**LIFE RE-Vultures** 



Conservation of Black and Griffon vultures in the cross-border Rhodopes mountains



# REPORT OUTLINING POWER LINES PRIORITY FOR MITIGATION MEASURES



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#### TECHNICAL REPORT UNDER ACTION A6 of LIFE RE-VULTURES project LIFE14NAT/NL/901

#### **BULGARIAN SOCIETY FOR THE PROTECTION OF BIRDS**

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## About the project:

This survey and report are developed under action A6 of the LIFE project Conservation of Black and Griffon vultures in the cross-border Rhodopes mountains (LIFE Re-Vultures LIFE14NAT/NL/000901) funded by the European Commission. The project aims to reduce acute threats to black and griffon vultures and thus allow them to recover in the Bulgarian/Greek cross-border area of the Eastern Rhodope Mountains.











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#### I. Introduction

Electrocution of birds on overhead lines is an important cause of unnatural mortality of raptors, storks and other species across Europe. There are two main aspects of the negative impact of power supply lines on birds: (a) electrocution – upon perching or flying off a pole, a bird can cause short circuit as its body might bridge the wires and the earthling section of the pole. The risk of such short circuits increases in humid and rainy weather. Birds have semi-liquid faeces and when defecating while perched on a pole they can cause a voltaic arc; (b) collision with wires – birds in flight might collide with wires as they are difficult to notice, especially in poor weather conditions of low visibility (Demerdzhiev et al., 2014). Mortality caused by hazardous power lines was identified as a serious threat for a number of species in Bulgaria (Stoychev and Karafeizov, 2004). Study in several SPAs in south Bulgaria focused on 20 kV power lines found out that bird mortality on some type of poles could reach the remarkable 0.21 birds per pole over a period of only 4 months (Demerdzhiev et al., 2009). In Eastern Rhodopes until 2011 it is estimated that 13.16% of the mortality cases involving Griffon vultures are caused by electrocution or collision with power lines. In 2013 two Griffon vultures died in the Eastern Rhodopes due to collision with power lines as well. Considering the size of the Griffon Vulture population in the Eastern Rhodopes this threat might have a serious impact. Electrocution is amongst the main threats for the Egyptian Vulture in the area which is harboring 70% of the species' national population. This area is of a great importance also for the protection of the Black vultures, which intensively use the area for foraging and feeding (Vasilakis et al., 2008). Consequently, Eastern Rhodopes are identified as area with high importance for future minimisation of the risks of electrocution or collision with power lines for vulture and other species.





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## II. Materials and methods

This survey was carried out in the Eastern Rhodopes, Bulgaria in the period July – August 2017. As priority areas were identified territories frequently used by Griffon Vultures for foraging and roosting which was revealed by the data from the GPS telemetry of the species. This study is complimentary to a previous study on hazardous power lines in the same target SPAs in Eastern Rhodopes which was conducted in 2012 and 2013 in the frame of the project "Return of the Neophron" (LIFE10 NAT/BG/000152). Under that study all power lines in 5 km buffer around existing Egyptian Vulture nests were mapped (Dobrev et al. 2016) (Fig. 1.).

The survey was carried out following the methodology and field protocols developed under the project "Return of the Neophron" (LIFE10 NAT/BG/000152) (see Annexes). Ground team was walking under the target power lines mapping the pylons and collecting information for victims due to electrocution or collision. The following information was recorded for each pylon – GPS coordinates, type of pylon, habitat type in 20 m radius from the pylons, photo of the pylon. For each victim detailed information was recorded. If the victim was found near the base of the pylon the reason for death was considered electrocution, if the victim was found under the wires between two pylons the reason for death was considered collision with wires. Information on species, number, and age of the carcasses was recorded as well and photos were taken. All collected information was filled in the previously developed database.













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Fig. 1. Power lines mapped in the frame of the current survey and the survey in 2012-2013



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#### **III. RESULTS**

In the frame of this study 409 poles from 30 different types along more than 20 km of power lines were mapped. In total 210 of the pylons were from two types considered among the most hazardous for birds. Ground teams found 13 corpses of dead birds under 11 hazardous power poles. All of them died due to electrocution. No victims of collision with power wires were recorded. Most of the victims were from the family Corvidae - Corvus corax – 4, Corvus corone cornix - 3 and Corvus sp. - 3. The other victims found were 1 Buteo buteo, 1 Ciconia ciconia and 1 unidentified bird. No vulture mortalities were recorded in this survey (Fig. 2). Six of the electrocuted birds were found under pylon type Vu1, another 4 were under pylon types Cr1 and Cr2 which are among the most hazardous types of pylons. All victims were found under pylons in pastures or pastures with bushes.



