State Barrier Fence
Esperance Extension
Predator and Pest Control
Management Plan

Prepared for
Department of Agriculture and Food Western Australia
by Strategen

April 2017
State Barrier Fence
Esperance Extension

Predator and Pest Control
Management Plan

Strategen is a trading name of
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April 2017
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Environmental conclusions

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Client: Department of Agriculture and Food Western Australia

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<th>Purpose</th>
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<th>Form</th>
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</tbody>
</table>

Filename: DAF16515_01 R002 Rev 1 - 13 April 2017
Table of contents

Summary i

1. Context, scope and rationale 1
   1.1 What is the Proposal? 1
   1.2 Scope 1
   1.3 Key environmental factor, aspects and objectives 2
   1.4 Requirements of the ESD 2
   1.5 Rationale and approach
      1.5.1 Existing management practices for predator and pest control in Esperance 5
      1.5.2 Environmental baseline studies 5
      1.5.3 Key assumptions and uncertainties 6
      1.5.4 Management approach 7
      1.5.5 Rationale for choice of management targets 7

2. PPCMP provisions 9
   2.1 PPCMP environmental objective 9
   2.2 Management actions 9
   2.3 Management targets 10
   2.4 Monitoring 10
   2.5 Review and revision of management actions 13
   2.6 Reporting provisions
      2.6.1 Annual reporting 14
      2.6.2 Reporting on exceedance of the management target 14

3. Adaptive management and review 16

4. Stakeholder consultation 17

5. References 18

List of tables

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 1-1</td>
<td>Key environmental factor, EPA objective and environmental aspect of the Proposal</td>
<td>2</td>
</tr>
<tr>
<td>Table 1-2</td>
<td>Requirements for the PPCMP under the ESD (Assessment number: 2088)</td>
<td>2</td>
</tr>
<tr>
<td>Table 2-1</td>
<td>Risk-based management actions that will be implemented to meet the condition environmental objective</td>
<td>9</td>
</tr>
<tr>
<td>Table 2-2</td>
<td>Management targets to measure the efficacy of management actions relative to the environmental objective</td>
<td>10</td>
</tr>
<tr>
<td>Table 2-3</td>
<td>Monitoring to measure the efficacy of management actions against the management target</td>
<td>11</td>
</tr>
<tr>
<td>Table 2-4</td>
<td>Monitoring and corrective actions for management targets</td>
<td>13</td>
</tr>
<tr>
<td>Table 2-5</td>
<td>Environmental management plan reporting table</td>
<td>15</td>
</tr>
</tbody>
</table>

List of figures

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 1-1</td>
<td>Regional location</td>
<td>3</td>
</tr>
<tr>
<td>Figure 1-2</td>
<td>Existing environment conditions along the Proposal alignment</td>
<td>4</td>
</tr>
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</table>
Summary

This Predator and Pest Control Management Plan (PPCMP) is submitted in accordance with the requirements under the Environmental Scoping Document (ESD) (Assessment Number 2088) Item 12 for the State Barrier Fence Esperance Extension (SBFEE) Project by Department of Agriculture and Food Western Australia (DAFWA).

The table below presents the environmental management targets for predator and pest control to measure achievement of the EPA objective that must be met through implementation of this PPCMP.

<table>
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<th>Required information</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title of proposal</td>
<td>State Barrier Fence Esperance Extension.</td>
</tr>
<tr>
<td>Proponent</td>
<td>Department of Agriculture and Food Western Australia.</td>
</tr>
<tr>
<td>Environmental Scoping Document</td>
<td>Assessment Number 2088.</td>
</tr>
<tr>
<td>Purpose of this Condition EMP</td>
<td>The PPCMP is submitted to fulfil the requirement of Item 12 in the ESD (Assessment Number 2088).</td>
</tr>
<tr>
<td>EPA’s environmental objective for the key environmental factor</td>
<td>Terrestrial Fauna: To protect terrestrial fauna so that biological diversity and ecological integrity are maintained.</td>
</tr>
<tr>
<td>PPCMP environmental objective</td>
<td>Ensure that predator and pest control is implemented so that there are no significant adverse impacts on non-target fauna on either side of the proposed barrier fence.</td>
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</table>
| Management targets                                         | Management target 1: No increase in wild dog activity within 10 km adjacent (outside) to the proposed barrier fence post construction.  
Management target 2: No increase in fox activity within 10 km of the proposed barrier fence (inside and outside) post construction.  
Management target 3: Predict risk of emu migration events before they occur. |

