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Past and Present State of the Cinereous Vulture (Aegypius monachus) and Feasibility Analysis for its Reintroduction in Bulgaria

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Abstract. Widespread in the past, the cinereous vulture has disappeared in most of Europe (including Bulgaria) in the twentieth century. Surviving nucleus remained only in Spain, Greece, Ukraine and the Caucasus. The species is considered extinct as nesting in Bulgaria yet within the Red Data Book in 1985. Despite occasional observations in the country and frequent presence and even sporadic nesting of solitary pairs in Eastern Rhodopes Mts., the cinereous vulture's Balkan Peninsula population (only one colony of 20-30 pairs in NE Greece) shows inability to increase further, disperse and reestablish naturally. This justifies the need to assist creation of new and more nesting sites to ensure long-term conservation of the species, based on local reintroduction in Bulgaria. After the success with the local reintroductions of the griffon vulture since 2010 in the Kresna Gorge and different places along the Balkan Mountains the conservation community in Bulgaria was encouraged to further proceed with the exploration and planning of reintroduction and conservation activities for the cinereous vulture. Herewith assessment of the chosen territories for reintroduction is presented and recent best sites in Bulgaria identified.

Key words: local extinction, reintroduction, conservation, *Aegypius monachus*, *Gyps fulvus*.

Introduction

The cinereous vulture *Aegypius monachus* (also known as Eurasian black vulture) – the largest bird of prey in Europe, obligate scavenger, breeding solitary or in loose colonies, nesting in trees (CRAMP & SIMMONS, 1980), classified globally as "near threatened" (BirdLife International, 2018) used to be a widespread species in southern Europe, but since late 1800s until mid 1900s experienced dramatic decline and

disappeared from most of its range (including Bulgaria) (PATEV, 1950; BOTEV & PESHEV, 1985, HRISTOV & STOYANOV, 2002; STOYANOV *et al.*, 2007; GOLEMANSKY *et al.*, 2015). Surviving nucleus remained only in Spain, Greece, Ukraine and the Caucasus, while since 1990s small nuclei were reintroduced in south of France (BOTH *et al.*, 2017). In Spain, from the 1980s to the present day, the species is recovering, which is possible due to the adoption of specific

conservation measures, such as the ban and strict control on the use of poison baits, the protection of the main nesting colonies and the operation of feeding sites (BOTHÁ *et al.*, 2017). In Greece – the nearest to Bulgaria breeding colony of the species in Dadia-Soufli-Lefkimi Forest National Park the number ranges between 20-35 pairs in the last three decades (SKARTSI *et al.*, 2003; 2009; POIRAZIDIS *et al.*, 2004; SKARTSI, 2019). Despite the slow and slight increase in the number of the colony in Dadia-Soufli-Lefkimi Forest National Park and subsequently the increase in observations of immature birds roaming across the border in Bulgaria, still no new breeding nuclei or colonies were identified in neither Bulgaria, Greece or Turkey. Recently, increased mortality of young adults and immature birds in the colony was reported especially for birds that are leaving the very central core of the Dadia-Soufli-Lefkimi Forest National Park (SKARTSI, 2019).

The following two facts provide for the need of reintroduction of the cinereous vulture in Bulgaria:

1. The inability of the cinereous vulture's population on the Balkan Peninsula to increase further and disperse on its own;
2. The need to provide new and more nesting sites to ensure its long-term conservation.

Following the experience of the Foundation for Conservation of the Bearded Vulture (FCBV) in the reintroduction of this species in the Alps and FIR into the reintroduction of the griffon vulture (*Gyps fulvus*) in France in 1986 and the establishment of the Black Vulture Conservation Foundation (BVCF), today there are enough experience and knowledge to recover the large vultures' populations in Europe (TEWES *et al.*, 2004).

In 2003 the Fund for Wild Flora and Fauna (FWFF), "Green Balkans" and the Birds of Prey Protection Society (BPPS) in Bulgaria launched projects for restoration of the griffon vulture in Kotel Mountain, Sinite Kamani Nature Park, Vrachanski Balkan Nature Park, National Park Central Balkan and the Kresna Gorge. In 2007, the first

griffon vultures were released in the Kotel Mountain, and in 2010 the same occurred in the Kresna Gorge, the Sinite Kamani Nature Park, the Vrachanski Balkan Nature Park and the Central Balkan National Park. The first results were encouraging with 20-25 breeding pairs and 11 fledged young in 2016 (STOYNOV *et al.*, 2018) and continuing increase along Balkan Mountain sites, after more than half a century of absence from these areas. The initial results give rise to exploration and planning of conservation activities for the rarer cinereous vulture.

The purpose of this study is to present the past and present state of the cinereous vulture in Bulgaria, to assess the possibility and to rate different sites for their feasibility to host colonies of the species upon reintroduction.

