann Peyrard

Several bats species have an unfavourable conservation status - Myotis capaccinii has a status of 'unfavourable bad' across its range in Europe

The Article 17 report concerns 128 species or sub-species of mammals listed in all the annexes. Figure 6 contains a summary of the assessments of mammal species extracted from this report.

A breakdown of the overall conservation status assessments shows that for the EU as a whole, only a small proportion, about one in eight, of the mammal species are in a favourable condition.

About 40% of the assessments were 'unfavourable'. The numbers of species vary greatly among the biogeographic regions, but the small mammal fauna of the Macaronesian region has the highest proportion of species in good status. In contrast, the Boreal region has the highest proportion of species in unfavourable status among the terrestrial mammals. All four species found in the Baltic Sea have an unfavourable status.

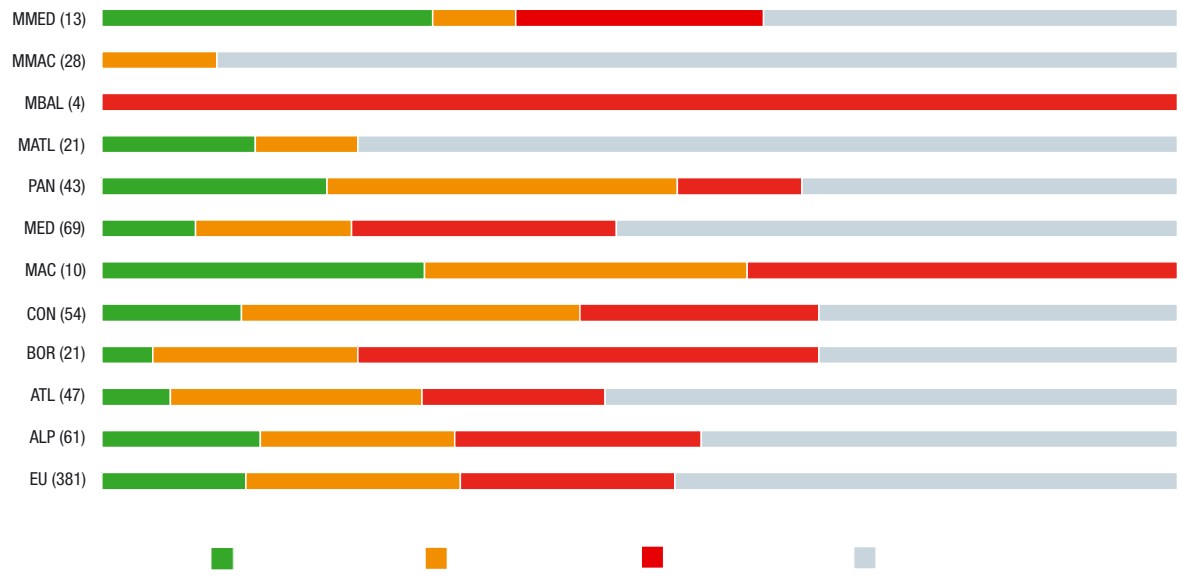
Unfortunately, a high proportion of species are poorly known throughout their range in Europe and in the biogeographic regions where they occur. Across the EU, these account for up to about half of the assessments. Since this is the case for most cetacean species, it is not surprising that 70-80% of the marine mammal assessments for the Atlantic Ocean are inconclusive due to a lack of data.

Somewhat surprisingly, it was shown that the proportion of 'priority' mammal species in Annex II in unfavourable conservation status is only slightly higher than that of non-priority species.

THREATS

Mammals on land are affected by different types of threats to those at sea. For terrestrial mammals, habitat loss and degradation has by far the greatest negative impact on species, followed by pollution, accidental death and invasive alien species. In contrast, pollution, accidental death and harvesting/ hunting impact negatively on the largest number of marine mammal species, for which habitat loss or invasive alien species are much less significant (Temple and Terry, 2007).

Figure 6: **Assessment of conservation status of mammals listed in the Annexes of the Habitats Directive in different biogeographic regions**



ALP (Alpine), ATL (Atlantic), BOR (Boreal), CON (Continental), MAC (Macaronesia), MED (Mediterranean), PAN (Pannonian), MMED (marine Mediterranean), MMAC (marine Macaronesian), MBAL (marine Baltic), MATL (marine Atlantic). The figure in brackets indicates the number of assessments in each region; the figure in the bars indicates the number of assessments.

The European Union has adopted a number of policy tools aimed at the conservation of endangered species, including mammals. These include the EU Birds and Habitats directives, other specific pieces of legislation related for example to fisheries, as well as policy documents such as the EU Biodiversity Action Plan.

Mammal conservation in Europe - **European biodiversity policy**

Mammals, like birds, have been at the forefront of nature conservation efforts since its earliest days. In fact in many countries, nature conservation grew out of game preservation – the preservation of mostly large animals that initially included many larger mammals.