Corporate endorsement

I hereby certify that to the best of my knowledge, the provisions within this Predator and Pest Control Management Plan are true and correct and address the legal requirements of the Environmental Scoping Document (Assessment Number:2088)

[Signature of duly authorised proponent representative]

Name: Kevin Chennell
Designation: Executive Director, Biosecurity and Regulation
1. **Context, scope and rationale**

This Predator and Pest Control Management Plan (PPCMP) presents the management measures for predators (wild dogs and foxes) and agricultural pest animals (emus and kangaroos) to be implemented following the establishment of a barrier fence extending the existing State Barrier Fence (existing SBF) around the Esperance agricultural area. How these management measures interact with existing predator and pest control measures in the Ravensthorpe/Esperance region is also discussed in this PPCMP.

For the purposes of this PPCMP, wild dogs refer to feral domestic dogs, dingoes and dingo-dog hybrids. Wild dogs, emus and kangaroos (predominantly Grey Kangaroos) are collectively referred to as target fauna.

1.1 **What is the Proposal?**

The Department of Agriculture and Food WA (DAFWA), on behalf of the agricultural industry in the Shires of Ravensthorpe and Esperance, proposes to extend the existing SBF from its current termination point 25 km east of Ravensthorpe, north to Salmon Gums, ending east of Esperance near Cape Arid National Park (the Proposal; Figure 1-1). The Proposal is in response to socio-economic impacts on industry and communities in the region from periodic emu ‘migrations’, kangaroo damage to crops and pasture and the impact of wild dogs limiting livestock enterprises. The Proposal provides a physical barrier to limit predators and pests from entering the agricultural regions from the adjacent Great Western Woodlands and rangelands.

The Proposal involves the construction of a 660 km long and 1.35 m high barrier fence that is largely impermeable to target fauna. The Proposal includes corridor gaps in the barrier fence at three major waterways that intersect the Proposal alignment, and a 3.2 km wide unfenced coastal corridor near Cape Arid National Park. These gaps in the proposed barrier fence will maintain significant ecological corridors (Figure 1-2).

The Proposal alignment follows the boundary between agricultural land and Unallocated Crown Land (UCL) in the Great Western Woodlands, with a total of 528.5 km of the Proposal alignment to be located on UCL and a further 130.9 km on private farming property (Figure 1-2).

The Proposal is currently being assessed under the Western Australian *Environmental Protection Act 1986* (EP Act). The Proposal was referred to the Environmental Protection Authority (EPA) under s 38 of the EP Act on 10 June 2016. The EPA determined a Public Environmental Review (PER) level of assessment (Assessment No. 2088) for the Proposal on 1 September 2016.

1.2 **Scope**

This PPCMP has been prepared on behalf of the DAFWA to address the risks identified in the Environmental Scoping Document (ESD; Assessment Number. 2088). The PPCMP has also been prepared to meet the EPA’s environmental objective for Terrestrial Fauna, and to support the PER and environmental assessment process.

The key risks identified in the ESD regarding predators were:

- changes to predator behaviour such as preferential predation along fence lines
- changes to feral animal abundance and distribution.

The EPA’s objective for Terrestrial Fauna, requirements under the ESD, and the sections in which the requirements are addressed in the PPCMP are presented in Table 1-1 and Table 1-2 respectively.

The PPCMP has been structured as a management-based environmental plan in accordance with Environmental Assessment Guidelines (EAG) 17 (EPA 2015) for *Preparation of Management Plans* under Part IV of the *Environmental Protection Act 1986* (EP Act) to provide an adaptive management framework to manage predator and pest populations.
Since the referral of the Proposal, and the release of the ESD, the EPA has published revised instructions on how to prepare environmental management plans. After 13 December 2016 the EAG 17 guidelines have been superseded. However, consistent with EPA advice for this transitional period this PPCMP has been prepared in accordance with the requirements set out in the ESD.

1.3 Key environmental factor, aspects and objectives

The ESD for the Proposal aims to ensure the EPA’s objective for preliminary environmental factors are met. The ESD identified Terrestrial Fauna as one of the key preliminary environmental factors for the Proposal.

The EPA objective, as well as the relevant environmental aspect of the Proposal that may impact Terrestrial Fauna is provided in Table 1-1.

Table 1-1: Key environmental factor, EPA objective and environmental aspect of the Proposal

<table>
<thead>
<tr>
<th>Environmental factor</th>
<th>EPA objective</th>
<th>Environmental aspect of the Proposal</th>
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</thead>
<tbody>
<tr>
<td>Terrestrial Fauna</td>
<td>To protect terrestrial fauna so that biological diversity and ecological integrity are maintained.</td>
<td>Clearing of habitat and the physical barrier to fauna movement.</td>
</tr>
</tbody>
</table>

The objective of the PPCMP is to ensure that predator and pest control is implemented so that there are no significant adverse impacts on non-target fauna on either side of the proposed barrier fence.