Materials and Methods

The presented past and present state of the species is based on survey of the existing literature and unpublished data on the species and on personal observations.

Feasibility study was made with evaluation of the possible sites for reintroduction of the cinereous vulture in Bulgaria. On the basis of a preliminary assessment the following areas have been considered: 1. "Vrachanski Balkan" Nature Park; 2. "Sinite kamani" Nature Park – Kotlenska Planina SPA; 3. Kresna Gorge – Pirin Mts.; 4. Eastern Rhodopes Mts.; 5. Western Rhodopes Mts.; 6. Varbisha Planina Mts.; 7. Kamchiiska Planina Mts. and 8. Provadiya-Royak Plateau.

Under the IUCN Guidelines for reintroductions, each species reintroduction project must be preceded by a feasibility study (IUCN/SSC, 2013). This paper provides the results of such a study for the feasibility for reintroduction of the cinereous vulture in Bulgaria, carried out within the LIFE08NAT/BG/278 project "Vultures' Return in Bulgaria" (2010-2015), supported by the EU LIFE + financial instrument.

Based on data for historical presence and current suitability derived from experts'

opinion, a long-list of nine areas as potential sites for reintroduction of the black vulture in Bulgaria was set up (see map Fig. 1 and Table 1).

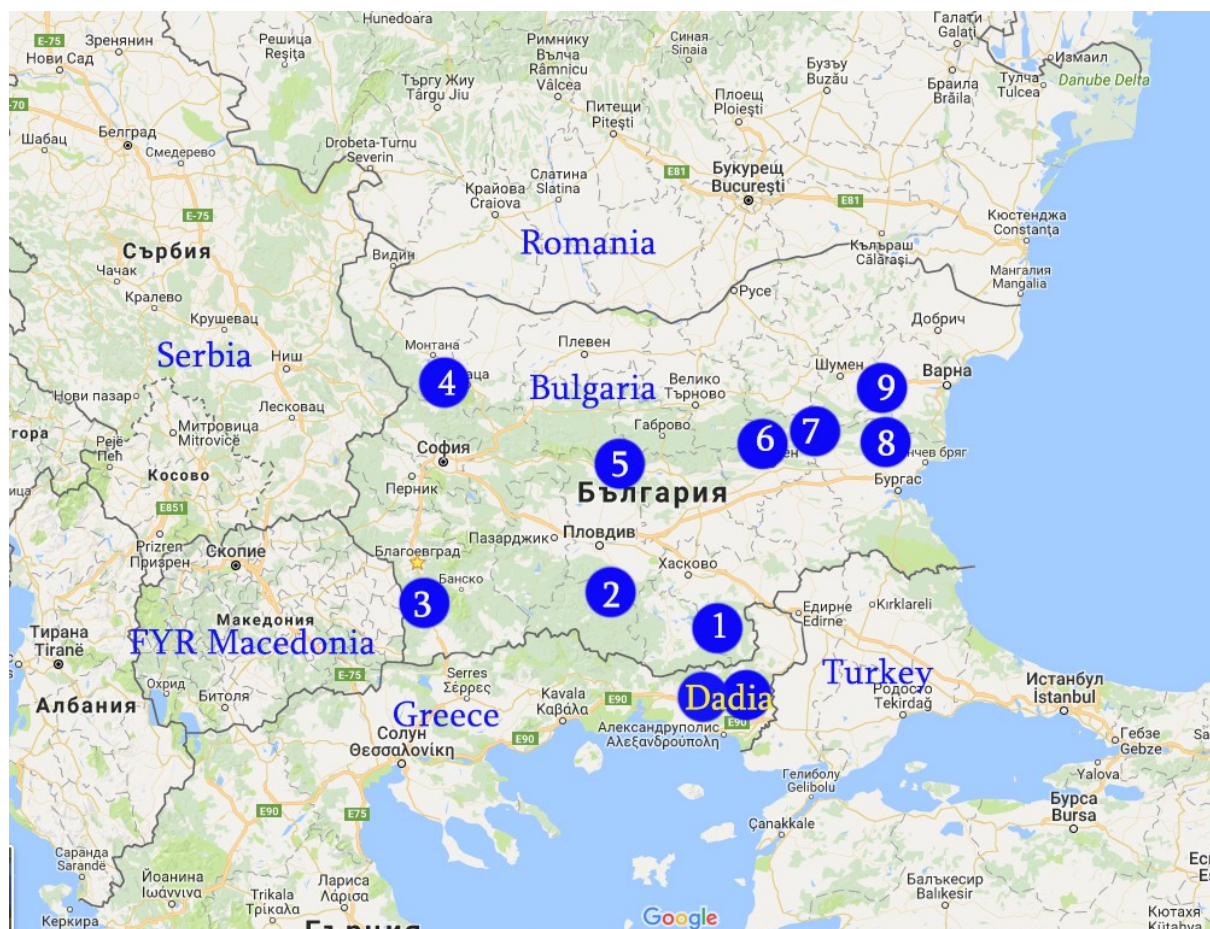


Fig 1. Map of the studied potential sites for the reintroduction of the black vulture in Bulgaria. “Dardia” – shows the place, where the last black vulture colony of the Balkans is recently found; 1 – Eastern Rhodopes Mts.; 2 – Western Rhodopes Mts.; 3 – Kresna Gorge/Pirin Mts.; 4 – Vrachanski Balkan Nature Park; 5 – Central Balkan National Park; 6 – Sinite Kamani Nature Park & Kotel Mountain; 7 - Varbishka Mountain; 8 – Kamchiska Mountain; 9 - Provadya- Royak Plateau.

Table 1. List of areas from Fig. 1 with general values on the concept.

Number on the map	Studied area	General value in the concept
Dardia	Dardia in Greece	Last colony in Balkans Birds still present, based on the near-by Dardia colony. Occasional breeding. Stronghold of the vultures (griffon, egyptian and black) in Bulgaria and Balkans. Three vulture restaurants. Active NGOs – BSPB - BirdLife Bulgaria and Green Balkans.
1	Eastern Rhodopes	Occasional visits by birds from Eastern Rhodopes/Dardia. Suitable nesting habitat.
2	Western Rhodopes	

3	Kresna Gorge/Pirin	Occasional visits by birds from Eastern Rhodopes/Dadia. Suitable nesting habitat. Griffon vulture reintroduction since 2010. National park administration. A vulture restaurant. Active NGOs – FWFF, Balkani Wildlife Society, Semperviva.
