

Conservation of the **BEARDED VULTURE** as a
resource for the maintenance of ecosystem services



LAYMAN'S REPORT

LIFE+ RED QUEBRANTAHUESOS





Life+ Project: "Conservation of the bearded vulture as a resource for the maintenance of ecosystem services"

LIFE12NAT/ES/000322

LIFE+ RED QUEBRANTAHUESOS

www.liferedquebrantahuesos.quebrantahuesos.org

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Fundación Biodiversidad



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The **Bearded vulture** (*Gypaetus barbatus*) is the only mountain raptor in the world specialized in the consumption of bone remains. It is included in Annex I of the Birds Directive, in the LIFE + Preferred List and cataloged 'Endangered' in the Spanish Catalog of Endangered Species. Present until the middle of the last century in all the Spanish mountain ranges, it has seen its populations drastically reduced, with a single population remaining in the Pyrenean mountain range, where the largest wild population of this bird is found in Europe. In the Picos de Europa the bearded vulture was definitively extinct in the middle of the 20th century.



The species and Threats

The reasons that caused the disappearance of a broad part of the population nuclei of the bearded vulture seem to be directly related to the unnatural mortality, fundamentally associated to the direct persecution and the use of the poison to fight against predators.

At present, the species is still subject to risk factors that make its populations are among the threatened ones throughout the Palearctic.

Main threats to the species:

Risk of extinction of the only viable wild population: The species present a small population size, which does not exceed 600 individuals. This, together with its range of distribution, limited to the Pyrenean mountain range; and its difficulty in successfully colonizing new territories, make the Pyrenean population - the last genetic reservoir of the Bearded vulture in Europe - vulnerable to stochastic and demographic phenomena.

Illegal use of poison: The illegal use of poisons is a non-selective method, used to eliminate certain wild-life species that compete with human interests, causing annual declines among wild bird populations. In the bearded vulture in the main cause of non-natural mortality.

Direct persecution and anthropogenic threats: Hunting as a trophy in the past and more recently accidents with human infrastructures such as electric wires led the species along with the poison to almost total extinction in the middle of the 20th century.

Decline in habitat quality: The decline and abandonment of extensive mountain farming also poses a serious threat to a species that feeds mainly on carrions found in the mountains. The progressive abandonment of the traditional agrarian system as a consequence of the emigration of the rural population towards the urban cores and the changes in the methods of exploitation (appearance of the intensive farming) cause a reduction of the food resources, limiting the accessibility of the necrophagous birds to the carrions.



The LIFE + Project 12 / NAT / ES / 000322

"**Conservation of the Bearded Vulture as a resource for the maintenance of ecosystem services**", promotes the conservation of the bearded vulture - a species declared in danger of extinction in Spain - in the Pyrenean Mountain Range and its recovery in the Cantabrian Mountains (Picos de Europa), reinforcing the idea that the conservation of a species and the maintenance of biodiversity are linked to local development.



Project Objectives

The main objective of the project is to recover the extinct population of bearded vultures in the P.N. Picos de Europa (Cantabrian Mountain chain) from on a program based on the transfer, by the Government of Aragon, of specimens recovered at risk in the Aragonese Pyrenees. . This project also aims to:

- **To establish** a set of good practices in order to encourage the recuperation of an extinct population, in line with work carried out over recent years.
- **To reinforce** the idea that the conservation of a species is linked to local development and the maintenance of biodiversity and ecosystemic services.
- **To improve** the ecological and social scene of the place of reintroduction and conservation to to ensure its success
- **To highlight** the inter-territorial links and common work objectives of public administration and civil society within National Parks in order to achieve the recuperation and conservation of an endangered species.

