

PirosLife

➤ Consolidation of a brown bear population
in a fragmented territory:
the central Pyrenees

LIFE13/NAT/ES/001394

Layman report
Project informative summary
July 2014–October 2019



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Project informative summary

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This project has involved the contribution of the European Union's LIFE funding instrument.

Coordinator: Ministry of Territory and Sustainability of the Government of Catalonia

Partners: General Council of Aran, Forestal Catalana, SA, Oso Pardo Foundation and University of Lleida

Project duration: July 2014–October 2019

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Project website: www.piroslife.cat

Twitter and Facebook accounts: @PirosLife

Coordination, content, photography and cartography: PirosLife technical team

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Photo, left: female with cubs. Photo, right: the bear Pyros

The project: Challenges and background

In the late nineteen-eighties the brown bear population in the Pyrenees began an unstoppable decline and the number of specimens decreased sharply. In 2010, the last native individual disappeared and the species in the zone and the Pyrenean stock in Europe therefore became extinct. The joint efforts of France, Spain and the European Union in 1996 allowed for the start of population reinforcement with the help of the LIFE programme through the transfer of specimens from Slovenia to the central Pyrenees, a zone in which there were no brown bears. This measure gave rise to intense conflict with the local population and the primary sector, the management of which required immediate solutions.

For the first ten years, the number of bears remained stagnant and only ten to twelve specimens remained. Subsequently, with fresh reinforcement in 2006 the population grew to 30 individuals, which occupied very high-quality territories within the Natura 2000 network.

Despite this demographic success, most specimens were descendants of a single male and there was therefore a high rate of inbreeding among them. The isolation of some specimens in the western Pyrenees was also detected and this raised doubts about the necessary connectivity among between the two Pyrenean areas in which the species was present. These risks and the conflicts with mountain

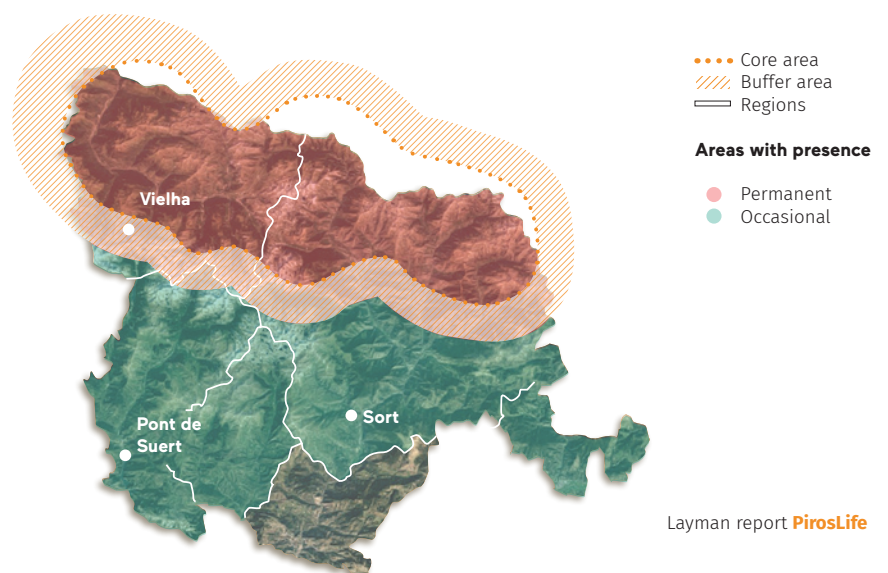
livestock and transhumant apiculture underlined the need for a new project to provide a response to this situation.

The administrative framework regulating areas where the species is present is, moreover, complex and different administrations have jurisdiction over matters of nature conservation, livestock, agriculture and tourism. Ensuring the continuity of brown bear distribution throughout the Pyrenees necessarily requires the collaboration, on a coordinated and joint basis, of the different institutions of the countries and regions involved.



Attack on a sheep

Administrative division (fragmented management)





The project had an overall budget of nearly 2.5 million euros for the performance of the different measures associated with consolidating the bear population in the central Pyrenees. 75% of this was funded by the European Union

The project: **PirosLife**

The PirosLife project arose from the need to consolidate the future of the brown bear population in the Pyrenees. The conservation status of this iconic species needed to be improved in a climate conducive to participation, knowledge and coexistence, in collaboration with people and institutions able to encourage the development of the territory bears inhabit, and to strengthen prevention measures in order to minimise the risk of attacks on livestock and on apiculture.

The measures were implemented in two main areas of the central Pyrenees in Catalonia, the Vall d'Aran and El Pallars Sobirà region, and also in the Alta Ribagorça, Pallars Jussà and Alt Urgell regions. Some of the measures of PirosLife were also applied in the French departments of Ariège, Haute-Garonne and Hautes-Pyrénées, and even in the northwest of Huesca province in Aragon.

▮ The main measures of the project

Monitoring the bear population and new captures to enhance knowledge about their distribution, reproduction, growth, demographic structure and behaviour.

Release of a male to improve the bear population of the Pyrenees genetically and to characterise the population's genetic structure in order to evaluate whether the quantity and diversity of individuals have increased.