4	Vrachanski Balkan NP	Occasional visits by birds from Eastern Rhodopes/Dadia. Historical record for cliff nesting black vultures. Griffon vulture reintroduction since 2010. A vulture restaurant. Nature park administration. Active NGOs – BPPS.
5	Central Balkan National Park	Griffon vulture reintroduction since 2010. National park administration. A vulture restaurant. Active NGOs – Green Balkans.
6	Sinite kamani NP/ Kotel Mountain	Occasional visits by birds from Eastern Rhodopes/Dadia. Historical record for nesting black vultures. Griffon vulture reintroduction since 2010. Nature park administration. Two vulture restaurants. Active NGOs – Green Balkans (Sinite Kamani) and FWFF (Kotel Mountain).
7	Varbisha Mountain	Potential site with historical importance for the species. Surviving egyptian vulture pairs.
8	Kamchia Mountain	Potential site with historical importance for the species. Surviving egyptian vulture pairs.
9	Provadiya- Royak Plateau	Potential site with historical importance for the species. Surviving egyptian vulture pairs.

The indices of most important below-mentioned factors were averaged and the result was used to rank the site. A short-list from the top three ranked sites was considered for further evaluation and detailed description to each site provided.

The suitability of a site for the reintroduction of the cinereous vulture in Bulgaria was calculated using a rating based on combination of several important factors that were indexed and the score used for the evaluation as follows:

a. Protected area - most of the site falls within a protected area and/or a Natura 2000 protected zone. The best estimate is obtained if the site falls into a protected area that has a management body, especially if it covers the bulk of the suitable nesting habitat: Reserve, national park, nature park - 3 points; Partially in a protected area and partly in Natura 2000 - 2 points. Only Natura 2000 zone - 1 point; none - 0.

b. Food base - livestock is calculated conservatively. Only sheep, goats, cattle and

equines (horses and donkeys), mature animals, excluding pigs, chicken and wild ungulates and potential prey species. The cattle and horses are calculated as multiplied by factor of 6 to turn into sheep equivalent. Then this amount is summed with the number of sheep and goats to provide the total sheep equivalent of the area - just to provide possibility to calculate the carrying capacity of the area (based on 20,000 sheep/ equivalent for 100 vultures see bellow [TERRASSE & CHOISY, 2007](#)). However the density of livestock heads per square kilometer is taken to rank the area in this study. The bigger the density the higher the score as <30 animals per km² = 1 point, 30-40 animals per km² = 2 points, >40 animals per km² = 3 points.

