IDENTIFYING POTENTIALLY DANGEROUS ELECTRICITY INFRASTRUCTURE TO BALKAN POPULATION OF EGYPTIAN VULTURE AND MITIGATION MEASURES (2012 - 2015)

TECHNICAL REPORT UNDER ACTION A6

LIFE+ PROJECT
“THE RETURN OF THE NEOPHRON”
LIFE10 NAT/BG/000152

PREPARED BY

BSPB, HOS, WWF-GREECE, RSPB

APRIL 2016

giving nature a home

AUTHORS:

Vladimir Dobrev[1], Alkis Kafetzis[2], Theodora Skartsi[2], Victoria Saravia[3], Anastasios Bounas[3], Lavrentis Sidiropoulos[3], Steffen Oppel[4], Aris Manolopoulos[3], Georgi Popgeorgiev[1] & Stoyan C. Nikolov[1]

1. *Bulgarian Society for Protection of Birds/BirdLife Bulgaria, Yavorov complex, bl. 71, vh. 4, PO box 50, 1111 Sofia, Bulgaria*
2. *WWF Greece, 21 Lambessi, Gr 117 43 Athens, Greece*
3. *Hellenic Ornithological Society/ BirdLife Greece, Themistokleous 80, GR-10681 Athens, Greece*
4. *Royal Society for the Protection of Birds/BirdLife UK, Centre for Conservation ScienceSandy, Bedfordshire, UK*

RECOMMENDED CITATION:

Dobrev, V., Kafetzis, A., Skartsi, T., Saravia, V., Bounas, A., Sidiropoulos, L., Oppel, S., Manolopoulos, A., Popgeorgiev, G. & Nikolov, S.C. 2016. Identifying potentially dangerous electricity infrastructure to Balkan population of Egyptian vulture and mitigation measures.Technical report under action A6 of the LIFE+ project "The Return of the Neophron" (LIFE10 NAT/BG/000152). BSPB, Sofia. 18 p.

ABOUT THE PROJECT

This fact sheet was prepared under the frames of action C5 of the LIFE+ project "The Return of the Neophron" (LIFE10 NAT/BG/000152, www.LifeNeophron.eu) funded by the European Union and co-funded by the "A. G. Leventis Foundation" and the MAVA Fondation pour la Nature, and implemented by the Bulgarian Society for the Protection of Birds (BirdLife Bulgaria), the Hellenic Ornithological Society (BirdLife Greece), the World Wide Fund for Nature – WWF Greece and the Royal Society for the Protection of Birds (BirdLife UK).

Contents

Extended summary 3
1. Introduction 3
2. Material and methods 4
    2.1. Study area and time period 4
    2.2. Mapping electricity infrastructure 4
    2.3. Risk assessment of the electricity infrastructure 5
3. Results 6
    3.1. Mapped electricity pylons and found victims 6
    3.2. Number and distribution of dangerous electricity pylons 7
4. Lessons learned 7
5. Mitigation measures to reduce the risk of electrocution 8
6. Acknowledgements 8
7. References 9
8. Annexes 10
    Annex I. Guide for electricity pylon identification in Bulgaria and Greece 10
    Annex II. Field protocol for mapping of electricity infrastructure 15
    Annex III. Field protocol for description of electrocuted birds. 15
    Annex IV. Types of roosting pylons for Egyptian vultures in Afar, Ethiopia 16
    Annex V. Sensitivity maps for the risk of electrocution of Egyptian vultures in Bulgaria and Greece 17

EXTENDED SUMMARY

Electrocution was identified as one of the main threats for the steeply declining Balkan population of the Egyptian vulture. To mitigate the threat, mapping and risk assessment of electricity pylons were conducted in active and recent breeding territories of the species in Bulgaria (29) and Greece (11) in the frame of the LIFE+ project "The Return of the Neophron". The study area included ten Special Protection Areas in Bulgaria and three in Greece. The fieldwork was carried out in 2012 and 2013 outside the breeding season (October – March). Protocol for data collection and algorithm for the risk assessment were developed.

All electricity pylons in the medium voltage (20 kW) electricity network within a buffer of 5 km around targeted Egyptian vulture nests were mapped – in total 9,496 pylons along more than 1,000 km power lines (7,071 pylons along more than 700 km power lines in Bulgaria and 2,425 pylons in Greece along more than 200 km power lines). Additionally, 4,643 pylons were mapped in the wintering grounds in Africa and the risk to birds from electrocution was assessed.

A total of 112 dead birds were found under the mapped pylons and power lines in Bulgaria, of which 76% were victims of electrocution and 24% of collision. There was only one case of a subadult Egyptian vulture found electrocuted within the project area. The 112 carcasses found belonged to the following species: White and Black stork (47%), Golden eagle, Short-toed eagle, Common buzzard, Goshawk, Sparrowhawk, Commom kestrel (18%), Passeriformes (25%, out of which corvids 11%), Tawny owl and Eagle owl (4%), other (6%). No electrocuted birds were found in Greece.

Risk of electrocution was assessed for all mapped pylons and sensitivity maps were produced. A total of 5,572 pylons were identified as critically dangerous to birds (4,023 in BG and 1,549 in GR) based on the type of the pylon. Additional prioritizing of the pylons for the aim of insulation was made considering also landscape cover and distance to the nest. Thus, we identified 1,283 dangerous pylons in Bulgaria and 1,524 in Greece which are recommended for insulation in the near future. As an added value, 3,728 pylons were identified as dangerous based on their construction in one of the main congregation sites of the species in Eastern Africa.

