

## **APPENDIX 7 – ASSESSMENT OF SIGNIFICANCE (BC ACT & FM ACT)**

### **DISCLAIMER**

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The NSW Environmental Planning and Assessment Act 1979 includes in Section 5AA, five factors which are to be considered when determining if a proposed development or activity 'is likely to have a significant effect on the threatened species or ecological communities, or their habitats' listed under the Biodiversity Conservation Act 2016. These five factors must be taken into account by consent or determining authorities when considering a development proposal or development application. This enables a decision to be made as to whether there is likely to be a significant effect on the species and hence if a Species Impact Statement is required (DECC, 2007).

The assessments in Table A6-1 (Appendix 6) identified 6 (possibly 7) presumed extinct species were to be reintroduced, 21 listed as threatened in the BC Act were known to occur within the vicinity of the proposed activity, with an additional 21 species list in the BC Act having a moderate to high potential of occurring based on the evaluation completed. The 49 biota considered for the Assessment of Significance are listed below.

#### To be reintroduced

- Western Quoll, presumed extinct BC Act
- Western Barred Bandicoot, presumed extinct BC Act
- Bilby, presumed extinct BC Act
- [Northern Hairy-nosed Wombat, presumed extinct BC Act – subject to further assessment]
- Brush-tailed Bettong, presumed extinct BC Act
- Bridled Nailtail Wallaby, presumed extinct BC Act
- Plains Mouse, presumed extinct BC Act

#### Known to occur

- Barking Owl, vulnerable BC Act
- Brown Treecreeper (eastern subspecies), vulnerable BC Act
- Bush Stone-curlews, endangered BC Act
- Dusky Woodswallow, vulnerable BC Act
- Glossy Black-Cockatoo, vulnerable BC Act
- Grey-crowned Babbler (eastern subspecies), vulnerable BC Act
- Little Lorikeet, vulnerable BC Act
- Little Eagle, vulnerable BC Act
- Scarlet Robin, vulnerable BC Act
- Speckled Warbler, vulnerable BC Act
- Superb Parrot, vulnerable BC Act
- Turquoise Parrot, vulnerable BC Act
- Varied Sittella, vulnerable BC Act
- Black-striped Wallaby, endangered BC Act
- Eastern Pygmy-possum, vulnerable BC Act
- Koala, vulnerable BC Act
- Pilliga Mouse, vulnerable BC Act
- *Commersonia procumbens*, vulnerable
- *Tylophora linearis*, vulnerable BC Act
- *Myriophyllum implicatum*, critically endangered BC Act
- 'Pilliga Outwash Ephemeral Wetlands in the Brigalow Belt South Bioregion' threatened ecological community, endangered BC Act

#### Moderate to High likelihood of occurrence

- Black-chinned Honeyeater, vulnerable BC Act (moderate)
- Diamond Firetail, vulnerable BC Act (moderate)
- Flame Robin, vulnerable BC Act (moderate)
- Hooded Robin, vulnerable BC Act (moderate)

- Malleefowl, endangered, BC Act
- Painted Honeyeater, vulnerable BC Act
- Regent Honeyeater, critically endangered BC Act
- Spotted Harrier, vulnerable BC Act (moderate)
- Square-tailed Kite, vulnerable BC Act (moderate)
- Corben's Long-eared Bat, vulnerable BC Act
- Eastern Cave Bat, vulnerable BC Act (high)
- Rufous Bettong, vulnerable BC Act (high)
- Squirrel Glider, vulnerable BC Act (moderate)
- Stripe-faced Dunnart, vulnerable BC Act (moderate)
- Little Pied Bat, vulnerable BC Act (high)
- Large-eared Pied Bat, vulnerable BC Act
- Yellow-bellied Sheath-tail-bat, vulnerable BC Act (moderate)
- Pale-headed Snake, vulnerable BC Act (moderate)
- Sloane's Froglet, vulnerable BC Act (high)
- Cobar Greenhood, vulnerable BC Act (moderate)
- Pine Donkey Orchid, vulnerable BC Act (moderate)

## Western Quoll

*(a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,*

The Western Quoll is currently listed as Extinct in NSW under the BC Act. The last recorded sighting was in 1857. Given that the species does not currently occur within the vicinity of the proposal, the direct and indirect impacts *will not* have an adverse effect on a viable local population, as none is present. The proposal will not adversely affect source population(s) of the species. Translocations will be subject to the conditions of a Translocation Proposal and approvals from relevant government agencies, such that no existing population will be materially impacted.

Western Quolls will be reintroduced into the proposed fence area as part of the proposal. As a mid-sized native predator, the Western Quoll may play a role in the regulation of populations of prey species; a natural process of landscape restoration.

Predicted population size is challenging to estimate given large variation in density estimates. The population size within a 5800 ha enclosure would be around 90 animals. This estimate is likely conservative: the ecologically similar Eastern Quoll attains much higher densities in Tasmania (0.01-0.06/ha, in places up to 0.4/ ha).

It is envisaged that the species will build a population outside the fenced areas in conjunction with feral predator control, such that the total population size will be larger than the fenced area alone. Population densities outside the fence, assuming intensive feral predator control, are predicted to be 0.007/ ha at Pilliga, or 210 animals in c. 35,632 ha of the EMA project area outside the fence.

For this proposal, AWC would seek to source Western Quolls from a number of wild populations in WA, supplemented with captive bred animals if required. The intention would be to maximise the genetic diversity of the reintroduced population.

The Western Quoll is currently listed as Extinct in NSW under the BC Act. It is not listed as an Endangered Population.

*(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*

- (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*

(ii) *is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,*  
The Western Quoll is currently listed as Extinct in NSW under the BC Act. It is not listed as an Endangered Ecological Community or Critically Endangered Ecological Community.

(c) *in relation to the habitat of a threatened species, population or ecological community:*

(i) *the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*

(ii) *whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*

(iii) *the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,*

The Western Quoll is currently listed as Extinct in NSW under the BC Act, so does not currently occur in NSW, or in the vicinity of the proposed CFAI. The proposed CFAI will create 5,822 ha of habitat free of introduced predators for Western Quoll, which would be reintroduced by AWC. The action would not affect existing habitat for the Western Quoll but will improve potential habitat to enable a successful reintroduction which is important for the long term survival of the species.

(d) *whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),*

There is no declared area of outstanding biodiversity value as listed under the BC Act within the vicinity of the proposed CFAI.

(e) *whether the proposed development or activity is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.*

The Western Quoll is currently listed as Extinct in NSW under the BC Act, so does not currently occur in NSW, or in the vicinity of the proposed CFAI. The action does not constitute, and is not part of, a key threatening process and is not likely to result in the operation of, or an increase in the impact of, a key threatening process affecting the Western Quoll.

## **Conclusion**

This Assessment of Significance has determined that the proposed activity *will not* have a 'significant effect' on Western Quolls or their habitats. Therefore, the proposed activity will not require a Species Impact Statement.

## **Western Barred Bandicoot**

(a) *in the case of a threatened species, whether the action proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,*

The Western Barred Bandicoot is currently listed as Extinct in NSW under the BC Act. The last recorded sighting was in 1866. Given that the species does not currently occur within the vicinity of the proposal, the direct and indirect impacts *will not* have an adverse effect on a viable local population, as none is present. The proposal will not adversely affect source population(s) of the species. Translocations will be subject to the conditions of a Translocation Proposal and approvals from relevant government agencies, such that no existing population will be materially impacted.

Western Barred Bandicoots have been introduced successfully to two predator-free locations: AWC's Faure Island in Shark Bay (WA) and Arid Recovery (SA). An introduction to a partly fenced mainland location on WA (Heirisson Prong) failed, presumably because of predation.

Western Barred Bandicoots were introduced to AWC's Faure Island wildlife sanctuary in 2005. This population has persisted, with population estimates of several hundred in recent years.

For this proposal, AWC would seek to source Western Barred Bandicoots from wild populations in WA (Bernier and Dorre Islands), if possible, to maximise the genetic diversity of the reintroduced population. Additional sources include reintroduced populations on AWC's Faure Island and Arid Recovery (if available). Captive breeding may be used to increase the number of founders.

The Western Barred Bandicoot is currently listed as Extinct in NSW under the BC Act. It is not listed as an Endangered Population.

*(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*

- (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*
- (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,*

The Western Barred Bandicoot is currently listed as Extinct in NSW under the BC Act. It is not listed as an Endangered Ecological Community or Critically Endangered Ecological Community.

*(c) in relation to the habitat of a threatened species, population or ecological community:*

- (i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*
- (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*
- (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,*

The Western Barred Bandicoot is currently listed as Extinct in NSW under the BC Act, so does not currently occur in NSW, or in the vicinity of the proposed CFAI. The proposed CFAI will create 5,822 ha of habitat free of introduced predators for Western Barred Bandicoot. The action would not affect existing habitat for the Western Barred Bandicoot but will improve potential habitat to enable a successful reintroduction which is important for the long term survival of the species.

*(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),*

There is no declared area of outstanding biodiversity value as listed under the BC Act within the vicinity of the proposed CFAI.

*(e) whether the proposed development or activity is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.*

The Western Barred Bandicoot is currently listed as Extinct in NSW under the BC Act, so does not currently occur in NSW, or in the vicinity of the proposed CFAI. The action does not constitute, and is not part of, a key threatening process and is not likely to result in the operation of, or an increase in the impact of, a key threatening process affecting the Western Barred Bandicoot.

## **Conclusion**

This Assessment of Significance has determined that the proposed activity *will not* have a 'significant effect' on Western Barred Bandicoot or their habitats. Therefore, the proposed activity will not require a Species Impact Statement.

## **Bilby**

*(a) in the case of a threatened species, whether the action proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,*

The Bilby is currently listed as Extinct in NSW under the BC Act. The last recorded sighting was in 1912. Given that the species does not currently occur within the vicinity of the

proposal, the direct and indirect impacts *will not* have an adverse effect on a viable local population, as none is present. The proposal will not adversely affect source population(s) of the species. Translocations will be subject to the conditions of a Translocation Proposal and approvals from relevant government agencies, such that no existing population will be materially impacted.

Bilbies have been successfully reintroduced to predator-free locations at AWC's Scotia (NSW), Yookamurra (SA) and Mt Gibson (WA) sanctuaries, and to Arid Recovery (SA), Thistle Island (SA) and Lorna Glen (WA). However, populations in several partly or inadequately fenced areas have collapsed due to incursions of feral predators.

For this proposal, AWC would seek to source Bilbies from wild populations (including reintroduced wild populations) in Queensland, NT and WA (including AWC properties), supplemented with animals from captive breeding to optimise genetic diversity.

The Bilby is currently listed as Extinct in NSW under the BC Act. It is not listed as an Endangered Population.

*(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*

- (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*
- (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,*

The Bilby is currently listed as Extinct in NSW under the BC Act. It is not listed as an Endangered Ecological Community or Critically Endangered Ecological Community.

*(c) in relation to the habitat of a threatened species, population or ecological community:*

- (i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*
- (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*
- (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,*

The Bilby is currently listed as Extinct in NSW under the BC Act, so does not currently occur in NSW, or in the vicinity of the proposed CFAI. The proposed CFAI will create 5,822 ha of habitat free of introduced predators for Bilby. The action would not affect existing habitat for the Bilby but will improve potential habitat to enable a successful reintroduction which is important for the long term survival of the species.

*(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),*

There is no declared area of outstanding biodiversity value as listed under the BC Act within the vicinity of the proposed CFAI.

*(e) whether the proposed development or activity is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.*

The Bilby is currently listed as Extinct in NSW under the BC Act, so does not currently occur in NSW, or in the vicinity of the proposed CFAI. The action does not constitute, and is not part of, a key threatening process and is not likely to result in the operation of, or an increase in the impact of, a key threatening process affecting the Bilby.

## **Conclusion**

This Assessment of Significance has determined that the proposed activity *will not* have a 'significant effect' on Bilbies or their habitats. Therefore, the proposed activity will not require a Species Impact Statement.

## Northern Hairy-nosed Wombat

*(a) in the case of a threatened species, whether the action proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,*

The Northern Hairy-nosed Wombat is currently listed as Extinct in NSW under the BC Act. The last recorded sighting was in 1909. Given that the species does not currently occur within the vicinity of the proposal, the direct and indirect impacts *will not* have an adverse effect on a viable local population, as none is present. The proposal will not adversely affect source population(s) of the species. Translocations will be subject to the conditions of a Translocation Proposal and approvals from relevant government agencies, such that no existing population will be materially impacted.

Northern Hairy-nosed Wombats and the closely related Southern Hairy-nosed Wombats can maintain relatively high density populations in suitable habitat. Given the very limited information available on the habitat requirements of Northern Hairy-nosed Wombats outside their current range, it would be courageous to estimate population size in potential reintroduction site such as the Pilliga. A target population would be at least 500 animals; at densities reported at Epping Forest NP, a population this size would require 2200 ha of suitable habitat.

The Northern Hairy-nosed Wombat is currently listed as Extinct in NSW under the BC Act. It is not listed as an Endangered Population.

*(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*

*(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*

*(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,*

The Northern Hairy-nosed Wombat is currently listed as Extinct in NSW under the BC Act. It is not listed as an Endangered Ecological Community or Critically Endangered Ecological Community.

*(c) in relation to the habitat of a threatened species, population or ecological community:*

*(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*

*(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*

*(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,*

The Northern Hairy-nosed Wombat is currently listed as Extinct in NSW under the BC Act, so does not currently occur in NSW, or in the vicinity of the proposed CFAI. The proposed CFAI will create 5,822 ha of habitat free of introduced predators for Northern Hairy-nosed Wombats. The action would not affect existing habitat for the Wombat but will improve potential habitat to enable a successful reintroduction which is important for the long term survival of the species.

*(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),*

There is no declared area of outstanding biodiversity value as listed under the BC Act within the vicinity of the proposed CFAI.

*(e) whether the proposed development or activity is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.*

The Northern Hairy-nosed Wombat is currently listed as Extinct in NSW under the BC Act, so does not currently occur in NSW, or in the vicinity of the proposed CFAI. The action does not constitute, and is not part of, a key threatening process and is not likely to result in the

operation of, or an increase in the impact of, a key threatening process affecting the Wombat.

## Conclusion

This Assessment of Significance has determined that the proposed activity *will not* have a 'significant effect' on Northern Hairy-nosed Wombats or their habitats. Therefore, the proposed activity will not require a Species Impact Statement.

## Brush-tailed Bettong

*(a) in the case of a threatened species, whether the action proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,*

The Brush-tailed Bettong is currently listed as Extinct in NSW under the BC Act. The last recorded sighting was in 1906. Given that the species does not currently occur within the vicinity of the proposal, the direct and indirect impacts *will not* have an adverse effect on a viable local population, as none is present. The proposal will not adversely affect source population(s) of the species. Translocations will be subject to the conditions of a Translocation Proposal and approvals from relevant government agencies, such that no existing population will be materially impacted.

Brush-tailed Bettongs have been introduced successfully to numerous locations in south-west WA in conjunction with broadscale fox control, to fenced areas in WA (including AWC's Karakamia and Mt Gibson sanctuaries, as well as Perup, Whiteman Park and Wadderin) and fenced areas and islands outside WA including AWC's Scotia (NSW) and Yookamurra (SA) sanctuaries, and St Peters Island and Wedge Island (SA). A number of reintroductions to sites on the mainland, including to partly-fenced areas (Francois Peron NP, WA and Yathong Nature Reserve, NSW), have failed because of predation.

The Brush-tailed Bettong is currently listed as Extinct in NSW under the BC Act. It is not listed as an Endangered Population.

*(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*

- (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*
- (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,*

The Brush-tailed Bettong is currently listed as Extinct in NSW under the BC Act. It is not listed as an Endangered Ecological Community or Critically Endangered Ecological Community.

*(c) in relation to the habitat of a threatened species, population or ecological community:*

- (i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*
- (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*
- (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,*

The Brush-tailed Bettong is currently listed as Extinct in NSW under the BC Act, so does not currently occur in NSW, or in the vicinity of the proposed CFAI. The proposed CFAI will create 5,822 ha of habitat free of introduced predators for Brush-tailed Bettongs. The action would not affect existing habitat for the Brush-tailed Bettong but will improve potential habitat to enable a successful reintroduction which is important for the long term survival of the species.

*(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),*



There is no declared area of outstanding biodiversity value as listed under the BC Act within the vicinity of the proposed CFAI.

*(e) whether the proposed development or activity is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.*

The Brush-tailed Bettong is currently listed as Extinct in NSW under the BC Act, so does not currently occur in the vicinity of the proposed CFAI. The action does not constitute, and is not part of, a key threatening process and is not likely to result in the operation of, or an increase in the impact of, a key threatening process affecting the Brush-tailed Bettong.

## **Conclusion**

This Assessment of Significance has determined that the proposed activity *will not* have a 'significant effect' on Brush-tailed Bettongs or their habitats. Therefore, the proposed activity will not require a Species Impact Statement.

## **Bridled Nailtail Wallaby**

*(a) in the case of a threatened species, whether the action proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,*

The Bridled Nailtail Wallaby is currently listed as Extinct in NSW under the BC Act. The last recorded sighting was in 1924. Given that the species does not currently occur within the vicinity of the proposal, the direct and indirect impacts *will not* have an adverse effect on a viable local population, as none is present. The proposal will not adversely affect source population(s) of the species. Translocations will be subject to the conditions of a Translocation Proposal and approvals from relevant government agencies, such that no existing population will be materially impacted.

Successfully reintroduced to AWC's fenced Scotia Sanctuary (stage 1, 2004; stage 2, 2008); this population has expanded to c. 2000 animals.

The Bridled Nailtail Wallaby is currently listed as Extinct in NSW under the NC Act. It is not listed as an Endangered Population.

*(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*

*(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*

*(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,*

The Bridled Nailtail Wallaby is currently listed as Extinct in NSW under the BC Act. It is not listed as an Endangered Ecological Community or Critically Endangered Ecological Community.

*(c) in relation to the habitat of a threatened species, population or ecological community:*

*(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*

*(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*

*(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,*

The Bridled Nailtail Wallaby is currently listed as Extinct in NSW under the BC Act, so does not currently occur in NSW, or in the vicinity of the proposed CFAI. The proposed CFAI will create 5,822 ha of habitat free of introduced predators for Bridled Nailtail Wallabies. The action would not affect existing habitat for the Bridled Nailtail Wallaby but will improve

potential habitat to enable a successful reintroduction which is important for the long term survival of the species.

*(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),*

There is no declared area of outstanding biodiversity value as listed under the BC Act within the vicinity of the proposed CFAI.

*(e) whether the proposed development or activity is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.*

The Bridled Nailtail Wallaby is currently listed as Extinct in NSW under the BC Act, so does not currently occur in the vicinity of the proposed CFAI. The action does not constitute, and is not part of, a key threatening process and is not likely to result in the operation of, or an increase in the impact of, a key threatening process affecting the Bridled Nailtail Wallaby.

## **Conclusion**

This Assessment of Significance has determined that the proposed activity *will not* have a 'significant effect' on Bridled Nailtail Wallabies or their habitats. Therefore, the proposed activity will not require a Species Impact Statement.

## **Plains Mouse**

*(a) in the case of a threatened species, whether the action proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,*

The Plains Mouse is currently listed as Presumed Extinct in NSW under the BC Act. The last recorded sighting was in 1843. Given that the species does not currently occur within the vicinity of the proposal, the direct and indirect impacts *will not* have an adverse effect on a viable local population, as none is present. The proposal will not adversely affect source population(s) of the species. Translocations will be subject to the conditions of a Translocation Proposal and approvals from relevant government agencies, such that no existing population will be materially impacted.

The Plains Mouse is currently listed as Extinct in NSW under the BC Act. It is not listed as an Endangered Population.

*(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*

*(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*

*(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,*

Plains Mouse is currently listed as Extinct in NSW under the BC Act. It is not listed as an Endangered Ecological Community or Critically Endangered Ecological Community.

*(c) in relation to the habitat of a threatened species, population or ecological community:*

*(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*

*(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*

*(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,*

Plains Mouse is currently listed as Extinct in NSW under the BC Act, so does not currently occur in NSW, or in the vicinity of the proposed CFAI. The proposed CFAI will create 5,822 ha of habitat for the Plains Mouse. The action would not affect existing habitat for the Plains Mouse but will improve potential habitat to enable a successful reintroduction which is important for the long term survival of the species.

(d) *whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),*

There is no declared area of outstanding biodiversity value as listed under the BC Act within the vicinity of the proposed CFAI.

(e) *whether the proposed development or activity is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.*

The Plains Mouse is currently listed as Extinct in NSW under the BC Act, so does not currently occur in NSW, or in the vicinity of the proposed CFAI. The action does not constitute, and is not part of, a key threatening process and is not likely to result in the operation of, or an increase in the impact of, a key threatening process affecting the Plains Mouse.

## **Conclusion**

This Assessment of Significance has determined that the proposed activity *will not* have a 'significant effect' on Plains Mice or their habitats. Therefore, the proposed activity will not require a Species Impact Statement.

## **Barking Owl**

(a) *in the case of a threatened species, whether the action proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,*

The Barking Owl is widely distributed around Australia, particularly in the tropical north, but it is uncommon and sparsely distributed in NSW (Debus and Rose, 2002, NPWS, 2003, Schedvin et al., 2001, Shelly, 2006, Kavanagh et al., 1995). The species is found in a range of coastal habitats, but in northern Australia and semi-arid areas, riparian areas dominated by red gum and *Melaleuca* species seem preferred.

In the Pilliga Forest, which is the stronghold in NSW for this species, Barking Owls are known to occupy a wide range of forest types, including those dominated by White Cypress Pine, several species of red gums, Pilliga Box and Narrow-leaved Ironbark (Kavanagh and Stanton, 2009). More than 20 territories of the Barking Owl, based on the distribution and territorial fidelity of 36 individually colour-banded birds, were identified within a 50,000 ha area of the Pilliga (Kavanagh and Stanton, 2009). Using this information, total population size of Barking Owls in the Pilliga was estimated to be at least 100 pairs (Kavanagh and Stanton, 2009). Owl diets in the Pilliga consisted of a very wide range of prey items, including birds, micro-bats, arboreal marsupials, invertebrates and some rabbits (Kavanagh and Stanton, 2009) in contrast to diets in other parts of their range that consisted largely of rabbits (where present) and birds (Schoenjahn et al., 2008, Kavanagh et al., 1995).

Barking Owl home-ranges in the Pilliga averaged 2,000 ha, based on nine radio-tracked breeding birds (Kavanagh and Stanton 2009). The owls displayed no strong preference for, or against, any of the commonly occurring forest vegetation types for foraging. They also showed no aversion to foraging in areas logged selectively for White Cypress Pine within the previous 16 years (Kavanagh and Stanton, unpublished data). Nest-hollows for these owls were always located in large old eucalypts, usually in red gums and Narrow-leaved Ironbarks, but frequently also in large dead ringbarked trees. Nest trees were usually located within forest stands that were less disturbed than surrounding areas (although all of the study areas had been selectively logged on more than one occasion). The nesting period for Barking Owls in the Pilliga occurs from late winter (August) to late spring (November), and nest-site fidelity is common. A wide variety of trees and tall shrubs were used for roosting, including Narrow-leaved Ironbark, White Cypress Pine, Belah, Rough-barked Apple, Wilga and Bull Oak. Stands of Belah, although limited in occurrence, were important roost sites (Kavanagh and Stanton 2009).

The Barking Owl is common and widespread in the Pilliga EMA project area; during spring 2016, the species was recorded at approximately half of the 60 sites surveyed by AWC (each site was located on a 2.5 km grid placed across the area).

OEH (2017d) identify the following threats to the Barking Owl:

- Clearing and degradation of habitat, mostly through cultivation, intense grazing and the establishment of exotic pastures.
- Inappropriate forest harvesting practices that remove old, hollow-bearing trees and change open forest structure to dense regrowth.
- Firewood harvesting resulting in the removal of fallen logs and felling of large dead trees.
- Too-frequent fire leading to degradation of understorey vegetation which provides shelter and foraging substrates for prey species.
- Disturbance of nesting and excessive disturbance of foraging by inappropriate use of call-playback surveys.

The proposed activity is not likely to significantly increase the level of any of these potential threats. The key points relating to the impact of the proposed activity are that:

- a) Approximately 48 ha is proposed for clearing along the entire 32 km perimeter of the conservation fence;
- b) This clearing will be implemented as a narrow strip averaging 15 m in width;
- c) A separate area of approximately 11 ha will be partially cleared for the proposed operations base; and
- d) One new management track (8.2 km long) will be created (3 ha clearing).

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of most of this clearing will have no significant impact on the life cycles of Barking Owls whose home-ranges in the Pilliga average 2,000 ha.

AWC surveys have shown that hollow-bearing trees are widespread and common throughout the EMA project area, despite the long history of logging and other forestry activities. These assessments also showed that trees larger than 80 cm diameter at breast height (i.e. those most likely to contain large hollows suitable for nesting by Barking Owls), while much less common (16.4% of trees larger than 40 cm DBH), were sufficient to provide a range of nesting opportunities for Barking Owls within their very large home-ranges. The proposed activity will not affect the existing pattern of forest structure.

The proposed activity does not include harvesting for firewood. The only dead standing trees that will be removed are those that occur directly on the path of the linear conservation fence and other infrastructure. Standing dead trees are known to be used occasionally as nest sites by the Barking Owl in the Pilliga forests, but the loss of any such trees is expected to be insignificant in the context of the large home-ranges of these owls.

The proposed activity will require a Strategic Fire Advantage Zone (SFAZ) of 200 m width around the outside of the fence and an Asset Protection Zone (APZ) of 75 m around the proposed operations base. Understorey vegetation in these areas will be managed to reduce the severity of any wildfire. Because the home-ranges of Barking Owls are large, the impact of these wildfire safety measures on the owls will be minimal.