Comprehensive measures for the protection of flocks and herds and of apiculture against bear attacks and evaluation of the system to prevent and to compensate damage. Implementation of a mediation process to encourage the coexistence of bears and the local population.

Diagnosis and design of a network of cross-border landscape connectivity for the brown bear with improvements to its habitat.

Development of a series of educational and informative activities conducive to creating and raising awareness.

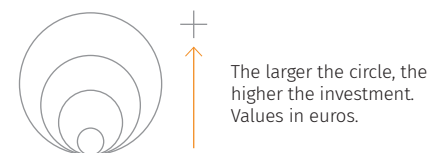
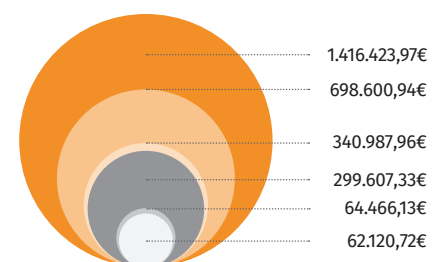
Creation of a platform to promote ecotourism and encourage acceptance and social acknowledgement of the presence of bears in a well-conserved habitat.

Improved coordination and transfer of national and international information among all the agents, bodies and administrations involved in regions where bears are present.

Training of all sectors, particularly professional sectors, the local population and schools, with a view to encouraging a climate of acceptance and coexistence.

▮ Project expenditure

The graph below shows the project's expenditure. Measures to prevent damage and the implementation of a mediation process are the primary expenses, followed by demographic monitoring of the bear population and the release of a new male. Then come measures of awareness-raising, education and environmental volunteer work.



- Damage preventive measures
- Monitoring of the bear population
- Raising awareness, education and volunteer work
- Design of a landscape connectivity network
- International coordination and management of the project
- Promotion of ecotourism, training of tourist agents and local guides

Main results

The number of individuals increased from thirty to fifty specimens over the five years of the project. The genetic impact of the introduction of a male into the population will, however, require evaluation over a longer period of time because there is no evidence it has produced any offspring in the three and a half years since its introduction.

Increase from 30 to 50 specimens

Obtaining accurate information

Generation of accurate information on zones where bears are present and on their movements, quality maps and use of habitat by the species.

Measures of protection for flocks and herds were implemented and improved and new procedures for action were developed. Communication with the primary sectors involved was strengthened and the number of bear attacks on operations where the measures were applied fell.

Improving preventive measures of protection

Construction of a centre for recovery

Communication among the different political and administrative units was improved and work was performed on a joint basis, with the creation of different committees for the conservation of the species. A centre to care for animals with problems (orphaned, injured, weak) was built for their recovery, rehabilitation and subsequent return to the wild.

Although there is still opposition from much of the zone's livestock sector, considerable progress was made to encourage acceptance of the bears' presence and there appeared opportunities for economic development associated with their management and presence.

Normalising the presence of brown bears

Mediation processes

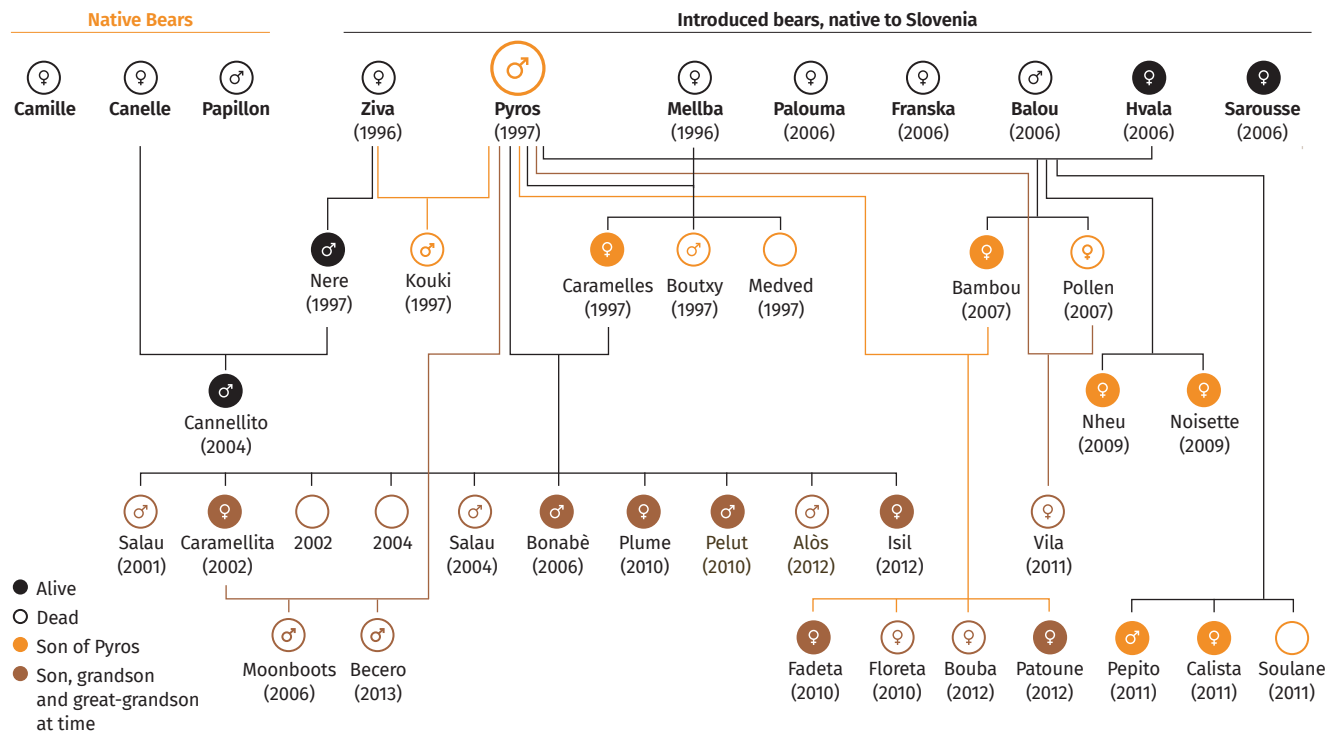
The rules for establishing mediation processes were designed and compiled in a document on best practices for organising such processes.