1. INTRODUCTION

The Egyptian vulture (Neophron percnopterus) is the most threatened vulture species that breeds in Europe (Birdlife International 2008). The Balkan population of the species has been declining at a rate of ~7% per year for several decades due to a variety of factors operating in the breeding and wintering areas (Velevski et al. 2015).

One of the major factors causing mortality in the Egyptian vulture is electrocution (Nikolov et al. 2016). Electrocution is found to operate as a threat in the breeding areas and in the wintering grounds. While there may be a small number of individuals affected in the breeding areas in the Balkans (Saravia et al. 2016), in the wintering grounds the effect could be much greater (Angelov et al. 2013, Arkumarev et al. 2014).

The present study aimed to identify dangerous electricity pylons in the recent breeding territories of Egyptian vultures in Bulgaria and Greece (holding ca. 50% of the Balkan population of the species, Velevski et al. 2015) and propose effective mitigation measures.

2. MATERIAL AND METHODS

2.1. *Study area and time period*

The study was carried out in the Eastern Rhodopes and North-Eastern Bulgaria, Thrace and Central Greece in areas around active Egyptian vulture nests known in 2012 in Bulgaria (29) and in Greece (11). These sites included ten Special Protection Areas (SPAs) in Bulgaria and three SPAs in Greece (**Figure 1**). The fieldwork was carried out in 2012 and 2013 outside the breeding season (October – March).

Figure 1. *SPAs in Bulgaria and Greece where the study was carried out.*

2.2. *Mapping electricity infrastructure*

We mapped all electricity pylons in the medium voltage (20 kW) electricity network within a buffer of 5 km around targeted Egyptian vulture nests. The mapping was carried out by field researchers walking under power lines and pylons (**Figure 2**), based on research of available information in sources such as Google Earth and topographic maps. The following data were collected:

- Exact type of pylon according to a guidelines created in the framework of this action for pylon identification and classification (**Annex I**);
- Location of each pylon (coordinates taken with a GPS device);
- Habitat where the pylon was situated;
- Photograph of the pylon;
- Presence and species of dead birds found under studied electricity pylons.

All the data was entered into standard field protocols (**Annexes II and III**).

Bearing in mind that the present study was not designed to assess bird mortality caused by electricity infrastructure, but merely to map and classify the existing electricity network, it nevertheless may provide a general idea of the species affected by electrocution or collision.

Additionally, mapping of the electricity infrastructure in Afar, Ethiopia, which is one of the wintering grounds of the species and a main congregation site of the species was also carried out in January 2013. The mapping was done with GPS devices and a vehicle following the main electricity lines that cross Afar and where Egyptian vultures are roosting (Arkumarev et al. 2014). Coordinates for each pylon were taken. A simple assessment on the risk that each pylon represented was done by assuming that all high voltage power lines and pylons are safe while low and medium voltage power lines and pylons are dangerous.

Figure 2. *Fieldwork for identification and mapping of dangerous electricity pylons nearby Egyptian vulture nests. Photography: WWF Greece /J. Gracia.*

2.3. Risk assessment of the electricity infrastructure

To optimize the resources for insulation, there was a need to assess the risk of electrocution for each single pylon and prioritize the identified dangerous pylons. Therefore, we developed a scoring algorithm to rank the pylons according to the threat they represent for the Egyptian vulture. The electrocution risk at each pylon was assessed based on the combination of six criteria considered important for the species (Carrete et al. 2007). For each criteria a score ranging from 0 to 3 was given, based on whether it presented 'no risk' (0), 'low risk' (1), 'medium risk' (2), or 'high risk' (3). The total score for the electrocution risk of a pylon was then calculated by summing up the risk scores for all six criteria, weighted by the relative importance of each criteria.

The following criteria were considered (range of risk in parentheses):

A: pylon type (1= other pylons, 2=vulnerable pylon type, 3=critical pylon type, see Annex I);

B: observed accidents (2 = no observed accidents, 3= observed accidents);

C: proximity to foraging areas (0= >1000 m, 1= 600-999, 2= 300-599 3= <300 m);

D: proximity to the nest (0= >1500 m, 1= 1000-1499, 2= 500-999, 3= <500m);

E: habitat (0= pylon in water bodies, industrial areas or city, mines; 1= forests, croplands, vineyards, dunes; 2= rocks, open areas with dominant open natural habitats; 3= pylon in open pasture land or other foraging habitat or a dump site);

F: vicinity to nearest asphalt roads (0= >300m, 1= 200-299, 2= 100-199, 3= <100 m).

The relative importance of each criterion was weighted on a scale from 0-1 based on previous expertise and evidence from literature (Demerdzhiev 2014). Pylon type and distance to the nest were considered the most important criteria and were given a weight of 0.22, followed by proximity to foraging areas which was weighted by 0.20. Habitat where the pylon is situated received a lower weight of 0.18, followed by observed accidents which received a lower weight of 0.13 and the relatively low weight of 0.04 for vicinity to asphalt roads.