At the centre of the EU's biodiversity policy are the EU 'nature directives', the Birds and the Habitats directives. The latter is directly relevant to the conservation of mammals.

The Habitats Directive (Council Directive 92/43/EEC) is built on two pillars. The first concerns creating a network of protected sites called Natura 2000 [which also includes the sites designated under the Birds Directive (79/409/EEC)]. Annex I of the Habitats Directive contains a list of more than 200 natural habitat types of Community interest for which special areas of conservation (SACs) have to be established. Annex II contains a list of plant and animal species of Community interest whose conservation also requires the conservation of their habitats through SACs in the Natura 2000 network. Of the 324 animal species, or sub-species, listed in Annex II, 54 are mammals, of which 18 are defined as 'priority' – i.e. in need of immediate attention.

Unfortunately, one mammal species listed in Annexes II and IV, the Pyrenean Ibex (*Capra pyrenaica pyrenaica*) has already become extinct.

The second pillar of the Habitats Directive is species protection. According to Article 12 of the directive, a system of strict general protection inside and outside the Natura 2000 must be set up for animal species listed in Annex IV(a). This list is complemented by Annex V, which lists species or sub-species whose

SACs in the Natura 2000 network are crucial for mammal conservation – A SAC in Portugal for habitats and bats species

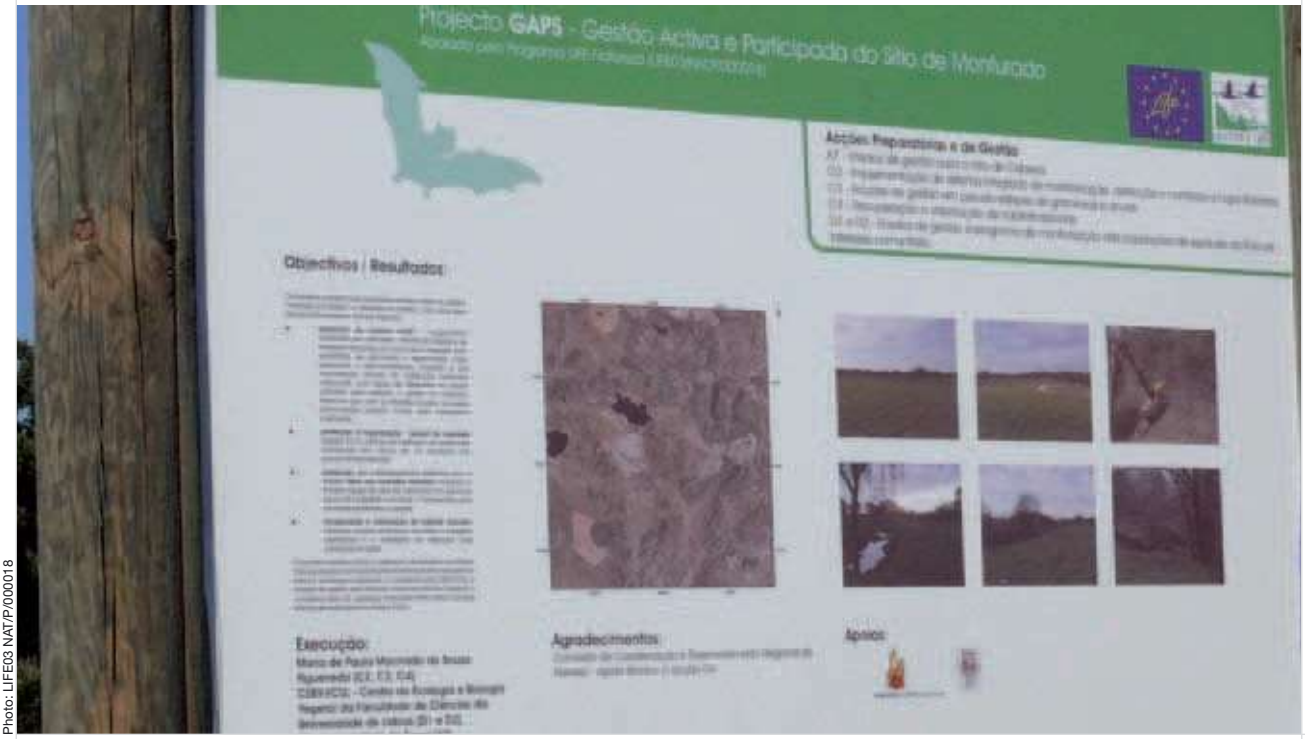


Photo: LIFE03 NAT/P/000018

population may be exploited subject to putting a system of management measures in place.

The listings for Annexes IV and V are not evident from the text of the legislation, since larger taxonomic groups (e.g. "All Microchiroptera except the above") may form an entry. The authoritative lists of species in such cases are the lists of mammal species reported by Member States in the Article 17 reports (see page 49).

