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Environmental Management Plan

Idiosoma nigrum and Egernia stockesii



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Idiosoma nigrum and Egernia stockesii

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1.0 Purpose of MNES Mitigation and Monitoring Plan

1.1 Background

The Department of Industry, Innovation and Science (DIIS) and the Commonwealth Scientific and Industrial Research Organisation (CSIRO) intend to construct the Square Kilometre Array (SKA) radio telescope, comprising the SKA Low Frequency Aperture Array (SKA1-Low) on Boolardy Station. The project will be referred under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) to the Department of Environment and Energy (the department). This management plan will be included in the submission to demonstrate how the proponents intend to address management and mitigation of potential impacts.

1.2 **Project description**

The proposed action involves the development of the Square Kilometre Array (SKA) on Boolardy Station. Boolardy Station is a 346,748ha pastoral property (pastoral lease no. 3114/406) located on the Pindar-Berringarra Road in the arid rangeland region of the midwest of Western Australia (Crown lease 3146/1966), approximately 194km north-north-east of Pindar and 200km west-south-west of Meekatharra (Figure 1). Access to Boolardy Station is via the Berringarra Pindar Road and Kali Road.

The SKA1-Low pre-construction design considers various factors, including avoiding sources of radio frequency interference and avoiding geophysical, environmental and cultural constraints largely based on desktop analysis but also considering the information available from a recent heritage mapping survey and a separate environmental survey conducted by Aecom. The SKA infrastructure will be at the same general location (Boolardy Station) as the Australian Square Kilometre Array Pathfinder (ASKAP) and Murchison Widefield Array (MWA) already constructed on the MRO (currently a separate lease within the bounds of Boolardy Station).

The design for the SKA1-Low telescope provides locations for up to 512 individual array stations of approximately 35 m in diameter (Figure 2). The majority (296) of the 512 array stations will form a densely populated core over an area approximately 1 km in diameter, with spiral arms extending out from this core to approximately 35 km. Each spiral arm consists of 12 station clusters with 6 stations each and cluster separation distances typically between 5 -10 km. Each array station will consist of approximately 256 individual antennas, each standing approximately two metres tall.

1.3 Purpose

This management plan has been prepared to commence the preparation of formal procedures intended to maximise the ongoing protection and long term conservation of the EPBC Act listed threatened fauna species, *Idiosoma nigrum*, the Shield-back Trapdoor Spider, and *Egernia stokesii* subsp. *badia*, Western Spiny-tailed Skink populations, located on Boolardy Station.

The main purpose of the management plan will be to avoid project activities having direct impacts to *I. nigrum* and *E. stokesii* habitat and mitigate indirect impacts during construction and operation. The plan has been developed by Ecologists and Environmental Scientists, and addresses the following:

- measures to avoid or minimise the mortality of *I. nigrum* and *E. stokesii* species during construction and operation of the SKA array
- measures to protect species and their habitat in and adjacent to the project footprint (the project area)
- a fauna monitoring program to be undertaken for *I. nigrum* to:
 - collect additional data on the distribution and abundance of *I. nigrum* prior to the commencement of construction
 - ongoing monitoring of *I. nigrum* annually for the life of the project to measure the impact of the action over time

- measure the success of management measures to inform an adaptive management approach
- annual internal reporting on milestones and compliance with this plan.

The project will not commence construction until the plan has been approved by the department.

1.4 Responsible Persons

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2.0 Baseline Studies

2.1 Species description

Idiosoma nigrum

Idiosoma nigrum, commonly known as the Shield-backed (or Black Rugose) Trapdoor Spider is endemic to the Murchison region in WA (Main 2003). *I. nigrum* was originally recorded and described by Main in 1952 (Phoenix 2015),

"The Shield-backed Trapdoor Spider has a body length of approximately 14mm and a chelicerae length of approximately 4mm. The most distinguishing feature of this species is the dark brown to black colour of the abdomen and appendages, which sits in contrast to the yellow to grey abdominal underside. The dorsal side of the abdomen is heavily sclerotised and deeply grooved, forming a shield-like structure. The eyes are arranged in three rows with the two anterior rows possessing two eyes and the posterior row possessing four eyes in a transverse line.

Egernia stokesii subsp. badia

Egernia stokesii is a stout-bodied skink with well-developed limbs each with 5 digits. There are large variations in adult size between populations, ranging from 81-195mm snout-vent length. The tail is short and broad, tapering sharply to a point and is covered by long spinose scales which are prickly to touch. The head is short and strong with eyes protected by a strong brow ridge. Colours vary from dark-brown to black. The population on Boolardy Station is glossy black with no patterning and possesses a less spinose tail (DEC 2012).

2.2 Habitat

Idiosoma nigrum

I. nigrum is able to persist in small isolated areas due to their low dispersion powers, long life cycle and sedentary life style (Avon Catchment Council 2007). They take several years to reach reproductive maturity and females can live up to and exceed 20 years. Females spend their entire life in the burrow or within its proximity therefore dispersal is male biased and estimated to be less than 500m. The species becomes dormant during the drier months of November to February.