The proposed activity, in itself, will not contribute to an increase in the frequency of call-playback surveys for the Barking Owl. However, AWC's draft Ecological Health Monitoring Framework includes the Barking Owl as an important indicator of the ecological health of the EMA project area. As such, this species will be routinely surveyed twice a year to monitor its status and distribution in the project area.

It is *unlikely* that the proposed activity will have an adverse impact on the life cycle of this species and so the action is not likely to place a viable local population at risk of extinction.

The levels of nesting, roosting and foraging resources available to the owls within their large home-ranges will not be significantly affected by the proposed activity. In addition, the proposed conservation fence is likely to increase reproductive success in those Barking Owl territories which overlap the fence because of the expected increase in native small-medium sized mammals and birds following the removal of feral predators.

The Barking Owls in the Pilliga forests are not listed as an endangered population.

*(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*

- (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*
- (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,*

The Barking Owl population in the Pilliga is not listed as an endangered ecological community or critically endangered ecological community.

*(c) in relation to the habitat of a threatened species, population or ecological community:*

- (i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*
  - (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*
  - (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,*
- (i) The proposed CFAI would result in habitat modification across about 62 ha, most of which would be a narrow strip 15 m wide, through areas in which several pairs of Barking Owls are known to occur. This is minimal in the context of the known large size of Barking Owl home-ranges in the Pilliga.
  - (ii) The proposal would not isolate or fragment habitats given the extremely narrow clearing and the ability of the Barking Owl to fly across such narrow clearings. Radio-tracking studies of nine Barking Owls in the Pilliga showed that these birds often foraged near the edges of existing roads in the area (Kavanagh and Stanton 2009).
  - (iii) The modification of habitats will be minor in the context of the known large size of Barking Owl home-ranges in the Pilliga. The proposed activity will result in the clearing or modification of approximately 62 ha within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow nature of most of this clearing will have no significant impact on the habitat of Barking Owls whose home-ranges in the Pilliga average 2,000 ha. In addition, the proposed activity would create a 5,822 ha feral predator and herbivore free area which is likely to be of benefit to the owls by improving the quality of relevant habitats. Given that large areas of forest and woodland would remain unaffected by the clearing (including those within the proposed fenced area), it is unlikely that the habitat to modified is important to the long-term survival of the Barking Owl in the study area

*(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),*

There is no declared area of outstanding biodiversity value as listed under the BC Act within the vicinity of the proposed CFAI.

*(e) whether the proposed development or activity is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.*

The proposed activity – reintroducing regionally extinct native mammals – is not recognised as a key threatening process (KTP) under schedule 3 of the BC Act. However, three KTPs are relevant to the proposed activity and they have already been discussed in Part (a) above

in relation to the Barking Owl. These KTPs are: *Removal of dead wood and dead trees*, the *Clearing of native vegetation* and the *Removal of hollow-bearing trees*.

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of this clearing (15 m wide) will have no significant impact on the habitat of the Barking Owl whose home-ranges in the Pilliga average 2,000 ha.

Surveys carried out by AWC showed that hollow-bearing trees are widespread and common throughout the study area. These assessments also showed that trees larger than 80 cm diameter at breast height (i.e. those most likely to contain large hollows suitable for nesting by Barking Owls), while much less common (16.4% of trees larger than 40 cm DBH), were sufficient to provide a range of nesting opportunities for Barking Owls within their very large home-ranges.

The proposed activity will result in the retention (but relocation) of dead wood and the removal of dead trees if they occur directly on the path of the linear conservation fence and other infrastructure. Standing dead trees are known to be used occasionally as nest sites by the Barking Owl in the Pilliga forests, but the loss of any such trees is expected to be insignificant in the context of the large home-ranges of these owls.

The removal of feral predators and herbivores from within the 5,822 ha fenced area will deliver substantial benefits for the Barking Owl. It will provide a significant reduction in the operation of seven KTPs: *Competition and grazing by the feral European Rabbit*, *Competition and habitat degradation by Feral Goats*, *Herbivory and environmental degradation caused by feral deer*, *Predation and hybridisation by Feral dogs*, *Predation by the European Red Fox*, *Predation by feral cats*, and *Predation, habitat degradation, competition and disease transmission by Feral Pigs*.

In summary, the proposed activity is *unlikely* to significantly increase the impact of any relevant key threatening process in the proposal area. It is certain to reduce the impact of several key threatening processes.

## **Conclusion**

This Assessment of Significance has determined that the proposed activity is *'unlikely'* to have a *'significant effect'* on Barking Owls or their habitat in the proposal area. The levels of nesting, roosting and foraging resources available to the owls within their large home-ranges will not be significantly affected by the proposed activity. Indeed, the proposed conservation fence is likely to increase reproductive success in those Barking Owl territories which overlap the fence because of the expected increase in native small-medium sized mammals and birds following the removal of feral predators. Therefore, the proposed activity will not require a Species Impact Statement.

## **Brown Treecreeper**

(a) *in the case of a threatened species, whether the action proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,*

The Brown Treecreeper occurs in sub-coastal environments and slopes of the Great Dividing Range through central NSW (Wagga Wagga, Temora, Forbes, Dubbo, Inverell) (Morcombe, 2004). Whilst it has a large range the species has greatly reduced in density across most of that range (Reid, 1999).

The species is found in eucalypt woodlands dominated by stringybarks or other roughbark eucalypt, usually with an open grassy understorey (including Box-gum Woodland) and dry open forest. They are also found in mallee and River Red Gum forest bordering wetlands with an open understorey of acacias, saltbush, lignum, cumbungi and grasses.

The Brown Treecreeper has also declined or disappeared from most remaining remnants that are smaller than 300 ha, at least partly because females disperse from these areas or die preferentially and are not replaced (Cooper et al., 2002, Cooper and Walters, 2002). Once lost from a remnant, recolonisation is unlikely without assistance.

OEH (2017d) identify the following threats to the Brown Treecreeper:

- Historical loss of woodland, forest and mallee habitats as a result of agriculture, forestry, mining and residential development.
- Fragmentation of woodland and forest remnants which isolates populations and causes local extinctions.
- Ongoing degradation of habitat, particularly the loss of tree hollows and fallen timber from firewood collection and overgrazing.
- Lack of regeneration of eucalypt overstorey in woodland due to overgrazing and too-frequent fires.
- Loss of ground litter from compaction and overgrazing.
- Inappropriate forestry management practices

The proposed activity is not likely to contribute significantly to these potential threats. The key points relating to the impact of the proposed activity are that:

- a) Approximately 48 ha is proposed for clearing along the entire 32 km perimeter of the conservation fence;
- b) This clearing will be implemented as a narrow strip averaging 15 m in width;
- c) A separate area of approximately 11 ha will be partially cleared for the proposed operations base; and
- d) One new management track (8.2 km long) will be created (3 ha clearing).

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow nature of most of this limited clearing will have no adverse impact on the life cycle of Brown Treecreepers as they are known to occupy home ranges of up to 10 ha.

AWC surveys have shown that hollow-bearing trees are widespread and common throughout the proposal area, despite the long history of logging and other forestry activities. The removal of a limited number of hollow-bearing trees during clearing for the proposed fence would have a negligible impact on availability of hollows and not have adverse impacts on life cycles of Brown Treecreepers. A viable local population is not likely to be placed at risk of extinction.

The Brown Treecreeper is not listed as an endangered population.

*(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*

- (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*
- (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,*

The Brown Treecreeper is not listed as an endangered ecological community or critically endangered ecological community.

*(c) in relation to the habitat of a threatened species, population or ecological community:*

- (i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*
- (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*
- (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,*

- (i) The proposed CFAI would result in habitat modification of about 62 ha through areas that Brown Treecreepers are known to occur. This is a tiny proportion of the total habitat area for the species within the proposal area and within the entire Pilliga forests.
- (ii) The proposal would not isolate or fragment habitats given the ability of the Brown Treecreeper to fly across clearings of 15 m in width.
- (iii) The modification of habitats will be minor in the context of the study area: approximately 62 ha within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of the Pilliga forests. The narrow nature of most of the proposed clearing (15 m wide) further reduces the likelihood of any significant impact. In addition, the proposed activity would create a 5,822 ha feral predator and herbivore free area which is likely to be of benefit to the Brown Treecreeper by improving the quality of relevant habitats. Given that large areas of forest and woodland would remain unaffected by clearing (including those within the proposed fenced area), it is unlikely that the proposed minor habitat changes will be important to the long-term survival of Brown Treecreeper in this locality.

(d) *whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),*

There is no declared area of outstanding biodiversity value as listed under the BC Act within the vicinity of the proposed CFAI.

(e) *whether the proposed development or activity is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.*

The proposed activity – reintroducing extinct mammals – is not recognised as a key threatening process (KTP) under schedule 3 of the BC Act. However, three KTPs are relevant to the proposed activity: *Removal of dead wood and dead trees, Clearing of native vegetation and Removal of hollow-bearing trees.*

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The linear nature of most of the clearing means that it is unlikely to remove the entire home range for any individuals; it will likely affect only a small area of the home range for a very small proportion of the local population.

The proposed activity will result in the retention (but relocation) of dead wood that occurs directly on the path of the linear conservation fence and other infrastructure. The minor amounts of dead wood that would be relocated are not expected to have significant impacts on the species.

AWC surveys have shown that hollow-bearing trees are widespread and common throughout the project area, despite the long history of logging and other forestry activities. The removal of a limited number of hollow-bearing trees during clearing for the proposed fence would have a negligible impact on availability of hollows and not have adverse impacts on life cycles of Brown Treecreepers.

The removal of feral predators and herbivores from within the 5,822 ha fenced area will provide benefits to the Brown Treecreeper. It will significantly reduce seven KTPs: *Competition and grazing by the feral European Rabbit, Competition and habitat degradation by Feral Goats, Herbivory and environmental degradation caused by feral deer, Predation and hybridisation by Feral dogs, Predation by the European Red Fox, Predation by feral cats, and Predation, habitat degradation, competition and disease transmission by Feral Pigs.*

In summary, the proposed activity is *unlikely* to significantly increase the impact of any relevant key threatening process in the study area. It is certain to reduce the impact of several key threatening processes.



## Conclusion

This Assessment of Significance has determined that the proposed activity is *'unlikely'* to have a *'significant effect'* on Brown Treecreepers or their habitats. Therefore, the proposed activity will not require a Species Impact Statement.

## Bush Stone-curlews

*(a) in the case of a threatened species, whether the action proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,*

The Bush Stone-curlews is found throughout much of Australia except for Tasmania (DEC, 2006). Only in northern Australia is it still common and in the south-east it is either rare or extinct throughout its former range. It occurs in open forests, woodlands and shrublands with a sparse grassy groundcover. Bush Stone-curlews are considered largely nocturnal in nature, especially active on moonlight nights, when they forage for invertebrates and small frogs, snakes and lizards.

Bush Stone-curlews have home ranges of between 25 and 62 ha (DEC, 2006). In the Pilliga forests, previous records in the NSW BioNet database suggest they occur across a variety of vegetation types and are widespread. Surveys by AWC of 60 sites in the Pilliga EMA project area resulted in the detection of Bush Stone-curlews on 3 occasions.

OEH (2017d) identifies the following threats for Bush Stone-curlews:

- Predation by foxes and cats.
- Trampling of eggs by cattle.
- Clearance of woodland habitat for agricultural and residential development.
- Modification and destruction of ground habitat through removal of litter and fallen timber, introduction of exotic pasture grasses, grazing and frequent fires.
- Disturbance in the vicinity of nest sites.

The proposed activity is not likely to contribute significantly to these potential threats. The key points relating to the impact of the proposed activity are that:

- a) Approximately 48 ha is proposed for clearing along the entire 32 km perimeter of the conservation fence;
- b) This clearing will be implemented as a narrow strip averaging 15 m in width;
- c) A separate area of approximately 11 ha will be partially cleared for the proposed operations base; and
- d) One new management track (8.2 km long) will be created (3 ha clearing).

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of most of this clearing will have no adverse impact on the life cycle of Bush Stone-curlews whose home-ranges are between 25 and 62 ha.

There is a long history of logging and other forestry activities in the project area. The proposed activity does not include harvesting for firewood. Fallen timber that is directly on the path of the linear conservation fence or other infrastructure will be moved aside. The proposed activity will not affect the existing pattern of forest structure.

The proposed activity will require a Strategic Fire Advantage Zone (SFAZ) of 200 m width around the outside of the fence and an Asset Protection Zone (APZ) of 75 m around the proposed operations base. Understorey vegetation in these areas will be managed to reduce the severity of any wildfire. Because the areas to be modified are limited in extent, there are unlikely to be any adverse effects on the life cycles of Bush Stone-curlews.

The proposed activity, in itself, will not contribute to an increase in the frequency of call-playback surveys for the Bush Stone-curlews. However, AWC's draft Ecological Health Monitoring Framework includes Bush Stone-curlews as an important indicator of the

ecological health of the EMA project area. As such, this species will be routinely surveyed twice a year to monitor its status and distribution in the project area.

It is *unlikely* that the proposed activity will have an adverse impact on the life cycle of this species (and so the action is not likely to place a viable local population at risk of extinction). The habitats available to Bush Stone-curlews within their large home-ranges will not be significantly modified by the proposed activity, and survival rates and nesting success are likely to increase inside the fenced area.

Bush Stone-curlews are not listed as an endangered population.

*(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*

- (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*
- (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,*

Bush Stone-curlews are not listed as an endangered ecological community or critically endangered ecological community.

*(c) in relation to the habitat of a threatened species, population or ecological community:*

- (i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*
- (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*
- (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,*

- (i) The proposed CFAI would result in habitat modification of about 62 ha through areas that Bush Stone-curlews are known to occur. This is a tiny proportion of the total habitat area for the species within the proposal area and within the entire Pilliga forests.
- (ii) The proposal would not isolate or fragment habitats as Bush Stone-curlews are known to fly over conservation fences elsewhere (i.e. Mulligan's Flat Sanctuary, ACT).
- (iii) The modification of habitats will be minor in the context of the study area: approximately 62 ha within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of the Pilliga forests. The narrow, linear nature of most of the proposed clearing further reduces the likelihood of any significant impact. In addition, the proposed activity would create a 5,822 ha area free of feral cats and foxes. This will be of substantial benefit to the long-term viability of the Bush Stone-curlews in the Pilliga EMA project area. Given that large areas of forest and woodland would remain unaffected by clearing (including those within the proposed fenced area), it is unlikely that the proposed habitat modifications could be important to the long-term survival of Bush Stone-curlews in the locality.

*(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),*

There is no declared area of outstanding biodiversity value as listed under the BC Act within the Pilliga forest.

*(e) whether the proposed development or activity is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.*

The proposed activity – reintroducing regionally extinct native mammals – is not recognised as a key threatening process (KTP) under schedule 3 of the BC Act. However, two KTPs are relevant to the proposed activity and they have already been discussed in Part (a) above in relation to the Bush Stone-curlew. These KTPs are: *Removal of dead wood and dead trees*, and the *Clearing of native vegetation*.

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. Noting the narrow, linear nature of most of this clearing (15 m wide), it will have no significant impact on Bush Stone-curlews within the Pilliga study area.

The proposed activity will result in the retention (but relocation) of dead wood and the removal of dead trees if they occur directly on the path of the linear conservation fence and other infrastructure. The minor amounts of dead wood that would be relocated are not expected to have significant impacts on the species.

The removal of feral predators and herbivores from within the 5,822 ha fenced area will deliver substantial benefits for the Bush Stone-curlew. It will provide a significant reduction in the operation of seven KTPs: *Competition and grazing by the feral European Rabbit*, *Competition and habitat degradation by Feral Goats*, *Herbivory and environmental degradation caused by feral deer*, *Predation and hybridisation by Feral dogs*, *Predation by the European Red Fox*, *Predation by feral cats*, and *Predation, habitat degradation, competition and disease transmission by Feral Pigs*.

In summary, the proposed activity is *unlikely* to introduce or to significantly increase the impact of any relevant key threatening process in the proposal area. It is certain to reduce the impact of several key threatening processes.

## Conclusion

This Assessment of Significance has determined that the proposed activity is *'unlikely'* to have a *'significant effect'* on Bush Stone-curlews or their habitat in the proposal area. In addition, the proposed conservation fence is likely to increase general survival rates and reproductive success in those Bush Stone-curlews that use the proposed fenced area because of the removal of feral predators. Therefore, the proposed activity will not require a Species Impact Statement.

## Dusky Woodswallow

(a) *in the case of a threatened species, whether the action proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,*

The Dusky Woodswallow is often reported in woodlands and dry open sclerophyll forests, usually dominated by eucalypts, including mallee associations. It has also been recorded in shrublands and heathlands and various modified habitats, including regenerating forests, and very occasionally in moist forests or rainforests.

In the Pilliga forests, habitat for Dusky Woodswallow is likely to be widespread given the density of BioNET database records. Similarly, Dusky Woodswallow was recorded 13 times during recent AWC surveys.

The home range of the Dusky Woodswallow is thought to be around 2 ha, although no detailed study has been conducted. On that basis, the Pilliga study area could potentially have as many as 16,000 home ranges.

OEH (2017d) identifies the following threats for Dusky Woodswallow:

- Past and ongoing reductions in habitat quality
- Competitive exclusion by Noisy Miners (*Manorina melanocephala*)
- Nest predation by Currawongs, Magpies and Grey Butcherbirds
- Inappropriate fire regimes, excessive grazing and removal of coarse woody debris from the groundlayer.

The proposed activity is not likely to contribute significantly to these potential threats. The key points relating to the impact of the proposed activity are that:

- a) Approximately 48 ha is proposed for clearing along the entire 32 km perimeter of the conservation fence;
- b) This clearing will be implemented as a narrow strip averaging 15 m in width;
- c) A separate area of approximately 11 ha will be partially cleared for the proposed operations base; and
- d) One new management track (8.2 km long) will be created (3 ha clearing).

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of most of this limited clearing will have no adverse impact on the life cycle of the Dusky Woodswallow since this species often forages in cleared areas and, in particular, in ecotone environments.

In the context of the vast area of Pilliga woodland/forest that will be unaltered by the proposed activity the modification of about 62 ha is considered *unlikely* to result in an adverse effect on the life cycle of Dusky Woodswallow such that a viable local population would be placed at risk of extinction.

Dusky Woodswallow is not listed as an endangered population.

*(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*

- (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*
- (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,*

Dusky Woodswallow is not listed as an endangered ecological community or critically endangered ecological community.

*(c) in relation to the habitat of a threatened species, population or ecological community:*

- (i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*
- (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*
- (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,*

(i) The proposed CFAI would result in habitat modification of about 62 ha through areas that Dusky Woodswallows are known to occur. This is a tiny proportion of the total habitat area for the species within the proposal area and within the entire Pilliga forests.

(i) The proposal would not isolate or fragment habitats as Dusky Woodswallows are known to fly and forage across large cleared areas.

(ii) The modification of habitats will be minor in the context of the study area: approximately 62 ha within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of the Pilliga forests. The narrow, linear nature of most of the proposed clearing (15 m wide) further reduces the likelihood of any significant impact. In addition, the proposed activity would create a 5,822 ha feral predator and herbivore free area which is likely to be of benefit to the Dusky Woodswallow by improving the quality of relevant habitats. Given that large areas of forest and woodland would remain unaffected by clearing (including those within the proposed fenced area), it is unlikely that the proposed minor habitat changes will be important to the long-term survival of Dusky Woodswallow in this locality.

*(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),*

There is no declared area of outstanding biodiversity value as listed under the BC Act within the vicinity of the proposed CFAI.

(e) *whether the proposed development or activity is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.*

The proposed activity – reintroducing regionally extinct native mammals – is not recognised as a key threatening process (KTP) under schedule 3 of the BC Act. However, three KTPs are relevant to the proposed activity: *Removal of dead wood and dead trees*, *Clearing of native vegetation* and *Removal of hollow-bearing trees*.

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of this clearing will have little adverse impact on the home ranges of Dusky Woodswallows within the Pilliga EMA project area.

The proposed activity will result in the retention (but relocation) of dead wood and the removal of dead trees if they occur directly on the path of the linear conservation fence and other infrastructure. The minor amounts of dead wood that would be relocated are not expected to have significant impacts on the species.

AWC surveys have shown that hollow-bearing trees are widespread and common throughout the proposal area, despite the long history of logging and other forestry activities. The removal of a limited number of hollow-bearing trees during clearing for the proposed fence would have a negligible impact on availability of hollows and not have adverse impacts on life cycles of Dusky Woodswallows.

The removal of feral predators and herbivores from within the 5,822 ha fenced area will deliver substantial benefits for the Dusky Woodswallow. It will provide a significant reduction in the operation of seven KTPs: *Competition and grazing by the feral European Rabbit*, *Competition and habitat degradation by Feral Goats*, *Herbivory and environmental degradation caused by feral deer*, *Predation and hybridisation by Feral dogs*, *Predation by the European Red Fox*, *Predation by feral cats*, and *Predation, habitat degradation, competition and disease transmission by Feral Pigs*.

In summary, the proposed activity is *unlikely* to significantly increase the impact of any relevant key threatening process in the proposal area. It is certain to reduce the impact of several key threatening processes.

## **Conclusion**

This Assessment of Significance has determined that the proposed activity is *'unlikely'* to have a *'significant effect'* on Dusky Woodswallow or their habitat in the proposal area. The levels of nesting and foraging resources available to the Dusky Woodswallow within their home-ranges will not be significantly affected by the proposed activity. Therefore, the proposed activity will not require a Species Impact Statement.

## **Glossy Black-Cockatoo**

(a) *in the case of a threatened species, whether the action proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,*

The Glossy Black-Cockatoo was once widespread across most of south-eastern Australia but now has a patchy distribution just in areas of NSW from the coast to the tablelands, and as far west as the Riverina and Pilliga Scrub (Cameron, 2005, Cameron, 2007, Cameron and Cunningham, 2006, Clout, 1989, NSWSC, 2008).

The Glossy Black-Cockatoo occurs in coastal woodlands and drier forest areas, open inland woodlands or timbered watercourses. The species' main habitats are eucalypt woodlands and forests which have a sub-canopy or understorey of sheoaks : they depend on sheoaks for forage.

Glossy Black-Cockatoos are known to occur within the vicinity of the proposed CFAI and across the Pilliga forests. During AWC field surveys, the Glossy Black-Cockatoo was recorded on a single occasion. During 2014, surveys by the Pilliga Forest Bird Watchers Group confirmed the presence of as many as 231 cockatoos. Glossy Black-Cockatoos do not have specific home ranges, but defend the immediate area of the nest hollow while foraging as far as 50 km away (Cameron, 2007, Clout, 1989, NSWSC, 2008).

OEH (2017d) identifies the following threats to Glossy Black-Cockatoos:

- Reduction of suitable habitat through clearing for development.
- Decline of hollow bearing trees over time due to land management activities.
- Excessively frequent fire which eliminates sheoaks from areas, prevents the development of mature sheoak stands, and destroys nest trees.
- Firewood collection resulting in loss of hollow bearing trees, reduced recruitment of hollow bearing trees, and disturbance of breeding attempts.
- Decline in extent and productivity of sheoak foraging habitat due to feral herbivores.
- Limited information on the location of nesting aggregations and the distribution of high quality breeding habitat.
- Disturbance from coal seam gas and open cut coal mining causing loss of foraging and breeding habitat as well as disturbing reproductive attempts.
- Forestry activity resulting in loss of hollow bearing trees, reduced recruitment of hollow bearing trees, degradation of foraging habitat, and disturbance of breeding attempts.
- Decline in extent and productivity of sheoak foraging habitat caused by moisture stress due to climate change.
- Degradation of foraging habitat and reduced regeneration of sheoak stands due to grazing by domestic stock.
- Loss of foraging habitat due to slashing/underscrubbing.
- Change in the spatial and temporal distribution of foraging resources due to global warming.
- Illegal bird smuggling and egg-collecting.
- Habitat infestation by weeds such as African boxthorn, *Gazania*, buffel grass and other invasive grasses.

The proposed activity is not likely to contribute significantly to these potential threats. The key points relating to the impact of the proposed activity are that:

- a) Approximately 48 ha is proposed for clearing along the entire 32 km perimeter of the conservation fence;
- b) This clearing will be implemented as a narrow strip averaging 15 m in width;
- c) A separate area of approximately 11 ha will be partially cleared for the proposed operations base; and
- d) One new management track (8.2 km long) will be created (3 ha clearing).

The proposed activity will result in the clearing or modification of approximately 62 ha within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of most of this limited clearing will have no adverse impact on the life cycle of the Glossy Black-Cockatoo since this species forages widely (over 50 km).

AWC surveys have shown that hollow-bearing trees are widespread and common throughout the proposal area, despite the long history of logging and other forestry activities. The removal of a limited number of hollow-bearing trees during clearing for the proposed fence would have a negligible impact on availability of hollows and not have adverse impacts on life cycles of Black-Cockatoos.

The proposed activity will require a Strategic Fire Advantage Zone (SFAZ) of 200 m width around the outside of the fence and an Asset Protection Zone (APZ) of 75 m around the proposed operations base. Understorey vegetation in these areas will be managed to reduce

the severity of any wildfire. Because the foraging range of the Glossy Black-Cockatoo is large, the impact of these wildfire safety measures on the cockatoo will be minimal.

Sheoaks are an essential source of forage for Glossy Black-Cockatoos. The study area has been suffering from an ongoing decline in the extent and productivity of sheoak habitats. Under the proposal, this decline in essential habitat across 5,822 ha is expected to reverse once large introduced herbivores are removed from the fenced area.

In summary, it is *unlikely* that the proposed activity will have an adverse impact on the life cycle of this species (and so the action is not likely to place a viable local population at risk of extinction). The levels of nesting and foraging resources available to the cockatoos across their large ranges will not be significantly affected by the proposed activity. In addition, the proposed conservation fence is likely to increase reproductive success in those Glossy Black-Cockatoo foraging ranges which include parts of the proposed fenced area because of the expected increase in extent and productivity of sheoak foraging habitat following the removal of feral herbivores.