A closer inspection of the annexes of the Habitats Directive demonstrates the diversity and flexibility offered by the annexes (see page 55). As mentioned, the member of a taxonomic group may not only be a species, but also a particular sub-species within a species that is in need of site or species protection (for instance the Corsican subspecies of the red deer, (*Cervus elaphus corsicanus*). In Annex IV, a reference to a larger taxonomic group may replace listing all individual species. Species in need of conservation of their habitats usually also enjoy strict species' protection. However, it is mainly among mammals that a judicious use of 'geographic restriction' in Annexes II and IV has been made. Species such as the beaver, the wolf, the bear and the lynx are in need of site protection in much or most of their range, but not in some Member States or in some geographic areas delimited by other descriptive terms. Similarly, even if in need of site protection, in some areas the species may be listed in Annex V rather than in Annex IV, allowing for exploitation (hunting) of the species under a sustainable management system.

Photo: LIFE07 NAT/GR/000291/ FOP

According to the Habitats Directive, species such as the bear are in need of site protection in much or most of their range, but not in some Member States or in some geographic areas

Annex VI of the Habitats Directive lists the prohibited methods and means of capture and killing, and modes of transport when capturing or killing animal species listed in Annex V (a). This list also applies if a derogation is granted, under the strict conditions laid out in Article 16, to a species listed in Annex IV (a) otherwise enjoying strict protection. Annex VI(a) contains a list of 14 non-selective means specifically prohibited for mammals.

OTHER LEGAL INSTRUMENTS

Maritime and fisheries policy

In addition to being protected under the Habitats Directive, marine mammals, seals and cetaceans, are also the subjects of a number of legislative acts and policy documents[1].

To reduce the impact of fishing on dolphin populations, the EU adopted Council Regulation (EC) No. 812 of 2004 (amended by Regulation (EC) 809/2007) – Black sea dolphins stranded as victims of inappropriate fishing gear

Photo: LIFE00 NAT/RO/007194

1 For more information on the measures related to the EU maritime and fisheries policy, see: http://europa.eu/legislation_summaries/maritime_affairs_and_fisheries/fisheries_resources_and_environment.

Photo: LIFE98 NAT/UK/000608

Killing of seals is prohibited in the EU. In 2009 the EU banned the trade in seal products

Incidental catches of cetaceans (whales, porpoises and dolphins) during fishing threaten the conservation of marine mammals belonging to this group. To reduce the impact of fishing on dolphin populations, the EU adopted Council Regulation (EC) No. 812 of 2004 (amended by Regulation (EC) 809/2007) to introduce technical measures such as restrictions on the use of drift nets in specified areas and the obligatory use of acoustic deterrent devices on vessels of 12 m or longer, and also the use of gear listed in Annex I of the regulation. In addition, Member States are required to design and implement monitoring schemes for incidental catches of cetaceans by vessels flying their flag.

Trade in seal products

In the EU, certain methods and means of capture and killing seals are prohibited in areas protected by EU law. Seal hunting outside the EU, however, is governed by different rules and regulations. The EU is concerned about the animal welfare aspects of some seal hunting practices and adopted Regulation (EC) No. 1007/2009 of the European Parliament and the Council banning the trade in seal products in the European Union. This legislation supplements the existing legislation banning imports into the EU of skins from the harp seal and hooded white coat pup seals.

The Commission regulation (EU) No. 737/2010 sets out the conditions for limited exceptions to respect the fundamental economic and social interests of Inuit and other indigenous peoples, and other specific conditions regarding goods from seals for personal and non-commercial use, and for products from seals hunted for reasons of sustainable management of marine resources.

The EU Biodiversity Action Plan

In 2006 the Commission adopted a communication (COM (2006)216) on "Halting Biodiversity Loss by 2010 – and Beyond: Sustaining ecosystem services for human well-being", which outlines the overall framework for meeting the target of halting the loss of biodiversity in the EU by 2010.

The EU Biodiversity Action Plan set out in the communication includes many actions that contribute to maintaining or restoring to a favourable conservation status species of Community interest. One of the actions is to implement, review and develop EU-wide species

Guidelines for Population Level Management Plans for Large Carnivores

action plans for Europe's most threatened species, in addition to the bird species that are already the subject of such plans. The conservation needs and priorities for action on mammal species defined as large carnivores were finalised in 2008, as "Guidelines for Population Level Management Plans for Large Carnivores"[2].

