

A landscape photograph showing a hillside covered in dry, yellowish-brown scrub vegetation and scattered trees under a clear blue sky. The image is partially obscured by a large blue curved shape at the top and a teal and green curved shape at the bottom.

Silverton Wind Farm Feral Pest Management Plan

FINAL REPORT

Prepared for GE Renewable Energy

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1 Introduction

1.1 Background

The Silverton Wind Farm is located approximately five kilometres north of Silverton and 25 kilometres north-west of Broken Hill in the far west of NSW. The Silverton Wind Farm was approved by the then Minister for Planning in May 2009. The Wind Farm was declared to be a critical infrastructure project under the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act), as an energy generating development with the capacity to generate at least 250MW.

Project and Concept Approval was granted in May 2009, pursuant to Part 3A of the EP&A Act. Further modification (Modification 3) was then approved in December 2016 in accordance with Clause 8J(8) of the *Environmental Planning and Assessment Regulation 2000* and the transitional arrangements of the EP&A Act. Approval was granted for the modifications to the project approval (08_022 MOD 3) and concept approval (08_0022MOD2) subject to the conditions set out in the instrument of approval.

Schedule 3 - Condition 18 of the Project Approval requires that prior to the commencement of construction, the Proponent must prepare a Biodiversity [Adaptive] Management Plan for the project, and Schedule 3 - Condition 18(c) requires that the plan includes a description for “controlling weeds and feral pests”. The Biodiversity Adaptive Management Plan (BAMP) (Biosis 2018a) identified that a Feral Pest (animal) Management Plan would be developed as a stand-alone document. This document has been prepared to satisfy that obligation and has been developed in consultation with:

- Alana Philp, GE Renewable Energy.
- Leaseholders John Blore (Belmont Station) and Nigel and Greg Lawrence (9 Mile Station). The Langford leaseholders were unable to comment at this time.
- The Department of Planning, Industry and Environment (DPIE).

1.2 Purpose

The Feral Pest Management Plan provides an overview of the management of feral (animal) pest species across the Silverton Wind Farm. It was developed by a suitably qualified expert (Jules Farquhar, Zoologist, Biosis) and provides a description of the impacts to threatened fauna and ecological communities caused by:

- European Red Fox *Vulpes vulpes*.
- European Rabbit *Oryctolagus cuniculus*.
- Feral Cat *Felis catus*.
- Wild Dog *Canis* spp, (including domestic breeds of dog gone wild, pure strains of dingo and hybrids between the two).
- Feral Pigs *Sus scrofa*.
- Wild Horses *Equus caballus*.

Details are also provided in relation to proposed management methods such as baiting and shooting.

Management and monitoring of Feral Goats *Capra hircus* is detailed in the Silverton Wind Farm Goat Management Plan (GMP) (Biosis 2018c) and the BAMP, hence the management of goats is not outlined further in this plan.

Silverton Wind Farm is responsible for management of land that is used for its infrastructure, including turbine hardstands, approximately 42 kilometres of road network, alignments of underground cabling, overhead transmission powerlines, switchyard and operations and management facilities. The land occupied by the wind farm is situated within broader rangelands under three leaseholds used for primary production of sheep and goats.

1.3 Relationship to other plans

The BAMP is the overarching document that incorporates the methods, actions, monitoring and reporting identified for the biodiversity management during the operational phase of the wind farm. BAMP is to be read in conjunction with the supporting plans:

- Barrier Range Dragon Management Plan (BRDMP) (Biosis 2018b).
- Goat Management Plan (GMP) (Biosis 2018c).
- Recovery Plan for Porcupine Grass Sparse Woodland (PGSWRP) (Biosis 2018d).
- Vegetation Management Plan (VMP) (Biosis 2018e).

This Feral Pest Management Plan is to be read in conjunction with the GMP and BAMP.

1.4 Key biodiversity assets to be protected from animal pests

The Barrier Range Dragon was recently described as a separate species from the Tawny Rock Dragon *Ctenophorus decresii* (McLean et al. 2013), and is currently known from four sites in western New South Wales, including the Silverton Wind Farm (Sass & Swan 2010). The species is associated with rocky habitats such as outcrops, gorges, escarpments, rock spoils and scattered rock aggregates (Sass & Swan 2010, McLean et al. 2013).

Porcupine Grass Sparse Woodland (PGSW) was first identified by NGH Environmental in 2008 following baseline surveys for the Silverton Wind Farm Project. It is a distinctive and naturally restricted community, which was subsequently listed as a critically endangered community (NSW Scientific Committee 2010) under the NSW *Threatened Species Conservation Act 1995* (replaced by the BC Act).

