



# Pygmy Blue-tongue Lizard Scientific Research and Monitoring Plan

# Pygmy Blue-tongue Lizard - Scientific Research and Monitoring Plan

22 June 2015

Version 1

Prepared by EBS Ecology for Hornsdale Wind Farm Pty Ltd

Document Control				
Revision No.	Date issued	Revision type	Media	Issued to
1	27/04/2015	Draft	Electronic	Mark Headland / Franck Woitiez, NEOEN
1.1	28/05/2015	Draft	Electronic	Mark Headland / Franck Woitiez, NEOEN
1.2	22/06/2015	Final	Electronic	Mark Headland / Franck Woitiez, NEOEN

EBS Ecology Project Number: E50305

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**CITATION:** EBS Ecology (2015) Construction Pygmy Blue-tongue Lizard - Scientific Research and Monitoring Plan . Report to Hornsdale Wind Farm Pty Ltd. EBS Ecology, Adelaide.

Cover photograph: EBS pictures

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## EPBC Approval Condition

Condition	Condition Requirement
4	To offset the potential impacts to the EPBC Act listed <i>Tiliqua adelaidensis</i> the person taking the action must submit to the minister for approval a scientific monitoring and research plan to monitor impacts to <i>Tiliqua adelaidensis</i> at the project site from both the construction and the operation of the wind farm, as referred to in section 6 of the final Preliminary Documentation (March 2013). The scientific monitoring and research plan must include details of how research results will be publicly available. The scientific monitoring and research plan must be approved prior to the commencement of construction. The approved plan must be implemented.

Discussions regarding this Scientific Research and Monitoring Plan have been held with Dr Mark Hutchinson (SA Museum) and Professor Mike Bull (Flinders University). Both Dr Hutchinson and Prof Bull have extensive experience in research on PBTL's and are both on the PBTL Recovery Team. The investigation of the potential impacts of the wind farms on PBTL behaviour would be undertaken by Prof Bull's research lab whilst the monitoring of population numbers would be undertaken by qualified ecologists on behalf of the Hornsdale Wind Farm.

## Impacts of Wind Farms on Population Numbers

A scientific monitoring and research plan is required to monitor any potential impacts on Pygmy Blue-tongue Lizard (PBTL) populations and habitat areas as a part of the construction and operation of the Hornsdale Wind Farm Stage 1. Currently there are three turbine locations and associated infrastructure that are positioned close to potential PBTL habitat, turbines 87, 90, 93 and 94 (Figure 1). Initial surveys in the areas will act as the baseline data for the sites. The aim of these surveys is to ensure management practices during construction and the ongoing operation of the Wind Farm have limited impacts on the PBTL populations and habitat.

## Methods

The assessment would involve the following steps:

- Surveys for PBTL will be conducted before any construction takes place by a suitably qualified Ecologist, to collect baseline data for the area. Follow up surveys will also be conducted during the construction phase and every three months during the construction phase. Surveys will also be conducted after the construction has been completed. To assess if any changes have occurred to the populations/ individuals and PBTL habitat in the area.
- During the operation of the wind farm the sites should be annually assessed in March - April as it is a good time to survey for PBTL due to low grass cover. This allows the surveyors to detect spider

holes with less effort than when cover of grass is high.

- Set up of 1 ha quadrats will be located within the PBTL habitat nearby construction activities and potential impact areas. The number of quadrats required will be based on the construction footprints and impact areas. A minimum of three quadrats will be set up; one will be set up downslope of turbine 87 within likely habitat where a healthy population of PBTL occur. Another quadrat would be set up downslope of turbine 90 near road construction activities and where PBTL individuals have been located. Another would be located in between turbines 90 and turbine 93. Additional quadrats may be implemented depending on construction layout.
- The quadrats will be marked using permanent steel droppers. Each corner of the quadrat will have an 1800 mm steel dropper installed.
- The 1 ha quadrats will need to be traversed and all spider holes to be marked with survey tags. Once an area has been checked for spider holes and the surveyor is confident that all holes have been located a survey for PBTL presence is then carried out. All marked spider holes will be checked for PBTL occupancy using an optic fibre 'Burrowscope'. Spider holes that will not be checked include holes containing ants and holes with a diameter of less than 5 mm which are considered too small for juvenile PBTL. Survey tags are removed once hole has been recorded, as a way of insuring all holes in the quadrat are surveyed and there are no double ups.
- All spider holes and PBTL burrows will be marked using a GPS. Other data to be recorded will include the quantity and estimated age (juvenile, sub-adult, adult) of PBTL present and the estimated depth of the burrow.
- Spider holes and habitat area within the quadrats will also be assessed for sediment run off.

## Impacts of Wind Farms on Lizard Behaviour

In natural conditions lizards spend all of their time closely associated with a burrow. They bask at the burrow entrance to maintain body temperature, and they use the burrow entrance as an ambush site to capture passing prey (e.g. spiders and grasshoppers). When climatic conditions are extreme (too hot or too cold) or when they are disturbed (for instance by a bird flying overhead) they retreat into the burrow. We predict that lizards that are more frequently disturbed:

- Will spend less time at the burrow entrance
- Will be in poorer body condition because they have less time to detect prey
- Will be more likely to abandon the burrow (and face risks of predation or movement out of suitable habitat)

If wind towers disturb lizards, we predict:

- The effects of disturbance will be strongest for lizard burrows closest to the wind towers

## Methods

Research has been previously established involving a series of solar powered video cameras that allow lizard behaviour to be monitored over complete days.