The Glossy Black-Cockatoo in the Pilliga forests are not listed as an endangered population.

*(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*

- (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*
- (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,*

The Glossy Black-Cockatoo is not listed as an endangered ecological community or critically endangered ecological community.

*(c) in relation to the habitat of a threatened species, population or ecological community:*

- (i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*
- (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*
- (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,*

- (i) The proposed CFAI would result in habitat modification across about 62 ha, most of which would be a narrow strip 15 m wide, through areas in which Glossy Black-Cockatoos are known to occur. This is minimal in the context of the known large size of Glossy Black-Cockatoo foraging ranges.
- (ii) The proposal would not isolate or fragment habitats given the narrow clearing strip and the ability of Glossy Black-Cockatoos to fly across such distances.
- (iii) The modification of habitats will be minor in the context of the known large size of Glossy Black-Cockatoo foraging ranges in the Pilliga. The proposed activity will result in the clearing or modification of approximately 62 ha within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of most of this clearing (15 m wide) will have no significant impact on the habitat of Glossy Black-Cockatoos whose foraging ranges are large. In addition, the proposed activity would create a 5,822 ha feral predator and herbivore free area which is expected to be of benefit to Glossy Black-Cockatoos by improving the quality of habitats, in particular that of sheoaks which provide essential forage for the cockatoos. Given that large areas of forest and woodland would remain unaffected (including those within the proposed fenced area), it is unlikely that the habitat to be modified is important to the long-term survival of Glossy Black-Cockatoo in the locality.

*(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),*

There is no declared area of outstanding biodiversity value as listed under the BC Act within the vicinity of the proposed CFAI.

*(e) whether the proposed development or activity is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.*

The proposed activity – reintroducing regionally extinct native mammals – is not recognised as a key threatening process (KTP) under schedule 3 of the BC Act. However, two KTPs are relevant to the proposed activity and they have already been discussed in Part (a) above in relation to the Glossy Black-Cockatoo. These KTPs are: *Clearing of native vegetation* and *Removal of hollow-bearing trees*.

The proposed activity will result in the clearing or modification of approximately 62 ha within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of this clearing (15 m wide) will have no significant adverse impact on the habitat of the Glossy Black-Cockatoo which forage over long-distances.

Surveys carried out by AWC showed that hollow-bearing trees are widespread and common throughout the proposal area, despite the long history of logging and other forestry activities. These assessments also showed that trees larger than 80 cm diameter at breast height (i.e. those most likely to contain large hollows suitable for nesting by Glossy Black-Cockatoos), while much less common (16.4% of trees larger than 40 cm DBH), were sufficient to provide a range of nesting opportunities for the cockatoos within their very large foraging ranges.

The removal of feral predators and herbivores from within the 5,822 ha fenced area will deliver substantial benefits for the Glossy Black-Cockatoo. It will provide a significant reduction in the operation of seven KTPs: *Competition and grazing by the feral European Rabbit*, *Competition and habitat degradation by Feral Goats*, *Herbivory and environmental degradation caused by feral deer*, *Predation and hybridisation by Feral dogs*, *Predation by the European Red Fox*, *Predation by feral cats*, and *Predation, habitat degradation, competition and disease transmission by Feral Pigs*.

In summary, the proposed activity is *unlikely* to significantly increase the impact of any relevant key threatening process in the proposal area. It is certain to reduce the impact of several key threatening processes.

## **Conclusion**

This Assessment of Significance has determined that the proposed activity is *'unlikely'* to have a *'significant effect'* on Glossy Black-Cockatoos or their habitat in the proposal area. The levels of nesting and foraging resources available to the Glossy Black-Cockatoo will not be significantly affected by the proposed activity. Indeed, the proposed conservation fence is likely to increase foraging opportunities because of the expected increase in the extent and productivity of sheoak foraging habitat following the removal of feral herbivores. Therefore, the proposed activity will not require a Species Impact Statement.

## **Grey-crowned Babbler**

*(a) in the case of a threatened species, whether the action proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,*

The Grey-crowned Babbler is found on the western slopes of the Great Dividing Range as well as a number of locations in the Hunter Valley where it inhabits woodlands in family groups of up to fifteen individuals (Robinson, 2006, PB, 2005, King, 1980, OEH, 2017d). However, groups as large as twenty birds have been recorded in the Cobar Penneplain (EnviroKey, 2010). Family groups, known as 'troupes', maintain territories that can range from as little as one but up to 50 ha depending on the size of the troupe and the quality of habitat resource present (King, 1980). Home ranges are defended all year round, and disputes with neighbouring groups are frequent.



Loss of habitat is regarded as a key threat to this species. However, Grey-crowned Babbler are known to exist within small home ranges heavily impacted by past clearing events. Previous surveys in the Hermidale area on the Cobar Penneplain revealed the presence of a troupe within a one hectare patch of Mulga where an active nest with chicks was recorded (EnviroKey, 2010). That home range had been isolated by past clearing of more than 50 ha of woodland several years prior which had surrounded the remaining patch. At least eight Grey-crowned Babbler were observed bringing food items to an active nest by regularly traversing log piles (the result of clearing) to forage wider than their remaining patch. Further, Grey-crowned Babbler is frequently recorded foraging and breeding near the offices of the Girilambone Copper Mine. It is these observations that lead to the suggestion that Grey-crowned Babblers are, to some degree, resilient to the impacts of habitat loss and habitat fragmentation provided connectivity to other habitats remain.

The Grey-crowned Babbler is common and widespread in the Pilliga study area. During spring 2016, the species was recorded on 34 occasions by AWC.

OEH (2017d) identifies the following threats for the Grey-crowned Babbler:

- Loss, degradation and fragmentation of woodland habitat on high fertility soils.
- Excessive total grazing pressure and loss of coarse woody debris is resulting in degradation and loss of important habitat components.
- Infestation of habitat by invasive weeds including exotic perennial grasses. These weeds are very aggressive and form dense grass swards covering inter-tussock spaces preventing access to leaf and stick litter where babblers commonly forage for invertebrates.
- Inappropriate fire regimes - excessive fires lead to loss of tree and shrub regeneration and absence of fire may lead to the grass sward being too dense and therefore unsuitable for foraging by babblers.
- Aggressive exclusion from forest and woodland habitat by over abundant Noisy Miners.
- Climate change impacts including reduction in resources due to drought.
- Nest predation by species such as ravens and butcherbirds may be an issue in some regions where populations are small and fragmented.

The proposed activity is unlikely to contribute significantly to these potential threats. The key points relating to the impact of the proposed activity are that:

- a) Approximately 48 ha is proposed for clearing along the entire 32 km perimeter of the conservation fence;
- b) This clearing will be implemented as a narrow strip averaging 15 m in width;
- c) A separate area of approximately 11 ha will be partially cleared for the proposed operations base; and
- d) One new management track (8.2 km long) will be created (3 ha clearing).

The proposed activity will result in the clearing or modification of approximately 62 ha within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of most of this clearing will have no adverse impact on the life cycle of the Grey-crowned Babbler. Based on the previous work of King (1980), the home range of a troupe of the Grey-crowned Babblers is likely to be between 6 and 10 ha in the Pilliga study area and babblers are well-able to forage in and to cross cleared areas.

In summary, it is *unlikely* that the proposed activity will have an adverse impact on the life cycle of this species (and so the action is not likely to place a viable local population at risk of extinction). The levels of nesting and foraging resources available to the babblers within their home-ranges will not be significantly affected by the proposed activity. Indeed, the proposed conservation fence is likely to increase reproductive success following the removal of feral predators.

Grey-crowned Babbler is not listed as an endangered population.

(b) *in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*

(i) *is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*

(ii) *is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,*

Grey-crowned Babbler is not listed as an endangered ecological community or critically endangered ecological community.

(c) *in relation to the habitat of a threatened species, population or ecological community:*

(i) *the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*

(ii) *whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*

(iii) *the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,*

(i) The proposed CFAI would result habitat modification across about 62 ha, most of which would be a narrow strip 15 m wide, through areas in which the Grey-crowned Babbler is known to occur. This is minimal in the context of the large area of the Pilliga forest.

(ii) The proposal would not isolate or fragment habitat as Grey-crowned Babblers are known to fly and forage across clearings exceeding 15 m in width.

(iii) The modification of habitats will be minor in the context of the study area: approximately 62 ha within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of the Pilliga forests. The narrow, linear nature of most of the proposed clearing (15 m wide) further reduces the likelihood of any significant impact. In addition, the proposed activity would create a 5,822 ha area free of feral cats and foxes. This will be of significant benefit to the long-term viability of the Grey-crowned Babblers in the Pilliga proposal area. Given that large areas of forest and woodland would remain unaffected by clearing (including those within the proposed fenced area), it is unlikely that the proposed habitat modifications could be important to the long-term survival of Grey-crowned Babblers in the locality.

(d) *whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),*

There is no declared area of outstanding biodiversity value as listed under the BC Act within the vicinity of the proposed CFAI.

(e) *whether the proposed development or activity is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.*

The proposed activity – reintroducing regionally extinct native mammals – is not recognised as a key threatening process (KTP) under schedule 3 of the BC Act. However, two KTPs are relevant to the proposed activity and they have already been discussed in Part (a) above in relation to the Grey-crowned Babbler. These KTPs are: *Removal of dead wood and dead trees*, and the *Clearing of native vegetation*.

The clearing of some vegetation is necessary to create the proposed CFAI, but the amount would be only a tiny proportion of the Pilliga study area (about 0.2%) which is embedded within more than 500,000 ha of the Pilliga forests. The linear nature of most of the clearing means that it is unlikely to remove the entire home range for any groups of babblers; it will likely affect only a small area of the home range for a very small proportion of the local population.

The proposed activity will result in the retention (but relocation) of dead wood that occurs directly on the path of the conservation fence and other infrastructure. The minor amounts of dead wood that would be relocated are not expected to have significant impacts on the species.

The removal of feral predators and herbivores from within the 5,822 ha fenced area will deliver substantial benefits for the Grey-crowned Babbler. It will provide a significant reduction in the operation of seven KTPs: *Competition and grazing by the feral European Rabbit, Competition and habitat degradation by Feral Goats, Herbivory and environmental degradation caused by feral deer, Predation and hybridisation by Feral dogs, Predation by the European Red Fox, Predation by feral cats, and Predation, habitat degradation, competition and disease transmission by Feral Pigs.*

In summary, the proposed activity is *unlikely* to significantly increase the impact of any relevant key threatening process in the proposal area. It is certain to reduce the impact of several key threatening processes.

## Conclusion

This Assessment of Significance has determined that the proposed activity is *'unlikely'* to have a *'significant effect'* on Grey-crowned Babbler or their habitat in the proposal area. The levels of nesting and foraging resources available to the babblers within their home-ranges will not be significantly affected by the proposed activity. In addition, the proposed conservation fence is likely to increase reproductive success in those Grey-crowned Babbler that have part or all of their home ranges within the proposed fenced area because of the removal of feral predators. Therefore, the proposed activity will not require a Species Impact Statement.

## Little Lorikeet

*(a) in the case of a threatened species, whether the action proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,*

The Little Lorikeet is distributed widely across the coastal and Great Divide regions of eastern Australia from Cape York to South Australia (Courtney and Debus, 2006). NSW provides a large portion of the species' core habitat, with lorikeets found westward as far as Dubbo and Albury. Nomadic movements are common, influenced by season and food availability, although some areas retain residents for much of the year and 'locally nomadic' movements are suspected of breeding pairs. Little Lorikeets are gregarious, usually foraging in small flocks, often with other species of lorikeet. They feed primarily on nectar and pollen in the tree canopy, particularly on profusely-flowering eucalypts, but also on a variety of other species including, melaleucas and mistletoes. Riparian habitats are particularly used for foraging, due to higher soil fertility and therefore, greater productivity. Isolated flowering trees in paddocks, roadside reserves and urban trees also help sustain populations of the species.

The Little Lorikeet is known to occur within the vicinity of the proposed CFAI and across the Pilliga Forest and during AWC field surveys, was recorded on 27 occasions. The majority of these records are in the north of the EMA project area.

OEH (2017d) identifies the following threats to Little Lorikeet:

- Given that large old eucalyptus trees on fertile soils produce more nectar, the extensive clearing of woodlands for agriculture has significantly decreased food for the lorikeet, thus reducing survival and reproduction. Small scale clearing, such as during roadworks and fence construction, continues to destroy habitat and it will be decades before revegetated areas supply adequate forage sites.
- The loss of old hollow bearing trees has reduced nest sites, and increased competition with other native and exotic species that need large hollows with small

entrances to avoid predation. Felling of hollow trees for firewood collection or other human demands increases this competition.

- Competition with the introduced Honeybee for both nectar and hollows exacerbates these resource limitations.
- Infestation of habitat by invasive weeds.
- Inappropriate fire regimes.
- Aggressive exclusion from forest and woodland habitat by over abundant Noisy Miners.
- Climate change impacts including reduction in resources due to drought.
- Degradation of woodland habitat and vegetation structure due to overgrazing.

The proposed activity is not likely to contribute significantly to these potential threats. The key points relating to the impact of the proposed activity are that:

- a) Approximately 48 ha is proposed for clearing along the entire 32 km perimeter of the conservation fence;
- b) This clearing will be implemented as a narrow strip averaging 15 m in width;
- c) A separate area of approximately 11 ha will be partially cleared for the proposed operations base; and
- d) One new management track (8.2 km long) will be created (3 ha clearing).

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of most of this limited clearing will have no adverse impact on the life cycle of the Little Lorikeet which is considered nomadic and able to travel long distances in search of food.

AWC surveys have shown that hollow-bearing trees are widespread and common throughout the proposal area, despite the long history of logging and other forestry activities. The removal of a limited number of hollow-bearing trees during clearing for the proposed fence would have a negligible impact on availability of hollows and not have adverse impacts on life cycles of Little Lorikeets.

The proposed activity will require a Strategic Fire Advantage Zone (SFAZ) of 200 m width around the outside of the fence and an Asset Protection Zone (APZ) of 75 m around the proposed operations base. Understorey vegetation in these areas will be managed to reduce the severity of any wildfire. Some canopy trees will be retained in the SFAZ and there is expected to be negligible impact on Little Lorikeets as they are nomadic.

In summary, it is *unlikely* that the proposed activity will have an adverse impact on the life cycle of this species (and so the action is not likely to place a viable local population at risk of extinction). The levels of nesting and foraging resources available to the Little Lorikeet over the Pilliga study area will not be significantly affected by the proposed activity. In addition, the proposed conservation fence may increase reproductive success in Little Lorikeets which use the fenced area following the removal of feral predators.

Little Lorikeet is not listed as an endangered population.

*(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*

- (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*
- (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,*

Little Lorikeet is not listed as an endangered ecological community or critically endangered ecological community.

*(c) in relation to the habitat of a threatened species, population or ecological community:*

- (i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*

- (ii) *whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*
- (iii) *the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,*

(i) The proposed CFAI would result in habitat modification across about 62 ha, most of which would be a narrow strip 15 m wide, through areas which Little Lorikeets are known to use. This is minimal in the context of the large size of areas used by the birds.

(ii) The proposal would not isolate or fragment habitats given the narrow clearing strip and the ability of Little Lorikeets to fly and forage across large cleared areas.

(iii) The modification of habitats will be minor in the context of the study area: approximately 62 ha within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of the Pilliga forests. The narrow, linear nature of most of the proposed clearing (15 m wide) further reduces the likelihood of any significant impact. In addition, the proposed activity would create a 5,822 ha feral predator and herbivore free area which may be of benefit to the Little Lorikeet by improving the quality of relevant habitats. Given that large areas of forest and woodland would remain unaffected by clearing (including those within the proposed fenced area), it is unlikely that the proposed minor habitat changes will be important to the long-term survival of Little Lorikeet in this locality.

(d) *whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),*

There is no declared area of outstanding biodiversity value as listed under the BC Act within the vicinity of the proposed CFAI.

(e) *whether the proposed development or activity is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.*

The proposed activity – reintroducing regionally extinct native mammals – is not recognised as a key threatening process (KTP) under schedule 3 of the BC Act. However, two KTPs are relevant to the proposed activity and they have already been discussed in Part (a) above in relation to the Little Lorikeet. These KTPs are: *Clearing of native vegetation* and the *Removal of hollow-bearing trees*.

The proposed activity will result in the clearing or modification of approximately 62 ha within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of this clearing (15 m wide) will have no significant adverse impact on the habitat of the Little Lorikeet which are known to fly across extensive cleared areas.

AWC surveys have shown that hollow-bearing trees are widespread and common throughout the study area, despite the long history of logging and other forestry activities. These assessments also showed that these features were sufficient to provide a large selection of nesting opportunities for the Little Lorikeet across the proposal area.

The removal of feral predators and herbivores from within the 5,822 ha fenced area may deliver substantial benefits for the Little Lorikeet. It will provide a significant reduction in the operation of seven KTPs: *Competition and grazing by the feral European Rabbit, Competition and habitat degradation by Feral Goats, Herbivory and environmental degradation caused by feral deer, Predation and hybridisation by Feral dogs, Predation by the European Red Fox, Predation by feral cats, and Predation, habitat degradation, competition and disease transmission by Feral Pigs.*

In summary, the proposed activity is *unlikely* to significantly increase the impact of any relevant key threatening process in the proposal area. It is certain to reduce the impact of several key threatening processes.

## Conclusion

This Assessment of Significance has determined that the proposed activity is *'unlikely'* to have a *'significant effect'* on Little Lorikeets or their habitat in the proposal area. The levels of nesting and foraging resources available to the lorikeets within the Pilliga study area will not be significantly affected by the proposed activity. In addition, the proposed conservation fence is likely to increase longevity for Little Lorikeet following the removal of feral predators. Therefore, the proposed activity will not require a Species Impact Statement.

## Little Eagle

*(a) in the case of a threatened species, whether the action proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,*

The Little Eagle is found across mainland Australia except in densely forested areas. It nests in tall, living trees, in a large stick nest (OEH, 2017d). The Little Eagle is highly mobile, with the NSW population considered a single population (OEH, 2017d). Recently, a tagged individual from the ACT was observed in the NT.

OEH (2017d) identify the following threats to the Little Eagle:

- Secondary poisoning from rabbit baiting
- Clearing and degradation of foraging and breeding habitat

The proposed activity is not likely to contribute significantly to these potential threats. The key points relating to the impact of the proposed activity are that:

- a) Approximately 48 ha is proposed for clearing along the entire 32 km perimeter of the conservation fence;
- b) This clearing will be implemented as a narrow strip averaging 15 m in width;
- c) A separate area of approximately 11 ha will be partially cleared for the proposed operations base; and
- d) One new management track (8.2 km long) will be created (3 ha clearing).

The proposed activity will result in the clearing or modification of approximately 62 ha within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. Adverse impacts to the life cycle of the Little Eagle would only be likely if nesting locations were affected. No evidence of any breeding was noted by AWC ecologists during field surveys. The narrow, linear nature of most of this limited clearing will not interfere with the life cycles of the Little Eagle population given the highly nomadic nature of the species.

The proposed activity will require a Strategic Fire Advantage Zone (SFAZ) of 200 m width around the outside of the fence and an Asset Protection Zone (APZ) of 75 m around the proposed operations base. Understorey vegetation in these areas will be managed to reduce the severity of any wildfire. Because the foraging ranges of Little Eagles are large and they are nomadic, the impact of these wildfire safety measures will be minimal.

In summary, it is *unlikely* that the proposal could have an adverse effect on the life cycle of Little Eagle such that a viable local population is likely to be placed at risk of extinction.

The Little Eagle is not listed as an endangered population.

*(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*

- (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*

(ii) *is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,*  
The Little Eagle is not listed as an endangered ecological community or critically endangered ecological community.

(c) *in relation to the habitat of a threatened species, population or ecological community:*

- (i) *the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*
- (ii) *whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*
- (iii) *the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,*

- (i) The proposed CFAI would result in habitat modification across about 62 ha through areas that Little Eagles are known to occur. This is a tiny proportion of the total habitat area for the species within the proposal area and within the entire Pilliga forests.
- (ii) The proposal would not isolate or fragment habitats as Little Eagles are known to fly and forage across large cleared areas, and are highly mobile.
- (iii) The modification of habitats will be minor in the context of the known large size of Little Eagle foraging ranges in the Pilliga. The proposed activity will result in the clearing or modification of approximately 62 ha within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of most of this clearing (15 m wide) will have no significant impact on the habitat of Little Eagles. In addition, the proposed activity would create a 5,822 ha feral predator and herbivore free area which is expected to be of benefit to Little Eagles by improving the quality of habitats including the availability of prey. Given that large areas of forest and woodland would remain unaffected (including those within the proposed fenced area), it is unlikely that the habitat to be modified is important to the long-term survival of Little Eagle in the locality.

(d) *whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),*

There is no declared area of outstanding biodiversity value as listed under the BC Act within the vicinity of the proposed CFAI.

(e) *whether the proposed development or activity is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.*

The proposed activity – reintroducing regionally extinct native mammals – is not recognised as a key threatening process (KTP) under schedule 3 of the BC Act. However, two KTPs are relevant to the proposed activity and they have already been discussed in Part (a) above in relation to the Little Eagle. These KTPs are: *Removal of dead wood and dead trees*, and the *Clearing of native vegetation*.

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of this clearing (15 m wide) will have no significant adverse impact on the habitat of the Little Eagle which can easily travel several hundreds of kilometres.

The proposed activity will result in the retention (but relocation) of dead wood and the removal of dead trees if they occur directly on the path of the linear conservation fence and other infrastructure. The minor amounts of dead wood that would be relocated are not expected to have significant impacts on the species.

The removal of feral predators and herbivores from within the 5,822 ha fenced area will deliver substantial benefits for the Little Eagle (see above). It will provide a significant

reduction in the operation of seven KTPs: *Competition and grazing by the feral European Rabbit, Competition and habitat degradation by Feral Goats, Herbivory and environmental degradation caused by feral deer, Predation and hybridisation by Feral dogs, Predation by the European Red Fox, Predation by feral cats, and Predation, habitat degradation, competition and disease transmission by Feral Pigs.*

In summary, the proposed activity is *unlikely* to introduce or to significantly increase the impact of any relevant key threatening process in the proposal area. It is certain to reduce the impact of several key threatening processes.

## Conclusion

This Assessment of Significance has determined that the proposed activity is *'unlikely'* to have a *'significant effect'* on Little Eagles or their habitat in the proposal area. The levels of nesting and foraging resources available to this species will not be significantly affected by the proposed activity. In addition, the proposed conservation fence is likely to benefit Little Eagles because of the expected increase in native small-medium sized mammals following the removal of feral predators. Therefore, the proposed activity will not require a Species Impact Statement.

## Scarlet Robin

(a) *in the case of a threatened species, whether the action proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,*

In NSW, the Scarlet Robin occurs in open forests and woodlands from the coast to the inland slopes and in winter, dispersing birds are known to appear in the east of the inland plains (OEH, 2017d). The Scarlet Robin is considered sensitive to habitat fragmentation and the reductions of structural complexity of habitat and native ground covers (Barrett et al. 2007; Watson et al. 2001). Scarlet Robins are known to occur within the vicinity of the proposed CFAI and across the Pilliga Forest and during the AWC field survey, were recorded on three occasions. Scarlet Robins are known to occupy home ranges of around 10 ha but this is dependent on habitat quality (Debus, 2006).

OEH (2017d) identify the following threats to Scarlet Robin:

- Historical habitat clearing and degradation.
- Habitat modification due to overgrazing.
- Reduction of size of remnant patches.
- Reduction in the structural complexity of habitat, including reductions in canopy cover, shrub cover, ground cover, logs, fallen branches and leaf litter.
- Reduction of the native ground cover in favour of exotic grasses.
- Loss of nest sites, food sources and foraging sites, such as standing dead timber, logs and coarse woody debris from depletion by grazing, firewood collection and 'tidying up' of rough pasture.
- Predation by over-abundant populations of Pied Currawong (*Strepera graculina*) which are supported by planted exotic berry-producing shrubs; this pressure, in addition to that from other native and exotic predators, may be a potentially severe threat to the breeding success of Scarlet Robin populations.
- Predation by feral cats (*Felis catus*).
- Robbing of nests and predation of fledglings by rats.
- Isolation of patches of habitat, particularly where these patches are smaller than 30 ha, and in landscapes where clearing has been heavy or where remnants are surrounded by cropping or stock grazing.
- Habitat for the Scarlet Robin may become unsuitable if dense regeneration occurs after bushfires or other disturbances.



The proposed activity is not likely to contribute significantly to these potential threats. The key points relating to the impact of the proposed activity are that:

- a) Approximately 48 ha is proposed for clearing along the entire 32 km perimeter of the conservation fence;
- b) This clearing will be implemented as a narrow strip averaging 15 m in width;
- c) A separate area of approximately 11 ha will be partially cleared for the proposed operations base; and
- d) One new management track (8.2 km long) will be created (3 ha clearing).

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of most of this clearing will have no significant adverse impacts on the life cycles of Scarlet Robins as they are known to occupy home ranges of around 10 ha (Debus, 2006). The linear nature of most of the clearing means that it is unlikely to remove the entire home range for any individuals; it will likely affect only a small area of the home range for a very small proportion of the local population.

The proposed activity will require a Strategic Fire Advantage Zone (SFAZ) of 200 m width around the outside of the fence and an Asset Protection Zone (APZ) of 75 m around the proposed operations base. Understorey vegetation in these areas will be managed to reduce the severity of any wildfire. Because the areas to be modified are limited in extent, there are unlikely to be any adverse effects on the life cycles of Scarlet Robins.

In summary, it is *unlikely* that the proposed activity will have an adverse impact on the life cycle of this species (and so the action is not likely to place a viable local population at risk of extinction). The levels of nesting and foraging resources available to the Scarlet Robin across the Pilliga study area will not be significantly affected by the proposed activity. In addition, the proposed conservation fence is likely to increase reproductive success following the removal of feral predators.

