

*Viability study*  
*for the Reintroduction of Griffon Vulture*  
*Retezat National Park, Romania*



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## 1. Introduction

Romania has been home to significant vulture populations up to the first decades of the 20th century. All four European vulture species (*Gypaetus barbatus*, *Gyps fulvus*, *Aegypius monachus*, *Neophron percnopterus*) are reported to have existed in this country. The birds used to be widespread all over the Romanian Carpathians but mainly concentrated in mountain ranges with extensive rocky areas such as the Bucegi and Piatra Craiului Massifs (in the Curvature Carpathians), the Retezat Massif (in the Southern Carpathians) and the Ceahlau Massif (in the Eastern Carpathians). However, all four species are now extinct in Romania although occasional sightings of Egyptian Vultures occur in the Southern part of the country. The causes for the population decrease and extinction of all the species seemed to be mainly collection of eggs and poisoning.

Successful vulture reintroductions and population restocking programs have been done in several sites in Europe. The experience from these projects has shown that the most successful procedure is to begin with a reintroduction of the Griffon Vulture and then, on the long term, eventually attempt the reintroduction of the other species.

The presence of livestock in the mountains is generally recognised as one of the most important factors for the existence of Vulture populations in a specific area. In Romania almost half of the labor force is active in agriculture, of which one third is animal production. The national sheep flock is presently made of some 7 million sheep and 3 million cattle, of which over half in summer are kept in livestock camps in the mountains. This high density of livestock in the country is particularly encouraging for an attempt of vulture reintroduction. Another encouraging factor is that the Romanian Carpathian mountains are one of the most untouched and integer places in Europe.

In spring 2004 the Association for Bird and Nature Protection „Milvus Group” and the Carpathian Wildlife Foundation (Fundatia Carpati) submitted a proposal to the The Frankfurt Zoological Society (ZGF) for co-funding a feasibility study for the reintroduction of Griffon Vultures in the Romanian Carpathians. The organization has finally agreed to co-fund the project (other cofounder is the Institute for Geo-Information Science and Earth Observation – ITC, Enschede, The Netherlands). The feasibility study was carried out throughout 2005. It revealed that the Romanian Carpathians surely present the necessary conditions for a potential reintroduction. However, the Retezat Mountain massif might not be the most suitable and it appears recommendable to extend the feasibility study onto additional areas.

## **2. Objectives of the reintroduction**

The objective of the envisaged reintroduction on the Romanian Carpathians is to restore the former natural fauna of the area and thus to increase the natural heritage of the country. Vultures are very important for the health of nature, since they are the species that clean the environment of animal carcasses. In Romania, where most of the large mammals and birds are still present, the presence of vultures would complete the picture of a healthy piece of nature, which is one of the most important heritages of the country.

Also, the presence of Griffon Vultures in the Carpathians would be significant from the zoogeographic point of view, since it would allow an important link for the populations in Ukraine and the ones in the Balkans. This would allow the exchange individuals between the different areas and thus increase the genetic viability of the populations.

## **3. Biology of the species**

### *3.1 Taxonomy*

Order: Falconiformes

Family: Accipitridae

Genus: *Gyps*

Species: *fulvus*

Polytypic. Nominate *fulvus* (Hablizl, 1783), North Africa, south and south –east Europe, south-west Asia south to Sinai, Arabia, and north-west Pakistan, and central Asia from Tadzhikistan to the Altai.

### *3.2 Morphology*

Dimensions:

- long: 100-110 cm

- wing span: 260-270 cm

- weight: 7 500 – 11 000 g

The Griffon Vulture is one of the largest European birds of prey.

### *3.3 Reproduction*

The Griffon Vulture is a typically monogamous species and presumably the bond of a couple lasts until the death of one partner. These birds reach sexual maturity after the fourth-fifth year of life. The mating mainly occurs between late December and January, but can be repeated also in the following months, probably in order to reinforce the bond between the partners of the couple. Not all sexually mature Griffon Vultures mate every year, some do that every second year or only occasionally. This species nests in colonies that can reach up to 100 pairs. The nests are built in rocky walls on sea shores or in canyons, in variable altitudes up to over 2000

meters. Usually one single egg is produced, which is incubated by both, the male and female bird, for 52 days. If the egg is lost for any reason, the birds can produce a new egg and repeat this until April.

The chick is fed with a mush of meat that is regurgitated by the parents. It is permanently guarded by at least one of the parents, which protect it against the wind, rain and snow.

The first flights around the nesting site are occurring at the age of three months. At 80 days the chick is of the size of an adult, but recognizable by a white collar around the naked neck. The first real flights for longer distances, and with bigger security, occur at 4-5 months, but the chicks continue to be partially fed by the parents also after that.

### *3.4 Food habits*

Griffon Vultures feed almost exclusively on dead animals, observations of attacks on live animals being extremely rare. The preferred food is represented by carcasses of large mammals, mainly ungulates. These can be wild species (such as Red deer (*Cervus elaphus*), Roe deer (*Capreolus capreolus*) or Chamoix (*Rupicapra rupicapra*)) or domestic livestock. However, if needed also carcasses of smaller animals can be consumed, such as small mammals or birds.

For the search of food Griffon Vultures are very strongly bonded to a particular territory and to the presence of vast open ranges. During the search of carcasses these birds can cover very high distances, commonly reaching 50 km from the nesting or resting sites. This is made possible by the particular social mechanisms of the species: each individual explores an area, constantly maintaining sight contact with the others that proceed the same way in other areas. When one bird finds a carcass it will fly down to it in circular movements. This attracts the other individuals, from distances of tens of kilometers, which thus reach the area. Like this, big groups of Griffon Vultures can reach the same spot in a short period.

When a carcass is found Griffon Vultures feed mainly on the soft tissues of the animal, preferably the natural openings (mouth, anus and eyes) or, if the carcass is older, the soft skin.

### *3.5 Habitat requirements*

Griffon vultures need vast open spaces with scarce tree cover, preferably high plateaus and steppe areas. Compulsory requisites are the presence of large surfaces for the search of food as well as the presence of cliff areas in rough mountain ranges or rocky coast lines, needed for nesting. Preferably the area should be characterized by the presence of ascending air currents, which are used by the birds to reach high altitudes in flight. Although this species prefers dry climates, it can occur also in areas with heavy snowfall if these area suitable for nesting and for finding food. This is especially the case in mountain ranges with steep canyons and with mountain pastures that are used for livestock raising. Some populations move more or less

regularly between different climatic areas in order to use periodic food sources, and thus reaching more unsuitable areas in the remaining period of the year. Such kind of movements can be found, for instance, in Griffon Vultures that spend the summers in the Alpine chain, feeding on the carcasses of the livestock that is grazed on the mountains, whereas they transfer to the warmer Balcans for the winter. The Griffon Vulture populations have been strongly influenced by human caused habitat changes and by the changes of the livestock raising practices.

#### **4. Distribution and status of the griffon vulture**

##### *1.1. World distribution and status*

The Eurasian griffon has a large range (from Spain and Morocco, through the Mediterranean countries, Near East and Central Asia to North Eastern India), with an estimated global distribution area of some 10,000,000 km<sup>2</sup>. It has a large global population estimated to be 100,000-1,000,000 individuals (Ferguson-Lees et al. 2001). Global population trends have not been determined; however the recent Gyps vulture crisis in Asia may have had significant negative impact on the Asian Eurasian griffon population as well.

The European population was estimated to be 18769-18884 breeding pairs in 2002 (*Action Plan for the recovery and conservation of vultures on the Balkan Peninsula*) and the Spanish population is steadily growing till the present years. The population trend is positive in the western European countries (Spain, France, Italy, and Portugal) but only the Spanish population can be considered as a safe and established population. The Balkan Peninsula population however is undergoing a serious decline, with negative trends in almost all of the national populations (*Action Plan for the recovery and conservation of vultures on the Balkan Peninsula*, BVAP workshop Prilep Macedonia, abstracts).

