

Photographic record of a Martial Eagle killed at Jeffreys Bay wind farm



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Summary: This short note describes an eye-witness and photographic account of the death of a juvenile Martial Eagle at the Jeffreys Bay Wind farm in winter 2016. The bird's behaviour prior to, and after, being struck by a turbine blade and a post-mortem X-ray are described. This is the first record of a Martial Eagle killed at an operational wind farm and may be the first witnessed death of a collision-prone bird at a wind farm in South Africa.

The extent of avian mortalities at wind farms in South Africa are poorly known given the relatively recent advent of operational wind farms here. However, six wind farms have released data on avian deaths due to wind turbines. Birdlife South Africa have collated and shared these data with the goal of understanding the circumstances surrounding the deaths, the species at risk, and possible solutions (S Ralston-Paton unpubl data). Of 309 fatalities recorded in just over a year from six wind farms, 36 per cent are raptors. Circumstance surrounding the deaths of four Verreaux's Eagles *Aquila verreauxii* are described by Smallie (2015). No fatalities of Vulnerable Martial Eagles *Polemaetus bellicosus* have been recorded to date.

Comprehensive operational monitoring for 24 months prior to our visit at Jeffreys Bay wind farm, and carcass searches around all 60 turbines (J Smallie, unpubl. data) has detected no eagle fatalities at the wind farm, despite frequent flight activity by Martial Eagles. A breeding pair of Martial Eagles exists on site and they have co-existed with the turbines since operations began in 2014.

Here we describe:

- the behaviour leading up to and during the death of a subadult Martial Eagle on the Jeffreys Bay wind farm in winter 2016;
- provide photographic evidence of the impact and injuries;
- present X-ray images and veterinary interpretation of the trauma involved.

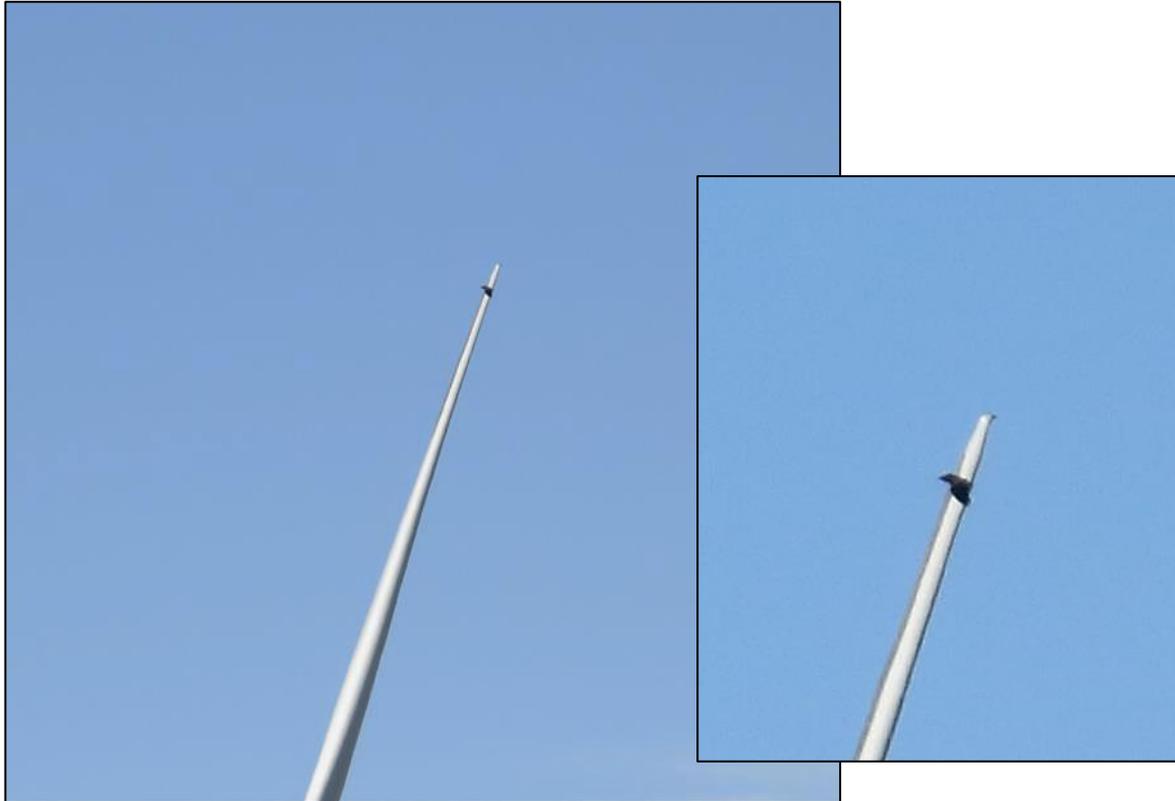
In the mid-morning of our second day (27 July 2016) of routine monitoring of Black Harriers *Circus maurus* from two Vantage Points in the southern portion of the Jeffreys Bay wind farm, we both became aware of Jackal Buzzards *Buteo rufofuscus* mobbing a juvenile Martial Eagle over the centre of the wind farm.