According to ([TERRASSE & CHOISY, 2007](#)), at a radius of 30 km from the place of release/nesting in the territory, there must be at least 20,000 sheep or equivalent to expect the survival of a population of 100 griffon vultures. This is calculated for

mortality in livestock of less than or equal to 5%, 150 kg of meat for griffon vulture per year = 300 kg of carcass or 6 000 kg of live animals per bird per year. Of course, it is important to consider the way livestock is farmed and the accessibility of dead corpses to the vultures. In Bulgaria we have to consider also the presence of large predators (wolf, bear and jackal) and very large number of stray dogs, which are in competition with vultures for food resources. See Table 2-5.

c. Breeding habitat - the presence and quality of the breeding habitat is calculated for a minimum of 10 breeding pairs: Suitable forest or trees in rocks at suitable slopes and altitude in remote areas. Subjective assessment based on expert opinion in accordance with the published habitat models.

d. The presence of griffon vulture - the presence of a group or breeding colony in the area or the presence of griffon vultures in separate seasons: Breeding colony - 3 points; frequent seasonal presence - 2 points; occasional presence - 1 point; none - 0.

e. Distance to other colonies of the cinereous vulture - the advantage here is the remoteness of the release site from an active cinereous vulture colony, because the birds released can be attracted and settled permanently in the existing colony. By analogy with the griffon vulture, if the release site is in an area less than 100 km away, almost certainly leads to absorption of the released birds by the existing colony.

f. Active NGOs that are actively engaged in biodiversity conservation and maintain the site and/or have the capacity and could maintain in long-term feeding site for vultures.

g. Poison - here is estimated the danger (potential and current) of poison baits use to control predators and the use of pesticides in intensive farming, which may lead to unintentional poisoning of scavengers. A higher rating means less importance of this factor in the area.

Results and Discussion

Historical distribution in Bulgaria (before 2010).

In Bulgaria, the 1800s and the first decades of the 1900s, the cinereous vulture used to breed in the whole of the country: the Danube plain, the surroundings of Provadia Town, the valley of the Rusenski Lom River, the Danube River Coast, Ludogorie Region, Dobrudja Region, Stara Planina (Balkan Mountain) Mts., Sofia Plain, Vitosha Mts., Rila Mts., Pirin Mts., the Maritsa River Valley, Rhodopes Mts. and Strandzha Mts. At the second half of 20th century, occasional birds or pairs were observed only between Shumen and Preslav, Nevsha, Varna and in the region of the Eastern Rhodopes Mts. - near Borislavtsi, Dolni Glavanak, Kardjali and Kazak (BOEV & MICHEV, 1981; BOTEV & PESHEV, 1985). There is also data for cinereous vulture from the vicinity of Veliko Tarnovo - a stuffed bird, obtained on December 21, 1895, is kept in the National Museum of Natural History. ARABADJIEV (1962) notes that until 1930-1940 he has observed cinereous vultures relatively often in Strandzha Mts. and Sakar Mts. It is possible that the male and female birds, harvested on 22.02.1933 from the area of Murgash, Western Stara Planina Mts., were a nesting pair (their skins are stored in the NMNH-Sofia). Around 1960 the species is hardly found in Bulgaria. There is reason to believe that some pairs or small nuclei existed until later, possibly until the end of the 1970s. During the period 1960-1970, cinereous vultures were reported only 3 times. In the period 1970-1980 observations were 11, 8 were from the Eastern Rhodopes Mts. and 3 from the Eastern Balkan Mountains (MICHEV, 1985). For the period 1980-1990 the number of observations of cinereous vultures is already 147 (IANKOV *et al.*, 1994). Although this figure is due to the intensification of ornithological observations, the increase of the presence of the species itself is undoubtedly a fact, also with the confirmed breeding of single pair in Eastern Rhodopes Mts. in 1993 (MARIN *et al.*,

1998), as well as information for possible breeding in the next several years but without finding the nest (STOYNOV *et al.*, 2007). This is also related to the beginning of active conservation of the last colony of the species and the establishment of the Dadia Forest Reserve (later on turned into Dadia-Soufli-Lefkimi Forest National Park) in the Greek part of the Eastern Rhodopes Mts., along with feeding sites operation there, but also in the Bulgarian part of the mountain.

Present state and distribution in Bulgaria (after 2010).

Since 2010 with the reintroduction of the griffon vulture in Kresna Gorge and three sites along Balkan Mountains and intensive feeding site operations in these sites, appearance of cinereous vultures was expected. The frequent presence of food and interspecies attraction provided results in 2013, when the first cinereous vultures were observed in three reintroduction sites with so far established griffon vulture social groups in Kresna Gorge, Sinite Kamani Nature Park and Kotel Mountain. Since then every year observations of one, but up to five (Kresna Gorge) different specimen cinereous vultures were observed in each griffon vulture reintroduction site. The number and presence in time of single individuals gradually increased (STOYNOV & PESHEV, 2011-2014; PESHEV *et al.*, 2015; 2016; 2017; BONCHEV & STOYNOV, 2017) and also single individuals started to appear in Vrachanski Balkan Nature Park in three years in a row since 2017 (George Stoyanov pers. com.). Not all cinereous vultures reported were marked, but all marked ones originated from Dadia-Soufli-Lefkimi Forest National Park's colony in Greece.

