

# Re-introduction of the Griffon Vulture *Gyps fulvus* in Kresna Gorge of Struma River, Bulgaria Annual Report for 2021

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“Bright Future for the Black Vulture in Bulgaria” LIFE14 NAT/BG/649  
Report on Action D2 - “Monitoring the impact on indicator species”



**BRIGHT FUTURE FOR THE BLACK VULTURE**  
VULTURES BACK TO LIFE LIFE14NT/BG/649





Recommended citation:

**Peshev, H., E. Mitrevichin, A. Grozdanov, N. Vangelova, G. Georgiev, N. Stoyanov & E. Stoynov (2022):** Re-introduction of the Griffon Vulture *Gyps fulvus* in Kresna Gorge of Struma River, Bulgaria, Annual Report 2021, Fund for Wild Flora and Fauna, Blagoevgrad. DOI: 10.13140/RG.2.2.12352.33287

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ID Number: 101523620

Annual bulletin published by the Fund for Wild Flora and Fauna © 2011-2022.

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**ISSN: 1314-9814**

DOI: DOI: 10.13140/RG.2.2.12352.33287



Figure 1. Griffon Vultures in Kresna Gorge

## Abstract

This is the **twelfth year** of the Griffon Vulture *Gyps fulvus* reintroduction into Kresna Gorge, which started in 2010 and is implemented by the NGO Fund for the Wild Flora and Fauna (FWFF). This document is part of the report of Action D2 of the project “Vultures Back to LIFE” LIFE14NAT/BG/649”.

After the mass poisoning incident in March 2017, the colony of the Griffon Vultures in Kresna Gorge slowly recovered and this process continued through 2021. For the control and prevention of poisoning a massive use of high definition and intensive data collecting and loading satellite transmitters are on-going.

Highlights from the reintroduction process of the Griffon Vulture in Kresna Gorge for 2021 are as follows:

- 1.) Two pairs of Griffon Vultures successfully raised young.
- 2.) The exchange of individuals between the colony of the species in Demir Kapia – North Macedonia and Kresna Gorge continued – supporting the theory that the two sites are parts of a common Vulture Key Area in the Balkans;
- 3.) More than 100 individually recognized Griffon Vultures visited Kresna Gorge in 2021;
- 4.) Three Cinereous Vultures (*Aegypius monachus*) and four Egyptian Vultures (*Neophron percnopterus*) were observed in Kresna Gorge in 2021.

In 2021, marked Griffon Vultures from Israel, Greece, Serbia, Croatia, Italy, and other parts of Bulgaria (including Eastern Rhodopes, Eastern Balkan Mountains, and Vrachanski Balkan) were again observed in Kresna Gorge.

Individuals released or captured and marked in Kresna Gorge were observed in Serbia, Israel, Turkey, Greece, Northern Macedonia, Austria, Italy, France, Egypt, Syria, Iraq, Iran, Saudi Arabia, Jordan, Lebanon, and Yemen as well as in other parts of Bulgaria (Vrachanski Balkan, Sinite Kamani, Kotel, and Eastern Rhodopes).

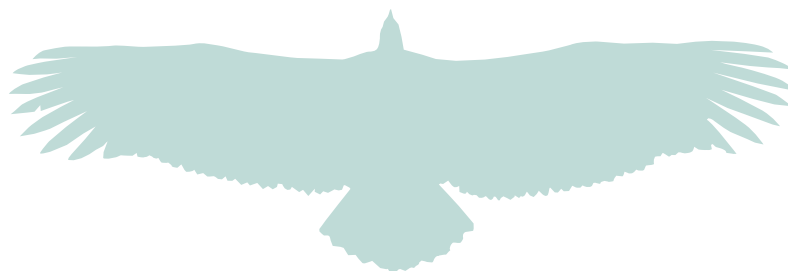
For the first time, a wild-caught and tagged Griffon Vulture in Kresna Gorge migrated towards France but lost its transmitter in the area of Verdon. In this area, a reintroduction program for Griffon and Cinereous Vultures has been running for more than 20 years and as a result, a local colony exists.