1.4 Requirements of the ESD

The ESD outlines the required work items to be conducted to inform the assessment of the environmental impact of the Proposal for Terrestrial Fauna.

The PPCMP has been prepared to address the requirements of work item 12 of the ESD as presented in Table 1-2.

Table 1-2: Requirements for the PPCMP under the ESD (Assessment number: 2088)

<table>
<thead>
<tr>
<th>Item</th>
<th>Requirement</th>
<th>Section in PPCMP</th>
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<tr>
<td>12</td>
<td>Describe the management measures for predator/pest control to be implemented as part of this proposal, and how this interacts with any other relevant predator/pest control programs in the vicinity of the proposal. An environmental management plan is to be submitted as part of the PER consistent with Environmental Assessment Guidelines 17 Preparation of management plans under Part IV of the Environmental Protection Act 1986.</td>
<td>Section 2; Table 2-2</td>
</tr>
</tbody>
</table>
Figure 1-2: Existing environment condition along the Proposal alignment and regional location

Legend
- Town
- Existing SBF
- Major watercourses
- Reserves
- Proposal alignment existing environment condition
- Previously chained firebreak
- Previously cleared freehold farmland
- Existing track or graded firebreak
- Uncleared vegetation


Note that positional errors may occur in some areas.
1.5 Rationale and approach

The PPCMP has been developed to:

- manage and minimise the risks associated with predators and pests identified in the ESD
- identify monitoring and mitigation measures for predators and pest control
- meet the EPA’s environmental objective for Terrestrial Fauna
- ensure that predator and pest control is implemented so that there are no significant adverse impacts on non-target fauna on either side of the proposed barrier fence.

A number of assumptions and uncertainties influence the management approach for meeting the environmental objectives are outlined in Section 1.3 and Section 1.5.3. The identified management actions, management targets and proposed review and revision of management actions are aligned with the overall management approach.

1.5.1 Existing management practices for predator and pest control in Esperance

Under the Biosecurity and Agriculture Management Act 2007 (BAM Act) landholders and landowners/occupiers are responsible for wild dog and fox control on their own properties. Control techniques to manage wild dogs for the existing SBF include baiting with meat poisoned with 1080 (sodium fluoroacetate) and to a lesser extent, trapping and shooting.

The management approach for the PPCMP integrates existing SBF management practices for predator and pest control. This includes integration of relevant elements of the Western Australian Wild Dog Action Plan 2016–2021 (the Action Plan) (WAWDAG 2016) and the DAFWA emu migration procedure. This PPCMP is complementary to the Action Plan; however, each is to be implemented separately, with the Action Plan to be implemented in full by a range of parties such as private landholders and Biosecurity Groups.

Recognised Biosecurity Groups are expected to continue baiting predators 0–20 km from the proposed barrier fence.

1.5.2 Environmental baseline studies

The PPCMP has been prepared in consideration of the following environmental investigations and predator/pest control programs in the vicinity of the Proposal:

- State Barrier Fence Biological Surveys (Ecoscape 2015)
- Risk assessment of the proposed extension to the State Barrier Fence on the Brush Wallaby (Everard & Bamford 2016)
- Biological Surveys of the State Barrier Fence – Merivale Road Reserve Realignment – Cape Arid (GS Bio Logic 2015)
- Biosecurity Procedure SBF-003 State Barrier Fence Emu Migration Procedure (DAFWA 2016)
- Western Shield Program (Parks and Wildlife 2016b).

Changes to feral animal abundance and distribution and changes to anti-predator behaviour in prey species were identified as potential risks associated with the Proposal.

Ecoscape (2015) survey findings

Ecoscape (2015) conducted a desktop review and field surveys for a Level 2 flora, Level 1 fauna and dieback assessment for the Proposal alignment on six survey periods between October and December 2013, and September and October 2014.
The report highlighted concern for conservation significant fauna species if the proposed barrier fence and access roads potentially increase the predatory impact of foxes and feral cats. However, the same access roads were also identified by Ecoscape (2015) to potentially facilitate more cost-effective monitoring and control of foxes and cats.

Both foxes and cats are established throughout the area and no direct effect of the fence on presence or abundance was expected by Ecoscape (2015).

