

# PROPOSED AVIFAUNAL POST-CONSTRUCTION MONITORING FOR LONGYUAN MULILO DE AAR 1 MAANHAARBERG WIND ENERGY FACILITY

## MAIN POINTS

- Post-construction monitoring is necessary to a) confirm what the actual impacts of the WEF are, b) determine if additional mitigation is required at the WEF and c) to improve future assessments.
- Post-construction monitoring does not negate the need to first avoid, minimise and mitigate negative impacts during the project development stage.
- Post-construction monitoring can be divided into three categories: a) Habitat classification, b) quantifying bird numbers and movements (replicating baseline monitoring), and c) quantifying bird mortalities.
- Quantifying bird mortalities (collision monitoring) has three components: a) estimation of searcher efficiency and scavenger removal rates, b) mortality searches, and c) estimation of collision rates.
- The proposal contained in this document is based on the prescribed protocol in the Birdlife SA/Endangered Wildlife Trust Best Practice Guidelines for assessing and monitoring the impact of wind energy facilities on birds in southern Africa (Second revision, 2014)

## 1 Aim of post-construction monitoring

Avifaunal impact assessments rely on a number of assumptions. The baseline monitoring performed at the wind energy facility (WEF) represents a compromise between practicality (time and cost) and statistical rigor. Relying on imperfect data and research findings from different regions (and often different species) means that there will always be a degree of uncertainty and risk associated with assessments.

Post-construction monitoring is therefore critical to:

- i. confirm what the actual impacts of the WEF are,
- ii. determine if additional mitigation is required (adaptive management), and
- iii. improve future assessments.

Post-construction monitoring will aim to answer the following questions:

- i. How has the habitat available to birds in and around the WEF changed?
- ii. How has the number of birds and species composition changed?
- iii. How has the movements of priority species changed?
- iv. How has the WEF affected nearby priority species' breeding success?
- v. How many birds collide with the turbines and associated infrastructure? And are there any patterns to this?
- vi. Is additional mitigation necessary?

The proposed post-construction monitoring can be divided into three categories: a) Habitat classification, b) quantifying bird numbers and movements (replicating baseline monitoring) and c) quantifying bird mortalities.

## **2 Timing**

Post-construction monitoring will be started as soon as possible after the first turbines become operational to ensure that the immediate effects of the facility on resident and passing birds are recorded, before they have time to adjust or habituate to the development. However, it should be born in mind that it is also important to obtain an understanding of the impacts of the facility as they would be over the lifespan of the facility. Over time the habitat within the WEF may change, birds may become habituated to, or learn to avoid the facility. It is therefore necessary to monitor over a longer period than just an initial one year.

## **3 Duration**

The monitoring should run over a period of at least three years. If significant impacts are observed and additional mitigation is required, the matter will be taken up with the developer to discuss the extension of the monitoring beyond the three-year mark. In such instances the scope of monitoring could be reduced to focus only on the impacts of concern.

## **4 Habitat classification**

Any observed changes in bird numbers and movements at a WEF may be linked to changes in the available habitat. The avian habitats available will be assessed at least once a year (at the same time every year), using the same methods during pre-construction.

## **5 Bird numbers and movements**

In order to determine if there are any impacts relating to displacement and/or disturbance, all methods used to estimate bird numbers and movements during baseline monitoring will be applied in exactly the same way to post-construction work in order to ensure the comparability of these two data sets. This includes sample counts of small terrestrial species, counts of large terrestrial species and raptors, focal site surveys and vantage point surveys.

## **6 Collisions**

The collision monitoring will have three components:

- a) experimental assessment of search efficiency and scavenging rates of bird carcasses on the site;
- b) regular searches in the immediate vicinity of the wind farm for collision casualties;
- c) estimation of collision rates.

## **6.1 Searcher efficiency and scavenger removal**

The value of surveying the area for collision victims only holds if some measure of the accuracy of the survey method is developed. The probability of a carcass being detected and the rate of removal/decay of the carcass must be accounted for when estimating collision rates and when designing the monitoring protocol.

### **6.1.1 Searcher efficiency**

In order to estimate the probability of a field team member detecting a carcass, a sample of suitable bird carcasses (of similar size and colour to a variety of the priority species – e.g. Egyptian Goose *Alopochen aegyptiaca*, domestic fowl and pigeons) will be obtained and distributed randomly around the site. Alternatively dummies of similar look and size to the birds at risk of collision might also be used. The number and co-ordinates of the carcasses/dummies will be recorded. The proportion of the carcasses located in surveys will indicate the relative efficiency of the field teams. These trials will be done during the scheduled carcass searches, without the knowledge of the field teams (if need be, trail carcasses will be marked so as to distinguish them from collision victims). This procedure will be repeated opportunistically (as and when suitable bird carcasses become available).