The Scarlet Robin is not listed as an endangered population.

*(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*

- (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*
- (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,*

The Scarlet Robin is not listed as an endangered ecological community or critically endangered ecological community.

*(c) in relation to the habitat of a threatened species, population or ecological community:*

- (i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*
- (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*
- (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,*

- (i) The proposed CFAI would result in habitat modification across about 62 ha. This is a tiny proportion of the total habitat area for the species within the proposal area and within the entire Pilliga forests.
- (ii) The proposal would not isolate or fragment habitats as Scarlet Robin are known to fly and forage across large cleared areas.
- (iii) The modification of habitats will be minor in the context of the total area of habitat available for the Scarlet Robin in the Pilliga forests. The proposed activity will result

in the clearing or modification of approximately 62 ha within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of most of this clearing will have no significant impact on the habitat of Scarlet Robins. In addition, the proposed activity would create a 5,822 ha feral predator and herbivore free area which is expected to be of benefit to Scarlet Robins by improving the quality of habitats. Given that large areas of forest and woodland would remain unaffected (including those within the proposed fenced area), it is unlikely that the habitat to be modified is important to the long-term survival of Scarlet Robin in the locality.

(d) *whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),*

There is no declared area of outstanding biodiversity value as listed under the BC Act within the vicinity of the proposed CFAI.

(e) *whether the proposed development or activity is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.*

The proposed activity – reintroducing regionally extinct mammals – is not recognised as a key threatening process (KTP) under schedule 3 of the BC Act. However, two KTPs are relevant to the proposed activity and they have already been discussed in Part (a) above in relation to the Scarlet Robin. These KTPs are: *Removal of dead wood and dead trees*, and *Clearing of native vegetation*.

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of this clearing (15 m wide) will have little adverse impact on the home ranges of Scarlet Robins within the Pilliga study area.

The proposed activity will result in the retention (but relocation) of dead wood and the removal of dead trees if they occur directly on the path of the linear conservation fence and other infrastructure. The minor amounts of dead wood that would be relocated are not expected to have significant impacts on the species.

The removal of feral predators and herbivores from within the 5,822 ha fenced area will deliver substantial benefits for the Scarlet Robin. It will provide a significant reduction in the operation of seven KTPs: *Competition and grazing by the feral European Rabbit*, *Competition and habitat degradation by Feral Goats*, *Herbivory and environmental degradation caused by feral deer*, *Predation and hybridisation by Feral dogs*, *Predation by the European Red Fox*, *Predation by feral cats*, and *Predation, habitat degradation, competition and disease transmission by Feral Pigs*.

In summary, the proposed activity is *unlikely* to introduce or to significantly increase the impact of any relevant key threatening process in the proposal area. It is certain to reduce the impact of several key threatening processes.

## **Conclusion**

This Assessment of Significance has determined that the proposed activity is *'unlikely'* to have a *'significant effect'* on Scarlet Robins or their habitat in the proposal area. The levels of nesting and foraging resources available to the robins across the Pilliga study area will not be significantly affected by the proposed activity. In addition, the proposed conservation fence is likely to increase reproductive success for those Scarlet Robins who use the area because of the removal of feral predators. Therefore, the proposed activity will not require a Species Impact Statement.

## Speckled Warbler

*(a) in the case of a threatened species, whether the action proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,*

The Speckled Warbler has a patchy distribution throughout south-eastern Queensland, the eastern half of NSW and into Victoria, as far west as the Grampians (OEH, 2017d, Morcombe, 2004). The species is most frequently reported from the hills and tablelands of the Great Dividing Range, and rarely near the coast. There has been a decline in population density throughout its range, with the decline exceeding 40% where no vegetation remnants larger than 100 ha survive.

Speckled Warbler are known to occur within the vicinity of the proposed CFAI and across the Pilliga Forest. During an AWC field survey, they were recorded on 46 occasions. The potential for suitable habitat within Pilliga EMA project area is high since it contains structurally diverse microhabitats and covers 35,000 ha. Home range size of Speckled Warblers is around 8 ha (Bell, 1984).

OEH (2017d) identify the following threats to this Speckled Warbler:

- Due to the fragmented nature of the populations and their small size the species is susceptible to catastrophic events and localised extinction.
- Clearance of remnant grassy woodland habitat for paddock management reasons and for firewood.
- Poor regeneration of grassy woodland habitats.
- Modification and destruction of ground habitat through removal of litter and fallen timber, introduction of exotic pasture grasses, heavy grazing and compaction by stock and frequent fire.
- Habitat is lost and further fragmented as land is being cleared for residential and agricultural developments. In particular, nest predation increases significantly, to nest failure rates of over 80%, in isolated fragments.
- Nest failure due to predation by native and non-native birds, cats, dogs and foxes particularly in fragmented and degraded habitats.

The proposed activity is not likely to contribute significantly to these potential threats. The key points relating to the impact of the proposed activity are that:

- a) Approximately 48 ha is proposed for clearing along the entire 32 km perimeter of the conservation fence;
- b) This clearing will be implemented as a narrow strip averaging 15 m in width;
- c) A separate area of approximately 11 ha will be partially cleared for the proposed operations base; and
- d) One new management track (8.2 km long) will be created (3 ha clearing).

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow nature of most of this clearing will have no significant adverse impacts on the life cycles of Speckled Warblers as they are known to forage and cross minor clearings to move between areas of vegetation within their home ranges of about 8 ha. In addition, the linear nature of most of the clearing means that it is unlikely to remove the entire home range for any individuals; it will likely affect only a small area of the home range for a very small proportion of the local population.

There is a long history of logging and other forestry activities in the proposal area, but the proposed activity will not harvest any wood. Dead wood that is directly on the path of the conservation fence and other infrastructure will be relocated a short distance. The minor amounts of dead wood that would be relocated are not expected to have significant impacts on the species.

The proposed activity will require a Strategic Fire Advantage Zone (SFAZ) of 200 m width around the outside of the fence and an Asset Protection Zone (APZ) of 75 m around the proposed operations base. Understorey vegetation in these areas will be managed to reduce the severity of any wildfire. The ability of Speckled Warbler to forage and breed in these areas will remain.

In summary, it is *unlikely* that the proposed activity will have an adverse impact on the life cycle of this species (and so the action is not likely to place a viable local population at risk of extinction). The levels of nesting and foraging resources available across the Pilliga proposal area will not be significantly affected by the proposed activity. In addition, the proposed conservation fence is likely to increase longevity and reproductive success of birds using habitats within it following the removal of feral predators.

The Speckled Warbler is not listed as an endangered population.

*(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*

- (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*
- (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,*

The Speckled Warbler is not listed as an endangered ecological community or critically endangered ecological community.

*(c) in relation to the habitat of a threatened species, population or ecological community:*

- (i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*
- (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*
- (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,*

- (i) The proposed CFAI would result in habitat modification of about 62 ha through areas that Speckled Warblers are known to occur. This is a tiny proportion of the total habitat area for the species within the proposal area and within the entire Pilliga forests.
- (ii) The proposal would not isolate or fragment habitats as Speckled Warblers are known to fly and forage across variegated landscapes.
- (iii) The modification of habitats will be minor in the context of the total area of habitat available for the Speckled Warbler in the Pilliga forests. The proposed activity will result in the clearing or modification of approximately 62 ha within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of most of this clearing (15 m wide) will have no significant impact on the habitat of Speckled Warblers. In addition, the proposed activity would create a 5,822 ha feral predator and herbivore free area which is expected to be of benefit to Speckled Warblers by improving the quality of habitats. Given that large areas of forest and woodland would remain unaffected (including those within the proposed fenced area), it is unlikely that the habitat to be modified is important to the long-term survival of Speckled Warbler in the locality.

*(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),*

There is no declared area of outstanding biodiversity value as listed under the BC Act within the vicinity of the proposed CFAI.

*(e) whether the proposed development or activity is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.*

The proposed activity – reintroducing regionally extinct native mammals – is not recognised as a key threatening process (KTP) under schedule 3 of the BC Act. However, two KTPs are relevant to the proposed activity and they have already been discussed in Part (a) above in relation to the Speckled Warbler. These KTPs are: *Removal of dead wood and dead trees*, and the *Clearing of native vegetation*.

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of this clearing (15 m wide) will have little adverse impact on the home ranges of Speckled Warblers within the Pilliga study area.

The proposed activity will result in the retention (but relocation) of dead wood and the removal of dead trees if they occur directly on the path of the linear conservation fence and other infrastructure. The minor amounts of dead wood that would be relocated are not expected to have significant impacts on the species.

The removal of feral predators and herbivores from within the 5,822 ha fenced area will deliver substantial benefits for the Speckled Warbler. It will provide a significant reduction in the operation of seven KTPs: *Competition and grazing by the feral European Rabbit*, *Competition and habitat degradation by Feral Goats*, *Herbivory and environmental degradation caused by feral deer*, *Predation and hybridisation by Feral dogs*, *Predation by the European Red Fox*, *Predation by feral cats*, and *Predation, habitat degradation, competition and disease transmission by Feral Pigs*.

In summary, the proposed activity is *unlikely* to introduce or to significantly increase the impact of any relevant key threatening process in the proposal area. It is certain to reduce the impact of several key threatening processes.

## **Conclusion**

This Assessment of Significance has determined that the proposed activity is *'unlikely'* to have a *'significant effect'* on Speckled Warblers or their habitat in the proposal area. The levels of nesting and foraging resources available to this species in the Pilliga study area will not be significantly affected by the proposed activity. In addition, the proposed conservation fence is likely to increase general longevity and reproductive success for Speckled Warbler following the removal of feral predators. Therefore, the proposed activity will not require a Species Impact Statement.

## **Superb Parrot**

*(a) in the case of a threatened species, whether the action proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,*

Superb Parrots are known to nest in box-gum woodland, riparian woodland and isolated paddock trees, where they may travel as far as 10 km to suitable foraging habitat (BakerDabb, 2011). Breeding areas are located in the NSW south-west slopes (core breeding habitat has been identified as roughly bordered by the towns of Cowra and Yass in the east, and Grenfell, Cootamundra and Coolac in the west) and within the corridors of the Murrumbidgee, Murray and Edward Rivers. Landscape movements of these populations occur at the end of the breeding season, when birds move north toward the Upper Namoi and Gwydir River regions (BakerDabb, 2011, Manning et al., 2004, Manning et al., 2006).

Superb Parrots are known to occur within the vicinity of the proposed CFAI and across the Pilliga forests. Superb Parrots move to the broader Namoi-Gwydir area which includes the Pilliga forests outside of the breeding season. All breeding activity occurs in the NSW South Western Slopes, Riverina and Murray region. During the AWC field survey, Superb Parrots were recorded on six occasions.

OEH (2017d) identify the following threats to this species:

- Removal of hollow bearing trees.
- Clearing of woodland remnants.
- Poor regeneration of nesting trees and food resources.
- Feeding on grain spills and subsequently being struck by vehicles.
- Loss of hollows to feral bees and native and exotic hollow-nesting birds.
- Illegal trapping which can also result in the destruction of hollows.

The proposed activity is unlikely to contribute significantly to these potential threats. The key points relating to the impact of the proposed activity are that:

- a) Approximately 48 ha is proposed for clearing along the entire 32 km perimeter of the conservation fence;
- b) This clearing will be implemented as a narrow strip averaging 15 m in width;
- c) A separate area of approximately 11 ha will be partially cleared for the proposed operations base; and
- d) One new management track (8.2 km long) will be created (3 ha clearing).

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of most of this clearing will have no significant adverse impacts on the life cycles of Superb Parrots given their highly nomadic nature.

AWC surveys have shown that hollow-bearing trees are widespread and common throughout the proposal area, despite the long history of logging and other forestry activities. The removal of a limited number of hollow-bearing trees during clearing for the proposed fence would have a negligible impact on availability of hollows and not have adverse impacts on life cycles of Superb Parrots.

The proposed activity will require a Strategic Fire Advantage Zone (SFAZ) of 200 m width around the outside of the fence and an Asset Protection Zone (APZ) of 75 m around the proposed operations base. Understorey vegetation in these areas will be managed to reduce the severity of any wildfire. These minor habitat modifications will not adversely affect the nomadic Superb Parrot.

In summary, it is *unlikely* that the proposed activity will have an adverse impact on the life cycle of this species (and so the action is not likely to place a viable local population at risk of extinction). The levels of roosting and foraging resources available to the Superb Parrot across the Pilliga forests will not be significantly affected by the proposed activity.

The Superb Parrot is not listed as an endangered population.

*(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*

- (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*
- (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,*

The Superb Parrot is not listed as an endangered ecological community or critically endangered ecological community.

*(c) in relation to the habitat of a threatened species, population or ecological community:*

- (i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*
- (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*
- (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,*

- (i) The proposed CFAI would result in habitat modification across about 62 ha. This is a tiny proportion of the total habitat area for the species within the proposal area and within the entire Pilliga forests.
  - (ii) The proposal would not isolate or fragment habitats given most of the clearing will be in a narrow strip and that Superb Parrots fly and forage across large cleared areas.
  - (iii) The modification of habitats will be minor in the context of the total area of habitat available for the Superb Parrot in the Pilliga forests. The proposed activity will result in the clearing or modification of approximately 62 ha within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of most of this clearing (15 m wide) will have no significant impact on the habitat of Superb Parrots. In addition, the proposed activity would create a 5,822 ha feral predator and herbivore free area which may be of benefit to Superb Parrots by improving the quality of habitats. Given that large areas of forest and woodland would remain unaffected (including those within the proposed fenced area), it is unlikely that the habitat to be directly affected is important to the long-term survival of Superb Parrot in the locality.
- (d) *whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),*

There is no declared area of outstanding biodiversity value as listed under the BC Act within the vicinity of the proposed CFAI.

- (e) *whether the proposed development or activity is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.*
- The proposed activity – reintroducing regionally extinct native mammals – is not recognised as a key threatening process (KTP) under schedule 3 of the BC Act. However, one KTP is relevant to the proposed activity and has already been discussed in Part (a) above in relation to the Superb Parrot. This KTP is: *Clearing of native vegetation*.

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of this clearing (15 m wide) will have negligible adverse impact on the habitat of the Superb Parrot given the widely ranging nature of the species (often foraging up to 10 km in a single day).

The removal of feral predators and herbivores from within the 5,822 ha fenced area will deliver substantial benefits for Superb Parrots. It will provide a significant reduction in the operation of seven KTPs: *Competition and grazing by the feral European Rabbit, Competition and habitat degradation by Feral Goats, Herbivory and environmental degradation caused by feral deer, Predation and hybridisation by Feral dogs, Predation by the European Red Fox, Predation by feral cats, and Predation, habitat degradation, competition and disease transmission by Feral Pigs*.

In summary, the proposed activity is *unlikely* to introduce or to significantly increase the impact of any relevant key threatening process in the proposal area. It is certain to reduce the impact of several key threatening processes.

## **Conclusion**

This Assessment of Significance has determined that the proposed activity is *'unlikely'* to have a *'significant effect'* on Superb Parrot or their habitat in the proposal area. The levels of foraging resources available across the Pilliga study area and wider Pilliga forests will not be significantly affected by the proposed activity. In addition, the proposed conservation fence may deliver benefits following the removal of feral predators. Therefore, the proposed activity will not require a Species Impact Statement.

## Turquoise Parrot

(a) *in the case of a threatened species, whether the action proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,*

The Turquoise Parrot's range extends from southern Queensland through to northern Victoria, from the coastal plains to the western slopes of the Great Dividing Range. They usually live on the edges of eucalypt woodland adjoining clearings, timbered ridges and creek lines. Often seen in pairs or small flocks, they prefer to feed in the shade in search of seeds and herbaceous plants (Quin and Baker-Gabb, 1993).

OEH (2017d) identify the following threats to Turquoise Parrot:

- Clearing of grassy-woodland and open forest habitat.
- Loss of hollow-bearing trees.
- Degradation of habitat through heavy grazing, firewood collection and establishment of exotic pastures.
- Predation by foxes and cats.
- Illegal trapping of birds and collection of eggs which also often results in the destruction of hollows.
- Inappropriate fire regimes.
- Aggressive exclusion from forest and woodland habitat by over abundant Noisy Miners.
- Climate change impacts including reduction in resources due to drought.

The proposed activity is not likely to contribute significantly to these potential threats. The key points relating to the impact of the proposed activity are that:

- a) Approximately 48 ha is proposed for clearing along the entire 32 km perimeter of the conservation fence;
- b) This clearing will be implemented as a narrow strip averaging 15 m in width;
- c) A separate area of approximately 11 ha will be partially cleared for the proposed operations base; and
- d) One new management track (8.2 km long) will be created (3 ha clearing).

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of most of this clearing will have no adverse impact on the life cycles of Turquoise Parrots given their ability to fly across such small gaps.

AWC surveys have shown that hollow-bearing trees are widespread and common throughout the proposal area, despite the long history of logging and other forestry activities. The removal of a limited number of hollow-bearing trees during clearing for the proposed fence would have a negligible impact on availability of hollows and not have adverse impacts on life cycles of Turquoise Parrots.

The proposed activity will require a Strategic Fire Advantage Zone (SFAZ) of 200 m width around the outside of the fence and an Asset Protection Zone (APZ) of 75 m around the proposed operations base. Understorey vegetation in these areas will be managed to reduce the severity of any wildfire. Turquoise Parrots will be able to continue foraging across the SFAZ and APZ.

In summary, it is *unlikely* that the proposed activity will have an adverse impact on the life cycle of this species (and so the action is not likely to place a viable local population at risk of extinction). The levels of nesting, roosting and foraging resources available to this species will not be significantly affected by the proposed activity. In addition, the proposed conservation fence is likely to increase reproductive success following the removal of feral predators.

The Turquoise Parrot is not listed as an endangered population.



(b) *in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*

- (i) *is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*
- (ii) *is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,*

The Turquoise Parrot is not listed as an endangered ecological community or critically endangered ecological community.

(c) *in relation to the habitat of a threatened species, population or ecological community:*

- (i) *the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*
- (ii) *whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*
- (iii) *the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,*

- (i) The proposed CFAI would result in habitat modification across about 62 ha. This is a tiny proportion of the total habitat area for the species within the proposal area and within the entire Pilliga forests.
- (ii) The proposal would not isolate or fragment habitats given most of the clearing will be in a narrow strip and that Turquoise Parrots fly and forage across large cleared areas.
- (iii) The modification of habitats will be minor in the context of the total area of habitat available for the Turquoise Parrot in the Pilliga forests. The proposed activity will result in the clearing or modification of approximately 62 ha within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of most of this clearing (15 m wide) will have no significant impact on the habitat of Turquoise Parrots. In addition, the proposed activity would create a 5,822 ha feral predator and herbivore free area which is expected to be of benefit to Turquoise Parrots by improving the quality of habitats. Given that large areas of forest and woodland would remain unaffected (including those within the proposed fenced area), it is unlikely that the habitat to be directly affected is important to the long-term survival of Turquoise Parrot in the locality.

(d) *whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),*

There is no declared area of outstanding biodiversity value as listed under the BC Act within the vicinity of the proposed CFAI.

(e) *whether the proposed development or activity is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.*

The proposed activity – reintroducing regionally extinct native mammals – is not recognised as a key threatening process (KTP) under schedule 3 of the BC Act. However, two KTPs are relevant to the proposed activity and they have already been discussed in Part (a) above in relation to the Turquoise Parrot. These KTPs are: *Clearing of native vegetation* and the *Removal of hollow-bearing trees*.

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of this clearing (15 m wide) will have little or no impact on the habitat of the Turquoise Parrot given the widely ranging nature of the species and the large size of the Pilliga study area.

AWC surveys have shown that hollow-bearing trees are widespread and common throughout the proposal area, despite the long history of logging and other forestry activities.

The removal of a limited number of hollow-bearing trees during clearing for the proposed fence would have a negligible impact on availability of hollows and not have adverse impacts on life cycles of Turquoise Parrots.

The removal of feral predators and herbivores from within the 5,822 ha fenced area will deliver substantial benefits for the Turquoise Parrot. It will provide a significant reduction in the operation of seven KTPs: *Competition and grazing by the feral European Rabbit*, *Competition and habitat degradation by Feral Goats*, *Herbivory and environmental degradation caused by feral deer*, *Predation and hybridisation by Feral dogs*, *Predation by the European Red Fox*, *Predation by feral cats*, and *Predation, habitat degradation, competition and disease transmission by Feral Pigs*.

In summary, the proposed activity is *unlikely* to significantly increase the impact of any relevant key threatening process in the proposal area. It is certain to reduce the impact of several key threatening processes.

## Conclusion

This Assessment of Significance has determined that the proposed activity is *'unlikely'* to have a *'significant effect'* on Turquoise Parrots or their habitat in the proposal area. The levels of nesting, roosting and foraging resources available across the Pilliga study area will not be significantly affected by the proposed activity. In addition, the proposed conservation fence is likely to increase reproductive success following the removal of feral predators. Therefore, the proposed activity will not require a Species Impact Statement.

## Varied Sittella

(a) *in the case of a threatened species, whether the action proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,*

The Varied Sittella is sedentary and inhabits most of mainland Australia except the treeless deserts and open grasslands, with a nearly continuous distribution in NSW from the coast to the far west (Noske, 2001, OEH, 2017d). It inhabits eucalypt forests and woodlands, especially rough-barked species and mature smooth-barked gums with dead branches, mallee and acacia woodland. The Varied Sittella feeds on arthropods gleaned from crevices in rough or decorticated bark, dead branches, standing dead trees, and from small branches and twigs in the tree canopy. It builds a cup-shaped nest of plant fibres and cobweb in an upright tree fork high in the living tree canopy, and often re-uses the same fork or tree in successive years. The apparent decline has been attributed to declining habitat cover and quality (Watson et al., 2001). Varied Sittella are known to occur within the vicinity of the proposed CFAI and across the Pilliga Forest. During AWC field surveys, Varied Sittella were recorded on 37 occasions.

OEH (2017d) identify the following threats to this species:

- Population viability is sensitive to habitat isolation and simplification, including reductions in tree species diversity, tree canopy cover, shrub cover, ground cover, logs, fallen branches and litter.
- Apparent decline has been attributed to declining habitat. The sedentary nature of the Varied Sittella makes cleared land a potential barrier to movement.
- The Varied Sittella is also adversely affected by the dominance of Noisy Miners in woodland patches.
- Threats include habitat degradation through small-scale clearing for fencelines and road verges, rural tree decline, loss of paddock trees and connectivity, 'tidying up' on farms, and firewood collection.
- Overgrazing by stock impacting on leaf litter and shrub layer.

The proposed activity is not likely to contribute significantly to these potential threats. The key points relating to the impact of the proposed activity are that:

- a) Approximately 48 ha is proposed for clearing along the entire 32 km perimeter of the conservation fence;
- b) This clearing will be implemented as a narrow strip averaging 15 m in width;
- c) A separate area of approximately 11 ha will be partially cleared for the proposed operations base; and
- d) One new management track (8.2 km long) will be created (3 ha clearing).

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of most of this clearing will have little or no impact on the life cycle of Varied Sittellas given that they have home ranges between 13 and 20 ha (Noske, 1998).

The proposed activity will require a Strategic Fire Advantage Zone (SFAZ) of 200 m width around the outside of the fence and an Asset Protection Zone (APZ) of 75 m around the proposed operations base. Understorey vegetation in these areas will be managed to reduce the severity of any wildfire. It is likely that Varied Sittellas will continue to forage and nest in the SFAZ and APZ given that they are known to forage and nest in highly modified woodland patches.

In summary, it is *unlikely* that the proposed activity will have an adverse impact on the life cycle of this species (and so the action is not likely to place a viable local population at risk of extinction). In addition, the proposed conservation fence is likely to increase general longevity and reproductive success following the removal of feral predators.

The Varied Sittella is not listed as an endangered population.

*(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*

- (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*
- (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,*

The Varied Sittella is not listed as an endangered ecological community or critically endangered ecological community.

*(c) in relation to the habitat of a threatened species, population or ecological community:*

- (i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*
- (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*
- (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,*

- (i) The proposed CFAI would result in habitat modification across about 62 ha. This is a tiny proportion of the total habitat area for the species within the proposal area and within the entire Pilliga forests.
- (ii) The proposal would not isolate or fragment habitats as Varied Sittellas are known to fly and forage across variegated landscapes.
- (iii) The modification of habitats will be minor in the context of the total area of habitat available for the Varied Sittella in the Pilliga forests. The proposed activity will result in the clearing or modification of approximately 62 ha within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the

Pilliga forests. The narrow, linear nature of most of this clearing (15 m wide) will have no significant impact on the habitat of Varied Sittellas. In addition, the proposed activity would create a 5,822 ha feral predator and herbivore free area which is expected to be of benefit to Varied Sittellas by improving the quality of habitats. Given that large areas of forest and woodland would remain unaffected (including those within the proposed fenced area), it is unlikely that the habitat to be directly affected is important to the long-term survival of Varied Sittella in the locality.

(d) *whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),*

There is no declared area of outstanding biodiversity value as listed under the BC Act within the vicinity of the proposed CFAI.

(e) *whether the proposed development or activity is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.*

The proposed activity – reintroducing regionally extinct native mammals – is not recognised as a key threatening process (KTP) under schedule 3 of the BC Act. However, two KTPs are relevant to the proposed activity and they have already been discussed in Part (a) above in relation to the Varied Sittella. These KTPs are: *Removal of dead wood and dead trees*, and the *Clearing of native vegetation*.

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of this clearing (15 m wide) will have little or no impact on the habitat of the Varied Sittella whose home-range is generally between 13 and 20 ha; it will likely affect only a small area of the home range for a very small proportion of the local population.

The proposed activity will result in the retention (but relocation) of dead wood and the removal of dead trees if they occur directly on the path of the linear conservation fence and other infrastructure. The minor amounts of dead wood that would be relocated are not expected to have significant impacts on the species.