Different official procedures were drawn up for managing the brown bear. These will continue in the future and may be exported to other territories in the Pyrenees and in the European Union, where similar conservation policies are being implemented. The procedure for capture by helicopter, which was successfully applied for the first time in southern Europe, and the procedure for chemical testing of aversion therapy for conflictive bears were particularly significant.

Brown bear management procedures

Goiat: genetic improvement of the population

Descendants of Pyros until 2013



In spring 2016, an adult breeding male of Slovenian origin was captured from the Jelen game reserve and released in L'Alt Àneu (Pallars Sobirà region). This measure saw the introduction of a specimen that, should it breed, would increase genetic diversity and reduce possible inbreeding among the population given that most specimens are currently the offspring of a single male, Pyros, which in 2019 was pronounced dead after two years without a trace. The adult male released, which was between 11 and 12 years old and weighed 205 kg, was called Goiat. This act required the signing of an international cooperation agreement between Spain and Slovenia and the issue of the respective CITES and TRACES certificates.

Once the bear had been released, it was fitted with a tracking collar for monitoring by satellite, plus ear trackers and ear tags for visual identification. A mould was also made of its paw prints. Blood samples were taken to rule out possible diseases and fur samples were collected for its genetic identification. Given that it was released later than initially envisaged, to date it has not been possible to establish whether Goiat has produced

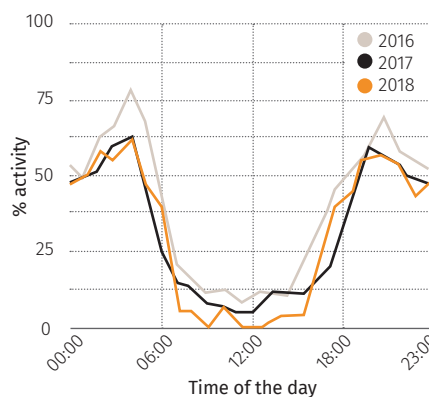
any offspring while any evaluation of the population's genetic improvement requires a longer period of time.

Goiat has been recorded at over 17,000 locations over four years, which indicates considerable mobility and a bimodal nocturnal activity pattern (from 8 pm to 4 am). This activity increases during the mating period (end of spring to the start of summer), which is when interactions with other bears occur. In late autumn, Goiat's activity and movements decrease significantly prior to hibernation. An average of 46 interactions with other bears per year was detected, which indicates that Goiat has adapted favourably to the bear population of the Pyrenees.

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In summer 2018, Goiat was recaptured in the Naut Aran zone by means of an innovative procedure and a helicopter operation run by the Countryside Rangers corps. The purpose was to change the GPS collar, the battery of which was running out. Monitoring of the animal was therefore guaranteed until the end of the project.

Yearly activity of the bear Goiat



Release of Goiat

Monitoring of the population: genetic and demographic characterisation

To define the population's genetic and demographic structure, different sampling methodologies were used: opportunist (tracks, excrement, predation episodes, observation) and systematic (radio-monitoring, itineraries and one-off captures). The most commonly used were the following of itineraries with the periodic setting and checking of fur traps and of automatic photography and video systems. The monitoring teams of PiroLife in the Aran and the Pallars regions, together with the Countryside Rangers corps and the Environmental Agents of Vall d'Aran, with the collaboration of some volunteers, set and checked 251 fur traps and 47 still photo and video cameras, collected 1,078 samples and analysed 1,259 photographic and video contacts in the Vall d'Aran, El Pallars Sobirà and L'Alta Ribagorça. They also compiled 172 observations of bears and 208 predation episodes.

Genetic characterisation of the population, which is undertaken on an annual basis by the Molecular Genetic Veterinary Service of Barcelona Autonomous University, through the identification of individuals by polymorphic markers (microsatellites) and, subsequently, by SNP (Single nucleotide polymorphism), yielded sufficient detail of the population's composition. Genetic samples were also sent to France in order to diversify, compare and verify results.

