LIFE GYPCONNECT

MEMORANDUM/VOLUME 1

A better future for Bearded Vulture

Gypconnect

NATURA 2000

AGIR pour la BIODIVERSITÉ

This document was produced with the support of:
the European Commission,
the MAVA Foundation

in cooperation with:
La Ligue pour la Protection des Oiseaux (LPO France)
La Vulture Conservation Foundation (VCF)
La Ligue pour la Protection des Oiseaux de l'Aude (LPO Aude)
Le Parc national des Cévennes (PN des Cévennes)
Vautours-en-Baronnies (VEB)
Le Parc Naturel Régional du Vercors (PNR du Vercors)
Sorbonne Université (SU)
Centre National d'Informations Toxicologiques Vétérinaires (CNITV)
ENEDIS

Introduction

The Bearded Vulture is deemed vulnerable (VU) in Europe and threatened with extinction (EN) in France (European Red List, IUCN, 2015 and Red list of threatened species in France, Birds of Metropolitan France, 2016). To bridge the current gap that persists between its populations in the Western Alps and the Eastern Pyrenees, the LIFE GYPCONNECT programme has been developed to create new core populations and re-establish exchanges between these different mountain ranges with the aim of reconstituting a true European Bearded Vulture metapopulation.
Several tools have been set up under LIFE GYPCONNECT which are listed in this **memorandum**.
The purpose of this document is to provide a detailed overview of various tools and steps that have been necessary to implement actions in the LIFE GYPCONNECT programme. These tools answered the main questions arising from the project implementation pragmatically to ensure its efficiency and the success of scheduled actions.
Efforts have been made to give this document a didactic framework, thereby making the information it contains more accessible. The factsheets have thus been written in summary form and provide cross-references to which readers can refer for additional information as required. These factsheets may thus be analysed and understood as bases for effective reproducibility. This compilation seeks above all to assist sponsors of projects involved in wildlife conservation programmes requiring population translocation and reintroduction boosts. It is therefore aiming to share experiences acquired under LIFE GYPCONNECT and ensure the transferability of actions. Project sponsors should be able to analyse fully the means and measures related to safeguarding wild species whilst thus identifying technical assistance needs. This compilation can therefore serve as training material. In addition, this memorandum can be used very effectively to trace and/or analyse the governance implemented under LIFE GYPCONNECT to improve stakeholder coordination, make consensual decisions and launch joint actions for another nature protection project. The various actions undertaken under LIFE GYPCONNECT are presented in this document per theme.

Every sheet is arranged using the following structure:

Issues at stake
This part gives some context on the theme addressed and recalls the issues at stake for the Bearded Vulture.

Actions and tools used
This part sets out the actions and tools used under LIFE GYPCONNECT.

Regulatory aspects
This part takes stock of the regulatory context and legislative framework in France and Europe for the actions in question. The authorisations and associated administrative documents required to implement them are clarified.

Constraints and difficulties encountered
This part outlines the constraints and difficulties encountered by the beneficiaries in implementing the actions in question. They are based on feedback from the LIFE GYPCONNECT beneficiary structures.

Means and costs engaged
This part details the means and costs engaged in the 2016-2020 period. The costs shown in the tables are a guide only and can change based on a variety of parameters such as special contexts, networks and skills/expertise mobilised or changes in the cost of living. A few elements are added for each sheet to specify the type of expenses committed to implement the actions in question. In some cases, estimated costs are stated as a guide.

Summary

VOLUME 1

Sheet 1 A1/A2/C1/C2/C11

Conservation

Reintroduce the Bearded Vulture

TOOLS DEVELOPED

European protocol to ensure the consideration of «selection criteria for hacking sites to reintroduce the Bearded Vulture», which also contains recommendations for laying out the hacking site and feeding and monitoring Bearded Vultures before and after fledging (Vautour en Baronnies, LIFE GYPCONNECT Deliverable A1, 2016)/**Appendix 1.1**

Indicators of progress in creating new core populations of Bearded Vultures and establishing connections between them (François Sarrazin, LIFE GYPCONNECT, Deliverable A2, 2017)/**Appendix 1.2**

AVERAGE COST OF ACTION

€222,981.62

Issues at stake

Reintroduction operations are essential in restoring Bearded Vulture populations in Europe. In France, under LIFE GYPCONNECT, they are used to create new core populations that allow exchanges between the populations in the Pyrenees and Alps and the existence of a genetic flow necessary for their viability. These operations fall under the Endangered European Species Programme (EEP) for the Bearded Vulture in Europe. It meets the IUCN recommendations (*http://data.iucn.org/dbtw-wpd/edocs/2013-009.pdf*).

The Vulture Conservation Foundation (VCF) coordinates the EEP programme for the Bearded Vulture and organises the availability of birds for the various European reintroduction programmes. Different entities (zoos, private collections, recovery centres and breeding centres) in the Bearded Vulture EEP network intended for reintroduction, capable of evolving and breeding in the wild when reaching sexual maturity.

The ultimate goal is to establish a population capable of surviving and breeding without human intervention.

The involvement of local players is crucial in guaranteeing acceptance of the species, ensuring local dynamics and appropriation of the reintroduction project for a lasting commitment.

© B. Berthémy

Actions ans tools used

Several actions have been necessary to proceed with these reintroductions:

1. Selecting release sites (Action A1) and defining success indicators (Action A2)

Potential release sites are identified by different beneficiaries and then go through a validation phase involving experts from Bearded Vulture international network. The recommendation is for at least two release sites to be validated for each sector to protect against any use that may subsequently prove impossible.

It seemed necessary to upgrade the pre-existing protocol developed by the EGS (Eulen- und Greifvogelstation Haringsee) and VCF, which considered solely the mountain context of Alpine sites, to incorporate the criteria specific to the old, low-lying mountain ranges (Pre-Alps and Massif Central). The goal was to have an **updated protocol** that incorporated the particular contexts of the Life territories. This would provide greater control of the tranquillity and attractiveness of sites selected for Bearded Vultures and ensure the success of the bird release phases.

Steps in creating release sites

Release site, Lozere © LPO

Various criteria are used for site selection. These include attractiveness of sites for the vultures, landowner approval, proximity to structures used for reintroduction operations, distancing from breeding sites of territorial species (pairs of Bearded Vultures, pairs of Golden Eagles, etc.) and distancing from at-risk structures (power lines, wind turbines, etc.). Under action A2, several demographic and spatial scenarios of the dynamics of Bearded Vulture populations in the South of France have been produced for use in modelling the viability of connected and restored populations. It has been possible to develop precise, objective **success indicators** to assess the effectiveness of conservation operations throughout the programme in an adaptive management software program, as per the IUCN recommendations for conservation translocation programmes.

2. Develop selected release sites and maintain pre-existing sites (Action C1)

Once selected, the release sites must undergo specific development work to ensure the reception and safety of birds to be released. These developments will include especially the installation of protective devices against possible predators and falling birds. They also ensure that the site is accessible to the monitoring teams and reduce as far as possible the problems of exposure to bad weather and stability of hacking sites (limiting risks of fall of solid elements).

The surface area of a release site can vary from ten to a hundred square metres (depending on the configuration conditions and relief of each site): there must be sufficient space for the young vultures whilst being sheltered from bad weather and for monitoring the birds.

To encourage the birds to adapt to the hacking site and increase the chances of success, it is recommended to place at least two individuals together on each hacking site.

Nestlings are aggressive and competitive, the older chick is stronger and does not allow the weaker one to feed and so it eventually dies (cainism). To deal with the risk of aggressive behaviour between chicks, provision could be made for structures where the birds can move away from the gaze of their fellow birds or removable screens to split the installation, if necessary, and thus the individuals whilst maintaining visual contact between them. Daily monitoring of the birds' behaviour allows intervention when necessary.

It is also necessary to provide facilities for monitoring and surveying the birds (observation hut and monitoring camera).

These facilities are designed to be dismantled if necessary, should the site change or in anticipation of the end of the programme, to avoid damaging the site and the landscape. The infrastructures must be serviced regularly by the beneficiaries throughout the reintroduction programme.

3. Captive breeding for reintroduction (Action C11)

Captive breeding under the Bearded Vulture EEP programme is an essential action of LIFE GYPCONNECT. Action C11 provided for the supply of birds for reintroducing the Bearded Vulture in the release sites.

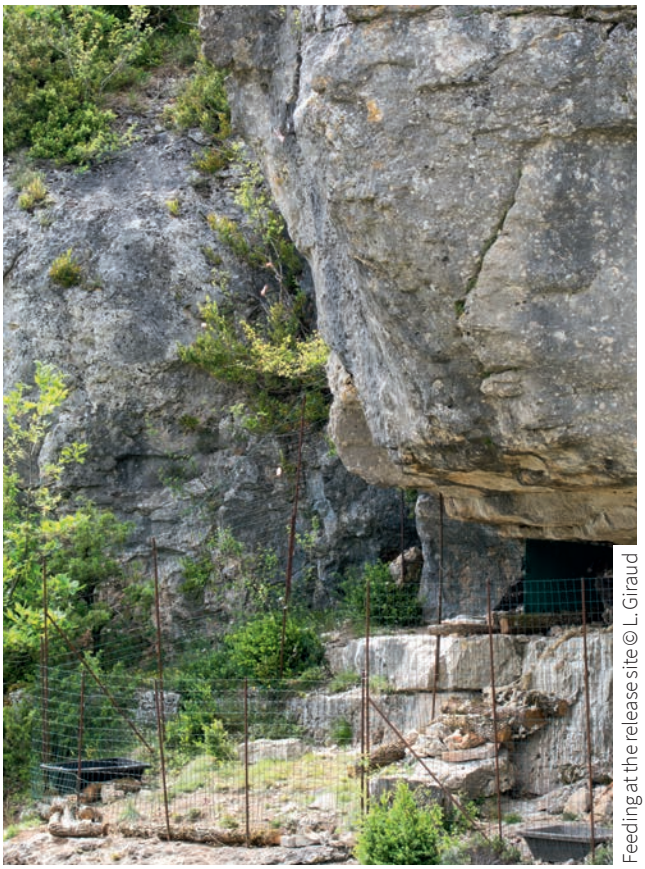
Captive breeding has been preferred for this reintroduction programme. Removing eggs in the Bearded Vulture nesting areas, as is done in other programmes, did not meet the needs of the LIFE GYPCONNECT and can have major impacts in the populations.

Building watching post, Lozere © LPO

The VCF has developed and improved the guidelines for captive breeding and for feeding Bearded Vultures in captivity to maximise the survival and productivity of captive birds. These guidelines have been published in a series of technical documents updated and available on the VCF Internet site: *https://www.4vultures.org/our-work/captive-breeding/bearded-vulture/*
The programme planned to supply and release at least four individuals a year split between the two release territories (Massif Central and Drôme), subject to the availability of birds produced every year.

4. Release and monitoring of birds before and after fledging (Action C2)
Action C2 encompasses the implementation of releases of young birds in the different release sites of the LIFE intervention area until the end of the programme.
The monitoring observatory must have a clear view for easy monitoring but be far enough away to avoid disturbing the birds. Installing a camera is recommended especially when areas exist outside the field of observation. It is advisable for the surveillance team to comprise at least two people at the same time. If an accident occurs, there should always be at least one person observing the remaining birds.
The birds are identified by rings and bleached feathers, specially during the nestling period. To improve post-fledging monitoring, the released birds are fitted with a GPS tracker that transmits their position via the mobile telephone network (GSM). Powered by solar panels, the GPS tags are fixed to the bird's body with a specify leg loop harness made from Teflon. The GPS trackers are coupled to an immobility detector that can also measure the temperature of the GPS (indicating a lost tracker or a problem for the bird) and to a VHF transmitter (radio waves) so that the tracker can be located by radio-tracking.
A Bearded Vulture monitoring **protocol** has been defined to monitor the birds and to ensure their emancipation, state of health and proper development before and after fledging.

5. Feeding birds on the release sites
The VCF **Guidelines for feeding** vultures in captivity states the importance of providing the birds with sufficient quantities of good-quality food to ensure good breeding conditions, good health and good life expectancy and reproduction.
Vultures must be fed with meat and bones from domestic animals (rabbits, domestic rats, calves, goats and sheep).
It is very important not to provide food from animals shot with lead ammunition or poisoned. The ratio between bone and meat-based matter varies according to the age of the bird. Chicks below the age of four weeks are fed on 100% soft tissue. Fully-grown birds should receive a diet composed of 70% bone and 30% soft tissue. This ratio should be reversed to 70% soft tissue and 30% bone for younger birds aged over four weeks, until they have reached full size. Bones that are too large must be sawn into 5 to 10 cm sections for assimilation by the birds rather than broken, to avoid perforations of the stomach or oesophagus (mainly calf bones). For the bones: lower leg bones from calves, sheep and goats are recommended. For the soft tissues: gutted rats or rabbits up to 3 kg, pieces of goats or ewes are recommended.
At this age, the daily ingested food is around 400-500 g for each bird (almost the double as an adult bird). Depending on the situation, e.g. ravens or griffons or other scavengers, the amount has to be increased.


Feeding at the release site © L. Giraud

BEFORE FLEDGING, AT THE HACKING SITE
Food must be given at night, or during the day if the birds have no visual contact with the operators. The birds must not associate the provision of food with humans. Food should be given every two to three days at most, with the intake of food checked constantly by the surveillance team. On sites where quite a few Griffon Vultures may be present which consume or scatter the remains of bones left for the Bearded Vultures, it is advisable to top up food supplies at the end of the day or even in early evening to avoid competition with the Griffon Vultures. Never try to force the birds to leave the nest by reducing feeding. The birds have to choose the right time for fledging themselves.

AFTER FLEDGING
The food must be left in miscellaneous open places near the release site to make it easy for the birds to find. Food must be provided more frequently in sectors occupied by other scavenger species. In general, the birds stop visiting the hacking site's feeding area after a month. However, this time can vary between individuals, if there is contact with other Bearded Vultures, according to the availability of food; this is why noting the behaviour of the birds is important in determining when feeding can be stopped after fledging. Feeding can continue for up to three months after the first flights, gradually reducing the frequency (every three days, then twice a week and finally once a week in the last month).