**Great Southern Bio Logic (2015) survey findings**

Great Southern Bio Logic (GS Bio Logic 2015) undertook a desktop review and field surveys for Level 1 flora and Level 1 fauna survey, and dieback assessment for an additional 1.63 km section of Unallocated Crown Land (UCL) not surveyed in previous investigations. The 1.63 km of unsurveyed UCL is located north of Merivale Road, Boyatup, approximately 100 km east of Esperance. The flora survey was conducted in September 2015, and the dieback assessment and fauna survey was conducted in August 2015. In addition to rabbits, tracks from introduced cat and foxes were observed during the fauna survey (GS Bio Logic 2015).

### 1.5.3 Key assumptions and uncertainties

**Changes in predator and competitor abundance**

Everard & Bamford (2016) outlined that the establishment of the Proposal was likely to result in changes to predator and competitor abundance. Positive and/or negative outcomes were dependant on the species (Everard & Bamford 2016). The proposed barrier fence is not expected to be impermeable to foxes or cats as the fence is 1.35 m high and with a mesh size large enough for them to pass through. However, the Proposal alignment can be used as a focus for baiting programmes.

Several studies suggest that wild dogs reduce fox numbers (Glen *et al.* 2007; Letnic and Koch 2010), and keep the density of kangaroos low (Pople *et al.* 2000). However, with the sustained wild dog management that already occurs in the agricultural area, wild dogs are not expected to be at a sufficient density to regulate emus, kangaroos, cats or foxes. As a result, the abundance of foxes and cats within the Esperance agricultural area is not expected to change either side of the proposed barrier fence. Foxes and cats are attracted to disturbance and tracks (Graham *et al.* 2012), and; therefore, there could be a localised concentration of predators along the proposed barrier fence. Predation pressure was identified to potentially increase in uncleared areas, as the proposed fence and associated tracks would provide ready access for predators. Everard & Bamford (2016) recommended ongoing baiting with sodium fluoroacetate (1080) in a buffer zone of up to 20 km along the fence, conducted by a number of groups assisted by DAFWA, to reduce predation pressure. Biosecurity Groups currently bait for wild dogs, which also kill foxes, but there is no provision under the BAM Act to control cats as they are not Declared Pests.

The ecological benefits from kangaroos and emus will still be present within the agricultural land. Inside the 1190 km existing SBF, emus and kangaroos are still present. A survey in the 1980s within the Esperance agricultural area, estimated emu densities to be less than 0.1/ km² outside the proposed fenced area and approximately 0.3/ km² in the neighbouring agricultural areas (Caughley & Grice, 1982 cited in DAFWA 2016). This represents a single snapshot from thirty years ago, but demonstrates that populations of emus exist within the agricultural area and can exceed those in rangelands during non-migration periods.

**PER predicted outcomes**

There is a potential local risk of increased predation along the 69.3 km of the Proposal alignment that does not follow existing disturbance areas. The residual impacts were determined to be not significant as the risk will be mitigated through the implementation of existing baiting programs by Biosecurity Groups for wild dogs and foxes along with the separate and complementary implementation of this PPCMP by DAFWA.
The Proposal is expected to provide an effective, non-lethal means of emu control during migrations. No significant impact on any conservation significant species is expected following the implementation of existing baiting programs, the PPCMP and Emu Migration Procedure.

The key assumptions made in reaching the PER conclusions are that:

- the Proposal will be implemented in conjunction with the dog control provisions outlined in the Action Plan and that wild dog baiting programs will also effectively control foxes along the proposed barrier fence
- no significant change in feral cat numbers would be expected as a result of the Proposal
- the risk of preferential predation is greatest in areas where the proposed fence is to be constructed within new cleared areas.

**Predator and pest activity adjacent to proposed barrier fence**

A process for establishing a baseline for wild dog activity adjacent to the proposed barrier fence will be agreed upon with a fauna expert and relevant agencies (e.g. Parks and Wildlife) prior to implementation of the Proposal. At this stage activity levels are proposed to be determined based on motion camera events per unit of time, subject to the fauna expert and agency advice. An ‘event’ is proposed to consist of one or more wild dogs in shot with no more than five minutes between camera images. Photos taken less than five minutes apart are likely to be the same dog and will be considered one event.

A similar process is proposed to be adopted to establish a baseline for fox activity adjacent to the proposed barrier fence.

The monitoring program outlined in Table 2.3 has been designed to address the assumptions above.

**1.5.4 Management approach**

The approach for managing any potential impacts from the Proposal is to develop a comprehensive management-based program that identifies:

- management risks
- key management based targets
- management actions
- monitoring measures
- review and revision requirements.