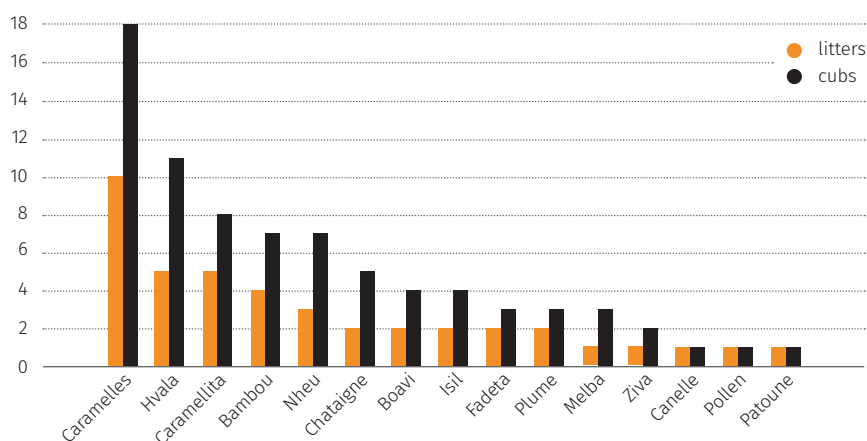
43 individuals were identified in the Pyrenees in 2017, 25 to 30 of which were in Catalonia, with a sex ratio of 45% males/55% females. 40 individuals were identified in 2018. From 2014 to 2019, the average number of breeding females was 4.5 (27 reproductions) while the average number of cubs born from 2014 to 2019 was 8.7 per year. Cub survival rate for the first year (cubs that survived their first year and were detected the second) was 70.6 %. Heterozygosity, meanwhile, was high and exceeded envisaged rates given the considerable probability of inbreeding.

Despite observation of Goiat's interaction with females in different years during the mating season, it is not yet possible

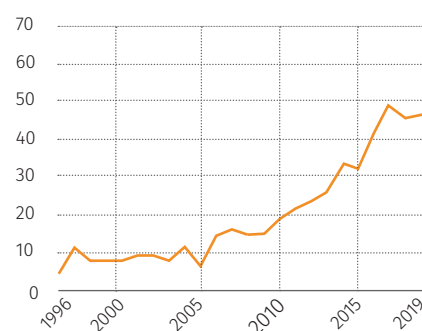
to verify whether he has produced any offspring. Of the 28 cubs detected in the years subsequent to the male's release, it was only possible to analyse 19, and none of these were Goiat's offspring. The results of genetic analyses are, however, always available one year after the collection of samples and, therefore, the results for the most recent year of the project could change this situation.

In addition to Goiat, there are two males that are not related to Pyros: Nere (of Slovenian stock but born in the Vall d'Aran, which returned from the western Pyrenees) and his male descendant Canelito (the mother of which is Pyrenean and also from the western Pyrenees).

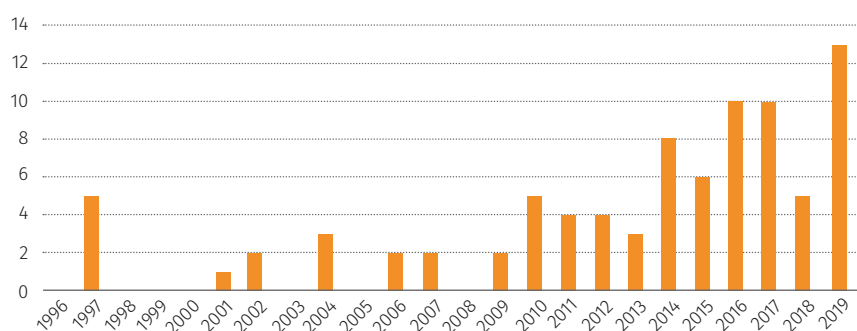
↘ Breeding females of the Pyrenees: 1996-2019



↘ Increase in the number of individuals per year: 1996-2019



↘ Number of cubs born per year: 1996-2019





Photo, left: fitting a camera. Photo, right: fur traps.

Monitoring the population: geographical characterisation

The programme for monitoring brown bears in Catalonia made it possible to mark off the zone with a permanent presence of these animals. This zone covers the entire area of Vall d'Aran and the northern strip of El Pallars Sobirà region. Bears may be present outside this area, albeit on a sporadic basis. Establishing limits for the zone with a permanent brown bear presence is not fixed and changes each year in accordance with the guidelines of the monitoring programme. The map of the zone with a permanent brown bear presence was obtained by adding together all the

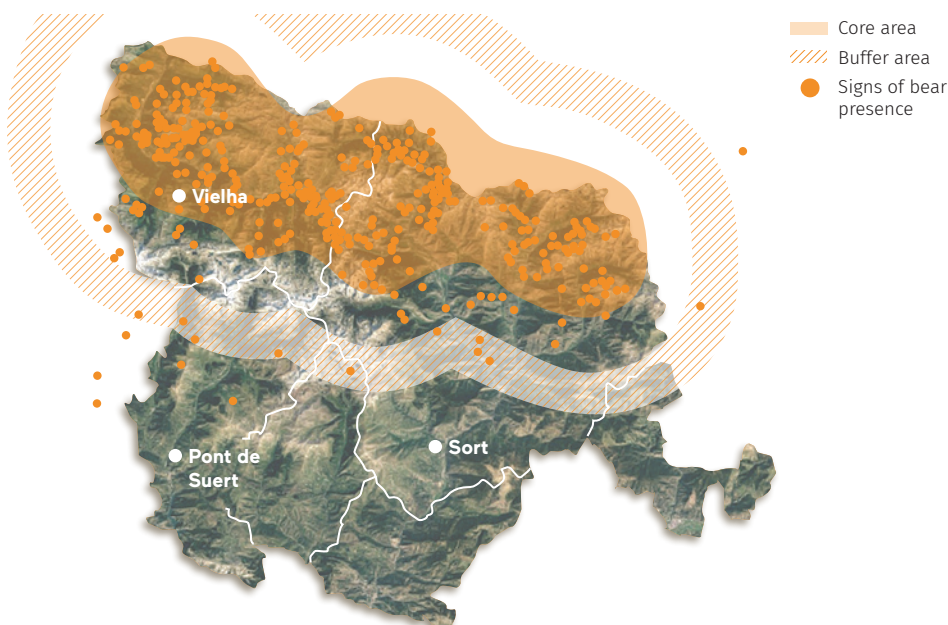
locations, based on the series of signs confirmed by means of geolocation, photographic contacts (with camera traps) and signs (excrement, footprints, fur and attacks) collected in traps and along itineraries monitored by the project's teams.