- **To demonstrate** that the technique of behavioural learning by natural imprinting can be an efficient tool, thereby complementing other tried and tested techniques.
- **To use ecotourism** as a powerful means of support and participation in biodiversity conservation projects.
- **To Disseminate** and communicate the results of the project among the stakeholders
- **To Dynamize** these mountain areas around the conservation of biodiversity and the reinforcement of public-private cooperation in the Natura 2000 Network

Mar Cantabria
(Cantabria)

Área Picos de Europa (Picos de Europa Mountains area)

Acciones
(Common)



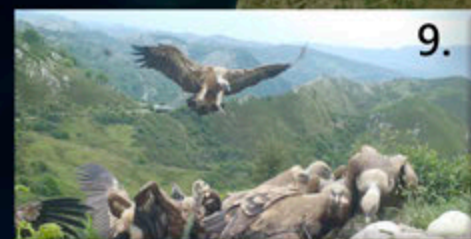
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14



13

España (Spain)

Actions

6. Set up an adaptive release platform for Bearded vulture
7. Release birds into the wild using hacking methods
8. Monitor and follow released specimens
9. Adapt areas for the elimination of livestock carcasses
10. Create an anti-poison patrol.



Act

11. Environmental education
12. Reinforcement of the
13. Creation and promotion
14. Dissemination





Actions

1. Identify problematic reproduction areas in Pyrenees
2. Improve adult productivity and survival rates in Pyrenees
3. Recover specimens from below-average production rate nests
4. Apply the assisted breeding protocol in human isolation
5. Behavioural learning by natural imprinting



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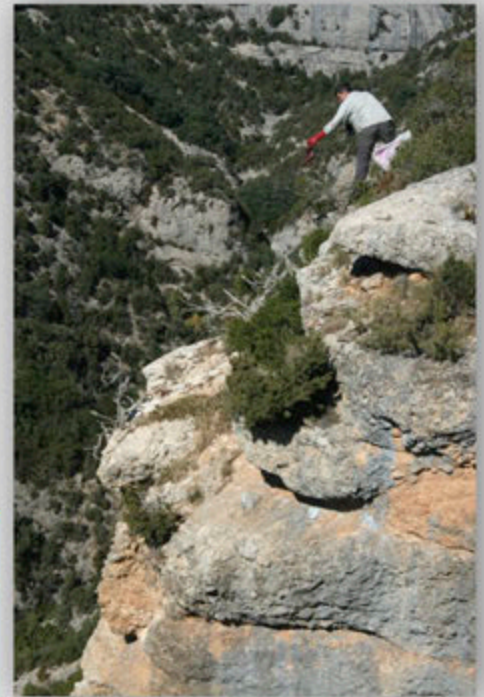
education and training
Natura 2000 Network
of a new Ecotourism product
and Communication



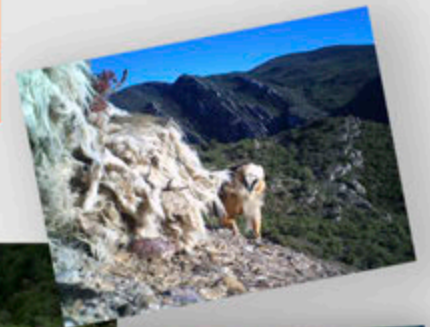
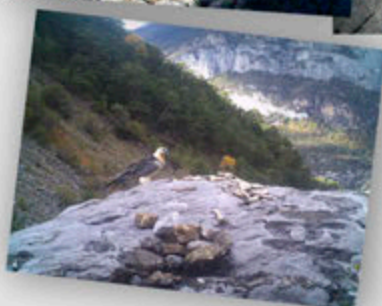
To improve breeding succes and adult survival rates in Pyrenees

One of the main problems that the species has is its low breeding success. Thanks to the work carried out for more than 20 years, we have an exhaustive knowledge of the breeding population of the bearded vulture in Aragón. Thanks to this, it has been possible to detect breeding pairs that present a high risk of loss of egg-laying.

To mitigate it, 12 Breeding Units with problems were selected and supplied during the reproduction period (from October to January) with bones and wool in order to improve their physiological state. During the 5 years of project with this action 359 contributions have been made deposited in specific places a total 6.081Kg. of bones and 248 Kg of wool



YEAR	Nº	Kg. bones	Kg. wool
2013-2014	108	1611	56
2014-2015	72	2080	48
2015-2016	47	735	48
2016-2017	67	1005	48
2017-2018	65	650	48
TOTAL	359	6.081	248



To recover specimens from below-average production rate nests

Once analyzed and defined the territories with little chance of survival by the environmental authorities of the Government and Aragon, have rescued, with the help of the Civil Guard and specialists of the Government of Aragon, a total of 36 eggs from 26 rescues of 17 different breeder units of the Aragonese Pyrenees during the 5 years of the LIFE + RED QUEBRANTAHUESOS Project.



