Department of **Biodiversity, Conservation and Attractions**

GOVERNMENT OF WESTERN AUSTRALIA

Guidelines for surveys to detect the presence of bilbies, and assess the importance of habitat in Western Australia

Version 1 – August 2017

Scope

Surveys for the threatened greater bilby (*Macrotis lagotis*) may be required in WA where development or land management activities are proposed that could potentially affect the species and/or habitat suitable for the species. This document provides guidelines for detecting current or recent presence, or asserting the absence of bilbies, and assessing the importance of the habitat proposed to be impacted. It is noted that the most appropriate technique and survey design is dependent on the question or purpose of the survey, the habitat types present, and the size and shape of the project area. Therefore, desktop reviews of recent database records, and desktop reviews and ground truthing of the environmental characteristics of the area must be coupled with professional judgement and these guidelines to determine the most appropriate survey design in any particular situation. These guidelines only apply to the on-ground survey part of the process. Mitigation surveys may be required immediately prior to impact to avoid direct mortalities but are not part of the scope of these guidelines, although techniques provided here may be applied.

These bilby survey guidelines address the targeted search requirement for conservation significant fauna as recommended for the reconnaissance survey component of a Level 1 survey in the *Technical Guide for Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment*.

Protocol

Detecting bilbies

Bilbies are cryptic and not easily observed or trapped. The most efficient and reliable technique to detect whether bilbies are present, or have used an area, is the observation of sign by trained and experienced observers. A range of sign may be present, including scats, tracks, burrows and diggings. The detection of scats, clear tracks and/or multiple diggings (particularly at the base of plants to access root dwelling larvae) can be used to confirm current presence. Unclear tracks (gait pattern alone), burrows, and diggings in the open, can be used to flag potential bilby activity or potential past presence, but may not verify current presence. Caution is required because a range of other species produce similar burrows, diggings and gait pattern to that of the bilby. Observers must have previous experience in tracking and detecting bilby sign, and/or be trained to an appropriate standard. Traditional Owners and Indigenous ranger groups are likely to have these skills.

Bilbies are often sparsely distributed across large areas, and populations can move across the landscape so a single survey may not detect bilby presence. This does not mean that bilbies will not use this habitat in the future, or did not use it in the past, particularly if there are database records and suitable habitat. To increase confidence in asserting absence, particularly in small impact areas, surveys need to extend beyond the area proposed to be impacted and include a buffer zone surrounding the impact area. Buffer zones account for the propensity of bilbies to emigrate and colonise adjacent habitat, and provide regional context of the consequences of clearing habitat. Historic records within the vicinity and the presence of suitable bilby habitat are also variables to support bilby use of an area without presence being recorded at the time of the survey.

As a guide, suitable bilby habitat is defined as habitat known to be favoured by bilbies in the region and currently includes residual landforms (e.g. laterite rises), loamy or sandy soils associated with paleodrainage lines and perched drainage lines, sandplains and dunefields, habitat types where shrubs containing root dwelling larvae are common, and recently burnt habitat (within the last 1-3 years).

Surveying the project area

A number of techniques can be applied to survey for sign of bilbies within small areas where impacts are proposed to occur. The preferred technique is dependent on the question or purpose of the survey, environmental characteristics, and the size and shape of the project area (Table 1). Techniques include:

- linear surveys/searches;
- 2 ha sign plot technique; and/or
- a combination of the above.

Linear searches are most effective when the area is smaller and where comparable, quantified data is not required. Transects must provide extensive and representative coverage of all suitable habitat types as a minimum, with appropriate spacing to detect the presence of bilbies. Transect spacing should be based on local recorded foraging area where available. They must be spaced no more than 500 m apart (preferable 200-400 m), with closer spacing in more densely vegetated areas.

Table 1: Techniques recommended for different situations.

Situation	2ha sign plot	Linear sign search	Combination
Small area (<1600 ha)		X	X
Detect presence/absence only		X	X
Comparable data required	X		X
Quantified data required	X		X
Large area (>1600 ha)	X	X	X

The standardised 2 ha sign plot method provides systematically quantified data and is important to produce directly comparable data with that from the surrounding region, other sites, or over time. It involves searching multiple 2 ha plots for bilby sign, for 25 minutes. In smaller areas, a density of 2-4 plots per 100 ha, or alternatively less plots with supplementary linear searches, should be applied. As the project area size increases, plot spacing may be increased. If sampling independence is required, plots need to be spaced more than 4 km apart. Plot locations need to be distributed to include all suitable bilby habitat and a range of fire ages.

A combination of the 2 ha plot protocol and the more intensive linear survey methods may also be appropriate to increase the confidence about whether bilbies are present or absent in the impact area.

Surveying the buffer zone

Survey of a buffer zone provides information regarding the likelihood of bilbies being in the vicinity of the area proposed to be impacted and can be used to assess the importance of habitat to be cleared. Ideally, for small areas the buffer zone should extend 6 km beyond the perimeter of the impact area (equivalent to the width of two bilby home ranges) where practical. Plot or transect spacing in the buffer zone should be based on the size, shape and environmental characteristics of the buffer zone, using the same principles outlined above. It is noted that a buffer zone may not be required in very large areas and that it may not be possible to survey all parts of the buffer zone, for example, where it extends into a neighbouring property, or for a linear (e.g. road) impact area.

Additional techniques

When scats, clear tracks and/or diggings are present at a site it should not be necessary to verify bilby presence with remote camera imagery. Remote cameras may be useful in detecting and confirming the presence of bilbies in habitats where their sign is not easily detected, determining current presence or activity (e.g. at burrows), or to determine whether an area is being used over the long term. The use of remotely piloted aircraft (RPA) and/or helicopters may also have potential in open habitats. Driving sandy tracks slowly to search for prints may also be used to complement other techniques.

Important Principles

- The most efficient and reliable technique to detect bilbies is the observation of sign by trained and experienced observers.
- Bilbies are often sparsely distributed across large areas, and populations can move across the landscape so a single survey may not detect bilby presence.
- The preferred technique is dependent on the question or purpose of the survey, the environmental characteristics, and the size/shape of the impact area and buffer zone.
- A buffer zone extending 6 km beyond the perimeter of the impact area (or a practical alternative) should be surveyed using the same principles, especially in small sites.
- For all techniques, survey effort is to be distributed across suitable bilby habitat, defined as habitat known to be favoured by bilbies in the region.
- If using linear searches, transects must be spaced no more than 500 m apart (preferable 200-400 m), with closer spacing in more densely vegetated areas.
- If using 2 ha plots, a density of 2-4 plots per 100 ha is required in smaller sites, or less plots with supplementary linear searches. Plots can be more widely distributed and stratified in larger areas.
- Other techniques may be used to complement these techniques.

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