Based on visual marking method (STOYNOV *et al.*, 2015), four cinereous vultures were identified to have been observed in two different sites after some time as follows: 1. Kresna Gorge and Zlatar in Serbia; 2. Vitachevo in Macedonia and Kresna Gorge; 3. Kresna Gorge and Kotel; 4. Kresna Gorge and Madzharovo (PESHEV *et*

al., 2015). The last shows that the cinereous vultures from Dadia-Soufli-Lefkimi Forest National Park use the existing griffon vulture colonies and related presence of vulture feeding sites in Balkans as stepping stones during their pre-adult roaming movements.

Feasibility study

The cinereous vulture faced local extinction from Bulgaria and despite the close proximity to still existing breeding colony in near-by Greece and ever more intensive vulture conservation activities in the last three decades and increasing number of observed individuals in different parts of the country, the species shows no ability to re-colonize new territories. That is why to restore the local population and to boost the Balkan one release of specimens is foreseen in attempt to reintroduce it in new localities along Bulgaria. Nine sites were studied for feasibility to host cinereous vulture colony.

Among the studied sites, the Sinite Kamani NP - Kotel Mountain and Vrachanski Balkan NP showed the highest values for rank of feasibility (Table 6 and Fig. 2). These two sites received equal rank (2.57) that was higher than the rank of the other seven potential areas.

The Eastern Rhodopes Mts. and Kresna Gorge - Pirin Mts. are the second group of important areas with suitable conditions and relatively high rank of feasibility (2.43). The habitat quality of Eastern Rhodopes Mts. is similar to that of the previous two sites, but the lower score comes from the proximity to the existing colony of the cinereous vulture in Dadia-Soufli-Lefkimi Forest National Park in Greece, that is considered negative factor influencing the establishment of local group/colony of newly released individuals by social attraction and absorption. The Kresna Gorge - Pirin Mts. receives lower score for poisoning threat. Due to the last large poisoning event from March 2017, when more than 40 griffon vultures died in single incident (PESHEV *et al.*, 2018) the site was totally rejected from potential sites for

release, despite it was provisionally selected. However the high rank and the on-going vulture conservation actions in the area provide for a possibility in mid-term the site to be re-considered for release of cinereous vultures if the illegal poisoning becomes under control.

Despite of the overall high rating, the Kresna Gorge is down-listed, because it receives a low score for the poison, a problem, which is

difficult to manage in the short term, as opposed to the low score of Vrachanski Balkan NP for the food base. The latter can be compensated by feeding site and food management and by measures to locally increase the number of livestock and wild ungulates that will result immediately and in the medium term.

Characteristics of the sites with highest rankings is provided in Table 7.

Table 2. Mortality rate of livestock by type and average weight of a carcass.

Species	Average annual mortality	Average live weight per individual (kg)	Average amount of meat without bones in a carcass (kg)
Ovine/Caprine	5.0 %	40	34
Bovine	3.1%	250	200
Porcine	4.2%	90	72
Equine	2.3%	120	100

Table 3. The daily food requirement in European vultures. Source: DONAZAR (1993).

Species	At temperature °C	Metabolism to maintain life (Kcal/day)	Required energy (Kcal/day)	Feeding per day (in grams)
<i>Gyps fulvus</i>	30°C	531	590-759	472-607
	0°C	549	610-784	488-627
<i>Aegypius monachus</i>	30°C	563	625-804	500-643
	0°C	572	636-817	509-656
<i>Neophron percnopterus</i>	30°C	160	178-228	142-182
	0°C	236	262-337	209-269
<i>Gypaetus barbatus</i>	30°C	375	417-535	334-428
	0°C	431	478-615	382-492

Table 4. Amount of food needed for potential number of cinereous vultures' local population.

Number of individuals cinereous vultures	Required food in kg/year	
	Min.	Max.
1	182.50	239.44
2	365.00	478.88
3	547.50	718.32
4	730.00	957.76
6	1095.00	1436.64
8	1460.00	1915.52
10	1825.00	2394.40
20	3650.00	4788.80
30	5475.00	7183.20
35	6387.50	8380.40
40	7300.00	9577.60
50	9125.00	11972.00

Table 5. Numbers of livestock as equivalent sheep heads, density of livestock per km² and ranking of each of the studied sites.

Studied area	Equivalent sheep number	Density of livestock per km ²	Index/rank Food base
Varbisha Mountain	522 932	52.32	3
Eastern Rhodopes Mts.	523 148	49.84	3
Sinite kamani NP/Kotel Mountain	383 469	48.57	3
Kresna Gorge/Pirin Mts.	253 796	35.73	2
Provadiisko - Royak Plateau	294 783	32.22	2
Central Balkan National Park	322 354	31.86	2
Kamchia Mountain	269 085	28.97	1
Western Rhodopes Mts.	234 204	19.44	1
Vrachanski Balkan NP	147 988	5.18	1

Table 6. Ranking of the evaluated sites for the reintroduction of cinereous vulture in Bulgaria.