Despite of the serious situation on the Balkan Peninsula and the seemingly negative trends in Asia, the species is not believed to approach the thresholds for the population decline criterion of the IUCN Red List (i.e. declining more than 30% in ten years or three generations). For these reasons, the species is evaluated by BirdLife International (the official Red List Authority for birds for IUCN) as Least Concern.

##### *1.2. Distribution in Romania*

We can discuss the distribution of the Eurasian Griffon in Romania only in past tense. The species last proved breeding in the country occurred more than 40 years ago. However the species was once very abundant in the country, occasionally several hundred birds were observed in one location and there are historical data about occurrence in every region of the country (for detailed map see [annex X](#) - Report on the status of Vultures in Romania).

Unfortunately the literature gives us very few information with regards the exact location and especially with regards the size of the former breeding population. The probable cause of

this lack of information is the wide distribution of the species and that probably it was not considered a very attractive species. (*It is interesting that there are significantly more observations published about the Bearded Vulture, a species which disappeared from the country more than 70 years ago, with no credible record since 1933.*) Many authors declare that the species was common in different areas but in very few cases concrete written evidence exists about breeding or about number of individuals with exact location.

Our dedicated vulture database contains 68 data about the species (only data certainly from Romania, the origins of some museum specimens and published information could not be surely identified these data were excluded from the database) and it's constantly growing, still there are very few data offering concrete evidence of breeding with exact locations. Only 6 such concrete data exists from Romania (along with further 6 which are probably referring to occurrence of breeding), most of them linked to the collection of eggs or nestlings from the nest or published because of extraordinary breeding behavior (for example solitary breeding of a pair in white-tailed eagle nest in the Danube floodplains at Ostrovul Strambu in 1903). The last breeding of the Griffon vulture in Romania occurred in 1961, proven by a collected egg unfortunately without exact identification of location of the nest, just with the specification Vrancea Mountains (in the Curvature Carpathians).

From the distribution of the confirmed and probable breeding sites we can suppose that the Griffons range was mainly in the southern part of the country. Probably the strongest populations breeding in the sub-mediterranean climatic zones of Romania: in the South Western extreme of the Carpathians and in the gorges and rocky slopes of Dobrogea (South Eastern Romania).

## **5. Causes of extinction in Romania**

The extinction of the vultures from Romania was probably a very complex process with several causes contributing to the final result. The exact identification of these causes it's already very hard, but it's even harder to approximate the percentage to which each individual parameter contributed to the extinction. We think that the two core factors in the extinction of vultures in Romania are direct persecution and poisoning in this order.

**Direct persecution** of raptors is having a long and bloody history in Romania. Approximately half (at least 30 data) of the whole database regarding Griffons is given by collected specimens for "scientific purposes". It seems that the ornithologists at the end of XIX and the first half of the XX century collected most of the specimens which were close enough for a successful shot. The collected specimens were traded internationally (especially by Dombrowski) or naturalized in Romanian museums. Along with the adult birds, eggs and nestlings were also collected, the brutal efficiency of this activity is well shown by the sometimes incredible amount of eggs collected (ex. more than 370 Cinereous vulture eggs

collected in one colony in three years between 1873-75). The shooting of the last few breeding pairs of Bearded vulture is almost completely documented. Birds were also regularly trapped for trade or to be used as a pet, we possess three data about trapping Bearded vultures from the last decades of the XIX century. According to our present knowledge we consider that direct persecution was among the (or it was) most important causes of extinction of vultures in Romania.

**Poisoning** was the other crucial factor in the process. The big poisoning campaign against the large carnivores (considered pests at that time) started in the beginning of the 1950s and lasted till the mid 60s. From this period we have 7 documented cases when poisoned birds were found (No. of cases: *Neophron* 2, *Aegyptius* 4, *Gyps* 1) usually with only one killed bird. Several specimens of poisoned Egyptian vultures (10 corpses) were found in 1962 (*Pușcariu 1969*) in southern Dobrogea and 6 corpses of Griffon in 1956 (*Mihalciuc 1973*) in the Curvature Carpathians. On the other hand there were documented incidents of poisoning even before the start of the campaign, affecting mainly Bearded vultures (1889 – 1 case, 1893 – 1 case, 1894 – 2 case, 1910 – 1 case) (*Kamner 1924, Linția 1954, Tălpeanu 1966*). In all cases (when it was identified) strychnine was the identified type of poison (4).

The other “traditional” causes for extinction of vultures in different countries like: **loss of food sources, loss of habitats, anthropization of breeding habitats** have not played an important role in the extinction. By the fact these factors are still favorable for vulture populations and seemingly they never represented a problem according to our present knowledge.

## **6. Previous experiences with reintroductions of griffon vultures**

There have been several cases of Griffon Vultures in Europe in recent years. Examples are the reintroductions in France (the Cervennes National Park France) and in Italy (Friuli – Northern Italy, Velino-Sirente Regional Park – Central Italy, Sicily – Southern Italy). The animals to be reintroduced were usually taken from the large populations in Spain and the procedures were comparable in all cases. The basic thing was to provide the animals the possibility to get acclimatized to the new area. An other important fact seemed to be the presence of artificial feeding sites. This appeared to be important for providing food to the reintroduced animals and to their offspring, since the availability of food has shown to be one of the critical issues at least at the beginning of the program. Another important function of the feeding sites is to bind the released birds to an area. Also, the existence of a feeding site can be a protection for the animals against poisoning, which can mean the extinction or a strong decline of the population, especially when it is recently introduced and thus still small.

Although there have been cases in which some of the reintroduced animals were killed by poison, by fire guns or other human-caused problems, the reintroductions appeared to have



been successful. This is probably due to the strong adaptability of the species. This adaptability has been demonstrated in the case of an “accidental” reintroduction of Griffon Vultures in the nearby of Sazburg, Austria. In this case some individuals, that were released in the zoo as a tourist attraction, have mated in nature and gave origin to a new small wild population.

It is actually because of this adaptability that in areas in which more than one vulture species are extinct it is usually recommended that reintroductions are begun with the Griffon Vulture, in order then to proceed to the other species. This is the reason why in Romania, where all four European vulture species are extinct, an attempt is planned to begin reintroduction of the Griffon Vulture.

## 1. IUCN Reintroduction guidelines

The main issues mentioned by the IUCN guidelines for reintroductions, regarding the reintroduction of Griffon vultures, are the following:

### *7.1 Definition of terms*

- "Re-introduction": an attempt to establish a species in an area which was once part of its historical range, but from which it has been extirpated or become extinct ("Re-establishment" is a synonym, but implies that the re-introduction has been successful).
- "Translocation": deliberate and mediated movement of wild individuals or populations from one part of their range to another.
- "Re-inforcement/Supplementation": addition of individuals to an existing population of conspecifics.
- "Conservation/Benign Introductions": an attempt to establish a species, for the purpose of conservation, outside its recorded distribution but within an appropriate habitat and eco-geographical area. This is a feasible conservation tool only when there is no remaining area left within a species' historic range.

### *7.2 Multidisciplinary approach*

A re-introduction requires a multidisciplinary approach involving a team of persons drawn from a variety of backgrounds. As well as government personnel, they may include persons from governmental natural resource management agencies, non-governmental organisations, funding bodies, universities, veterinary institutions, zoos (and private animal breeders) and/or botanic gardens, with a full range of suitable expertise. Team leaders should be responsible for coordination between the various bodies and provision should be made for publicity and public education about the project.