Layrou on feeding site © LPO

Regulatory aspects

The release into the wild of young Bearded Vultures, a European protected species, involves a variety of administrative steps to obtain the necessary authorisations to implement actions.

a. Selecting and developing a release site: Request for authorisation for works from owners, municipalities and other structures

b. Authorisation request file for reintroducing the Bearded Vulture into the natural environment This is intended to advise the authority responsible for issuing authorisations and derogations of a protected species reintroduction project. The opinion of the CNPN (National Council for Nature Protection) is mandatory before any ministerial validation.

c. Constituting a file with the prefectures involved for a public enquiry to obtain the necessary prefectoral orders for the introduction of the Bearded Vulture into the natural environment

d. The miscellaneous authorisations must be processed for the routing, handling and holding of specimens of the Bearded Vulture species:

- Obtaining a capacity certificate to ensure responsibility for the servicing, holding and breeding of non-domestic species of birds
- Ministerial derogation relating to specie(s) subject to Title I of Book IV of the Environment Code for CAPTURING-TRANSPORTING-HOLDING for rescuing purposes and/or with a view to release into the natural environment (Cerfa no. 13 616*01, Cerfa no. 11629*02, Cerfa no. 11630*02)
- Authorisation for capturing and holding birds for ringing for scientific purposes.

Constraints and difficulties encountered

⚠ Administrative constraints in obtaining authorisations for creating and using release sites (depending on the sites, the authorisations will be more or less easy to obtain : classified sites, national park, etc.).

⚠ Technical constraints in developing the sites given accessibility conditions to hacking sites and land and VCF protocol constraints.

⚠ Constraints over the availability of chicks produced every year by captive breeding centres and the sex ratio necessary to work towards creating breeding pairs in the wild.

⚠ Difficulties in ensuring release in a secure environment (risk of poisoning, shooting, risks of strikes and electrocution, etc.) which may involve cancelling release operations until the threat is neutralised.

⚠ Difficulties arising from complex monitoring and feeding logistics: major staff requirement, daily trips, difficulties in procuring butchering remnants nearby.

⚠ Difficulties in organising public events for releases given that it is impossible really to anticipate the outcome of the breeding season and the arrival date for the birds.

⚠ Technical problems in monitoring released birds: inherent risks in the operation and efficiency of various equipment used (problems with GPS transmitters/trackers, monitoring cameras, etc.).

Hacking site © B. Berthémy

PRESENTATION OF THE HACKING METHOD

Under the Bearded Vulture reintroduction programme in the Alps, a modified method of "hacking back" has been developed in the Haringsee specialist breeding centre (RFZ-EGS). Originally used in falconry, this technique has been adapted to the release of chicks hatched in captivity and to encourage the development of young raptors in the nest and after fledging. The idea was to install an artificial nest on a ledge or cavity, constructed similar to a Bearded vulture nest in the wild. The young are not enclosed and can leave the hacking site freely as soon as they can fly. In cliff-dwelling breeding birds, the chick does not leave the nest before it can fly. This hacking method involves humans taking the place of the parents for food supply and defence against natural predators (by making the release site location inaccessible to land predators initially) whilst limiting interactions with the chicks to avoid their imprinting on humans. To encourage chick behaviour suitable for local conditions (key factors of any reintroduction programme), the released young must have been raised by their natural or adoptive parents. In addition, to simulate birds correctly at the hacking site and thus their development, at least two chicks must be placed simultaneously on the release ledge. Permanent contact with a congener at the hacking site is very important for the behavioural development of the chicks.

ADVANTAGES OF THE HACKING METHOD

- Chicks already autonomous (released at ninety days): capable of eating alone; large and strong enough to defend themselves against other species and natural predators
- Optimum learning and adaptation abilities at ninety days: the young quickly acquire a behaviour of juveniles born in the wild and do not go far from the nest for the first weeks of flying, meaning the birds can be intensively monitored
- The young quickly become independent (about two months after fledging) and do not need to learn from the parents, mainly for breaking bones, which comes several weeks after the first flights
- Innate philopatric behaviour: the released chicks are young enough to look on the release site as their birthplace. This theoretically implies a high return percentage of birds to their release area; they occupy areas around the hacking site and thus develop a core population

Means and costs engaged

The costs presented match the miscellaneous expenses committed for implementing these actions:

- Expenses for updating the protocol
- Expenses for the administrative steps (processing authorisation requests)
- Expenses for selecting and developing hacking sites as well as site maintenance, securing and surveillance.
- Expenses for supplying birds for reintroduction operations: routing young vultures from breeding sites to release locations (purchasing transport crates)
- Expenses for operating bird releases (supervision of release phases)

Provision must also be made to mobilise personnel (facilitator, local coordinator, branch manager, task officer, agent, trainee, etc.) and if necessary acquire optical and communication equipment (for monitoring and surveillance) and consumables (to condition and supply the food to the young Bearded Vultures released). Provision must also be made for the budgets to bring in outside assistance to have birds produced by the EEP network.

The experience acquired has been used to assess the estimated «production» costs of €48,400 for a young Bearded Vulture (for specialized breeding centers), better and the pairing of breeding adults until the young bird is released.

COSTS ENGAGED IN THE 2016-2020 PERIOD	
A01 PROTOCOL UPDATE AND RELEASE SITE SELECTION	**7 059,37 €**
01 - Personnel	6 021,00 €
02 - Travel and subsistence	341,57 €
07 - Other costs	696,80 €
A02 PRODUCING SETTLEMENT, CONNECTION AND VIABILITY SCENARIOS FOR BEARDED VULTURE POPULATIONS	**20 203,10 €**
01 - Personnel	18 185,03 €
02 - Travel and subsistence	635,50 €
03 - External assistance	440,61 €
04 - Durables goods	941,96 €
C01 PREPARING RELEASE SITES	**32 902,18 €**
01 - Personnel	19 715,91 €
02 - Travel and subsistence	1 072,33 €
03 - External assistance	4 359,25 €
04 - Durables goods	2 174,10 €
06 - Consumables	5 580,59 €
C02 PROCEEDING WITH BIRD RELEASES	**447 381,66 €**
01 - Personnel	304 368,06 €
02 - Travel and subsistence	32 677,53 €
03 - External assistance	39 222,27 €
04 - Durables goods	59 029,17 €
06 - Consumables	2 799,95 €
07 - Other costs	9 284,68 €
C11 ENSURING THE SUPPLY OF BIRDS FOR THE REINTRODUCTION OPERATIONS OF BEARDED VULTURES ON RELEASE SITES	**384 380,18 €**
01 - Personnel	126 219,35 €
02 - Travel and subsistence	12 502,39 €
03 - External assistance	193 948,85 €
04 - Durables goods	16 196,99 €
06 - Consumables	250,60 €
07 - Other costs	35 262,00 €

Sheet 2 A3/A4/C3/C4

Conservation

Improve food resource availability and accessibility for the Bearded Vulture

TOOLS DEVELOPED

- Example of methodology of «Inventory of potential sites for creating feeding places and Bearded Vulture-specific feeding sites» (LPO Aude, LIFE GYPCONNECT A4, 2016)/**Appendix 2.1**
- Feeding sites and Bearded Vulture protocol: Technical guide for adapting the management of feeding stations for the benefit of the species, installation and operation of specific feeding sites (LPO Aude, LIFE GYPCONNECT A3, 2016)/**Appendix 2.2**
- Standard file of «draft regularisation of the practice of natural rendering outside installation» (LPO Aude, LIFE GYPCONNECT C3, 2016)/**Appendix 2.3**
- Note for breeders on the state of health of carcasses deposit for feeding (CNITV, 2020)/**Appendix 2.4**

AVERAGE COST OF ACTION

€73,171.93

Issues at stake

Vultures are an important key element in natural and pastoral spaces. They are an essential link in the food web by recycling dead animals, reducing the risks of emergence and dispersion of pathogenic strains and undoubtedly playing a cultural, social and economic role in human societies.
Feeding mainly on bones, the Bearded Vulture is last in line for the consumption of corpses. Although the species is able to break bones that are too large to be eaten whole by dropping them on stones, it prefers small to medium-sized bones that are more easily ingestible. Bearded Vultures consume on average food made up of 70% bone, 25% soft tissue and 5% skin. Adults' daily food requirements account for between 5 and 10% of their total weight, depending on the seasons and the status of the individuals (i.e. for adults between 350 and 400 g during the breeding period and 250 to 300 g outside the breeding period; for chicks and juveniles from 100 g at the beginning of rearing to 500 g at the end). Unlike Griffon and Cinereous Vulture chicks fed partly on matter regurgitated by the parents, Bearded Vulture chicks are fed with chunks from the earliest age.
Based on geographical area, the species' food needs are totally or partially covered by mortalities in wild (ibex, mouflon, izard and chamois in the main and deer, roe deer and wild boar to a lesser extent) and domestic ungulate populations. The corpses of birds (pigeons, choughs, etc.) and small mammals (marmots, rodents) are also used, especially to feed the chick during the first weeks after hatching.
In spaces with insufficient food available, help can be envisaged using material from domestic breeding centres. The European regulations on natural rendering allow for the implementation of several types of installation and practices that can help to improve accessibility to the food resource for the vultures:

Bearded Vulture on feeding place © L. Giraud

Feeding places | **Bearded Vulture specific feeding sites** | **Natural rendering outside an installation**

Under the LIFE GYPCONNECT, it seemed necessary to ensure the accessibility and availability of local food resources with the aim of making territories more attractive to encourage the birds to settle and move between the different mountain ranges.

Griffons, Cinereous and Bearded Vultures feeding © L. Giraud

1. Feeding places

The feeding sites are individual installations (exceptionally a group of two or three breeders) for use only by the beneficiary breeder(s). They are supplied directly by the breeder in random fashion based on mortalities occurring on the farms. The regulations fix a maximum limit of 500 kg per deposit; this therefore mainly concerns sheep and goat farms, more exceptionally cattle (calves and young animals). The very nature of the deposits (entire corpses) means that the purpose of these installations is to encourage the entire guild of necrophagous raptors. They can only be set up in areas where vultures are present in order to ensure the rapid elimination of corpses. The deposit area servicing operations are under the control of the breeders benefit from the installations.

Feeding stations creation is coordinated by the manager (making contact with the breeder, station inspection, even help in putting together the file). The manager provides annual administrative follow-up in conjunction with the breeders and departmental veterinary services issuing the installation creation permit, to ensure system compliance and renew the prefectoral authorisation orders before they expire.

All regions involved from French pre-Alps to the Pyrenees already had a network of feeding places of varying sizes before the LIFE GYPCONNECT programme. The installations created supplemented the existing network. This type of installation also helps to reinforce or recreate the ancestral link between pastoralism and the vultures, which are natural renderers. These stations give the breeder both an economic (less costly for the breeder) and a practical (independent, effective mortality management) solution.

2. Bearded Vulture-specific feeding sites

Supplied only from bones, this type of installation was developed in 1995 in the Pyrenees chain to fix new pairs and improve breeding success. The specific feeding sites must provide additional food in winter in areas considered to have insufficient for the species they contain, increase the food attractiveness within specific areas deemed favourable for installing new pairs and encourage the survival of the young. The specific feeding sites are supplied solely with bones from butchering (15-20 kg per deposit), preferably sheep and goats, every ten days from end November to early May, when the flocks are absent from the high mountain pastures.

Under the LIFE GYPCONNECT, the purpose of the specific feeding sites is to encourage the exchanges and make up for the lack of farms in the priority routes of movements of birds between the different mountain ranges. It is important in this case to supply these installations all year around given the dispersion of juveniles from July and the vagrancy of non-settled immature and adult birds throughout the year.

The project beneficiaries responsible for the sites operate, service and monitor them.

3. Natural rendering outside an installation

Shepherds had recourse to vultures very early on, as they saw them as important allies in freeing the mountain pastures of dead animals and providing a free and efficient rendering service.

Recourse to natural rendering outside dedicated stations should be favoured for farmers practising extensive livestock farming in the open air (an area inaccessible to the traditional industrial rendering service) and for pastoral groups in high altitude summer pasture areas where this practice is already a reality. To date, despite being authorised by Regulation (EU) 142/2011, France still does not authorise this practice on the pretext of compliance with the Rural Code, which requires that all animal carcasses be sent to a rendering facility.

Actions and tools used

A **technical guide** on natural rendering and the Bearded Vulture specifically was prepared under Action A3 from the Technical Leaflet - Natural rendering republished in 2014 by LPO France. This document sets out aspects of this practice (history, objectives, legislative framework) and all aspects relating to the introduction and management of feeding sites. The operation, stipulations for choosing the installation location and the administrative framework governing the various practices are presented for each device. The main aim of this action was to have an updated, harmonised protocol as an essential reference tool in the locating (Action C3), operation and monitoring of different feeding areas (Action C4).

A **standard file for draft regularisation of the natural rendering practice outside an installation** has been prepared by LPO Aude with LPO France to which each partner can refer for his own demands.

It was necessary to carry out an **inventory prior to creating feeding sites** (Action A4) to obtain maps on the potential for the Bearded Vulture food resource in the areas of the LIFE GYPCONNECT intervention area. These maps give the LIFE beneficiaries the information required to select territories for the deployment and promotion of feeding areas and support the development strategy for feeding stations to make up effectively for the shortfalls in the Bearded Vulture food web. This advance step is essential in creating natural feeding sites for use in direction concrete actions C3.

Action C4 was intended to operate the network of feeding places and specific feeding sites in the territories of the LIFE intervention area. This action therefore involves all feeding sites created before and during the LIFE GYPCONNECT and encompasses the servicing and monitoring operations of the system introduced. Automatic cameras are used to monitor numbers visiting the stations. It is, however, direct observation is essential to note the activity surrounding the stations and respond to certain questions that cannot be elucidated by simply looking at photographs.

A **note** intended for breeders has been produced by CNITV to communication on focal points relating to the state of health of carcasses that are deposited on the feeding places (diseases, veterinary treatments, etc.).