Area	Factor	1. Protected area	2. Natural food base	3. Nesting habitat	4. Presence of <i>Gyps fulvus</i>	5. Distance to existing colony of <i>A. monachus</i>	6. Active NGOs	7. Poison	Rank of feasibility
1. Sinite Kamani NP/Kotel Mountain		2	3	2	3	3	3	2	2.57
2. Vrachanski Balkan		3	1	2	3	3	3	3	2.57
3. Kresna Gorge/Pirin		2	2	3	3	3	3	1	2.43
4. Eastern Rhodopes		2	3	2	3	1	3	3	2.43
5. Central Balkan National Park		3	2	2	2	3	3	2	2.33
6. Varbisha Mountain		1	3	2	1	3	1	3	2.0
7. Western Rhodopes		2	1	3	1	2	2	2	1.86
8. Kamchiiska Mountain		1	1	2	1	3	1	2	1.57
9. Provadiisko-Royak Plateau		1	2	1	1	3	1	1	1.43

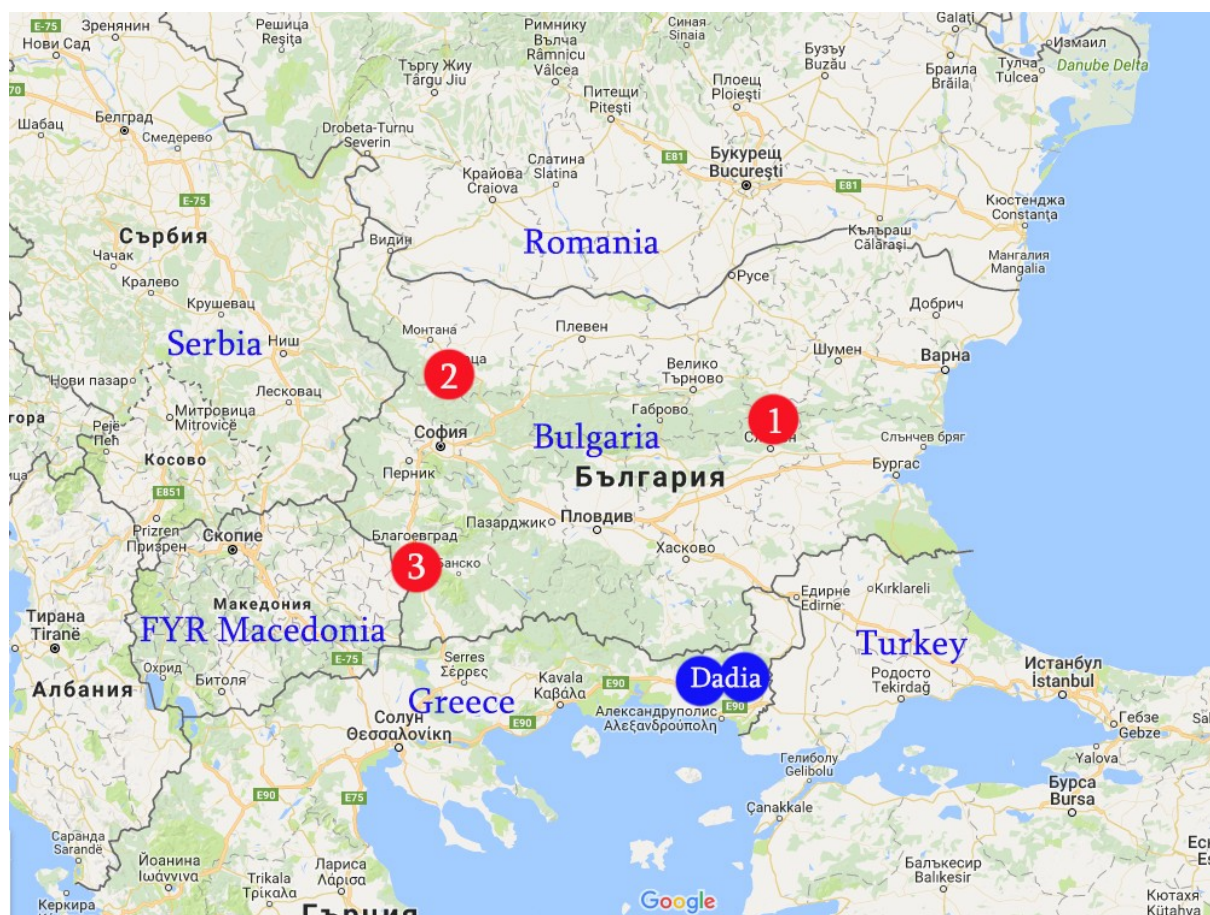


Fig. 2. Map of the short-listed potential reintroduction sites: 1 – Sinite Kamani NP & Kotel Mountain; 2. Vrachanski Balkan NP; 3. Kresna Gorge/Pirin Mts. and the location of the last cinereous vulture colony on Balkans – Dadia-Soufli-Lefkimi Forest National Park in Greece.