The Griffon Vultures from Kresna Gorge were again observed in the Rila and Pirin Mountains during the summer months of 2021.

The maintenance of the feeding site of the vultures continued in 2021 with over 34 tons of carcasses provided in 147 feeding events. Other activities to prevent conflict between livestock breeders and predators, and activities to increase wildlife and extensive livestock breeding continued.

The FWFF's nature conservation activities in the area continued under the "Bright future for the Black Vulture" - LIFE14 NAT/BG/649 project, under the leadership of Green Balkans - Stara Zagora, funded by the EU LIFE Financial Instrument, in cooperation with Vulture Conservation Foundation, EuroNatur, and Gobierno de Extremadura. The FWFF's activities are also co-funded by the Bioparc de Doue Conservation, Naturschutz-Tierpark Görlitz and Sainte Croix Conservation.

**Key words:** *Aegypius monachus*, *Neophron percnopterus*, Pirin National Park, Rila National Park, vulture feeding sites, satellite tracking, GPS/GPRS transmitters.



## Transfers

In 2021 five Griffon Vultures from Bioparc Zoo de Doué la Fontaine, Parc Animalier de Sainte-Croix, Parc Zoologique de Paris and La Volerie des Aigles were transferred on 27.11.2021 to the acclimatization aviary in Kresna Gorge (Figure 2).



Figure 2. Arrival of the transport on 27.11.2021

## Releases

In 2021, two Griffon Vultures were released in Kresna Gorge (Table 1.)

Table 1. Released, and rereleased reintroduced Griffon Vultures in Kresna Gorge in 2021.

Date	Tag	Transmitter	Release	
2021-01-24	V6	OT-33	Hard release	Rerelease
2021-01-24	HW	OT-33	Hard release	Rerelease
2021-02-18	V6	OT-33	Hard release	Rerelease
2021-04-20	HP	OT-33	Hard release	
2021-05-16	HP	OT-33	Hard release	Rerelease
2021-07-12	HP	OT-33	Hard release	



Figure 3. The release of HW on 24.01.2021.

# Monitoring

## Methods

The vultures were frequently (every 2 to 4 days) observed with binoculars and spotting scopes at the feeding site and the known roosting sites.

In 2021 we continued to use blue wing-tags with orange (enlightened to “gold”), yellow wing-tags with a black inscription with three and two vertically set symbols of a digit and a letter and vice versa (common letters for the Cyrillic and Latin alphabets) as follows:

**B69**, **1H**, **2H**, **C1**, **HZ** and the like (Figure 4).



Figure 4. The marking scheme for Griffon Vultures released in Kresna Gorge in the period 2013-2021.

We continued to use the reports of the local people and tourists about observations of vultures. This helped us to keep tracking the presence of the vultures in the area. In 2021 the social platform Facebook was used again to gather locations and pictures of birds from the mountain tourists – a successful practice with scientific and popularizing effects.

## Individual identification of vultures

We continued to photograph all the observed birds, according to the previously proposed and implemented “**visual marking**” method (Stoynov, Peshev et al. 2015). In order to gather material for individual identification, more than 2000 pictures were made during the period. Most of them were of Griffon Vultures, but also of Cinereous and Egyptian Vultures, eagles, and other diurnal raptors.

## GPS/GPRS tracking

The two Griffon Vultures released within the project and nine captured wild birds were equipped with GPS/GSM transmitters in 2021 (table 2.). We reused patagial transmitters OT-P33 produced by Ornitela Ltd. <http://www.ornitela.com/patagial-transmitter>. In 2021 we attached mostly transmitters model Ot-50 and one Ot-30. The transmitter-based information was used mainly to track potential poisoning incidents, thus preventing large-scale damages on the vulture population in the area.