Year	Nº interventions	URs Intervened	Rescued eggs	Broken eggs	Infertile eggs	Viable eggs
2014	3	nº 31	2		2	0
		nº 36	2			2
		nº 20	2	1		1
2015	4	nº 20	2			2
		nº 31	2		2	0
		nº 36	1			1
		nº 63	2		1	1
2016	4	nº 73	2			2
		nº 31	2		2	0
		nº 41	2			2
		nº 45	1			1
2017	8	nº 31	2		2	0
		nº 78	1			1
		nº 53	1			1
		nº 45	1			1
		nº 82	2			2
		nº 52	0			0
		nº 74	1			1
		nº 63	1	1		0
2018	7	nº 66	1			1
		nº 20	2			2
		nº 36	1			1
		nº 53	1			1
		nº 8	2			2
		nº 40	1		1	0
		nº 63	1	1		0
TOTAL	26	26	38	3	8	25



Main results

To apply the assisted breeding protocol

Rescued eggs-embryos are transferred to the Bearded Vulture Breeding Center in Human Isolation, (CRIA) owned by the Government of Aragon and concluded with the FCQ.

The center has the necessary technological and human resources to fully develop the tasks of incubation, neonatal assistance and veterinary inspection.

During the project, there was a 100% hatching rate and a 92% breeding success rate.



Year	Eggs arrived to CRIA	Broken eggs	Infertile eggs	Viable eggs	Hatched eggs	Dead chickens	Chickens raised
2014	6	1	2	3	3	0	3
2015	7	0	3	4	4	1	3
2016	7	0	2	5	5	0	5
2017	9	1	2	6	6	1	5
2018	9	1	1	7	7	0	7
TOTAL	38	3	10	25	25	2	23



Jana, an exceptional case



"Jana is a 2016 bearded vulture female coming from a double laying of the UR 41 that at birth weighed only 96.7 g. It is the lowest recorded weight for the species in Europe. After being raised and released, today flies free in the Picos de Europa. The UR 41 had been tried during 14 consecutive years without bringing their offspring forward. "

Behavioural learning by natural imprinting, hacking and release

The 21 specimens released in the framework of the project have followed a breeding protocol that ensures their adaptability to the environment and prepares them physically and cognitively for their life in freedom. To achieve this, a double hacking is carried out in two main phases. With 45 days of age on average, they move to facilities in the Ordesa and Monte Perdido National Park where behavioral hacking is carried out. They remain there until they are 90-100 days old. The last phase before the liberation is carried out in the National Park of the Picos de Europa, where the hacking of fixation to the territory is carried out. After spending 30 days in these pre-liberation cages and once their physical and psychic development is complete, they are released in the natural environment, a territory that they recognize as their own and that they will look for when they try to reproduce 7 years later.