Therefore, the total pylon risk score was calculated as follows:

Pylon Risk= 0.133*A + 0.200*B + 0.222*C + 0.178*D + 0.222*E + 0.044*F

where A, B, C, D, E and F are the risk scores (0-3) for each of the six criteria A-F.

Pylons were then categorized as follows:

- Low risk pylons: Score < 1.2;
- Medium risk pylons: Score between 1.2 and 1.39;
- High risk pylons: Score between 1.4 and 1.69;
- Very high risk pylons: Score > 1.7.

3. RESULTS

3.1. Mapped electricity pylons and found victims

A total of 9496 electricity pylons were mapped along more than 1,000 km power lines in Bulgaria and Greece (7,071 pylons along more than 700 km power lines in Bulgaria and 2,425 pylons in Greece along more than 200 km power lines). A total number of 5,572 pylons were identified as critically dangerous to birds (4,023 in BG and 1,549 in GR) based on the type of pylon (Annex I). Additional prioritizing of the pylons using the scoring algorithm identified 1,283 dangerous pylons in Bulgaria and 1,524 in Greece which should be subject of insulation in the near future (*see also Section 3.2*).

A total of 112 dead birds were found under the mapped pylons and power lines in Bulgaria, of which 85 (75.9%) had died from electrocution and 27 (24.1%) from collision. Only one Egyptian vulture (subadult) was found electrocuted during the regular monitoring of the breeding territories (BSPB 2012, **Figure 3**). The 112 carcasses found belonged to the following species: White and Black stork (47%), Golden eagle, Short-toed eagle, Common buzzard, Goshawk, Sparrowhawk, Commom kestrel (18%), Passeriformes (25%, out of which corvids 11%), Tawny owl and Eagle owl (4%), other (6%) (**Figure 4**).

Figure 3. *Electrocuted Egyptian vulture found in Eastern Rhodopes, Bulgaria in 2012. Photography: BSPB/S. Mumun.*

Figure 4. *Electrocuted White stork (left) and Goshawk (right). Photography: BSPB/G. Gerdzhikov.*

No electrocuted birds were found in Greece. However during the regular monitoring carried out during the Egyptian vulture's breeding season a Raven and a Honey buzzard were found dead under two pylons with transformers powering small irrigation water pumps within farmland areas.

In addition, 4,643 pylons were mapped in the wintering grounds and the risk to birds from electrocution was assessed (Arkumaev et al. 2014). From these 4,643 pylons, 3,728 were identified as dangerous based on their construction and 915 were identified as not dangerous (Annex IV). However, relatively low proportion (4%, n = 1,082 individuals) of the wintering population in the studied area (Afar, Ethiopia) was using dangerous pylons for roosting (Arkumaev et al. 2014)

3.2. Number and distribution of dangerous electricity pylons

A set of sensitivity maps for the risk of electrocution of Egyptian vultures in the breeding grounds in Bulgaria and Greece were produced (**Annex V**).

The coordinates of identified critical pylons recommended for insulation are available in digital format at this [link].

4. LESSONS LEARNED

Before planning any insulation activities within a conservation project, preliminary communication and consultations with electricity companies should be conducted to ensure the feasibility of the proposed insulations;

Before the implementation of effective insulation of dangerous pylons, evidence is needed to be collected at the key areas of the target species (e.g. breeding territories, bottlenecks of migration, roosting or congregation sites, etc.). Then, surveys of both the existing energy infrastructure and bird surveys in areas where some infrastructure is planned should be implemented to assess the risk to birds. Surveys to assess the risk of electrocution and collision in the breeding territories should cover all power lines in a buffer around the nest (buffer size according to target species). To obtain good evidence, it is recommended to search for dead birds should at least twice – in the beginning and at the end of the breeding season. Surveys should involve transects under the power lines and pylons during which all carcasses found should be described and identified in a field protocol. Carcasses should be collected and photos should be taken in the field. The study should cover at least three breeding seasons in order to have a representative set of data to carry out a correct assessment.

Providing cost-effectiveness evaluations and solutions to the electricity companies stressing the economic benefits that the insulation work will provide them in the long term will help to get their support and approval towards the implementation of the insulation activities;

All insulated lines should be monitored to evaluate the results and provide supporting data for further insulations. Particular attention should be given to any new materials or innovative methods for insulation in order to compare them to previous methods helping in the future selection of the best value for money materials/methods.

5. MITIGATION MEASURES TO REDUCE THE RISK OF ELECTROCUTION

- Coordination and cooperation with electricity companies operating in the areas important for the Egyptian vulture (and other threatened species). A good example is the disconnection of the "killer" power line in Port Sudan (BSPB 2014) and the LIFE+ project "Life for Safe Grid" implemented in partnership between EVN Bulgaria and BSPB.
- Convincing electricity companies to participate in conservation.
- Environmental impact assessments and management plans in SPAs should consider bird-friendly design of power lines.
- Producing and sharing sensitivity maps about the risks of electrocution and collision with relevant stakeholders and authorities.
- Prioritize pylons for insulation based on the risk of electrocution (based on a simple approach - choosing pylons with bird droppings by visual obervations or the simple algorithm used in the current report; or using a more sophisticated and more robust approach, e.g. Dwyer et al. 2013).
- Finding and applying innovations to reduce the risk of electrocution and collision (installing divertors; installation of roosting platforms on the pylons; installations preventing birds roosting on a pylon; underground cables instead of overhead wires, etc.). If feasible, replacing existing medium voltage power lines with underground electricity networks.