Effective monitoring required frequent determination of GPS locations of all tagged birds (every 5–10 minutes) and expert interpretation of the received data. In addition, the gathered information was used for scientific analysis of the home range, migration movements, and other ecological specifics of the vultures. In order to popularise the important role of the equipped vultures in poisoning monitoring and prevention, we adopted the term “poison-detectives” for them (Stoynov, Peshev & Grozdanov 2018).



Figure 5. Transmitter attached by the leg-loop method



Figure 6. Transmitter attached by the patagial method

Table 2. Captured and tagged Griffon Vultures.

Date	Species	Tag	Transmitter
2021-02-01	G. fulvus	EX - Rerelease	OT-50
2021-05-16	G. fulvus	W0812	OT-50
2021-06-12	G. fulvus	W0820	OT-50
2021-06-12	G. fulvus	W0811	OT-50
2021-06-16	G. fulvus	W0815	OT-50
2021-09-07	G. fulvus	V6	OT-P33
2021-09-07	G. fulvus	B2L	OT-30
2021-10-09	G. fulvus	BV4	OT-50
2021-11-03	G. fulvus	213983	OT-50
2021-11-16	G. fulvus	213984	OT-50
2021-12-21	G. fulvus	213985	OT-50



Figure 7. Tagging of a Griffon Vulture with OT-50 transmitter

The number dynamics and individual identification of the vultures on the feeding site were assisted again by a camera trap. This also helped to identify individuals observed from a great distance during the field monitoring.



## Results

At the beginning of 2021, about 50 vultures spent the winter in Kresna Gorge (table 3, 4). Many of them were not from the local colony but visitors, which joined it for the winter. In the summer of 2021, the vultures remained for a shorter period in the high parts of Pirin Mountains compared to the previous years. In this period the birds occasionally visited Maleshevska Mountains, probably due to the smaller number of cattle in Pirin Mts.

Marked birds from Israel, Greece, Serbia, Croatia, Italy, and other parts of Bulgaria were observed. On the other hand, birds released in Kresna Gorge were observed in Serbia, Greece, Austria, Turkey, Italy, Israel, Northern Macedonia as well as other parts of Bulgaria (Vrachanski Balkan, Sinite Kamani, Central Balkan, Kotel, and Eastern Rhodopes).

Table 3. Numbers of Griffon Vultures and Cinereous Vultures observed in Kresna Gorge in 2020 by months.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Number Identified Griffon Vultures	15	19	16	20	21	17	17	12	12	16	17	17
Number of Griffon Vultures observed at once (max.) at the feeding or roosting site	50	54	49	50	40	33	32	28	33	54	54	50
Number of Cinereous Vultures									1	2	1	
Number of Egyptian vultures							1	3				



Figure 8. Griffon Vultures near the feeding site

Table 4. Released Griffon Vultures and their observations in 2021 in Kresna Gorge

Tag	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
78	X	X	X	X	X	X	X	X	X	X	X	X
XX	x	x	x	x								
HE	X	X	X	X	X	X	X	X	X	X	X	X
HT	X	X	X	X	X	X	X		X	X	X	X
V3	X	X										
HC	X	X	X	X	X	X	X	X	X	X	X	X
HZ	X	X	X	X	X	X	X		X	X	X	X
V6		X	X									
HW	X	X	X	X	X	X	X	X	X	X	X	X
Y3	X	X	X	X	X	X	X	X		X	X	X
HA		X		X	X	X	X	X	X	X	X	X
HN			X	X	X	X	X		X	X	X	X