Technical guide « Bearded Vulture and natural rendering »

Regulatory aspects

The interministerial Order of 7 August 1998 (OJ of 20 August) on the disposal of animal corpses and feeding necrophagous raptors sets the regulatory framework and the limits of the feeding of necrophagous raptors, in a context of conservation for scientific purposes. It acknowledges their positive role as health auxiliaries in the field of rendering. At departmental level, this text lays down the standards applied to the stations by the health control body, the Departmental Directorate for Social Cohesion and Protection of Populations (DDCSPP). This order therefore makes it possible, in compliance with the planned provisions, to create feeding sites as part of the scientific monitoring of the reintroduction or safeguarding of certain threatened animal species.

At European level, Decision 2005/830/EC of the European Commission implementing Regulation (EC) 1774/2002 amended defines the new rules applicable to Greece, Spain, France, Italy and Portugal regarding the food for necrophagous birds. Regulation (EU) 142/2011 lays down health rules as regards animal by-products and derived products not intended for human consumption and provides for derogations for feeding protected, threatened necrophagous birds living in their natural habitats on entire bodies or parts of dead animals containing specified risk material. This regulation authorises natural rendering outside a station. This new provision remains subject to the decisions by the French administration on its deployment and implementation modalities.

Constraints and difficulties encountered

⚠ Accessibility constraints for data on domestic flocks for the inventory work

⚠ Administrative constraints in creating sites from DDCSPP and local administrative complexities

⚠ Conflicts with wind development projects or other files

⚠ Constraints relating to LIFE imposing location of sites in Natura 2000 areas to take advantage of the eligibility for expenses inherent to creating a station

⚠ Constraints in supplying bones suitable for the species leading to storage and replenishment constraints: finding butchers to supply the bones (parameters that also come to bear in the choice of site locations)

⚠ Constraints in monitoring installations: limits of effectiveness of automatic cameras, mainly when dispersing bones outside the camera's field of vision.

Means and costs engaged

The costs presented match the miscellaneous expenses committed for implementing these actions:

- Expenses in preparing and publishing the technical guide
- Expenses in collecting and processing data to produce and facilitate a global overview of the inventory of potential areas for creating feeding stations
- Expenses related to the exploring and processing of plot authorisation applications and to the supervision
- Expenses in installing and developing sites
- Expenses in operating and monitoring sites

Provision must also be made to mobilise personnel (facilitator, local coordinator, branch manager, task officer, agent, etc.) and if necessary acquire equipment (freezers for storing foodstuffs, automatic cameras for monitoring stations). In some cases, provision must be made for budgets to bring in outside assistance to operate stations and monitor their visitor numbers.

The cost of creating a feeding place is of course proportional to the size of the enclosure and whether or not there is a concrete slab. It can also vary from a few hundred euros to nearly €2,000, depending on technical constraints (accessibility, topography, substrate quality, etc.).

COSTS ENGAGED IN THE 2016-2020 PERIOD	
A03 DRAFTING A PROTOCOL AND RECOMMENDATIONS FOR NATURAL RENDERING SITES	**4 088,25 €**
01 - Personnel	3640,81 €
07 - Other costs	447,44 €
A04 DRAWING UP AN INVENTORY OF POTENTIAL NATURAL RENDERING SITES AND "SPECIFIC BEARDED VULTURE" FEEDING SITES	**8 855,01 €**
01 - Personnel	6 835,60 €
02 - Travel and subsistence	401,97 €
03 - External assistance	1 617,44 €
C03 Améliorer la disponibilité et l'accessibilité à la ressource alimentaire	**63 650,93 €**
01 - Personnel	29 986,71 €
02 - Travel and subsistence	1 513,51 €
03 - External assistance	7 898,04 €
04 - Durables goods	12 765,38 €
06 - Consumables	10 887,29 €
07 - Other costs	600,00 €
C04 ENSURING FUNCTIONAL SITES, "SPECIFIC BEARDED VULTURE FEEDING SITES" AND POPULATION MONITORING	**216 093,51 €**
01 - Personnel	53 194,38 €
02 - Travel and subsistence	7 169,88 €
03 - External assistance	107 398,90 €
04 - Durables goods	45 841,47 €
06 - Consumables	2 376,97 €
07 - Other costs	111,91 €

Sheet 3 A5/C5

Conservation

Secure and neutralise the electrical installations deemed hazardous

TOOLS DEVELOPED

Methodological guide presenting the protocol «Inventory of electric sections hazardous and potentially hazardous for large raptors and the Bearded Vulture in particular» (LPO France Grands Causses branch, LIFE GYPCONNECT A5, 2015)/**Appendix 3.1**

Overview of inventory maps and summary tables of power line sections and pylons hazardous or potentially hazardous for the Bearded Vulture (LPO France Grands Causses branch, LIFE GYPCONNECT A5, 2017)/**Appendix 3.2**

AVERAGE COST OF ACTION

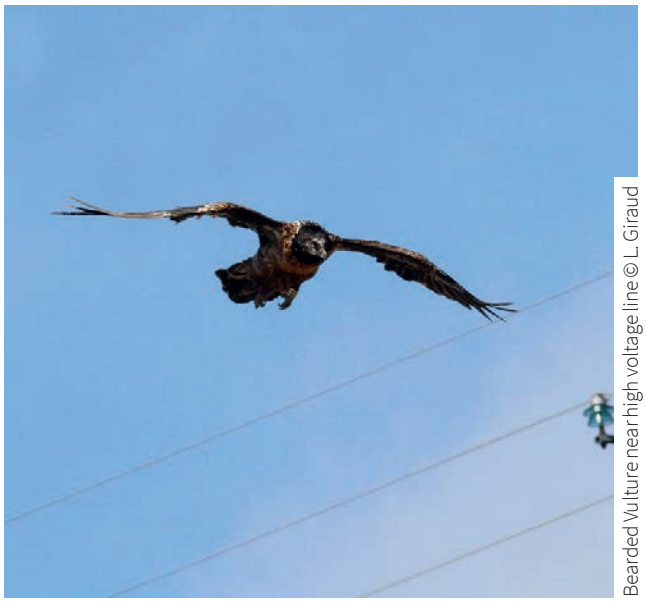
€144,384.09

Issues at stake

Overhead power lines can prove hazardous and fatal for birds when striking electrical distribution cables or during electrocution. Electrical installation strikes and electrocutions are among the leading causes of mortality in large raptors, especially the Bearded Vulture.

The risks from electrical networks vary according to whether they are very high voltage (VHV), high voltage (HV) or medium voltage (MV) lines. Very high voltage lines present a risk of being struck by birds when travelling. This risk is emphasised by the topography of territories where the electrical equipment is located and by the weather conditions, especially when the lines are low and arranged perpendicular to the travel routes. The HV and MV lines pose rather risks of strike and electrocution for the Bearded Vultures, given their flight behaviour of skimming over mountain ridges regularly crossed by power lines. The risk is particularly high for large species, such as the Bearded Vulture, which can simultaneously make contact with a part of their body with two phases (two conductors) or one phase (a cable) with an earthed conductor (the metal armouring attached to the pole).

Electrocuted Bearded Vulture © N. Ziletti



Bearded Vulture near high voltage line © L. Giraud

The LIFE GYPCONNECT programme planned for actions to reduce the threats weighing on the Bearded Vulture and large raptors in general, especially the threats posed by risks of strikes/collisions and electrocution.

It was therefore essential to continue the work of making safe electrical installations deemed hazardous by implementing necessary equipment works. Before this, to define priorities, there was a need to take an inventory and prioritise electrical equipment and sections deemed hazardous in certain high-stake departments in the LIFE intervention zone yet to have an up-to-date picture of the situation, in particular release sites, to reduce the threat of electrocution and strikes in these sectors.

Inventory of hazardous installations ▶ **Putting priorities in order** ▶ **Work on securing and neutralising sections**

Actions and tools used

1. Updating the protocol

The LIFE GYPCONNECT preparatory action A5 involved writing an updated **protocol** for the inventory of hazardous or potentially hazardous electrical sections. This protocol stems from both the experience and the knowledge acquired by the LPO France team and two protocols already developed under the National Wild Birds Committee (CNA) and previous LIFE projects on the Bearded Vulture. It also relies on feedback from action A3 (Take an inventory and prioritise the risks of strikes and electrocution) of the LIFE GypHelp no. LIFE 13 NAT/FR/000093 (2014-2018).

The at-risk structures are prioritised based on their intrinsic hazard level, their attractiveness to wild birds and their installation in the environment. The issues are shown in the form of a **mapping analysis and summary tables**.

This methodological guide can be adapted for all other study sectors and is also applicable to all large raptors.

Installation of equipement on a power line © L. Giraud

2. Inventory and prioritisation

The inventory has three stages:

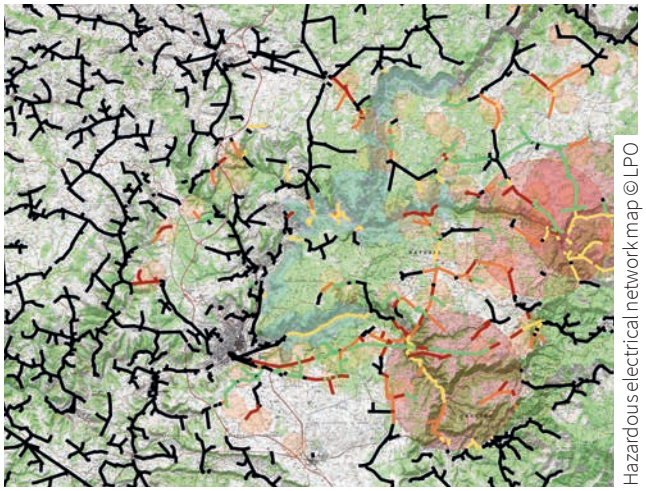
↘ Inventory of sections of power lines and pylons already equipped: mapping of layouts in the study sector (red and white wild bird spirals, spherical devices, candles, insulation/neutralisation, perches)

↘ Inventory of deadly power lines and pylons: inventory of bird mortalities, especially raptors in the study sector due to strikes or electrocution mobilising different regional players (nature protection associations, national parks, hunting federations, electricity transmission network managers). Field visits can be necessary to establish the topology of deadly sections: characteristics of the vegetation environment (forest, open environment, etc.), the topographical position (peak, slope discontinuity, etc.) and the technical characteristics of infrastructures.

↘ Exhaustive inventory of hazardous or potentially hazardous power lines and pylons For species with low population numbers like the Bearded Vulture, an inventory of infrastructures likely to cause further mortalities is essential to introduce preventive measures both inside and outside SPA. An initial inventory is taken according to the location/position of infrastructures with respect to the sensitive areas (movement area, sensitive species, major site, release site, community domain (nests), feeding sites (stations), etc.). A subsequent visit to the infrastructures can clarify and judge their hazard level related to the

Power line neutralization © L. Giraud

risks of strikes and electrocution using a variety of criteria (topography of the environment, geographical position, land use, surrounding vegetation, hazard level and attractiveness of the support, etc.).



Hazardous electrical network map © LPO

This work culminates in a final prioritisation of power line sections and pylons through a scoring system for each criterion. The sections have been classed in three priority levels: **1 - very high risk**; **2 - medium risk**; **3 - low risk**

3. Securing and development work

Neutralisation work to reduce and eliminate the risks from electrical equipment and sections (conservation action C5) is carried out based on preparatory study A5. This work must be used to prioritise wild bird sites to be made secure. This means fitting anti-collision devices to power lines and anti-electrocution devices to pylons. It also was used to envisage and programme power line burial sites.

This LIFE was a chance for ENEDIS Aveyron/Lozère to experiment with a new anti-collision tool: firefly devices. Aimed at reducing strikes and electrocution of raptors from power line cables, these experimental devices have a small coloured paddle that turns on itself through wind, thereby making the cables visible and audible to the birds. The device is fixed on the electric cable by a T-shaped plastic bracket. Care must be taken to position it perpendicular to the ground so that the firefly can move freely and not block.

Firefly device © L. Giraud

Regulatory aspects

Certain energy transmission infrastructure plans and projects can potentially affect one or more Natura 2000 sites included in the EU's Natura 2000 network or can have an impact on certain rare and threatened species that are protected by EU legislation. The Habitats and Birds directives fix the provisions to be complied with in such cases.

Constraints and difficulties encountered

⚠ Difficulty for the inventory in terms of exchanging mapping databases (mapping of power lines held by ENEDIS/RTE that should be given to LPO)

⚠ Difficulties for the prioritisation work that changes depending on the weather and noted mortalities. The qualitative assessment of lines already equipped has been added following the electrocution of a Bearded Vulture on a power line already fitted with bird protection

⚠ Making sure that the necessary work is carried out to guarantee the peace and quiet of the birds and minimise the risks of collision and accidents during helicopter transport to bring in or evacuate the equipment.

⚠ Budgetary constraints: the cost of making secure is very high and there is a huge number of hazardous lines. Sites to be conducted must be prioritised according to the budget allocated by ENEDIS.

⚠ Technical constraints: certain sections necessitate live work while the power supply is still connected and thus require special logistics (mobilising more agents, higher costs of technical installation equipment) whereas other work can take place with the power off.

⚠ Other technical constraints intrinsic to the installations covered by the work

Means and costs engaged

The costs presented match the miscellaneous expenses committed for implementing these actions:

↘ Expenses for updating the protocol, taking inventories and publishing maps

↘ Expenses for neutralisation work: equipment studies and installations, movements and routing; equipment (anti-collision and anti-electrocution equipment, cables, poles)

Provision must also be made to mobilise personnel and budgets to bring in outside assistance for the technicians who will be working on the sites.