6. ACKNOWLEDGEMENTS

We acknowledge the help of all field assistants involved in the fieldwork for mapping electric pylons within Egyptian vulture breeding territories in Bulgaria and Greece, namely Georgi Gerzhikov, Mihail Iliev, Sylvia Dyulgerova, Emil Yordanov, Anton Chaushev, Martin Karadzhov, Dimitris Vavylis, Elzbieta Kret, as well as EVS volunteers at WWF Greece, namely Joanna Wawrzyczek, Pierre Briere, Bonny van Puyvelde, Marisa Weber, Malte Buhrs, Maria Pita, Elizabeth Navarrete, Teresa Rius, Jorge Gracia and Maria Garcia. Elizabeth Ball (RSPB) proof read the text and provided valuable comments.

7. REFERENCES

Angelov,I., Hashim, I. & Oppel, S. 2013. Persistent electrocution mortality of Egyptian Vultures Neophron percnopterus over 28 years in East Africa. Bird Conservation International 23: 1-6.

Arkumarev, V., Dobrev, V., Abebe, Y. D., Popgeorgiev, G. & Nikolov, S. C. 2014. Congregations of wintering Egyptian Vultures Neophron percnopterus in Afar, Ethiopia: Present status and implications for conservation. Ostrich 85(2): 139-145.

BirdLife International 2008. Neophron percnopterus. In: IUCN (2011): IUCN Red List of Threatened Species. Version 2011.2. www.iucnredlist.org [accessed at: 2012.06.13]

BSPB (Bulgarian Society for Protection of Birds) 2012. The Return of the Neophron. Available at: http://lifeneophron.eu/en/news-view/91.html [accessed 25 March 2016].

BSPB (Bulgarian Society for Protection of Birds) 2014. The Return of the Neophron. Available at: http://lifeneophron.eu/en/news-view/220.html [accessed 25 March 2016].

Carrete, M., Grande, J.M., Tella, J.L., Sánchez-Zapata, J.A., Donázar, J.A., Díaz-Delgado, R. & Romo, A. 2007. Habitat, human pressure, and social behavior: Partialling out 490 factors affecting large-scale territory extinction in an endangered vulture. Biological Conservation 136: 143-154.

Demerdzhiev, D. 2014. Factors Influencing Bird Mortality Caused by Power Lineswithin Special Protected Areas and undertaken ConservationEfforts. Acta Zoologica Bulgarica 66(2): 411-423.

Dwyer, J.F., Harness, R.E. & Donohue, K. 2013. Predictive model of avian electrocution risk on overhead power lines. Conservation Biology 28(1): 159-168.

Nikolov, S. C., Barov, B., Bowden, C. and Williams, N. P. (Eds.) 2016. Flyway Action Plan for the Conservation of the Balkan and Central Asian Populations of the Egyptian Vulture *Neophron percnopterus* (EVFAP). BSPB, Sofia, in prep.

Saravia, V., Kret, E., Dobrev, V. & Nikolov S. C. 2016. Assessment of mortality causes for the Egyptian Vulture *(Neophron percnopterus)* in Bulgaria and Greece (1997-2015). Fact sheet under action A1 of the LIFE+ project "The Return of the Neophron" (LIFE10 NAT/BG/000152). HOS, Athens. 7 p.

Velevski, M., Nikolov, S.C., Hallmann, B., Dobrev, V., Sidiropoulos, L., Saravia, V., Tsiakiris, R., Arkumarev, V., Galanaki, A., Kominos, T., Stara, K., Kret, E., Grubač, B., Lisičanec, E., Kastritis, T., Vavylis, D., Topi, M., Hoxha, B. & Oppel, S. 2015. Population decline and range contraction of the Egyptian Vulture *Neophron percnopterus* on the Balkan Peninsula. Bird Conservation International 25: 440 - 450.

8. ANNEXES

Annex I. Guide for electricity pylon identification in Bulgaria and Greece

I. DANGEROUS PYLONS*

1.1. Concrete pylons. Insulators are located on 1, 2 or 3 crossbars at staggered intervals from the top of the pylon. The insulators are directed up ***(pin-type)***, often the higher insulator is above the top of the pylon (*see the photos of pylons types:* ***Cr 1, 2, 3, 4***). When there are more than three insulators, they are more often located on two crossbars always directed up (*see the photos of pylons type:* ***Cr 6***). In some cases there are concrete pylons with three insulators directed up and located on only one crossbar (*see the photos of pylon types:* ***Cr 8, 9***).

1.2. Metal pylons. Not widely distributed. More often they have 6 insulators directed up and located on 2 crossbars (*see the photos of pylons type:* ***Cr 5***); sometimes the metal pylons have 3 insulators directed up and located on 1 crossbar (*see the photos of pylons type:* ***Cr 7***) or with 3 insulators directed up and located on 3 crossbars (*looks like pylons type Cr 1, but made from metal*).

1.3. Metal pylons for stretching. Most often they are with 3 insulators located on the side of the pylon and on short crossbars. Other locations of the insulators are also possible, but they are always located laterally (*see the photos of pylons type:* ***Vu 1, 2, 3, 4 , 5***). They are used rarely, mostly in places where the line crosses a road or makes a curve.