Through the management of animal pest species, it is expected that Silverton Wind Farm, in association with leaseholders, can achieve net gains in the value of PGSW and for Barrier Range Dragon *Ctenophorus mirrityana* populations. The biology of the animal pest species, and an assessment of their likely impacts to these two key biodiversity values, are discussed herein. As discussed in Section 1.3, the BAMP and the GMP address management of Feral Goats aimed at conservation of PGSW, hence the management of goats is not considered in this plan.

Figure 1 Location of the study area

2 Feral Pests

Under the NSW Biosecurity Act 2015, pest animals can be considered as any species (other than native species) that present a biosecurity threat. It is the responsibility of individuals to ensure they discharge their general biosecurity duty to manage the biosecurity risks posed by pest animals. The Biosecurity Regulation 2017 outline mandatory measures for pest animal management in NSW. General control and management of pest animals outlined in this plan can be considered mechanisms for individuals to discharge their general biosecurity duty and landholders and community members should work with stakeholders identified for ongoing implementation of pest animal management practices (WLLS 2018).

Seven species of feral animal pests have been identified as having potential to occur at Silverton Wind Farm, posing a potentially significant threat to biosecurity, especially biodiversity values. They are:

- European Red Fox *Vulpes vulpes*.
- European Rabbit *Oryctolagus cuniculus*.
- Feral Cat *Felis catus*.
- Feral Goat *Capra hircus*.
- Wild Dog *Canis* spp, (including domestic breeds of dog gone wild, pure strains of dingo and hybrids between the two).
- Feral Pigs *Sus scrofa*.
- Wild Horses *Equus caballus*.

In NSW these species are regarded as important pest animals in the Western region, causing damage to primary production, natural environments and cultural assets, as well as increasing the risk associated with the spread of certain endemic and exotic diseases (WLLS 2018). In accordance with the general biosecurity duty, this plan recommends management measures to be implemented for these feral animal pests, with a focus on Fox and Rabbit control due to their potential to significantly impact conservation measures implemented under the VMP (Biosis 2018d) and BRDMP (Biosis 2018e), respectively.

Where it is necessary to use lethal methods such as shooting to destroy native animals because they are a threat to human safety, damaging property and/or causing economic hardship, the National Parks and Wildlife Service can issue a biodiversity conservation licence to harm protected native animals under the Biodiversity Conservation Act 2016 (WLLS 2018).

2.1 Foxes

2.1.1 Biology

The European Red Fox is a highly adaptable predator and scavenger, introduced to Australia in the 1870's. The key to its establishment and success is its ability to exploit a variety of habitat types, ranging from dense forests to desert, alpine and suburban landscapes (Saunders et al. 2010). They have few natural enemies and few serious diseases in Australia. They also have high reproductive rates and high rates of cub survival, which allows them to rapidly colonise new areas (DEWHA 2008).

Predation by the Red Fox continues to be implicated in terrestrial vertebrate declines throughout much of Australia. The process of predation particularly affects small to medium-sized mammals and severely limits

their distribution and abundance (Kinnear et al. 2002, Moseby et al. 2009). Ground-nesting birds and freshwater turtles are also heavily impacted by Fox predation (Dickman 1996, Robley et al. 2016). Although Foxes are most efficient as predators of small to medium-sized mammals, numerous reptile species feature in the diet of Red Foxes; particularly in summer when reptiles are most active (Read & Bowen 2001, Paltridge 2002). Predation by the red Fox is also a recognised threat to some threatened Australian lizard species (Nielsen and Bull 2016).

2.1.2 Key threatening process

The European Red Fox is listed as a key threatening process in two core acts of Parliament:

- *Predation by the European Red Fox* (Section 188 of the Commonwealth *EPBC Act*).
- *Predation by the European Red Fox* (Schedule 4 of the NSW *Biodiversity Conservation Act 2016*).

A national threat abatement plan has been prepared by the Commonwealth (DEWHA 2008). The European Red Fox is now widespread across Australia and eradication is not possible in the immediate future. Sustained control of Foxes, however, has been shown to substantially reduce impacts to native fauna in targeted areas where fauna are particularly vulnerable to predation (DEWHA 2008, Moseby et al. 2009).

The NSW Environment, Energy and Science Group (EES) (formerly the Office of Environment and Heritage) has identified Fox predation as a threatening process for the Barrier Range Dragon (OEH 2017).

2.1.3 Threatened Plant Community – Porcupine Grass Sparse Woodland

It is not expected that the European Red Fox will have any direct impact on PGSW. However, a reduction of Fox numbers through on-site control measures may result in an increase in Rabbit and goat populations, potentially increasing grazing pressure and damage to plant communities (Banks et al. 1998), including PGSW. It is therefore important in any control effort to simultaneously control populations of Foxes and feral herbivores (Rabbits and goats) to avoid undesirable outcomes to biodiversity.