The state of Europe's biodiversity in 2010

In 2010, the European Environment Agency (EEA) in collaboration with the European Commission produced an EU 2010 Biodiversity Baseline, which summarises the latest facts and figures on the status and trends of biodiversity and ecosystem components in Europe. The conclusion is that the EU's biodiversity remains under serious threat:

- Although the loss of species in the EU is not as rapid as in other continents, the percentage of species threatened with extinction remains of great concern. Up to 25% of European animal species face the risk of extinction and an even greater number show declining populations.
- In 2009, a comprehensive check of the rare and threatened species and habitat types protected under the European Union's nature legislation revealed that 65% of the protected habitats and 52% of protected species are in an unfavourable conservation status. The situation is even worse for species found in grasslands, agricultural and coastal areas.
- The latest inventory of land cover in the EU shows that artificial areas resulting from urban sprawl, industrial development and new infrastructure continue to spread rapidly across Europe. In the last 15 years, over 12 500 km² of land has been concreted over (an increase in artificial areas of almost 8%).
- This expansion often comes at the expense of valuable natural areas, so nearly 30% of the EU-27 territory is now highly to moderately fragmented.
- This can seriously affect the health of ecosystems, many of which can no longer deliver the optimal quality and quantity of services such as the provision of clean air and water, or the control of floods and soil erosion. Most of Europe's ecosystems are now judged to be degraded.
- Europeans currently consume twice as much as the EU's land and sea can deliver in terms of natural resources. This puts immense pressure on biodiversity elsewhere in the world as well as in Europe.

2 *http://ec.europa.eu/environment/nature/conservation/species/carnivores/docs/guidelines_final2008.pdf*

Several key mammal habitats have an unfavourable conservation status

Photo: LIFE05 NAT/E/000073

Photo: LIFE00 NAT/E/007335 - Diputación Foral de Álava

American mink, an invasive mammal

In January 2010 the Commission presented to the institutions options for a post-2010 biodiversity strategy.

In its conclusions of 15 March 2010, the Environment Council agreed a new long-term vision and mid-term headline target for biodiversity in the EU for the period beyond 2010, when the current target expires. The new target aims to halt the loss of biodiversity and the degradation of ecosystem services in the EU by 2020, restore such systems in so far as feasible, while stepping up the EU contribution to averting global biodiversity loss.

This target will underpin the new EU biodiversity strategy that is being developed by the Commission.

In its conclusions of 26 March, the European Council committed to the EU post-2010 vision and target for biodiversity, and underscored the urgent need to reverse continuing trends of biodiversity loss and ecosystem degradation.

A resolution of the European Parliament of 21 September 2010, an opinion of the European Economic and Social Committee of 15 September 2010, and an opinion of the Committee of Regions of 10 June 2010, have contributed important elements to the strategy being developed by the Commission services.

A special problem: invasive alien species (IAS) of mammals in Europe

When talking of mammals in the EU, it is impossible to speak only about those that are in need of conservation, since 22 of the mammal species found in Europe have been introduced either intentionally or unintentionally by man since 1500. Some of these species survive by themselves or depend on human help for their survival, but as many as nine of these have been listed among the 100 worst invasive alien species in Europe by the EU-funded DAISIE project. For example, the North American grey squirrel is responsible for displacing the native red squirrel from most of the United Kingdom and Ireland.

The Commission adopted a communication in 2008 presenting policy options for an EU strategy on invasive species. The Council, in its conclusions of 25 June 2009, called on the Commission to present a comprehensive EU framework that fills in existing gaps at EU level, including new dedicated legislative elements and, where necessary, amending or incorporating existing provisions. The possible elements mentioned are prevention and information exchange; early detection, warning and rapid response, and monitoring, control and containment, and finally, restoration of biodiversity affected by IAS.

APPENDIX

Mammal species listed on Annexes II, IV and V of the Habitats Directive

The animals listed in the Habitats Directive are classified under different Annexes, each with its own level of protection. Annex II species demand the highest protection – they are species whose conservation requires the designation of Special Areas of Conservation (SACs). Annex IV species are defined as those in need of strict protection. Annex V species are those whose taking in the wild and exploitation may be subject to management measures.

HABITATS DIRECTIVE ANNEX			
TAXON OR TAXA (Geographic restrictions)	ANNEX II	ANNEX IV	ANNEX V
ERINACEOMORPHA			
Erinaceus algirus		X	
SORICOMORPHA			
Crocidura canariensis		X	
Crocidura sicula		X	
Galemys pyrenaicus	X	X	
CHIROPTERA			
Rhinolophus blasii	X	X	
Rhinolophus euryale	X	X	
Rhinolophus ferrumequinum	X	X	
Rhinolophus hipposideros	X	X	
Rhinolophus mehelyi	X	X	
Barbastella barbastellus	X	X	
Miniopterus schreibersi	X	X	
Myotis bechsteini	X	X	
Myotis blythii	X	X	
Myotis capaccinii	X	X	
Myotis dasycneme	X	X	
Myotis emarginatus	X	X	
Myotis myotis	X	X	
All Microchiroptera except the above		X	
Rousettus aegiptiacus	X	X	
RODENTIA			
Gliridae: All species except Glis glis and Eliomys quercinus	X		
Myomimus roachi	X	X	
*Marmota marmota latirostris**	X	X	