COSTS ENGAGED IN THE 2016-2020 PERIOD	
A05 DRAWING UP AN INVENTORY OF DANGEROUS POWER LINES	**7 785,30 €**
01 - Personnel	3 679,84 €
02 - Travel and subsistence	445,76 €
04 - Durables goods	3 626,70 €
06 - Consumables	33,00 €
C05 SECURING AND NEUTRALIZING DANGEROUS ELECTRICAL INSTALLATIONS	**569 751,06 €**
01 - Personnel	28 105,55 €
02 - Travel and subsistence	1 241,98 €
03 - External assistance	366 933,30 €
04 - Durables goods	165 044,74 €
06 - Consumables	1 446,76 €
07 - Other costs	6 978,72 €

ANTI-COLLISION EQUIPMENT

↘ spirals devices (€25 each, one spiral every 15 m, i.e. €1.5k per km)

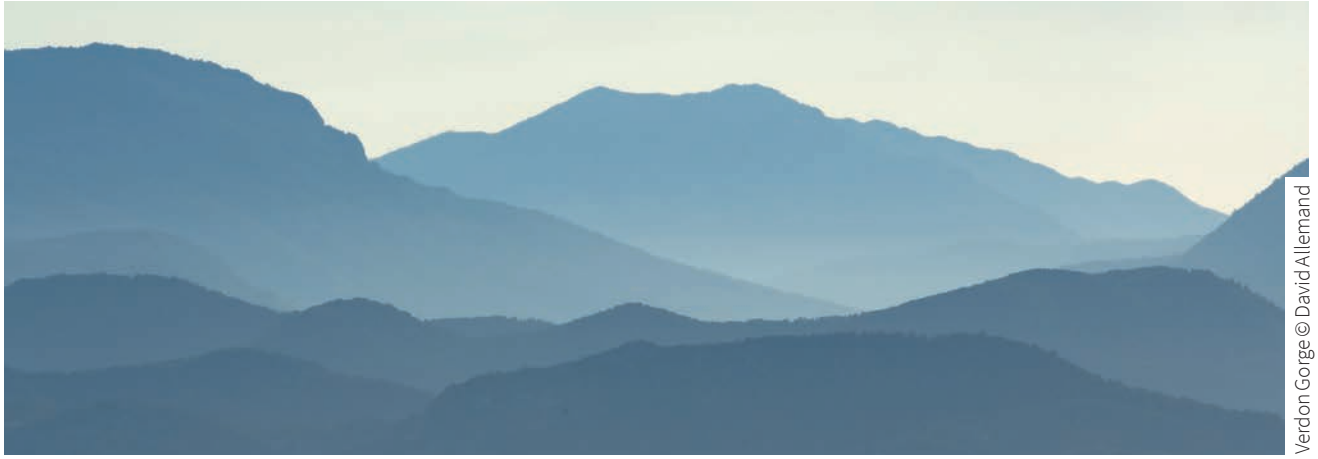
↘ spherical devices (€200 + cable trim, one beacon every 25 m, i.e. €7.2k per km)

↘ Firefly (€25 each)

ANTI-ELECTROCUTION EQUIPMENT

↘ phase protection system (€690 each)

↘ candle system (€80 each)



Verdon Gorge © David Allemand

Sheet 4 A6/C6

Conservation

Incorporate the Bearded Vulture issue into wind turbine development

TOOLS DEVELOPED

Analysis protocol: Assessment of vulture movement numbers and the risk of collision with wind farms in the South of France Assali C., Duriez O., Giraud L., LIFE GYPCONNECT A6, 2019/**Appendix 4.1**

Mapping catalogue of the Bearded Vulture's major susceptibility to the risks represented by wind power development, accompanied by scores on the issues at stake by species and by municipality, for all municipalities in metropolitan France/**Appendix 4.2**

AVERAGE COST OF ACTION

€15,046.66

Issues at stake

Many birds and bats are victims every year of wind turbine blades and ancillary arrangements of these installations. No cases of Bearded Vulture collisions in France have been documented due, firstly, to the limitations inherent in monitoring the impacts of wind farms and the recent development of these farms and, secondly, to the fact that the Bearded Vulture population features low numbers. Although several studies have been able to demonstrate the impacts of wind farms on other vulture species such as the Griffon Vulture, Black Vulture and Egyptian Vulture, the flight strategy of the Bearded Vulture exposes it particularly to wind risks.

As the central LIFE objective is to connect Alpine and Pyrenean populations, the Bearded Vultures are expected to follow the other species in the necrophagous guild and are more exposed to this risk. This new flow could lead to collisions and there should be new vigilance operating in this corridor.

The multiplication of wind turbines in both the species movement corridors and within its home range constitutes a real threat to the conservation of Bearded Vulture populations and the achievement of the LIFE GYPCONNECT objectives. Under the LIFE programme, it therefore seemed important to find solutions to reduce and eliminate the risks of collisions/strikes with pre-existing wind power installations and avoid all new risks.

A document was drafted to assist the structures working for the benefit of the natural heritage, the sponsors of wind turbine projects and the administrations in charge of processing these files in taking into account the issues in protecting and safeguarding the Bearded Vulture in the context of wind power development. The optimum aim is for wind turbine project applicants to give up submitting requests for authorisation within the perimeters of the LIFE GYPCONNECT intervention area.

Griffon Vulture killed by wind turbine © LPO

Actions and tools used

LIFE GYPCONNECT Action A6 involved mapping major sensitivity areas beneficial to the Bearded Vulture, backed up by a typological description of movement axes and corridors of birds identified between the three major territorial entities in the LIFE intervention area.

Based on the **methodology** developed and used by Olivier Duriez (CEFE CNRS in Montpellier) in 2017 to estimate the issues relating to risks of collision between vultures and wind turbines, the work conducted was used to update the individual and global home ranges for four species of vultures in the South of France within the Pyrenean, Causses, Alpine and Corsican mountain ranges.

The home ranges are calculated in two ways, each providing complementary information:

- how often the space is used by the population which provides information on how intensely the space is used by the population

↘ the index for number of visitors to the space by the population which provides more information on the population's foraging (routine) area

To produce maps showing potential collision risks, the issues relating to the attendance of the four vultures species for each municipality are illustrated by a scoring system based on the home ranges thus calculated.

Municipalities achieving high (5-7.5) to very high (7.5-10) scores for the issues at stake are overall in line with the municipalities where the territory is covered by core areas of global home ranges.

Secondly, a global issue score is calculated per municipality corresponding to the maximum score achieved by one of four species of culture within each municipality. Knowing that the low number of Egyptian Vultures monitored has a major influence on the issue in municipalities whose territory is frequented by an individual, a global «three species» issues score was also calculated for the three most represented vulture species: Griffon Vulture, Black Vulture and Bearded Vulture.

The results in the Pyrenean mountain range are still incomplete and further studies are necessary given that to date the number of birds fitted with GPS in France that visit this sector is too low. It is planned in future projects to fit more birds in this mountain range and incorporate the data from Spanish birds circulating in French territory to establish the same maps for the French Pyrenees.

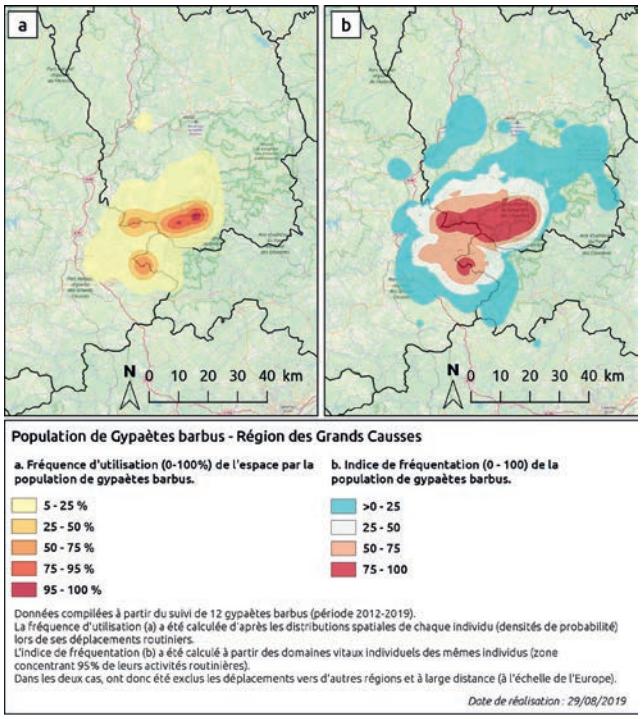
To make them easier to use, all the maps produced and issue scores have been compiled in a **mapping catalogue** of the Bearded Vulture's major susceptibility to the risks represented by wind power development

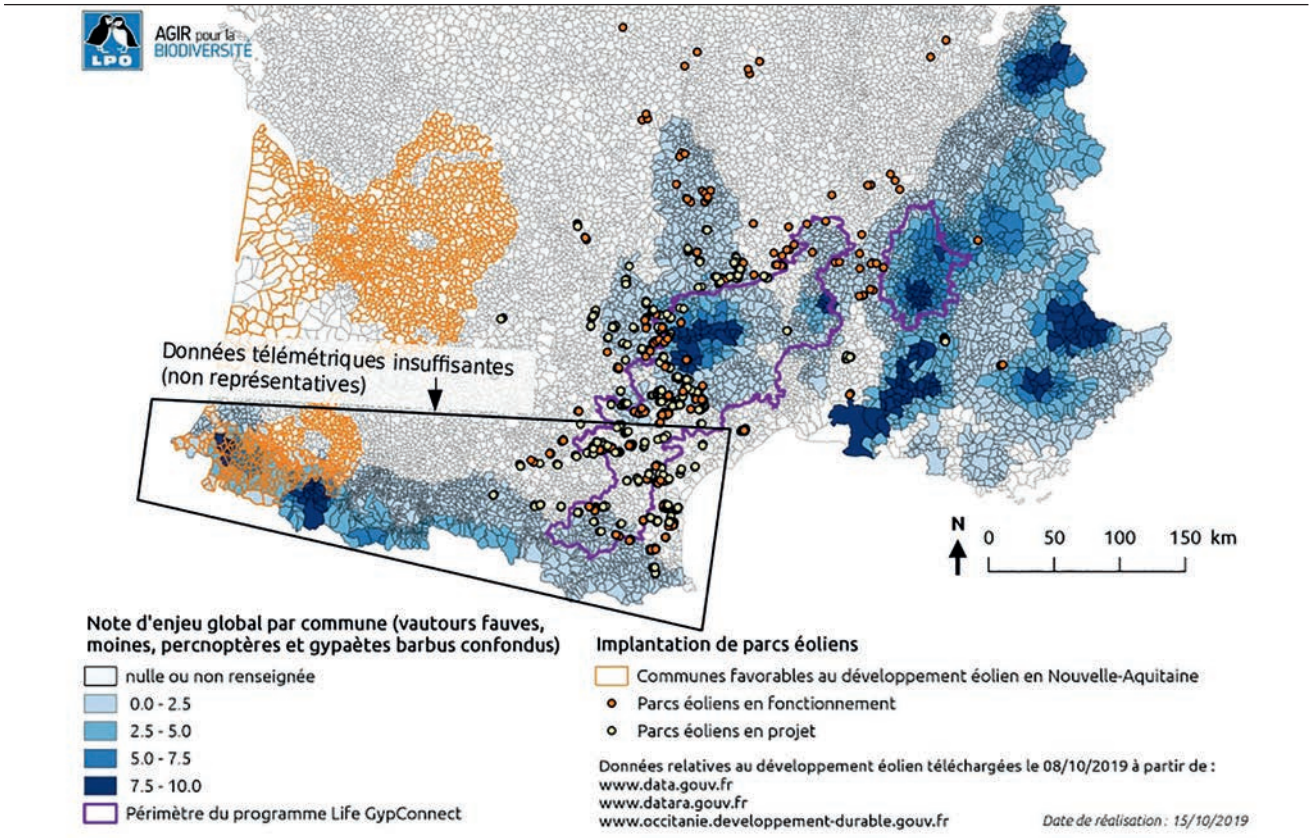
Taking maps of areas of major susceptibility of the Bearded Vulture and other vultures in the Regional Climate-Air-Energy Plan (SRCAE) of the regions in question (Action C6) into account can guide the strategic choices for new wind farm installations in regions where the interaction potential between vultures and wind turbines is well documented.

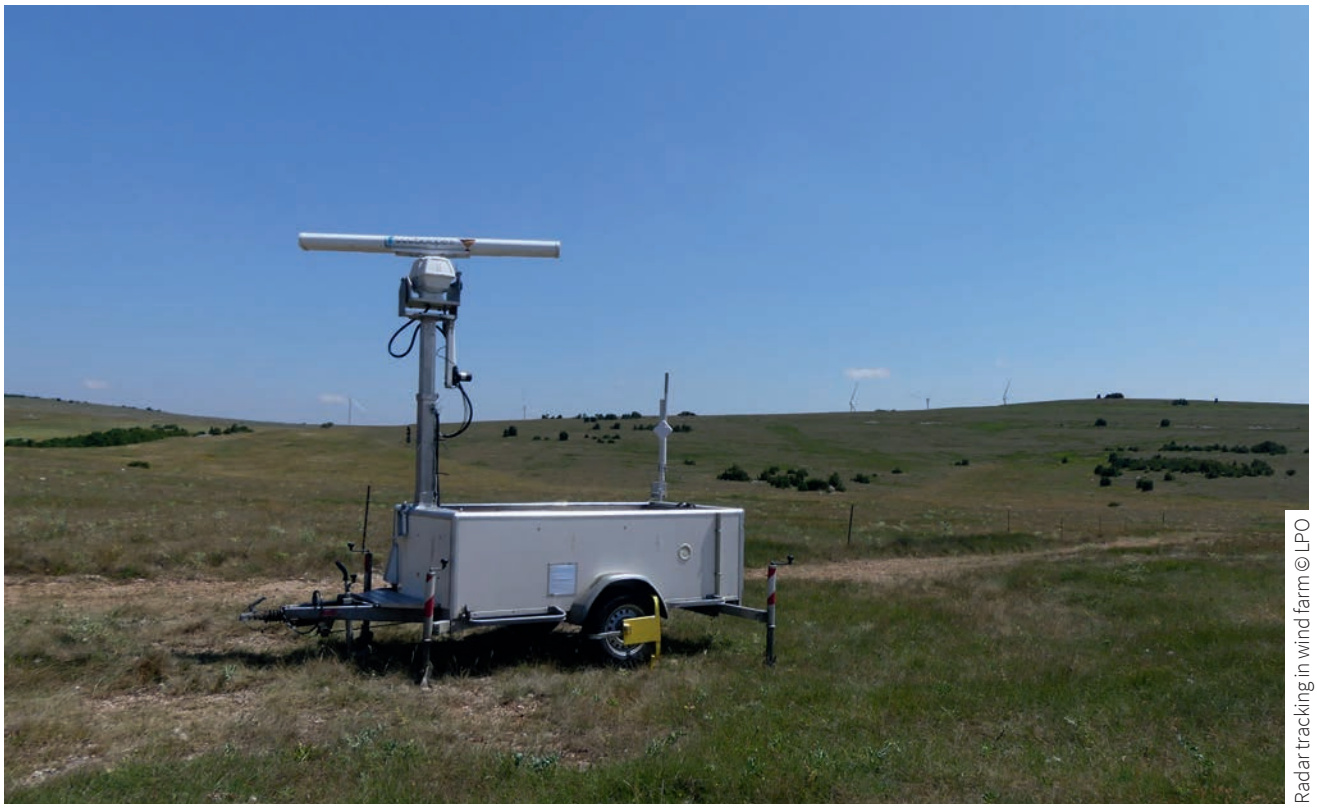
Under the avoid-reduce-compensate approach (French acronym ERC), developers and municipalities wishing to build new wind farms have to consider measures to:

↘ avoid: using the maps produced, it is important to avoid any wind turbine construction in municipalities with the highest risk (score higher than 5/10)

↘ reduce: for municipalities where the issue is in principle moderate or low (score lower than 5/10), the impact of wind farms can be further reduced by choosing sectors of the municipality where the impact will be lowest. Additional monitoring methods can localise the areas most susceptible







Radar tracking in wind farm © LPO

to wind turbine installation and take into account the impact on other birds and the bats.