2.1.4 Barrier Range Dragon

The potential effects of Red Foxes as predators of Barrier Range Dragons is uncertain. The habit of sheltering in rock crevices means that Barrier Range Dragons are potentially at low risk of being predated by Foxes. However, when larger prey such as Rabbits become less abundant, Foxes switch their diet to smaller vertebrate prey such as lizards (Read & Bowen 2001). As such, a precautionary approach of managing Foxes is advised to avoid unknown impacts to lizard populations. As highlighted in the BRDMP (Biosis 2018b), benefits to populations of the Barrier Range Dragon at the Silverton Wind Farm may be achieved through control of Foxes.

2.2 Rabbits

2.2.1 Biology

The European Rabbit *Oryctolagus cuniculus* poses a significant environmental threat through impacts on vegetation and habitat structure as a result of grazing. They tend to be night-time grazers, preferring green grass, herbs, young seedlings, and short, succulent plants, but will also dig below grasses to reach roots and seeds (DSEWPAC 2011). They can graze plants to ground level, preventing regeneration particularly through limiting seedling establishment (Williams et al. 1995). They are a major contributor to soil erosion and compaction, degradation of the surface soil cryptogamic crust, and compete with native fauna for resources such as food, water and habitat. Rabbit warrens provide shelter for Foxes and cats, thereby helping these pests persist in arid regions (Cooke 2011). Low-density Rabbit populations can cause significant damage to native vegetation, suggesting there might be no 'safe' level of Rabbit density (Cooke et al. 2008).

2.2.2 Key threatening process

Rabbits are listed as a key threatening process in two core acts of Parliament:

- *Competition and land degradation by Rabbits* (Section 188 of the Commonwealth *EPBC Act*).
- *Competition and grazing by the feral European Rabbit* (Schedule 4 of the NSW *Biodiversity Conservation Act 2016*).

A national threat abatement plan has been prepared by the Commonwealth (CoA 2016).

The BCD has identified habitat degradation by livestock and Rabbits, particularly during drought, as threatening processes that may decrease populations and impede dispersal of the Barrier Range Dragon (OEH 2017).

2.2.3 Threatened Plant Community – Porcupine Grass Sparse Woodland

Rabbits are present within areas of PGSW at Silverton Wind Farm. In 2008, Rabbits were recorded in low abundance, likely due to drought and lack of ground cover due to grazing pressure from goats (NGH Environmental 2008). Grazing pressure and habitat degradation by Rabbits is a key threat to PGSW because it prevents recruitment of flora species comprising this community.

Local leaseholders report that in the area of Silverton Wind Farm, Rabbit numbers generally appear to have been reduced in recent years, as Rabbit Haemorrhagic Disease (sometimes referred to as 'Rabbit calicivirus') has been locally effective at controlling the population. They also note that Rabbit density is generally very low across the broad rocky landscape and tends to be higher along intermittent watercourses where the substrate is more amenable to burrowing.

2.2.4 Barrier Range Dragon

It is not expected that the Rabbits will have any direct impact on Barrier Range Dragon populations at Silverton Wind Farm. Populations will nonetheless benefit from Rabbit control through reduced grazing pressure on vegetation and, consequently, foraging habitat for Barrier Range Dragons.

2.3 Cats

2.3.1 Biology

The term 'Feral Cat' is applied to those living independently of humans in the wild. Feral Cats are a serious vertebrate pest in Australia, and have severe effects on native fauna (Woinarski et al. 2014). They have been implicated in the decline and extinction of several native species following introduction (Doherty et al. 2016). Their high reproductive rate and versatility in diet and habitat use has made them highly successful invaders across much of Australia (Read & Bowen 2001). Feral Cats are implicated in 26 % of bird, mammal and reptile species extinctions worldwide (Doherty et al. 2016). Unlike Foxes, which are apparently inept at stalking small vertebrate prey such as reptiles, cats are extremely efficient predators of reptiles (Read & Bowen 2001, Woinarski et al. 2018).

2.3.2 Key threatening process

Feral Cats are listed as a key threatening process in two core acts of Parliament:

- *Predation by Feral Cats* (Section 188 of the Commonwealth *EPBC Act*).
- *Predation by Feral Cats* (Schedule 4 of the NSW *Biodiversity Conservation Act 2016*).

A national threat abatement plan has been prepared by the Commonwealth (CoA 2015).

The BCD has identified predation by cats as a threatening process for the Barrier Range Dragon (OEH 2017).

2.3.3 Threatened Plant Community – Porcupine Grass Sparse Woodland

It is not expected that cats will have any direct impact on PGSW. However, a reduction of cat numbers through on site control measures may result in an increase in the Rabbit population (Moseby & Hill 2011), with consequently higher grazing pressure and damage to plant communities including PGSW. It is therefore important in any control efforts to simultaneously control populations of cats and Rabbits to avoid undesirable outcomes to biodiversity.