1.4. Metal pylons for electricity line redirection. Specific, with limited use. Most often they are made out of metal, and rarely from concrete. They have many insulators (>6) located densely, more often on the top of the pylon, with a lot of wires connecting between the insulators. On the pylons there are shifting gears, and these pylons are always supplementary isolated from the ground *(see the photos of pylons type:* ***Ju 1, 2, 3, 4****).*

II. NOT DANGEROUS PYLONS*

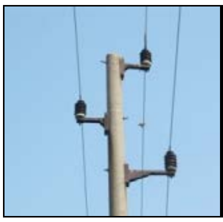
The typical characteristic of this group of pylons is that the insulators are directed down.

*Cr (crytical), Vu (Vulnurable), Nt (Near threatening), Ju (Jumper)

2.1. Metal pylons. Not so widely distributed. Most often there are two types: (i) with 3 insulators directed down and located on 3 short crossbars (*see the photos of pylons type:* ***Nt 2***) and (ii) with 6 insulators located on 1 or 2 long crossbars (*see the photos of pylons type:* ***Nt 3***).

2.2. Concrete pylons. Widely distributed. Most often, there are two types (i) with 3 insulators directed down and located on 3 crossbars (see the photos of pylons type: Nt 1) and (ii) high, П-shaped with 3 insulators on 1 crossbar *(see the photos of pylons type:* ***Nt 4****).*

Crytical Type of pylons (Cr) – metal, wooden, concrete pylons with different number of crossbars and insulators directed up;





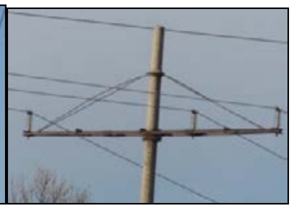
Cr1 Cr2 Cr3 Cr4 Cr5

1 *Cr (crytical), Vu (Vulnurable), Nt (Near threatening), Ju (Jumper)*


Cr6


Cr7


Cr8


Cr9


Cr10


Cr11


Cr12


Cr13


Cr14


Cr15


Cr16


Cr17


Cr18


Cr19


Cr20

Vlnurable type of pylons (Vu) - metal, wooden, concrete pylons with different number of crossbars and insulators located laterally;


Vu1


Vu2


Vu3


Vu4

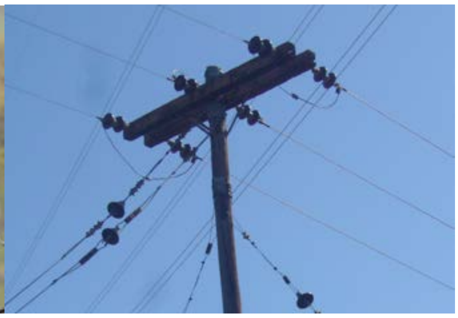



Vu5 Vu6 Vu7 Vu8




Vu9 Vu10 Vu11 Vu12





Vu13 Vu14 Vu15




Vu16 Vu17 Vu18 Vu19

Near threatening type of pylons (Nt) - metal, wooden, concrete pylons with different number of crossbars and insulators directed down;





Nt1 Nt2 Nt3 Nt4 Nt5




Nt6 Nt7 Nt8 Nt9

Jumper type of pylons (Ju) - Most often they are made out of metal, and rarely from concrete, with many insulators (>6) located densely, directed laterally and/or up;