To date, there are no compensation measures for tampering with vulture foraging areas by building wind farms. Measures to avoid and reduce risks must be include in a global adaptive management initiative, controlled by regular monitoring of mortalities. A national monitoring protocol for onshore wind farms has been prepared with the aim of standardising impact monitoring.

Under the LIFE GYPCONNECT, radar tracking in a wind farm where the impact mitigation measures were deemed insufficient was requested. This monitoring was intended to provide reliable data of bird numbers visiting this farm. It also involved coupling cameras (whose effectiveness still has to be demonstrated) installed by the operator with a radar tracking system and increasing the pressure of observation. The only techniques that seemed reliable and indispensable in terms of the conservation of large raptors on this wind turbine site were GPS telemetry (longitudinal tracking of known individuals) coupled with the use of radar.

Radar tracking is thus recognised as a powerful tool in studying bird behaviour. It can objectify all bird movements and detect and know the precise paths of movements during the day and at night. Although the species are unknown, all individuals within an 8 km radius can be detected easily and effectively, including small bird species, that can be detected more than 1000 m away. While visual techniques provide detailed information on the species, the number of individuals and their flight behaviour in the vicinity of the wind farm, radar can detect birds approaching the wind farm and provide precise information on passage distance and flight behaviour. This system is not invasive for the monitored species and is the only tool that can work effectively in all weather conditions (except during rainy periods), unlike the video camera system used increasingly on wind farms. The use of radar is more and more recommended in the vicinity of wind farms; studies of the number of wild birds visiting these sites during the day coupled with other monitoring methods (telemetric studies and field visits, etc.) can be carried out in good conditions.

Regulatory aspects

Given the lack of data on the species' collision with a wind turbine in Europe (according to Durr 05/2012), the Bearded Vulture has not been retained by France as a species sensitive to the wind turbine in the Wind turbine environmental monitoring guide and protocol (MEDEE, 2015), whereas this lack of mortality can be explained by very reduced numbers in its population.

In France, the race towards renewable energies supported by public policies to meet the goal of 30% green energy by 2030 (Grenelle Environment Forum) gives wind power developers a facilitating instruction framework. The installation of wind farms is subject to the regime of Installations Classified for the Protection of the Environment which is henceforth being processed by single authorisation. This supersedes the different procedures that were required and the multiple site issues they expressed. The many warnings by environmental managers is not enough to curb the unreasoned growth of wind power projects whose insufficient monitoring of mortality is widely denounced. Relaxing the appraisal procedures for wind turbine projects and reducing their processing time has made the possibilities for appealing against projects deemed prejudicial more complex and limited over time.

Constraints and difficulties encountered

⚠ Difficulties in collecting, processing and analysing data for defining issues.

• Limited method due to its direct dependence on the availability of telemetry data: the estimation of the interaction potential between vultures and wind turbines cannot be extrapolated outside areas visited by the monitored individuals. The issue scores obtained must be considered as the minimum values that may well change with the inclusion of more telemetric data. In addition, the least documented regions in terms of telemetric monitoring are home to numerous wind farms, both in operation and planned (Aude, for example).

• Limited availability of data on thermal potentials for use in considering more or less favourable flight conditions for an estimate that could be extrapolated outside the areas covered by telemetric data and to take movements of vultures in their dynamic environment into account.

⚠ Difficulties in ensuring effective watch over wind power development: to obtain results of monitoring mortalities in wind farms, to obtain data on current wind power projects and to make biodiversity issues heard by developers and prefectures.

Means and costs engaged

The costs presented match the miscellaneous expenses committed for implementing these actions:

↘ Expenses for collecting, processing and analysing data and then producing maps

↘ Expenses for publishing the results and disseminating the maps

↘ Expenses for participating in consultative bodies on wind power

Provision must also be made to mobilise personnel (local coordinator, branch manager, task officer, agent) and if necessary to purchase sets of mapping data.

The acquisition of telemetry data needed to conduct this type of analysis automatically gives rise to expenses for monitoring individuals (equipment, subscriptions, etc.).

COSTS ENGAGED IN THE 2016-2020 PERIOD	
A06 PRODUCING MAPPINGS OF THE PRESENCE OF BEARDED VULTURES AND THEIR INCLUSION IN WINDPOWER PLANNING AND INSTALLATION DOCUMENTS	**7 595,91 €**
01 - Personnel	6 423,62 €
02 - Travel and subsistence	852,99 €
06 - Consumables	319,30 €
C06 INCLUSION OF MAPPINGS OF HIGHLY SENSITIVE AREAS FOR THE BEARDED VULTURE IN WIND POWER PROGRAM PLANNING AND DEVELOPMENT	**52 590,72 €**
01 - Personnel	34 684,43 €
02 - Travel and subsistence	1 975,74 €
03 - External assistance	2 150,00 €
04 - Durables goods	13 763,75 €
07 - Other costs	16,80 €

Sheet 5 C7

Conservation

Monitor and combat the toxic threat

TOOLS DEVELOPED

Post mortem sheet (CNITV, 2020)/**Appendix 5.1**

Kit for collecting corpses of birds found in the life area (CNITV, LIFE GYPCONNECT C7, 2016)/**Appendix 5.2**

TOOLS DEVELOPED

€26,627.27

Issue at stake

Necrophagous raptors are particularly exposed to poisoning both by possibly ingesting carcasses from hunting or animals themselves killed by poisoning or malicious acts. The toxic threat can be expressed through unintentional and accidental acts or more usually deliberate and criminal acts. With the risks of collision/strikes and electrocution, poisoning is the most significant threat for this species (10% of the total known Bearded Vulture mortality in Europe); it also causes the most mortality in the Egyptian Vulture and Cinereous Vulture in Europe. Lead intoxication accounts for 5% of known mortalities in Europe for the Bearded Vulture.

Poisoning and intoxication are a major problem likely to affect the success of reintroduction projects such as the one conducted under LIFE GYPCONNECT. It was therefore necessary to boost the concrete actions of combating and watching out for the toxic threat in this context by implementing an efficient, coordinate anti-poisoning plan based on surveying bird mortality in the LIFE intervention territory. This surveillance is based on a national protocol for the recovery of carcasses and the mobilisation of players for the detection (civil society, field agents), collection (sworn agents, field agents with authorisation) and the analyses

Durzon found dead from Carbofuran poisoning © LPO

that can identify the cause of death (competent veterinary surgeons and laboratories). It must result in different actions being implemented to eliminate the reasons for mortality and make the instigators of malicious acts and imprudent users accountable.

Post mortems performed have identified different molecules responsible for poisoning raptors and the Bearded Vulture in particular in the LIFE GYPCONNECT project area:

- The first element responsible for poisoning noted under the LIFE is carbofuran, an insecticide molecule in the carbamate family used in agriculture and banned in France since 2008. And yet, this molecule continues to be found in poisoning cases. Carbofuran acts quickly and small quantities are sufficient to be fatal for all animal species that are very susceptible to it. Given the high toxicity of this molecule and its nature, this type of poisoning is viewed as intentional.
- The second cause of noted poisonings is lead (see Sheet 6).
- Anti-coagulants, or anti-vitamin K (AVK) are pesticide products used to control so-called «harmful» species in farms and private gardens. These compounds are likely to accumulate in the liver if ingested repeatedly. A wide variability of sensitivity between species is recorded, which makes it difficult to define a toxic dose. There are eight anti-coagulant molecules used as pesticides in France but only bromadiolone is authorised outdoors. Raptors seem to be the most exposed compared with the necrophagous species given their diet. The consumption of small rodents (AVK targets) by birds of prey seems to be the main source of contamination but the vultures do not for all that escape exposure to anti-coagulant rodenticides. The sources of exposure to AVK for vultures requires further investigation. To date, knowledge of the susceptibility of birds to anti-coagulants cannot make a direct link between AVK contamination and the cause of mortality.
- Veterinary euthanising products have also been identified as responsible for the intoxication of a Griffon Vulture. Ingesting dead animals euthanised with these products can cause significant neurological disorders that can lead to flight incapacitation, a potentially fatal fall of the animal or cardiac arrest. It is therefore important to take care not to make this type of corpse available to the necrophagous birds.

Poisoning is the second reason for mortality in reintroduction projects, which have sometimes been suspended for investigation to limit the risks. Mortality surveillance is therefore especially important as projects can be adapted to threats identified.

These mortality cases are rarely detected without GPS trackers. This equipment facilitates the detection of abnormally immobile individuals and teams can react more quickly to find the bird. If the bird is alive, quick action can provide the care needed for it to survive; if it is dead, it is important to recover the body as quickly as possible so that the state of preservation of the body allows a post mortem to be carried out.

As natural renderers, the Bearded Vulture and other raptors in the necrophagous guild consume farm animals. Thus, in view of the profound changes in animal husbandry and the transformation of veterinary practices from individual symptomatic medicine to preventive herd medicine, it seemed necessary to look into the environmental risk linked to these veterinary practices in animal husbandry and in particular the use of certain medicines such as antibiotics, anti-inflammatories and anti-parasites and their impact on wildlife. Non-steroid anti-inflammatories in particular are toxic to necrophagous raptors. It is primordial and essential to raise the awareness of everyone involved (farmers, veterinarian and also health protection groups, chambers of agriculture, etc.) to the environmental risks. Reasonable use of health and veterinary products must also be promoted.

Actions and tools used

Action C7 under LIFE GYPCONNECT involved surveillance to identify the toxic risks and be able to propose management actions to combat this threat. To do this, the LIFE project team relied on detecting the mortality of Bearded Vultures and other large raptors acting as sentinel species and then determining the causes of death, be of chemical, infectious, parasitic or other origin. Responsible for coordinating this action, the National Centre for Veterinary Toxicological Information (CNITV) is also involved in performing post mortems, interpreting toxicological results and suggesting ways of trying to limit the impact of the toxic threat to the preservation of species.

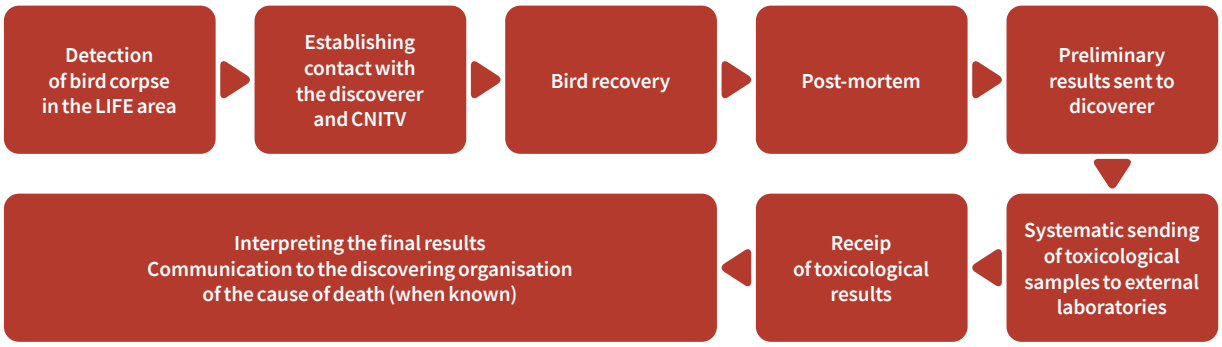
This action is part of the epidemiological surveillance of bird diseases subject to a national action plan set up on the territory. The surveillance of risks of contamination and poisoning of necrophagous raptors, called «Poison watch», relies on a network of observers that reports and collects raptor corpses. A committee of specialists made up of veterinary surgeons, toxicologists and ornithologists analyses the results of post mortems and toxicological research by specialist laboratories.

CNITV has defined a protocol for taking in charge a bird found dead in the LIFE area. This protocol can be transposed to other species and/or other «wildlife» projects.

To facilitate the interpretation of the necropsy results, it is important that the person who finds the animal sends through the signalment, i.e. the most complete description possible of the discovery of the corpse (time, precise location, date, state and position of the animal at the time of discovery, surrounding environment, etc.) accompanied by photos.

It can happen that this chain is broken before the bird is recovered. After detecting the bird, the French Biodiversity Agency (OFB) agents are contacted as soon as malicious acts are suspected (poisoning, shooting). The bird is then put under seal and subject to the constraints of judicial enquiries.