The proposed monitoring and adaptive management approach is based on risks identified and mitigation proposed in Ecoscape (2015), GS Bio Logic (2015) and Everard & Bamford (2016). The management approach also integrates and builds upon the Action Plan and DAFWA Emu Migration Procedure.

**1.5.5 Rationale for choice of management targets**

Management targets (Table 2-2) were selected to manage the significant risks identified for the Proposal and are based on:

- review of available data for the region
- the relationship between the Proposal aspects and the EPA environmental factors
- existing predator and pest control programs in the region
- industry standards and legislative requirements
- the requirements of the ESD.

**Predator control**

Dingoes, feral dogs and their hybrids are Declared Pests in Western Australia under s 22 of the BAM Act.
The key risks identified in the ESD regarding predators were:

- changes to predator behaviour such as preferential predation along fence lines
- changes to feral animal abundance and distribution.

To manage the risk of predators, the Proposal will be implemented in conjunction with and complementary to the wild dog control provisions outlined in the Action Plan. Biosecurity Groups, acting independently of this PPCMP, will ensure that wild dog control is undertaken within 0–20 km of the outside of the proposed barrier fence to reduce the risks of increased numbers or preferential predation by wild dogs or foxes along the Proposal alignment. Landholders are responsible for the control of Declared Pests on their own properties, but receive assistance from Biosecurity Groups when required. Wild dog baiting programs are also effective at attracting and killing foxes.

No specific management of feral cats is proposed as the Proposal is not expected to have a significant impact on cat numbers. Feral cats are not currently declared under the BAM Act and, therefore, cannot be managed under legislation in a similar manner to foxes and wild dogs. Feral cat baiting could be conducted using Eradicat 1080 feral cat baits either as a local program (if approved) or part of a wider fauna recovery program such as Western Shield (if applicable). The registration of Eradicat restricts its use to lands managed by Parks and Wildlife and lands approved by Parks and Wildlife. There is precedence elsewhere in the State for Eradicat use on private land following approval (Rafferty D 2016 [Parks and Wildlife] pers. comm. 13 January).

The Western Shield program within Cape Arid National Park utilises baits of a strength that will kill wild dogs, cats and foxes. The numbers of those species in Cape Arid National Park will be directly related to the level of baiting undertaken by Parks and Wildlife as part of the Western Shield Program. It is expected that any changes to baiting by Parks and Wildlife would have the greatest influence on predator numbers and is an activity outside of DAFWA control and not related to the proposed barrier fence. Location for predator control implemented by DAFWA as part of this PPCMP will, therefore, be localised to the fence gaps (including the 3.2 km coastal gap) and previously uncleared areas.

### Pest control

Emus move within their range according to climatic conditions. If sufficient food and water are present, emus will reside in one area. Where these resources are more variable, emus move as needed to find suitable conditions (Australian Museum 2016). These events have been referred to as emu ‘migrations’.

Emus and kangaroos are Declared Pests under the BAM Act. Implementation of the Proposal through the construction and maintenance of the proposed barrier fence is the only proposed pest control measure for these species. However, the risk of fauna mortality or injury during an emu migration was identified as a risk in the impact assessment. Mitigation measures to minimise these risks, such as the design of the Proposal alignment and structure, are outlined in the PER. Additional management measures include the monitoring of emu numbers and influencing factors such as weather to provide forewarning of emu migration risk periods (Table 2-3). This system will then enable DAFWA to implement its Emu Migration Procedure which includes:

- incident management responsibilities and resourcing
- increased monitoring along the fence
- reinforcement of the fence if required
- strict enforcement of public access constraints along the fence to prevent stress on any migrating animals
- provisions for euthanizing any fallen or unwell animals (without disturbing other migrating emus).

Other than implementation of the proposed fence, no specific management of kangaroos is proposed.

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1 Note that in ecology, a migration is normally defined as a phenomenon that is usually predictable, annual and two-way (Bamford M [Bamford Consulting] 2016, pers. comm. 15 January) – ecologically, the emu ‘migration’ events referred to in this PPCMP are more correctly termed irruptions.
2. PPCMP provisions

This section of the PPCMP identifies the provisions that DAFWA proposes to implement to ensure that predator and pest control is implemented reducing significant adverse impacts on non-target fauna on either side of the proposed barrier fence. Management targets that DAFWA will use to measure performance and monitoring that will be undertaken in relation to the management targets are also identified. Finally, it identifies how DAFWA will review and revise management actions if the management targets are exceeded.