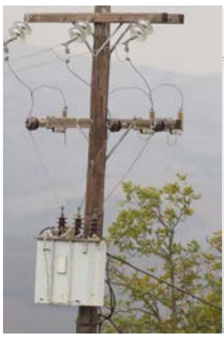

Ju1 Ju2 Ju3 Ju4




Ju5 Ju6 Ju7 Ju8




Ju9 Ju10 Ju11 Ju12




Ju13 Ju14 Ju15 Ju16

Ju17

Ju18

Ju19

Ju20

Ju21

Ju22

Ju23

Ju24

Ju25

Ju26

Ju27

Ju28

Ju29

Ju30

Annex II. Field protocol for mapping of electricity infrastructure

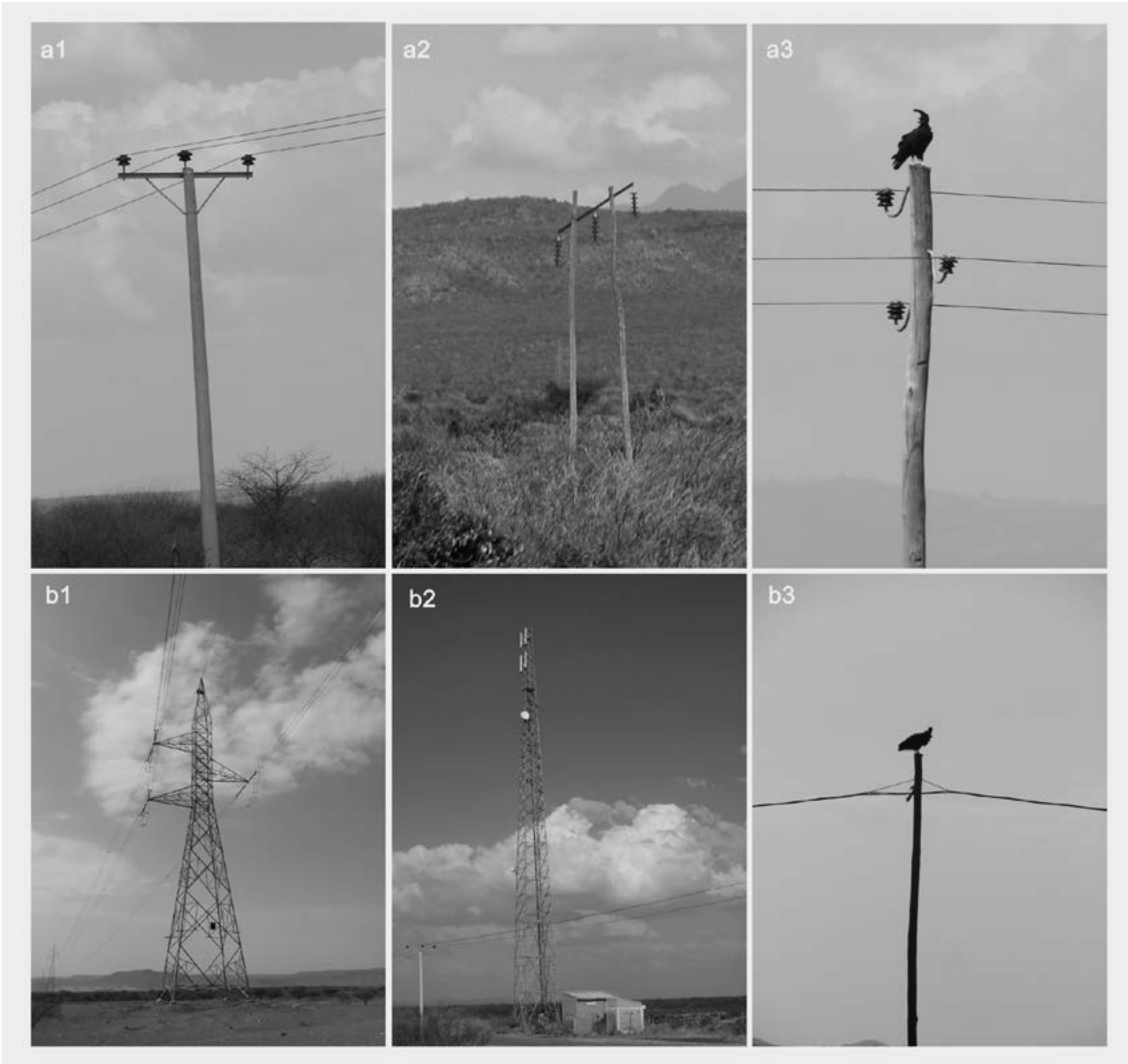
Nest ID:			Date:		Participants:		Weather conditions:	
№	*Type of pylon*	*Electr. comp. code*	*Picture file name*	*GPS waypoint ID (observer initials+visit ID)*	*Faeces*	*Dead birds (Yes/No)*	*Habitat (based on CLC)*	*Other comments*

Annex III. Field protocol for description of electrocuted birds.

Nest ID:			**Date:**		**Weather conditions:**			**SPA code:**
№	***Type of pylon***	***Species***	***Age/sex of the bird***	***Age of the carcass***	***GPS waypoint name***	***Picture file name***	***Reason for mortality***	***Description***

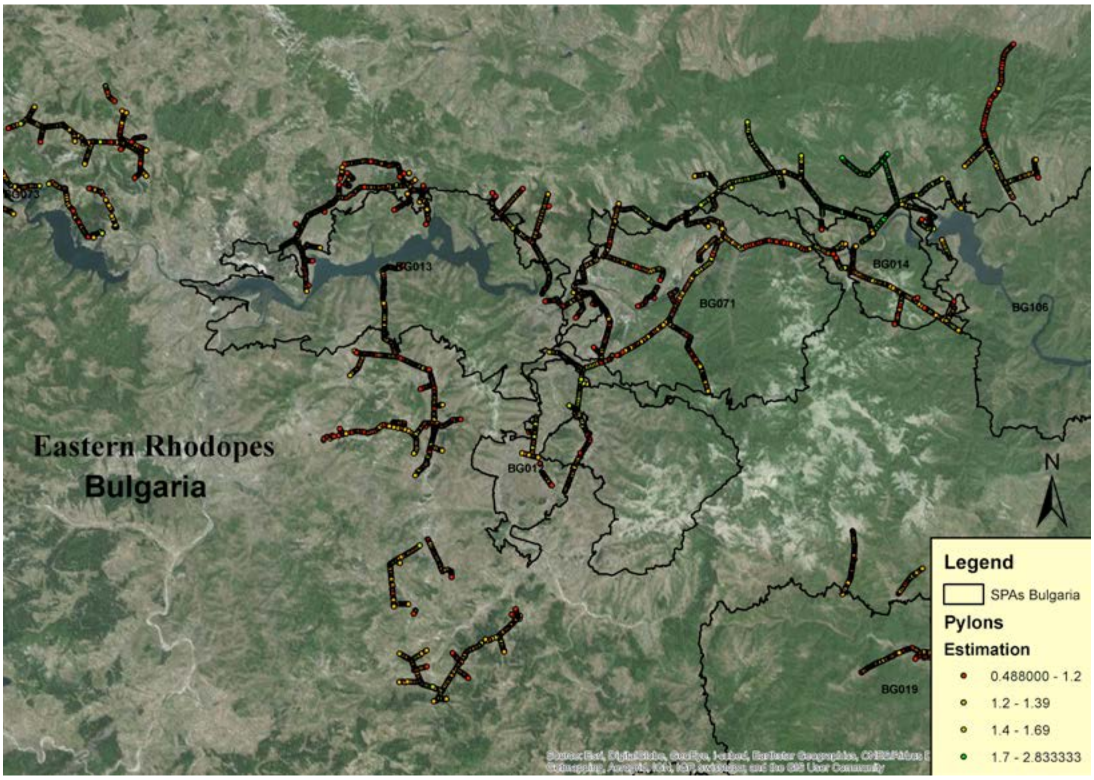
Annex IV. Types of roosting pylons for Egyptian vultures in Afar, Ethiopia