A **kit for collecting** bird corpses has also been developed under this action.



Protocol for taking in charge a bird found dead in the LIFE area

Regulatory aspects

The legislation prohibits any detention, transport or handling of dead or living wild animals by non-licensed persons (Environment Code, mainly Articles L411-1 to L411-6, L424-9 and L425-6 to L425-13). This licence can be permanent (sworn persons such as French Biodiversity Agency (OFB) agents, national park wardens, representatives of the authorities, etc.), semi-permanent or regularly renewable (green card holders) or sporadic on special request under CITES.

In addition, the detention, transport of handling of dead or living wild animals necessitates following strict health protocols to avoid any propagation of zoonotic diseases.

Under LIFE GYPCONNECT, agents working in the field to recover and transport corpses are either sworn personnel or hold a green card. Post mortems and sampling of corpses are performed by veterinary surgeons holding a green card and fulfilling ad hoc health conditions:

- following the harmonised post mortem protocol
- complying with hygiene and biosafety rules
- keeping samples for a second opinion
- sending corpses for rendering after post mortems and sampling

Laboratories operating under LIFE are accredited veterinary laboratories, with quality protocols meeting the need for reliable, repeatable results.

Judicial enquiries have to comply with additional rules (sealing, protocol for lodging complaints, swearing of oaths, right of reserve, etc.). These ensure the legal conduct of the enquiry but can lead to considerable delays in obtaining the results needed to manage the causes of death and the fight against malevolence.

Bearded Vulture © Ghislaine et Thierry Nicaise

Constraints and difficulties encountered

⚠ Difficulties in detecting and finding dead birds which can often be opportunistic or using GPS data for birds fitted with trackers.
⚠ Constraints linked to the need for a good conservation state of the corpse for the post mortem: quick response in recovering corpses (rapid decomposition of corpses during summer heat) and storing corpses before CNITV recovers the bird.
⚠ Considerably extended deadlines in obtaining analysis results from judicial enquiries.
⚠ Difficulties in actions by beneficiaries given the duty of reserve of judicial enquiries.

Means and costs engaged

The costs presented match the miscellaneous expenses committed for implementing this action:
↘ Expenses in collecting and transferring corpses
↘ Expenses for radiographs, post mortems, sample collecting and sending them to the analysis laboratories
↘ Expenses for standardising the protocol and producing an official collection kit.
↘ Expenses in maintaining a mortality database
↘ Expenses for results analyses and summaries (entrusted to specialist laboratories as outside assistance)
Provision must also be made to mobilise personnel (local coordinator, branch manager, task officer, agent) and if necessary acquire equipment for the corpse collection kit and corpse storage (freezers, gloves, freezer bags, masks, etc.).

COSTS ENGAGED IN THE 2016-2020 PERIOD	
C07 REINFORCE CONCRETE ACTIONS TO FIGHT AND MONITOR TOXIC THREATS	**106 509,07 €**
01 - Personnel	55 535,96 €
02 - Travel and subsistence	14 063,56 €
03 - External assistance	33 472,51 €
04 - Durables goods	1 103,17 €
06 - Consumables	1 889,76 €
07 - Other costs	444,11 €

Sheet 6 C8

Conservation

Toward the use of lead-free ammunition

TOOLS DEVELOPED

Awareness-raising video: available in the documentary base on the Life GYPCONNECT Internet site *https://gypaetebarbu.fr/life-gypconnect/*

Booklet to assist in choosing alternative ammunition/**Appendix 6.1**

Production of miscellaneous documents for implementing the action, available in appendices to the document «Parc national des Cévennes, LIFE GYPCONNECT Deliverable C8, 2019»: awareness-raising survey questionnaire [15], satisfaction survey [16], shooting sheet template [17], action participation convention template [18]/**Appendix 6.2**

AVERAGE COST OF ACTION

€8,587.74

Issues at stake

Lead is a toxic metal for all vertebrates and is a hazard to wildlife. It is one of the major threats to scavenging raptors worldwide.

At the end of the food chain, vultures are exposed to lead lead intoxication by ingesting lead fragments from the flesh or bones of unrecovered animal or hunting waste, or contaminated tissue. The acidity of gastric juices, especially those of necrophagous birds like vultures, dissolves the lead which is then absorbed. Confused with calcium by the organism, the lead then enters the bloodstream and is fixed in the tissues of organs like the liver or kidneys. It is then stored in the bones for several years, testifying to past exposure. During an event such as egg-laying, bone calcium can be remobilised and lead can be re-circulated. As bones are the preferred location for storing the lead, the Bearded Vulture is even more exposed than the other necrophagous raptors given its feeding habits.

Lead poisoning, occurs when high levels of lead are found in the blood, but the time for symptoms to appear will depend on several factors such as the amount of lead, the weight of the animal, its species, its physical condition and so on.

Three types of poisoning are thus possible:

↘ Acute poisoning: birds are found in good body condition, with one or more of the following signs: muscle weakness and hypo or hyper neurological disorders (e.g. paralysis or convulsions), deafness, impaired vision, abundant green urine and biliverdinaemia and respiratory distress.

↘ Chronic poisoning: the birds are cachectic, weak, anaemic, with low protein, digestive stasis and biliverdinaemia and listlessness.

↘ Sub-clinical poisoning: birds are found in varying states of weight and are typically admitted for some other cause (such as collision with a vehicle or trauma). They express few symptoms of poisoning or none at all.

Category	➲ Clinical significance	➲ Level of lead in the liver
non-acute toxic dose	Environmental exposure	< 6 µg/g (dry mass)
Potentially toxic dose, the effects of which are still poorly known	Possible sub-clinical poisoning	6 à 20 µg/g (dry mass)
Toxic dose	Clinical poisoning	> 20 µg/g (dry mass)

Interpretation table of lead levels in the liver

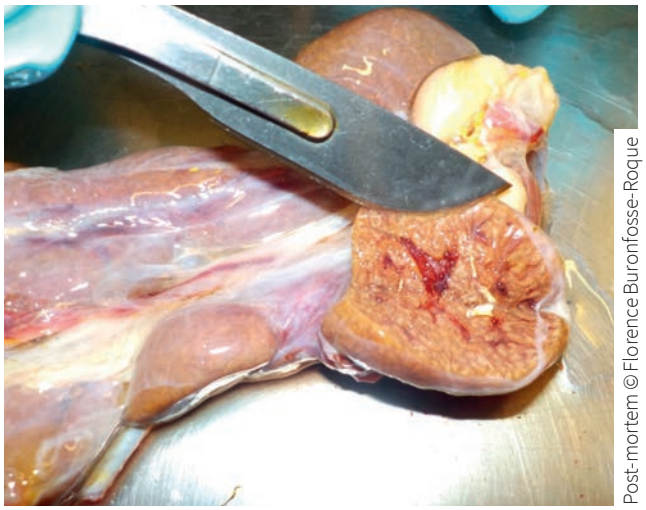
The amount of lead in the liver can define the toxicity categories presented in the next table.

Below 6 µg/g of lead in the liver, there is mainly little environmental contamination, with no impact on the health of the animal.

Above 20 µg/g, lead can clearly be incriminated as the primary cause of death. The bird may then have shown the symptoms described above before its death. As wild animals are able to conceal signs of their vulnerability for as long as possible, these disorders may, however, go unnoticed and death may be attributed to another cause (notably violent trauma), in fact following poisoning.

Between these two thresholds, it is accepted that lead can play a role as a mortality factor by tampering with the animal's capacities, with an even greater probability the closer you get to toxic doses. However, there are still insufficient data on this topic to achieve a better analysis.

Lead affects reproduction and the ability to learn and fly. Studies have shown that chronic exposure to lead causes neurological and psychomotor disorders that can reduce



Post-mortem © Florence Buronfosse-Roque

the ability of raptors to move around and avoid obstacles.
Lead from hunting ammunition is one of the main sources of lead poisoning in large raptors. The most important exposure method is secondary absorption through consuming carcasses containing pellet fragments or small-calibre pellets (shot) or heavily contaminated tissue. Hunting waste is another risk factor for the scavengers. Lead poisoning in much rarer cases can result directly from illegally shooting the bird when the lead is found in a highly vascularised anatomical area. In LIFE GYPCONNET, a vulture is dead of lead poisoning after being shot: a pellet had lodged in one of its kidneys.
Under LIFE GYPCONNECT, it therefore seemed necessary to make the hunting world aware of the problem of lead poisoning and the spread of lead in food webs and proposed solutions aimed at a profound change in practices to reduce or even eliminate the risks of exposure and lead poisoning of Bearded Vultures and large raptors in general.

Actions and tools used

Experiments in using lead-free ammunition was initiated under Action C8 of LIFE GYPCONNECT by the Parc national des Cévennes in conjunction with the Lozère departmental hunting federation. The goal of these experiments was to make the hunting world aware of the problem of lead poisoning, especially the impact of using lead cartridges on necrophagous raptors in particular, and to reiterate also the risk for people who eat meat hunted with lead ammunition. It aimed to promote the use of alternative ammunition for large game hunting by raising awareness of their performance through in-field testing.
This type of lead-free ammunition testing has also been used in two other European programmes in France: Life GypHelp (Alps, Haute-Savoie) and Interreg EcoGyp (French and Catalan Pyrenees).
This involved experimenting with the use of lead-free ammunition in two hunting campaigns by two hunting teams from the territory of the Parc national des Cévennes, near release sites of Bearded Vultures. The aim is to see to what extent, after information and use of this type of ammunition, volunteer hunters would be prepared to continue using it. Various blocking points were raised during discussions with the hunters: in principle important when facing something new in practice (habits to be changed, scepticism about the performance of lead-free ammunition); technical aspects requiring learning, framework (new gun settings, possible need to change weapons); higher cost than conventional lead bullets. These experiments had to answer potential questions raised by hunters, especially relating to the technical performance of lead-free ammunition compared with lead ammunition and the cost involved in switching to lead-free ammunition. The results of the study show that the cost of alternative ammunition is on average 44.5% more expensive than lead ammunition, but this cost varies greatly depending on the calibres and types of ammunition used. A ballistics expert was included in the experiments to ensure technical monitoring throughout the operation.
Most hunters who took part in the shooting tests in the experiments were satisfied with the use and performance of these bullets. The technical aspect (adaptation, new settings) and cost both require further improvement to convince hunters completely and encourage them to use lead-free ammunition. Moving to the use of lead-free ammunition is not possible without major work to raise awareness of and communicate with the main users in question - the hunters. A **video** tracing the approach to these experiments has been produced to report on the results, communicate on this operation and promote the use of alternative ammunition. A **booklet** to assist in choosing alternative ammunition, based on calibres and hunting methods, has also been published. These two types of tool were chosen to guarantee their use by the targeted public, i.e. everyone involved in the world of hunting. The film is intended for hunters, institutions and the general public.

Public meeting © PCN

The different stages of experiment

Regulatory aspects

Fragments of lead from hunting bullets found in the bodies of large game not recovered or injured is therefore a potential threat identified for the Bearded Vulture and for all necrophagous raptors. The ministerial Order of 1 June 2006 bans the use of lead shot in the wetlands mentioned in Article L.424-6 of the Environment Code in France but shooting large game with lead bullets is still permitted in these areas. A survey report dated 12 September 2018 from the European Chemicals Agency (A review of the available information on lead in shot used in terrestrial environments, in ammunition and in fishing tackle) estimated that 14,000 tonnes of lead shot are dispersed every year in terrestrial areas in Europe and that lead ammunition is the main source of environmental contamination from non-regulated lead. In Europe, lead ammunition is banned in Belgium, Denmark, Norway and the Netherlands. In 2020 the European Parliament banned the use of lead ammunition in all EU wetlands. States have 24 months to bring this ban into force.

Bearded Vulture © Bruno Berthémy

Constraints and difficulties encountered

⚠ Limited choice of alternative ammunition in conjunction with the huge range of calibres and ammunition used by volunteer hunters (multi-criteria approach: technical, financial)

⚠ Discussions and regular communication complicated with volunteer hunters

Means and costs engaged

The costs presented match the miscellaneous expenses committed for implementing this action:

↘ Expenses to mobilise a ballistics expert.

↘ Expenses in implementing the experiments.

↘ Expenses in producing awareness-raising tools, promoting the action and broadcasting the results.

Provision must also be made to mobilise personnel (agent, local coordinator, branch manager, task officer) and acquire equipment for lead-free ammunition experiments.

Lead-free ammunition © LPO

COSTS ENGAGED IN THE 2016-2020 PERIOD	
C08 EXPERIMENTING LEAD-FREE AMMUNITIONS	**34 350,96 €**
01 - Personnel	26 422,98 €
02 - Travel and subsistence	1 037,52 €
03 - External assistance	6 890,47 €

Sheet 7 C9

Conservation

Care for distressed birds

TOOLS DEVELOPED

Protocol for taking care of distressed Bearded Vultures under LIFE GYPCONNECT in French and English (LPO France, LIFE GYPCONNECT Deliverable C9, v2 2018)/**Appendix 7.1**

AVERAGE COST OF ACTION

€6,977.50

Issues at stake

The Bearded Vulture is a very fragile species. Its populations feature low numbers with a breeding strategy based on the longevity of adults, late sexual maturity, extremely low breeding success and low productivity of fledglings. Any loss of an individual can therefore have dire consequences for all its wild populations, as each bird has an inestimable heritage value.

From an ethical point of view, everything possible must be done to set an injured bird free again or, failing that, to use it in a conservation programme to help restore wild populations of Bearded Vultures.

It therefore seemed necessary to boost the efficiency of the bird care network and the surveillance mesh to deal with any Bearded Vulture in distress.

Actions and tools used

When a distressed individual is recovered (injured, sick, exhausted or a young bird that has fallen out of the nest), an appropriate procedure should be defined to assist managers in the various LIFE territories to make the best decisions and coordinate the care of the birds in the best possible way. This relies on a network of competent professionals and accredited rescue centres equipped to receive Bearded Vultures placed at the service of the programme and its beneficiaries.