*denotes priority species for conservation

HABITATS DIRECTIVE ANNEX			
TAXON OR TAXA (Geographic restrictions)	ANNEX II	ANNEX IV	ANNEX V
*Pteromys volans (Sciuropterus russicus)**	X	X	
Spermophilus citellus (Citellus citellus)	X	X	
*Spermophilus suslicus (Citellus suslicus)**	X	X	
Sciurus anomalus		X	
Castor fiber ***Annex II:*** *except the Estonian, Latvian, Lithuanian, Finnish and Swedish populations* ***Annex IV:*** *except the Estonian, Latvian, Lithuanian, Polish, Finnish and Swedish, populations* ***Annex V:*** *Finnish, Swedish, Latvian, Lithuanian, Estonian and Polish populations*	X	X	X
Cricetus cricetus ***Annex IV:*** *except the Hungarian populations* ***Annex V:*** *Hungarian populations*		X	X
Mesocricetus newtoni	X	X	
Microtus cabrerae	X	X	
*Microtus oeconomus arenicola**	X	X	
*Microtus oeconomus mehelyi**	X	X	
Microtus tatricus	X	X	
Sicista betulina		X	
Sicista subtilis	X	X	
Hystrix cristata	X		
CARNIVORA			
*Alopex lagopus**	X	X	
Canis aureus		X	
*Canis lupus** ***Annex II:*** *except the Estonian population; Greek populations: only south of the 39th parallel; Spanish populations: only those south of the Duero; Latvian, Lithuanian and Finnish populations* ***Annex IV:*** *except the Greek populations north of the 39th parallel; Estonian populations, Spanish populations north of the Duero; Latvian, Lithuanian, Polish, Slovak, Bulgarian populations and Finnish populations within the reindeer management area as defined in paragraph 2 of the Finnish Act No 848/90 of 14 September 1990 on reindeer management* ***Annex V:*** *Spanish populations north of the Duero, Greek populations north of the 39th parallel, Finnish populations within the reindeer management area as defined in paragraph 2 of the Finnish Act No 848/90 of 14 September 1990 on reindeer management, Latvian, Lithuanian, Estonian, Polish and Slovak populations*	X	X	X
Ursus arctos* **Annex II: *except the Estonian, Finnish, and Swedish populations*	X	X	
*Gulo gulo**	X		
Lutra lutra	X	X	
Martes martes			X

*denotes priority species for conservation

HABITATS DIRECTIVE ANNEX			
TAXON OR TAXA (Geographic restrictions)	ANNEX II	ANNEX IV	ANNEX V
Mustela eversmanii	X	X	
Mustela putorius			X
*Mustela lutreola**	X	X	
Vormela peregusna	X	X	
Felis silvestris		X	
Lynx lynx ***Annex II:*** *except the Estonian, Latvian and Finnish populations* ***Annex IV:*** *except the Estonian population* ***Annex V:*** *Estonian population*	X	X	X
*Lynx pardinus**	X	X	
Halichoerus grypus	X	X	
*Monachus monachus**	X	X	
Phoca hispida botnica	X	X	
*Phoca hispida saimensis**	X	X	
Phoca vitulina	X	X	
All other Phocidae	X		
Genetta genetta	X		
Herpestes ichneumon	X		
LAGOMORPHA			
Lepus timidus	X		
ARTIODACTYLA			
*Cervus elaphus corsicanus**	X	X	
Rangifer tarandus fennicus	X		
*Bison bonasus**	X	X	
Capra aegagrus (natural populations)	X	X	
Capra ibex		X	
Capra pyrenaica (except Capra pyrenaica pyrenaica)		X	
*Capra pyrenaica pyrenaica**	X	X	
Ovis gmelini musimon (Ovis ammon musimon) (natural populations – Corsica and Sardinia)	X	X	
Ovis orientalis ophion (Ovis gmelini ophion)	X	X	
*Rupicapra pyrenaica ornata (Rupicapra rupicapra ornata)**	X	X	
Rupicapra rupicapra (except Rupicapra rupicapra balcanica, Rupicapra rupicapra ornata and Rupicapra rupicapra tatrica)	X		
Rupicapra rupicapra balcanica	X	X	
*Rupicapra rupicapra tatrica**	X	X	
CETACEA			
Phocoena phocoena	X	X	
Tursiops truncatus	X	X	
All other Cetacea	X		