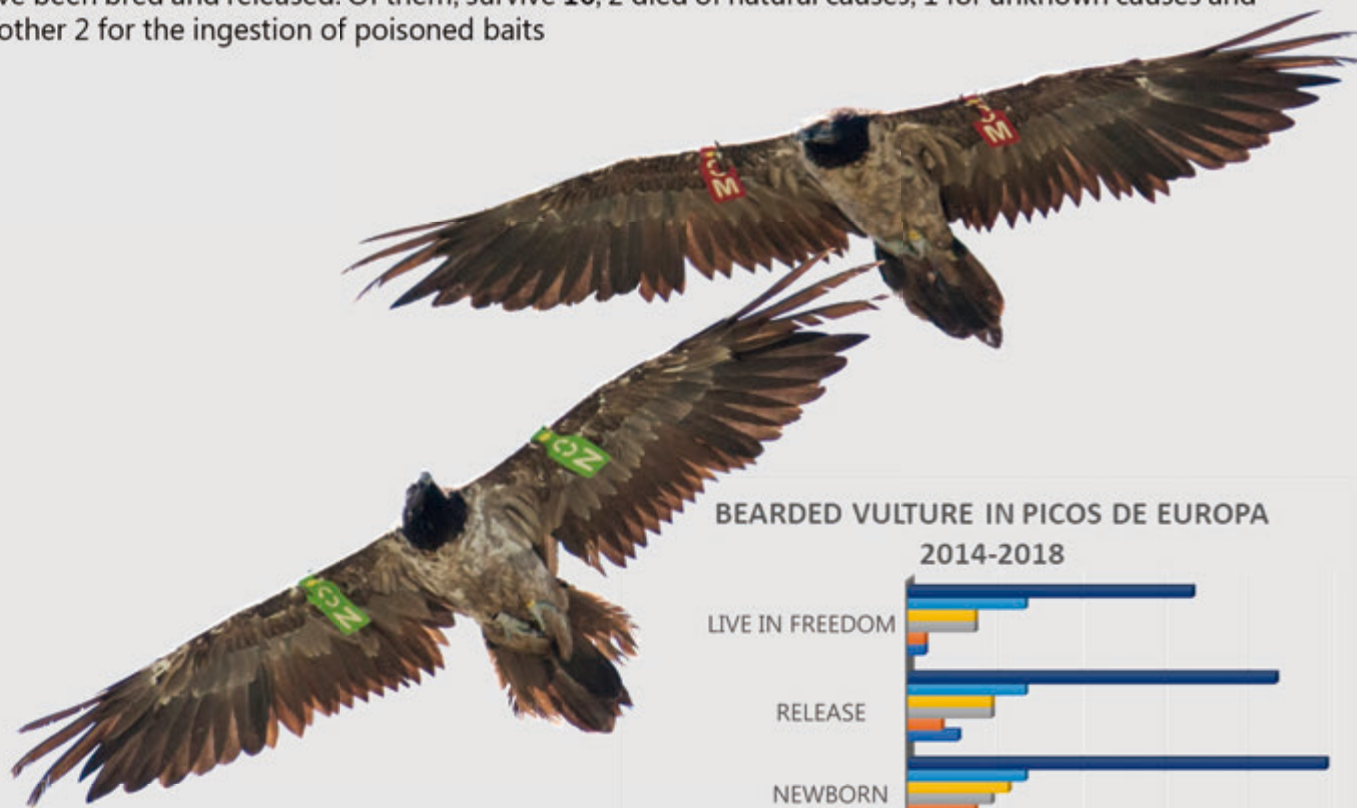


	Specimen	Date of transfer to hacking PNOMP	Date of transfer to PNPE	Release
2014	Biziele	23/04/2014	25/06/2014	21/07/2014
	Güëña	23/04/2014	25/06/2014	21/07/2014
	Chloe	04/04/2015	25/06/2014	31/07/2014
2015	Esperanza	04/04/2015	28/06/2015	17/08/2015
	Quebrantina	23/04/2014	28/06/2015	31/07/20105
2016	Cares	09/04/2016	31/05/2016	29/06/2016
	Vitorina	09/04/2016	31/05/2016	29/06/2016
	Jana	09/04/2016	31/05/2016	08/07/2016
	Julia	11/04/2016	11/06/2016	20/07/2016
	Escudero	22/04/2016	11/06/2016	20/07/2016
2017	Carlota	05/05/2017	28/06/2017	28/07/2017
	Centenaria	05/05/2017	28/06/2017	28/07/2017
	Nicolas	05/05/2017	28/06/2017	28/07/2017
	Pilar	12/05/2017	07/07/2017	04/08/2017
2018	Sidney	03/04/2018	22/05/2018	21/06/2018
	Aquilón	03/04/2018	22/05/2018	28/06/2018
	Mónica	03/04/2018	31/05/2018	28/06/2018
	Santander	18/04/2018	11/06/2018	23/07/2018
	Mandi	27/04/2018	20/06/2018	23/07/2018
	Covadonga	04/05/2018	20/06/2018	23/07/2018
	Eva	04/05/2018	28/06/2018	30/07/2018

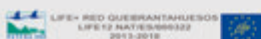
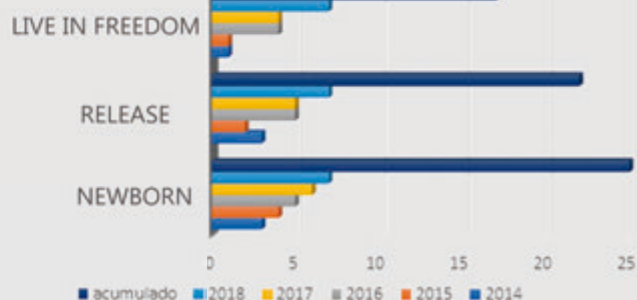