### 7.3 Pre-project activities

#### (i) Feasibility study and background research

An assessment should be made of the taxonomic status of individuals to be re-introduced. They should preferably be of the same subspecies or race as those which were extirpated, unless adequate numbers are not available. An investigation of historical information about the loss and fate of individuals from the re-introduction area, as well as molecular genetic studies, should be undertaken in case of doubt as to individuals' taxonomic status. A study of genetic variation within and between populations of this and related taxa can also be helpful. Special care is needed when the population has long been extinct.

Detailed studies should be made of the status and biology of wild populations (if they exist) to determine the species' critical needs. For animals, this would include descriptions of habitat preferences, intraspecific variation and adaptations to local ecological conditions, social behavior, group composition, home range size, shelter and food requirements, foraging and feeding behaviour, predators and diseases. For migratory species, studies should include the potential migratory areas. For plants, it would include biotic and abiotic habitat requirements, dispersal mechanisms, reproductive biology, symbiotic relationships (e.g. with mycorrhizae, pollinators), insect pests and diseases. Overall, a firm knowledge of the natural history of the species in question is crucial to the entire re-introduction scheme.

The species, if any, that has filled the void created by the loss of the species concerned, should be determined; an understanding of the effect the re-introduced species will have on the ecosystem is important for ascertaining the success of the re-introduced population.

The build-up of the released population should be modelled under various sets of conditions, in order to specify the optimal number and composition of individuals to be released per year and the numbers of years necessary to promote establishment of a viable population.

A Population and Habitat Viability Analysis will aid in identifying significant environmental and population variables and assessing their potential interactions, which would guide long-term population management.

#### (ii) Previous Re-introductions

Contacts with persons having relevant expertise should be conducted prior to and while developing re-introduction protocol.

#### (iii) Choice of release site and type

Site should be within the historic range of the species. For a re-introduction, there should be no remnant population to prevent disease spread, social disruption and introduction of alien genes. In some circumstances, a re-introduction may have to be made into an area which is fenced or otherwise delimited, but it should be within the species' former natural habitat and range.

#### (iv) Evaluation of re-introduction site

Availability of suitable habitat: re-introductions should only take place where the habitat and landscape requirements of the species are satisfied, and likely to be sustained for the foreseeable future. The possibility of natural habitat change since extirpation must be considered. Likewise, a change in the legal/ political or cultural environment since species extirpation needs to be ascertained and evaluated as a possible constraint. The area should have sufficient carrying capacity to sustain growth of the re-introduced population and support a viable (self-sustaining) population in the long run.

Identification and elimination, or reduction to a sufficient level, of previous causes of decline: could include disease; over-hunting; over-collection; pollution; poisoning; competition with or predation by introduced species; habitat loss; adverse effects of earlier research or management programmes; competition with domestic livestock, which may be seasonal.

(v) Availability of suitable release stock

It is desirable that source animals come from wild populations. If there is a choice of wild populations to supply founder stock for translocation, the source population should ideally be closely related genetically to the original native stock and show similar ecological characteristics (morphology, physiology, behaviour, habitat preference) to the original sub-population.

Removal of individuals for re-introduction must not endanger the captive stock population or the wild source population.

Individuals should only be removed from a wild population after the effects of translocation on the donor population have been assessed, and after it is guaranteed that these effects will not be negative.

Prospective release stock, including stock that is a gift between governments, must be subjected to a thorough veterinary screening process before shipment from original source.

(vi) Release of captive stock

Most species of mammal and birds rely heavily on individual experience and learning as juveniles for their survival; they should be given the opportunity to acquire the necessary information to enable survival in the wild, through training in their captive environment; a captive bred individual's probability of survival should approximate that of a wild counterpart.

#### *7.4 Socio-economic and legal requirements*

- Socio-economic studies should be made to assess impacts, costs and benefits of the re-introduction programme to local human populations.
- A thorough assessment of attitudes of local people to the proposed project is necessary. The programme should be fully understood, accepted and supported by local communities.
- The policy of the country to re-introductions and to the species concerned should be assessed.

- Re-introduction must take place with the full permission and involvement of all relevant government agencies of the recipient or host country.

#### *7.5 Planning, preparation and release*

- Approval of relevant government agencies and land owners, and coordination with national and international conservation organizations.
- Construction of a multidisciplinary team with access to expert technical advice for all phases of the programme.
- Identification of short- and long-term success indicators and prediction of programme duration, in context of agreed aims and objectives.
- Securing adequate funding for all programme phases.
- Design of pre- and post- release monitoring programme so that each re-introduction is a carefully designed experiment, with the capability to test methodology with scientifically collected data. Monitoring the health of individuals, as well as the survival, is important; intervention may be necessary if the situation proves unforeseeably favourable.
- Appropriate health and genetic screening of release stock, including stock that is a gift between governments. Health screening of closely related species in the re-introduction area.
- If release stock is wild-caught, care must be taken to ensure that: a) the stock is free from infectious or contagious pathogens and parasites before shipment and b) the stock will not be exposed to vectors of disease agents which may be present at the release site (and absent at the source site) and to which it may have no acquired immunity.
- If vaccination prior to release, against local endemic or epidemic diseases of wild stock or domestic livestock at the release site, is deemed appropriate, this must be carried out during the "Preparation Stage" so as to allow sufficient time for the development of the required immunity.
- Appropriate veterinary or horticultural measures as required to ensure health of released stock throughout the programme. This is to include adequate quarantine arrangements, especially where founder stock travels far or crosses international boundaries to the release site.
- Development of transport plans for delivery of stock to the country and site of re-introduction, with special emphasis on ways to minimize stress on the individuals during transport.
- Determination of release strategy (acclimatization of release stock to release area; behavioural training - including hunting and feeding; group composition, number, release patterns and techniques; timing).
- Establishment of policies on interventions (see below).

- Development of conservation education for long-term support; professional training of individuals involved in the long-term programme; public relations through the mass media and in local community; involvement where possible of local people in the programme.
- The welfare of animals for release is of paramount concern through all these stages.

#### *7.6 Post-release activities*

Post release monitoring is required of all (or sample of) individuals. This most vital aspect may be by direct (e.g. tagging, telemetry) or indirect (e.g. spoor, informants) methods as suitable.

- Demographic, ecological and behavioural studies of released stock must be undertaken.
- Study of processes of long-term adaptation by individuals and the population.
- Collection and investigation of mortalities.
- Interventions (e.g. supplemental feeding; veterinary aid; horticultural aid) when necessary.
- Decisions for revision, rescheduling, or discontinuation of programme where necessary.
- Habitat protection or restoration to continue where necessary.
- Continuing public relations activities, including education and mass media coverage.
- Evaluation of cost-effectiveness and success of re- introduction techniques.
- Regular publications in scientific and popular literature.

### **7. Study area**

As study area we selected the Retezat National Park. Situated in the Western part of the Southern Carpathians, the oldest protected area of Romania with its extensive rocky areas, huge mountain pastures, high densities of large carnivores and famous historical vulture populations seemed to be a logical choice for a viability study.

The area of the Retezat National Park was putted under protection on the basis of the Royal Order no.2478 from 3<sup>rd</sup> of July 1934, published in the Ministerial Councils Journal no. 593 from 22<sup>nd</sup> of March 1935. This date is of a crucial importance for the Romanian nature conservation as the Retezat was the first protected area in Romania. In 1979 the are received the biosphere Reserve status under the UNESCO MAB program.

This park has an altitude range from low mountain ranges to alpine landscape. Peak Peleaga with 2,509 meters above sea level is the highest elevation in the biosphere reserve. The Retezat Massif is a well-defined upland block, separated on most sides from the rest of the range by deep valleys and to the north overlooking the Tertiary Hateg basin.