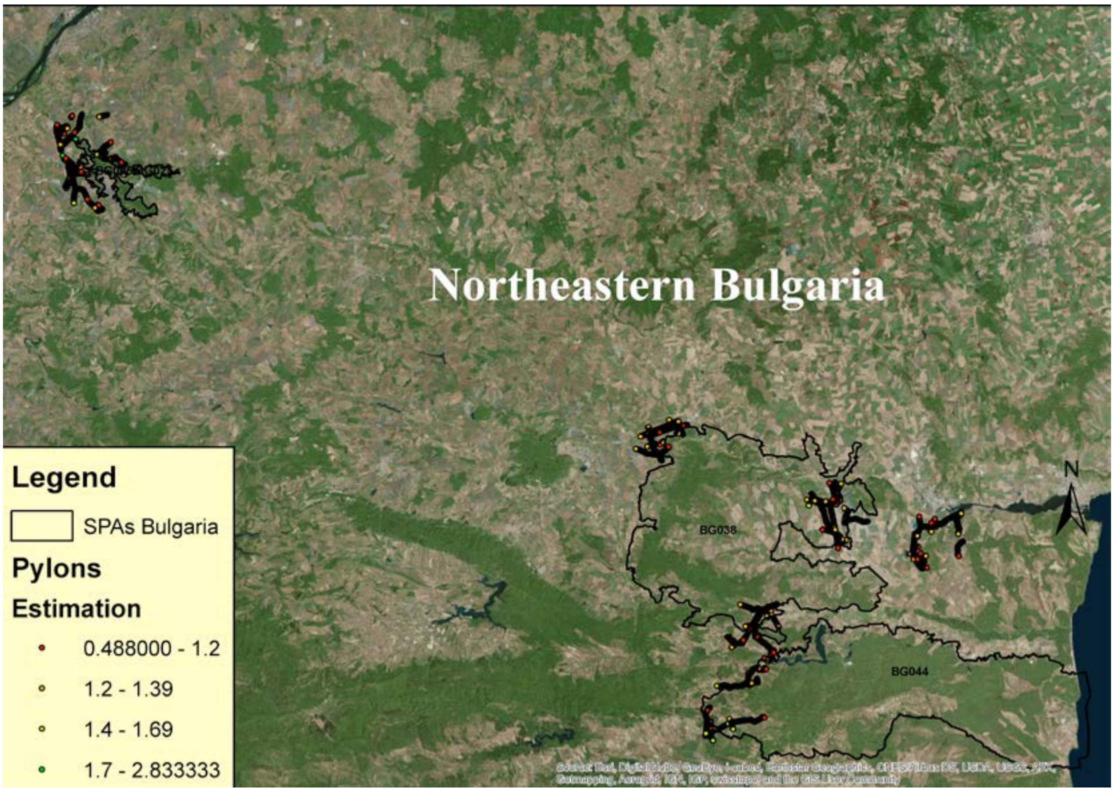
(a) Dangerous type, including: (a1) low voltage T-shaped poles, (a2) low voltage П-shaped poles, (a3) low voltage I-shaped, and (b) Safe type, including: (b1) high voltage A-shaped poles, (b2) communication tower, and (b3) poles without wires.