Table 7. Description of most important features of the shortlisted sites for reintroduction of the cinereous vulture in Bulgaria.

1. Sinite kamani/Kotel Mountain	
Item	Data
General description	Found in mid eastern Bulgaria, part of the Stara Planina (Balkan Mountain) chain. Low-mountainous area (400-1000 m) with foothills with transitional Mediterranean and Continental climate. Loose populated. Large forest patches are mosaically mixed with open pastures and to the north and south with arable land.
Habitat	Heterogeneous. Forest patches of planted Austrian pine are found among larger missives of oak and beech forests. In some places cliffs and steep slopes tree vegetation provide suitable nesting sites.
Food	383 469 equivalent of sheep heads. Livestock density of 48.57 heads per km ² .

	<p>Sheep, goats and cattle, as well as free ranging horses are grazing the mountainous pastures. In the southern part near Sliven, large pig farms and slaughterhouses provide large quantities of (potential) food for vultures. The Wolf is present in the mountains, but rarely conflicts with livestock breeders as it feeds mainly on wild boar and red and roe deer, which are abundant in the forests. Two large vulture feeding sites (20 km apart) are supplied with about 15-20 tons per year each, by the two NGOs-Green Balkans and FWFF.</p>
Socio-economic factors	<p>One large city – Sliven (90 000 inhabitants) is found in the southern part of the area. The largest protected area- Sinite Kamani Nature Park is found just above the city. Out of the city agriculture – in the mountain mainly livestock breeding and forestry are the main occupations of the local inhabitants.</p>
Other wildlife and related species	<p>Since 2010 the Griffon Vulture was successfully reintroduced. In 2016 – >50 birds are permanently present, 8-10 pairs bred and 5 chicks were produced and the colony increases. 6-8 pairs of Golden Eagle breed in the area. The Egyptian Vulture tends to recover and 3-5 birds are present each summer. Just recently also the White-tailed Sea Eagle is in attempt to re-colonize the area. Eastern Imperial Eagle and the Lesser Spotted Eagle are breeding and frequently present too. The first black vulture in the area for decades was observed in 2013 at the feeding site and since then every year 1-2 individuals are registered.</p>
Strategic importance	<p>The site is found far from Dadia (200 km) to the north. This is the closest step to extend the Eastern Rhodopean black vulture population to Balkan Mountain. If the reintroduction becomes successful, the distance between the black vulture populations in Rhodopes and Crimea will be with 1/3 shorter.</p>
Score	<p>The site is top rated for start of the reintroduction of the black Vulture in Bulgaria. An excellent combination of suitable habitats, food resources, protected areas, active conservation groups, socio-economic importance and strategic position for future successful reintroduction of the black vulture.</p>

2. Vrachanski Balkan Nature Park

<i>Item</i>	<i>Data</i>
General description	<p>Found in north-western Bulgaria, part of the Stara Planina (Balkan Mountain) chain. Low to Mid-mountainous area (500-1500 m) with foothills with Continental climate. Loose populated. Large forest patches are mosaically mixed with open mountain ridges - pastures and to the north with arable land. Large river valley with huge limestone cliffs of up to 400 m walls.</p>
Habitat	<p>Heterogeneous. Forest patches of planted Austrian pine are found among larger missives of oak and beech forests. Large areas represent cliffs and steep slopes with tree vegetation that may provide suitable nesting sites. In some places single pines are found in cliffs, providing classic black vulture's nesting habitat.</p>

