

Lake Turkana Wind Power Project - Kenya

Ornithological Surveys

Progress Report
December 2010



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1 Introduction

- 1.1.1 The proposed Lake Turkana Wind Power Project (LTWP) is situated in the Marsabit district of northwest Kenya. The project aims to provide 300MW of wind energy for the national grid, via a series of 365 wind turbines.
- 1.1.2 The windfarm will be positioned within an overall project site of 24,000 acres (approximately 100km²), the turbines will be located at a distance of at least 8km¹ to the east of Lake Turkana itself.
- 1.1.3 An Environmental and Social Impact Assessment for the windfarm development has been formally approved and an EIA license was issued in July 2009.
- 1.1.4 It has been recommended that a one-year programme of ornithological surveys is required to validate the conclusions of the ESIA prepared for the Project. The survey method was prepared and discussed with the Royal Society for the Protection of Birds (RSPB) and the National Museums of Kenya.
- 1.1.5 URS/Scott Wilson commenced these surveys in October 2010 using a team of ornithologists from the National Museums of Kenya. The surveys will be conducted on a monthly basis over a twelve month period, including additional survey effort in the two migration periods of Autumn and Spring, which coincide with the months of October and November 2010 and March/April 2011.
- 1.1.6 This progress report presents a summary of the initial results arising from the first two month's survey (October and November) during the autumn migration and an additional raptor flight line survey at one Vantage Point (VP8). Whilst the full analysis of potential for bird strike from wind turbines will be modelled on the basis of a more complete data set, the purpose of this report is to present the findings of the initial surveys and also provide an indication of any "red-flags", which might affect the project process.

¹ The precise layout of the turbines is not yet available.

2 Ornithological Survey

2.1 Methods

2.1.1 The survey methods involved vantage point watches and transect surveys. A summary of the methods are provided below.

Vantage point watches

2.1.2 Recording focussed on larger, less manoeuvrable species which are known to be at potential risk of collision with wind turbines (target species), these are as follows:

- All large water birds (plover sized and above), e.g. flamingos, pelicans, storks and cranes;
- Birds of prey, including owls and raptors such as vultures, eagles, buzzards;
- Bustards;

2.1.3 The vantage point (VP) watches entailed recording bird flights over a set area of the proposed wind farm at a representative number of locations- ten (see Figure 1). The orientation of each VP covered a 180° field of view. Six of these VPs were located at meteorological mast sites (VP*m) and four adjacent to a track (VP*). These ten locations were chosen as a sample to give good spatial coverage across the site, approximately 50% of the area, (based on an average 2km field of view), to cover regular bird-flight lines and potential migratory movement. The locations included views of ridgelines and valleys, and the full range of habitats on the site (i.e. from desert to scrub).

2.1.4 Bird flight heights were recorded within three flight height bands which correspond to the current turbine specifications (i.e. Vestas V52 turbines with a 44m hub height). These height bands were as follows:

- Band A below rotor sweep height (<18m a.g.l²)
- Band B within rotor sweep height (18 to 70m a.g.l)
- Band C above rotor sweep height (>70m a.g.l)