To monitor and follow released specimens

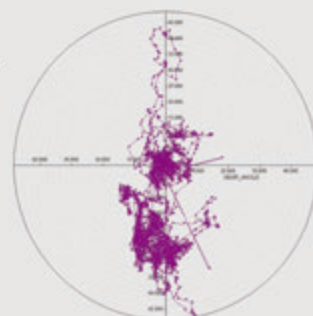
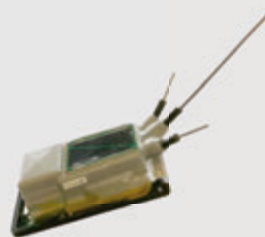
During the 5 years of the project, a total of **21** specimens that have become part of the wild stock have been bred and released. Of them, survive **16**, 2 died of natural causes, 1 for unknown causes and another 2 for the ingestion of poisoned baits



BEARDED VULTURE IN PICOS DE EUROPA
2014-2018



More than **12,200** hours of monitoring have been used by specialized technicians and **334,463** geolocations of the 21 released specimens have been compiled



To monitor and follow released specimens

After more than 60 years of absence, in 2017 the first breeding attempt of a bearded vulture in the Picos de Europa took place. "Deva" a female released in 2010 within the framework of the reintroduction project and "Casanova", a wild specimen from the Pyrenees has been the first Picos de Europa Breeding Unit since its extinction in the middle of the last century. Although they have not yet been able to move forward their offspring (in the bearded vulture the average age for the first successful reproduction is around 11 years ...) the fact of choosing territory and trying to breed gives reasons to be optimistic and continue with the efforts made to finally achieve a stable population nucleus that mitigates the high risk of extinction to which the species is subject in Europe.



To adapt areas for the elimination of livestock carcasses

The Supplementary Feeding Point that has been established in the reintroduction area is frequently visited by the project's specimens. In addition, griffon vultures, kites, golden eagles and even some black vultures are common diners. This influx of species is of great importance for the reintroduced young bearded vultures since it is used as a point of socialization that fosters intra- and interspecific relationships that are of vital importance for long-term survival.