2.1 PPCMP environmental objective

The PPCMP environmental objective is to ensure that predator and pest control is implemented so that there are no significant adverse impacts on non-target fauna on either side of the proposed barrier fence.

2.2 Management actions

Risk-based management actions have been identified and prioritised to achieve the PPCMP environmental objective outlined in Section 1.3 (Table 2-1). These management actions focus the greatest management effort on Proposal activities that have the highest likelihood of causing environmental impact. These management actions were specifically developed to ensure that predator and pest control is implemented, reducing significant adverse impacts on non-target fauna on either side of the proposed barrier fence.

Table 2-1: Risk-based management actions that will be implemented to meet the condition environmental objective

<table>
<thead>
<tr>
<th>Risk and key impacts</th>
<th>Management actions</th>
<th>Risk-based priority</th>
<th>Timeframe/ project phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Wild dogs pass through or under the proposed barrier fence.</td>
<td>Regularly maintain the proposed barrier fence to ensure that its integrity is maintained.</td>
<td>Moderate</td>
<td>Ongoing following construction</td>
</tr>
<tr>
<td>2. Preferential predation along fence line.</td>
<td>Ensure wild dog and fox control baiting is implemented near fence gaps, including the 3.2 km coastal gap, and areas where new clearing has been undertaken.</td>
<td>High</td>
<td>Ongoing</td>
</tr>
<tr>
<td>3. Mortality or injury of emus during a migration.</td>
<td>Develop and implement a method for identifying the likely precursors of emu migration.</td>
<td>Moderate</td>
<td>Pre-construction</td>
</tr>
<tr>
<td></td>
<td>Implement DAFWA emu migration procedure if emu migration has been identified or is considered likely.</td>
<td>High</td>
<td>Ongoing</td>
</tr>
</tbody>
</table>
2.3 Management targets

Management targets have been developed to measure and report against the achievement of the environmental objective in Table 1-1. Management targets are outlined in Table 2-2.

Table 2-2: Management targets to measure the efficacy of management actions relative to the environmental objective

<table>
<thead>
<tr>
<th>Proponent environmental objective</th>
<th>To ensure that predator and pest control is implemented so that there are no significant adverse impacts on non-target fauna on either side of the proposed barrier fence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management target 1</td>
<td>No increase in wild dog activity within 10 km adjacent (outside) to the proposed barrier fence post construction.</td>
</tr>
<tr>
<td>Management target 2</td>
<td>No increase in fox activity within 10 km of the proposed barrier fence (inside and outside) post construction.</td>
</tr>
<tr>
<td>Management target 3</td>
<td>Predict risk of emu migration events before they occur*.</td>
</tr>
</tbody>
</table>

*Note: Refer to Table 2-3 for timing requirements to inform management

2.4 Monitoring

The purpose of monitoring is to inform, through the management target/s, if the environmental objective is being achieved and when management actions will be have to be reviewed and revised. The proposed monitoring program for predator and pest control is provided in Table 2-3.
Table 2-3: Monitoring to measure the efficacy of management actions against the management target

