Bird mortality due to hazardous powerlines in East Oromia and Afar regions, Ethiopia, 2019

Photo: Samuel Bakari

TECHNICAL REPORT

under action A3 of the "Egyptian Vulture New LIFE" project

(LIFE16 NAT/BG/000874)

January 2020
Nairobi

LIFE16 NAT/BG/000874

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RECOMMENDED CITATION

Bakari, S., Mengistu, S., Tesfaye, M., Ruffo, A. D., Oppel, S. Arkumarev., V and Nikolov, S.C. 2020. Bird mortality due to hazardous powerlines in East Oromia and Afar regions, Ethiopia, 2019. Technical report under actions A3 of the "Egyptian Vulture New LIFE" (LIFE16 NAT/BG/000874) project. BirdLife Africa, Nairobi. 17 p.

ABOUT THE PROJECT

This survey and report are developed under the frames of action A3 of the LIFE project "Egyptian Vulture New LIFE" (LIFE16 NAT/BG/000874, www.LifeNeophron.eu) funded by the European Commission and co-funded by the "A. G. Leventis Foundation". The project aims to mitigate the main threats along the flyway of the Balkan population of the Egyptian vulture and is implemented by an alliance of 20 partners in 14 countries in the Balkans, Middle East and Africa.

ACKNOWLEDGEMENTS

This survey was possible thanks to the Ethiopian Wildlife Conservation Authority (EWCA) who provided us with support and permission, and the regional authorities in Oromia and Afar who allowed us to visit these regions and to conduct the field work. We are very grateful to Ato Mengistu Wondafrash, Cloe Pourchier, Clementine Bougain, Mohammed Boyi, Paul Terso, Mekonnen Gassa, Ato Tewabe and Ato Tesfaye.

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SUMMARY

Ethiopia shelters the largest known wintering congregation of the Egyptian Vulture (*Neophron percnopterus*), a globally endangered species and the only long-distance migrant among the four species of European Vultures. In Africa, electrocution and collisions with powerlines is a well-recognised threat to vultures although not very well documented. With Ethiopia gearing for an intensive energy infrastructure development, we present findings of main risks posed by power grid in the country. In 2019, we surveyed a total of 218.64 km of low and medium voltage distribution lines in Oromia and Afar regions and observed a total of 73 carcasses of birds, including 10 Egyptian Vultures and 26 other vultures, 32 of which were victims of electrocution and 34 were victims of collisions with power lines.

We provide recommendations how this mortality can be reduced by (1) insulating existing dangerous infrastructure to make it safe; (2) marking lines in regular flight paths to reduce collision risk; and (3) using only safe power transmission and distribution infrastructure designs for all new installations.

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INTRODUCTION

The Egyptian vulture (*Neophron percnopterus*) is a globally endangered species and the only regular long-distance migrant among the four species of European vultures (Botha et al. 2017). Its Balkan (Eastern European) population is declining by 7% per year, currently consisting of less than 70 breeding pairs (Velevski et al. 2015). Birds from this population are wintering in the Sahel Zone of Central and Eastern Africa (Oppel et al. 2015; Buechley et al. 2018) where the adults are spending almost half of the year, while after its first migration some immatures may stay up to three years without returning to the breeding grounds (Phipps et al 2019). Ethiopia is known to shelter the largest known wintering congregation of the species in Eastern Africa (>1,500 ind.), and most of the birds have been recorded to roost on electric pylons (Arkumarev et al. 2014). Electrocution and collisions with power lines is a well-recognised threat to vultures in Africa (Ogada et al. 2015; Angelov et al. 2013). Considering that Ethiopia is in the process of very intensive energy infrastructure development (World Bank 2018), it is an urgent need to investigate the potential risks of electrocution and collisions of the Egyptian vulture and other birds of conservation concern with the hazardous power lines.

METHODOLOGY

Field visits were made in January, June, October and December 2019 on overall 68 days in Eastern Oromia (Metahara and Adama) and Afar (Logya), based on the telemetry data provided from tagged Egyptian vultures wintering in Ethiopia. The survey was conducted using transects along hazardous powerlines (mostly low- and medium-voltage), done by foot or by car (**Fig. 1**), and covering in total 218.64 km (**Tab. 1**). Each field team consisted of at least two people.

Tab. 1. *Survey effort for powerline transects.*

Month (2019)	Number of km surveyed
January	189.51
June	21.77
October	0.5
December	6.86

Fig. 1*. Powerline transects by foot (left) and by car (right) (photos: S. Nikolov & S. Oppel).*

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RESULTS

We found a total of 73 carcasses of birds, including 11 Egyptian Vultures and 26 other vultures (**Tab. 2**). Of these carcasses, 32 were victims of electrocution and 34 were victims of collisions with power lines.