2.3.4 Barrier Range Dragon

The potential effects of Feral Cats as predators of Barrier Range Dragons is uncertain, however they are known predators of similar small reptiles; including other *Ctenophorus* species (Woinarski et al. 2018). Arid environments experience dynamic cycles of drought conditions followed by sporadic rainfall events, resulting in the unpredictable and varied response of plants and animals between years. The threat of cats on Barrier Range Dragons likely varies depending on changes in cat population density, driven by rainfall in inland Australia (Woinarski et al. 2018). For example, cat populations are known to decrease during extremely dry conditions and when Rabbit abundance is low (Moseby & Hill 2011).

Local leaseholders reported that the cat population has declined with the Rabbit population. They trap cats opportunistically.

2.4 Wild Dogs

2.4.1 Biology

For the Western Region, Wild Dogs include dingoes *Canis lupus dingo*, domestic dogs *Canis familiaris* that have escaped or been released and hybrids between the two species. Wild Dogs are highly adaptable; persisting in most environments across Australia, provided that shelter, water and food are adequate and human disturbance is limited. The distribution and abundance of Wild Dogs are considered to be far less common in the southern third of the Western Local Land Services Region. However, densities in the Broken Hill region are considered by the NSW DPI to be of medium presence and abundance, attributed to the gradual southward movement of northern populations and partly through cross – border incursions of Wild Dogs from South Australia, from populations that reside south of that state’s dog fence.

Wild Dogs live in small groups or packs in territories where the home range of individuals averages about 4000 hectares in eastern NSW and up to 90,000 hectares in dry western environments. Wild Dogs usually breed once a year and are defined as having a flexible social system, with members of a social group continuing to meet and separate over time.

Wild Dogs weigh between 7-25kg and mostly eat fresh meat and carrion. However, food habits can vary between locations, with some Wild Dogs observed to eat fruit and plugging insects when available. Whilst domestic livestock can constitute a portion of the Wild Dogs’ diet in agricultural areas, common prey items include small to medium-sized mammals such as wallabies, Rabbits, possums, wombats, echidnas, birds, reptiles, rodents and other small mammals.

Dingoes *Canis lupus dingo* are present in the local area at relatively low density (J. Blore pers. comm. 2019). Dingoes are considered a component of the indigenous fauna, but across the continent the population is now intermingled to some degree with Wild Dogs *Canis lupus familiaris* and hybrids. The presence of dingoes and Wild Dogs is likely to have an influence on the density and behaviours of Foxes and Cats, but specifics of such effects are not known for the Barrier Range area.

2.4.2 Key threatening processes

Wild Dogs are listed as a key threatening process under Schedule 4 of the NSW *Biodiversity Conservation Act 2016*. The process is listed as:

- *Predation and hybridisation by Feral Dogs, *Canis lupus familiaris**

2.4.3 Threatened Plant Community – Porcupine Grass Sparse Woodland

It is not expected that Wild Dogs will have any direct impact on PGSW. However, as with cats, a reduction of Wild Dogs numbers through on site control measures may result in an increase in the Rabbit population, with consequently higher grazing pressure and damage to plant communities including PGSW. It is therefore important in any control efforts to simultaneously control populations of Wild Dogs and Rabbits to avoid undesirable outcomes to biodiversity.

2.4.4 Barrier Range Dragon

The potential effects of Wild Dogs as predators of Barrier Range Dragons is uncertain. It is possible that it is not a routine prey species and/or that a level of ecological equilibrium may have been attained during the long-term presence of dingoes. It is also feasible that the habit of sheltering in rock crevices means that Barrier Range Dragons are potentially at low risk of being predated by Wild Dogs.

2.5 Feral Pigs

2.5.1 Biology

Feral Pigs *Sus scrofa* have become established within a wide variety of habitats across Australia including rangelands, alpine regions, tropical rainforests, floodplains and wetlands. In arid environments, the distribution of Feral Pigs is often seasonal and restricted to watercourses, associated floodplains and man-made water supplies. Whilst Feral Pigs are present through most parts of the Western Local Land Services region, the greatest densities occur in the floodplain areas of Kinchega National Park and Paroo Darling National Park.

Feral Pigs are occasionally observed by leaseholders within seasonal creek beds and gullies, typically following significant wetting events. Whilst present within the local area, their occurrence in areas of infrastructure under management by GE Renewable Energy (GE) is considered to be highly unlikely given the topography of the site (i.e. high, rocky ranges) and absence of suitable habitat (i.e. permanent water courses, associated floodplains, man-made water supplies, etc.). However, a small number of access roads within the wind farm traverse suitable habitat.