*denotes priority species for conservation

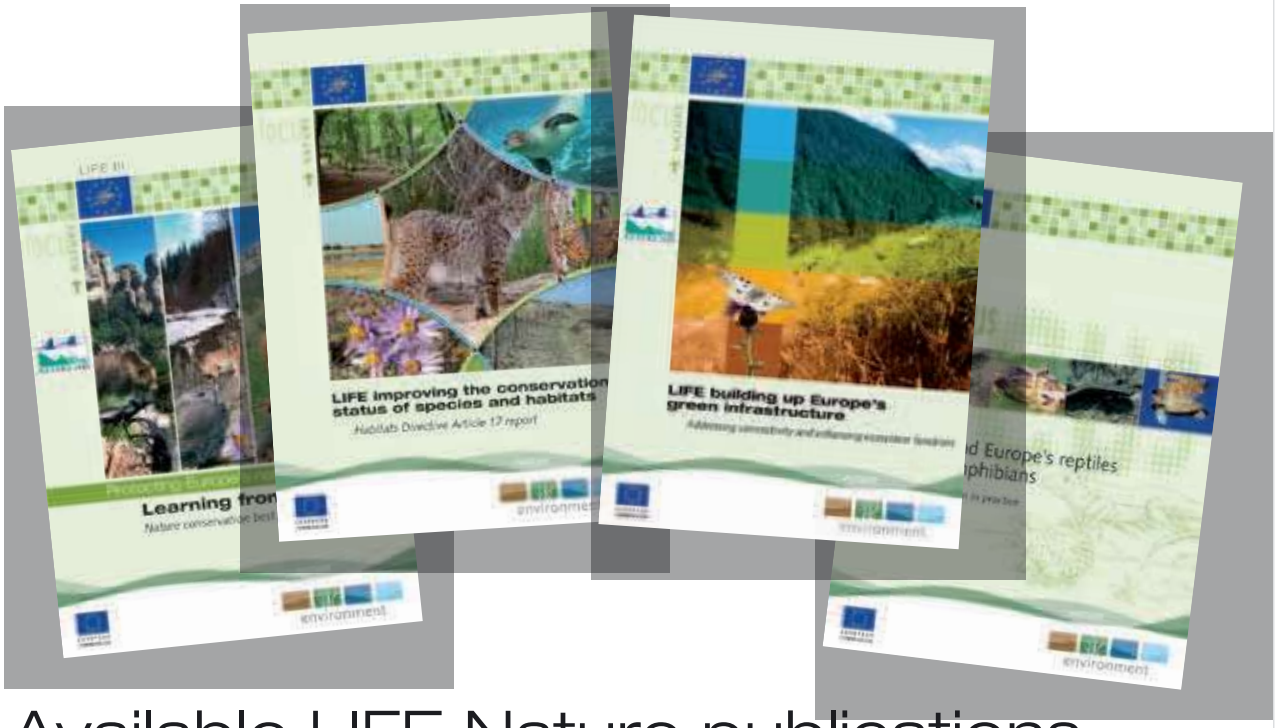
Projects focusing on **mammal species**

The table below provides examples of LIFE projects mentioned in this publication focusing on mammal species. For more information on individual projects, visit the online database at: http://ec.europa.eu/environment/life/project/Projects/index.cfm

Country	Project Reference	Title
Austria	LIFE95 NAT/A/000399	Bear protection programme for Austria
	LIFE02 NAT/A/008519	Conservation and management of the brown bear in Austria
Belgium	LIFE05 NAT/B/000085	Restoration of European otter habitats (Be & Lu)
	LIFE06 NAT/B/000095	Action plan for three threatened bat species in Flanders
Estonia	LIFE00 NAT/EE/007081	Recovery of *Mustela lutreola* in Estonia: captive and island populations
Finland	LIFE95 NAT/FIN/000097	Protecting flying squirrel habitats in the Nuuksio area
	LIFE95 NAT/FIN/000147	Saimaa ringed seal management plan in Lake Pihlajavesi
	LIFE98 NAT/FIN/005325	Ensuring the purity of the breed of wild forest reindeer (*Rangifer tarandus fennicus*)
France	LIFE96 NAT/F/003202	Conservation of large carnivores in Europe: wolf in France
	LIFE96 NAT/F/004794	Conservation of large carnivores in Europe: Brown bear in central Pyrenees
	LIFE99 NAT/F/006299	Conservation of great carnivores in Europe: return of the wolf in the French Alps
	LIFE03 NAT/F/000099	Preservation and spread of the corsican moufflon populations within Corsica
	LIFE03 NAT/F/000104	Limitation to the negative interactions between dolphins and human activities
	LIFE04 NAT/FR/000080	Conservation of 3 cave-dwelling bats in Southern France
	LIFE05 NAT/F/000135	Preservation of the heathlands, peatlands and bats of Montselgues
	LIFE08 NAT/F/000473	Conservation and integrated management of two bat species in the French Mediterranean region
Germany	LIFE95 NAT/D/000045	Transboundary programme for the protection of bats in Western Central Europe
	LIFE96 NAT/D/003040	Stabilisation of the population of beaver and otter
Greece	LIFE93 NAT/GR/010800	Protection and Management of the Population and Habitats of *Ursus arctos* in Greece (first phase)
	LIFE96 NAT/GR/003222	Conservation of *Ursus arctos* and its habitats in Greece (2nd phase)
	LIFE96 NAT/GR/003225	The Mediterranean monk seal in Greece: Conservation in action
	LIFE97 NAT/GR/004249	Conservation of *Canis lupus* and its habitats in Central Greece
	LIFE00 NAT/GR/007248	The Monk Seal: conservation actions in two Greek NATURA 2000 sites
	LIFE05 NAT/GR/000083	Monk seal & fisheries: Mitigating the conflict in Greek seas
	LIFE07 NAT/GR/000291	Demonstration of Conservation Actions for *Ursus artcos** and habitat type 9530* in Northern Pindos N.P., Grevena Prefecture, Greece
Hungary	LIFE00 NAT/H/007162	Funding the base of long term large carnivore conservation in Hungary