A protocol has been written based on existing documents and experience acquired by the beneficiaries and submitted to a committee of experts. This **protocol** forms part of the goal to ensure the survival of recovered individuals and also to find out more about and reduce the threats to the Bearded Vulture in the programme's territory and beyond. It is based mainly on a protocol already drafted under the Bearded Vulture national action plan which needed to be updated.

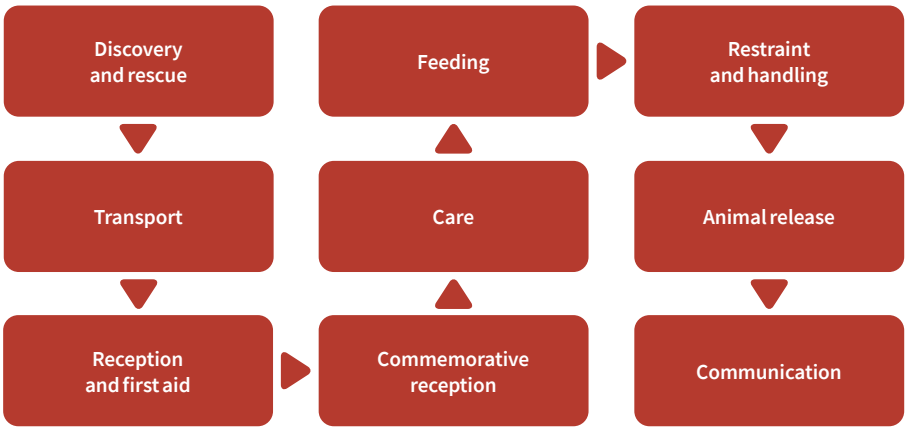
This involves transport and care in conditions that do not aggravate the birds' condition and generate as little stress as possible. The ultimate goal at the end of this process is to return to their natural environment individuals who are viable, self-supporting and free from dependence on man.

Experience has shown that wild Bearded Vultures in remission have particular need of visual contact with their cogeners. Without this they stop eating and end up dying. The presence of other Bearded Vultures, or failing that another species of raptor, helps the remission of the bird significantly. The injured Bearded Vulture will also need an accessible nest so that it can rest whilst it convalesces. Intensive treatments such as surgery must be carried out as much as possible at the beginning of the bird's care and only if the Bearded Vulture's life is threatened (open fracture, etc.).

Rescued Bearded Vulture © VCF

The accredited rescue centres and referring veterinary surgeons are listed in the appendix to this protocol.

The VCF played a large role in providing beneficiaries, care centres and veterinary surgeons with advice and technical support for this action.



Rescue Protocol for Bearded Vultures in distress

Regulatory aspects

References to miscellaneous administrative documents necessary in caring for birds are also appended to this protocol:

↘ The request for authorisation to capture and transport specimens of protected animal species (Cerfa 11629*02) from DREAL

↘ The request for authorisation to transport with a view to releasing into the wild specimens of protected animal species (Cerfa 11630*02) from DREAL

↘ The certificate of transfer of non-domestic animals in case of placement of a bird that cannot be released and must be placed in an authorised structure (Cerfa 14367*01).

Constraints and difficulties encountered

⚠ Difficulties in monitoring the birds assiduously and the ability to recover the bird in distress quickly:

- visual observations of birds released before and after fledging,
- monitoring GPS data of released birds (checked every day),
- checking movements,
- quick response when an anomaly is suspected,
- intervention ability (speed, good knowledge of the territory and access)
- suitability of physical resources in transporting Bearded Vultures

Means and costs engaged

The costs presented match the miscellaneous expenses committed for implementing this action:

↘ Expenses for updating the protocol

↘ Expenses for transporting and caring for birds in distress

Provision must also be made to mobilise personnel and, if necessary, acquire bird transport carriers and photographic traps. It may also be necessary to plan for outside assistance budgets to help care for birds and cover the expenses of accredited and veterinary care centres.

COSTS ENGAGED IN THE 2016-2020 PERIOD	
C09 ENSURING THE MANAGEMENT OF BIRDS IN DISTRESS	**27 910,00 €**
01 - Personnel	18 279,94 €
02 - Travel and subsistence	1 268,35 €
03 - External assistance	5 586,76 €
04 - Durables goods	2 617,54 €
06 - Consumables	157,40 €

Sheet 8 C10

Conservation

Limit sources of disturbance and nuisances from human activities

TOOLS DEVELOPED

Methodology for identifying threats/**Appendix 8.1**

AVERAGE COST OF ACTION

€31,081.95

Issues at stake

The Bearded Vulture is a species that is very sensitive to disturbance during resting, movements, feeding and breeding. Many human activities can affect it, causing the birds to abandon the most vulnerable sites in the long term, or affect their breeding.

To encourage the establishment of breeding populations, it is essential to ensure the tranquillity and therefore the attractiveness of the sites used by Bearded Vultures and to maintain the safety of the birds reintroduced under the LIFE GYPCONNECT programme.

The goal of action C10 was to implement all necessary means to maintain the tranquillity of sites used by large raptors, including the Bearded Vulture, within the LIFE perimeter. This means limiting the sources of disturbance and nuisances from human activities and consolidating partnerships and information and awareness-raising actions with and towards players in the LIFE territories.

Secondly, this action can also secure the Bearded Vulture release sites during reintroduction operations.

Throughout the LIFE (2015-2021), beneficiaries in charge of managing sites used by the large raptors have taken an annual inventory of noted or potential threats, to compile all useful data in listing the risks that weigh on these populations every year. It also involves gaining a better understanding of the environmental contexts that govern each site and finally to encourage the settlement of Bearded Vultures and other large raptors on their preferred sites and the sustainability of their populations.

The results are used to identify site conservation issues and, above all, to testify to actions implemented or measures required to prevent, limit or neutralise these sources of disturbance and nuisances created by humans at local and national level.

Actions and tools used

A common **Methodology** has been defined and was used by all beneficiaries involved in the implementation of action 10 in advance to identify threats and carry out the inventory, whilst taking into account the specific features of each sector. Different information is provided:

- Source of disturbance
- Type of threat
- Qualification of the site in question
- Geolocalisation
- Period/date
- Intensity, extent of the threat and description of the impact
- Actions implemented and
- Implementation date/period
- Additional comments

A summary of annual inventories for each site is used to identify the main threats for each territory and to present the results of measures undertaken to reduce or eliminate the disturbances.

1. Identifying the threats

Surveillance on the ground and links established with users and managers of the territories enable LIFE operators to identify and prevent potential threats.

Each beneficiary records any threat weighing on necrophagous raptor populations on his intervention site or any disturbance noted.

What activities?

Different types of activity have been identified: outdoor sports (trail running, climbing, mountain biking, freeflying, base jumping), hunting, photography and naturalist observation, flying (aircraft, helicopter, plane, drone, ultralight, etc.), wind farms and wind farm projects, power lines, photovoltaic park projects, silvicultural work, road maintenance and development work, straying dogs and prescribed burning.

2. Limiting or neutralising the sources of disturbance and nuisance

On the basis of identified potential or proven threats, measures are implemented to reduce or even eliminate the risks of disturbance and human-related nuisance for the Bearded Vulture and large raptors.

What actions implemented?

↘ Securing release sites

↘ Setting up majority sensitive areas for release, settlement and breeding sites and disseminating information on the sensitivity of the sector and the restrictions on intervention inherent to these sites to all those involved.

↘ Boosting the monitoring of populations and surveillance of rest, feeding and breeding sites

↘ Ensuring compliance with the regulations

↘ Participating in regulatory supervision and consultation actions relating to the projects, plans or programmes

↘ Consultation: establishing site management conventions, instigating dialogue with the players, involving some players in the site management, neutralising the threats on sites used by large raptors, postponement of works and developments.

↘ Awareness-raising: information/training campaign, awareness-raising and mediation actions

Major sensitivity areas are set up in each known breeding site to identify and take into account the most sensitive areas where any disturbance during the nesting period (between November and August for the Bearded Vulture) can lead to abandoned nests and breeding failure. The most critical period is laying, brooding and the first rearing period. Major sensitivity areas are also set up for equally sensitive release and settlement sites.

There are two types of major sensitivity area: core areas and buffer areas, corresponding to the sensitivity distances of the species in question.

Protection area © LPO

Regulatory aspects

In France, the Bearded Vulture is protected by application of Articles L.411-1 and L.411-2 of the Environment Code and by the Order of 29 October 2009 establishing the list of protected birds throughout the country and the modalities for their protection. Article 3 stipulates especially that:

«I.- The following are prohibited throughout metropolitan France and at all times: the intentional destruction or removal of eggs and nests; the intentional destruction, mutilation, capture or removal of birds in the natural environment; the intentional disturbance of birds, particularly during the period of reproduction and dependence, provided that the disturbance jeopardises the proper fulfilment of the biological cycles of the species in question.

II. - The destruction, alteration or degradation of breeding sites and resting places of animals shall be prohibited in the parts of the metropolitan territory where the species is present as well as in the area of natural movement of existing core populations. These prohibitions apply to physical or biological elements deemed necessary for the reproduction or resting of the species in question, as long as they are actually used or usable during the successive breeding or resting cycles of that species and insofar as the destruction, alteration or deterioration jeopardises the proper accomplishment of these biological cycles.» In addition, different regulatory tools currently exist in the Environment Code that can support the actions to limit disturbances/nuisances (e.g. Order of 12 December 2005 banning the intentional disturbance of the Bearded Vulture).

Constraints and difficulties encountered

⚠ Difficulties in preparing an exhaustive list of threats and exhaustive listing of potential disturbance cases (limit of a territory's surveillance capacities) and in estimating the intensity of threats

⚠ Difficulty in assessing the potential disturbance of certain activities (subjective description of bird reactions)

⚠ Communication and mediation difficulties, mainly in practising activities outside federations or local management structures

Means and costs engaged

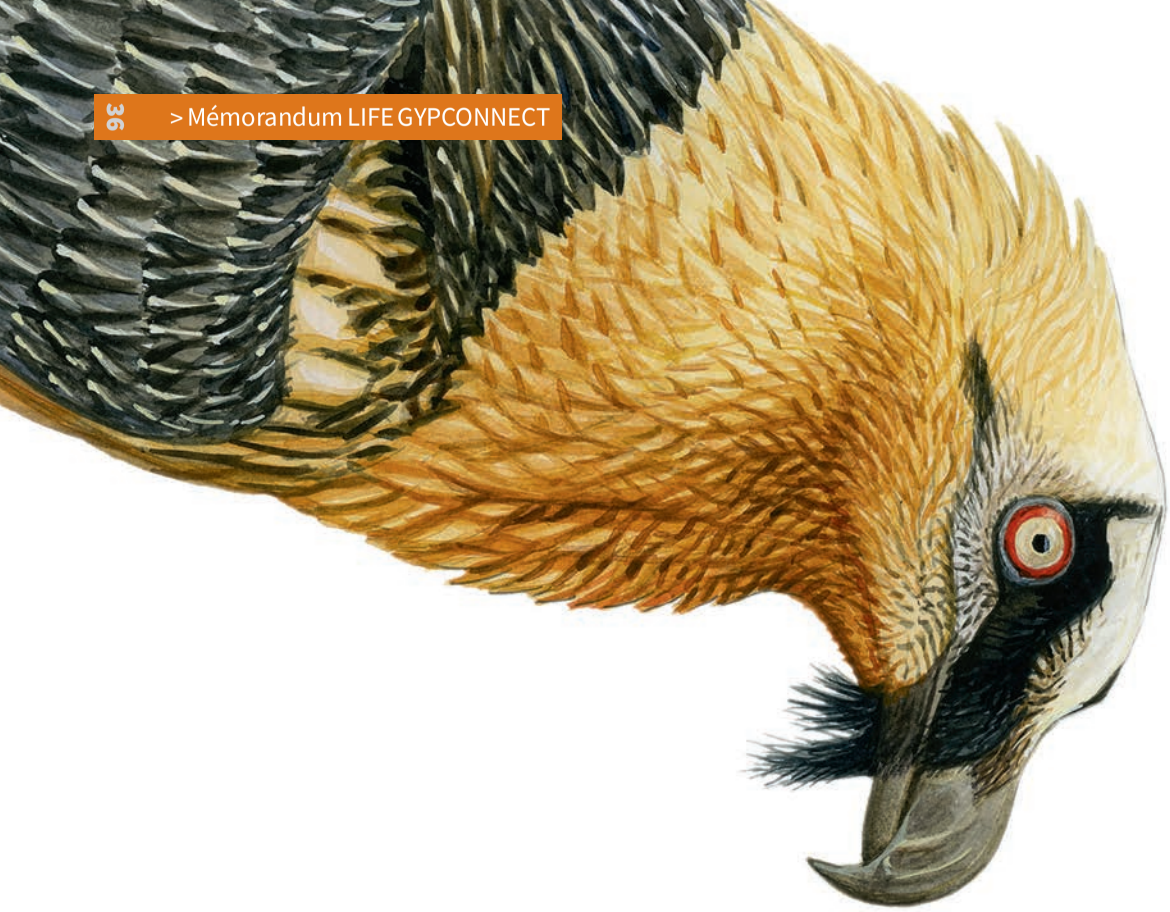
The costs presented match the miscellaneous expenses committed for implementing this action:

- Expenses for surveillance on the ground and the inventory of threats
- Expenses for consultation, maintenance and development of agreements and conventions with the users of the territory
- Expenses to secure reintroduction sites

Provision must also be made to mobilise personnel (local coordinator, branch manager, task officer, warden, etc.) and if necessary to acquire optical equipment, a vehicle and consumables. In some cases, provision must be made for budgets for calling on outside assistance to monitor certain territories in order to reduce the time and travelling required and also to make the most of local skill networks to promote better ownership of the project at local level.