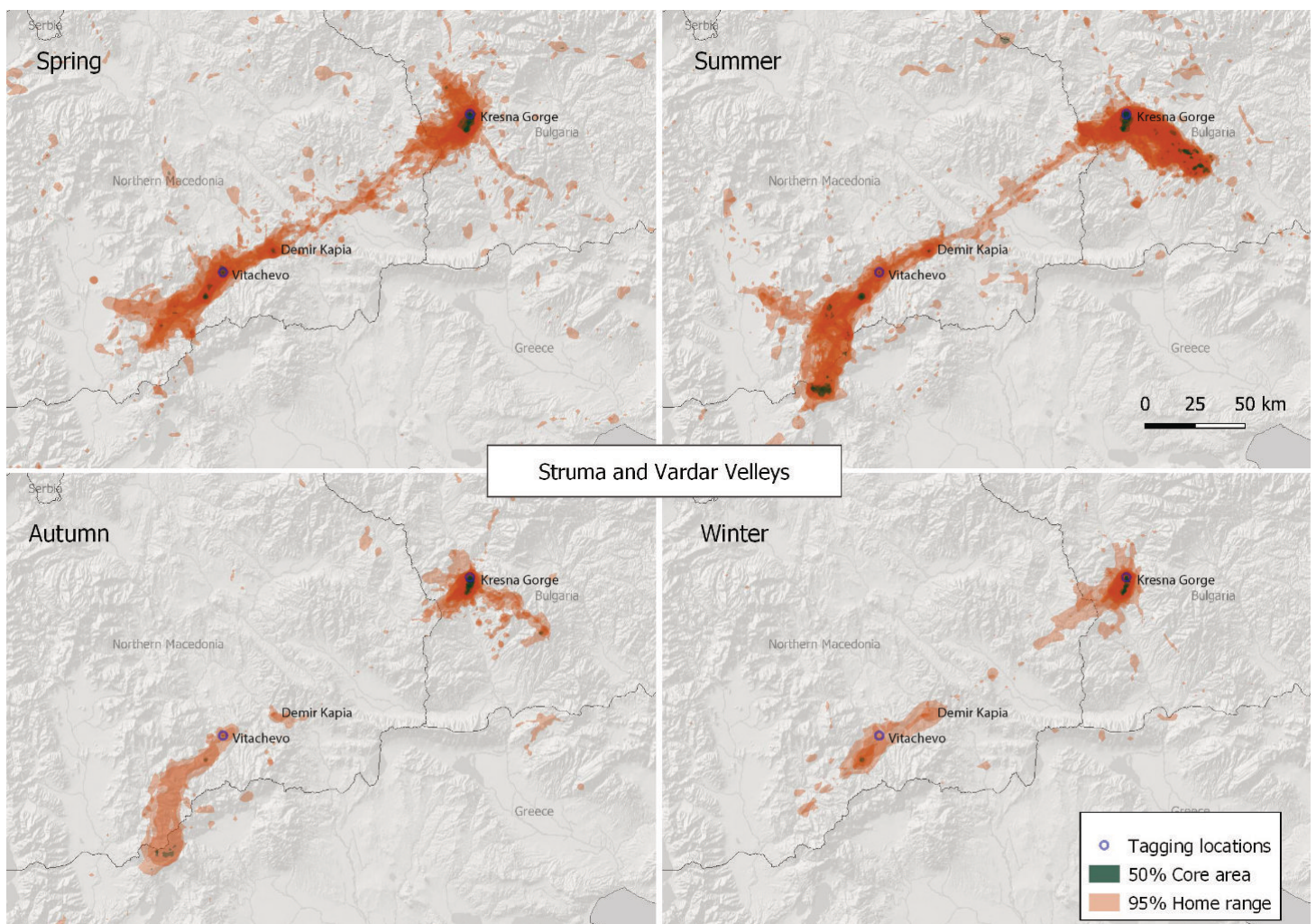


Figure 9. Homerange of the Griffon Vultures in Struma-Vardar culture zone (Peshev et al. 2021)

## Whereabouts of some of the marked birds

Birds marked in Kresna Gorge were recognized by the wing tags and rings in Italy, Serbia Turkey and in vulture colonies in Bulgaria (Table 5).