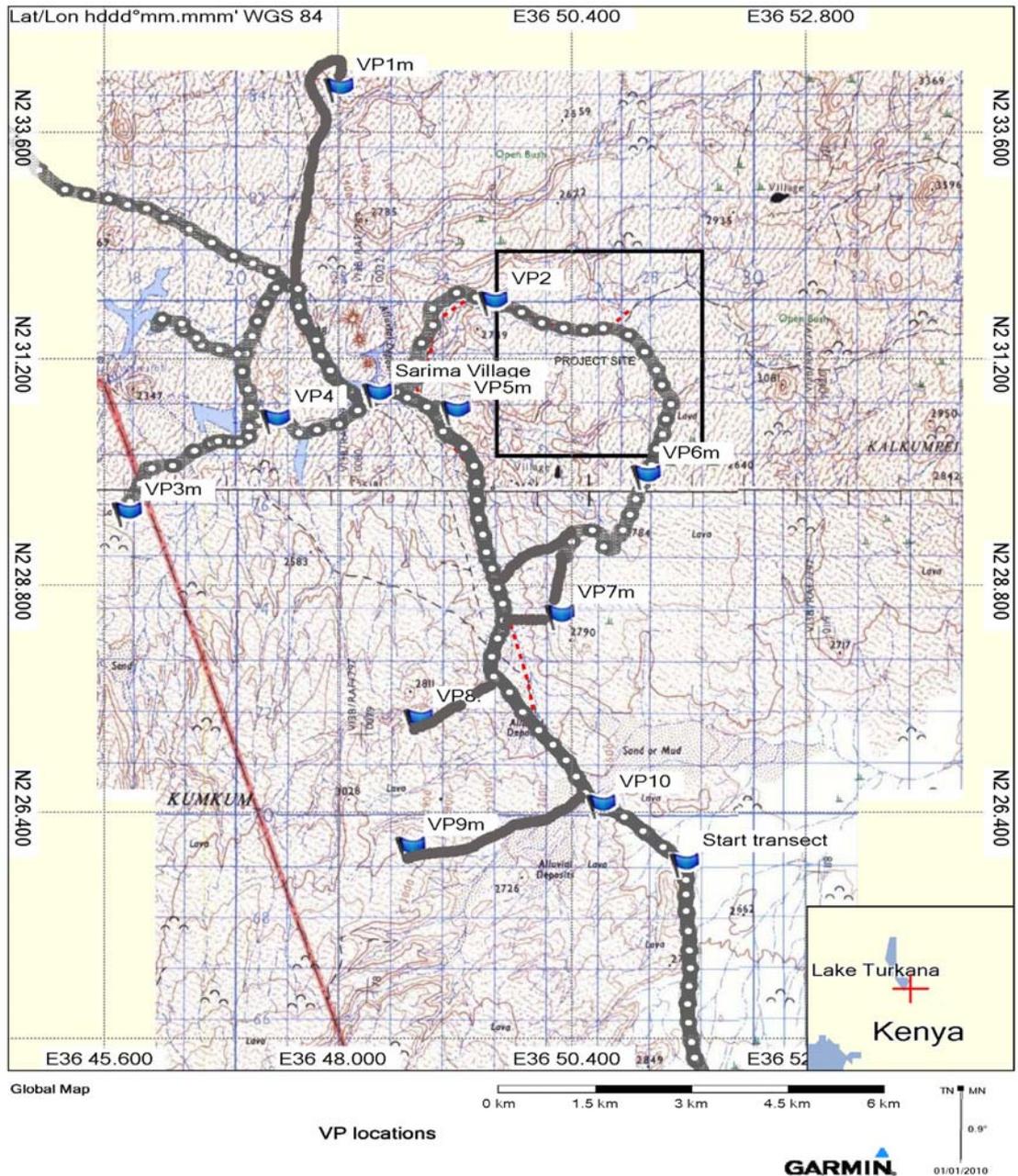
2.1.5 The number of seconds recorded for each bird flight was entered onto a standard recording proforma. Data will then be input to the SNH band model which is then used to estimate the likely number of collisions for each species per year. At this stage with only two months of data it is not possible to model this with any confidence that conclusions are likely to be accurate. However, the surveys have provided valuable data for discussion in the meantime.

2.1.6 During the October and November VP surveys of the autumn migration,, each VP was visited four times per month (4 x 3 hours).

2.1.7 During the October surveys a high concentration of raptors were recorded around VP8. During November an additional raptor flight line survey was undertaken to gather more data on the movements of raptors around VP8.

² a.g.l above ground level

Figure 1 – VP Locations and access tracks



Bird recording transects

2.1.8 Transects along access tracks were surveyed by vehicle. This started from 500 metres south of the site boundary on the main track, and continued within the site boundary en route to the first VP watch location on each day (see access tracks on Figure 1). Stops were made when target bird species (same as for VPs) were encountered both flying and on the ground, and details were recorded on the standard pro-forma.

3 Results

3.1 Vantage point observations October & November 2010

- 3.1.1 No water-birds or bustards were recorded from any of the October to November VP watches (240 hrs in total) and target species were wholly restricted to raptors.
- 3.1.2 The total number of raptor flights recorded in October during the 240 hrs of observations was 272 flights, or just over 1 flight per hour. The most common species involved was steppe buzzard with 198 flights, followed by lesser-spotted eagle with 14 flights and greater kestrel with 10 flights. The remainder consisted of 13 further species making less than 10 flights during all of the watches (see Table 1).
- 3.1.3 The number of bird flights in November was noticeably lower than was recorded in October with only 92 raptor flights recorded during the 240 hours of watches. Species abundance recorded in November was slightly different to that recorded in October, with steppe eagle being the most common species with 24 flights, followed by steppe buzzard with only 21 flights, followed by lesser kestrel and Eurasian hobby with 11 and 10 flights respectively.
- 3.1.4 The lower numbers of observed raptor flights in November compared to October, appears to indicate that the raptor migration season may have begun to slow down during November. This trend was largely due to the fact that steppe buzzard flights dropped from 198 flights in October to 21 flights in November.
- 3.1.5 Vantage Point 8 which is situated close to the top of a ridge that runs roughly north to south through the site produced a higher number of flights of migrating birds of prey, notably steppe buzzard, lesser spotted and steppe eagle. VP's 2, 3 and 4 also produced moderate numbers of raptor flights although not quite in the numbers recorded at VP 8.
- 3.1.6 Raptor numbers recorded from VP8 during each of the 6hr watches were always less than 5 individuals for all species, except for steppe buzzard where a maximum of 54 were recorded. Low altitude movements were mainly restricted to the first and last couple of hours of each watch. During the middle part of the day migrating raptors were generally flying at a great height (well above turbine height) and as a consequence were mostly undetectable.
- 3.1.7 Additional observations from VP8 indicate that southward migrating raptors most probably use this ridge and high ground to the west of VP8 as a part of their migration route towards the mountains which lie between Lake Turkana and South Horr. Low altitude flights peak during early morning and later on in the day when their flight is much lower than during the middle part of the day. It was noted that many of the raptors migrating past VP8 tended to fly just below the top of the ridge. If, as proposed, the turbines are located on top of the ridges, this may mean that the majority of migrating raptors using this ridge may not actually come close to any of the turbine blades if turbines are located along ridge tops.