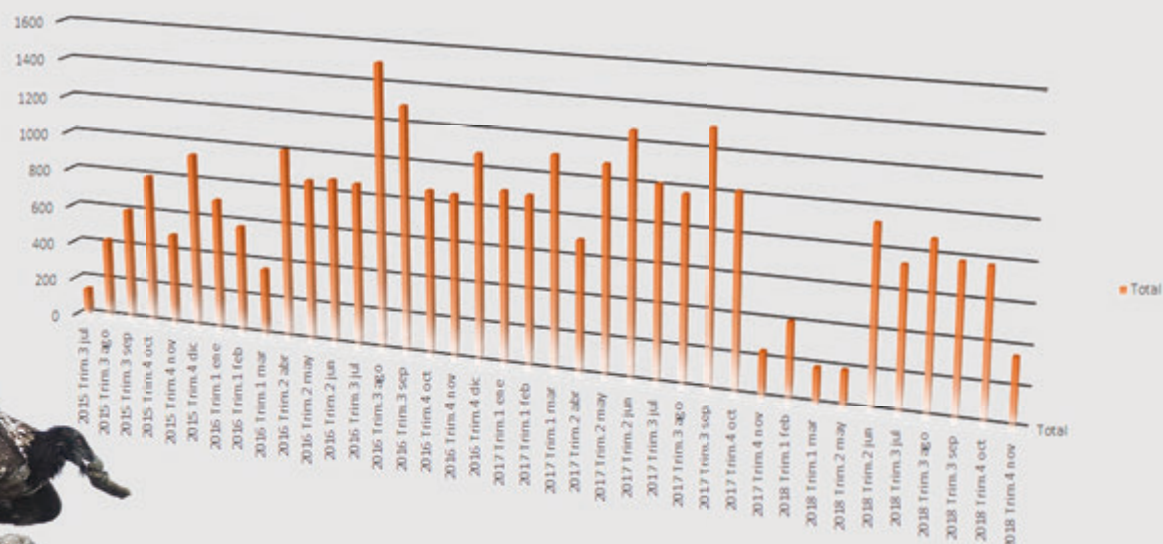


"The Environmental Benefit of the Feeding point"
The total of remains contributed to the feeding point during the project that are consumed by the scavengers suppose to counteract the CO₂ emissions of **54 *** days of operation of the bus transportation plan to Lagos de Covadonga
* 20,512 Kg. CO₂ that have not been emitted into the atmosphere thanks to the ecological role of scavengers

YEAR	KG.	Nº ANUAL CONTRIBUTIONS	% CONSUMED
2015	3.398	25	90%
2016	10.867	51	92.90%
2017	10.545	43	95%
2018*	3.364	20	95.05%
TOTAL	28.174	139	93.24%

*DATA AT 31/08/2018

CONTRIBUTIONS 2014-2018

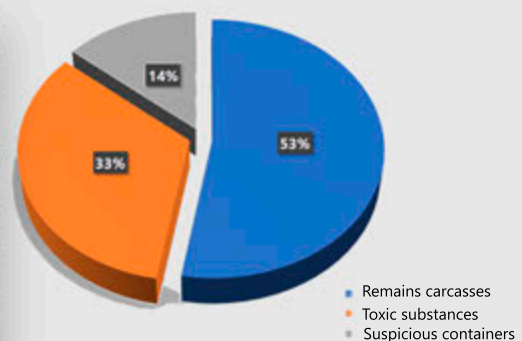


To create an anti-poison patrol

Two of the specimens released in the project died due to the ingestion of poisoned baits. In fact death by poison is the main cause of unnatural mortality of the species. Throughout these 5 years of work, 89 interventions have been carried out, with a total of 36 positive results (finding remains of corpses or presumed toxic substances).

YEAR	Nº interventions	positive results
2013	5	1 remains of wildlife carcasses
2014	20	4 toxic substances 2 remains of wildlife carcasses
2015	21	8 toxic substances 7 remains of wildlife carcasses 2 container with suspicious substances
2016	17	4 remains of wildlife carcasses
2017	7	1 container with suspicious substances
2018	18	5 remains of wildlife carcasses 2 container with suspicious substances
TOTAL	88	36 positives

Typology of the remains



Dissemination and Communication

During the realization of the project it has been tried to demonstrate that the promotion of the biodiversity and its conservation can be an element able to consolidate a model that favors the consolidation of the projects of conservation of the biodiversity, and that these social and economic returns can be actively reverted into the conservation of biodiversity itself.

With this present idea, a complete dissemination and communication program was developed to reach all sectors of society as a whole



Environmental benefits

• **Creation** of a new population in Spain of this threatened species. The Picos de Europa National Park has recovered the population that was extinguished 60 years ago. The restoration of this extinct population is key to activate a metapopulation system for mountain spaces of the Natura 2000 Network.

With its creation it is allowed:

- **Reduce the risk of extinction** of the bearded vulture population by environmental estocasticity.
- **Increase** the peninsular population of this species, as well as the range of distribution currently limited to the Pyrenean mountain range.

"In 2013, only 2 bearded vultures lived in the Picos de Europa National Park, from experimental releases prior to the project. LIFE12NAT / ES / 000322 involved the direct release of 21 individuals. It has also been noted an effect called for Pyrenean specimens and from the reintroduction project that is currently running in the Sierra de Ca-zorla (Andalusia). And the formation of the first reproductive unit. "

• **Consolidation** of the dual embryo at risk rescue protocol and breeding by natural imprinting in human isolation, a methodology tested by the FCQ, which has strengthened the connection between the Cantabrian Mountain range populations and has been very efficient in results and cost /benefit. The results of this breeding method are put in the lead in productivity standards and low cost on reintroduction projects known to date.

"The rescue of embryos at risk, from reproductive units with very low productivity, close to 0%, allows the incorporation into the Iberian genetic pool of genes of the species not expressed in some cases in more than 23 years. "

• The **survival rate** at the end of the project is 76%, highlighting the fact that the mortality rate from human causes is the lowest (9.5%) for similar projects in Spain, which represents the highest rate of survival achieved so far in projects of this species in Spain.