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Method</th>
<th>Location</th>
<th>Parameters</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Management target 1</strong>: No increase in wild dog activity within 10 km adjacent (outside) to the proposed barrier fence post construction.</td>
<td>Deploy motion-sensitive cameras and review camera images along the Proposal alignment. Near fence gaps, including the 3.2 km coastal gap, and areas where new clearing has been undertaken. Indicative locations: • two cameras at each fence end (fourteen cameras) • cameras at 1 km intervals within new clearing areas (up to 20 cameras).</td>
<td>Number of wild dog motion camera events per unit of time (refer to Section 1.5.3).</td>
<td>Biannually for two weeks during whelping (Spring) and dispersal (Summer/Autumn) for the first three years. Monitoring to commence prior to construction. For new clearing areas, cameras to be deployed for 3 years after completion of clearing. Wet season to be avoided to prevent spread of dieback along the proposed barrier fence.</td>
<td></td>
</tr>
<tr>
<td>No net change in the number of reports by community on wild dog activity</td>
<td>Invite all landholders with properties adjacent to the proposed fence to opportunistically record sightings of wild dogs and report via FeralScan. Farm land and roads adjacent to proposed barrier fence.</td>
<td>Opportunistic sightings of wild dogs reported by the community.</td>
<td>Opportunistic.</td>
<td></td>
</tr>
<tr>
<td><strong>Management target 2</strong>: No increase in fox activity within 10 km of the proposed barrier fence (inside and outside) post construction.</td>
<td>Deploy motion-sensitive cameras and review camera images along the Proposal alignment. Near fence gaps, including the 3.2 km coastal gap, and areas where new clearing has been undertaken. Indicative locations: • two cameras at each fence end (fourteen cameras) • cameras at 1 km intervals adjacent to Cape Arid National Park (eight cameras) • cameras at 1 km intervals within new clearing areas (20 cameras).</td>
<td>Number of motion camera events per unit of time (refer to Section 1.5.3).</td>
<td>Biannually for two weeks during whelping (Spring) and dispersal (Summer/Autumn) for the first three years. Monitoring to commence prior to construction. For new clearing areas, cameras to be deployed for 3 years after completion of clearing. Wet season to be avoided to prevent spread of dieback along the proposed barrier fence.</td>
<td></td>
</tr>
<tr>
<td>No net change in the number of reports by community on fox activity</td>
<td>Invite all landholders with properties adjacent to the proposed fence to opportunistically record sightings of foxes and report via FeralScan. Farm land and roads adjacent to proposed barrier fence.</td>
<td>Opportunistic sightings of foxes reported by the community.</td>
<td>Opportunistic.</td>
<td></td>
</tr>
<tr>
<td>Indicator</td>
<td>Method</td>
<td>Location</td>
<td>Parameters</td>
<td>Frequency</td>
</tr>
<tr>
<td>-----------</td>
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<td>----------</td>
<td>------------</td>
<td>-----------</td>
</tr>
<tr>
<td><strong>Management target 3:</strong> Predict risk of emu migration events before they occur.</td>
<td>Community reporting of large numbers of emus and/or a significant increase in emu numbers. A contact for this type of reporting will be provided to relevant land owners and managers. Provide land owners and managers (pastoralists, mining and exploration industry, tourist operators and landowners) to the north of the Proposal alignment with information on the key indicators that are precursors to emu migration events.</td>
<td>North of the Proposal alignment (south of Kalgoorlie).</td>
<td>Community reports to DAFWA of increased abundance or congregation of emus.</td>
<td>Opportunistic.</td>
</tr>
<tr>
<td>Occurrence of precursor conditions</td>
<td>Undertake assessment of precursor conditions to determine likelihood of emu migration event (Table 2-1). This includes revision of likely weather conditions that may result in emu migrations (i.e. high rainfall years followed by very dry conditions).</td>
<td>Weather stations north of the Proposal alignment and south of Kalgoorlie (desktop assessment).</td>
<td>Precursor conditions.</td>
<td>Bi-annually.</td>
</tr>
</tbody>
</table>
2.5 Review and revision of management actions

In the event that management targets are not met, the Proponent will investigate the potential cause and any potential impacts that may result to Terrestrial Fauna. This includes risks and key impacts with associated management actions and priorities in Table 2-1 that will be reviewed and revised. If the management targets were not met as a result of the Proposal the risk assessment will be reviewed and management actions revised as per Table 2-4 to ensure the environmental objectives are met.

Reviewed and revised management actions will be implemented by the Proponent to mitigate and manage impacts so they once again will meet the management target and the environmental objective.

Table 2-4: Monitoring and corrective actions for management targets

<table>
<thead>
<tr>
<th>Trigger</th>
<th>Indicators</th>
<th>Corrective actions</th>
</tr>
</thead>
</table>
| **Management target 1:** No increase in wild dog activity trend adjacent (outside) to the proposed barrier fence post construction. | • increase in the number of public and agency records / observations / complaints regarding wild dogs outside the proposed fence  
• motion camera data records demonstrate an increased trend in the number of wild dog events at the fence gaps, and new clearing areas. | 1. Notify Parks and Wildlife of recorded increase of wild dog activity trend adjacent (outside) to the proposed fence near conservation reserves.  
2. Notify DAFWA Invasive Species of recorded increase of wild dog activity adjacent (outside) to the proposed fence.  
3. Review wild dog control procedures.  
4. Determine appropriate corrective action in consultation with Parks and Wildlife and Biosecurity Groups. |
| **Management target 2:** No increase in fox activity trend within 10 km of the proposed barrier fence (inside and outside) post construction. | • increase in the number of public and agency records / observations / complaints of foxes in farm land and roads adjacent to barrier proposed fence  
• motion camera data records demonstrate an increased trend in the number of fox events at the fence gaps and new clearing areas on either side of the fence. | 1. Notify Parks and Wildlife of recorded increase in trend of fox activity inside or outside of the proposed fence near conservation reserves.  
2. Notify DAFWA Invasive Species of recorded increase of fox activity adjacent (outside) to the proposed fence.  
3. Determine appropriate corrective action in consultation with Parks and Wildlife. |
| **Management target 3:** Predict risk of emu migration events before they occur. | • congregation of emu mob in the order of thousands of emus along the proposed fence prior to implementation of the DAFWA Emu Migration Procedure  
• community and Agency reporting of elevated emu numbers. | 1. Notify Parks and Wildlife and DAFWA of large emu migration event.  
2. Review DAFWA Emu Migration Procedure.  
3. Determine appropriate corrective action in consultation with Parks and Wildlife. |
2.6 Reporting provisions