2.5.2 Key threatening process

Feral Pigs are listed as a key threatening process under Schedule 4 of the NSW *Biodiversity Conservation Act 2016*. The process is listed as:

2.5.3 Predation, habitat degradation, competition and disease transmission by Feral Pigs *Sus scrofa* Threatened Plant Community – Porcupine Grass Sparse Woodland

Feral Pigs have been observed to access the area within the goat fence by pushing in under the flood gates or other low access points. However, it is not expected that Feral Pigs will have any direct impact on PGSW as the community occurs on steep rocky terrain with skeletal soils (Biosis 2018d), upslope to their preferred habitats.

2.5.4 Barrier Range Dragon

Feral Pigs are not likely to represent a threat to the Barrier Range Dragon. The rocky and ridgeline habitats of the species are generally unsuitable for Feral Pigs.

2.6 Wild Horses

Wild Horses *Equus caballus* are well adapted to sparsely distributed and unpredictable resources of arid Australia but also do well in the sub-alpine and alpine districts of Australia. They can move up to 50 km a day to food and water and have few predators and diseases. In western NSW, Wild Horses, along with a number of other pest animals (deer species, feral camels and feral donkeys) are considered to be emerging issues, requiring targeted approaches to prevent greater problems emerging.

Wild Horses prefer grassland and shrubland with plentiful water and pasture, but can inhabit a variety of environments including semiarid plains and rocky ranges. Wild Horses are predominantly found in the northern half of the Western Local Land Services Region, and have not been observed by leaseholders in the local area.

Their occurrence in areas of infrastructure under management by GE is therefore considered to be highly unlikely. This is primarily attributed to a lack of recorded or anecdotal observations of Wild Horses in the local area by leaseholders within the local area and knowledge of the species current distribution and abundance within the Western Local Land Services Region.

Wild Horses are not considered further in this plan.

3 Management obligations

Pest animal management is a shared responsibility between landholders, community, industry and government and requires a coordinated approach across a range of scales and land tenures. Under the *Local Land Services Act 2013* all land managers in NSW, whether on public or private land, have an obligation to control declared pest species on their land.

3.1 Foxes

- The NSW Government gazetted the *Local Land Services (European Red Fox) Pest Control Order* in 2014, making Foxes a declared pest species under the *Local Land Services Act 2013*.
- The NSW Western Regional Strategic Pest Animal Management Plan (WRSPAMP) stipulates that land managers in western NSW have the responsibility to implement a Fox control program, with the aim of reducing the impact of Foxes on primary production and the natural environment (WLLS 2018).

3.2 Rabbits

- The NSW Government gazetted the *Local Land Services (Rabbits) Pest Control Order* in 2016, making Rabbits a declared pest species under the *Local Land Services Act 2013*.
- The NSW WRSPAMP stipulates that land managers in western NSW have the responsibility to actively control wild Rabbits on or immediately adjacent to high value agricultural, environmental or cultural assets.

3.3 Cats

- There is no NSW Government Pest Control Order that requires land managers to control cats.
- The NSW WRSPAMP stipulates that land managers in western NSW are expected to actively participate in or cooperate with coordinated control programs for Feral Cats where they are targeted at protecting high value agricultural and/or environmental assets.

3.4 Wild Dogs

- The NSW Government gazetted the *Local Land Services (Wild Dogs) Pest Control Order* in 2015, making Wild Dogs a declared pest species under the *Local Land Services Act 2013*.
- The NSW WRSPAMP stipulates that land managers in western NSW are expected to:
 - Using best practice techniques, actively control Wild Dogs wherever found on properties managed by the land manager, aiming to keep numbers to minimal levels.
 - Actively participate in coordinated group control programs for Wild Dogs.
 - Regularly report numbers and locations of Wild Dogs, and damage/losses believed to be caused by Wild Dogs to local pest control group and/or Western Local Land Services.
 - Monitor and report results of Wild Dog control programs to local pest control group and/or Western Local Land Services.

3.5 Feral Pigs

- There is no NSW Government Pest Control Order that requires land managers to control Feral Pigs.
- The NSW WRSPAMP stipulates that land managers in western NSW are expected to:
 - Using best practice techniques, actively control and keep controlled Feral Pigs on properties managed by the land.
 - Actively participate in coordinated group control programs for Feral Pigs.
 - Regularly report numbers and locations of Feral Pigs and damage/losses believed to be caused by Feral Pigs to local pest control group and/or Western Local Land Services.
 - Monitor and report results of Feral Pig control programs to local pest control group and/or Western Local Land Services.

4 Management approach

4.1 Adaptive management

Arid landscapes such as the Barrier Range environment of Silverton Wind Farm are climatically dynamic; they tend to undergo 'boom-and-bust' cycles of plant recruitment and animal population fluctuations according to the amount of rainfall in a given season. It is therefore unrealistic to prescribe a single management approach that is inflexible to such change. Management actions undertaken in one year may be wholly ineffective in another year depending on ecological productivity.