Many of the dangerous power distribution lines were relatively new, and likely constructed under the National Electrification Program (NEP) which was initiated in 2017. The standard design for these distribution lines is to use concrete poles with a metal crossbar and three wires propped up above the metal crossbar.

Table. 2. *Number of bird victims of electrocution and collision with power lines found in Eastern Oromia and Afar, 2019.*

Species	N of collision victims	N of electrocution victims	N of victims of unknown cause
Hooded Vulture	1	8	2
Egyptian Vulture	4	6	1
Yellow-billed Kite	1	5	2
Marabou Stork	5	3	1
Rüppell's Vulture	4	2	0
White-backed Vulture	4	2	0
Verreaux's Eagle Owl	0	1	0
unidentified vulture	3	0	0
Other birds	12	5	1

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East Oromia region (Metahara area)

A total of 17.8 km of power lines were surveyed and 43 bird carcasses (2.4 dead birds per km of powerline) were discovered (**Fig. 2 & 3**). Among the 43 carcasses, 25 were vultures (8 Hooded Vultures, 6 White-backed Vultures, 4 Egyptian Vultures, 4 Rüppell's Vultures, and 3 unidentified vultures). The rate of dead birds encountered was ranging from 0 – 10 birds per km of power line in different months, with a mean rate of 4.94 dead birds three times per year (**Tab. 2**). It should be noted that these encounter rates are minimum figures, as many carcasses may have been removed by scavengers (e.g. dogs, hyenas, jackals etc.) before they could be detected.

Fig. 2. *Vultures found as victims of electrocution and collision around Metahara, 2019 (photos: S. Nikolov & V. Arkumarev).*

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Fig. 3. *Electrocution or collision victims of other species around Metahara, 2019 (photos: S. Nikolov).*

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The main reason for the high vulture mortality due to the powerlines near Metahara is the presence of three reliable food sources: the rubbish dump near Lake Basaka (where up to 60 vultures forage every day), and two abattoirs (the local slaughterhouse, and the export abattoir 5 km south of Metahara). In addition, people from the town dump their dead animals in the area near the local slaughterhouse. These abattoirs regularly provide large quantities of food when animals are slaughtered, and vultures and other birds therefore perch on tall structures that allow them to survey for potential food availability and to digest after feeding (**Fig. 4**). In addition, the two telecommunication antennas in Metahara also serve as nocturnal roost for >100 Hooded Vultures, and the high-voltage power pylons in Awash National Park serve as nocturnal roost for >200 Egyptian Vultures.

Fig. 4. *Photos showing one of the surveyed low-voltage power lines next to the local and the export abattoirs, with vultures perched on almost every single pylon. Although this pylon type is less dangerous than the metal crossbar type, vultures get electrocuted when they spread their wings during landing and take-off (photos: V. Arkumarev & S. Oppel).*

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In December 2019 we discovered that a new powerline is being constructed to the Metahara export abattoir – one of the main food sources that attracts a large number of birds. This powerline has the typical metal crossbar design and is therefore even more dangerous than the already existing line with wooden poles (**Fig. 5**). This line will extend 5 km from Metahara to the export abattoir. Based on our current evidence, we project that this line will cause the death of 66 vultures and 8 other birds every year (**Tab. 3**).

***Table. 3**. Encounter rate (dead birds / km) of bird carcasses along powerlines around Metahara in 2019. The annual mortality of the new 5 km power line is predicted based on the average encounter rate per km projected over 5 km three times per year, and does not account for carcass removal by scavengers.*

Month	Effort (km)	All birds	All vultures	Egyptian Vulture	Predicted annual mortality at the new 5 km power line		
Jan	13.7	2.05	0.80	0.22			
Jun	3.6	2.78	2.50	0.28			
Oct	0.5	10.00	10.00	0.00	All birds	All vultures	Egyptian Vulture
Average		*4.94*	*4.43*	*0.17*	74.13	66.52	2.49

***Fig. 5.** New power pylons erected near the Metahara Export Abattoir, a reliable food source for vultures. Note that the design of these pylons, with a metal crossbar and propped up insulators,*

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will pose an extreme electrocution risk for large birds like vultures and marabous (photo: S. Oppel).