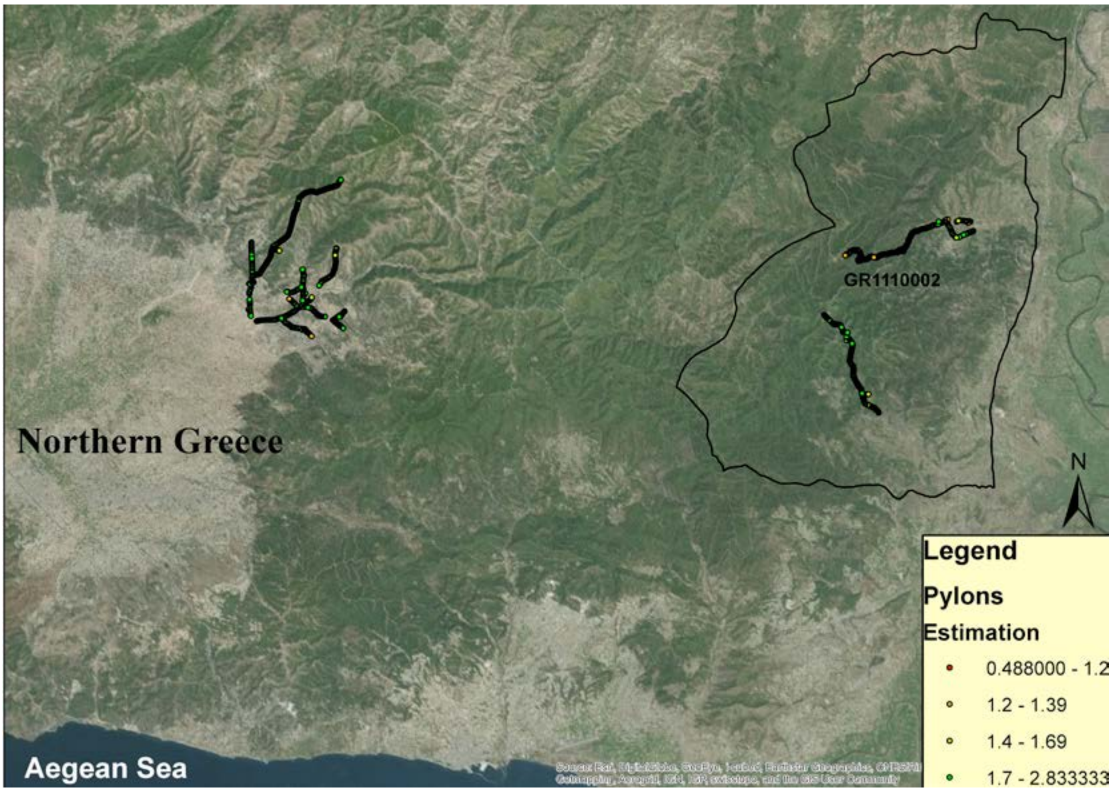


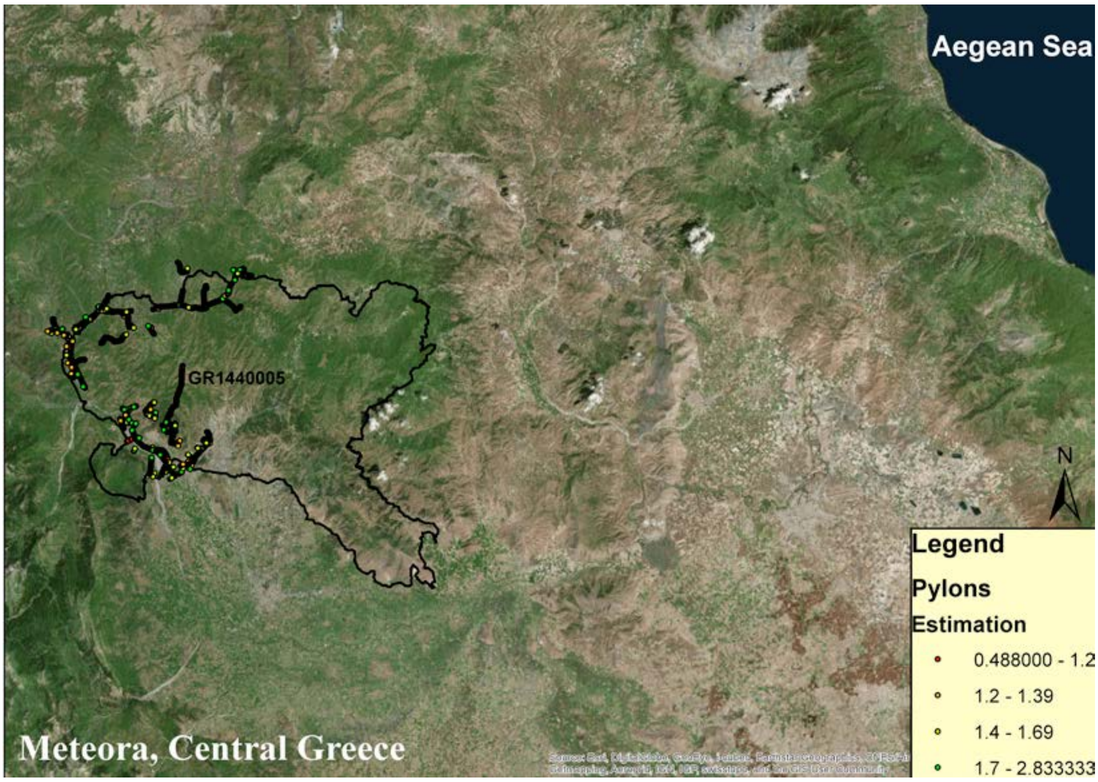
__Annex V.__ Sensitivity maps for the risk of electrocution of Egyptian vultures in Bulgaria and Greece

Maps refer to the breeding grounds in Eastern Rhodopes (Bulgaria and Greece), Northeatern Bulgaria, Northern and Central Greece (green =low risk; yellow = medium risk; orange = high risk and red = very high risk; for the values of the categories see Methods).






Northern Greece
GR1110002
N
Legend
Pylons
Estimation
0.488000 - 1.2
1.2 - 1.39
1.4 - 1.69
1.7 - 2.833333
Aegean Sea


Aegean Sea
GR1440005
N
Legend
Pylons
Estimation
0.488000 - 1.2
1.2 - 1.39
1.4 - 1.69
1.7 - 2.833333
Meteora, Central Greece