At 10:19 two Jackal Buzzards *Buteo rufofuscus* were observed persistently mobbing the Martial Eagle over turbines 38 and 39 at a height of about 150 m. The mobbing continued for 11 minutes until 10:30 when the remaining buzzard headed north west. Their persistence had forced the eagle to a lower altitude of about 120-130m and she began circling around turbine 38 in medium-strength north-



westerly winds (between 10.9 and 11.4 km h⁻¹) under clear skies.

At 10:30 the eagle began soaring to regain height over turbine 38, in the absence of the buzzards. As she moved in a westerly direction (right to left in the images below) a turbine blade hit her on her right flank as it reached the highest point of its arc. The impact shown below occurred approximately 1-2 m from the end of the 49 m blade.



She appeared to turn as if she saw the blade approaching from her right. Blades tips of these turbines travel at a near constant speed of 323 km h⁻¹ except in the lightest winds (P Oosthuizen pers comm) and it would have been difficult for her to avoid it.

First visual observations from 990 m away suggested it had missed her and she was flying away. However, she plummeted vertically from about 80 m above the ground (the hub height), to hit the ground 35 m from the base of the turbine.

The following sequence of photographs, taken with the rapid-sequence function on a Canon Power shot SX50 SD digital camera shows the whole descent to the ground from ~60 m at 10:30.





Photos: The subadult Martial Eagle free-falling from ~50m following the turbine blade strike at Jeffreys Bay wind farm on 27 July.



She appeared to fall earthwards on her back, judging by the photographs, but was face-down when first found (above).

We initially mistook the turbine that had impacted her (it is the closer of the two in the photographs above) and we only recovered her body at 13:22, about 3h after she was killed. She was 35 m from the base in the position shown, on the south side of the turbine, at S 34 01' 05.4" E 24 50' 05.4".

First impressions suggested no external injuries other than a broken left foot. However, subsequent post-mortem examination at the veterinary clinic of Dr D Glanville in Jeffreys Bay indicated the extent of her injuries. These included a broken lower spine and a gash in her right flank just above her right thigh (Appendix). Given the break in her central-lower spine it is likely that she was dead or paralysed by the time she hit the ground. Her broken left foot, with no obvious haemorrhaging, suggests it was broken as she hit a small rock on the ground on impact.

The X-rays indicated the break in her back, (Figure 1), and it was possible to feel the breakage in her vertebrae through the gash in her side. The gash was approximately 5 cm x 3 cm, and had penetrated the abdominal cavity.

The size of the subadult bird suggested it was a female, with a mass of 5.1 kg (Simmons 2005). She was aged by her plumage to be a 3rd year bird, two years from adulthood (R van Eeden pers. comm.). The sternum and breast muscle suggested she was in good condition, a conclusion supported by veterinarian, Dr Glanville. All other signs were that she was a healthy bird with no stress bars in the feathers, and no obvious feather parasites.



Photos 3 and 4: The large size of the bird and a mass of 5.1 kg suggested a female.