Depending on the timing of construction and the presence of lizards, the exact methods may change, however, it is likely that the following will occur:

1. Select three sites at the windfarm that have lizards living close to proposed turbines and three sites that are remote from any proposed turbines as controls.
2. Within each site 10 burrows would be selected. In those sites close to turbines, some burrows would be selected closer to the towers and some further away.
3. The first part of the study would take place prior to construction. Over the spring and summer (Oct – March), the selected burrows would be checked and capture the lizards to measure body weight and assess body condition (and reproduction over the Jan-Feb period), and filming of the lizard behaviour would take place over four days.
4. Once the turbines and other infrastructure are in place, the procedure would be repeated over another yearly cycle. This approach has the advantage that the lizards close to the turbines act as their own control group, making it possible to draw more direct conclusions on responses to the presence of turbines, while the more distant control groups enable us to factor in any background effects of seasonal variation.

## Outcomes

The analyses will determine the effect of population site (windfarm adjacent or not) and position within a windfarm population (close to or far from wind tower) on time spent at burrow entrance, body condition, reproductive success, and residence time. All of these are important indicators of lizard fitness. In addition, the overall lizard population numbers will be monitored to determine if they are stable over a longer period of time.

The results will clearly clarify whether or not the windfarms influence lizard fitness and the long-term suitability of habitat near wind turbines. If there is an impact, the results will suggest the distance from the towers at which the impact is strongest, and will lead to clearer recommendations for the co-existence of wind turbines and stable lizard populations.

The results of the research and monitoring will be made public in several ways. Some aspects are likely to be published in scientific journals, subject to the acceptance of articles. Results will also be included in

a summary report that will be uploaded to the projects website after the completion of each monitoring event. Some details (such as specific lizard locations) will be removed from the report to protect the species and limit public knowledge regarding specific locations.

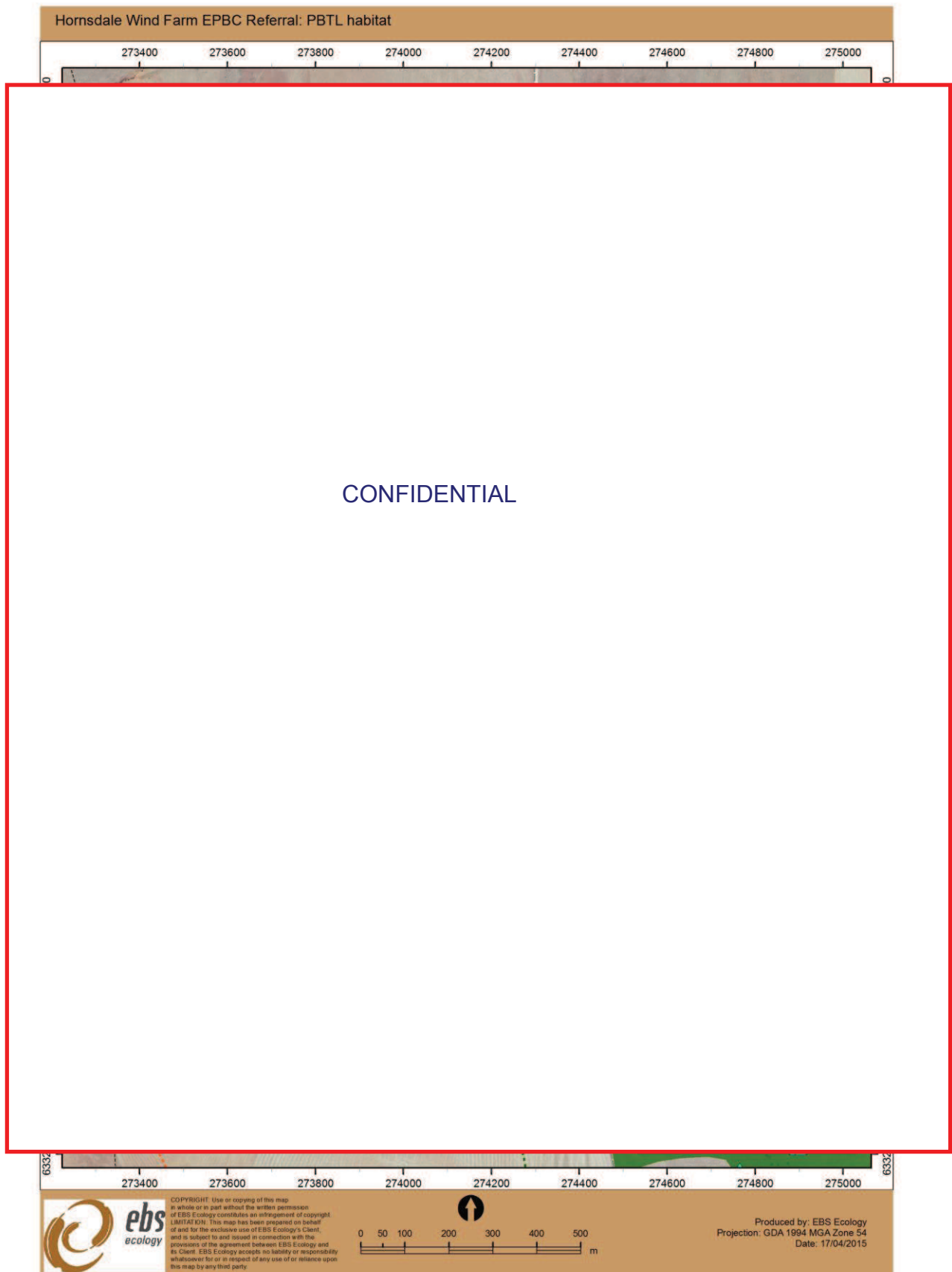


Figure 1. PBTL habitat, PBTL locations and proposed infrastructure locations.



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