Table 1 – Target species flights recorded during the 12 hrs of observations at each vantage point during October 2010

Species	Location										total
	VP1	VP2	VP3	VP4	VP5	VP6	VP7	VP8	VP9	VP10	
Osprey	1	-	-	-	-	-	-	-	-	-	1
Steppe buzzard	3	22	31	24	5	6	3	66	7	31	198
Tawny eagle	-	-	-	-	1	2	1	-	2	1	7
Steppe eagle	-	-	-	-	-	1	-	2	-	3	6
Lesser-spotted eagle	1	-	-	2	-	1	1	9	-	1	15
Greater-spotted eagle	-	-	-	-	-	-	-	1	-	3	4
Martial eagle	-	-	-	-	-	-	-	-	2	-	2
Bateleur	-	1	-	-	-	-	-	2	-	1	4
Egyptian Vulture	-	-	-	2	3	-	-	-	-	-	5
Rüppell's griffon vulture	-	-	-	-	-	-	-	2	-	-	2
Pallid harrier	-	1	-	-	1	1	1	-	-	-	4
Saker falcon	-	-	-	-	-	-	2	2	-	-	4
Greater kestrel	-	1	1	-	-	-	-	2	5	1	10
Common kestrel	-	-	1	-	-	-	-	-	-	1	2
Lesser kestrel	-	-	-	-	-	-	-	1	-	6	7
Black-shouldered kite	-	-	-	-	-	-	-	-	1	-	1

Table 2 – Target species flights recorded during the 12 hrs of observations at each vantage point during November 2010

Species	Location										Total
	VP1	VP2	VP3	VP4	VP5	VP6	VP7	VP8	VP9	VP10	
Steppe buzzard	1	1	4	5	-	3	-	1	6	-	21
Tawny eagle	-	-	-	-	-	-	-	1	-	-	1
Steppe eagle	1	-	1	3	-	3	3	9	4	-	24
Lesser-spotted eagle	-	-	-	1	-	-	-	3	-	-	4
Martial eagle	1	-	-	-	-	-	-	1	-	-	2
Black-chested snake eagle	1	-	-	-	-	-	1	-	-	-	2
Egyptian Vulture	-	-	-	-	1	-	-	-	2	5	8
Pallid harrier	-	-	-	-	-	-	1	-	-	-	1
Lanner falcon	-	-	-	-	-	1	-	2	-	-	3
Eurasian hobby	-	1	-	1	-	7	-	2	-	-	11
Common kestrel	-	-	-	2	1	-	-	2	-	-	5
Lesser kestrel	-	-	-	-	-	7	-	-	3	-	10

3.2 Transect survey October & November 2010

3.2.1 Once all transects counts are completed it will be possible to estimate a density for all of the target species recorded on site. However, at this stage due to the small amount of data collected it is not possible to make any meaningful estimates, although the data does indicate the majority of species are at relatively low densities. This is evidenced by the fact that no target species birds at all were recorded on three of the November and one of the October transects. On transects where birds were recorded these were only in low numbers, considering the mean length of the transects that were in the region of about 6km.

3.2.2 Other than steppe buzzard which was the most common species the remainder of species were recorded in only small numbers. Single sightings of Heuglin's bustard and Abdim's Stork were the only non raptor target species recorded during the October and November transect surveys.