COSTS ENGAGED IN THE 2016-2020 PERIOD	
C10 LIMITING THE SOURCES OF DISTURBANCE AND HAZARDS DUE TO HUMAN ACTIVITIES	**124 327,81 €**
01 - Personnel	99 847,16 €
02 - Travel and subsistence	5 360,06 €
03 - External assistance	3 228,30 €
04 - Durables goods	12 748,99 €
06 - Consumables	2 670,23 €
07 - Other costs	473,08 €

Bearded Vulture © Michele mendi



Bearded Vulture © François Desborde

Sheet 9 A7/E1/E4/E6/E7/E8

Awareness-raising

Communicate and promote the Bearded Vulture

TOOLS DEVELOPED

- Communication plan and preliminary sociological survey
- Visual identity
- Communication tools available for downloading on the Internet site: *gypaetebarbu.fr/life-gypconnect/*
- Outreach leaflets; LIFE GYPCONNECT six-monthly newsletter: Plume du LIFE; Internet site and social networks
- Information media and promotion tools/**Appendix 9.1**

AVERAGE COST OF ACTION

€36,628.96

Issues at stake

The success of the LIFE GYPCONNECT programme relied on the provision of effective and appropriate means to present the activities, objectives and partners of the programme, facilitate information searches, disseminate targeted information and run networks. Thus, an appropriate, relevant communication strategy was defined to promote the programme, its issues and objectives and also the LIFE financial instrument supported by the European Commission to ensure the commitment by a larger number of players at all levels.

Actions and tools used

A **communication plan** had to be defined to structure and coordinate the different actions and media used under the LIFE GYPCONNECT programme (Action E1). It was important to define precisely targets in the category of players identified under the project to deploy the most suitable means of communication. To this end, a sociological survey on the representations associated with necrophagous raptors and in particular the Bearded Vulture (Action A7) was carried out in the four territories involved in implementing LIFE GYPCONNECT to clarify the perceptions of the different audiences. This preliminary work made it possible to formulate recommendations aimed at «influencing collective representations of necrophagous birds» and «changing prejudices and harmful behaviour towards the Bearded Vulture and other species of necrophagous birds». Each category of identified targets has expectations or even fears for conservation activities for large raptors and more specifically vultures, which it was important to take into account when setting up this strategic plan. Emphasis was placed on a participatory contribution with the different targets in favour of meetings, dialogues and consultations to identify the needs and questions of the different audiences. This approach made it possible to adapt the messages better and direct the actions in a coherent and tactical way. The territory's players were thus able to view the project as genuine added value for each territory in the LIFE intervention area, not as a constraint or hindrance to local activities and initiatives. Special attention was paid to defining achievable, prioritised, measurable and scheduled goals (in the short and medium term).

The communication strategy also gave a global vision of information, awareness-raising and communication actions to be undertaken beforehand in advance (LIFE GYPCONNET open days at programme start and end per site (Pyrenees - Massif Central - Alps), lobbying, press actions, Internet site, events, etc.).

A **visual identity** for LIFE GYPCONNECT was defined to present the Bearded Vulture as the emblem of biodiversity in mountain and Alpine ecosystems and an ambassador for the guild of necrophagous (Action E4). Its recognition as an element in territorial enrichment contributes to greater consideration of necrophagous raptors and appropriation of the issues in safeguarding the Bearded Vulture.

This visual identity took for the form of various information media and promotion tools designed as vectors of information, awareness-raising or communication to present the project and its European dimension to different audiences (Action E7): kakemono, posters, banners, stickers, television interviews and documentary, films, etc.

It was possible to install interpretation panels on developed sites near the various places concerned by the project (release sites or corridor areas) (for example, the vulture promotion project in the Vercors Regional Natural Park - Vulture trail in Diois region of the Vercors). Fixed educational panels thus marked out the project in the territory and helped to promote the Bearded Vulture as the

inseparable emblem of the biodiversity essential to Man. Several **communication tools** were developed:

↘ Publishing outreach leaflets (Action E8) is essential to publicise the LIFE GYPCONNECT programme and promote the results and experiences. Both paper and digital formats are chosen to allow wide circulation of these media which concentrate all the essential information on the project and its results. All associated beneficiaries are involved in designing, drafting and circulating this leaflet.

↘ The LIFE GYPCONNECT six-monthly newsletter «Plume du LIFE» (action E1) is intended to communicate the actions implemented under LIFE to the public: actions, monitoring of birds, results of releases, breeding seasons, international news, awareness-raising, environmental education and communication actions, etc. This bulletin is published as a .pdf and circulated electronically to all the programme's technical, financial and institutional partners and everyone on the address list of associated beneficiaries and networks of international experts working to safeguard the Bearded Vulture worldwide.

↘ A specific LIFE GYPCONNECT Internet site (Action E6) gypaetebarbu.fr was created as the project's main means of communication to the general public, observers and partners. The coordinator beneficiary is responsible to uploading it, helped by all associated beneficiaries for the design and updating. It makes available some of the tools presented here: the newsletter, outreach leaflets, etc. LIFE GYPCONNECT news is relayed regularly in the social networks of different beneficiaries.

Means and costs engaged

The costs presented match the miscellaneous expenses committed for implementing this type of action:

- Expenses in preparing a communication plan and visual identity
- Expenses in designing and circulating communication tools and information media
- Expenses in creating and managing the Internet site
- Expenses in organising and holding events

Provision must also be made to mobilise personnel (facilitator, local coordinator, branch manager, task officer, agent, etc.). In some cases, provision must be made for budgets to bring in outside assistance to create some media.

COSTS ENGAGED IN THE 2016-2020 PERIOD	
A07 COLLECTING AND ANALYZING PUBLIC PERCEPTIONS ON RAPTORS AND ON THE BEARDED VULTURE SPECIFICALLY TO PROMOTE RELEVANT COMMUNICATION	**38 031,75 €**
01 - Personnel	3 568,07 €
02 - Travel and subsistence	499,16 €
03 - External assistance	33 964,52 €
E01 PREPARING A COMMUNICATION CAMPAIGN	21 280,45 €
01 - Personnel	18 752,77 €
02 - Travel and subsistence	1 037,68 €
03 - External assistance	1 125,00 €
07 - Other costs	365,00 €
E04 ENHANCING BEARDED VULTURES AS A MAJOR COMPONENT OF THE BIODIVERSITY INDISPENSABLE TO MANKIND	51 802,55 €
01 - Personnel	15 598,95 €
02 - Travel and subsistence	949,39 €
04 - Infrastructure	20 043,75 €
04 - Durables goods	15 174,00 €
06 - Consumables	22,16 €
07 - Other costs	14,30 €
E06 BUILDING A PROJECT-SPECIFIC WEBSITE	13 014,23 €
01 - Personnel	11 636,43 €
02 - Travel and subsistence	1 377,81 €
E07 DESIGNING AND IMPLEMENTING INFORMATION MATERIALS	16 327,71 €
01 - Personnel	5 981,49 €
02 - Travel and subsistence	3,84 €
03 - External assistance	278,58 €
07 - Other costs	10 063,80 €
E08 PUBLISHING LAYMAN REPORTS	6 059,15 €
01 - Personnel	793,29 €
03 - External assistance	299,36 €
07 - Other costs	4 966,50 €

Bearded Vulture © François Desborde

Sheet 10 E2/E3/E5

Awareness-raising

Raise public awareness and broadcast knowledge and experiences

ACTIONS AND TOOLS DEVELOPED

- Awareness-raising tools/**Appendix 10.1**
- Awareness-raising actions
- Themed seminars (and their proceedings) and workshops
- Good practices memorandum

AVERAGE COST OF ACTION

€106,872.13

Issues at stake

Effective awareness-raising comes through direct knowledge of target audiences and their specific features. Based on this observation, a study was carried out under preparatory action A7 on the perceptions of necrophagous raptors, especially the Bearded Vulture, by the various audiences (breeders, general public, journalists) (Sheet 9). The results of the survey made it possible to adapt the tools, educational methods and content of interventions to raise the awareness of the target audiences more effectively. This awareness-raising is important as it aims to change the practices and beliefs about necrophagous raptors and in particular the Bearded Culture. The awareness-raising programme thus developed was designed as a tool to facilitate the introduction of conservation measures by providing knowledge and understanding of conservation issues for these species and the goals of the European LIFE GYPCONNECT programme.

Disseminating the LIFE GYPCONNECT results means sharing experiences and good practices used, highlighting and giving more visibility to the actions carried out and results obtained and encouraging the exchange of good practices to stimulate their replication and/or adaptation. It is an essential step in urging everyone committed to safeguarding the Bearded Vulture and necrophagous raptors to undertake actions based on successful experiences. Seminars and workshops thus make it possible to learn from experiences and to capitalise on and disseminate the results and the transposition of successes. Holding these events contributes to the objectives of coherence, transversality and synergy of actions between the different conservation programmes for the Bearded Vulture and necrophagous raptors in Europe.

Actions and tools used

Several actions ensured the awareness-raising of audiences and dissemination of knowledge and experiences:

1. Organising an awareness-raising campaign for different players (Action E2)

Setting up an effective awareness-raising campaign should make it possible to integrate interventions across the board into a dynamic of inter-regional coherence in line with the specific LIFE GYPCONNECT goal of re-establishing connections between the different Bearded Vulture core populations.

Specific mediation tools have thus been developed

↘ Educational and awareness-raising tools

• Mediation kits (five types) with tools appropriate for different audiences: 1/6th scale silhouettes, four 1:1 scale models of the four vultures (and their assembly tutorial), reproduction of a bone that can be broken up and reassembled, image bank, games, optical equipment, etc.

• Video presentation clip of the programme and its issues, with sequences that have been used in many situations (meetings, exhibitions, Internet site, etc.)

• LIFE travelling exhibition: six self-supporting panels, two triple-sided columns, two video terminals, adult and child diaries, identification rings for monitoring

• Museography and educational panels

↘ Communication tools: leaflets, posters, kakemono

↘ Interactive terminals for virtual reality LIFE GYPCONNECT experience

↘ Films, documentaries and videos

Communication and awareness-raising actions took place: public meetings; public events for releases; events for schoolchildren and other specific events

The awareness-raising programme was designed for a variety of audiences:

▶ Raising the awareness of family residents, children, tourists and elected representatives in the territory: general public events, poaching

Public event for release © LPO

▶ Raising the awareness of young people: educational projects, inter-territory twinning actions
▶ Raising the awareness of local socio-professionals involved by he various conservation actions: breeding, hunting, outdoor sports, tourism, energy production and transmission, environmental education, media, elected representatives Information and training of players, managers and users is also essential to the project: a training/information plan suitable for each audience has been developed.

2. Knowledge management (Action E3)
Seminars are a way of passing on experiences, sharing knowledge and promoting the results of the project at its various stages. They can also boost the coherence and motivation of the project team as well as define a post-LIFE action plan with a homogeneous, coherent vision of many actions to the pursued and perpetuated.
Three seminars have been organised under LIFE GYPCONNECT to share and disseminate knowledge, experiences and skills. These meetings target broad dissemination of results of project actions at its various stages, mainly through seminar proceedings.
↘ Seminar 1 (People, vultures, breeders ... cross benefits for all territories...): Roles and benefits of scavenging in pastoral ecosystems
↘ Seminar 2: Food support and health precautions for the Bearded Vulture
↘ Seminar 3: Outcomes from LIFE, feedback and securing the future after LIFE, with publication of outcome proceedings
This memorandum document has been produced under Action E3. It lists all the protocols, technical guides and tools developed under LIFE. It is a key promotional document to ensure that the LIFE successes can be transposed along with the efficiency and perpetuation of actions in favour of the Bearded Vulture.

3. Maintain consistency and transversality of LIFE GYPCONNECT actions with other LIFE projects (Action E5)
Consistency and transversality of LIFE GYPCONNECT actions with other LIFE dedicated to necrophagous raptors seemed necessary to ensure the success of the project. Special emphasis has been placed on creating synergy between this LIFE programme and the LIFE GypHelp programme LIFE13NAT/FR/000093 (2014-2018) that complemented LIFE GYPCONNECT. Organising seminars and workshops with the teams from other programmes shared experiences and helped to develop common reflections.

Seminar © LPO

Constraints and difficulties encountered

⚠ Difficulties in defining tools that satisfy all structures involved in the project (different target audiences and needs)

⚠ Difficulties in organising public events for releases given that it is impossible to anticipate really the outcome of the breeding season and the arrival date for the birds.

Means and costs engaged

The costs presented match the miscellaneous expenses committed for implementing this type of action:

↘ Expenses in designing, publishing and making available the planned tools

↘ Expenses in organising seminars and workshops and dissemination of knowledge

↘ Expenses in organising and holding events

Provision must also be made to mobilise personnel (facilitator, local coordinator, branch manager, task officer, agent, etc.) and if necessary to acquire optical, office and exhibition equipment. In some cases, provision must be made for budgets to bring in outside assistance to create coordination and educational projects or produce certain information media.

COSTS ENGAGED IN THE 2016-2020 PERIOD	
E02 ORGANIZING AN AWARENESS-RAISING CAMPAIGN FOR ALL STAKEHOLDERS	**342 056,65 €**
01 - Personnel	182 096,31 €
02 - Travel and subsistence	15 326,30 €
03 - External assistance	98 480,93 €
04 - Durables goods	28 746,95 €
06 - Consumables	3 070,51 €
07 - Other costs	14 335,66 €
E03 ENSURING KNOWLEDGE MANAGEMENT	**68 779,65 €**
01 - Personnel	46 513,45 €
02 - Travel and subsistence	5 023,71 €
03 - External assistance	2 707,20 €
06 - Consumables	44,70 €
07 - Other costs	14 490,59 €
E05 ENSURING THE COHERENCE AND CROSS-CUTTING CHARACTERISTICS OF LIFE GYPCONNECT ACTIONS WITH THOSE OF OTHER LIFE PROJECTS, AND MAINLY WITH LIFE GYPHELP	**16 652,21 €**
01 - Personnel	13 800,91 €
02 - Travel and subsistence	2 680,82 €
03 - External assistance	170,48 €

More information at:

www.gypconnect.fr

With the support of

Co-financers

Coordinating beneficiary

Associated beneficiaries

Service Éditions LPO n°ED2103002AB © LPO 2021