Adaptive management in this document relates to the ongoing management of feral pests, with a particular focus on the management of grazing pressure from Rabbit populations to facilitate the maintenance and improvement of PGSW vegetation extent and condition, with the aim of achieving a net gain in condition. It also aims to ensure the long term viability of Barrier Range Dragon populations through the management of Fox populations. Adaptive management follows a MERI cycle – Monitoring, Evaluation, Reporting, and Improvement.

Management of feral pests across the Silverton Wind Farm will follow an adaptive management approach. Implementation began with the collection of baseline data on the status of PGSW and Barrier Range Dragon in 2019 and is being followed by annual monitoring for three years. If necessary, management actions will be revised following each annual monitoring period to continually improve on-ground management and ecological outcomes.

In accordance with the BAMP (Biosis 2018b), a detailed review in consultation with BCD after the initial three year period will ensure the management approach is appropriate to achieve a net gain in the conservation value of PGSW. The review will also provide an informed understanding of the response of the Barrier Range Dragon population to a range of management measures outlined in the BRDMP (Biosis 2018b). This cycle of 'do, monitor, evaluate and respond' is the foundation of adaptive management and is widely applied to terrestrial and aquatic ecosystem management (Kingsford et al. 2011).

4.2 Feral Animal Pest management

The following management approaches are recommended as feral pest control measures at Silverton Wind Farm for because they are the most effective for managing these pests in arid landscapes, are recommended methods by NSW Government *Local Land Services*, and fulfil the expectations for pest management outlined in the NSW Western Regional Strategic Pest Animal Management Plan.

At Silverton Wind Farm, GE has management responsibility for the land it leases, which consists principally of the network of locations of wind farm infrastructure, including roads, handstands, overhead power transmission and underground cable routes, plus switchyard and amenities. Management of pest animals cannot function as a stand-alone exercise over these areas and will be undertaken in collaboration with adjacent leaseholders.

All pest control practices should comply with the Model Codes of Practice (COPs) and Standard Operating procedures (SOPs) for the humane control of key pest animal species: <https://www.pestsmart.org.au/animal-welfare/humane-codes/>.

4.2.1 Fox management

Eradication of Foxes is well beyond the capacity of available techniques and resources. Reducing the impact of the Red Fox on the Barrier Range Dragon population is nonetheless feasible at Silverton Wind Farm, provided that a combination of control techniques is used. The most common control techniques are ground baiting with 1080 poison and ground shooting. The use of alternative control measures, such as trapping, fencing and guard animals, are not feasible given the large scale of the landscape within which the Silverton Wind Farm sits. Control practices can be successful, but generally have a short-term effect on local Fox numbers.

The recommended approach is to maintain awareness of the potential for foxes to become problematic for these key values, especially following periods of higher than normal rainfall. If required to be implemented, no single control method will be successful on its own and when Foxes are removed from an area, reinvasion or immigration from existing untreated areas generally occurs within two to six weeks. If commenced, a sustained Fox control program is therefore essential. GE Renewable Energy will facilitate, and contribute to, the sustained efforts of leaseholders to control Fox numbers at Silverton Wind Farm using the methods set out below.

Ground baiting (1080 poison)

The main poison used to control Foxes is 1080. This poison is an odourless, tasteless white powder that has a special dye added for identification of the toxin. It is used for poisoning of Foxes by incorporating it into fresh, dried or processed meat baits. Poisoned baits are distributed either on the ground by hand or from the air in a helicopter or fixed-wing aircraft. Ground baiting is more cost effective than aerial baiting. 1080 poison use is regulated by the Pesticides Act and Pesticide Control Order that defines the requirements for use. Landholders must have current approved chemical users training to obtain and use 1080 poison. Coordinated local group baiting programs will enhance outcomes of baiting efforts.

A major caveat of poison baiting is that it may affect native carnivores and scavengers such as goannas and some scavenging birds, including Wedge-tailed Eagles. The benefits of this control method are confined to the baited area and, unless some barrier prevents re-invasion, last only for as long as baiting is regularly applied. The Silverton Wind Farm has an extensive network of roads, which allows for ease of access to bait deployment stations by vehicle. Baiting stations should be concentrated in areas where Barrier Range Dragons are most abundant, as identified in the BRDMP (Biosis 2018b).

Ground shooting

Lethal shooting of Foxes with a rifle is one of the most humane methods of Fox control, provided it is carried out by a skilled shooter. Firing at close range ensures that the target can be correctly identified as a Fox and therefore reduces the risk of injury to non-target animals. Shooting is typically carried out at night (i.e. when Foxes are most active) from a vehicle with the aid of a spotlight. The use of whistles that resemble a Rabbit distress call are used to lure the Fox into shooting range. Firing at close range is desirable as it ensures an accurate lethal shot to either the head (brain) or chest (heart-lung). Leaseholders within the Silverton Wind Farm currently practice periodic shooting of Foxes on site.