Table 5. Distant observations of vultures marked in Kresna Gorge.

Tag	Period	Place	Observer
<b>2X</b>	January to December	Uvats (Serbia)	Sasa Marinkovich
<b>12</b>	March to November	Uvats (Serbia)	Sasa Marinkovich
<b>45</b>	June to December	Uvats (Serbia)	Sasa Marinkovich
<b>A4</b>	June to September	Uvats (Serbia)	Sasa Marinkovich
<b>B73</b>	March to December	Uvats (Serbia)	Sasa Marinkovich
<b>EX</b>	September to December	Uvats (Serbia)	Sasa Marinkovich
<b>Y1</b>	March to December	Uvats (Serbia)	Sasa Marinkovich
<b>Y2</b>	January to December	Uvats (Serbia)	Sasa Marinkovich
<b>Y6</b>	June to December	Uvats (Serbia)	Sasa Marinkovich
<b>Y9</b>	July to December	Uvats (Serbia)	Sasa Marinkovich
<b>HA</b>	January to April	Eastern Rhodopes	Volen Arkumarev
<b>HN</b>	January to April	Eastern Rhodopes	Volen Arkumarev
<b>45</b>	January to Marsh	Eastern Rhodopes	Volen Arkumarev
<b>V5</b>	January to November	Eastern Rhodopes	Volen Arkumarev
<b>G10</b>	January to November	Eastern Rhodopes	Volen Arkumarev
<b>C9</b>	January, February	Eastern Rhodopes	Volen Arkumarev
<b>V1</b>	January to November	Eastern Rhodopes	Volen Arkumarev
<b>H</b>	February to September	Eastern Rhodopes	Volen Arkumarev
<b>C7</b>	Marsh, April, December	Eastern Rhodopes	Volen Arkumarev
<b>V3</b>	8, Marsh	Eastern Rhodopes	Volen Arkumarev
<b>XX</b>	April	Eastern Rhodopes	Volen Arkumarev
<b>Y5</b>	11, April	Eastern Rhodopes	Volen Arkumarev
<b>A4</b>	18, April	Eastern Rhodopes	Volen Arkumarev
<b>A4</b>	16, December	Dead Sea (Israel)	Ohad Hadzofe
<b>V6</b>	21, September	Legnano (Italy)	Mario Posillico
<b>V3</b>	12, June	Riserva naturale del lago di Cornino (Italy)	Fulvio Genero
<b>V3</b>	7, May	Vrachanski Balkan	Georgi Stoyanov
<b>Y5</b>	6, April	Chanakkale	Mehmet Kiranv

