

CHOJE EAST WIND FARMS

COLLISION RISK AND RANGE LOSS ASSESSMENT UPDATES FOR MARCH 2022 REDUCED LAYOUT

This note has been produced to update the ornithological assessment for the proposed Fronteer and Wind Garden wind farms in the Choje East block, following a layout update in March 2022 reducing the number of turbines at Fronteer from 38 to 19, and at Wind Garden from 47 to 23. These layout revisions follow discussions with EWT in a post-appeal meeting for the Western cluster wind farms proposed by SPVs owned by Wind Relic (where it was agreed that turbines would be removed from the whole extent of all Martial Eagle nests to a buffer of 5km) and to address outstanding I&AP concerns.

The current best available technology is a turbine with a lower hub height than initially applied for (i.e. reduced from 120m to 115m). This change in hub height will not have any material effect on the avifaunal impact assessment.

COLLISION RISK ASSESSMENT UPDATE

The methodology for the collision risk assessment and for the baseline data on which it is based are unchanged from that presented in the AIA reports for the Fronteer and Wind Garden Wind Farms.

Fronteer Wind Farm

The predicted collision risks from the previous 38-turbine Fronteer wind farm, as presented in the AIA are shown in the following Table.

AIA Table 9. Collision risk modelling predictions based on 2019-20 data for the Fronteer wind farm 38-turbine layout: annual risk, year per collision and total collisions in 25 years.

Species	Martial Eagle	Verreaux's Eagle	Blue Crane	Ludwig's Bustard	Southern Black Korhaan	Lanner Falcon
<i>Primary avoidance rate used for assessment</i>	99%	99%	98%	98%	98%	98%
Collision prediction (annual)	0.147	0.005	0.301	0.010	0.016	0.076
Years per collision	6.8	211.2	3.3	103.0	61.6	13.1
Total collisions in 25 years:	3.69	0.12	7.52	0.24	0.41	1.91

** Note this is an extrapolation from baseline data in absence of mitigation, not a prediction of the actual number of collisions expected from the wind farm.*

The updated risks from reduced scheme of 19 turbines are summarised in the following Table, which follows the same format as AIA Table 9 to facilitate direct comparison. **Collision risk was reduced for**

all species. The magnitude of the reduction is dependent on the use that each species made of the area from which the turbines have been removed.

Updated Table 9. Collision risk modelling predictions based on 2019-20 data for the Fronteer wind farm 19-turbine layout: annual risk, year per collision and total collisions in 25 years.

Species	Martial Eagle	Verreaux's Eagle	Blue Crane	Ludwig's Bustard	Southern Black Korhaan	Lanner Falcon
Primary avoidance rate used for assessment	99%	99%	98%	98%	98%	98%
Collision prediction (annual)	0.023	0	0.164	0.009	0.014	0.005
Years per collision	43.0	0	6.1	108.3	71.5	182.0
Total collisions in 25 years:	0.58	0	4.09	0.23	0.35	0.14

** Note this is an extrapolation from baseline data in absence of mitigation, not a prediction of the actual number of collisions expected from the wind farm.*

Wind Garden Wind Farm

The predicted collision risks from the previous 47-turbine Wind Garden wind farm, as presented in the AIA are shown in the following Table.

AIA Table 9. Collision risk modelling predictions based on 2019-20 data for the Wind Garden wind farm 47-turbine layout: annual risk, year per collision and total collisions in 25 years.

Species	Martial Eagle	Verreaux's Eagle	Blue Crane	Ludwig's Bustard	Southern Black Korhaan	African Fish-eagle
Primary avoidance rate used for assessment	99%	99%	98%	98%	98%	98%
Collision prediction (annual)	0.042	0.128	0.226	0.048	0.034	0.059
Years per collision	24.0	7.8	4.4	20.7	29.2	17.0
Total collisions in 25 years *	1.04	3.20	5.65	1.21	0.86	1.47

** Note this is an extrapolation from baseline data in absence of mitigation, not a prediction of the actual number of collisions expected from the wind farm.*

The updated risks from reduced scheme of 23 turbines are summarised in the following Table, which follows the same format as the AIA Table 9 to facilitate direct comparison. As for Fronteer, **collision**

risk was reduced for all species. Again, the magnitude of the reduction is dependent on the use that each species made of the area from which the turbines have been removed.