The biosphere reserve is not inhabited, however rural communities living just outside the biosphere reserve depend on agriculture, livestock raising and forestry activities partly undertaken on the park territory.

#### *1.3. Climate*

The climate of the Retezat Mountains was described according to the registered data of the nearby meteorological stations (Cuntu, Țarcu, Parâng and Semenic) as the park territory has no own meteorological station.

The determinant factors for the climate of the mountain are the altitude, the general orientation of the main mountain crests according to the movements of the Mediterranean and Atlantic air masses as well as the exposure of the individual slopes.

The **radiant heat** received is depending on the exposure and steepness of the slopes and is dropping significantly with the altitude from 115 Kcal./cm<sup>2</sup>/year on 700 m to 98 Kcal./cm<sup>2</sup>/year on 2500 m (1000 m – 112 Kcal./cm<sup>2</sup>/year; 1500 m – 108 Kcal./cm<sup>2</sup>/year; 1800 m – 105 Kcal./cm<sup>2</sup>/year; 2000 – 103 Kcal./cm<sup>2</sup>/year). There is a significant difference in the received radiant heat between the slopes situated on the southern respectively northern side of the main crest.

At over 2, 000 m altitude the temperature averages -2 -4 C°, rising to 2-4 C° towards 1400-1500 m. In the warmest month of the year, July, the mean air temperature is around 6 C° on the highest summits and 8-10 C° from the upper forest belt downwards to the mountain foot. In the coldest month, January, there are -10 C° at over 2, 000 m altitude, and -8 -6 C° from the upper forest belt downwards.

There is a pronounced **temperature gradient** according to the altitude; temperature is dropping with 0.3 - 0.4 C°/100m during winter and with 0.5 - 0.7 C°/100m in the summer. With the altitude the daily amplitude of the temperature is also shrinking.

The average **hours of sunshine/year** is also differing according to the altitude. On the basis of the mountains the average figure is 1850-1900 hours/year while on the crests it's around 1600 hours/year. The difference between the southern and northern slopes on low altitude can reach the 200-250 hours of sunshine/year while on high altitudes it really reaches the 100 hours/year figure.

The predominant **winds** have a northern, north-eastern component; their frequency on the crests is 94-95% where dead calm is really exceptional. On the other hand in the deep, protected valleys the lull can have a 40-60% frequency. The wind speed is also rising with altitude from an average of 2-3m/s on the basis of the mountains to 9-10m/s on the crests.

The yearly quantity of **precipitation** is also depending on the altitude. And it's rising from 900 mm at lower altitudes to 1300-1400 at higher altitudes. The wettest month of the year is June (120-150 mm) while the driest months are September and October (50-70 mm).

#### *1.4. Topography*

The massif rises up between two major depressions - Petroșani and Hațeg, and two rivers - Râul Mare and Jiul de Vest. It is skirted by the Țarcu, Godeanu and Vâlcan Mountains.

The main part of the massif, Retezatul Mare, consists mostly of crystalline rocks; the southern part, Retezatul Mic, contains important masses of limestone.

There are two main ridges, approximately SW-NE oriented, joined in their central part. The northern ridge is the highest with peaks like Bucura (2, 433), Peleaga (2, 509), Păpușa (2, 508), Mare (2, 463). The southern ridge is lower and has the Peaks Custura (2, 457), Gruniu (2, 294), Lazăru (2, 282). The most characteristic peak in the area, named Retezat like the massif itself, reaches 2, 482 m. The two main ridges extend northwards into some elongated, parallel and fairly long ridges, and shorter extensions southwards.

The greatest part of the Retezat Massif is built from Danubian Autochthons crystalline formations. Two intrusive massive bodies (the Retezat and the Buta grandiosities) pierce the weakly metamorphosed crystalline schist layered in a syncline crossed longitudinally by the Lăpușnicul Mare and the Râul Bărbat Valleys. The Danubian Autochthonous sedimentary is formed of sandstones and especially of massive limestone characteristic of the Piule - Iorgovanu relief. East of the Râul Bărbat and Pilugu Valleys, rise the Tulișa Mountains, a part of Retezat Mountains, themselves with a dominant sedimentary structure.

Leveled surfaces in the Retezat are less outstanding than in the mountains surrounding it. Some surfaces and slightly wavy plateaus, occur at heights of 2000-2100 m, in the Zlata, Zănoaga, Slăvei and Lăncița Mountains. Remnants of the Râul Șes leveled surface are noticeable on the northern side of the Retezat and inside the big drainage belonging to the Râul Șes, Râul Mare and Lăpușnicul Mare Rivers.

#### 1.5. Flora

More than 1/3 of Romanian flora can be found in the Retezat Mountains. High meadows create a haven for rare alpine flora. In the mountain area, long, steep slopes are covered with different types of forest, especially beech, spruce and fir, with birch and rowen as pioneer species. At the sub-alpine level, slopes shaped by ice are often protected by dwarf pine. The forest line reaches 1900 m with some Spruce adapted to the harsh climate. Arola pines (*Pinus cembra*) in the dwarf pine cover offer shelter and food to birds. Some areas are covered with rhododendron *kotschy*, and *Alnus viridis* can be found. The higher peaks of the alpine level are covered in scree and stones. The rich alpine flora was the main reason for the original designation of the Retezat as a national park. Some of the species are quite rare e.g. pink (*Dianthus glacialis*), endemic whitlow-grass (*Draba dornerii*), louse wort (*Pedicularis exaltata*), bird's eye primrose (*Primula minima*), milk-wetch (*Astragalus australis*), alpine fleabane (*Erigeron acer*), wormwood (*Artemisia campestris*), black vanilla orchid (*Nigritella rubra*). Retezat National Park is a genetic center for two important mountain plant genus: *Hieracium* and *Poa*.

#### 1.6. Fauna

Due to the wide variety of habitats and to the large undisturbed natural areas, the Retezat National Park is hosting a rich and abundant fauna. Due to the specific mountain and alpine habitats the mammal fauna is particularly rich (55 species). Large ungulates are well

represented; there are especially large populations of red deer, roe deer as well as wild boar. The chamois population is very important on the level of Romania, but this species is having serious problems all over the Romanian Carpathians especially due to poaching. Large carnivores are also well represented with healthy populations of bear, wolf and lynx.

The birdlife of the Retezat is also rich (168 registered species), with nationally important populations of some key species for conservation like Golden eagle (5+ breeding pairs), Peregrine falcon, Capercaillie, etc. Lesser spotted eagle, eagle owl, pigmy owl, crag martin, scarlet rosefinch, three toed woodpecker, horned lark are also among the 120 nesting bird species of Retezat. Because of these, the Retezat National Park was included in the BirdLife's IBA Network and is at the moment proposed by the Milvus Group as an SPA under the EC Bird Directive.

The invertebrate groups are well represented in the park, the butterflies are especially abundant in Retezat, both as number and species, and specialists designed two Prime Butterfly Areas in the Retezat National Park.

#### *1.7. Conservation status of the habitat*

Lacking urban settlements the park is not under a serious anthropogenic pressure. The impact on the environment comes mainly from overgrazing and recreational activities. However tourism is well controlled and channeled by the park management and the administration is currently running a project for the exact evaluation of the impact of grazing on the natural habitats (alpine pastures).

#### *1.8. Nesting sites*

A habitat suitability analysis prepared by Chiara Polce (Annex II) reveals the presence of wide ranges suitable for nesting. In fact, the author concludes that the availability of nesting sites would not be a limiting factor for a reintroduction, also on the basis of available literature about similar projects. Especially on the eastern part of the Southern slopes of the Retezat massif, there are steep limestone valleys and long rocky walls that would offer suitable nesting habitats for vultures. These parts of the mountain are also having the warmest microclimate of the whole mountain range.