4.2.2 Rabbit management

Rabbits are now widely established and abundant in Australia and eradication is not possible with current techniques. Effective Rabbit control requires integration of different methods. Any single technique used in isolation is less effective than two or more techniques carefully combined. When reliance is placed on only one technique and follow-up control is not implemented, initial gains are lost as Rabbits will readily recolonise in the absence of further control.

The Rabbit population size at Silverton Wind Farm is considered by leaseholders to be relatively low and to be largely confined to the vicinity of watercourses. It is thus not likely that Rabbits currently have substantial detrimental effects on the PGSW vegetation community or on Barrier Range Dragon habitats. Under these circumstances, the recommended approach is to maintain awareness of the potential for Rabbits to become problematic for these key values, especially following periods of higher than normal rainfall. Management of Rabbits should be instigated immediately if Rabbits are detected to have increased in areas of the PGSW vegetation community or in Barrier Range Dragon habitats. As required, GE will contribute to the efforts of leaseholders to control Rabbit numbers at Silverton Wind Farm using the methods set out below.

Biological control

At present, control of Rabbits in western NSW is heavily reliant on established biocontrols such as myxomatosis and Rabbit Haemorrhagic Disease (RHD). Myxomatosis has become less effective against Rabbits due to increased resistance and the percentage killed is generally too low to achieve significant reduction of their impacts. RHD has a high mortality rate resulting in the death of 70–90 per cent of susceptible Rabbits. The NSW Department of Primary Industries advises against the introduction of RHD while myxomatosis is active in Rabbits. It is uncertain to what extent Rabbit populations at Silverton Wind Farm have either of these viruses, although leaseholders have indicated that Rabbit densities are lower than in the past since RHD has been present. If, through the adaptive management process, an increase in biocontrol is considered to be warranted as a supplement to other control methods, NSW Local Land Services must be contacted to assess the suitability and availability of the virus.

Poison

Poisoning is most effective during the non-breeding season (when Rabbits are less territorial and less tied to warrens) and feed is scarce. The best time is usually during mid to late summer. 1080 poison and Pindone are toxins registered for the control of Rabbits. Both are covered by product labels and Pest Control Orders issued by the NSW Environment Protection Authority (EPA). The objective of poisoning is to remove 90% or more of Rabbits, which will prevent the population from quickly recovering, allowing time to implement follow up control. Carrots are the preferred feed material for Rabbits, but oats and pellets may be used also. Poisons and fumigants can be purchased and equipment associated with Rabbit control can be hired from the Local Land Services office for a nominal fee.

Poisoning is most effective when combined with warren ripping as a follow-up control measure to further discourage Rabbits from taking up residence on site (Banks et al. 1998). However warren ripping is not recommended near areas of PGSW due to the risk of inadvertent damage to vegetation and topsoil.

Shooting, trapping and fencing

Shooting, trapping and fencing can be highly effective control measures for Rabbits on smaller properties, or when Rabbit numbers are already low. However, they should not be relied upon to control medium to high density Rabbit populations and should be implemented in concert with poisoning and/or biological control measures.

4.2.3 Cat management

Strategies for controlling Cats in Australia include shooting, trapping, poisoning and the introduction of feline panleucopaenia. Cat eradication has been successful using these control strategies, however it is only achieved on islands or within areas bounded by predator-proof fencing.

The recommended approach is to maintain awareness of the potential for cats to become problematic for these key values, especially following periods of higher than normal rainfall. Cat control would likely benefit

populations of Barrier Range Dragons on site by reducing predation pressure, however it is costly and practically impossible to effectively control cats in large remote areas such as the Silverton Wind Farm property (Denny & Dickman 2010). Furthermore, local leaseholders reported that the cat population has declined with the Rabbit population. As such, this management plan does not outline a management approach for controlling cats at Silverton Wind Farm. However, if a local coordinated control program for Feral Cats is initiated, GE will contribute to, the efforts of leaseholders to control cat numbers at Silverton Wind Farm.

4.2.4 Wild Dog management

Strategies recommended by Local Land Services for controlling the distribution and number of Wild Dogs in the southern third of the Western Region include coordinated control programs such as aerial and ground baiting (spring and autumn), trapping and shooting.

The abundance of Wild Dogs at the Silverton Wind Farm is considered by leaseholders to be low. Monitoring of the Barrier Range Dragon population at the Silverton Wind Farm site pre and post construction (between 2018 and 2021) found the distribution and abundance of the species to be closely correlated with declines in seasonal rainfall. It is therefore considered highly unlikely that the current presence or occurrence of Wild Dogs within areas of infrastructure under management by GE is causing substantial detrimental effects on the Barrier Range Dragon population. Under these circumstances, the recommended approach is to maintain awareness of the potential for Wild Dogs to become problematic for these key values, especially when an abundance of macropods and Rabbits are observed to have increased onsite.