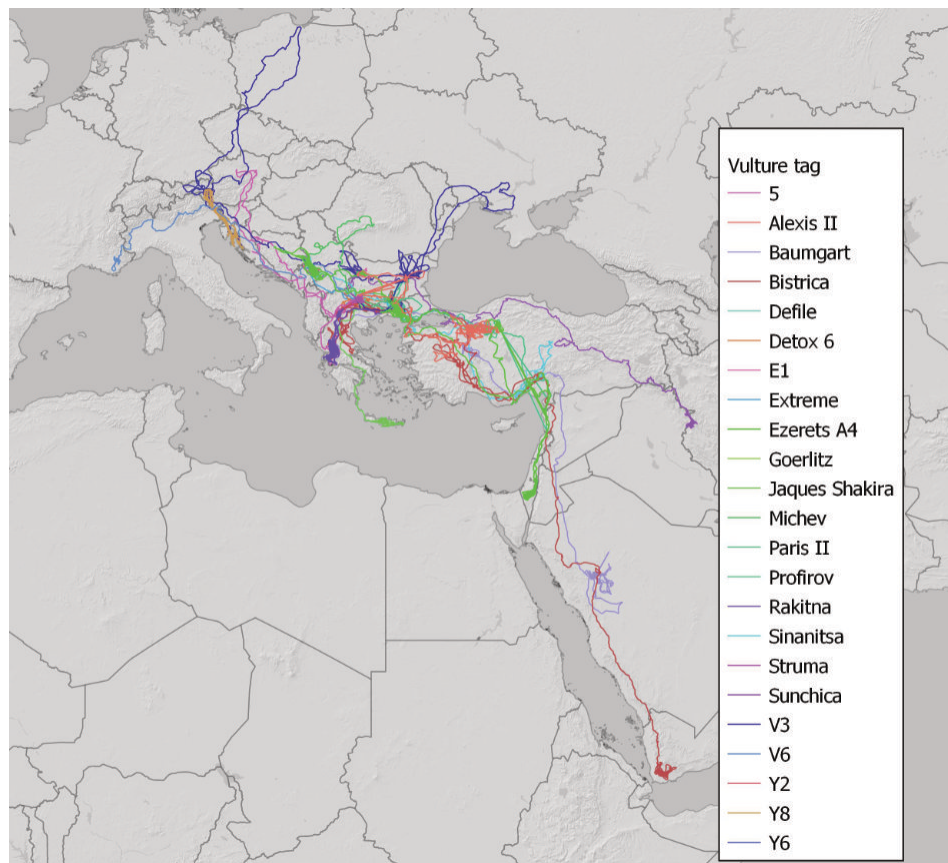


Figure 10. Movement of Griffon Vultures with transmitters tagged in the Kresna Gorge in 2021.

## Attracted exogenous birds

More than 100 individually recognized Griffon Vultures visited Kresna Gorge in 2021. Some of the birds became part of the local colony, while others just benefited from the feeding site and remained for different periods (Table 6).

Table 6. Presence of marked exogenous birds.

Tag	Ring		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
5	B95	Kresna gorge	X	X	X	X	X	X	X	X	X	X	X	X
T59	H20	Israel	X	X	X	X	X	X	X	X	X	X	X	X
Y4 (M)	BY4	Kresna gorge	X	X	X	X	X	X	X		X	X	X	X
	BY1	Kresna gorge		X	X	X	X				X	X	X	X
K9A	K9A	Kotel	X	X	X	X	X	X	X	X		X	X	X
17		Serbia	X	X										
	FD7	Italy	X	X										
EX		Kresna gorge		X	X	X	X	X	X	X				
39		Serbia				X	X	X						
45		Serbia				X								
47		Serbia				X	X							
	CZC	Croatia				X								
	CZB	Croatia				X						X	X	X
	G54	Greece					X		X					
11	S65	Serbia					X	X	X	X				
16		Serbia						X	X					
C7		Kresna gorge								X				
	BV4	Kresna gorge										X		
	CH1	Croatia											X	X



Figure 11. Vultures tagged in Serbia and Israel on the Kresna Gorge feeding site.

## Breeding

Several pairs demonstrated breeding behaviour in 2021. Two of them laid eggs and hatched young successfully (Figure 12). Another two pairs were also observed but the breeding success was unclear. The bird tagged with wing tag **5** could not find a partner and did not nest in 2021. Of all breeding birds in 2021, only one had a wing tag **(78)**.



Figure 12. Vulture nest with chick in Kresna Gorge.

## Mortalities and misfortunes

On 08.08.2021, a week after its release, **HP** was found dead. Most likely the bird had been killed by predators.



Figure 13. The corpse of **HP**.

On 03.05.2021 **V6** was poisoned in the Pindus Mountains, Greece.



Figure 14. **V6** was found dead in Ponor Mountain, Bulgaria.

On 04.05.2021 **V5** was found dead in Ponor Mountain, Bulgaria.

On 30.11.2021 **213984** tried to migrate south across the Aegean Sea and drowned.



Figure 15. Collection of poison samples from a horse carcass near the town of Dobrinishte.