### **6.1.2 Scavenger removal**

In order to determine the rates at which carcasses are scavenged, or decay to the point that they are no longer obvious to the field workers, fresh carcasses of similar size and colour to a variety of the priority species will be placed randomly around the site and the location of each carcass recorded. The total number of carcasses set out will be determined at a later stage, but not so plentiful as to saturate the food-supply for the local scavengers. These sites will be checked every second day for a period of 15 days to record any changes in the presence, location and condition of each carcass. This will provide an indication of scavenge rate (average persistence time) that will inform the extent to which estimates of collision frequency should be adjusted to account for scavenge rate. Scavenger numbers and activity in the area may vary seasonally so, therefore, scavenge and decomposition rates will be measured at least twice over a monitoring year, once in winter and once in summer. It is anticipated that the scavenger removal exercise will be done twice a year.

## **6.2 Collision victim surveys**

### **6.2.1 Area to be searched**

Search plot size will be determined by the wind turbine technology and the maximum size of the potential collision victims at the site, based on the results of the pre-construction monitoring. Searches will either be symmetrical using a square plot, or a circular plot, depending on what is practical. The transects will be parallel and spaced equally apart yielding a standardised search width on either side of the transect line. In tandem with surveys of the wind farm for collision casualties, all guyed masts and sample sections of any new lengths of power line associated with the development will also be regularly surveyed for collision and/or electrocution victims.

### *6.2.2 Turbines to be searched and frequency of searches*

A sample of no less than 50% of turbines will be searched, once a week, or all turbines will be searched twice a month, depending on what is practical, and bearing in mind the requirements of the bat search protocol, which will be combined with the bird searches (see 6.2.3 below). This should be seen as a compromise between thoroughness and what is practically achievable.

### *6.2.3 Aligning search protocols*

There is no reason that the field work would need to be done separately for both birds and bats, but the involvement of experts from both fields would be required to oversee the work and interpret the results. A challenge in this regard is different monitoring protocols. Bats are normally small and the carcasses may not persist as long as those of birds. As a result bat fatality monitoring requires more frequent surveys.

### *6.2.4 Recording and reporting mortalities*

All suspected collision incidents will be comprehensively documented, detailing the following variables:

- Observer name
- Project name
- Date
- Time
- Species
- Number adults/juveniles
- GPS location/s
- Condition of remains
- Nearest turbine number
- Distance to nearest turbine
- Compass bearing to nearest turbine
- Habitat type/mix of habitats
- Plot on map
- Photograph of the collision site as it was located

### *6.2.5 Carcass management*

All physical evidence will be collected, bagged and carefully labelled, and refrigerated or frozen to await further examination and to confirm the cause of death. Handling of carcasses will be limited, particularly if these are to be used in scavenger removal trials. The provincial conservation authority will be consulted to confirm, if any permits are required to keep and transport carcasses.

If any injured birds are recovered, each will be contained in a suitably-sized cardboard box. The local conservation authority will be notified and requested to transport casualties to the nearest reputable veterinary clinic or wild animal/bird rehabilitation centre. In such cases, the immediate

area of the recovery will be searched for evidence of impact with the turbine blades, and any such evidence will be fully documented (as above), including outcome and possible post-mortem.

#### 6.2.6 *Ad hoc recording of collisions*

Maintenance and wind farm staff will be trained on the topic of bird interactions with wind farms and will be required to report bird mortalities through a formalised reporting system. This will be in addition to post-construction monitoring and will not replace formal fatality searches. Operational staff will be instructed to record the fatality in the prescribed manner and to remove the carcass for storage. Instead the position of the carcass will be recorded with GPS and a photographic record taken for later identification.

#### 6.2.7 *Estimation of collision rates*

Observed mortality rates need to be adjusted to account for searcher efficiency, scavenger removal and the probability that carcasses were located outside the search area. There have been many different formulas proposed to estimate mortality rates. The available methodologies will be investigated and an appropriate method will be applied.

## 7 **Reporting**

A post-construction monitoring report will be completed at the end of each year of post-construction monitoring. As a minimum, the report will attempt to answer the following questions:

- i. How has the habitat available to birds in and around the WEF changed?
- ii. How has the number birds and species composition changed?
- iii. How has the movements of priority species changed?
- iv. How has the WEF affected priority species' breeding success?
- v. What are the likely drivers of any changes observed?
- vi. How many, and which species of birds collided with the turbines, and are there any patterns to this?
- vii. What is the significance of any impacts observed?
- viii. Is additional monitoring and mitigation necessary?

The post-construction monitoring report will include a comparison of the predicted and observed impacts, as this may provide useful insights for future impact assessments. If additional mitigation was implemented on the basis of previous years post-construction monitoring, the report will include an assessment of the effectiveness of these measures. The need for further post-construction monitoring and the scope of any further work will also be reviewed.

-----