One of the leaseholders has noted that it is occasionally necessary to control Dingoes / Wild Dogs, especially around lambing seasons. Wild Dogs, including Dingoes, are declared pest animals throughout NSW under the Local Land Services (Wild Dogs) Pest Control Order 2015. Management of Wild Dogs should be instigated immediately if Wild Dogs are detected to have increased in areas of the PGSW vegetation community or in Barrier Range Dragon habitats.

When 1080 poison baits routinely used for Fox control are eaten by Dingoes / Wild Dogs they are not likely to be lethal but the dose may make the animal ill and then averse to taking a bait in future. For this reason, the leaseholder baits for all canids using Dingo baits. As required, GE will contribute to the efforts of leaseholders to control Wild Dog numbers at Silverton Wind Farm.

4.2.5 Feral Pig management

The abundance of Feral Pigs at the Silverton Wind Farm is considered by leaseholders to be low, and the areas of suitable habitat within the leaseholding are highly localised and restricted. The leaseholders routinely report numbers and locations of Feral Pigs and damage/losses believed to be caused by Feral Pigs to leaseholders' local pest, any control group and/or Western Local Land Services. If initiated, GE should participate in coordinated group control programs for. As required, GE will contribute to, the efforts of leaseholders to control Feral Pigs in areas of the PGSW vegetation community or in Barrier Range Dragon habitats at Silverton Wind Farm. However as noted previously, PGSW and habitat for Barrier Range Dragon both occur upslope of the preferred drainage line habitat of Feral Pigs.

5 Summary of management actions

A summary of management actions for control of feral pest species at Silverton Wind Farm is set out in Table 1, below.

Monitoring and reporting the outcomes of the pest control program will be included in annual reporting for PGSW and BRD and the review of management actions at the end of 2021.

Table 1 Management actions, monitoring, responses and responsibility for control of feral pest species at Silverton Wind Farm

#	Species	Task / Performance Criteria	Measure / Target	Evidence of Completion	Responsibility	Timing
FP01	Fox	Maintain awareness of the potential for impact on biodiversity values, especially following periods of higher than average rainfall If required, targeted baiting in Barrier Range Dragon habitat at Silverton Wind Farm.	When required by regional control programs, baiting implemented in a co-ordinated manner with leaseholder programs, using baits appropriate to the local feral predator population.	Document management activities implemented, including timing, technique and locations.	GE operational staff/ leaseholders	If required, twice yearly in association with leaseholders (April/May and Sept/Oct).
FP02	Rabbit	Maintain awareness of the potential for impact on biodiversity values, especially following periods of higher than average rainfall Management of Rabbits should be instigated immediately if Rabbits are detected to have increased in areas of the PGSW vegetation community or in Barrier Range Dragon habitats.	When required by regional control programs, Rabbit management implemented in association with leaseholders if Rabbit population increases (e.g. if Rabbit Haemorrhagic Disease observed to lose effectiveness).	Document management activities implemented, including timing, technique and locations.	GE operational staff/ leaseholders	If Rabbit population in PGSW increases.

#	Species	Task / Performance Criteria	Measure / Target	Evidence of Completion	Responsibility	Timing
FP03	Cat	Maintain awareness of the potential for impact on biodiversity values, especially following periods of higher than average rainfall Cooperate with coordinated cat control programs	When required, actively participate in or cooperate with coordinated control programs for Feral Cats where they are targeted at protecting high value agricultural and/or environmental assets.	Document management activities implemented, including timing, technique and locations.	GE operational staff/ leaseholders	If a coordinated control program is initiated.
FP04	Wild Dog	Maintain awareness of the potential for impact on biodiversity values, especially following periods of higher than average rainfall If required, implement targeted baiting in Barrier Range Dragon habitat at Silverton Wind Farm.	When required by regional control programs, Wild Dog baiting implemented in co-ordinated manner with leaseholders if Wild Dog population increases	Document management activities implemented, including timing, technique and locations.	GE operational staff/ leaseholders	If required, twice yearly in association with leaseholders (April/May and Sept/Oct).
FP05	Feral Pig	Support Feral Pig control programs	Regularly report numbers and locations of Feral Pigs and damage/losses believed to be caused by Feral Pigs to local pest control group and/or Western Local Land Services. If required, participate in coordinated group control programs for Feral Pigs in suitable habitat.	Document management activities implemented, including timing, technique and locations.	GE operational staff/ leaseholders	Ongoing reporting of any Feral Pig observations at the wind farm. If a coordinated control program is initiated.

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