As a result of the annual meetings of the Cross-border Committee for Monitoring the Brown Bear in the Pyrenees (GSTOP), with evaluation and analysis of all the localizations and detections recorded in Catalonia, together with data from Aragon and Navarra, and with data from

France and Andorra, it was possible to establish a more probable map of the distribution of brown bears in the Pyrenees, which currently covers a geographical area of 7,400 km². The geographical distribution of the bear population in the Pyrenees grew significantly from 2014 to 2019. It increased from 4,000 km² in 2014 to 7,400 km² in 2018.

Captured bears were monitored using a GPS satellite localization method, which provides information on the position of animals with tracking collars. To this end, the male Goiat was recaptured (2018) and the male Cachou was captured (2019). Localizations revealed the activity of the specimens, their mobility among sectors, possible contacts with other individuals and hibernation sites, and also confirmed authorship of specific attacks on livestock and apiculture. One of the results of this project was the drafting of codes of procedure: the Procedure for capturing brown bears in Catalonia, the Procedure for monitoring brown bears in Catalonia and the Procedure for repelling problematic bears.

▮ Brown bear detection in the permanent zone of the Catalan Pyrenees



Diagnosis and design of a landscape connectivity network and improvement of habitat

Establishing a connectivity network for the brown bear in the Pyrenees requires definition of the zones where its presence has been detected achieved by building a map using the above-mentioned records of different origin. 19,149 cases of brown bears in the Pyrenees (Catalonia, Aragon and southern France) were analysed, 140 of which were historical data on the native population (1900-1993), and the others on the introduced population (1996-2017). The records mentioned above were used to establish a habitat model that defined the environmental characteristics necessary for the existence of the species on the cartographic base of the Pyrenees. It was thus possible to draw three quality maps: one for males, one for females and one for females with cubs. These maps identified areas significant for bears, classified into three categories: suitable zones, good zones and optimal zones. The connectivity among them was defined using Maxent software.

Analysis of the factors that determine bear presence and knowledge of their potential distribution meant measures could be taken to improve their habitat in connectivity zones in areas of the Natura 2000 network, in the High Pyrenees Natural Park and in the Aigüestortes and Lake Sant Maurici National Park, and also in other areas outside Catalonia.

These measures, performed as part of a custody agreement established with the Decentralised Municipality of Isil and Alòs and with the support of ENDESA, were based essentially on encouraging the growth of species used as a food resource for bears, utilising two methodologies: boosting their presence with measures such as clearances (to encourage the growth of brambles) and planting fruit trees. To this end, 184.4 kg of seeds of different wild plant groups were collected by hand. These included wild cherries (*Prunus avium*), European crab apples (*Malus sylvestris*), Alpine buckthorn (*Rhamnus alpina*) and

rowan (*Sorbus aucuparia*). Having been transferred to nurseries, these seeds were germinated to yield 7,000 seedlings that were replanted in previously defined and researched connectivity zones. Raspberries and local varieties of apples were also acquired. 9,150 trees and shrubs were planted (18.8% whitebeams, 15.86% terebinths, 6.5% cherries, 33.7% local apple varieties, 21.9 % regional apple varieties, 3.3 % raspberries). One valley was planted with 17 fruit tree woods on 15 ha; three zones (15 ha) in the Natura 2000 network were cleared to encourage the growth of cranberries, marshes with umbelliferae and raspberries. Local workers were hired to establish the plantations in order to boost employment in the region.

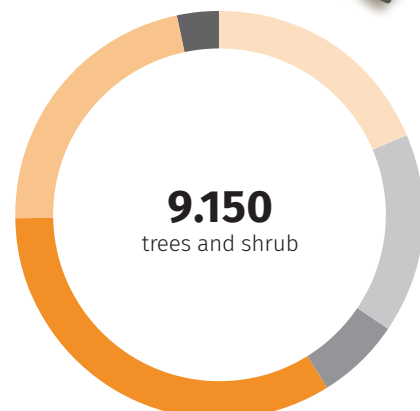
Planting has involved the hiring of local workers to help to create employment in the region

Planting of trees and shrubs

- 33,7 % native apple varieties
- 21,9 % irrigated apple varieties
- 18,8 % whitebeams
- 15,86 % alpine buckthorn
- 6,5 % cherries
- 3,3 % raspberries

Goiat's movements on roads

- Core area
- Urban street
- Crossroads





Photo, left: attack on horse. Photo, right: shepherds and flocks.