The removal of feral predators and herbivores from within the 5,822 ha fenced area will deliver substantial benefits to the Varied Sittella. It will provide a significant reduction in the operation of seven KTPs: *Competition and grazing by the feral European Rabbit*, *Competition and habitat degradation by Feral Goats*, *Herbivory and environmental degradation caused by feral deer*, *Predation and hybridisation by Feral dogs*, *Predation by the European Red Fox*, *Predation by feral cats*, and *Predation, habitat degradation, competition and disease transmission by Feral Pigs*.

In summary, the proposed activity is *unlikely* to significantly increase the impact of any relevant key threatening process in the proposal area. It is certain to reduce the impact of several key threatening processes.

## **Conclusion**

This Assessment of Significance has determined that the proposed activity is *'unlikely'* to have a *'significant effect'* on Varied Sittella or their habitats. Therefore, the proposed activity will not require a Species Impact Statement.

## **Black-striped Wallaby**

(a) *in the case of a threatened species, whether the action proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,*

The Black-striped Wallaby is a small to medium sized wallaby having a preference for dense woody and shrubby vegetation at or within a few m of ground level (Evans, 1996, OEH, 2017d). Black-striped Wallabies are known to occur within the vicinity of the proposed CFAI and across the Pilliga Forest and during AWC field surveys they were recorded on 28

occasions. Evans (1996) reports a relatively large home range of about 90 ha for Black-striped Wallaby.

OEH (2017d) identify the following threats to this species:

- Clearing, fragmentation and isolation of habitat for agriculture and forestry.
- Risk of local extinction because populations are small and isolated.
- Overgrazing of habitat by domestic stock.
- Grazing of habitat by feral goats and rabbits.
- Predation by foxes.
- Loss of habitat through weed invasion.
- Illegal killing by poisoning or shooting.
- Predation by feral and wild dogs.
- Too-frequent burning associated with forestry and grazing resulting in simplification of habitat with loss of mosaic of dense understorey areas and open grassy areas.
- Removal of wild dogs potentially exposes wallabies to other threats (competition from other species of wallabies and kangaroos plus increased predation pressure from fox) due to removal of top order predator.

The proposed activity is unlikely to contribute significantly to these potential threats. The key points relating to the impact of the proposed activity are that:

- a) Approximately 48 ha is proposed for clearing along the entire 32 km perimeter of the conservation fence;
- b) This clearing will be implemented as a narrow strip averaging 15 m in width;
- c) A separate area of approximately 11 ha will be partially cleared for the proposed operations base; and
- d) One new management track (8.2 km long) will be created (3 ha clearing).

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of most of this clearing will have no impact on the life cycle of the Black-striped Wallaby whose home-ranges are in the order of 90 ha.

The proposed activity will require a Strategic Fire Advantage Zone (SFAZ) of 200 m width around the outside of the fence and an Asset Protection Zone (APZ) of 75 m around the proposed operations base. Understorey vegetation in these areas will be managed to reduce the severity of any wildfire. The large home-ranges of the Black-striped Wallaby will ensure that any impact will be minimal.

Wallabies inside the proposed fence will have the threats of feral predation and feral competition removed and are likely to increase in population. The increased control of feral predators outside the fence is also likely to deliver an increase in the population outside the fence. Noting that the fence is a barrier to movement between the two populations, AWC will monitor the population inside and outside the fence: if there is any risk to the genetic viability of the either population, AWC will carry out an exchange of animals between the two populations.

The proposed activity includes the reintroduction of another macropod species, the Bridled Nailtail Wallaby, to the fenced area and, subsequently, potentially outside the fenced area, subject to the development of a defensible 'beyond the fence' strategy. The Black-striped Wallaby previously co-occurred with the Bridled Nailtail Wallaby across much of its range. Both still co-exist at the only location where the Bridled Nailtail Wallaby is still extant in the wild: at Taunton National Park, in Queensland. The two species differ in size (the Black-striped Wallaby is about twice the size of the Bridled Nailtail Wallaby) and, on this basis alone, are likely to partition habitat on the basis of dietary requirements. Reported habitat preferences also differ: the Black-striped Wallaby being associated with forest with a dense shrub layer, while the Bridled Nailtail Wallaby is associated with scrub edges, grazing in adjacent grassy woodlands.

In summary, it is *unlikely* that the proposed activity will have an adverse impact on the life cycle of this species (and so the action is not likely to place a viable local population at risk of extinction). In addition, the proposed conservation fence is likely to significantly increase the population across the 5,800 ha feral predator-free area.

The Black-striped Wallaby is not listed as an endangered population.

*(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*

- (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*
- (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,*

The Black-striped Wallaby is not listed as an endangered ecological community or critically endangered ecological community.

*(c) in relation to the habitat of a threatened species, population or ecological community:*

- (i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*
- (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*
- (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,*

- (i) The proposed CFAI would result in habitat modification across about 62 ha. This is a tiny proportion of the total habitat area for the species within the proposal area and within the entire Pilliga forests.
- (ii) The proposal would isolate the fenced area from remaining portions of the Pilliga. The population in the fenced area is likely to increase significantly. AWC will monitor the population inside and outside the fence: if there is any risk to the genetic viability of the either population, AWC will carry out an exchange of animals between the two populations.
- (iii) The removal of vegetation will be minor in the context of the total area of habitat available for the Black-striped Wallaby in the Pilliga forests. The proposed activity will result in the clearing or modification of approximately 62 ha within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of most of this clearing (15 m wide) will have no significant impact on the forage and shelter available to Black-striped Wallabies. In addition, the proposed activity would create a 5,822 ha feral predator and herbivore free area which is expected to be of benefit to Black-striped Wallabies by removing feral predators and resource competition from introduced herbivores. See above. Accordingly, the effect of the action on habitat will be to improve the long-term survival of the species in the locality.

*(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),*

There is no declared area of outstanding biodiversity value as listed under the BC Act within the vicinity of the proposed CFAI.

*(e) whether the proposed development or activity is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.*

The proposed activity – reintroducing regionally extinct native mammals – is not recognised as a key threatening process (KTP) under schedule 3 of the BC Act. However, one KTP is relevant to the proposed activity and it has already been discussed in Part (a). This KTP is: *Clearing of native vegetation.*

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha

of continuous habitat in the Pilliga forests. The long, narrow, linear nature of this clearing (15 m wide) will have no impact on the habitat of the Black-striped Wallaby whose home-ranges are about 90 ha.

The removal of feral predators and herbivores from within the 5,822 ha fenced area, and the increase in feral animal control across the balance of the EMA project area, will deliver substantial benefits to the Black-striped Wallaby. It will provide a significant reduction in the operation of seven KTPs: *Competition and grazing by the feral European Rabbit*, *Competition and habitat degradation by Feral Goats*, *Herbivory and environmental degradation caused by feral deer*, *Predation and hybridisation by Feral dogs*, *Predation by the European Red Fox*, *Predation by feral cats*, and *Predation, habitat degradation, competition and disease transmission by Feral Pigs*.

In summary, the proposed activity is *unlikely* to significantly increase the impact of any relevant key threatening process in the proposal area. It is certain to reduce the impact of several key threatening processes.

## Conclusion

This Assessment of Significance has determined that the proposed activity is '*unlikely*' to have a '*significant effect*' on Black-striped Wallabies or their habitat in the proposal area. The levels of foraging resources available will not be significantly affected by the proposed activity. In addition, the proposed conservation fence is likely to increase general longevity and reproductive success following the removal of feral predators and feral herbivores. Therefore, the proposed activity will not require a Species Impact Statement.

## Eastern Pygmy-possum

(a) in the case of a threatened species, whether the action proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

The Eastern Pygmy-possum is a tiny arboreal marsupial (average weight 24 g) distributed from south-east Queensland to south-east South Australia, and Tasmania. In NSW, it occurs along the coast, ranges and inland slopes, with the Pilliga region being the north-west limit of its distribution. It inhabits a wide range of vegetation types from rainforest to heath, where it feeds on pollen, nectar and invertebrates. It is an important pollinator of several species of Banksia and potentially other large-flowered myrtaceous and proteaceous plants (Evans and Bunce 2000). Home ranges are small (from <1 ha in heath, to 3-4 ha in forest, but can be up to 20 ha) (Bladon et al. 2002; Law et al. 2013). Dens have been identified in small hollows (entrance diameters ≤ 4 cm), tree stumps and logs, nest boxes, discarded bird nests and Common Ringtail Possum (*Pseudocheirus peregrinus*) dreys and thickets of vegetation such as Xanthorrhoea skirts (Law et al. 2013). Maternity dens are primarily in trees, fallen logs or stumps.

The Eastern Pygmy-possum is known to occur in the vicinity of the proposed CFAI, with one recent record obtained during the AWC field survey in April 2017. There are a number of other records across the Pilliga region, all in the south-east of the EMA project area.

OEH (2017d) identify the following threats to this species:

- Loss and fragmentation habitat through land-clearing for agriculture, forestry and urban development.
- Changed fire regimes that affect the abundance of flowering proteaceous and myrtaceous shrubs, particularly banksias.
- Declining shrub diversity in forests and woodlands due to overgrazing by stock and rabbits.
- Predation from cats, dogs and foxes.
- Loss of nest sites due to removal of firewood.
- Mortality on roads through habitat and movement areas.

The action is *unlikely* to have an adverse effect on the life cycle of the Eastern Pygmy-possum such that a viable local population of the species is likely to be placed at risk of extinction, because:

- The clearing of 62 ha represents a very small percentage of the habitat that is available to the local population (0.2% of the study area), with the majority of woodland/forest within and adjoining being unaffected.
- The clearing is linear, 12-15 m wide, therefore not likely to impact substantially on any individual home ranges (3-4 ha home ranges are c. 150-200 m wide)
- Our clearing protocols will minimise any individual casualties.
- The loss of hollow bearing trees from cleared areas is unlikely to materially affect the population, given the abundance of hollow-bearing trees in the proposal area and the broad nesting behaviour of the species.
- The fence is unlikely to be a barrier for this species, given its small size and climbing ability.

In addition, the overall impact of the action is positive because the fenced area would result in the creation of a 5,822 ha area free of feral cats and foxes, and reduced numbers of feral herbivores. With predation by cats and foxes and modification of habitat by introduced herbivores being identified threats to this species, the proposal addresses these key threats and is likely to be of significant benefit.

Eastern Pygmy-possum is not listed as an endangered population.

*(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*

- (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*
- (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,*

Eastern Pygmy-possum is not listed as an endangered ecological community or critically endangered ecological community.

*(c) in relation to the habitat of a threatened species, population or ecological community:*

- (i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*
- (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*
- (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,*

- (i) The proposed CFAI would result in habitat modification of about 62 ha. This is a tiny proportion of the total habitat area for the species within the proposal area and within the entire Pilliga forests.
- (ii) The proposal is not expected to isolate the population in the fenced area from remaining portions of the Pilliga.
- (iii) The modification of habitats will be minor in the context of the total area of habitat available for the Eastern Pygmy-possum in the Pilliga forests. The proposed activity will result in the clearing or modification of approximately 62 ha within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of most of this clearing (15 m wide) will have no significant impact on the habitat of Eastern Pygmy-possums. In addition, the proposed activity would create a 5,822 ha feral predator and herbivore free area which is expected to be of benefit to Eastern Pygmy-possums by improving the quality of habitats. Given that large areas of forest and woodland would remain unaffected (including those within the proposed fenced area), it is



unlikely that the habitat to be directly affected is important to the long-term survival of Eastern Pygmy-possum in the locality.

(d) *whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),*

There is no declared area of outstanding biodiversity value as listed under the BC Act within the vicinity of the proposed CFAI.

(e) *whether the proposed development or activity is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.*

The proposed activity – reintroducing extinct mammals – is not recognised as a key threatening process (KTP) under schedule 3 of the BC Act. However, one KTP is relevant to the proposed activity: the *Clearing of native vegetation*.

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of most of this clearing will have little adverse impact on the home ranges of Eastern Pygmy-possums within the Pilliga study area.

The removal of feral predators and herbivores from within the 5,822 ha fenced area will deliver benefits for Eastern Pygmy-possums. It will provide a significant reduction in the operation of seven KTPs: *Competition and grazing by the feral European Rabbit, Competition and habitat degradation by Feral Goats, Herbivory and environmental degradation caused by feral deer, Predation and hybridisation by Feral dogs, Predation by the European Red Fox, Predation by feral cats, and Predation, habitat degradation, competition and disease transmission by Feral Pigs.*

In summary, the proposed activity is unlikely to introduce or to significantly increase the impact of any relevant key threatening process in the proposal area. It is certain to reduce the impact of several key threatening processes.

## Conclusion

This Assessment of Significance has determined that the proposed activity is *'unlikely'* to have a *'significant effect'* on Eastern Pygmy-possums or their habitat in the proposal area. Therefore, the proposed activity will not require a Species Impact Statement.

## Koala

(a) *in the case of a threatened species, whether the action proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,*

The Koala occurs in fragmented distribution throughout eastern Australia from north-east Queensland to the Eyre Peninsula in South Australia (DECC, 2008a, DOTE, 2014, Kavanagh et al., 2007, Matthews et al., 2007, McAlpine et al., 2006, McAlpine et al., 2015). The Koala is an arboreal marsupial, weighing 6-12 kg for males and 5-8 kg for females (OEH, 2017d), which spends most of its time within tree canopies, but is vulnerable to predation when it comes to the ground to move between food trees.

Koalas feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but display preferences for different tree species depending on regional location (DECC, 2008a). In the Pilliga forests, Koalas have been shown to preferentially select the leaves of several red gum species that are present (Dirty Gum, Blakely's Red Gum, River Red Gum) and the endemic Pilliga Box, but they also forage in a number of other local tree species (e.g. Narrow-leaved Ironbark) in proportion to their availability (Kavanagh et al. 2007). Habitat suitability more generally is largely dependent on tree species and maturity, soil fertility, the area of habitat and its disturbance history (DECC, 2008a). Local studies in the Pilliga and on the nearby Liverpool Plains have shown that Koalas use trees from across a

wide range of diameter size-classes, including extensive use of young eucalypt plantations that consist of favoured tree species (Kavanagh et al. 2007, Kavanagh and Stanton 2012).

The Pilliga forests were estimated to support more than 15,000 Koalas at the end of the 1990s, a decade of above average rainfall, but the population declined significantly during an extended drought (2001-2009) combined with extended periods of above-average temperatures (Kavanagh and Barrott 2001, McAlpine et al. 2015, Lunney et al. 2017). The forest types occurring within the Pilliga study area contain all of the food tree species known to be favoured/used by the Koala. Recent surveys by AWC located Koalas at 5 of the 60 sites (each 2.5 km apart and spaced on a grid) surveyed in spring 2016 in the Pilliga EMA project area, however none of these records were located within the proposed feral predator-free fence. One additional opportunistic sighting of a Koala was located adjacent to the proposed feral predator-free fence, and it is likely that a small number of individuals may occur within it because potential habitat for the Koala is widespread within the proposal area.

OEH (2017d) identify the following threats to Koala:

- Loss, modification and fragmentation of habitat.
- Vehicle strike.
- Predation by roaming or domestic dogs.
- Intense prescribed burns or wildfires that scorch or burn the tree canopy.
- Koala disease.
- Heat stress through drought and heatwaves.
- Human-induced climate change.
- Inadequate support for fauna rehabilitation.
- Poor understanding of sources of trauma and mortality.
- Poor understanding of population distribution and trend.
- Poor understanding of animal movements and use of habitat.

The proposed activity is not likely to contribute significantly to these potential threats. The key points relating to the impact of the proposed activity are that:

- a) Approximately 48 ha is proposed for clearing along the entire 32 km perimeter of the conservation fence;
- b) This clearing will be implemented as a narrow strip averaging 15 m in width;
- c) A separate area of approximately 11 ha will be partially cleared for the proposed operations base; and
- d) One new management track (8.2 km long) will be created (3 ha clearing).

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of most of this clearing (15 m wide) will have no adverse impact on the life cycle of the Koalas whose home-ranges in the Pilliga average 10-15 ha (Kavanagh et al. 2007). Koalas in the Pilliga have been shown to survive and remain within their pre-logging home-ranges after they were selectively logged for White Cypress Pine. Radio-tracking studies also showed that Koalas regularly crossed forest roads and tracks within their home-ranges (Kavanagh et al. 2007).

Vehicle strike is a significant source of Koala mortality in urban areas and along highways (Taylor and Goldingay 2010), however, traffic volumes along roads and tracks in the Pilliga study area are a tiny fraction of those in urban areas and vehicle speeds are limited to a maximum of 60 km per hour. Vehicle strike is likely to be a very rare occurrence in the Pilliga. The proposed action will not increase the likelihood of vehicle strike.

Similarly, predation by roaming or domestic dogs is a significant threat to Koalas near urban areas (McAlpine et al. 2015), however, dogs are relatively uncommon in the Pilliga EMA project area (e.g. AWC recorded dogs at 5 of 120 remote-camera locations surveyed in spring 2016).

The proposed activity will require a Strategic Fire Advantage Zone (SFAZ) of 200 m width around the outside of the fence and an Asset Protection Zone (APZ) of 75 m around the proposed operations base. Understorey vegetation in these areas will be managed to reduce the severity of any wildfire, but many canopy trees are expected to be retained in fire management zones.

The incidence of Chlamydia in the Pilliga Koala population is very low, compared to areas on the north coast of NSW (Kavanagh et al. 2007, Australian Museum, unpublished data). It is unlikely that the proposed activity would exacerbate the levels of disease in the low, sparsely distributed Koala population in the Pilliga study area.

Heat stress through drought and heatwaves is thought to have been the primary factor causing an observed major decline of Koalas in the Pilliga forests, including within the Pilliga EMA project area (Kavanagh et al. 2007, McAlpine et al. 2015, Lunney et al. 2017). Human-induced climate change is thought to underpin these changed conditions. It is unlikely that the proposed activity would exacerbate any climatic effects.

Koala rehabilitation, if required, is likely to be more accessible once AWC staff have a daily presence in the Pilliga EMA project area.

Koala research in the Pilliga forests over the past 20 years is continuing to develop an understanding of sources of Koala trauma and mortality (e.g. thorn-stick injury from the introduced weed, Tiger Pear), the trends in Koala population size, and the levels of understanding of Koala movements and use of habitat (e.g. Kavanagh and Barrott 2001, Kavanagh et al. 2007, McAlpine et al. 2015, Lunney et al. 2017).

The proposed action involves the establishment of a conservation fence that will prevent any Koalas within the feral-free area to move outside of the feral-free area. This is not likely to have an adverse impact on the life cycle of this species at this location because there are adequate resources available to Koalas either side of the fence, particularly at their current low population density in the study area.

- Koalas inside the proposed fence will have the threats of feral predation removed and are likely to increase in population, although there are other limitations (climatic) that may impede the growth of the population.
- The increased control of feral predators outside the fence may also deliver an increase in the population outside the fence.
- The fence will be a barrier to movement of Koalas. At present, there are no known Koalas within the proposed fenced area, but suitable habitat occurs within it and a small number of individuals may occur there. To mitigate any impacts, AWC will monitor the population inside and outside the fence: if there is any risk to the genetic viability of either population, AWC will carry out an exchange of animals between the two populations..

For the reasons provided above, it is *unlikely* that the proposed activity will have an adverse impact on the life cycle of this species (and so the action is not likely to place a viable local population at risk of extinction). In addition, the proposed conservation fence is likely to increase Koala survival and fecundity through the exclusion of exotic predators (dogs, foxes and cats), and through a general reduction in the severity of these threats outside of the proposed conservation fence. The creation of a 5,822 ha protected area will remove a significant threat and promote an increase in population within this area. Manual exchange of animals between the fenced and unfence areas will be carried out if required.

The Koalas in the Pilliga are not listed as an endangered population.

*(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*

- (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*

(ii) *is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,*  
The Koala population in the Pilliga is not listed as an endangered ecological community or critically endangered ecological community.

(c) *in relation to the habitat of a threatened species, population or ecological community:*

- (i) *the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*
- (ii) *whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*
- (iii) *the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,*

- (i) The proposed CFAI would result in habitat modification of about 62 ha through areas that Koalas may use. This is minimal in the context of the large size of the Pilliga EMA project area (35,632 ha), the current very small population of Koalas inhabiting the area (probably 10-20), and the very large continuous area of the Pilliga forests (> 500,000 ha).
- (ii) The proposal would isolate the fenced area from remaining portions of the Pilliga. The fence will protect Koalas from feral predators; however, it will also be a barrier to the movement of Koalas. At present, there are no known Koalas within the fenced area, but suitable habitat occurs within the fenced area and a small number of individuals may occur there. To mitigate any impacts, AWC will monitor the population inside and outside the fence: if there is any risk to the genetic viability of either population, AWC will carry out an exchange of animals between the two populations.
- (iii) The modification of habitats will be minor in the context of the total area of habitat available for the Koala in the Pilliga forests. The proposed activity will result in the clearing or modification of approximately 62 ha within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. In addition, the proposed activity would create a 5,822 ha feral predator and herbivore free area which is expected to be of benefit to Koalas by improving the quality of habitats. Given that large areas of forest and woodland would remain unaffected (including those within the proposed fenced area), it is unlikely that the habitat to be modified is important to the long-term survival of Koala in the locality.

(d) *whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),*

There is no declared area of outstanding biodiversity value as listed under the BC Act within the vicinity of the proposed CFAI.

(e) *whether the proposed development or activity is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.*

The proposed activity – reintroducing regionally extinct native mammals – is not recognised as a key threatening process (KTP) under schedule 3 of the BC Act. However, several KTPs are relevant to the proposed activity, including *Clearing of native vegetation*.

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The small area to be cleared will have no adverse impact on the habitat of Koalas. Radio-tracking studies of Koalas in the Pilliga has shown that Koalas regularly crossed forest roads and tracks within their home-ranges (Kavanagh et al. 2007).

The removal of feral predators and herbivores from within the 5,822 ha fenced area will deliver substantial benefits for any Koalas inside it. It will reduce or eliminate the threats posed by: *Competition and grazing by the feral European Rabbit, Competition and habitat*

*degradation by Feral Goats, Herbivory and environmental degradation caused by Feral Deer, Predation and hybridisation by Feral Dogs, Predation by the European Red Fox, Predation by Feral Cats, and Predation, habitat degradation, competition and disease transmission by Feral Pigs.*

The fence will protect Koalas from feral predators; however, it will also be a barrier to the movement of Koalas. At present, there are no known Koalas within the proposed CFAI, but suitable habitat occurs within the area and a small number of individuals may occur there. To mitigate any impacts, AWC will monitor the population inside and outside the fence: if there is any risk to the genetic viability of either population, AWC will carry out an exchange of animals between the two populations.

In summary, the proposed activity is *unlikely* to introduce or to significantly increase the impact of any relevant key threatening process in the proposal area. It is certain to reduce the impact of several key threatening processes.

## **Conclusion**

This Assessment of Significance has determined that the proposed activity is *'unlikely'* to have a *'significant effect'* on the Koala or its habitat in the proposal area. Instead, the proposed conservation fence is likely to increase the survival and fecundity of any small Koala population that is currently residing in the proposed fenced area, following the removal of feral predators and introduced herbivores. Therefore, the proposed activity will not require a Species Impact Statement.

## **Pilliga Mouse**

*(a) in the case of a threatened species, whether the action proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,*

The Pilliga Mouse was once thought to be restricted to the Pilliga region of NSW. However, a Pilliga Mouse was reportedly trapped in the Warrumbungles after a major wildfire in January 2013, suggesting a sparse local population may have previously existed that responds to early stages of post-fire succession (OEH, 2017d). The Pilliga Mouse typically occurs at low densities and appears to prefer areas with sparse ground cover. Evidence exists of marked population fluctuations (Tokushima et al., 2009, Tokushima and Jarman, 2009).

OEH (2017d) have identified the following threats to this species:

- Logging operations in areas containing key habitat elements of >30% cover of low shrubs below 50 cm in height; absence of tall understorey at 2m height, >20 cm sand depth, floristic indicators.
- Inappropriate level of Broombush harvesting.
- Inappropriate fire regimes.
- Predation - by feral predators (fox, cat and pig) may also influence the continued existence of this species.
- Competition from feral House Mouse populations.

The proposed activity is not likely to contribute significantly to these potential threats. The key points relating to the impact of the proposed activity are that:

- a) Approximately 48 ha is proposed for clearing along the entire 32 km perimeter of the conservation fence;
- b) This clearing will be implemented as a narrow strip averaging 15 m in width;
- c) A separate area of approximately 11 ha will be partially cleared for the proposed operations base; and
- d) One new management track (8.2 km long) will be created (3 ha clearing).

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha

of continuous habitat in the Pilliga forests. If the area to be disturbed is currently used by any Pilliga Mice, they would only constitute a similarly tiny fraction of the whole Pilliga population. In addition, the proposed pre-disturbance surveys are expected to identify Pilliga Mice in the affected area and these would be moved to undisturbed sites.

The proposal involves establishing a 5,800 ha area which is free of feral predators. This deliver a substantial increase in the population of Pilliga Mice (based on experience elsewhere with the effect of feral predator-free areas on rodent populations, including at Scotia and Arid Recovery).

The proposed activity includes the reintroduction of another native rodent species, the Plains Mouse, to the fenced area and, subsequently, potentially outside the fenced area, subject to the development of a defensible 'beyond the fence' strategy. The Pilliga Mouse previously co-occurred with the Plains Mouse at the regional level (Paull and Date 1999 report a record of the Plains Mouse from Manilla from the 19<sup>th</sup> century). The two species differ in size (the Plains Mouse is much larger (4-5 times larger) than the Pilliga Mouse and, on this basis alone, are likely to partition habitat on the basis of dietary requirements. Reported habitat preferences also differ: at present, the Plains Mouse is associated with clay soils, while the Pilliga Mouse is associated with sandy soils. These habitat preferences are likely refugial and could be expected to expand within the fenced area, due to release from predation by feral predators.