Fig. 2. Species found electrocuted and their numbers





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## IV. Priority power lines for mitigation measures

#### A. Hazardous power poles priority for insulation.

All data gathered from the previous and the current surveys on the hazardous power lines in Eastern Rhodopes was analyzed together. A special scoring algorithm has been developed under the project "Return of the Neophron" which was used to identify the priority pylons for insulation. The algorithm is ranking the pylons according to the threat they pose to the vultures. The electrocution risk for each pylon was assessed based on six criteria (a) pylon type, (b) accidents recorded, (c) proximity to vulture foraging areas, (d) habitat, (e) proximity to vulture nests, (f) proximity to nearest asphalt road. More on the methods used for computing this information can be found in Dobrev et al. (2016). Some of the pylons identified as priority for mitigation have been already insulated in the frame of the project "Return of the Neophron". In the current project it is foreseen that at least 120 hazardous power poles will be insulated. The highest ranked 120 pylons according to the applied algorithm were selected for insulation (Fig. 3). These are pylons posing risk of electrocution for Griffon and Egyptian vultures in the Eastern Rhodopes. The selected pylons represent 7 different types. The most numerous are the pylons from type Vu1 - 79, followed by pylons from types Vu3 and Cr1 (Fig. 4). The electricity company will be contacted and the pylons priority for insulation will be presented. However, it is expected that for some of the pylon types no insulators have been developed yet. The reasons are some technical constrains arising from the structure of the poles. In such cases these pylons will be replaced with other hazardous pylons following the results from the risk assessing algorithm. All insulated lines will be monitored to evaluate the results and provide supporting data for further insulations. Particular attention will be payed to new materials or innovative methods for insulation if such are applied in order to compare them to previous methods helping in the future selection of the best value for money materials/methods.









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Fig. 3. Power lines priority for insulation



Fig. 4. Types of pylons identified as priority for insulation



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# **B.** Identification of power lines posing risk of collision to vultures which to be insulated with bird diverters.

In the frame of the previous and the current survey more than 7000 poles and 350 km power lines were mapped in Eastern Rhodopes. Some of these power lines are crossing territories with frequent presence of vultures. These are territories used by vultures for foraging, feeding or roosting. In the frame of the project at least 2.5 km of hazardous power lines will be equipped with bird diverters making them easily visible for birds and preventing vulture mortalities from collision with the electric wires. After analyzing the data obtained by the GPS telemetry of the Griffon Vultures and the data collected during the surveys with some older observations two power lines were identified as priority for insulation with bird diverters (Fig. 5). These power lines pose serious risk for all three vulture species inhabiting Eastern Rhodopes as they are situated near the breeding sited and near one of the feeding stations in the area. The first power line is situated on a top of a hill on the southern bank of Studen kladenets Reservoir. In 2013 one Griffon Vulture was found dead after collision with this power line. The second priority power line is situated near the feeding station in SPA Studen kladenets. It is a high voltage power line which passes near a ridge frequently used by vultures for soaring.













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Fig. 5. Priority power lines for installation of bird diverters

## V. Conclusions

In the frame of the project "Conservation of Black and Griffon vultures in the cross-border Rhodopes mountains" (LIFE14 NAT/NL/901) at least 120 hazardous pylons will be insulated and bird diverters will be mounted on at least 2.5 km of power lines preventing vulture mortalities due to electrocution or collision with electric infrastructure. All target power lines are situated in areas inhabited by vultures and used for foraging, feeding and roosting.



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#### **VII.** Annexes

Annex I. Field protocol for collecting data on bird mortalities due to electrocution or collision



Annex III: Field protocol for description of electrocuted birds (action A6 of the project LIFE10 NAT/BG/000152)

Nest IL			Date:		weather cond	itions:		SPA CODE:
N₂	Type of pylon	Species	Age/sex of the bird	Age of the carcass	GPS waypoint name	Picture file name	Reason for mortality	Arguments



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#### Annex II. Field protocol for mapping of electricity infrastructure

Nest ID:			Date	Participants	Participants		Westher conditions:			
Лê	Type of pylon	Electr. comp. code	Picture file name	GPS waypoint II (observer initials+visi ID)	) Faeces	Dead birds (Tes/No)	Habitat (based on CLC)	Other comments		
					-					
				-						