### 1.9. Previous conservation efforts in the area

The Retezat is definitely one of the National Parks with the biggest conservation effort undertaken on its territory, in this respect it's probably only overtaken by the Danube Delta Biosphere Reserve. The management of the park is well developed in Romanian context, mainly due to the "Biodiversity Conservation Management Project" - financed by GEF through a Large Sized Project which was targeting three different protected areas. The list of projects undertaken in the park is self explanatory (see text box).

<b>List of selected projects undertaken in the Retezat National Park</b>	
<b>2001-2005</b>	- Biodiversity Conservation Management Project - financed by GEF
<b>2001-2004</b>	- Retezat National Park Biodiversity Survey
<b>2001-2003</b>	- Retezat Biodiversity Monitoring Plan Project
	- Retezat GIS database project
	- Tourism Monitoring project
<b>2002</b>	- 2 joint projects with BTCV-British Trust for Conservation Volunteers
<b>2003</b>	- Local children were involved in WWF painting contest
	- Assessment of grazing pressure (study of the Retezat National Park core zone)
	- Local Environmental Action Plan for Hunedoara County
<b>2003-2004</b>	- Local children were involved in painting contests launched by: WWF, Green Cross, European Commission
<b>2004</b>	- Watching Retezat Chamois
	- Retezat Junior Ranger camp
	- Retezat Monograph (Encyclopedia)
	- Retezat Biodiversity Database
<b>Ongoing projects</b>	- Sustainable Tourism Strategy-co financed by PAN Parks Foundation
	- Partner in West Region Environmental Action Plan development
	- Local communities socio economic assessment
	- Biodiversity Survey
	- Biodiversity Monitoring
	- Assessment of grazing pressure (study of the Retezat National Park buffer zone pastures)

## 8. Food availability

The habitat suitability study performed by Chiara Polce (Annex XX) showed a maximum theoretical population size that could be sustained by the area that is smaller than the one suggested by literature for similar projects. Nevertheless, the author suggests that this finding should be further investigated. Particularly, due to the extent of available information, the analysis was limited to the boundaries of the Retezat National Park whereas the food availability in the surroundings of the park were not investigated. This boundary is unlikely to be considered by vultures of any meaning. The availability of carcasses of livestock and wild animals in the surrounding areas, of a very vast extent has to be added to the one in the park range, when considering the carrying capacity of the range.

### 9.1 Livestock raising activities

In Romania there are still very big livestock numbers . Large proportions of these are kept ranging on mountain pastures during summer, especially sheep and cattle.

	Number	Density (heads/100ha)
Cattle	2.870.782	12,04
Pigs	8.259.680	34,64

Sheep	7.238.404	30,36
Goats	744.272	3,12
<b>Total</b>	<b>19.113.138</b>	<b>80,17</b>

Source: General Agricultural Census 2002 (INSSE)

In the county of Hunedoara there is a livestock density of 19,6 cattle, 42,2 pigs and 42,2 sheep and goats per 100 ha. Since the county is made mainly of mountains and foothills, where livestock is usually raised extensively, it can be estimated that most of the cattle and of the sheep and goats are kept on the mountain pastures. In the Retezat National Park these densities are estimated to be slightly smaller (16,3 cattle and 20,1 sheep/ on 100 ha). However, the National Park territory is surrounded on the west, south and east by large mountain ranges on which livestock raising is practised.

In the territory of Retezat National Park the number and distribution of livestock changes from year to year. However, the main livestock activities, in this case the mountain camps, remain more or less the same. According to the last official census, of 2003, there were 18 different pastures in the park territory, on which a total of 10.990 sheep, 252 cattle, 245 horses and 14 donkeys (Tab. X) were kept. These pastures are all located in the higher altitudes of the Mountain range (Fig. X).

<b>Name of the pasture</b>	<b>2003</b>
Arades	970 sheep
Zlata	0
Secari	100 horses
Zanoguta	0
Zanoaga	700 sheep
Slavei	970 sheep
Bucura	140 cows; 30 horses; 4 buffalos
Peleaga	1100 sheep; 20 horses; 3 donkeys
Papusa	1100 sheep; 20 horses
Piciorul Coltului and Fata Retezatului	320 sheep; 14 horses
Stanisoara and Pietrele	108 cows
Valea Rea and Gales	61 horses
Dragsanu	2200 sheep; 11 donkeys
Stanuleti	1000 sheep
Dalma cu Brazi	800 sheep
Scorota	530 sheep
Buta	300 sheep
Piule and Plesa	1000 sheep

The livestock raising system that is practiced in the Retezat Mountains, as well as all over the Romanian Carpathians, is particularly favourable for the presence of wild carnivores, and also for vultures. In this form of livestock raising, known as “pendulating livestock raising”, the domestic animals are taken onto mountain pastures in early summer, where they are kept until they are taken back to the villages at the beginning of winter. Thus, during the summer months the grasslands in mountain areas are generally strongly populated by livestock. The flocks use very vast grassland ranges and although the animals are guarded by shepherds and dogs they can easily get lost, especially in bad weather conditions or during darkness. Also, livestock is commonly predated on by large carnivores (wolves (*Canis lupus*) and bears (*Ursus arctos*)). Therefore the presence of livestock carcasses on the ground is not rare, although an estimate of the biomass is not possible.

One of the major roadblocks for vulture conservation or recovery in Europe is the EC-imposed sanitary-veterinary legislation that forbids livestock raisers to leave dead animals on the ground. In most cases the legislation imposes that the carcasses are buried or otherwise disposed, and thus not left to scavengers to feed on. Romania is now aligning its legislation to the requirements to the European Commission, which includes also the regulations for carcass disposal. However, this is not likely to represent a major problem in the near future: also if foreseen by law, it will hardly be possible to impose that all carcasses are disposed according to the EC laws. The pastures on which the livestock is kept are usually in remote areas, often to be reached only by walking long distances. This implies that on the one hand it is not realistic that the shepherds transport the carcasses to the next incinerators, and on the other hand that an effective control cannot be performed. Therefore it is likely that in the future, as long as the present livestock raising systems will exist, this food source will be available to a certain degree. One critical factor for the conservation of vultures is thus the conservation of extensive livestock raising activities in the mountains.

#### 1.10. Wild species

The Retezat Mountains is hosting significant populations of large sized mammals. The population figures of the National Park itself are not clearly known as the evaluation of game species population size is done according to the hunting territories delimitation done by the National Forestry Institute together with the Hunters Association.

There are several (7) hunting areas overlapping with the territory of the National Park. The subpopulations of different species of the core park area are forming one whole population together with the

<b>Species</b>	<b>Population</b>
<b>Roe deer</b> ( <i>Capreolus capreolus</i> )	259
<b>Red deer</b> ( <i>Cervus elaphus</i> )	227
<b>Chamois</b> ( <i>Rupicapra rupicapra</i> )	961 (450-480 in the protected area)
<b>Wild boar</b> ( <i>Sus scrofa</i> )	212

subpopulations situated outside the protected area, and they will form together the biomass available for the vultures based on wild species.

The wild ungulates are well represented in the park, the population figures are the following:

These populations are not big enough to support a large vulture colony, but together with the livestock they create the main food base of the vultures. More importantly the wild species are all year round in the mountains (of course with some altitudinal movements) and due to the increased winter mortality they will play an important role in the diet of the vultures especially in the winter time.