Updated Table 9. Collision risk modelling predictions based on 2019-20 data for the Wind Garden wind farm 23-turbine layout: annual risk, year per collision and total collisions in 25 years.

Species	Martial Eagle	Verreaux's Eagle	Blue Crane	Ludwig's Bustard	Southern Black Korhaan	African Fish-eagle
Primary avoidance rate used for assessment	99%	99%	98%	98%	98%	98%
Collision prediction (annual)	0.002	0.053	0.073	0.039	0.012	0.052
Years per collision	515.9	18.7	13.6	25.6	85.9	19.2
Total collisions in 25 years *	0.05	1.33	1.83	0.98	0.29	1.30

* Note this is an extrapolation from baseline data in absence of mitigation, not a prediction of the actual number of collisions expected from the wind farm.

Cumulative Collision Risk

The AIA reports included a cumulative assessment of the collision risks from the two schemes in combination. The AIA Table 10 below gives the predicted collision risks for the two proposed wind farms in the Choje Eastern Block for the original 38- and 47-turbine schemes.

AIA Table 10. Cumulative collision risk for the Choje wind farms in the Eastern Block (annual risk).

	Martial Eagle	Verreaux's Eagle	Cape Vulture	Blue Crane	Secretary-bird	Lanner Falcon	Ludwig's Bustard	Southern Black Korhaan
Avoidance rate:	99%	99%	95%	98%	98%	98%	98%	98%
Wind Garden	0.04	0.11	0	0.22	0	0	0.04	0.03
Fronteer	0.15	0.005	0	0.30	0	0.08	0.01	0.02
TOTAL EAST	0.19	0.12	0	0.52	0	0.08	0.05	0.05

The updated cumulative collision risks for the reduced 19- and 23-turbines schemes are summarised in the Updated Table 10 below, which again follows the same format as the AIA report Table 10, showing the reduced risks.

Updated Table 10. Cumulative collision risk for the Choje wind farms in the Eastern Block (annual risk).

	Martial Eagle	Verreaux's Eagle	Cape Vulture	Blue Crane	Secretary-bird	Lanner Falcon	Ludwig's Bustard	Southern Black Korhaan
Avoidance rate:	99%	99%	95%	98%	98%	98%	98%	98%
Wind Garden	0.002	0.053	0	0.07	0	0	0.04	0.01
Fronteer	0.023	0	0	0.16	0	0.01	0.01	0.01
TOTAL EAST	0.025	0.053	0	0.23	0	0.01	0.05	0.02

In the previous AIA reports, it was concluded for both wind farms that the predicted levels of additional mortality for all species were low numerically, and that these effects would not be significant, at either the regional or the national scale. Notwithstanding this, mitigation measures were still required to minimise the risk of collision to Martial Eagle and Verreaux's Eagle in particular, so that the two wind farm sites make as small as possible a contribution to the overall cumulative risk from all the Choje wind farms as a whole. Whilst the reduced layouts have substantially reduced the overall collision risks from both proposed wind farms, that conclusion remains the same.

RANGE LOSS ASSESSMENT UPDATE

The methods used in the AIA reports for the assessment of potential eagle range loss were set out in Section 8.4 of the respective AIA reports for each wind farm.

Verreaux's Eagle (both sites)

The AIA report concluded for both Fronteer and Wind Garden wind farms that the magnitude of the potential habitat loss for Verreaux's Eagles was negligible, and would not constitute a significant impact for either of the two ranges in proximity to the wind farm sites. That conclusion is unaffected by the reduced layouts.

Martial Eagle (Fronteer)

The predicted Martial Eagle range loss for the Fronteer wind farm from the AIA is summarised below (AIA Table 11). This predicted a very small loss of the SW range and a larger (up to 19%) loss of the NE range, but concluded that, given the low use that these birds make of this area (from the vantage point survey results and from the range modelling), such a loss would not be considered significant.