In considering potential competition, it must be remembered that the Pilliga Mouse was just one of 10 species of native rodents that occurred in the Pilliga region 200 years ago (Ford and Aplin 2008). Besides the Pilliga Mouse, that assemblage included another three *Pseudomys* species, a 'tree-rat' (*Conilurus albipes*), two species of hopping mice (*Notomys*) and three species of *Rattus*. The richness of the historical rodent assemblage suggests the operation of fine-scale partitioning based on size differences, habitat preferences, diet, etc. The current assemblage in the Pilliga SCA comprises just one native rodent (the Pilliga Mouse) and the introduced house mouse; there are many 'empty niches' previously filled by the regionally- or globally-extinct rodents. That is, a weight of evidence suggests the Plains Mouse is very unlikely to competitively exclude the Pilliga Mouse .

In summary, it is *unlikely* that the proposed activity will have an adverse impact on the life cycle of this species (and so the action is not likely to place a viable local population at risk of extinction). It is likely to deliver a significant increase in the population of the species.

Pilliga Mouse is not listed as an endangered population.

*(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*

- (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*
- (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,*

Pilliga Mouse is not listed as an endangered ecological community or critically endangered ecological community.

*(c) in relation to the habitat of a threatened species, population or ecological community:*

- (i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*
- (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*
- (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,*

- (i) The proposed CFAI would result in habitat modification across about 62 ha. This is a tiny proportion of the total habitat area for the species within the proposed proposal area and within the entire Pilliga forests.
- (ii) The proposal would not isolate or fragment habitats as clearing will only occur along narrow strips through the habitats.
- (iii) The modification of habitats will be minor in the context of the total area of habitat available for the Pilliga Mouse in the Pilliga forests. The proposed activity will result in the clearing or modification of approximately 62 ha within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. In addition, the proposed activity would create a 5,822 ha feral predator and herbivore free area which is expected to be of benefit to Pilliga Mice by improving the quality of habitats – this is likely to deliver an increase in the population of Pilliga Mice in the locality. Given that large areas of forest and woodland would remain unaffected (including those within the proposed fenced area), it is unlikely that the habitat to be modified is important to the long-term survival of Pilliga Mouse in the locality.

(d) *whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),*

There is no declared area of outstanding biodiversity value as listed under the BC Act within the vicinity of the proposed CFAI.

(e) *whether the proposed development or activity is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.*

The proposed activity – reintroducing extinct mammals – is not recognised as a key threatening process (KTP) under schedule 3 of the BC Act. However, two KTPs are relevant to the proposed activity: the *Removal of dead wood and dead trees*, and *Clearing of native vegetation* is of relevance to this species.

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. Because the area to be cleared is a tiny fraction of the habitats available to the mice in the Pilliga, any adverse impacts on the population will be minor, and measures will be taken to mitigate these by moving any mice that will be affected to other, nearby sites.

The proposed activity will result in the retention (but relocation) of dead wood and the removal of dead trees if they occur directly on the path of the conservation fence and other infrastructure. The minor amounts of dead wood that would be relocated are not expected to have significant impacts on the species.

The removal of feral predators and herbivores from within the 5,822 ha fenced area will produce substantial benefits to, and a likely increase in the population of, Pilliga Mice. It will provide a significant reduction in the operation of seven KTPs: *Competition and grazing by the feral European Rabbit*, *Competition and habitat degradation by Feral Goats*, *Herbivory and environmental degradation caused by feral deer*, *Predation and hybridisation by Feral dogs*, *Predation by the European Red Fox*, *Predation by feral cats*, and *Predation, habitat degradation, competition and disease transmission by Feral Pigs*.

In summary, the proposed activity is *unlikely* to introduce or to significantly increase the impact of any relevant key threatening process in the proposal area. It is certain to reduce the impact of several key threatening processes.

## Conclusion

This Assessment of Significance has determined that the proposed activity is *'unlikely'* to have a *'significant effect'* on Pilliga Mouse or their habitats. Therefore, the proposed activity will not require a Species Impact Statement.

## ***Commersonia procumbens***

(a) in the case of a threatened species, whether the action proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

*Commersonia procumbens* is Endemic to NSW, mainly confined to the Dubbo-Mendooran-Gilgandra region, but is also in the Pilliga and Nymagee areas. Recent collections have been made from the Upper Hunter region, and additional populations have been found in Goonoo SCA in response to the 2007 fires. This species grows in sandy sites, often along roadsides. It has been recorded in *Eucalyptus dealbata* and *Eucalyptus sideroxylon* communities, *Melaleuca uncinata* scrub, under mallee eucalypts with a *Calytrix tetragona* understorey, and in a recently burnt Ironbark and *Callitris* areas. Also found in *Eucalyptus fibrosa* subsp. *nubila*, *Eucalyptus dealbata*, *Eucalyptus albens* and *Callitris glaucophylla* woodlands north of Dubbo. Other associated species include *Acacia triptera*, *Callitris endlicheri*, *Eucalyptus melliodora*, *Allocasuarina diminuta*, *Philothea salsolifolia*, *Xanthorrhoea* species, *Exocarpos cupressiformis*, *Leptospermum parvifolium* and *Kunzea parvifolia*. The species is often found as a pioneer species of disturbed habitats. It has been recorded colonising disturbed areas such as roadsides, the edges of quarries and gravel stockpiles and a recently cleared easement under power lines.

Many hundreds of plants were observed by AWC in 2016 and 2017. One collection (from adjacent to Old Fence Road) was sent to the National Herbarium of NSW where the identification was confirmed, and the specimen retained for their collection.

The field inspection by AWC included searches of all suitable habitat for *Commersonia procumbens* within the AWC management area. It was found to occur only in very recently burnt (< 4-5 years) vegetation of either Fringe Myrtle-Westringia heath, Broom Bush heath, or Burrow's Wattle woodland. This plant is particularly abundant (often the dominant low ground cover) in areas burnt in 2015. Individuals were found only very rarely in heathlands burnt in 2012, where plants were most common on the road edge where grading of the road had possibly extended the germination period. It was not found in very similar heathlands nearby which were burnt in 2010.

AWC surveys in transects perpendicular to Broom Road also found that this species was abundant throughout that heathland patch, and these areas would not be directly impacted by the clearing of vegetation.

OEH (2017d) identify the following threats to this species:

- Cessation or modification of pre-historic disturbance regimes (fire suppression may disadvantage populations by preventing renewal of the seedbank).
- Woody shrub competition (particularly thick stands of *Acacia triptera*).
- Continued grading of roads and roadsides (the depth of disturbance is important, but at certain depths it could result in removal or damage to the perennating parts of the plant).

The proposed activity is not likely to contribute significantly to these potential threats. The key points relating to the impact of the proposed activity are that:

- a) Approximately 48 ha is proposed for clearing along the entire 32 km perimeter of the conservation fence;
- b) This clearing will be implemented as a narrow strip averaging 15 m in width;
- c) A separate area of approximately 11 ha will be partially cleared for the proposed operations base; and
- d) One new management track (8.2 km long) will be created (3 ha clearing).

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. This is a tiny proportion of the total habitat area for the species within the proposal area and within the entire Pilliga forests. In addition, the



species is associated with recently burnt habitats, and germination is stimulated by road grading. This species is mostly threatened by long fire intervals. Given that it is likely to be present in the seed bank of areas that have not been recently burnt, the small area to be disturbed by the proposed activity is unlikely to threaten the viability of the population in the study area, and will not lead to its local extinction.

The proposed activity includes the reintroduction of several omnivorous mammals (the Western Barred Bandicoot, Bilby, Brush-tailed Bettong, Plains Mouse) and a grazer - Bridled Nailtail Wallaby – inside the fenced area, initially, and potentially outside the fence, subject to development of an 'outside the fence' strategy. While reintroduced species may possibly browse on a species of threatened plant as part of their diets, none of the reintroduced species specialise on threatened plants and hence any impacts of reintroduced species on threatened plants can be safely presumed to be minor. Further, as the reintroduction is to be conducted in conjunction with the removal of goats and other large introduced herbivores from the fenced area, the overall grazing impacts are likely to be reduced. Some impacts of reintroduced species on threatened plants may be positive, due to the roles that threatened mammals play in seed and mycorrhizal fungi dispersal, and in creating diggings that trap nutrients and water, promoting seed germination. In any case, any impacts on threatened plants will be monitored through AWC's Ecological Health Monitoring Framework (EHMF). Given the estimated size of the population of *Commersonia procumbens* in the proposal area, monitoring can be expected to detect any adverse impacts from grazing in sufficient time to develop and adopt any required mitigation measures.

It is *unlikely* that the proposed activity will have an adverse impact on the life cycle of this species (and so the action is not likely to place a viable local population at risk of extinction). In addition, the creation of a 5,822 ha area free of large introduced herbivores is a significant benefit to this species.

*Commersonia procumbens* is not listed as an endangered population.

(b) *in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*

- (i) *is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*
- (ii) *is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,*

*Commersonia procumbens* is not listed as an endangered ecological community or critically endangered ecological community.

(c) *in relation to the habitat of a threatened species, population or ecological community:*

- (i) *the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*
- (ii) *whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*
- (iii) *the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,*

- (i) The proposed CFAI would result in habitat modification across about 62 ha. This would remove about 100 plants (if they have not senesced naturally by the time clearing takes place), but leaves the vast majority of the habitat available for this species unmodified.
- (ii) The proposal would not present a barrier that would fragment or isolate habitats given the likely reproduction methods of the species and disturbed locations in which it grows.
- (iii) The modification of habitats will be minor in the context of the total area of habitat available for *Commersonia procumbens* in the Pilliga forests. The proposed activity will result in the clearing or modification of approximately 62 ha within an area of

35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The number of plants that might be removed during clearing is small compared to the number in the known local population. In addition, the proposed activity would create a 5,822 ha feral predator and herbivore free area which is expected to be of benefit to *Commersonia procumbens* by reducing the risks of trampling and browsing. Fire disturbance is known to enhance populations of this species and AWC will be introducing fire management regimes which may encourage its germination. It is therefore unlikely that the modification of habitats will adversely impact the long-term survival of *Commersonia procumbens* in the locality.

(d) *whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),*

There is no declared area of outstanding biodiversity value as listed under the BC Act within the vicinity of the proposed CFAI.

(e) *whether the proposed development or activity is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.*

The proposed activity – reintroducing regionally extinct native mammals – is not recognised as a key threatening process (KTP) under schedule 3 of the BC Act. However, one KTP is relevant to the proposed activity and it has been discussed in Part (a): the *Clearing of native vegetation*.

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The removal of about 100 plants will not have a significant impact as it represents a small proportion of a much larger local population.

The removal of feral herbivores from within the 5,822 ha fenced area together with timely and careful fire management will deliver substantial benefits for *Commersonia procumbens*. The removal of feral predators and herbivores will provide a significant reduction in the operation of four KTPs that pose serious threats to *Commersonia procumbens*: *Competition and grazing by the feral European Rabbit*, *Competition and habitat degradation by Feral Goats*, *Herbivory and environmental degradation caused by feral deer*, and *Predation, habitat degradation, competition and disease transmission by Feral Pigs*.

In summary, the proposed activity is *unlikely* to result in the operation of, or significantly increase the impact of, any key threatening process in the proposal area.

## Conclusion

This Assessment of Significance has determined that the proposed activity is *'unlikely'* to have a *'significant effect'* on *Commersonia procumbens* or their habitats. Therefore, the proposed activity will not require a Species Impact Statement.

## *Tylophora linearis*

(a) *in the case of a threatened species, whether the action proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,*

This inconspicuous twiner is sparsely distributed, and flowers and fruits sporadically and then dies back to a tuber (OEH, 2017d). AWC confirmed its presence along the proposed CFAI in several locations and AWC found several other locations away from the fence-line. The AWC records were not restricted to any particular vegetation types in this area, though presence of shrubs to climb on is probably an important factor. Discovery of many new populations of this taxon (Forster et al., 2004) subsequent to its original NSW status listing as Endangered, lead to its downgrading to Vulnerable (OEH, 2017d). However it remains Endangered under the EPBC Act (SPRAT, 2017). In the Pilliga region, the species is widespread. Over 400 individuals were recorded in surveys conducted in the east Pilliga for

the proposed Santos development, with predicted abundance in that area of over 30,000 individuals.

A recent (August 2017) survey within the proposed CFAI recorded 11 plants, in seven localities, within 5 m either side of the proposed management track (which is proposed to be only 4 m in total width) and a further 20 plants within 50 m either side and perpendicular to the alignment at each of these seven localities. *T. linearis* does not appear to have any specific habitat preferences and plants recorded on the survey traverse provide an unbiased estimate of the population density over the study area as a whole. The 11 plants recorded within a 10 m x 8.2 km strip equates to a mean density of c. 1.34 plants ha/ha. This provides an estimate of almost 8,000 plants over the approximately 5,900 ha proposal area.

Assuming the track removes habitat over a 4 m width, it will remove approximately 0.06% of the *T. linearis* habitat in the proposed fenced area and will result in a long-term depletion of the *T. linearis* population by about that same amount. In the short term, effects on the population may be avoided by minor realignments to avoid existing plants. However, this will not have any long-term benefit as *T. linearis* is relatively short lived and fails to persist at present locations in the longer term. Currently nothing precise is known about the longevity or persistence of *T. linearis*, but its seed characteristics indicate that it is readily dispersed.

OEH (2017d) identify the following threats to this species:

- Track maintenance.
- Forestry activities.
- Inappropriate disturbance regimes.

The proposed activity is not likely to contribute significantly to these potential threats. The key points relating to the impact of the proposed activity are that:

- a) Approximately 48 ha is proposed for clearing along the entire 32 km perimeter of the conservation fence;
- b) This clearing will be implemented as a narrow strip averaging 15 m in width;
- c) A separate area of approximately 11 ha will be partially cleared for the proposed operations base; and
- d) One new management track (8.2 km long) will be created (3 ha clearing).

Fifteen *T. linearis* plants were identified in the vicinity of the proposed fence and an additional 11 plants, in seven localities, within 5 m either side of the proposed management track (which is proposed to be only 4 m in total width) were found. The clearing of 62 ha of native vegetation, and the removal of these *T. linearis*, is necessary to create the proposed feral predator-free area. The proposed CFAI would result in the removal of a small proportion of the 35,632 ha Pilliga EMA project area (about 0.17%) and a small proportion of the likely population in the study area (estimated nearly 8,000 individuals), with the majority of woodland/forest and individual plants being unaffected. In addition, the fenced area would result in the creation of a 5,822 ha area free of large introduced herbivores which are an existing threat to the species. In the context of the woodland/forest that remains unaffected by the proposed activity, the remaining plants that would remain unaffected and the creation of a 5,822 ha area free of large introduced herbivores, the modification of 62 ha and the removal of a small number of plants (about 15 plants on the fence, and additional plants at seven locations on the proposed track inside the fence) is a minor impact.

The proposed activity includes the reintroduction of several omnivorous mammals (the Western Barred Bandicoot, Bilby, Brush-tailed Bettong, Plains Mouse) and a grazer - Bridled Nailtail Wallaby – inside the fenced area, initially, and potentially outside the fence, subject to development of an 'outside the fence' strategy. While reintroduced species may possibly browse on a species of threatened plant as part of their diets, none of the reintroduced species specialise on threatened plants and hence any impacts of reintroduced species on threatened plants can be safely presumed to be minor. Further, as the reintroduction is to be conducted in conjunction with the removal of goats and other large introduced herbivores from the fenced area, the overall grazing impacts are likely to be reduced. Some impacts of

reintroduced species on threatened plants may be positive, due to the roles that threatened mammals play in seed and mycorrhizal fungi dispersal, and in creating diggings that trap nutrients and water, promoting seed germination. In any case, any impacts on threatened plants will be monitored through AWC's Ecological Health Monitoring Framework (EHMF). Given the estimated size of the population of *Tylophora linearis* in the proposal area, monitoring can be expected to detect any adverse impacts from grazing in sufficient time to develop and adopt any required mitigation measures.

On this basis, it is *unlikely* that the proposal could have an adverse effect on the life cycle of *Tylophora linearis* such that a viable local population is likely to be placed at risk of extinction.

*Tylophora linearis* is not listed as an endangered population.

(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

- (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or
- (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

*Tylophora linearis* is not listed as an endangered ecological community or critically endangered ecological community.

(c) *in relation to the habitat of a threatened species, population or ecological community:*

- (i) *the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*
- (ii) *whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*
- (iii) *the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,*

- (i) The proposed CFAI would result in habitat modification across about 62 ha. About 15 individuals on the proposed fence line, and additional plants at seven locations on the proposed track inside the fence, would be removed, but the vast majority of the habitat available for this species would remain unmodified.
- (ii) The proposal would not present a barrier that would fragment or isolate areas of known habitat given the likely distribution of this species across the Pilliga including across existing roads.
- (iii) The modification of habitats will be minor in the context of the total area of habitat available for *Tylophora linearis* in the Pilliga forests. The proposed activity will result in the clearing or modification of approximately 62 ha within an area of 35,632 ha (0.17%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The number of plants that might be removed during clearing is small compared to the number in the known local population. In addition, the proposed activity would remove introduced herbivores from 5,822 which would reduce the risk of trampling, and reintroduce mammals which would assist in restoring damaged ecosystems. These are likely to significantly benefit the long-term viability of *Tylophora linearis*. Given that large areas of forest and woodland would not be affected by clearing (including those within the proposed fenced area), it is unlikely that the habitat to be modified is important to the long-term survival of *Tylophora linearis* in the locality.

(d) *whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),*

There is no declared area of outstanding biodiversity value as listed under the BC Act within the vicinity of the proposed CFAI.

(e) *whether the proposed development or activity is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.*

The proposed activity – reintroducing regionally extinct native mammals – is not recognised as a key threatening process (KTP) under schedule 3 of the BC Act. However, one KTP is relevant to the proposed activity and it has been discussed in Part (a): the *Clearing of native vegetation*.

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.17%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The removal of about 15 plants from the fenceline and plants at seven locations on the proposed track inside the fence will not have a significant impact on the local population.

The removal of feral herbivores from within the 5,822 ha fenced area will deliver substantial benefits for *Tylophora linearis*. It will provide a significant reduction in the operation of KTPs that are likely to pose serious threats to *Tylophora linearis*: *Competition and grazing by the feral European Rabbit, Competition and habitat degradation by Feral Goats, Herbivory and environmental degradation caused by feral deer, and Predation, habitat degradation, competition and disease transmission by Feral Pigs.*

In summary, the proposed activity is *unlikely* to result in the operation of, or increase the impact of a key threatening process with consideration of the mitigation measures proposed.

## Conclusion

This Assessment of Significance has determined that the proposed activity is *'unlikely'* to have a *'significant effect'* on *Tylophora linearis* or their habitats. Therefore, the proposed activity will not require a Species Impact Statement.

## ***Myriophyllum implicatum***

(a) *in the case of a threatened species, whether the action proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,*

Previously thought to be extinct, *Myriophyllum implicatum* was rediscovered in the Pilliga and is now listed as critically endangered under the BC Act.

Several individuals of the *Myriophyllum* genus were located adjacent or along the proposed fence-line by AWC botanists. Four specimens at two locations were confirmed as *Myriophyllum implicatum* by the National Herbarium of NSW, Royal Botanic Gardens. These occurred on one large well-developed wetland just inside the proposed fence on the eastern side, and the other was in the Pilliga NP north-east of the proposed fence. It is possible that more individuals could be located in any of these wetlands following targeted survey.

OEH (2017d) identify the following threats to this species:

- Climate change.
- Habitat destruction by feral pigs.
- Habitat disturbance by 4WD vehicle access.
- Artificial changes to inundation, surface water flow, or artesian spring flows.
- Invasion of exotic species such as grasses, Lippia (*Phyla canescens*), and the potential emerging threat from African carrion flower (*Orbea variegata*).
- Very little known about species' distribution, especially on private lands to the north.
- High risk of extinction due to small population size and restricted distribution.

The proposed activity is not likely to contribute significantly to these potential threats. The key points relating to the impact of the proposed activity are that:

- a) Approximately 48 ha is proposed for clearing along the entire 32 km perimeter of the conservation fence;
- b) This clearing will be implemented as a narrow strip averaging 15 m in width;

- c) A separate area of approximately 11 ha will be partially cleared for the proposed operations base; and
- d) One new management track (8.2 km long) will be created (3 ha clearing).

The proposed fence-line will come close to only a few of the wetlands occupied by *Myriophyllum implicatum* but none will be removed by the proposal. There are likely to be considerable benefits to this species following implementation of AWC management as the wetlands will be protected from pig damage which is recognised as a threat to this plant (OEH, 2017d).

With consideration of these factors, it is *unlikely* that the proposal could have an adverse effect on the life cycle of *Myriophyllum implicatum* such that a viable local population is likely to be placed at risk of extinction.

*Myriophyllum implicatum* is not listed as an endangered population.

(b) *in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*

- (i) *is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*
- (ii) *is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,*

*Myriophyllum implicatum* is not listed as an endangered ecological community or critically endangered ecological community.

(c) *in relation to the habitat of a threatened species, population or ecological community:*

- (i) *the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*
- (ii) *whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*
- (iii) *the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,*

- (i) The proposed CFAI would result in habitat modification across 62 ha, but this will occur away from known individuals of *Myriophyllum implicatum*.
- (ii) The proposal would not present a barrier that would fragment or isolate areas of known habitat given that no wetland areas supporting *Myriophyllum implicatum* would be directly impacted.
- (iii) The habitats to be modified do not support *Myriophyllum implicatum*. In addition, the proposed activity would create a 5,822 ha area free of introduced herbivores. This is a significant benefit to the long-term viability of *Myriophyllum implicatum*. Given that no areas of occupancy would be directly affected, the native vegetation to be removed is unlikely to be important to the long-term survival of *Myriophyllum implicatum* in the locality.

(d) *whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),*

There is no declared area of outstanding biodiversity value as listed under the BC Act within the vicinity of the proposed CFAI.

(e) *whether the proposed development or activity is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.*

The proposed activity – reintroducing extinct mammals – is not recognised as a key threatening process (KTP) under schedule 3 of the BC Act. However, one KTP is relevant to the proposed activity: *Clearing of native vegetation*.

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha

of continuous habitat in the Pilliga forests. This KTP will not impact on *Myriophyllum implicatum* as no plants will be removed.

The removal of feral herbivores from within the 5,822 ha fenced area will introduce benefits for *Myriophyllum implicatum*. It will provide a significant reduction in the operation of KTPs that pose serious threats to *Myriophyllum implicatum*: *Competition and grazing by the feral European Rabbit*, *Competition and habitat degradation by Feral Goats*, *Herbivory and environmental degradation caused by feral deer*, and *Predation, habitat degradation, competition and disease transmission by Feral Pigs*.

In summary, the proposed activity is *unlikely* to result in the operation of, or significantly increase the impact of, any key threatening process in the proposal area. It is certain to reduce the impact of several key threatening processes.

## Conclusion

This Assessment of Significance has determined that the proposed activity is '*unlikely*' to have a '*significant effect*' on *Myriophyllum implicatum*. Therefore, the proposed activity will not require a Species Impact Statement.

## Pilliga Outwash Ephemeral Wetlands

(a) *in the case of a threatened species, whether the action proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,*

Pilliga Outwash Ephemeral Wetlands are not a threatened species.

Pilliga Outwash Ephemeral Wetlands are not an endangered population.

(b) *in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*

- (i) *is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*
- (ii) *is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,*

(i) Field surveys undertaken by AWC botanists along the proposed fenceline (more than 10 m either side) and at the operations base location identified the presence of 13 "herbfield or shallow basin wetlands" within the vicinity of the proposal. This is 4% of the 340 Pilliga outwash wetlands known to occur in the Pilliga (Bell et al., 2012). The largest is 200 m by 140 m, while most are much smaller. Threats listed for this TEC include disturbance to the ground surface by feral pigs, sedimentation resulting from erosion, grazing by cattle and horses, track construction and native vegetation clearing (OEH, 2017d). The proposal is unlikely to result in any reduction of this TEC. In addition, it will remove known threats to their long term viability by removing feral pigs. AWC will put mitigation measures in place to minimise the potential for erosion and sedimentation. Given this, the proposal is unlikely to have an adverse effect on the extent of this TEC.

(ii) The modification of habitats will be minor in the context of the total area of habitat in the Pilliga forests and will not modify the composition of the TEC. In addition, the proposal will result in the removal of feral pigs from within the fenced area and this TEC will benefit from the removal of these introduced herbivores as they degrade and modify the ecological integrity of these wetlands, and are a key threat to their long-term viability. As such, the proposal is will not modify the composition of the TEC such that its local occurrence is placed at risk of extinction. The proposal will improve the integrity or the TEC within the locality through feral animal removal and control.

(c) *in relation to the habitat of a threatened species, population or ecological community:*

- (i) *the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*
- (ii) *whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*
- (iii) *the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,*

- (i) The proposed CFAI would result in habitat modification across about 62 ha, but not affect any vegetation consistent with this TEC.
- (ii) The proposal would not present a barrier that would fragment or isolate areas of this TEC, given that none would be directly affected.
- (iii) No area of TEC would be removed by the proposal. Potential indirect impacts such as erosion and sediment as a result of clearing native vegetation will be avoided by appropriate mitigation measures.

(d) *whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),*

There is no declared area of outstanding biodiversity value as listed under the BC Act within the vicinity of the proposed CFAI.

(e) *whether the proposed development or activity is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.*

Whilst the proposed activity – reintroducing extinct mammals – is not recognised as a key threatening process (KTP) under schedule 3 of the BC Act, one KTP is relevant to the proposed activity: *Clearing of native vegetation*. Under the FM Act, one KTP, *Degradation of native riparian vegetation*, is also relevant given potential erosion and sedimentation impacts.

The proposed activity will result in the clearing or modification of approximately 62 ha within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The small area affected by clearing does not include this TEC, so the KTP will not operate on it.