The large carnivores are important members of the mountain ecosystems, being especially important in the safeguarding of the existence of both livestock and wild species carcasses. Fortunately Romania is hosting the largest populations of both bears and wolfs (except Russia) in Europe. In 2004 the estimated national population (by the National Forestry Institute) size of the brown bear was 6356 individuals, in the same year the wolf population was estimated to be over 4000 individuals. These figures may be a bit exaggerated, but still it is unquestionable that the national populations of both species can be considered at the moment as healthy and safe populations. The National Parks brown bear population is estimated to be at around 30 individuals while the wolf population is thought to be around 60-70 specimens.

#### *1.11. Hunting activities*

The hunting rights of the hunting areas overlapping with the national parks territory are all in the possession of the National Forestry Institute (NFI). Hunting on the territory of the NP is strictly forbidden (in line with the Hunting Law (103/1996)), and as on the NFIs hunting territories there are no hunter groups (as on the hunting territories managed by the Hunters Association) the hunting pressure on game species is much lower than the national average.

The lower hunting pressure is lowering the possibility of the disturbance caused by hunting, the probability of shooting on birds as well as significantly decreases the chances of lead poisoning in the Park and in the immediate surroundings.

## **9. Socio-economic situation and attitudes**

Romania began the transition from Communism in 1989 with a largely obsolete industrial base and a pattern of output unsuited to the country's needs. The country emerged in 2000 from a punishing three-year recession thanks to strong demand in EU export markets.

In this country the socio-economic situation in rural areas is still poor. After the revolution in 1989 Romania was free of debts, due to Ceaușescu's strict austerity measures. However, as an effect of the past communist regime the population had lost the ability to deal

with a free market economy. Also, the economic, agricultural and industrial infrastructure was strongly impoverished. The consequence was an extremely fast inflation, which peaked in 1993 at 356%. However, salaries increased much more slowly than the prices. Thus, in 2003 prices were 212 times higher than in 1991 whereas real salaries were 69% of the real salaries in the same year. This translates into very simple living conditions, both in the cities and in rural areas. Also, in many areas, mainly in mountain areas, roads, industry and other infrastructure are very poorly developed. This is the case especially in the Retezat area, which is one of the most scarcely populated areas of Romania.

### *10.1 Agriculture/livestock raising*

In Romania agriculture is one of the professional activity that employ the biggest percentage of the National work force (34,7%) (Romanian Statistical Yearbook (INSSE) 2005). However, the productivity of this sector is low, in fact agriculture accounts for only 13,1% of the Gross Domestic Product.

In the study area, as in the whole of Romania, small-scale agriculture and extensive livestock raising still plays a major role in the local professional activities. Indeed, in this country round 40% of the labour force is active in agriculture, and a third of this lives of livestock production. In the county of Hunedoara (the county in which the study area is located) 49% of the surface is agricultural land, of which 73% is used for livestock grazing (pastures and grasslands). This is because the county is mainly made of mountain ranges and hills, where large-scale agriculture is usually not practised. In these areas the arable lands are usually made of the small patches of land belonging to individual holdings, which do agricultural production for own consumption.

Especially in mountain regions agriculture is still largely practiced with traditional methods and with a very scarce use of machineries. It is still very common that hay is cut with had scythes and gathered by women with forks, whereas the arable lands are still worked on with machineries pulled by horses.

Since the fall of the communist regime in 1989 there has been a strong decrease of the livestock raising sector, mainly in mountain areas. When the old collective farms were dismantled private farmers did not take over the livestock because they could not afford to keep large animal numbers. Consequently, huge livestock numbers were slaughtered throughout the early 90ties. The 15% increase of livestock numbers in private hands did not manage to compensate for this huge decline. Therefore, the national flock decreased by 42% from 1990 to 2002. The most consistent decrease was among cattle numbers (54%), followed by sheep (53%) and pigs (29%). Only the number of horses has increased by 38%.

The extent of extensive livestock raising is, however, likely to further decrease in the future: Romania submitted its application for EU membership in 1995 and will probably be ready for accession by 2007. For this the country is in the process of aligning its legislation to EU requirements, which among others implies the development of rural development and agri-environment strategies.

The envisaged accession of Romania to the EU is making living conditions of small-scale livestock raisers increasingly difficult. Cheese, the main product of traditional livestock raising, could not at present be exported to EU Member States unless substantial investments in infrastructure are made to meet the rigorous EU hygiene, welfare and quality requirements. In the meantime, imports from the European Community, including cheese, are increasing at extremely fast levels. Thus, in the future there is likely to be a significant reduction in the demand for cheese produced at mountain livestock camps.

There is still a lack of a sound legislation that fights this trend. In the last decade the Common Agricultural Policy (CAP) has foreseen a series of tools that aim at reducing the negative effects of agriculture on the environment and at the same moment promote small-scale farming in all Member States. However, these tools have not yet been adapted to the specific Romanian conditions in the form of a national rural development policy. Therefore, up to now efforts to support small-scale farmers and to environmentally protect agricultural land are still at their very first stages. Also the development of agri-environment schemes is in its initial phase and there is no guarantee that these will address the needs of traditional pastoral systems.

## *10.2 Forestry*

The Romanian Carpathians are covered to their majority by vast forests. Huge areas are still untouched by humans and represent one of the most pristine ecosystems in Europe. Nevertheless, forest exploitation is consistent in the country: Romania has an ancient tradition of forest exploitation mainly, which until recently has been carried out by the National Forest Administration (Regia Nationala Padurilor - RNP). Since 2000 forests have been partly privatised according to Law on reconstitution of the right of land property (*Pentru reconstituirea dreptului de proprietate asupra terenurilor agricole și celor forestiere-1/2000*). Since then, round one third (2 million hectares) of the forests have passed into the hands of private owners whereas another third is planned to be privatised in the coming years. Thus, RNP will remain with the ownership of round one third of the Romanian forests. The management of the private forests is now in the hands of private forest districts, which are controlled by private control companies. These, on their turn, have to produce documentation about the state and the exploitation of the forests, which have to be approved by the Ministry of Agriculture, Forests and Rural Development. This trend is believed to be causing a progressive decrease of the

conservation value of the forests, whereas the overall forest surface is believed to increase due to the general trend of abandonment of rural areas.

In the territory of Retezat National Park forest exploitation is done only for management reasons, whereas any exceptional intervention has to be approved by the Romanian Academy and with the central authorities (Ministry of Agriculture, Forests and Rural Development, Ministry of Environment and Water Management). Therefore, in this area the pressure of forest exploitation is not likely to be a threat.

### *10.3 Industry*

The study area is within the Retezat National Park, in which borders no industry is present. In the immediate surroundings only minor industry is present, among which the textile industry in Lupeni (south of the Park), a termoelectric plant in Hateg (north-east of the Park territory) and a minor car factory in Petrosani (south-east of the Park). The Jiu Valley, extending from Petrosani to the south, is home to the largest coal extraction industry of the country, which is the major source of income of the whole Southern part of the valley and its confining lowlands. However, the area in which this exploitation is more intensive is located around Targu Jiu, which is at over 40 km from the border of the National Park and from the high mountain areas.

### *10.4 Tourism*

The Retezat National Park is the most ancient National Park in Romania and is an area of spectacular beauty and with huge untouched ranges. It is, therefore, one of the major tourist attractions of the countries. However, the number of tourists visiting the area is very low if compared to other mountain areas in Europe (15 – 20 000/year). Also, as in many areas in Romania, the tourist infrastructure is extremely poor. There is no major hotel the only infrastructure for accommodation being represented by 8 touristic cabins that can be reached by car, but are outside of the Park boundaries. Within the Park the only accommodation possibilities are three cabins that can be accessed only by foot, and 8 camp sites. There are no restaurants, cable cars and other tourist infrastructures and paved roads within the Park and the closest major paved road is at over 10 km from the park boundaries.