Breeding habitat consists of heavy clay soils in areas of open *Eucalyptus loxophleba*, *E.* salmonophloia and *E. capillosa* woodland, where *Acacia acuminata* forms a sparse understorey. This habitat is considered critical for the survival of this species (Avon Catchment Council 2007). It is believed that males mature and mate after the first significant rains of the year, dispersing up to 500m (Phoenix 2015). There is some evidence that females may store sperm (Anonymous 2010) but whether this means that males only mate with virgin females or whether adult females mate repeatedly during their life is unclear. It is also unknown whether males mate within their matriarchal unit and whether they mate with more than one female.

Land clearing, secondary salinisation and the introduction of feral animals such as goats, have substantially decreased its distribution in the past 50 years. The species is a medium-sized to large trapdoor spider; females grow up to 30mm in body length with dark brown to black colouration and a distinctive, rugose abdominal cuticle. The trapdoor of the burrow is constructed with a characteristic fan ('moustache') of twigs attached to the burrow rim.

It has been identified that the local habitat preferences of *I. nigrum*, make it difficult to extrapolate the distribution of the species at Boolardy Station. Habitat mapping alone should not be used to infer the distribution of the species (Phoenix 2015). They typically inhabit clay soils of Eucalypt woodland and *Acacia* vegetation, and relies heavily on leaf-litter and twigs to build its burrow (Australian Government 2013).

One known location of *I. nigrum* (the Spider) consists of a number of severely fragmented populations in the central and northern Wheatbelt (Main *et al.* 2000 cit. in. Australian Government 2013). The second and third locations recorded locations are at Jack Hills and Weld Range respectively, which represent two isolated populations 200km north of previously known populations. The population size of *I. nigrum* at each of these locations is unknown. Presence of I.nigrum at Boolardy Station is based on sightings of the trapdoor burrows in 2014, not the Spider.

Egernia stokesii subsp. badia

E. *stokesii* subsp. *badia* (Black Form) populations are restricted to massive granite exposures with variable cover of loose boulders and pockets of soil and low shrubland vegetation (DEC 2012). These outcrops are geographically separated by open low woodland and shrubland. All the black form populations are significant due to their overall small geographic range and ongoing degradation of habitat from uncontrolled grazing (DEC 2012).

Presence of the Skink is determined by direct sightings or suitable habitat (i.e. rocky crevices).

2.3 Studies

Idiosoma nigrum

Limited studies have been conducted for *I. nigrum*. The species has a low dispersibility yet it has been found in three isolated populations all more than 50km from one another. This reflects their limited dispersal ability. The two populations that occur in the Murchison (Weld Range and Jack Hills) are both more than 200 km from its previously known extent in the central and northern Wheatbelt.

The Level 1 fauna assessment (AECOM 2014) identified potential evidence of the Spider at one location in the lower saline footslopes habitat, below rocky breakaways. Following this, a reconnaissance survey was conducted in December 2014 (Phoenix 2015). The survey confirmed the presence of *I. nigrum* at one location. The site was characterised by sparse Mulga (*Acacia aneura* complex) woodland with rocky ground-cover; however the species was absent at other sites of similar habitat. It is therefore difficult to determine its total range and extent with certainty.

Vibration associated with vehicles has been known to have the potential to affect nearby populations. Recent work at Jack Hills and Weld Range has shown a possible reduction in emergents and juveniles within 50m of exploration drilling pads (Phoenix Environmental unpub. Data, cit. in Anonymous 2010).

Egernia stokesii subsp. badia

Granite outcrops were subject to targeted *E. stokesii* subsp. *Badia* (the Skink) micro-habitat searches during the field survey. Four pieces of scat were recorded at three granite outcrop locations (AECOM 2014).

Evidence of the Skinks presence, was recorded at two locations isolated at one granite outcrop in the area surveyed for the SKA1-Low project. One individual Skink was recorded at one location to the north outside the SKA1-Low project footprint. One individual was recorded by Alexander Holm & Associates (2008) on a granite outcrop located south of the MRO, outside the project footprint. This record was reconfirmed during the field survey (Phoenix 2015).

This indicates that despite the construction and operation of the Australian SKA Pathfinder, associated Control Building, access tracks and trenches for power distribution cables and Fibre Optic cabling, this population has continued to survive.