The proposed activity has the potential to result in minor erosion or sedimentation in riparian habitats, but the riparian areas affected by clearing will be extremely small in the context of the whole riparian network within the proposal area. The potential impacts can be fully mitigated by standard control methods which would be included in AWC's plans and operations. In addition, the removal of large herbivores from the proposed fenced area will remove an existing, serious cause of erosion and sedimentation in riparian habitats such as this TEC.

The removal of feral herbivores from within the 5,822 ha fenced area will significantly reduce the operation of KTPs that pose serious threats to this TEC: *Competition and grazing by the feral European Rabbit, Competition and habitat degradation by Feral Goats, Herbivory and environmental degradation caused by feral deer, and Predation, habitat degradation, competition and disease transmission by Feral Pigs*.

In summary, mitigation measured that will be part of the proposed activity will make it *unlikely* that it will result in the operation of, or significantly increase the impact of, any key threatening process in the proposal area.

## **Conclusion**

This Assessment of Significance has determined that the proposed activity is '*unlikely*' to have a '*significant effect*' on Pilliga Outwash Ephemeral Wetlands or their habitats, especially noting the measures that will be used to mitigate the small risk of erosion and sedimentation. Therefore, the proposed activity will not require a Species Impact Statement.



## Black-chinned Honeyeater

(a) in the case of a threatened species, whether the action proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

The Black-chinned Honeyeater extends south from central Queensland, through NSW, Victoria into south eastern South Australia, though it is very rare in the last state (Ford and Paton, 1977). In NSW it is widespread, with records from the tablelands and western slopes of the Great Dividing Range to the north-west and central-west plains and the Riverina. It is rarely recorded east of the Great Dividing Range, although regularly observed from the Richmond and Clarence River areas. It has also been recorded at a few scattered sites in the Hunter, Central Coast and Illawarra regions, though it is very rare in the latter. Occupies mostly upper levels of drier open forests or woodlands dominated by box and ironbark eucalypts, especially Mugga Ironbark (*Eucalyptus sideroxylon*), White Box (*E. albens*), Inland Grey Box (*E. microcarpa*), Yellow Box (*E. melliodora*), Blakely's Red Gum (*E. blakelyi*) and Forest Red Gum (*E. tereticornis*). Feeding territories are large making the species locally nomadic.

OEH (2017d) identify the following threats to this species:

- Clearing of remnant open forest and woodland habitat.
- Poor regeneration of open forest and woodland habitats because of intense grazing.
- May be excluded from smaller remnants by aggressive species such as the Noisy Miner (*Manorina melanocephala*).
- Fragmentation of woodland habitat.
- Infestation by invasive weeds.
- Inappropriate fire regimes.
- Climate change and reduction in resources due to drought.

The proposed activity is not likely to contribute significantly to these potential threats. The key points relating to the impact of the proposed activity are that:

- a) Approximately 48 ha is proposed for clearing along the entire 32 km perimeter of the conservation fence;
- b) This clearing will be implemented as a narrow strip averaging 15 m in width;
- c) A separate area of approximately 11 ha will be partially cleared for the proposed operations base; and
- d) One new management track (8.2 km long) will be created (3 ha clearing).

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. Black-chinned Honeyeater is likely to occur within the vicinity of the proposed CFAI and across the Pilliga Forest.

The narrow, linear nature of most of this clearing will have no significant adverse impacts on the life cycles of Black-chinned Honeyeaters as they are known to forage over larger areas. The linear nature of most of the clearing means that it is unlikely to remove a complete foraging area for any individuals; it will likely affect only a small area of the foraging range for a very small proportion of the local population.

The proposed activity will require a Strategic Fire Advantage Zone (SFAZ) of 200 m width around the outside of the fence and an Asset Protection Zone (APZ) of 75 m around the proposed operations base. Understorey vegetation in these areas will be managed to reduce the severity of any wildfire. Because the areas to be modified are limited in extent, there are unlikely to be any adverse effects on the life cycles of Black-chinned Honeyeaters.

In summary, it is *unlikely* that the proposed activity will have an adverse impact on the life cycle of this species (and so the action is not likely to place a viable local population at risk of extinction). The levels of foraging resources available to the Black-chinned Honeyeater across the Pilliga study area will not be significantly affected by the proposed activity. In

addition, the proposed conservation fence may benefit the species following the removal of feral animals and an improvement in habitat quality.

Black-chinned Honeyeater is not listed as an endangered population.

*(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*

- (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*
- (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,*

Black-chinned Honeyeater is not listed as an endangered ecological community or critically endangered ecological community.

*(c) in relation to the habitat of a threatened species, population or ecological community:*

- (i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*
- (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*
- (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,*

- (i) The proposed CFAI would result in habitat modification of about 62 ha through areas that Black-chinned Honeyeater are known to occur. This is a tiny proportion of the total habitat area for the species within the proposal area and within the entire Pilliga forests.
- (ii) The proposal would not isolate or fragment habitats as Black-chinned Honeyeaters are well able to fly across narrow cleared corridors.
- (iii) The modification of habitats will be minor in the context of the total area of habitat available for the Black-chinned Honeyeater in the Pilliga forests. The proposed activity will result in the clearing or modification of approximately 62 ha within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of most of this clearing (15 m wide) will have no significant impact on the habitat of Black-chinned Honeyeaters. In addition, the proposed activity would create a 5,822 ha feral predator and herbivore free area which is expected to be of benefit to Black-chinned Honeyeaters by improving the quality of habitats. Given that large areas of forest and woodland would remain unaffected (including those within the proposed fenced area), it is unlikely that the habitat to be modified is important to the long-term survival of Black-chinned Honeyeater in the locality.

*(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),*

There is no declared area of outstanding biodiversity value as listed under the BC Act within the vicinity of the proposed CFAI.

*(e) whether the proposed development or activity is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.*

The proposed activity – reintroducing extinct mammals – is not recognised as a key threatening process (KTP) under schedule 3 of the BC Act. However, two KTPs are relevant to the proposed activity: the *Removal of dead wood and dead trees*, and *Clearing of native vegetation*.

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of this clearing (15 m wide) will have little adverse impact on the home ranges of Black-chinned Honeyeaters within the Pilliga study area.

The proposed activity will result in the retention (but relocation) of dead wood and the removal of dead trees if they occur directly on the path of the linear conservation fence and other infrastructure. The minor amounts of dead wood that would be relocated are not expected to have significant impacts on the species.

The removal of feral predators and herbivores from within the 5,822 ha fenced area may deliver benefits for the Black-chinned Honeyeater. It will provide a significant reduction in the operation of seven KTPs: *Competition and grazing by the feral European Rabbit*, *Competition and habitat degradation by Feral Goats*, *Herbivory and environmental degradation caused by feral deer*, *Predation and hybridisation by Feral dogs*, *Predation by the European Red Fox*, *Predation by feral cats*, and *Predation, habitat degradation, competition and disease transmission by Feral Pigs*.

In summary, the proposed activity is *unlikely* to introduce or to significantly increase the impact of any relevant key threatening process in the proposal area. It is certain to reduce the impact of several key threatening processes.

## Conclusion

This Assessment of Significance has determined that the proposed activity is '*unlikely*' to have a '*significant effect*' on Black-chinned Honeyeater. In addition, the proposed conservation fence is likely to increase general longevity and reproductive success following the removal of feral animals and an improvement in habitat quality. Therefore, the proposed activity will not require a Species Impact Statement.

## Diamond Firetail

*(a) in the case of a threatened species, whether the action proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,*

Diamond Firetail is widely distributed in NSW, with a concentration of records from the Northern, Central and Southern Tablelands, the Northern, Central and South-western Slopes and the North-west Plains and Riverina (OEH, 2017d, Morcombe, 2004). Although they are not commonly found in coastal districts, there are records from near Sydney, the Hunter Valley and the Bega Valley (OEH, 2017d). They are considered relatively sedentary; however, many populations are known to disperse, especially during drought periods. They are known to build bottle-shaped nests in trees and bushes and preferentially choose mistletoe as a nest site (Cooney and Watson, 2005). It has declined in numbers in many areas and has disappeared from parts of its former range with Reid (1999) identifying it as a 'decliner' in a review of bird species' status in the NSW sheep-wheatbelt.

Diamond Firetail are likely to occur within the vicinity of the proposed CFAI and across the Pilliga Forest.

OEH (2017d) identify the following threats to Diamond Firetail:

- Clearing and fragmentation of woodland, open forest, grassland and mallee habitat for agriculture and residential development, and firewood collection.
- Poor regeneration of open forest and woodland habitats.
- Invasion of weeds, resulting in the loss of important food plants.
- Modification and destruction of ground- and shrub layers within habitat through: removal of native plants, litter and fallen timber; introduction of exotic pasture grasses; heavy grazing and compaction by stock; and frequent fire.
- Predation of eggs and nestlings by increased populations of native predators such as the Pied Currawong (*Strepera graculina*).
- Risk of local extinction due to small, isolated populations.

The proposed activity is not likely to contribute significantly to these potential threats. The key points relating to the impact of the proposed activity are that:

- a) Approximately 48 ha is proposed for clearing along the entire 32 km perimeter of the conservation fence;
- b) This clearing will be implemented as a narrow strip averaging 15 m in width;
- c) A separate area of approximately 11 ha will be partially cleared for the proposed operations base; and
- d) One new management track (8.2 km long) will be created (3 ha clearing).

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of most of this clearing will have no significant adverse impacts on the life cycles of the Diamond Firetail which will have the ability to fly over them. The linear nature of most of the clearing also means that it is unlikely to remove the entire home range for any individuals; it will likely affect only a small area of the home range for a very small proportion of the local population.

The proposed activity will require a Strategic Fire Advantage Zone (SFAZ) of 200 m width around the outside of the fence and an Asset Protection Zone (APZ) of 75 m around the proposed operations base. Understorey vegetation in these areas will be managed to reduce the severity of any wildfire. Because the areas to be modified are limited in extent, there are unlikely to be any adverse effects on the life cycles of Diamond Firetails.

In summary, it is *unlikely* that the proposed activity will have an adverse impact on the life cycle of this species (and so the action is not likely to place a viable local population at risk of extinction). In addition, the proposed conservation fence is likely to increase longevity and reproductive success of birds using habitats within it (i.e., across 5,800 ha) following the removal of feral predators and an improvement in habitat quality.

Diamond Firetail is not listed as an endangered population.

*(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*

- (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*
- (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,*

Diamond Firetail is not listed as an endangered ecological community or critically endangered ecological community.

*(c) in relation to the habitat of a threatened species, population or ecological community:*

- (i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*
- (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*
- (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,*

- (i) The proposed CFAI would result in habitat modification of about 62 ha. This is a tiny proportion of the total habitat area for the species within the proposal area and within the entire Pilliga forests.
- (ii) The proposal would not isolate or fragment habitats as Diamond Firetails are known to fly and forage across variegated landscapes.
- (iii) The modification of habitats will be minor in the context of the total area of habitat available for the Diamond Firetail in the Pilliga forests. The proposed activity will result in the clearing or modification of approximately 62 ha within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of most of this clearing (15 m wide) will have no significant impact on the habitat of Diamond Firetails. In addition, the proposed activity would create a 5,822 ha feral predator and herbivore free area

which is expected to be of benefit to Diamond Firetails by improving the quality of habitats. Given that large areas of forest and woodland would remain unaffected (including those within the proposed fenced area), it is unlikely that the habitat to be modified is important to the long-term survival of Diamond Firetail in the locality.

(d) *whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),*

There is no declared area of outstanding biodiversity value as listed under the BC Act within the vicinity of the proposed CFAI.

(e) *whether the proposed development or activity is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.*

The proposed activity – reintroducing extinct native mammals – is not recognised as a key threatening process (KTP) under schedule 3 of the BC Act. One KTP is relevant to the proposed activity: *Clearing of native vegetation*.

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of most of this clearing will have no impact on the habitat of the Diamond Firetail as they are known to forage and fly across clearings within agricultural land.

The removal of feral predators and herbivores from within the 5,822 ha fenced area will deliver benefits for the Diamond Firetail. It will provide a significant reduction in the operation of seven KTP: *Competition and grazing by the feral European Rabbit, Competition and habitat degradation by Feral Goats, Herbivory and environmental degradation caused by feral deer, Predation and hybridisation by Feral dogs, Predation by the European Red Fox, Predation by feral cats, and Predation, habitat degradation, competition and disease transmission by Feral Pigs.*

In summary, the proposed activity is *unlikely* to introduce or to significantly increase the impact of any relevant key threatening process in the proposal area. It is certain to reduce the impact of several key threatening processes.

## Conclusion

This Assessment of Significance has determined that the proposed activity is *'unlikely'* to have a *'significant effect'* on Diamond Firetail or their habitats. In addition, the proposed conservation fence is likely to increase general longevity and reproductive success following the removal of feral animals and an improvement in habitat quality. Therefore, the proposed activity will not require a Species Impact Statement.

## Flame Robin

(a) *in the case of a threatened species, whether the action proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,*

The Flame Robin is a seasonal breeding migrant that inhabits open grassy woodlands in south-eastern Australia. It perches on fallen woody debris or on the ground where it hunts for insects. The Flame Robin builds its cup-shaped nest of bark strips and spiderweb inside a loose bark flap on the trunk of a tree, or in a crevice or tree hollow.

OEH (2017d) identify the following threats to Flame Robin:

- Clearing and degradation of breeding and wintering habitats.
- Degradation and simplification of habitat by removal of standing dead timber, logs and coarse woody debris.
- Nest predation by native and exotic predators, including artificially large populations of Pied Currawong (*Strepera graculina*) in some areas.

- Habitat for this species may become unsuitable if dense regeneration occurs after bushfires or other disturbances.
- Competitive exclusion by over-abundant Noisy Miners (*Manorina melanocephala*) within habitat.
- Isolation of patches of habitat, particularly where these patches are smaller than 10 ha, and in landscapes where clearing has been heavy or where remnants are surrounded by cropping or stock grazing.
- Degradation and simplification of habitat due to overgrazing.
- Reduction of the native ground cover in favour of exotic grasses.
- Reduction in the structural complexity of habitat, including reductions in canopy cover, shrub cover, ground cover, logs, fallen branches and leaf litter.
- Reduction of size of remnant patches.

The proposed activity is not likely to contribute significantly to these potential threats. The key points relating to the impact of the proposed activity are that:

- a) Approximately 48 ha is proposed for clearing along the entire 32 km perimeter of the conservation fence;
- b) This clearing will be implemented as a narrow strip averaging 15 m in width;
- c) A separate area of approximately 11 ha will be partially cleared for the proposed operations base; and
- d) One new management track (8.2 km long) will be created (3 ha clearing).

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of most of this clearing will have no significant adverse impact on the life cycle of Flame Robins as they are known to forage in cleared and other disturbed strips of land. The linear nature of most of the clearing also means that it is unlikely to remove the entire home range for any individuals; it will likely affect only a small area of the home range for a very small proportion of the local population.

The proposed activity will require a Strategic Fire Advantage Zone (SFAZ) of 200 m width around the outside of the fence and an Asset Protection Zone (APZ) of 75 m around the proposed operations base. Understorey vegetation in these areas will be managed to reduce the severity of any wildfire. Because the areas to be modified are limited in extent, there are unlikely to be any adverse effects on the life cycles of Flame Robins.

In summary, it is *unlikely* that the proposed activity will have an adverse impact on the life cycle of this species (and so the action is not likely to place a viable local population at risk of extinction). The levels of nesting and foraging resources available to the Flame Robin across the Pilliga study area will not be significantly affected by the proposed activity. In addition, the proposed conservation fence is likely to increase reproductive success following the removal of feral animals and an improvement in habitat quality across 5,800 ha.

The Flame Robin in the Pilliga is not listed as an endangered population.

*(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*

- (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*
- (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,*

The Flame Robin is not listed as part of an endangered ecological community or critically endangered ecological community.

*(c) in relation to the habitat of a threatened species, population or ecological community:*

- (i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*

- (ii) *whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*
- (iii) *the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,*

- (i) The proposed CFAI would result in habitat modification across about 62 ha. This is a tiny proportion of the total habitat area for the species within the proposal area and within the entire Pilliga forests.
- (ii) The proposal would not isolate or fragment habitats as Flame Robin are known to forage in such recently cleared areas.
- (iii) The modification of habitats will be minor in the context of the total area of habitat available for the Flame Robin in the Pilliga forests. The proposed activity will result in the clearing or modification of approximately 62 ha within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of most of this clearing will have no significant impact on the habitat of Flame Robins. In addition, the proposed activity would create a 5,822 ha feral predator and herbivore free area which is expected to be of benefit to Flame Robins by improving the quality of habitats. Given that large areas of forest and woodland would remain unaffected (including those within the proposed fenced area), it is unlikely that the habitat to be modified is important to the long-term survival of Flame Robin in the locality.

(d) *whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),*

There is no declared area of outstanding biodiversity value as listed under the BC Act within the vicinity of the proposed CFAI.

(e) *whether the proposed development or activity is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.*

The proposed activity – reintroducing regionally extinct mammals – is not recognised as a key threatening process (KTP) under schedule 3 of the BC Act. However, two KTPs are relevant to the proposed activity and they have already been discussed in Part (a) above in relation to the Flame Robin. These KTPs are: *Removal of dead wood and dead trees*, and *Clearing of native vegetation*.

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of this clearing will have no adverse impact on the home ranges of Flame Robins within the Pilliga study area.

The proposed activity will result in the retention (but relocation) of dead wood and the removal of dead trees if they occur directly on the path of the conservation fence and other infrastructure. The amounts of dead wood and debris that would be created and partially relocated nearby are not expected to have significant impacts on the species; indeed, the changes in habitat are likely to be favourable for this species.

The removal of feral predators and herbivores from within the 5,822 ha fenced area will deliver substantial benefits for the Flame Robin. It will provide a significant reduction in the operation of seven KTPs: *Competition and grazing by the feral European Rabbit*, *Competition and habitat degradation by Feral Goats*, *Herbivory and environmental degradation caused by feral deer*, *Predation and hybridisation by Feral dogs*, *Predation by the European Red Fox*, *Predation by feral cats*, and *Predation, habitat degradation, competition and disease transmission by Feral Pigs*.

In summary, the proposed activity is *unlikely* to introduce or to significantly increase the impact of any relevant key threatening process in the proposal area. It is certain to reduce the impact of several key threatening processes.

## Conclusion

This Assessment of Significance has determined that the proposed activity is '*unlikely*' to have a '*significant effect*' on Flame Robins or their habitat in the proposal area. The levels of nesting and foraging resources available to the robins across the Pilliga study area will not be significantly affected by the proposed activity. In addition, the proposed conservation fence is likely to increase reproductive success and foraging opportunities for those Flame Robins who use the area (5,800 ha) because of the removal of feral animals and an improvement in habitat quality. Therefore, the proposed activity will not require a Species Impact Statement.

## Hooded Robin

*(a) in the case of a threatened species, whether the action proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,*

The Hooded Robin is found across many parts of Australia in woodlands, acacia scrub and mallee (Sass, 2009, Reid, 1999). It is generally considered that the Hooded Robin requires a structurally diverse habitat including microhabitat such as native grasses, shrubs and fallen timber across a breeding territory of around 10 ha (OEH, 2017d). However, it is believed that the species generally exhibits demanding requirements for both habitat complexity and area (>100ha) (Watson et al., 2001) confirming that the study area provides both of these attributes.

OEH (2017d) identify the following threats to this species:

- Clearing of woodlands, resulting in loss and fragmentation of habitat.
- Modification and destruction of ground habitat through heavy grazing and compaction by stock, removal of litter and fallen timber, introduction of exotic pasture grasses and frequent fire.

The proposed activity is not likely to contribute significantly to these potential threats. The key points relating to the impact of the proposed activity are that:

- a) Approximately 48 ha is proposed for clearing along the entire 32 km perimeter of the conservation fence;
- b) This clearing will be implemented as a narrow strip averaging 15 m in width;
- c) A separate area of approximately 11 ha will be partially cleared for the proposed operations base; and
- d) One new management track (8.2 km long) will be created (3 ha clearing).

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of most this clearing will have no significant adverse impacts on the life cycles of Hooded Robins as they are known to occupy home ranges of around 10 ha. The linear nature of most of the clearing means that it is unlikely to remove the entire home range for any individuals; it will likely affect only a small area of the home range for a very small proportion of the local population.

The proposed activity will require a Strategic Fire Advantage Zone (SFAZ) of 200 m width around the outside of the fence and an Asset Protection Zone (APZ) of 75 m around the proposed operations base. Understorey vegetation in these areas will be managed to reduce the severity of any wildfire. Because the areas to be modified are limited in extent, there are unlikely to be any adverse effects on the life cycles of Hooded Robins.

It is *unlikely* that the proposal would have an adverse effect on the life cycle of Hooded Robin such that a viable local population is likely to be placed at risk of extinction. The levels of nesting and foraging resources available to the Hooded Robin across the Pilliga study area will not be significantly affected by the proposed activity. In addition, the proposed conservation fence is likely to increase reproductive success following the removal of feral animals and an improvement in habitat quality across 5,800 ha.



Hooded Robin is not listed as an endangered population.

*(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*

- (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*
- (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,*

Hooded Robin is not listed as an endangered ecological community or critically endangered ecological community.

*(c) in relation to the habitat of a threatened species, population or ecological community:*

- (i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*
- (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*
- (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,*

- (i) The proposed CFAI would result in habitat modification across about 62 ha. This is a tiny proportion of the total habitat area for the species within the proposal area and within the entire Pilliga forests.
- (ii) The proposal would not isolate or fragment habitats as Hooded Robins are known to fly and forage across large cleared areas
- (iii) The modification of habitats will be minor in the context of the total area of habitat available for the Hooded Robin in the Pilliga forests. The proposed activity will result in the clearing or modification of approximately 62 ha within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of most of this clearing (15 m wide) will have no significant impact on the habitat of Hooded Robins. In addition, the proposed activity would create a 5,822 ha feral predator and herbivore free area which is expected to be of benefit to Hooded Robins by improving the quality of habitats. Given that large areas of forest and woodland would remain unaffected (including those within the proposed fenced area), it is unlikely that the habitat to be modified is important to the long-term survival of Hooded Robin in the locality.

*(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),*

There is no declared area of outstanding biodiversity value as listed under the BC Act within the vicinity of the proposed CFAI.

*(e) whether the proposed development or activity is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.*

The proposed activity – reintroducing extinct mammals – is not recognised as a key threatening process (KTP) under schedule 3 of the BC Act. However, two KTPs are relevant to the proposed activity: the *Removal of dead wood and dead trees*, and *Clearing of native vegetation*.

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of this clearing will have minimal adverse impact on the habitat of the Hooded Robin given that this species is known to utilise clearings in forest/woodland landscapes, including in agricultural land.

The proposed activity will result in the retention (but relocation) of dead wood and the removal of dead trees if they occur directly on the path of the conservation fence and other infrastructure. The minor amounts of dead wood that would be relocated are not expected to have significant impacts on the species.

The removal of feral predators and herbivores from within the 5,822 ha fenced area will provide benefits for the Hooded Robin. It will provide a significant reduction in the operation of seven KTPs: *Competition and grazing by the feral European Rabbit*, *Competition and habitat degradation by Feral Goats*, *Herbivory and environmental degradation caused by feral deer*, *Predation and hybridisation by Feral dogs*, *Predation by the European Red Fox*, *Predation by feral cats*, and *Predation, habitat degradation, competition and disease transmission by Feral Pigs*.

In summary, the proposed activity is *unlikely* to introduce or to significantly increase the impact of any relevant key threatening process in the proposal area. It is certain to reduce the impact of several key threatening processes.

## Conclusion

This Assessment of Significance has determined that the proposed activity is *'unlikely'* to have a *'significant effect'* on Hooded Robin or their habitats. In addition, the proposed conservation fence is likely to increase general longevity and reproductive success following the removal of feral animals and an improvement in habitat quality across 5,800 ha. Therefore, the proposed activity will not require a Species Impact Statement.

## Malleefowl

(a) in the case of a threatened species, whether the action proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction, Malleefowl is a large, ground dwelling bird that primarily occurs in mallee across southern Australia but is also known to inhabit eucalypt woodlands and acacia shrublands that provide some refuge in the form of dense shrubby understorey (Benshemesh, 2007, NPWS, 1999, Parsons et al., 2008, Priddel and Wheeler, 1999). Malleefowl vary in the size of their home range which is likely influenced by the level of available resources. These are known to range between 50 and 500 ha in area. Malleefowl incubate eggs in large mounds that are comprised of large volumes of sandy soil and leaf litter. Males continually add leaf litter to these mounds as the decomposition provides moisture and heat required for successful egg incubation.

Malleefowl have been previously recorded in the general locality, although not for almost 20 years.

OEH (2017d) identify the following threats to this species:

- Loss of habitat due to clearing has led to a decline in distribution and abundance.
- Fragmentation, resulting from clearing or degradation of habitat, may reduce the size of populations and increase the extent to which they are isolated. Small, isolated populations have a greater risk of extinction due to genetic effects and chance events (e.g., drought and fire).
- Degradation of the habitat, a result of inappropriate grazing or fire regimes, may result in changes to the physical and biological nature of the habitat (e.g., changes in the structure and floristics of vegetation, diversity and abundance of invertebrates). These changes may render habitat unsuitable or increase the risk posed by other threatening processes (e.g., predation).
- Fire removes litter for mound construction, shelter from predators, and food sources, especially seeds. Mounds are not usually constructed in an area within 15-20 years after a fire and it may be 40 years before maximum densities are attained.
- Predation by foxes or cats has a significant impact on populations, particularly on young birds.
- Accidental death of a small number of birds occurs each year. For small isolated populations these losses can be significant. Birds crossing roads or feeding on spilt grain beside roads are particularly vulnerable.

- Anthropogenic climate change is a long term threat as it may alter habitat characteristics (e.g., change in physical structure or productivity) such that its capacity to support viable populations is reduced.
- Uncertainty with respect to the species' reproductive ecology and the effects of different predators on breeding success.
- Competition for food, and disturbance to nesting mounds, by feral goats.
- Disturbance to nesting mounds by feral pigs.