### *10.5 Public attitudes*

The opinion poll carried out in summer 2005 (Annex IV) revealed a generally positive attitude towards vultures, and specifically griffon vultures, although the general knowledge about the species was relatively low.

The positive attitude and the lack of resistance towards a reintroduction is remarkable considering that all four vulture species have been eradicated from Romania by humans and considering that reintroductions often do meet strong resistance by local communities. This is even more remarkable in the light of the fact that most respondents believed that a reintroduction is possible and thus apparently this option is considered realistic.

It appears that in general quite consistent confusion is made between birds of prey (eagles, buzzards) and vultures. In general, the knowledge about bird species appeared to be relatively low, considering that all the species that were asked to be identified (except for the griffon vulture) are species that are commonly found in the study area. However, also exotic species were named (penguin, parrot, peacock), which suggests that the knowledge of people about birds might be influenced by the mass media. Foresters appeared to have a better capability to distinguish vultures from eagles, which is expectable due to their professional activities.

It is suggested that many people are unable to distinguish between eagles and vultures and this hypothesis is supported by the fact that the knowledge score about feeding behaviour was low. In fact the majority of the respondents wrongly stated that vultures are predators and that they kill animals to feed on them. Also, half of them stated that these birds kill livestock. All these are typical characteristics of eagles.

This is even further supported by the fact that most people wrongly believed that vultures are solitary (which instead is true for eagles).

These findings are extremely important for a potential reintroduction of Griffon vulture in Romania because they indicate that there is a strong need for people to be informed about the difference between predatory birds (eagles) and vultures, equally across the professional categories.

The importance of public information about vultures is supported by the correlation that appeared to exist between the attitudes of people towards these animals and the general knowledge, and by the inverse correlation between knowledge and the belief that these birds kill livestock.

## **10. Threats**

The success of a reintroduction program is strongly depending on the ability to reduce the magnitude of the threatening factors historically causing the extinction. In the same time we have to keep in mind that in the last decades, serious demographic changes took place all over Europe, the linear infrastructure was strongly developed, the agricultural habits were “reformed”, the lifestyle of the urban (and the rural) population changed significantly. These changes may result in the destruction of former habitats or food sources which may hinder the



carrying capacity of certain habitats. One of the most important objectives of this study is to identify potential threatening factors a potential future vulture population.

*a. Anthropization of the territory*

The Retezat National Parks territory has no human settlements, so the static urbanization can not be considered a problem. The demographical indicators of the territories on the southern edge (Upper Jil valley) of the park were fluctuating in the past, after a strong increase in the population due to the development of the coal mining industry, after the fell of the communism the areas human population is strongly decreasing due to the closing of the majority of the coal mines (this were underground mines with no significant effect on the landscape), Hunedoara county being on the first place in Romania with regards the number of citizens permanently leaving the county (mainly due to the situation in the Jil valley).

The most important recently developed human induced impact on the area is caused by tourism. The tourism industry is developing on a daily basis, the Retezat National Park is one of the most visited “wild” mountain areas of Romania (15-22.000 visitors/years). Fortunately and thanks to the park management the tourism was not evolving towards the mass tourism, and no important tourist infrastructure development took place in the area. The national parks management is willing to keep this direction of the development to avoid the adverse effects of mass tourism, and is presently developing a sustainable tourism strategy for the area with the financial support of PAN-parks.

As a conclusion we can state that tourism does not represent a serious threat for an eventual future vulture population. It is however advisable that the location of the reintroduction place should be selected in a way to avoid as possible the areas with many tourist tracks and if possible to avoid the use of rocks traditionally visited by cliff-hangers. The south eastern part of the park offers several such rocky areas where no significant human disturbance can be foreseen.

*b. Habitat destruction*

Habitat destruction does not occurred in the Retezat Mountain or at least not on a significant level. There was no linear infrastructure built trough the park; no quarries were created inside the park; the habitat structure and percentage of the different habitats does not changed significantly in the last century.

We can state that if the Retezat National Park was hosting vulture populations its carrying capacity was not influenced by changes or destruction of the habitats. Furthermore it is very unlikely that in the future such habitat destruction will occur.

*c. Power lines*

There are no power lines on the parks territory.

Never the less as in the construction of the Romanian power lines many pylons types are used (out of which quite a few are especially dangerous for large sized birds) this threatening factor can not be overlooked. The most dangerous pylons for birds are the medium-voltage transmission line pylons (15-20 Kv), as these type of transmission lines are reaching virtually all Romanian settlements it will be very hard to locate the release site in a way to avoid the birds easy contact with such lines.

The Milvus Group has recently developed (as part of the activities under a GEF-SGP project) in cooperation with the Mures County Electric Company the insulation methodology for the most dangerous pylon types. The insulation of the most dangerous pylon types in the vicinity of the release site will be absolutely necessary, but as the insulation can be very expensive (can be close to 100 Euros) during the selection procedure of the reintroduction site this aspect should be carefully assessed.

*d. Lack of food sources*

Lack of food sources is one of the major threats for newly established vulture populations. Ideally the vulture population should be self sustainable in the long run, and abundant food is the most important precondition for such self-sustainability.

In the Environmental Suitability Assessment prepared by Chiara Polce (ITC) the potential food sources of the Retezat Mountains are also assessed (Appendix II). According to the conclusions of the study, the Retezat National Parks carrying capacity is not big enough to support a viable (60 individuals) Griffon Vulture population. These results are not to encouraging but we have to keep in mind to important facts that may possibly change these conclusions:

- i. the Retezat National Parks management is trying to limit the amount of the livestock which gains access to the parks territory due to the risk of overgrazing of valuable+ alpine pastures. As a result the livestock densities just outside the park (reachable of course by the vultures) are probably significantly higher.
- ii. Outside of the park limits the region is not so forested like in the park, this may also result in higher densities of livestock and some wild ungulates. Especially in the southern and the western edge of the park huge mountain pastures can be found.

If we consider these two facts it is obvious that to be able to determine the real food limitations we need to investigate the abundance of food resources in the surroundings of the park to be able to include these data into the used GIS model (proposed by C.Polce as well).

After the necessary data is gathered we will have a much more realistic picture on the carrying capacity of the area.

*e. Poisoning*

It seems that this formerly crucial threatening factor is not so important in Romania at the present situation. We do not possess information on recent cases of poisoning of large carnivores or raptors. The healthy large carnivore populations as well as the constantly increasing number of Ravens and the lack of any recent information about poisoning is all showing that this critical factor (some of the Balkan countries) is not likely to create great problems for the future reintroduction program.

*i. Illegal use of poison*

In Romania the illegal use of poison is not a usual method for the control of the large carnivores. The two main social groups which are likely to use poison for this purpose are the hunters and the shepherds. Hunters are protecting the carnivores as they produce a significant income for the hunters association as well as to the government when hunted with foreign hunters (a large brown bear can cost a foreign hunter several tens of thousands of Euro). This unfortunate situation for the mammal conservationists is basically preventing the hunters from the use of poison. In Romania virtually all of the shepherds are protecting their herds with (usually large numbers of) dogs, this habit never disappeared in Romania like in other countries where the extirpation of the carnivores made the guarding dogs unnecessary. These dogs are kept in very severe conditions, regularly being forced to acquire their own food from the nature. As the dogs are constantly searching for food, the use of any kind of poison by the shepherds would target primarily their own dogs. Due to this reasons deliberate poisoning of wildlife is not very probable.

As the vultures are particularly sensible for any incidence of poisoning the problem has to be further investigated. The use of the formerly most commonly used poison the strychnine is forbidden by law. Poisoning as a whole is forbidden by law (103/1996 under revision by the parliament) and in the case of hunters or gamekeepers is even more seriously punished (2-5 years of prison for gamekeepers). Even the use of toxic agricultural pesticides is forbidden without the necessary precautionary measures (unfortunately, strict enforcement of this article is absolutely not realistic at the moment, and “necessary precautions” are not defined). Awareness raising with regards the use of toxic materials for the general public is badly needed, as strong poisons can be brought on the internal market without any limitation (ex. different carbofuran products).