2.6.1 Annual reporting

A summary report will be produced annually during ongoing maintenance of the Proposal that details the results of monitoring.

The annual report will include:

- documentation of monitoring undertaken
- comparison of monitoring results to management targets
- documentation of any contingency actions undertaken.

The annual summary report will also include the achievement of management targets and the environmental objective. The PPCMP reporting template is presented in Table 2-5.

The first annual report will be submitted to the CEO of the OEPA within fifteen months of construction commencing addressing the first twelve months of construction and operation of the Proposal.

2.6.2 Reporting on exceedance of the management target

In the event that the management targets are exceeded (or not met), DAFWA will notify the CEO of the OEPA within seven days of identification of the exceedance.
### Table 2-5: Environmental management plan reporting table

<table>
<thead>
<tr>
<th>Key environmental factor: Terrestrial Fauna</th>
<th>EPA’s environmental objective and management targets in the PPCMP</th>
<th>Reporting on the management objective and management target</th>
<th>Status of achievement</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPA’s environmental objective: To protect terrestrial fauna so that biological diversity and ecological integrity are maintained.</td>
<td>The representation, diversity, viability and ecological function at the species, population and assemblage level for Terrestrial Fauna was maintained.</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>PPCMP environmental objective: To ensure that predator and pest control is implemented so that there are no significant adverse impacts on non-target fauna on either side of the proposed barrier fence.</td>
<td>Significant adverse impacts on non-target fauna on either side of the proposed barrier fence [were / were not] avoided as far as reasonable practicable.</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Management target 1: No increase in wild dog activity within 10 km adjacent (outside) to the proposed barrier fence post construction.</td>
<td>An increase in wild dog activity within 10 km adjacent (outside) to the proposed barrier fence [was / was not] recorded.</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Management target 2: No increase in fox activity trend within 10 km of the proposed barrier fence (inside and outside) post construction.</td>
<td>An increase fox activity within 10 km of the proposed barrier fence (inside and outside) [was / was not] recorded.</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Management target 3: Predict risk of emu migration events before they occur.</td>
<td>Risk of emu migration events [was / was not] identified</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>
3. Adaptive management and review

The Proponent will implement adaptive management systems to provide a robust management plan to learn from the implementation of mitigation measures, monitoring and evaluation against management targets in order to meet the PPCMP environmental objective. The following approach will be taken:

- motion camera and observational monitoring data will be systematically evaluated and trends reviewed on a biannual basis to verify whether responses to the impact are similar to predictions
- review management and monitoring requirements (including frequency and trend analysis) after 2–3 years
- address evaluation of assumptions and uncertainties in Section 1.5.3
- re-evaluate the risk assessment and revision of risk-based priorities on the basis of monitored information
- revision when management actions are not as effective as predicted
- external changes during ongoing maintenance of the Proposal, for example:
  - monitoring results
  - continuous improvement and changes in regulatory and corporate requirements
  - changes to the sensitivity of the key environmental factors
  - implementation of other activities in the area etc.
- whether the PPCMP needs to be reviewed (e.g. changes to PPCMP provisions, timeframes etc.).
4. Stakeholder consultation

Consultation regarding predator and pest control has been undertaken by DAFWA as part of the development of this Proposal and is outlined in the PER. Biosecurity Groups undertaking control of declared pest animals will continue to be highly involved in implementing this PPCMP.

This PCMMP will be subject to public review as part of the PER process.
5. References


Department of Agriculture and Food Western Australia (DAFWA) 2016, *Potential ecological footprint of the proposed Esperance extension to the State Barrier Fence on wildlife*, Government of Western Australia.


Wilkins P, Gilfillan S, Watson J. & Sanders, A. (ed) 2006, *The Western Australian South Coast Macro Corridor Network – a bioregional strategy for nature conservation*. Department of Conservation and Land Management (CALM) and South Coast Regional Initiative Planning Team (SCRIPT), Albany, Western Australia.