East Oromia region (Adama area)

In Adama, we observed a high voltage transmission line next to the rubbish dump west of Adama which poses a very high collision risk (**Fig. 6 & 7**) – in just less than half an hour, we observed tens of vultures miraculously missing the lines and observed one White-backed Vulture flying into lines and falling down the cliff. Hundreds of different species vultures and Marabou Storks feed on the rubbish dump and are routinely exposed to the danger of collision with the transmission line which descends into a valley and is invisible against the valley background, so that birds taking off from the rubbish dump can easily collide with any of the four different cables.

Fig. 6. *Vultures leaving the Adama rubbish dump are at extremely high risk to collide with the adjacent power transmission line (photo: S. Oppel).*

Fig. 7. *Bird carcass at the base of the cliff where collision victims fall after colliding with the transmission line adjacent to the Adama rubbish dump. This line urgently needs bird flight diverters installed (photo: S. Oppel).*

Afar region (Logya area)

Between January and December 2019, a total of 63.4 km of power lines were surveyed in Logya and 21 bird carcasses (0.33 dead birds per km of powerline) were discovered (**Fig. 8 & 9**), of which 10 had been electrocuted, 6 had died from collisions, and 5 had died of unknown causes. Among the 21 carcasses, 8 were vultures (5 Egyptian Vultures – all electrocuted, 2 Rüppell's Vultures, both collided with a line, and 1 Hooded Vulture died of unknown cause). In addition, in January 2019 a live Egyptian Vulture was found in very poor health state and died under veterinary care. The vulture had suffered chronic exposure to lead but the post-mortem revealed injuries that were consistent with the collision with a power line.

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Two powerlines were particularly dangerous: One that had been built in 2017 (**Fig. 8**) runs parallel to an irrigation canal just north of the main dump where animal faeces and livestock remains are disposed of. Because this dump is highly attractive to vultures and marabous, the line poses a collision risk when birds approach the dump from the north. The line also provides deceptive roosting opportunities, but due to the dangerous design of the pylons, roosting birds get electrocuted.

Fig. 8. *Egyptian Vulture and Marabou Stork carcasses at a small distribution line between the cattle market of Logya and the rubbish dump for animal faeces and remains. This line was built in 2017 and runs 1 km along an irrigation channel and poses an extremely high electrocution and collision risk (photo: S. Oppel).*

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A second very dangerous distribution line along the outskirts of Logya runs along the rubbish dump on the edge of the Awash river bed on the eastern periphery of Logya.

Fig. 9 *Searching for victims in the rubbish under a distribution line on the eastern periphery of Logya (photo: S. Oppel).*

In December a potentially dangerous line was discovered between Semera and Dubti, which has a dangerous design and runs past a permanent water source which is frequently used by vultures for drinking. Although no victims were found next to the water source, two carcasses (1 Marabou Stork, 1 unidentified raptor) were found 3 km south of the water source along the same line, and the line is hazardous for the Egyptian Vultures gathering at this water source every day.

Fig 10. *Bird carcasses under a small distribution line between Semera and Dubti in December 2019.*

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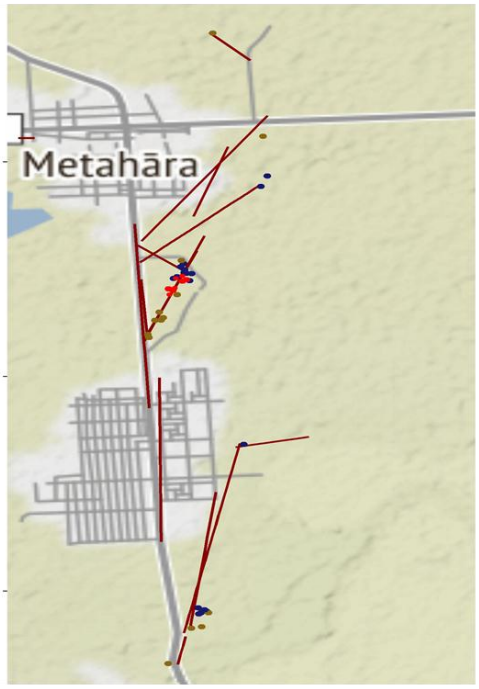
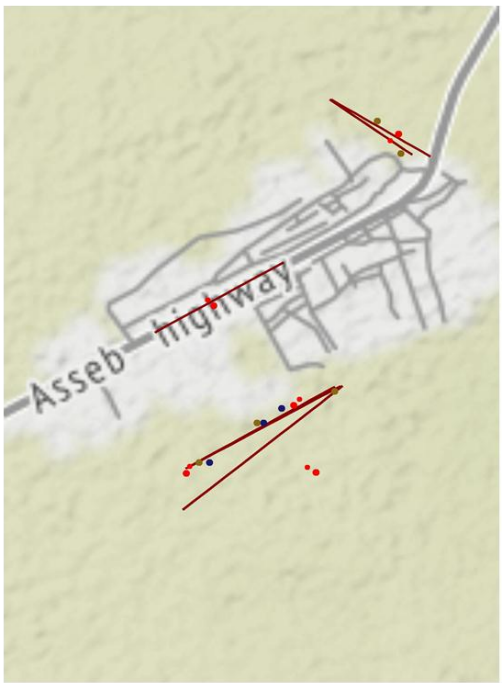
RECOMMENDATIONS