3.0 Monitoring measures

3.1 Procedure

The procedure for managing the Spider and Skink during design, construction and operation of the SKA project is outlined below:

- All staff members and contractors working on the Project will be trained to identify the Spider and Skink and their preferred habitat.
- All sightings of a spider trapdoor or the Skink will be reported internally.
- Any injuries/deaths/disturbance to the Spider or the Skink will be reported including a detailed description of circumstances.
- Potential new sightings in previously unmarked locations in areas where activities may disturb the fauna will be inspected by a qualified Zoologist with experience in identifying the Spider and the Skink. This will confirm whether realignment of the track is required.
- Access to restricted areas demarcated as Spider or Skink habitat will require permission from the CSIRO's MRO Manager prior to entry.
- An annual internal report will summarise all incidents relating to the Spider and Skink. Further analysis to be conducted on incidents to inform and improve on existing management measures and known occurrences of the species.
- Key Performance Indicators (KPIs) to be established based on a no-injury/death basis.

3.2 Pre-development monitoring

Pre-clearance surveys will be conducted prior to clearing or disturbing potential habitat for access tracks and antenna locations. The survey objective is to confirm the absence (or presence) of the Spider and/or Skink within demarcated cleared areas. This will include:

- identifying any trapdoor locations and Skink populations within the proposed clearing area (following demarcation of the clearing area by the proponent
- confiming presence of these species in the event that a population or evidence of the Spider and/or skink is identified by the proponent
- a 50 m buffer will be applied to any confirmed populations of the Spider and/or Skink
- establishing a degree of certainty around whether the Spider of Skink occurs within and outside the project footprint.

3.3 Post-development annual monitoring

Post -development monitoring will aim to:

- determine whether the Spider and Skink are still present at known locations on Boolardy Station
- collect information on the numbers of individuals over time to contribute to knowledge of the species and enable interpretation of trend data over time

- collect mortality data to determine safe operational conditions for the species, thereby informing the adaptive management approach
- report findings in annual technical monitoring report.

All data will be provided to the department and/or Department of Parks and Wildlife to improve our knowledge of these threatened species.

4.0 Mitigation measures

Mitigation measures for the Spider are focussed on reducing vibrations near known locations/populations. This would be managed by applying a 50 m exclusion zone around the Spider populations at Boolardy Station. Additional management measures include:

- Planning suitable separation between project infrastructure and project activities and known Spider habitat
- demarcating the project footprint to define areas to be cleared and prevent clearing outside the approved area
- conducting pre-clearance surveys if near Spider habitat
- demarcating and fencing Spider populations (applying a 50 m buffer).

Mitigation measures for the Skink will be similar and focus on minimising disturbance to known habitat, by demarcating and fencing Skink population locations and their known rocky habitat (applying a 50 m buffer). Additional skink management includes:

• provide ramps at the ends of trenches open for more than 24 hours to enable fauna, particularly lizards to escape before the heat of the day.

5.0 Environmental incident management

5.1 Determining an environmental incident

Incidents are to be reported to CSIRO's Project Manager and records retained (Incident, Accident and Near Miss Report). KPIs will be set and communicated to construction and supervision teams. Consider using financial penalties to enforce the severity of any impacts.

Reportable incidents in relation to this fauna management plan include:

- injury/death of the Spider or Skink
- sightings of the Spider (or Spider trapdoor) or Skink

- damage to known habitat within the 50 m buffer resulting in control measures as per section 5.2 being required.

5.2 Control measures for a suspected environmental incident

Actions to be undertaken in the event of an environmental incident include the following in relation to the specific event.

Injury/death of significant fauna

- 1. Cease work in the immediate area
- 2. Report to Site Environment Manager who will determine further action
- 3. Investigate the health of the injured fauna population and/or individual and remove from further harm

- 4. Determine whether other fauna individuals or population are nearby and may be in the line of harm
- 5. Investigate whether the footprint (including track or pad) can be moved to avoid further impacts.

Sightings of significant fauna

- 1. Cease work in the immediate area
- 2. Report to Site Environment Manager who will determine further action
- 3. Determine whether the fauna may be harmed or indirectly impacted
- 4. Investigate whether the footprint (including track or pad) can be moved to avoid further impacts.

Damage to demarcated or fenced significant fauna habitat

- 1. Cease work in the immediate area
- 2. Report to Site Environment Manager who will determine further action
- 3. Investigate if significant fauna is nearby and may be in the line of harm
- 4. Investigate whether the footprint (including track or pad) can be moved to avoid further impacts.

5.3 Reporting an environmental incident

Site Environment Manager to investigate incidents and implement preventative actions as required.

If the Spider or Skink are killed or injured, contact the Site Environment Manager or suitably qualified personnel.

Report any environmental incident resulting in the death of an individual or population of the Spider or Skink to the project manager.

5.4 Remediation of an environmental incident

Site Environment Manager to investigate the cause of the incident to prevent further incidents occurring.

Examine possible remedial actions including rehabilitation or additional demarcation and/or fencing of habitat.

Record details of incident and remedial actions taken.

5.5 Post environmental incident training

Conduct a lessons learnt meeting to determine the cause of the incident and possible breakdowns in procedure or communications. Apply these lessons and update procedures and/or communication protocols to prevent further incidents to inform the adaptive management plan.

6.0 References

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