Country	Project Reference	Title
Ireland	LIFE07 NAT/IRL/000342	Restoration of the Lr. Shannon SAC for Sea lamprey, Atlantic salmon and European otter
Italy	LIFE96 NAT/IT/003075	Caves and bats conservation in woodlands and seminatural dry grasslands and scrublands facies on calcareous substrates managment
	LIFE96 NAT/IT/003115	Preservation and conservation of *Canis Lupus* populations through biological surveys and non-poaching actions
	LIFE96 NAT/IT/003152	URSUS Project : Brenta brown bear conservation plan
	LIFE97 NAT/IT/004097	Priority measures for the conservation of large carnivores in the Alps
	LIFE97 NAT/IT/004115	Conservation actions for Apennines beech forest with *Taxus* and *Ilex*, and *Ursus arctos marsicanus* improvement
	LIFE97 NAT/IT/004141	Conservation of wolf and bear in the new parks of the Central Apennines
	LIFE97 NAT/IT/004143	Conservation and increase of the Abruzzo chamois - *Rupicapra ornata* - in “NATURA 2000 Sites” of the Gran Sasso
	LIFE98 NAT/IT/005114	Urgent actions for Bear in the SIC of the Sirente-Velino Regional Park
	LIFE99 NAT/IT/006209	Project for the conservation of the wolf in the Pollino National Park
	LIFE99 NAT/IT/006244	Brown bear (*Ursus arctos*) conservation in the Central Apennines
	LIFE00 NAT/IT/007131	Project URSUS - protection of the brown bear population of Brenta
	LIFE00 NAT/IT/007139	Bats, calcareous habitats and petrifying sources in the Park of Campo dei Fiori
	LIFE02 NAT/IT/008538	Conservation of *Rupicapra pyrenaica ornata* in the Central Apennines
	LIFE2003NAT/CP/IT/000003	Principles for the establishment of an alpine brow bear metapopulation
	LIFE03 NAT/IT/000148	Activities for the protection of cetaceans in the international sanctuary
	LIFE03 NAT/IT/000151	Conservation of Brown bear in the sites of the Sirente-Velino Regional Park
	LIFE03 NAT/IT/000163	Reduction of the impact of human activity on *Caretta* and *Tursiops* and their conservation in Sicily
	LIFE07 NAT/IT/000436	A new strategy against the poisoning of large carnivores and scavengers raptors
	LIFE07 NAT/IT/000502	Improving the conditions for large carnivore conservation - a transfer of best practices
	LIFE08 NAT/IT/000325	Development of coordinated protection measures for Wolf in Apennines
	LIFE08 NAT/IT/000332	Measures for the conservation of Chiroptera and Avifauna in Central Italy
Netherlands (The)	LIFE04 NAT/NL/000203	Habitat improvement for Microtus oeconomus in Alde Feanen
	LIFE06 NAT/NL/000071	Restoration of Brackish Marsh for Root Vole, Waders and Terns
Poland	LIFE06 NAT/PL/000105	European Bison conservation in the Bialowieza Forest, Poland
Portugal	LIFE94 NAT/P/001055	Conservation of the Wolf in Portugal
	LIFE94 NAT/P/001058	Conservation of the Iberian Lynx
	LIFE98 NAT/P/005236	Recovery of Madeira’s priority habitats and species
	LIFE99 NAT/P/006423	Recovery of habitats and preys of the *Lynx pardinus* in Serra da Malcata
	LIFE99 NAT/P/006432	Project for the conservation of cetaceans in Madeira Archipelago
	LIFE06 NAT/P/000191	Recovery of Iberian Lynx habitat in Moura/Barrancos Site
	LIFE07 NAT/P/000646	Identifying critical marine areas for bottlenose dolphin and surveillance of the cetaceans’ conservation status in Madeira archipelago
	LIFE08 NAT/P/000227	Enhancing Habitat for the Iberian Lynx and Black Vulture in the Southeast of Portugal