On 04.06.2021 a Cinereous Vulture released in Kotel under the LIFE project “Bright future for the Black Vulture” LIFE14 NAT/BG/649 disappeared and the transmitter was found dumped in the Struma River. At the place where the bird visited (near the town of Dobrinishte) was found a horse corpse covered with poison.

## Other species

The presence of the Griffon Vultures and the feeding site continuously attract other rare and threatened species in the area. For example, the Eurasian Black Vulture (*Aegypius monachus*) and the Egyptian Vulture (*Neophron percnopterus*).

### Eurasian Black Vulture

#### *Aegypius monachus*

Three individuals visited Kresna Gorge. Two of the birds were regularly eating at the feeding site during the autumn months of 2021. E6 was tagged in Dadia-Lefkimi-Soufli Forest National Park in Greece.



Figure 16. Cinereous Vulture on Kresna Gorge feeding site.



Figure 17. Immature Egyptian vulture in Kresna Gorge.

### Egyptian vulture *Neophron percnopterus*

Four Egyptian Vultures (two immature and two adults) remained in Kresna Gorge for different periods in 2021.



Figure 18. Eastern Imperial Eagle (*Aquila heliaca*)



Figure 19. Black Kite (*Milvus migrans*)



Figure 19. Golden Eagle (*Aquila chrysaetos*)



Figure 20. Lesser Spotted Eagle (*Clanga pomarina*)

## Urgent Conservation actions

As such actions, we recognize those that provide an immediate effect and are not necessarily sustainable but slow the population decline of a threatened species. For instance, the supplementary feeding of vultures, to minimize dispersal and avoid poisoning; nest guarding to ensure safe reproduction; brood management and captive birds release to increase recruitment; insulation of dangerous power lines; intensive in time tracking of vultures to detect and prevent poisoning, etc. Such actions may be implemented for endangered species to support them to reach at least a better conservation status or until any sustainable and long-term measures produce results.

### Feeding

The Covid-19 outbreak and the African swine fever largely complicated the provision of food to the feeding site in 2020 and this continued partly throughout 2021. Despite these difficulties, we continued to organize intensive feeding of vultures at minimum 3 to 4 times per week (and every time upon the availability of carcasses – sometimes up to 7 days a week). More than 34 tons of carcasses were provided in 147 deliveries at the feeding site in 2021 (Table 7).

Table 7. Number of feedings and amount of food provided by FWFF in Kresna Gorge in 2021.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	total
Feeding events	11	9	21	12	10	14	11	13	16	10	9	11	147
Amount of food in kg	3445	2900	4270	2990	2955	2255	2470	2315	2595	2475	2305	3515	34490



Figure 21. Carcasses of cows in local farms.



## Long-term Conservation Actions

*As such actions, we recognize those that do not necessarily provide an immediate effect but are sustainable and change the habitat and the local people's attitude to better for the target species. Such actions are rarely focused on a certain endangered species, which could be stated as flagship species, but more for its habitats and the entire ecosystem.*

### Restoration of food source for vultures

The attempts for reintroduction of the Fallow Deer (*Dama dama*) in the area continued as in 2021 another 3 deer were released and are now free-ranging.



Figure 22. Release of Fallow Deer in the enclosure in Kresna gorge

FWFF continues to keep a herd of Rhodope Short Horn Cattle in Kresna Gorge. The herd is doing well and is increasing. More and more farmers are now interested in raising this breed, as it is proven to be very adaptable and good for the area – in terms of forage use and predators protection.



Figure 23. Rhodope Short Horn Cattle in Kresna Gorge

## Against poison activities

The feeding site operation in an area with permanent wolf presence is the most effective anti-poison tool (Stoynov et al. 2018, Peshev et al. 2019). Maintaining permanent feeding sites for vultures in regions of sympatric presence of wolves and vultures is an irreplaceable conservation tool.

The existence of an aviary with Griffon Vultures inside, placed just at the feeding site, effectively attracts wild and already released reintroduced vultures. This is a way of keeping them away from occasionally present and potentially dangerous (poisoned) food.