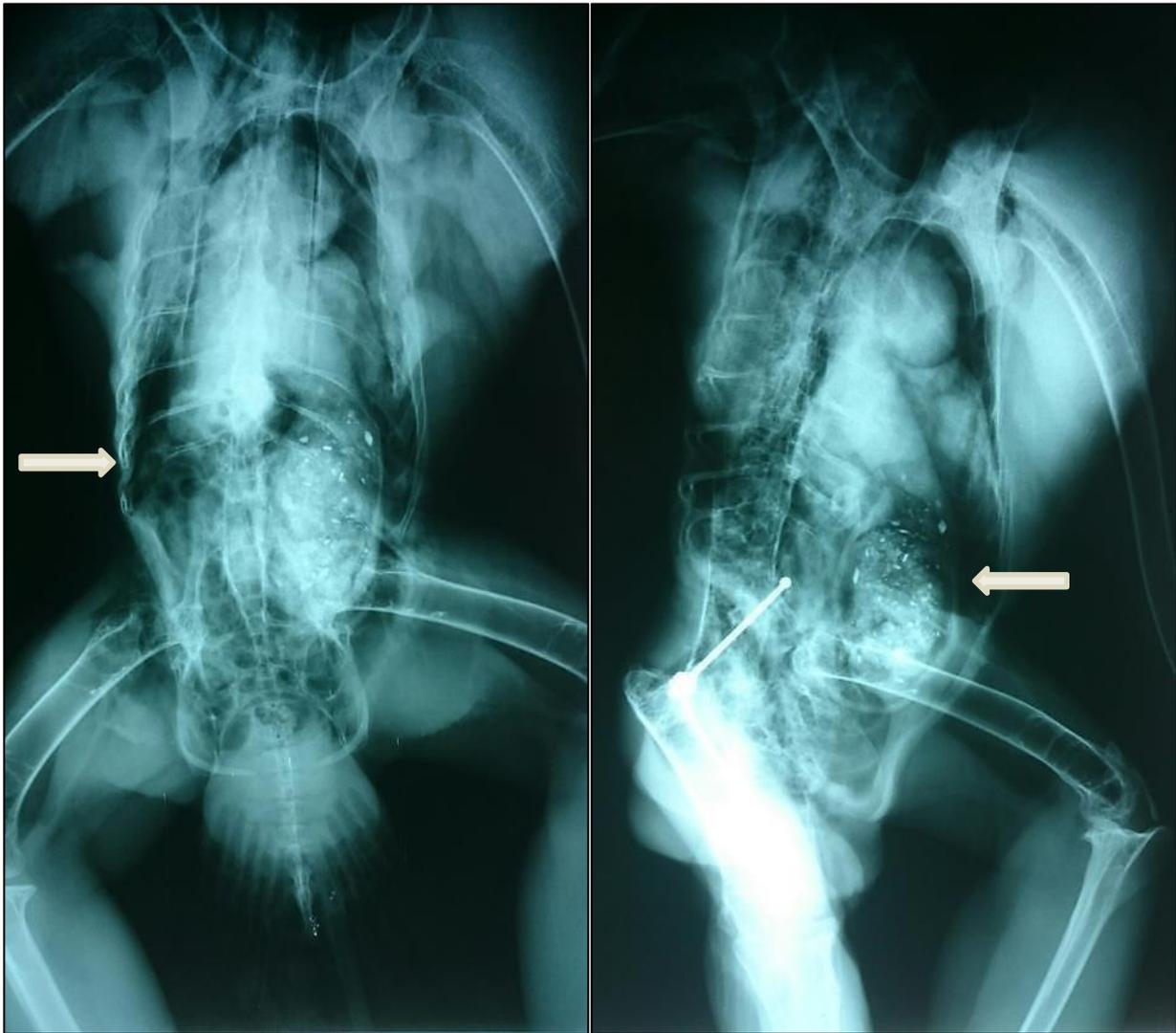


Figure 1: X-rays of the subadult Martial Eagle killed by impact with a turbine blade. The left image showing a dorsal view indicates the gash (lower left abdomen) and the misaligned vertebrae. A lateral view (right) shows a pin inserted into the gash to indicate its position. Note the full but ruptured, stomach with white flecks (presumed to be bone from prey) and the muscle mass present around the femur and tibio- tarsus.

Conclusions

A 3 year-old Martial Eagle was impacted and killed by an operational wind turbine blade at the Jeffreys Bay wind farm on the morning of 27 July under clear skies. The impact occurred close to the top of the arc of the blade of a centrally-place turbine at 128 m and within 1-2 m of the end of the blade. X-rays of the carcass indicated that the impact broke the spine of the bird, and punctured the lower right abdomen suggesting she turned to meet the blade shortly before impact. She was in good condition judging by muscle mass, weight and lack of stress bars in the feathers. Mobbing of Martial Eagles by Jackal Buzzards has been commonly observed on this site and no previous eagle mortalities have been noted over 2 years (J Smallie, unpubl. data). However, it is possible that the combination of inexperience of this eagle, and the length of time she was mobbed (11 minutes), played a significant role

in leading to her untimely death. This is the first record of a mortality of a Martial Eagle at a wind farm in South Africa.

Acknowledgements

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References

Smallie J. 2015. Verreaux's Eagle *Aquila verreauxii* wind turbine collision fatalities. Unpublished report Wildskies Ecological Services.

Simmons RE. 2005. Martial Eagle *Polemaetus bellicosus* in Hockey PAR, Dean WRJ, Ryan PG (Eds). Roberts Birds of Southern Africa VII. John Volcker Bird Book Fund Johannesburg.



Appendix photos:

(Top) The small gash in the Martial eagle's lower right abdomen, which punctured the abdominal wall. Minimal bleeding was apparent from this wound.

(Bottom) The eagle weighed on a veterinary scale, indicating a healthy mass of 5.1 kg

