DRAFT BAT MONITORING PROGRAMME FOR THE OPERATIONAL PHASE

1. Purpose

At present there is no credible knowledge concerning how South African bats are affected by the installation and operation of wind energy turbines. Therefore a post-construction bat monitoring study is advised. The purpose of this document is provide the principles for bat monitoring during the operational phase of the wind energy facility

This document was originally submitted as part of the final EIR submission in 2014. The monitoring will need to be updated based on current guidelines.

2. Aim of Monitoring

The aim of post-construction bat monitoring would be to analyse changes in bat activity patterns, perform mortality surveys and counts at specific turbines where fatalities are noticed to be the highest and to assess the effectiveness of the suggested mitigations.

If the negative impact of the turbines is significant enough to have impacted the ability of the bat population to survive, reproduce, or be affected significantly in their local distribution or abundance, this puts the population of bats at risk. This in turn runs the risk of infringing the National Environmental Management: Biodiversity Act 10 of 2004, unless mitigation is implemented.

The first two years of wind farm operation is the vital period in which to collect post-construction data as this is when any change in bat activity and mortalities are most likely to occur.

The South African Good Practice Guidelines for Surveying Bats in Wind Farm Developments (Sowler & Stoffberg, 2014) recommend that a minimum of two years intensive post-construction monitoring be undertaken, but auditing for impacts should continue throughout the lifespan of the facility (Sowler & Stoffberg, 2014). The post-construction study should ideally additionally utilise acoustic monitoring via passive bat detectors installed at the nacelle (hub/casing) height on turbines identified most likely to be at risk from having bat activity and potentially causing mortality.

Operational phase bat monitoring objectives include

- Determine mortality rates following construction and operation of wind farm
- Assess changes in bat activity patterns due to turbines
- Quantify the impacts of the operational wind energy facility with the use of pre-construction monitoring data
- Identify bat species subject to mortality
- Identify causes of mortality
- Identify specific periods of high mortality rates
- Evaluate the success of mitigation measures, and inform an adaptive mitigation plan and application

3. Monitoring Protocol

The bat monitoring should be carried out throughout all seasons of the year, especially during periods with increased rainfall and temperatures when insect numbers may be elevated. Sampling effort for carcass searches should be every 7 days preferably and can be done by local independent staff. Acoustic data collection from the passive systems would typically be every 3 months by specialists visiting the site. During each site visit stored carcass' should be identified, carcass searches conducted and infrared/thermal technology may be utilised to observe bat activity and behaviour around turbines and on site.

A statistically relevant sub-sample of the turbines should be selected for monitoring to cover all impacted habitat types and spatial extent of the developed area, as well as allowing for experimental comparisons during application of adaptive mitigation management.

» Acoustic monitoring

Acoustic monitoring equipment (e.g. SM3BAT ultrasonic recorder) should be installed at the nacelle height on selected turbines, these systems will record bat activity continuously every night for the entire night, for comparison to mortalities in order to estimate a proportionate mortality rate of local bat populations.

» Mortality surveys

Mortality surveys should be carried out to identify the number of bats killed per turbine over a known period of time (expressed as bats/turbine/time). This value represents a minimum estimate of bat mortality and is adjusted for bat carcass removal rates and searcher efficiency.

Mortality surveys typically include the following procedures:

» Standardized Search: counting the number of carcasses found around the turbines identified to potentially cause mortality
» Carcass Removal Trials: monitoring of bat carcasses removed by scavengers to estimate the length of time that carcasses remain in the field
» Searcher Efficiency Trials: percentage of carcasses found by searchers in the varying habitats throughout the wind farm.
» Quantify and if possible standardise the searchable plot area around each turbine, also ideally rate searchable areas according to a likely risk of not finding a carcass.

Transect size and spacing of mortality surveys

Surveys should be concentrated under the turbine and cover an area of at least 1/2 of the turbine height where possible and feasible. Searches should ideally be symmetrical around the turbine using linear/circular transects equally spaced if possible.

When found, carcasses should be photographed in the position found, GPS position noted, and collected. Carcasses should be collected in plastic bags, labelled, and frozen for species identification and/or

autopsy. This proposal relies on the assumption that local staff will be available on a weekly basis for carcass searches.

4. Adaptive management approach

The effects of turbines and wind farms on South African bats are unknown. Currently there are no South African guidelines for a post – construction bat monitoring protocol that is adaptive for our unique challenges. Thus the methodology described in this document is tentative and subject to change. The monitoring program may also be adapted to suit field conditions.

A precautionary and adaptive mitigation management approach must be adopted based on the results and certainty of results of the post – construction bat monitoring program. Mitigation management and mortality surveys may possibly be altered significantly as technological advancements can cause other methodologies to be more favourable.

This document may be updated as and when required.

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