Table 3 – Total number of bird registrations for all target species recorded during 10 transect counts conducted during October 2010

Species	Date									
	18/10	19/10	20/10	21/10	22/10	23/10	24/10	26/10	27/10	28/10
Steppe buzzard	-	-	20	4	1	9	12	16	3	-
Steppe eagle	-	1	-	1	-	1	4	-	-	-
Lesser-spotted eagle	-	-	-	-	4	-	1	-	-	-
Martial eagle	-	-	-	-	-	-	1	-	-	-
African hawk-eagle	1	1	-	-	-	-	-	-	-	-
Long-legged buzzard	-	1	-	-	-	-	-	-	-	-
Greater-spotted eagle	-	-	-	-	-	-	1	1	-	-
Lappet-faced vulture	-	-	-	-	-	-	2	-	-	-
Egyptian Vulture	-	-	-	-	-	-	1	-	-	-
Pallid harrier	-	1	-	2	-	-	-	-	-	-
Lesser kestrel	-	-	-	-	2	-	-	-	-	-
Greater kestrel	-	-	-	-	1	2	-	-	-	-
Eastern-chanting goshawk	-	-	-	-	-	2	-	-	-	-
Gabar goshawk	-	-	-	-	-	-	1	-	-	-
Heuglin's bustard	-	-	1	-	-	-	-	-	-	-

Table 4 – Total number of bird registrations for all target species recorded during 10 transect counts conducted during November 2010

Species	Date									
	10/11	11/11	12/11	13/11	14/11	15/11	16/11	17/11	18/11	19/11
Steppe buzzard	-	1	-	-	-	1	-	-	-	-
Steppe eagle	1	-	1	-	-	-	-	-	-	-
White-backed vulture	-	-	-	-	-	1	-	-	-	-
Egyptian Vulture	2	-	-	-	-	-	1	-	-	2
Eurasian hobby	-	-	-	-	-	1	-	-	-	-
Heuglin's bustard	-	-	1	-	-	-	-	-	-	-
Black-shouldered kite	-	-	1	-	-	-	-	-	-	-
Abdim's stork	-	-	-	1	-	-	-	-	-	-

4 Discussion

- 4.1.1 The survey data presented and discussed in this Progress Report represent two months data (October and November 2010) out of a total of twelve, including the additional survey effort to capture the autumn migration and the additional raptor flight line survey around VP8.
- 4.1.2 Whilst the data is preliminary, it is possible to make inferences regarding the occurrence of target species observed on the site, which have the potential for collision risk. Firstly, of the species recorded, there was only one record of a water-bird during a transect survey and none of any VP watches. The potential impact upon water birds at Lake Turkana was the primary concern arising from the project and the basis for recommending the 12 month survey. The low number of records of water-bird species seems likely to be due to the fact that there is little or no water on site and that Lake Turkana lies a considerable distance from the Site (c.8km). Furthermore, the site does not lie directly between Lake Turkana and any other of the Rift Valley lakes and as a consequence does not lie on any regular water bird flyway.
- 4.1.3 No bustard flights were recorded from any of the VP watches, despite Kori, Heuglin's and Buff-crested bustards being seen fairly frequently between South Horr and the north of the site. Therefore on the basis of the initial data, the potential for collision risk also appears to be limited for the bustard species.
- 4.1.4 At this early stage in the surveys, potentially the main bird issue appears to be associated with raptors. Raptors can be categorised into three groups,
- Western Palaearctic migrants (migrating October/November and again March/April e.g. steppe buzzard, steppe eagle)
 - Resident species (present all year round e.g. martial eagle, vultures.)
 - Wintering species (October to April, possibly small numbers of species such as steppe buzzard may remain on site throughout the winter months).
- 4.1.5 The first two months of survey (October and November 2010) coincide with the autumn migration of western Palaearctic birds from Europe to Africa. As a consequence of this the first two months of survey is likely to record higher numbers of birds than the rest of the year except for March and possibly April, when migration is reversed with birds migrating from Africa to Europe and Asia for the summer months.

Western Palaearctic migrants

- 4.1.6 Western Palaearctic migrant species were recorded in higher numbers than resident species, for example there were 219 steppe buzzard flights recorded from the autumn migration period of this species with approximately 50% of flights recorded at a height where collision would be possible. However when taking into account avoidance (at 95%) and the fact most flights were below the ridgelines (where turbines are likely to be located) actual collisions would be predicted to be minimal.
- 4.1.7 Data collected during October and November suggests that bird numbers were lower than might have been expected for a location within or close to a main migration route thought to be taken by Western Palaearctic migrants.

Resident Species

- 4.1.8 Resident bird of prey species appear to be present in only small numbers resulting in only a small number of flights being recorded during the VP watches.

Wintering Species

- 4.1.9 Although no data has been collected for wintering species so far, given the density of resident species the site can support, it is not anticipated that the bird population will increase significantly during the winter months.

5 Summary

- 5.1.1 Based on the bird activity observed on site to date and draft turbine layout, the data do not indicate any major red flags, with regard to potential for collision risk of target species. This evaluation will depend on the bird activity recorded at other times of the year, particularly during the spring migration, which will also include a survey of bat species.