	In 1931 in this area cliff nesting of black vultures was reported.
Food	148 000 equivalent of sheep heads and density of 5.18 livestock heads per km ² . Sheep, goats and cattle, as well as free ranging horses are grazing the mountainous pastures. In the northern part near Montana, but also Sofia to the south, large pig farms and slaughterhouses provide large quantities of (potential) food for vultures. The Wolf is present in the mountains, but rarely conflicts with livestock breeders as it feeds mainly on wild boar and red and roe deer, which are abundant in the forests. The BPPS in cooperation with the administration of the Nature Park supply a large feeding site for vultures (40 tons a year).
Socio-economic factors	One large city – Vratsa (54 000 inhabitants) is found in the northern part of the area. The largest protected area- Vrachanski Balkan Nature Park is found just above the city. Out of the city, agriculture – in the mountain mainly livestock breeding and forestry are the main occupations of the local inhabitants.
Other wildlife and related species	Since 2010 the Griffon Vulture was successfully reintroduced. In 2016 - >50 birds are permanently present, 8-10 pairs bred and 4 chicks were produced and the colony increases. 5-8 pairs of Golden Eagle breed in the area. The Egyptian Vulture tends to recover and 2-4 birds are present each summer. The first black vulture in the area for decades was observed in 2016 at the feeding site.
Strategic importance	The site is found far from Dadia (330 km) to the northwest towards the direction of the Griffon Vulture colonies in Serbia, Croatia and Italy, where from the connection with France and Spain would be established. If the reintroduction becomes successful, the distance between the black vulture populations in Rhodopes and pre-Alps (France) will be with 1/5 shorter.
Score	The site is second rated for start of the reintroduction of the black vulture in Bulgaria. Very good combination of suitable habitats, (potential) natural and manageable food resources, protected areas, active conservation group, socio-economic importance and strategic position for future successful reintroduction of the black vulture.

3. Kresna Gorge/Pirin

<i>Item</i>	<i>Data</i>
General description	Found in south-western Bulgaria, along the Struma valley, between the highest mountains in Bulgaria Rila and Pirin, which are also declared National Parks. Low to high-mountainous area (300-2900 m) with foothills with Mediterranean and mountainous climate. Densely populated valley and loose populated mountains. Large forest patches are mosaically mixed with open mountain ridges – pastures and rarely arable land.
Habitat	Heterogeneous. Forest patches of autochthonous and planted Austrian pine, Scots pine and Bosnian pine are found in the mountains – 800- 1800 m. Flat-topped trees are found on high

	altitudes away from people. In the Kresna Gorge a strict reserve preserves Mediterranean forest patches of <i>Juniperus excelsa</i> that forms suitable, but limited in space nesting habitat for black vulture at low altitude.
Food	Sheep, goats and cattle, as well as free ranging horses are grazing the mountainous pastures. The Wolf is present in the mountains and frequently conflicts with livestock breeders, which is a potential threat for illegal use of poisoned baits, especially in the lower parts of the area. The mountain pastures above 2000 m are used for free range pasturing of livestock in summer and the vultures prefer to feed there. The FWFF supply a large feeding site for vultures (>40 tons a year).
Socio-economic factors	One large city – Blagoevgrad (70 000 inhabitants) is found in the northern part of the area. The largest protected areas – Rila National Park, Pirin National Park and the Rila Monastery Nature Park are all found around the city. Out of the city, agriculture – in the mountain mainly livestock breeding, forestry and tourism are the main occupations of the local inhabitants.
Other wildlife and related species	Since 2010 the Griffon Vulture was successfully reintroduced. In 2016 – more than 50 birds are present, 8-10 pairs are formed, 4 bred and 2 chicks were produced and the colony increases. 3-4 pairs of Golden Eagle breed in the area. The Egyptian Vulture tends to recover and 2-3 birds are present each summer as well as black vultures – 5 different individuals in 2015.
Strategic importance	The site is found far from Dadia (280 km) to the west towards the direction of the Griffon Vulture colonies in Serbia, Croatia and Italy, where from the connection with France and Spain would be established. In combination with the potential reintroduction in Vrachanski Balkan, Kresna Gorge will be connection with the Griffon Vultures colonies in Republic of Macedonia and western Greece, providing possibility to be re-occupied by the black vulture in future.
Score	The site is third rated for start of the reintroduction of the black vulture in Bulgaria. Very good combination of suitable habitats, natural food resources, protected areas, active conservation group, socio-economic importance and strategic position for future successful reintroduction of the black vulture. The only concern is the potential use of poisoned baits, which despite of being addressed for years is still a potential threat.

Conclusions

The presence of cinereous vulture significantly decreased on the Balkans from the previous century, as a result of multiple conservation threats. The last remained population in Dadia Forest Reserve (later on turned into Dadia-Soufli-Lefkimi Forest National Park) in Greece is relatively small and cannot expand in the neighboring

territories, so reintroduction measures are recommended to support the presence of the species in the region. Three sites in Bulgaria – Sinite kamani NP – Kotel Mts., Vrachanski Balkan NP and Kresna Gorge-Pirin Mts. were selected to start restoration activities since they were rated with a higher score than the others at present, and because the number of individuals available to be

released is limited. The import and release of cinereous vultures in Bulgaria itself will be a success. However we will consider success the attachment of the released birds to the reintroduction target areas and increasing of the presence of cinereous vultures there (in number – more than 1 specimen; and presence in time – year-round). The biggest success in short-term will be considered the recording of cinereous vulture breeding attempt in the reintroduction target areas. In mid-term (by 2030) breeding of about 10 pairs in total in the release sites or adjacent areas will be considered as success.

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