AIA Table 11. Predicted Verreaux's Eagle and Martial Eagle range loss for the proposed 38-turbine Fronteer Wind Farm, assuming complete displacement of both species to 250m or 500m from turbines.

Species	Range	Area of range within 250m of proposed turbines (km ²)	% range loss if displaced 250m from turbines	Area of range within 500m of proposed turbines (km ²)	% range loss if displaced 500m from turbines
Verreaux's Eagle	SW (active confirmed)	0	0%	0	0%
	NW (potential)	0	0%	0	0%
Martial Eagle	SW (active confirmed)	0.02	0.02%	0.35	0.3%
	NE (active confirmed)	17.2	16.2%	20.5	19.3%

The updated range loss assessment for Fronteer is summarised in the Updated Table 11 below. There would still be a very small loss of the SW range but the loss from the NE range would be substantially reduced, from 16% to 4% at 250m displacement and 19% to 6% at 500m displacement.

Updated Table 11. Predicted Verreaux's Eagle and Martial Eagle range loss for the proposed 19-turbine Fronteer Wind Farm, assuming complete displacement of both species to 250m or 500m from turbines.

Species	Range	Area of range within 250m of proposed turbines (km ²)	% range loss if displaced 250m from turbines	Area of range within 500m of proposed turbines (km ²)	% range loss if displaced 500m from turbines
Verreaux's Eagle	SW (active confirmed)	0	0%	0	0%
	NW (potential)	0	0%	0	0%
Martial Eagle	SW (active confirmed)	0.02	0.02%	0.35	0.3%
	NE (active confirmed)	4.2	4.0%	5.9	5.6%

In the AIA it was concluded that there would be no significant disturbance impacts for these species, but that mitigation measures would be needed when considering the cumulative effects of the Choje wind farms in-combination.

Whilst the magnitude of the potential impact has been reduced for the new Fronteer layout, this conclusion remains the same.

Martial Eagle (Wind Garden)

The predicted Martial Eagle range loss for the Wind Garden wind farm from the AIA is summarised below (AIA Table 11). This predicted no loss of the NE range but up to 14% loss of the SW range, and concluded that, given the low use that these birds make of this area (from the vantage point survey results and from the range modelling), such a loss would not be considered significant.

AIA Table 11. Predicted Verreaux's Eagle and Martial Eagle range loss for the proposed 47-turbine Wind Garden Wind Farm, assuming complete displacement of both species to 250m or 500m from turbines.

Species	Range	Area of range within 250m of proposed turbines (km ²)	% range loss if displaced 250m from turbines	Area of range within 500m of proposed turbines (km ²)	% range loss if displaced 500m from turbines
Verreaux's Eagle	SW (active confirmed)	0	0%	0	0%
	NW (potential)	0.26	1.0%	0.70	2.7%
Martial Eagle	SW (active confirmed)	11.8	11.1%	14.4	13.6%
	NE (active confirmed)	0	0%	0	0%

The updated range loss assessment for Wind Garden is summarised in the Updated Table 11 below. There would still be no loss from the NE range and the loss from the SW range would be substantially reduced, from 12% to 4% at 250m displacement and 14% to 6% at 500m displacement.

Updated Table 11. Predicted Verreaux's Eagle and Martial Eagle range loss for the proposed 23-turbine Wind Garden Wind Farm, assuming complete displacement of both species to 250m or 500m from turbines.

Species	Range	Area of range within 250m of proposed turbines (km ²)	% range loss if displaced 250m from turbines	Area of range within 500m of proposed turbines (km ²)	% range loss if displaced 500m from turbines
Verreaux's Eagle	SW (active confirmed)	0	0%	0	0%
	NW (potential)	0	0%	0.55	2.1%
Martial Eagle	SW (active confirmed)	4.24	4.0%	5.87	5.5%
	NE (active confirmed)	0	0%	0	0%

In the AIA it was concluded that there would be no potentially significant disturbance impacts for these species, but that mitigation measures would be needed when considering the cumulative effects of the Choje wind farms in-combination.

Whilst the magnitude of the potential impact has been reduced for the new Wind Garden layout, this conclusion remains the same.

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