Damage prevention: a key tool for coexistence

The main sectors affected by damage caused by brown bears were apiculture and livestock (mainly ovine). In zones with a permanent bear presence, a comprehensive system of measures both of prevention and protection and of compensation for damages caused has therefore been developed. Protection of beekeeping operations basically involved the installation of electrified enclosures and their periodic supervision. At the start of the project protecting a maximum of five hives attacked by bears and per year was established as a target and an average of nearly twenty-nine hives per year were protected. This target was met upon completion.

As far as livestock operations were concerned, although measures focused on small animals, which were the most affected by attacks, measures involving the hiring of cattle and horse handlers were also initiated to supervise herds of cattle and horses. The comprehensive protection of the ovine and caprine sector entailed offering a free 24-hour surveillance service for the five months (June to October) during which livestock grazed on the mountains. It included the following measures:

- Grouping of six flocks and providing them with guard dogs.

- Hiring of 11 people to monitor large livestock, 17 shepherds and goatherds and 6 assistants for ovine and caprine livestock, for whom it was necessary to build four huts and restore five pre-existing huts.

- The installation and maintenance of flocks' nocturnal electrified enclosures.

The livestock breeders who signed up to the prevention programme reached an agreement with the Ministry of Territory and Sustainability (DTES), establishing the commitments to be assumed by each party. Periodic monitoring meetings were held with them and upon completion of summer grazing in the mountains, the season was assessed and improvements for the following season were discussed.

The number of losses in flocks and herds protected by means of these monitored groupings was significantly lower than for other flocks and herds. From 2015 to 2019, the probability of attacks on unprotected flocks and herds was 7.5 times higher than for protected flocks and herds.

A joint programme of the DTES and the FECOC (Federation of Catalan Institutions of Ovine and Caprine Livestock Breeders) was implemented. It promoted a subsidy for every sheep, intended either to encourage the hiring of shepherds or for direct protection by the owner. An average of 17 flocks per year subscribed to the programme and around 30,000 heads of livestock were managed with the involvement of between 46 and 48 owners.

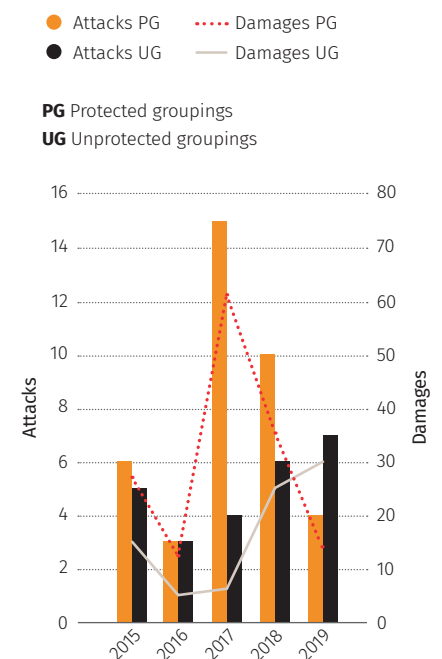
A technical team of experts was assigned the task of appearing onsite in the event of any alert of incidents or of a possible bear attack, making visual inspections, collecting samples and analysing them to verify the involvement of bears in

any attack on livestock. If the attack was confirmed to have been by a bear, proceedings to pay compensation were initiated.

Analysis of cases of bear attacks revealed contrary trends depending on the sector. The ratio of the number of damage episodes for each specimen of brown bear and for each year amounted to 1.5 heads of small livestock (sheep and goats), with an increase from 2015 to 2018 and a sharp fall in 2019 onwards. The same ratio for hives was 1.5 and fell from 2017 onwards.

Of the total attacks recorded, 67% were

Evolution of attacks and damages, 2015-2019





on livestock while the remaining 33% were on apiculture. The livestock sectors most affected were ovine and caprine, which accounted for 95% of the total. Bears made 160 attacks on livestock (an average of 32.0 attacks/year) and were involved in 263 predation episodes (an average of 52.6 attacks/year). Each bear preyed on 1.7 heads of livestock (small and large) per year. They also made 61 attacks on apiculture (an average of 12.2 attacks/year) and were involved in 224 predation episodes.

Moreover, the high, recent predation activity of the males Goiat (2017 and 2018) and Cachou (2019) on foals and mares generated considerable social tension, particularly among some owners of such livestock, which revealed a need to improve protection systems for large livestock. Chemical aversion therapy methods were applied on an experimental basis to give negative stimuli to the male Cachou when he ate horsemeat. To date, the results have been positive, given that no further attack on horses has been detected since applying this method.

In response to the repeatedly predatory behaviour of the bear Goiat, an inter-

vention procedure for problematic bears in the Pyrenees was drafted and approved. This document, promoted by the Government of Catalonia and the General Council of Aran, was produced by the Working Group for the Brown Bear in Pyrenees –which comprises technical staff from the Ministry of Ecological Transition and from the governments of Catalonia, Aran, Aragon and Navarra– and approved by the Spanish State Commission for Natural Heritage and Biodiversity. This procedure specifies the measures of dissuasion that must be applied to bears considered problematic so that when they approach livestock or return to eat the remainder of their prey, they have a dissuasive experience and alter their behaviour. If that does not work, the procedure envisages removing the problematic specimen from the environment.