• **Feeding** of necrophagous birds and **reduction of CO₂** emissions in the feeding station point of the Mirador de la Reina. Remains of cattle that were previously incinerated, through the project have been deposited in Supplementary Feeding Points, being used by the necrophagous fauna.

• **Reduction** of the presence of poison in the natural environment thanks to the work of detection and deterrence of the antipoison canine patrol.

• The umbrella character of the bearded vulture implies that many other species are protected under actions aimed at protecting it.



Economic benefits

- The interaction and collaboration with local agents, whose activity is linked to these territories (livestock management, hunting, tourism) is essential to consolidate the conservation dynamics initiated. Agreements have been signed with hunting societies. In the tourism sector there has been the collaboration of local companies to promote ecotourism around the bearded vulture and its conservation, such as the Parador Nacional de Cangas de Onís or the transport company ALSA.
- The '**Pro-Biodiversity**' Guarantee Mark applied to the direct sale of lamb meat in the Picos de Europa sub-area represents an improvement in the profitability of extensive livestock production and the involvement of the distributor sector (local supermarket chain), in the momentum of this activity in decline, but fundamental for the conservation of mountain ecosystems. Through the Pro-Biodiversity Guarantee Mark, the signing of an agreement between sheep and mountain goat producers with a national supermarket chain has been achieved, which has allowed an increase of 106% in the purchase price to the farmers.
- Collaboration with private agents with whom agreements have been signed for the continuity of the actions carried out within the framework of this project: Fundación Banco Santander and Fundación Iberdrola, both belonging to the IBEX 35, have contributed 320,000 euros for the conservation of the species.
- Improve the valorization of this species, especially by the local population and the entities with competence in the management of the territory. Work has been carried out with schools in the two sub-areas of the project to raise awareness about the bearded vulture, with tourism agents and technical personnel from the protected areas that are the habitat of the bearded vulture. Additionally, ecotourism actions have also had a strong awareness component.



Social benefits

- Maintenance and restoration of ecosystem services in mountain areas, through actions aimed at promoting the recovery of traditional practices (support for extensive livestock) and the abandonment of other harmful (placing poisoned baits, etc).
- Sensitization of local children and youth through the "School Network for the Bearded Vulture"
- More sustainable tourism practices in the two territories thanks to the commitment to low-impact products and little overcrowded such as those included in 'Ecotourism and Biodiversity', and training and networking actions.



The FCQ has 27 years of experience in the conservation of this species in Spain. In this sense, we will continue working on the conservation of the species in the same line of actions that it has followed up to now. The objectives for the next five-year period are aimed at favoring the recovery of the species in the historical territories of the north Iberian through the creation of biological corridors between new population cores, analyzing the factors that may limit this expansion and acting directly in its mitigation. The aim of the communication and social awareness work carried out by the FCQ is to transmit the potential of biodiversity conservation as an opportunity for rural development, by creating alliances that allow the reduction of conflicts with wildlife and the improvement of biodiversity and the production systems in mountain areas.

After-LIFE Objectives

- 1) Encourage the creation / consolidation of new founding core in territories with historical presence of the species.
- 2) Promote the population connectivity of the species in the north-south axis in the Iberian Peninsula
- 3) Mitigate the effect of natural and anthropic variables that affect the species in the work areas.
- 4) Increase mechanisms of public participation for the conservation of biodiversity as an opportunity for rural development.
- 5) Implement efficient communication actions that generate public awareness and change attitudes about the conservation of threatened species.



LIFE+ RED QUEBRANTAHUESOS



The Foundation for the conservation of the lammergeier is a non-profit private non-governmental organization (NGO), declared of public utility, registered in the foundations registry of the Ministry for the Ecological Transition (nº 500001) and constituted in the year 1995, which is dedicated to promote and develop projects of monitoring, research, management, rural development, ecotourism and awareness in the mountain habitats where the bearded vulture lives.

The main objectives of the FCQ are to ensure the recovery of the bearded vulture and its natural habitats within the territories of historic and recent distribution, as well as to promote attitudes of respect for the values linked to the conservation of biodiversity.