- The presence of reliable food sources, and thus large numbers of Egyptian vultures and other vultures, makes Metahara and Logya important places to ensure that power grid is safe for large birds. However, the current low- and medium-voltage electricity distribution infrastructure is unsafe in terms of both electrocution and collisions. **We identified 5 km of powerlines around Metahara and 2 km around Logya that permanently cause substantial mortality of vultures and other birds** (**Fig. 12**)**.** Thus, urgent mitigation measures are needed.
- **In short term**, we strongly recommend: (1) Retrofitting 100 hazardous poles (**Fig. 12**) around Metahara, and 36 hazardous poles (**Fig. 13**) around Logya with insulation caps; (2) Installing diverters/reflectors on 5 km powerlines in Metahara and 2 km powerlines around Logya as per the locations shown on **Fig. 11**, and on 0,8 km multi-tiered high-voltage transmission line around Adama rubbish dump **Fig. 7**.
- **In long term,** we recommend that all new electric infrastructures use a design which is safe for birds.

Collision and electrocution mortalities in Metahara



Collision and electrocution mortalities in Logia



● Egyptian Vultures ● Other Vultures ● Other Birds

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Fig. 11. *Locations of the identified bird killer power lines (around Metahara and Logya in 2019.*

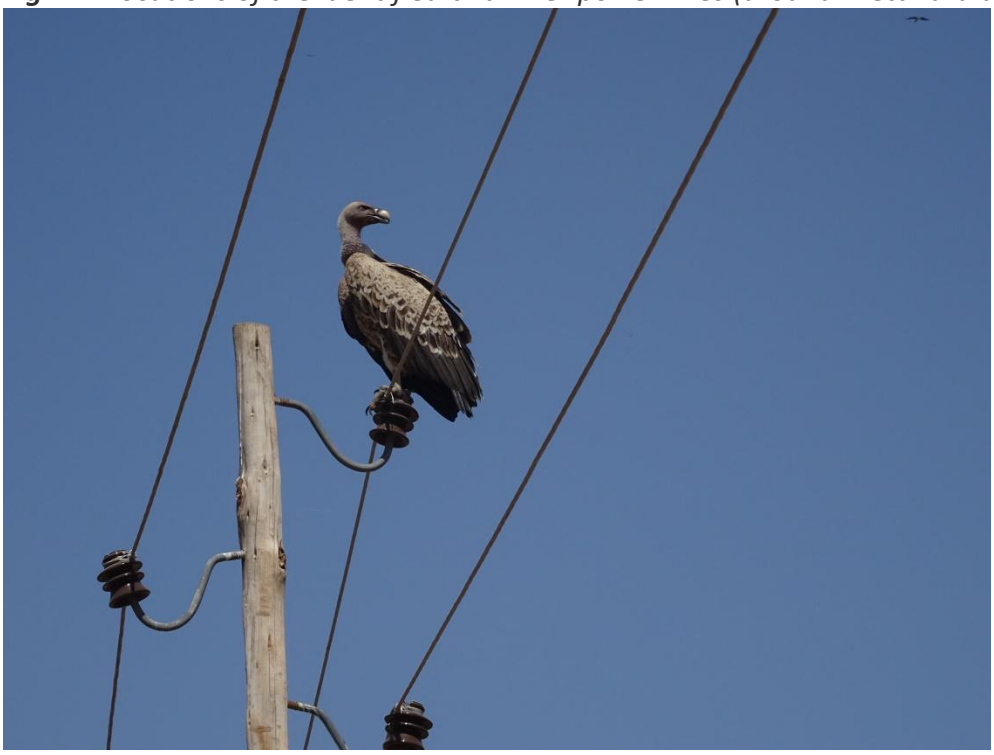

Fig. 12. *Hazardous poles to be insulated around Metahara (N = 100) (Photo: V. Arkumarev).*

Fig. 13. *Hazardous poles to be insulated around Logya (N = 36) (Photo: S. Oppel).*

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