This intervention procedure for problematic bears establishes that one of the measures to be applied must be the capture and the remote localization of these specimens. The battery on Goiat's collar was therefore replaced while in May 2019 the bear Cachou was captured. This animal had made repe-

ated attacks on livestock and particularly on beekeeping sites very close to towns in Vall d'Aran. It was caught using a Culvert trap.

As a special additional measure, an enclosure for helping bears with problems was built. Although the infrastructure is designed mainly as a home for orphan bears because these were the most common cases in recent years, it can also temporarily and exceptionally accommodate injured or sick adult bears. The compound is located beside the Aran Park facilities (Bossòst).



Flock guard dog.



Participants at sessions.



Information and coordination with the primary sector (livestock breeders) and other sectors

Performance of the above-mentioned measures of protection essentially requires information and constant coordination with all sectors involved (livestock breeders, hunters, tourism sector, local authorities) and with the rest of the local population.

The following significant measures were addressed to the livestock sector and hunters:

Holding of workshops with livestock breeders and hunters, with a view to presenting the PiroLife project and the measures envisaged for preventing damage, and to establishing debate to encourage the generation of joint proposals to improve the management model and, lastly, to draw up a handbook of best practices in zones with the presence of bears.

Technical visits were organised with livestock breeders and councils to Abruzzo (Italy) and to Somiedo (Asturias), two zones with a stable population of bears and a long track record in their management. The aim was to learn about their system of preventing damage to flocks and herds.

With a view to informing and providing skills to people in training, talks were given at schools of agriculture and forestry, high schools and universities in Catalonia and three videos were made to demonstrate the measures of prevention applied as part of the Project. Annual agreements were also established for students at the

School for Shepherds of Catalonia to obtain work experience in project groupings.

Training sessions were held about guard dogs for flocks and herds. Transhumant beekeepers were also informed about measures to prevent attacks on hives.

A symposium was likewise organised on European experiences in systems to prevent damage caused by large predators and international scientific and technical sessions were held on the return of large carnivores to mountain regions. These brought together participants from autonomous and local administrations, universities, research centres, environmental and institutions and ecologists and individuals from Catalonia, France, Italy, Slovenia, Poland, Aragon, Navarra, Cantabria, Asturias, Galicia and Castile and Leon, at a three-day event at Mòn-Natura Pirineus (Les Planes de Son), at which 200 attendees were registered. The purpose of the sessions was to disseminate the work done on the Project and for other regions to share their experiences in managing both the species and social conflict.

Mediation

Since the start of the project, very much of the livestock sector has been very reticent to the presence of a population of bears in the region. The damage caused by some individuals has only served to increase this discontent.

The year 2018 therefore saw the start of a mediation initiative that was intended to run beyond the completion of the PiroLife project. It features three phases, the two first of which have already been performed: phase one was an initial diagnosis to evaluate the willingness of the parties to explore points in common while phase two addressed two aspects particular. The first of these was to assess whether the group of interviewees takes active part in a format of debate other than normal to deal with significant matters of concern to them that belie their discontent. The second was to agree on the rules for a future meeting point for debate and to reach working conclusions to resolve these matters of conflict.

Lastly, phase three corresponds to the establishment of a permanent work panel for producing possible effective solutions for matters of concern. This panel must have continuity beyond the PiroLife project.



Raising awareness, education and environmental volunteer work

Installation of four informative panels at strategic points of the Vall d'Aran and El Pallars Sobirà regions that offer information in different languages about the Project and its goals, the biology of the brown bear and the measures undertaken.

Publication of diverse informative material: two gatefolds ("The brown bear in the central Pyrenees" and "How to act in a region with brown bears"); a six-monthly newsletter, the comic How can we help 'Mastí' to look after his flock?, and the making of three informative videos on measures to prevent attacks and the guard dogs of flocks and herds.

Publication of a special edition in the magazine Quercus, and reports in different magazines.

Organisation of 113 papers and talks, addressed mainly to the public and to local schools in areas where the brown bear lives, and in other regions of Catalonia and in Asturias, Valencia, France and Slovenia. They were attended by 3,620 people.

Creation of a specific webpage for the project (<https://piroslife.cat/en>), a Twitter account (<https://twitter.com/PirosLife>) and a Facebook account (<https://facebook.com/PirosLife>).

Creation of a working group coordinated by the University of Lleida, comprising professionals from the Valls d'Àneu and the Vall de Boí Learning Camps and centres of educational resources from the Pallars, Alta Ribagorça and Vall d'Aran regions, and assigned with the task of developing the Project's educational proposal. Measures taken for involvement in schools in zones with a presence of bears are based on ongoing training for teachers and on the creation of two boxes of educational materials (infant and primary educations), and on the training of students on the pri-

mary education degree course at the University of Lleida. An educational blog (<https://sites.google.com/site/piroslife/>) was also created.