The early warning system for poison control based on intensive GPS tracking for Griffon Vultures (Stoynov et al. 2018 and 2019) is now well established and operates as an integrated part from the against-poison and preventive activities.

Direct contact and frequent communication with local farmers, preventively, but specifically when the GPS tagged vultures visit the areas around their farms is also intensively applied. This way, eventual poaching is prevented.



Figure 24. Griffon Vultures near the feeding site

## Overview

In 2021, the nucleus formed in 2020 of two breeding pairs increased to four, but still only two laid eggs and raised young. The release of immature Griffon Vultures should continue with at least 10 birds per year until the colony begins to produce at least ten juveniles per year. Although the breeding nucleus is small, the area has a central place in the Balkan Peninsula since it serves as a summering, on-passage, and wintering site for the species.

As much as possible 20 kV power-line pylons should be safeguarded for birds in Kresna Gorge.

The actions for the establishment of a wild population of Fallow Deer and extensive

raised sheep and cattle herds should continue. The wild nucleus of Fallow Deer should now be shortly supplied with some more animals until they reach at least 30 females.

Feeding sites in the high mountain areas of Rila and Pirin National Parks should be established, as these areas are preferred by the vultures in summer. What is more, the risk of poisoning or electrocution in these areas is lower.

The poisoning is still hard to control along Struma and Mesta River valleys and this will probably be a long-term challenge, caused by the coexistence of people and predators in the area. Therefore, feeding of vultures on established feeding sites still is a must, while any actions for minimizing the poison baits use are underway as permanent and long-term measures.



Figure 25. Griffon Vulture **HW** in Kresna Gorge.

## Acknowledgements

The conservation work and monitoring of the vultures continue under the LIFE project “Bright future for the Black Vulture” LIFE14 NAT/BG/649, financed by the LIFE+ financial instrument of the EU. The Project aims at the reintroduction of the Black Vulture (*Aegypius monachus*) in three different sites of Bulgaria. Kresna Gorge was one of the target sites. However, due to the poisoning incident in March 2017, the release of Cinereous Vultures in this particular site will be postponed for an uncertain period. The monitoring of vultures and other related species is performed under Action D2 of the Project.

The coordinating beneficiary of the LIFE14 NAT/BG/649 project is Green Balkans NGO, while FWFF is one of the associated beneficiaries. The FWFF is in charge of the actions in Kresna Gorge and Kotlenska Planina (Kotel Mountain). The other associated beneficiaries within the Project are the Vulture Conservation Foundation (VCF), Gobierno de Extremadura and EuroNatur. Additional financial contributors to the FWFF’s activities in the Project are BIOPARC de Doue Conservation (France), Naturschutz-Tierpark Görlitz (Germany), and Sainte Croix Conservation (France).

At the pre-release stage, the project was financially supported by:

Deutsche Bundesstiftung Umwelt (DBU), Frankfurt Zoological Society (FZS), Foundation Ensemble, Rufford Small Grants (RSG), Whitley Fund for Nature (WFN), Black Vulture Conservation Foundation (BVCF), EAZA Carnivore initiative and others.

We are grateful to Bioparc Zoo de Doué la Fontaine, Parc Animalier de Sainte-Croix, Parc Zoologique de Paris and La Volerie des Aigles for the provided captive bred Griffon Vultures for release.

We are also grateful to Pensoft Publishers (Prof. Lubomir Penev), Parc Zoologique de Paris, TPX Impact (Vesselin Drangajov), Troublebakers as well as individual contributions by George Kuzmanov, Yavor Iliev, Filip Nikolov, Galina Martinova, Dimitris Vasilakis, Stefan Stoilov, Plamen Petrov and his family, Elena Zaprova and others for the provided financial support for the purchase and logistics of GPS transmitters for vultures and other related field activities.

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