In the future everything has to be done (awareness raising, improving the legislation) to prevent accidental or isolated poisoning actions, which in an unfortunate situation can have catastrophic effects on the future vulture population.

*f. Direct persecution*

According to our interpretation of the literature, direct persecution of the raptors was one of the main causes of the extinction of vultures from the Romania. Shooting of birds and collection of eggs and nestlings were widely practiced and done in some cases on an almost “industrial” level. The collection of more than 370 black vulture eggs in three consecutive years (Linția 1954) from one colony in Northern Dobrogea shows the brutal effectiveness of the methods used. More than half of the data in our vulture database are referring to “collected” birds. Today all the raptor species are protected by the law (between others Law on hunting 103/1996 and Law on nature conservation 462/2001), however enforcement of these laws are not always satisfactory, till now according to our knowledge no hunter was fined or persecuted due to illegally killing raptors.

*i. Collection of eggs and nestlings*

In Romania the collection of eggs and nestlings is not a major threat, however we possess some anecdotal information about some persons trading in eggs of wild species. If the location of the release site and that of the envisaged colony is situated inside a protected area like the Retezat National Park, this kind of threatening factors can be minimized.

*ii. Shooting*

There are 47-48.000 hunters in Romania. The general attitude among the hunters towards raptors is not positive. Usually the knowledge of hunters on the ecology of the raptors is very weak, and raptors are still generally considered pests. Even if the legal background is now very clear, the unofficial (practical) attitude towards basically every species with hooked beak is just slowly changing, many hunters still killing occasionally raptors.

As hunting in National Parks is prohibited by the law (and this piece of legislation is enforced quite well), shooting will not represent an imminent threat to the reintroduced population. However the implementation of a serious awareness raising campaign for hunters, about raptor ecology in general and especially with regards vulture feeding habits, is strongly suggested to avoid losses of dispersed individuals.

*a. Lead poisoning*

Lead poisoning as a threatening factor for scavenger birds was not assessed at all in Romania. Lead-free ammunition represents a very small fraction of the used ammunition in Romania (probably well under 1 % according the Hunters Association). A future investigation of lead contents of blood samples (liver in dead specimens) of Ravens and Golden Eagles from the Carpathians would clarify the magnitude of this threatening factor.

## 11. Resources for the reintroduction

- *Human resources* – the joined human resources of the organizations implementing this study together with other interested organizations (ex. Romanian Ornithological Society) are definitely enough for the successful implementation of most of the tasks of a reintroduction project (the Milvus Group alone has 5 employees specialized in raptor conservation). Other potential partners as National Parks would also dedicate human resources for the project, the involvement. On the other hand the human resource available has to be trained and formed to enable successful implementation. The identification of exact needs in terms of human resources at the moment is not possible, training of coordinators and/or exact guidelines provided by the BVAP are needed to build up and develop the reintroduction team.
- *Economic resources* – no *obvious* or *easily accessible* national financial resources are available for reintroduction purposes. However several institutions may be successfully approached for co-financing of the project (Ministry of Env., Ministry of Agr., Hunters Association, etc.), and even the national “Green Fund” may prove to be an option in the future. Corporate funding is not really working in Romania, at least not on the necessary level, but a reintroduction project may prove to be attractive enough especially for large multinational companies to get on board in financial terms. As a conclusion external funding for the project is critical but this may attract national or corporate funding.
- *Availability of individuals* – according to our understanding of the information received on the BVAP Prilep meeting, availability of individuals is not a major problem, as the available birds in Spain can provide the seed populations for several reintroduction projects in the Balkans.

## 12. Legal background

The Romanian legal system is under a serious and fundamental reforming process, especially due to the country's future accession to the European Union. This situation was not favoring our efforts to have a clear picture about the legal background of vulture reintroduction in Romania.

At the moment several critical pieces of legislation are in the pipeline of the Romanian parliament (just to mention a few: “Hunting Law” – regulating among other the introduction of new species (extinct species as well) in the Romanian fauna, “Law of Environmental Protection” regulating several relevant issues like use of poison, introduction of species, etc.

“Law referring the disposal of waste of animal origin” – relevant for carcass disposal, no such law till the present days).

All vulture species are protected by the law (103/1996; 462/2001), the vultures were among the first species to be declared as “Monuments of Nature” which is the highest conservation status in Romania (M.O. no.600/1933). Unfortunately the weakness of the enforcement of this law is well shown by the present situation of the vultures in Romania.

The introduction of new species is momentarily regulated by the “Law on Hunting” (Law: 103/1996), which states in its article no: 21: *“Introduction of new species in the Romanian fauna is done based on specific research results, and has to be approved by the central public authority responsible for forestry.”* It means that reintroduction as well, has to be approved by the Ministry of Agriculture, Forest and Rural Development. Milvus Group proposed that in the new law in case of introduction of any species in the wild fauna, the approval by the Ministry of Environment should be also obligatory, so it is likely that in the new law, for the reintroduction the approval of the ME is also obligatory. It’s very improbable that any of the ministries would create any problem with regards the approval process.

Presently the legal situation with regards the disposal of the waste of animal origins is not clear, the sanitary veterinary law (Law no.75/1991) is not clearly regulating this question. Romania is presently aligning (Law still under parliamentary debate) its legislation to the EC-imposed sanitary-veterinary legislation, which includes also the regulations for carcass disposal. However, this is not likely to represent a major problem in the near future: also if foreseen by law, it will hardly be possible to enforce the legislation (details under paragraph 9.1 present study).

Poisoning is prohibited in Romania by several legal documents (103/1996; 462/2001) however the situation is the same in most of the countries where poisoning is representing a real problem. The access to highly toxic substances for vultures is not limited by the law, for example not prohibited by law.

The legal requirements for vulture reintroduction are not clear enough. The species exact conservation status will change soon probably in the preferable direction. The frameworks for species reintroduction, carcass disposal, damage compensation are all under parliamentary debate. A detailed analysis of the finalized legal framework is necessary. Finalization of these pieces of legislation will happen till the end of 2006 the latest, but probably till the beginning of October 2006 when the next country report about Romania will be presented by the EC.

### **13. Conclusions**

It appears from the presented data that the conditions are given for a reintroduction of Griffon Vultures in the Romanian Carpathians whereas the area of the Retezat National Park might not be the most suitable area. The fact that it is known that this species used to inhabit this area but no nesting is clearly reported indicates that it not present the sufficient conditions for a permanent presence of this species. Indeed, the Retezat mountain range is subject to strong snowfall and harsh weather conditions in winter, which might be a discouraging factor for these vultures if more suitable nesting areas are available in the nearby. On the other hand the area of the National Park and its surroundings might be an important area to provide food sources for the summer months, considering that in that area human disturbance is low whereas the traditional livestock raising activities, which are an important food source, are still widely practiced. It is therefore likely that an area South of the Retezat Mountain range might be suitable for a reintroduction. The westernmost extremity of the Carpathians, at the very border to Serbia and Bulgaria, might combine suitable conditions for such an effort: the climatic conditions are milder and the area is less subject to heavy snow fall. The area is also likely to be suitable from the geomorphologic point view since it is interspersed by several steep valleys with extensive rock walls. On the other hand this area is not far in flying distance from the Retezat Mountain range and its surrounding, which might provide an important food source in summer.

It is, however, important to extend the present feasibility study onto this area in order to be sure that all the necessary conditions are met.

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