Country	Project Reference	Title
Romania	LIFE00 NAT/RO/007187	Conservation programme for Bat's Underground Habitats in SW Carpathians
	LIFE00 NAT/RO/007194	Conservation of the dolphins from the Romanian Black Sea waters
	LIFE02 NAT/RO/008576	In situ conservation of large carnivore in Vrancea County
	LIFE05 NAT/RO/000170	Enhancing the protection system of large carnivores in Vrancea county
	LIFE08 NAT/RO/000500	Beste practices and demonstrative actions for conservation of *Ursus arctos* specie in Eastern Carpathians, Romania
	LIFE08 NAT/RO/000504	Bat conservation in Padurea Craiului, Bihor and Trascau Mountains
Slovakia	LIFE08 NAT/SK/000239	Conservation of root vole **Microtus oeconomus mehelyi*
Slovenia	LIFE02 NAT/SLO/008585	Conservation of large Carnivores in Slovenia - Phase I (*Ursus Arctos*)
	LIFE04 NAT/SI/000234	Conservation of otter population (*Lutra lutra*) in Goricko - phase 1
	LIFE08 NAT/SLO/000244	Conservation and surveillance of conservation status of wolf (*Canis lupus*) population in Slovenia
Spain	LIFE94 NAT/E/001191	Feasibility action for the stabilization of the Atlantic population of Monk Seal
	LIFE96 NAT/E/003144	Actions for the recovery of the Atlantic Monk Seal (*Monachus monachus*) population
	LIFE97 NAT/E/004151	Project to support the conservation of *Caretta caretta* and *Tursiops truncatus* in the Canary Islands
	LIFE98 NAT/E/005305	Programme for the conservation of the brown bear in Asturias
	LIFE98 NAT/E/005306	Conservation of chiropters and invertebrates in volcanic cavities
	LIFE98 NAT/E/005326	Conservation of the cantabrian Brown bear breeding nucleus
	LIFE98 NAT/E/005343	Conservation of *lynx pardina* in Extremadura
	LIFE99 NAT/E/006336	Conservation of the Imperial eagle, Black vulture, Black stork and Iberian lynx on private protected land in Extremadura and Castilla-La-Mancha
	LIFE00 NAT/E/007299	Conservation of european mink (*Mustela lutreola*) in Castilla y Léon
	LIFE00 NAT/E/007331	Conservation of european mink (*Mustela lutreola*) in La Rioja
	LIFE00 NAT/E/007335	Conservation of the European mink (*Mustela lutreola*) in Álava
	LIFE00 NAT/E/007337	Bats conservation plan in the Valencian community
	LIFE00 NAT/E/007352	Conserving the Cantabrian brown Bear and combating poaching
	LIFE02 NAT/E/008604	Conservation of european mink (*Mustela lutreola*) in Catalonia (Spain)
	LIFE02 NAT/E/008609	Population recovery of Iberian Lynx in Andalusia
	LIFE02 NAT/E/008610	Conservation of cetaceans and turtles in Andalusia and Murcia
	LIFE02 NAT/E/008617	Conservation of the Iberian Lynx in Montes de Toledo-Guadalmena
	LIFE2003NAT/CP/E/000002	Collaboration actions for the conservation of *Mustela lutreola*
	LIFE04 NAT/ES/000043	Conservation of threatened chiropters of Extremadura
	LIFE05 NAT/E/000073	Ecosystemic management of rivers with European mink
	LIFE06 NAT/E/000209	Conservation and reintroduction of the Iberian lynx in Andalucia
	LIFE07 NAT/E/000735	Corridors for Cantabrian brown bear conservation
Sweden	LIFE98 NAT/S/005371	Preservation of the Arctic Fox, *Alopex lagopus*, in Sweden and Finland
	LIFE03 NAT/S/000073	Saving the endangered Fennoscandian *Alopex lagopus* (SEFALO+)
	LIFE08 NAT/S/000261	Static Acoustic Monitoring of the Baltic Sea Harbour porpoise
United Kingdom	LIFE04 NAT/GB/000245	Small Cetaceans in the European Atlantic and North Sea



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the programme

LIFE+ "**L**'**I**nstrument **F**inancier pour l'**E**nvironnement" / The financial instrument for the environment

Period covered (LIFE+) 2007-2013.

EU funding available approximately EUR 2,143 million

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

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> **LIFE Nature projects** improve the conservation status of endangered species and natural habitats. They support the implementation of the Birds and Habitats Directives and the Natura 2000 network.

> **LIFE+ Biodiversity projects** improve biodiversity in the EU. They contribute to the implementation of the objectives of the Commission Communication, "*Halting the loss of Biodiversity by 2010 – and beyond*" (COM (2006) 216 final).

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Contact

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