An environmental education network was also established with the participation of the Oso Pardo Foundation, the Oso de Asturias Foundation, the Patrimonio Natural de Castilla y León Foundation, the Environment Research Centre of Cantabria, the Casa de l'Òs Bru Association, the University of Lleida and teaching staff involved in this project.

Training of tourist guides in high mountain zones with two monographic courses for nature guides and different training sessions for tourist facility companies.

Design of three circular bear routes in the High Pyrenees Natural Park, with information to interpret the species' biology and behaviour. All the activities are focused on bears as a rural and mountain tourist attraction.

Creation, through an agreement with the Valls d'Àneu Consortium, of a tourist product platform to promote the marketing of 87 specific regional experiences by 45 different companies and institutions. Drafting of an action plan to establish continuity for the promotion of tourism beyond the project period.

Network of volunteers and other collaborators

La Paniquella Association, a volunteering programme was created with four areas of participation addressed to: monitoring and detecting the brown bear, damage prevention, raising awareness and other occasional tasks. This network of Piroslife volunteers involved over 50 people.

On a complementary basis and in collaboration with the Wood and Furniture Guild, a work and learning camp was organised to reconstruct the Estani-

lles shepherd's hut, which had been damaged in a fire. The restoration project received an award from the Association of Architects of Catalonia.

A further 30 collaborative research projects were performed with work experience and scholarship students from the Agricultural Training School of Santa Coloma de Farners and from different Spanish and international universities.





Photo, left: Informative talk about the Project at the nature work camp of Sorellona, in the High Pyrenees. Photo, right: planting of trees.

Benefits of the project

Environmental and improved sustainability benefits

Both the measures to improve the quality of the habitat and those addressed to encouraging the coexistence of the brown bear and the local population will affect not only the species itself, but also, as an umbrella species, others with which it shares habitat such as the capercaillie, the bearded vulture, the Pyrenean desman, the otter and different bats featured in Annexes II and IV of the Habitats Directive (Directive 92/43/EEC) and of the Birds Directive (Directive 2009/147/EC), included on the List of Wild Species under Special Protection. The measures to restore hayfields and the planting of fruit trees include habitats of priority interest in the Alt Pallars SCI (ES5130003). They also help compliance with European Union environmental policies and specifically with biodiversity goals.

Social benefits

The Project's measures to raise awareness have succeeded in improving both public and the authorities' knowledge of the environmental and social and economic importance of the brown bear. This has yielded exportable products that are currently used in schools and education centres.

The establishment of rules for mediating conflict are intended to guarantee the formation of permanent work panel upon which effective solutions to the matters of concern will be sought.

Benefits of management

These years have seen improvements in management with the local livestock sector, a growth in the number of livestock and apicultural operations protected from potential bear attacks and a qualitative rise in a generally collaborative attitude of livestock breeders and beekeepers. The management and protection of large bovine and equine livestock still requires improvement.

The information obtained on bear distribution in the Pyrenees, the cartography generated and the monitoring procedures may be used as essential tools and a starting point for the management of the species in the immediate future.

The experience and the procedures for monitoring, capture and repulsion generated during the Project will be applied in other administrative regions where bears coexist with human populations.

The Project has established a precedent in the use of innovative dynamic methodologies for capturing and monitoring bears in the Iberian Peninsula.

Economic benefits

Given that the brown bear is a species with high media impact at the top of the food web, it has been used to attract tourism on the basis of natural values that boost and improve the economic status of local businesses.

The hiring of services to implement the PiroLife project and of skilled personnel for work in the zone of application has yielded business opportunities for local people and companies.





Photo, left: clearing vegetation. Photo, right: informative panels at the Fornet refuge.

Future lines

Ensuring the protection and conservation of the current population of Pyrenean bears requires continued encouragement for measures of conservation, which are established in four core areas of work:

- Biological and ecological monitoring of the brown bear population in Catalonia.

- Coexistence with extensive livestock breeding and apiculture.

- Communication, education and raising of social awareness.

- Internal and external management and coordination (cross-border and international).

Work on the above blocks required the development of the measures compiled in the ten-year Action Plan. Significantly these include:

- Continuation of the biological and ecological monitoring of the species with application and improvement of the methods used hitherto.

- Consolidation of the system to prevent attacks on small livestock and apiculture that takes into consideration the progress and positive results obtained, with a focus on two points: first, prevention measures should be implemented in a greater number of livestock operations and those that have only adhered to it occasionally should be persuaded to do so on a definitive basis; second, a procedure to protect flocks and herds of medium-sized livestock should be created.

- Creation of a map of risk of potential attacks, drawn up on the basis of current and future data (bears, livestock and apiculture), with different degrees of intensity in order to prioritise efforts in these zones.

- Creation of an updated catalogue of tourism products associated with bears and ensuring its continuity.

- Promoting of the monitoring of brown bears with ongoing exchange of information and sharing of experiences and knowledge with other European and international projects.

- Approval and publication of the Plan for the Recovery of the Brown Bear in Catalonia.

- Maintenance and strengthening of the close coordination among all Pyrenean administrations, while increasing meetings and coordinated work, periodic visits and attendance at congresses and symposia on larger predators.



To guarantee the protection and conservation of the current Pyrenean bear population, continued measures of management are required



Coordinator
beneficiary

Collaborators



Generalitat de Catalunya
**Departament de Territori
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