The proposed activity is not likely to contribute significantly to these potential threats. The key points relating to the impact of the proposed activity are that:

- a) Approximately 48 ha is proposed for clearing along the entire 32 km perimeter of the conservation fence;
- b) This clearing will be implemented as a narrow strip averaging 15 m in width;
- c) A separate area of approximately 11 ha will be partially cleared for the proposed operations base; and
- d) One new management track (8.2 km long) will be created (3 ha clearing).

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of most this clearing will have no significant adverse impacts on the life cycles of Malleefowl as they are known to have large home ranges (over 4 square kilometres).

Therefore, it is *unlikely* that the proposal could have an adverse effect on the life cycle of Malleefowl such that a viable local population (if one exists) is likely to be placed at risk of extinction. In fact, the removal of feral predators across 5,800 ha will deliver a significant benefit to the species by increasing breeding success.

Malleefowl is not listed as an endangered population.

*(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*

- (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*
- (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,*

Malleefowl is not listed as an endangered ecological community or critically endangered ecological community.

*(c) in relation to the habitat of a threatened species, population or ecological community:*

- (i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*
- (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*
- (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,*

- (i) The proposed CFAI would result in habitat modification across about 62 ha. This is a tiny proportion of the total habitat available for the species (if it is present) within the proposal area and within the entire Pilliga forests.
- (ii) The proposal would not isolate or fragment habitats as Malleefowl are known to fly and forage across large areas. (They fly over the conservation fence at Scotia.)
- (iii) The modification of habitats will be minor in the context of the total area of habitat available for the Malleefowl in the Pilliga forests. The proposed activity will result in the clearing or modification of approximately 62 ha within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of most of this clearing will have no significant impact on the habitat of Malleefowl. In addition, the proposed activity

would create a 5,822 ha feral predator and herbivore free area which is expected to be of benefit to Malleefowl by removing feral predators and improving the quality of habitats. Given that large areas of forest and woodland would remain unaffected (including those within the proposed fenced area), it is unlikely that the habitat to be modified is important to the long-term survival of any Malleefowl that remain in the locality.

(d) *whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),*

There is no declared area of outstanding biodiversity value as listed under the BC Act within the vicinity of the proposed CFAI.

(e) *whether the proposed development or activity is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.*

The proposed activity – reintroducing extinct mammals – is not recognised as a key threatening process (KTP) under schedule 3 of the BC Act. However, two KTPs are relevant to the proposed activity: *The Removal of dead wood and dead trees*, and *Clearing of native vegetation*.

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of this clearing will have no material adverse impact on the habitat of any Malleefowl remaining in the area.

The proposed activity will result in the retention (but relocation) of dead wood and the removal of dead trees if they occur directly on the path of the conservation fence and other infrastructure. The minor amounts of dead wood that would be relocated are not expected to have significant impacts on the species.

The removal of feral predators and herbivores from within the 5,822 ha fenced area will produce benefits for any Malleefowl present. It will provide a significant reduction in the operation of seven KTPs: *Competition and grazing by the feral European Rabbit*, *Competition and habitat degradation by Feral Goats*, *Herbivory and environmental degradation caused by feral deer*, *Predation and hybridisation by Feral dogs*, *Predation by the European Red Fox*, *Predation by feral cats*, and *Predation, habitat degradation, competition and disease transmission by Feral Pigs*.

In summary, the proposed activity is *unlikely* to introduce or to significantly increase the impact of any relevant key threatening process on any Malleefowl that remain in the area of the proposal. It is certain to reduce the impact of several key threatening processes.

## **Conclusion**

This Assessment of Significance has determined that the proposed activity is *'unlikely'* to have a *'significant effect'* on any Malleefowl present or on their habitats. In addition, the proposed conservation fence is likely to increase reproductive success following the removal of feral predators. Therefore, the proposed activity will not require a Species Impact Statement.

## **Painted Honeyeater**

(a) *in the case of a threatened species, whether the action proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,*

The Painted Honeyeater is a nomadic species that occurs at low densities throughout its range. The greatest concentrations of the bird and almost all breeding occurs on the inland slopes of the Great Dividing Range in NSW, Victoria and southern Queensland.

They are known to occur in Box-gum woodland, Box-ironbark forest, Brigalow and Boree shrublands (Oliver et al., 2003, Oliver et al., 1998). A specialist feeder, they feed preferentially on the fruits of mistletoe with a preference for the genus *Amyena*.

Painted Honeyeater are predicted to occur within the vicinity of the proposed CFAI given their highly mobile and nomadic nature and the presence of mistletoe.

OEH (2017d) identify the following threats to this species:

- Clearing of woodlands and open forests.
- Removal of large, old trees with heavy mistletoe infestations.
- Degradation of open forest and woodland remnants, including thinning of trees bearing mistletoe.
- Heavy grazing of grassy woodlands.
- Habitat infestation by weeds such as African boxthorn, *Gazania* and invasive grasses.
- Inappropriate fire regimes.
- Aggressive exclusion from forest and woodland habitat by over abundant Noisy Miners.

The proposed activity is not likely to contribute significantly to these potential threats. The key points relating to the impact of the proposed activity are that:

- a) Approximately 48 ha is proposed for clearing along the entire 32 km perimeter of the conservation fence;
- b) This clearing will be implemented as a narrow strip averaging 15 m in width;
- c) A separate area of approximately 11 ha will be partially cleared for the proposed operations base; and
- d) One new management track (8.2 km long) will be created (3 ha clearing).

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of most this clearing will have no significant adverse impacts on the life cycles of Painted Honeyeaters as they are highly mobile and nomadic

It is *unlikely* that the proposal would have an adverse effect on the life cycle of Painted Honeyeater such that a viable local population is likely to be placed at risk of extinction.

Painted Honeyeater is not listed as an endangered population.

*(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*

- (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*
- (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,*

Painted Honeyeater is not listed as an endangered ecological community or critically endangered ecological community.

*(c) in relation to the habitat of a threatened species, population or ecological community:*

- (i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*
- (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*
- (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,*

- (i) The proposed CFAI would result in habitat modification across about 62 ha. This is a tiny proportion of the total habitat area for the species within the proposal area and within the entire Pilliga forests.
  - (ii) The proposal would not isolate or fragment habitats as Painted Honeyeaters are highly nomadic.
  - (iii) The modification of habitats will be minor in the context of the total area of habitat available for the Painted Honeyeater in the Pilliga forests. The proposed activity will result in the clearing or modification of approximately 62 ha within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of most of this clearing will have no significant impact on the habitat of Painted Honeyeaters. In addition, the proposed activity would create a 5,822 ha feral predator and herbivore free area which is expected to be of benefit to Painted Honeyeaters by improving the quality of habitats. Given that large areas of forest and woodland would remain unaffected (including those within the proposed fenced area), it is unlikely that the habitat to be modified is important to the long-term survival of Painted Honeyeater in the locality.
- (d) *whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),*

There is no declared area of outstanding biodiversity value as listed under the BC Act within the vicinity of the proposed CFAI.

- (e) *whether the proposed development or activity is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.*

The proposed activity – reintroducing extinct mammals – is not recognised as a key threatening process (KTP) under schedule 3 of the BC Act. However, one KTP is relevant: the *Clearing of native vegetation*.

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of this clearing will have no material adverse impact on the habitat of the Painted Honeyeater given the nomadic behavior of the species.

The removal of feral predators and herbivores from within the 5,822 ha fenced area, will provide a significant reduction in the operation of seven KTPs: *Competition and grazing by the feral European Rabbit, Competition and habitat degradation by Feral Goats, Herbivory and environmental degradation caused by feral deer, Predation and hybridisation by Feral dogs, Predation by the European Red Fox, Predation by feral cats, and Predation, habitat degradation, competition and disease transmission by Feral Pigs.*

In summary, the proposed activity is *unlikely* to introduce or to significantly increase the impact of any relevant key threatening process in the proposal area. It is certain to reduce the impact of several key threatening processes.

## Conclusion

This Assessment of Significance has determined that the proposed activity is *'unlikely'* to have a *'significant effect'* on Painted Honeyeater or their habitats. Therefore, the proposed activity will not require a Species Impact Statement.

## Regent Honeyeater

- (a) *in the case of a threatened species, whether the action proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,*

Regent Honeyeater occurs mainly in temperate woodlands and open forests of the inland slopes of south-east Australia (Menkhorst et al., 1999). Considered a flagship threatened woodland bird, the conservation of the Regent Honeyeater benefits a large suite of other

threatened and declining woodland fauna. Regent Honeyeater are found in woodlands/forests that support a significantly high abundance and richness of bird species. These habitats generally have a significantly large number of mature trees, high canopy cover and abundance of mistletoes.

Regent Honeyeater are predicted to occur within the vicinity of the proposed CFAI given the extensive area of forest/woodland within the 33,386 ha Pilliga SCA.

OEH (2017d) identify the following threats to this species:

- Historical loss, fragmentation and degradation of habitat from clearing for agricultural and residential development, particularly fertile Yellow Box-White Box-Blakely's Red Gum Woodlands.
- Continuing loss of key habitat tree species and remnant woodlands from major developments (mining and agricultural), timber gathering and residential developments.
- Key habitats continue to degrade from lack of recruitment of key forage species and loss of paddock trees and small remnants increasingly fragmenting the available habitat.
- Suppression of natural regeneration of overstorey tree species and shrub species from overgrazing. Riparian gallery forests have been particularly impacted by overgrazing.
- Competition from larger aggressive honeyeaters, particularly Noisy Miners, Noisy Friarbirds and Red Wattlebirds.
- The small population size and restricted habitat availability make the species highly vulnerable to extinction via stochastic processes and loss of genetic diversity, and reduced ability to compete, increased predation and reduced fledging rates.
- Egg and nest predation by native birds and mammals.
- Inappropriate forestry management practices that remove large mature resource-abundant trees. Firewood collection and harvesting in Box-Ironbark woodlands can also remove important habitat components.
- Disturbance at nesting sites leading to reduced nesting success by recreational users.

The proposed activity is not likely to contribute significantly to these potential threats. The key points relating to the impact of the proposed activity are that:

- a) Approximately 48 ha is proposed for clearing along the entire 32 km perimeter of the conservation fence;
- b) This clearing will be implemented as a narrow strip averaging 15 m in width;
- c) A separate area of approximately 11 ha will be partially cleared for the proposed operations base; and
- d) One new management track (8.2 km long) will be created (3 ha clearing).

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of most this clearing will have no significant adverse impacts on the life cycle of any Regent Honeyeaters present given their semi-nomadic nature.

It is *unlikely* that the proposal could have an adverse effect on the life cycle of Regent Honeyeater such that a viable local population is likely to be placed at risk of extinction.

Regent Honeyeater is not listed as an endangered population.

*(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*

- (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*

(ii) *is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,* Regent Honeyeater is not listed as an endangered ecological community or critically endangered ecological community.

(c) *in relation to the habitat of a threatened species, population or ecological community:*

- (i) *the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*
- (ii) *whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*
- (iii) *the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,*

- (i) The proposed CFAI would result in habitat modification across about 62 ha. This is a tiny proportion of the total habitat area for the species, if present, within the proposal area and within the entire Pilliga forests.
- (ii) The proposal would not isolate or fragment habitats as Regent Honeyeaters are highly mobile.
- (iii) The modification of habitats will be minor in the context of the total area of habitat available for any Regent Honeyeaters in the Pilliga forests. The proposed activity will result in the clearing or modification of approximately 62 ha within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of most of this clearing will have no significant impact on the habitat of Regent Honeyeaters. In addition, the proposed activity would create a 5,822 ha feral predator and herbivore free area which is expected to be of benefit to Regent Honeyeaters by improving the quality of habitats. Given that large areas of forest and woodland would remain unaffected (including those within the proposed fenced area), it is unlikely that the habitat to be modified is important to the long-term survival of any Regent Honeyeaters in the locality.

(d) *whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),*

There is no declared area of outstanding biodiversity value as listed under the BC Act within the vicinity of the proposed CFAI.

(e) *whether the proposed development or activity is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.*

The proposed activity – reintroducing extinct mammals – is not recognised as a key threatening process (KTP) under schedule 3 of the BC Act. However, one KTP is relevant: the *Clearing of native vegetation*.

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of this clearing will have no material adverse impact on the habitat of any Regent Honeyeaters using the area given their nomadic nature.

The removal of feral predators and herbivores from within the 5,822 ha fenced area, will provide a significant reduction in the operation of seven KTPs: *Competition and grazing by the feral European Rabbit, Competition and habitat degradation by Feral Goats, Herbivory and environmental degradation caused by feral deer, Predation and hybridisation by Feral dogs, Predation by the European Red Fox, Predation by feral cats, and Predation, habitat degradation, competition and disease transmission by Feral Pigs.*

In summary, the proposed activity is *unlikely* to introduce or to significantly increase the impact of any relevant key threatening process affecting the species if they are present in the proposal area. It is certain to reduce the impact of several key threatening processes.



## Conclusion

This Assessment of Significance has determined that the proposed activity is *'unlikely'* to have a *'significant effect'* on Regent Honeyeater or their habitats. The levels of nesting and foraging resources available to Regent Honeyeater across the proposal area and the broader Pilliga forest will not be significantly affected by the proposed activity. In addition, the proposed conservation fence is likely to deliver benefits for Regent Honeyeaters using the area by removing feral animals and improving habitat quality. Therefore, the proposed activity will not require a Species Impact Statement.

## Spotted Harrier

*(a) in the case of a threatened species, whether the action proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,*

The Spotted Harrier occurs in open woodland and grassland habitats across mainland Australia. It builds a stick nest in a live tree and breeds in Spring, occasionally Autumn (OEH, 2017d).

Spotted Harrier are likely to occur within the vicinity of the proposed CFAI based on the presence of woodland/forest.

OEH (2017d) identify the following threats to this species:

- Secondary poisoning from rabbit baiting.
- Secondary poisoning from rodenticides.
- Clearing and degradation of foraging and breeding habitat, particularly that which affects prey densities.

The proposed activity is not likely to contribute significantly to these potential threats. The key points relating to the impact of the proposed activity are that:

- a) Approximately 48 ha is proposed for clearing along the entire 32 km perimeter of the conservation fence;
- b) This clearing will be implemented as a narrow strip averaging 15 m in width;
- c) A separate area of approximately 11 ha will be partially cleared for the proposed operations base; and
- d) One new management track (8.2 km long) will be created (3 ha clearing).

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. If present, trees bearing Spotted Harrier nests will not be removed. The narrow, linear nature of most the clearing will have no significant adverse impacts on the movements of Spotted Harriers which have the ability to move easily across cleared, fragmented and forested landscapes.

The entire NSW population is considered a single population given its very wide dispersal capability.

It is *unlikely* that the proposal could have an adverse effect on the life cycle of Spotted Harriers such that a viable local population is likely to be placed at risk of extinction.

Spotted Harrier is not listed as an endangered population.

*(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*

- (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*
- (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,*

Spotted Harrier is not listed as an endangered ecological community or critically endangered ecological community.

- (c) *in relation to the habitat of a threatened species, population or ecological community:*
- (i) *the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*
  - (ii) *whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*
  - (iii) *the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,*

- (i) The proposed CFAI would result in habitat modification across about 62 ha. This is a tiny proportion of the total habitat area for the species within the proposal area and within the entire Pilliga forests.
- (ii) The proposal would not isolate or fragment habitats as Spotted Harriers are known to fly and forage across large cleared areas.
- (iii) The modification of habitats will be minor in the context of the total area of habitat available for the Spotted Harrier in the Pilliga forests. The proposed activity will result in the clearing or modification of approximately 62 ha within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of most of this clearing (15 m wide) will have no significant impact on the habitat of Spotted Harriers. In addition, the proposed activity would create a 5,822 ha feral predator and herbivore free area which is expected to be of benefit to Spotted Harriers by improving the quality of habitats and the availability of prey. Given that large areas of forest and woodland would remain unaffected (including those within the proposed fenced area), it is unlikely that the habitat to be modified is important to the long-term survival of Spotted Harrier in the locality.

- (d) *whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),*

There is no declared area of outstanding biodiversity value as listed under the BC Act within the vicinity of the proposed CFAI.

- (e) *whether the proposed development or activity is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.*

The proposed activity – reintroducing extinct mammals – is not recognised as a key threatening process (KTP) under schedule 3 of the BC Act. However, one KTP is relevant: the *Clearing of native vegetation*.

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of most of this clearing will have no impact on the habitat of the Spotted Harrier which forages widely (over tens of kilometres).

The removal of feral predators and herbivores from within the 5,822 ha fenced area will produce benefits for any Spotted Harriers using the area. It will provide a significant reduction in the operation of seven KTPs: *Competition and grazing by the feral European Rabbit, Competition and habitat degradation by Feral Goats, Herbivory and environmental degradation caused by feral deer, Predation and hybridisation by Feral dogs, Predation by the European Red Fox, Predation by feral cats, and Predation, habitat degradation, competition and disease transmission by Feral Pigs.*

In summary, the proposed activity is *unlikely* to introduce or to significantly increase the impact of any relevant key threatening process for any Spotted Harriers that use the proposal area. It is certain to reduce the impact of several key threatening processes.

## Conclusion

This Assessment of Significance has determined that the proposed activity is '*unlikely*' to have a '*significant effect*' on Spotted Harrier or their habitats. Therefore, the proposed activity will not require a Species Impact Statement.

## Square-tailed Kite

(a) in the case of a threatened species, whether the action proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

The Square-tailed Kite glides effortlessly on huge upswept wings just above the canopy of forests and woodlands, searching for the nests of other birds and a variety of invertebrate and small vertebrate prey. It builds its nest of sticks in the canopy of a large eucalypt tree, often near a watercourse or in a clump of generally larger trees.

OEH (2017d) identify the following threats to the Square-tailed Kite:

- Clearing, logging, burning, and grazing of habitats resulting in a reduction in nesting and feeding resources.
- Disturbance to or removal of potential nest trees near watercourses.
- Illegal egg collection and shooting.

The proposed activity is not likely to contribute significantly to these potential threats. The key points relating to the impact of the proposed activity are that:

- a) Approximately 48 ha is proposed for clearing along the entire 32 km perimeter of the conservation fence;
- b) This clearing will be implemented as a narrow strip averaging 15 m in width;
- c) A separate area of approximately 11 ha will be partially cleared for the proposed operations base; and
- d) One new management track (8.2 km long) will be created (3 ha clearing).

The proposed activity will result in the clearing or modification of approximately 62 ha within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow strip of clearing will have no significant adverse impacts on the life cycles of Square-tailed Kites which fly and forage across large continuously forested areas.

The proposed activity will require a Strategic Fire Advantage Zone (SFAZ) of 200 m width around the outside of the fence and an Asset Protection Zone (APZ) of 75 m around the proposed operations base. Understorey vegetation in these areas will be managed to reduce the severity of any wildfire. Because the foraging ranges of Square-tailed Kites are very large, the impact of these wildfire safety measures will be minimal.

In summary, it is *unlikely* that the proposal could have an adverse effect on the life cycle of Square-tailed Kite such that a viable local population is likely to be placed at risk of extinction.

The Square-tailed Kite is not listed as an endangered population.

(b) *in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*

- (i) *is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*
- (ii) *is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,*

The Square-tailed Kite is not listed as an endangered ecological community or critically endangered ecological community.

(c) *in relation to the habitat of a threatened species, population or ecological community:*

- (i) *the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*
- (ii) *whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*
- (iii) *the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,*

- (i) The proposed CFAI would result in habitat modification across about 62 ha. This is a tiny proportion of the total habitat area for the species within the proposal area and within the entire Pilliga forests.
- (ii) The proposal would not isolate or fragment habitats as Square-tailed Kites are known to fly and forage across large forested areas, and are highly mobile.
- (iii) The modification of habitats will be minor in the context of the large size of Square-tailed Kite foraging ranges. The proposed activity will result in the clearing or modification of approximately 62 ha within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of most of this clearing (15 m wide) will have no significant impact on the habitat of any Square-tailed Kites using the area. In addition, the proposed activity would create a 5,822 ha feral predator and herbivore free area which is expected to be of benefit to Square-tailed Kites by improving the quality of habitats and the availability of prey. Given that large areas of forest and woodland would remain unaffected (including those within the proposed fenced area), it is unlikely that the habitat to be modified is important to the long-term survival of any Square-tailed Kite in the locality.

(d) *whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),*

There is no declared area of outstanding biodiversity value as listed under the BC Act within the vicinity of the proposed CFAI.

(e) *whether the proposed development or activity is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.*

The proposed activity – reintroducing regionally extinct native mammals – is not recognised as a key threatening process (KTP) under schedule 3 of the BC Act. However, one KTP is relevant to the proposed activity and has already been discussed in Part (a) above in relation to the Square-tailed Kite: the *Clearing of native vegetation*.

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of this clearing (15 m wide) will have no significant impact on the habitat of any Square-tailed Kites using the area as their ranges are so large.

The removal of feral predators and herbivores from within the 5,822 ha fenced area will deliver substantial benefits for the Square-tailed Kite through increased prey availability. It will provide a significant reduction in the operation of seven KTPs: *Competition and grazing by the feral European Rabbit, Competition and habitat degradation by Feral Goats, Herbivory and environmental degradation caused by feral deer, Predation and hybridisation by Feral dogs, Predation by the European Red Fox, Predation by feral cats, and Predation, habitat degradation, competition and disease transmission by Feral Pigs.*

In summary, the proposed activity is *unlikely* to introduce or to significantly increase the impact of any relevant key threatening process in the proposal area. It is certain to reduce the impact of several key threatening processes.

## Conclusion

This Assessment of Significance has determined that the proposed activity is '*unlikely*' to have a '*significant effect*' on Square-tailed Kites or their habitat in the proposal area. The levels of nesting and foraging resources available to this species will not be significantly affected by the proposed activity. In addition, the proposed conservation fence is likely to increase reproductive success and foraging opportunities for Square-tailed Kites because of the expected increase in native small-medium sized mammals, birds and reptiles following the removal of feral predators. Therefore, the proposed activity will not require a Species Impact Statement.

## Squirrel Glider

(a) in the case of a threatened species, whether the action proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

The Squirrel Glider is medium-sized (approx. 200-260 g), nocturnal, lives in small family groups, and requires hollows in old trees for breeding and shelter. Home-range sizes are approximately 10-15 ha, and it can glide for up to 90 m in a single glide. The Squirrel Glider feeds on nectar, pollen and sap from eucalypts, banksias and some acacia species, as well as a range of invertebrates. It is sparsely distributed in low elevation forests and woodlands near the coast and on the western slopes of the Great Dividing Range, particularly where winter-flowering tree and shrub species are present.

OEH (2017d) identify the following threats to this species:

- Habitat loss and degradation.
- Fragmentation of habitat.
- Loss of hollow-bearing trees.
- Loss of understorey food resources.
- Inappropriate fire regimes.
- Reduction in food resources due to drought.
- Mortality due to entanglement on barbed wire.
- Occupation of hollows by exotic species.
- Mortality due to collision with vehicles.
- Predation by exotic predators.
- Changes in spatial and temporal distribution of habitat due to climate change

The action is *unlikely* to have an adverse effect on the life cycle of the Squirrel Glider such that a viable local population of the species is likely to be placed at risk of extinction, because:

- The clearing of 62 ha represents a very small percentage of the habitat that is available to the local population (0.2% of the EMA project area), with the majority of woodland/forest within and adjoining being unaffected.
- The clearing is linear, 12-15 m wide, therefore not likely to impact substantially on any individual home ranges.
- Our clearing protocols will minimise any individual casualties.
- The loss of hollow bearing trees from cleared areas is unlikely to materially affect the population, given the abundance of hollow-bearing trees in the proposal area.
- The fence is unlikely to be a barrier for this species, given its gliding ability.

In addition, the overall impact of the action is positive because the fenced area would result in the creation of a 5,822 ha area free of feral cats and foxes, and reduced numbers of feral herbivores. With predation by cats and foxes and modification of habitat by introduced herbivores being identified threats to this species, the proposal addresses these key threats and is likely to be of significant benefit.

The Squirrel Glider is not listed as an endangered population in the study area.

(b) *in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*

(i) *is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*

(ii) *is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,*

The Squirrel Glider is not listed as part of an endangered ecological community or critically endangered ecological community.

(c) *in relation to the habitat of a threatened species, population or ecological community:*

(i) *the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*

(ii) *whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*

(iii) *the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,*

(i) The proposed CFAI would result in habitat modification of about 62 ha. This is a tiny proportion of the total habitat area for the species within the proposal area and within the entire Pilliga forests

(ii) The proposal is not expected to isolate the population in the fenced area from remaining portions of the Pilliga.

(iii) The modification of habitats will be minor in the context of the total area of habitat available for the Squirrel Glider in the Pilliga forests. The proposed activity will result in the clearing or modification of approximately 62 ha within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of most of this clearing (15 m wide) will have no significant impact on the habitat of Squirrel Gliders. In addition, the proposed activity would create a 5,822 ha feral predator and herbivore free area which is expected to be of benefit to Squirrel Gliders by improving the quality of habitats and removing feral predators. Given that large areas of forest and woodland would remain unaffected (including those within the proposed fenced area), it is unlikely that the habitat to be directly affected is important to the long-term survival of the Squirrel Glider in the locality.

(d) *whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),*

There is no declared area of outstanding biodiversity value as listed under the BC Act within the vicinity of the proposed CFAI.

(e) *whether the proposed development or activity is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.*

The proposed activity – reintroducing extinct mammals – is not recognised as a key threatening process (KTP) under schedule 3 of the BC Act. However, one KTP is relevant to the proposed activity: the *Clearing of native vegetation*.

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of most of this clearing will have little adverse impact on the home ranges of Squirrel Gliders within the Pilliga proposal area.

The removal of feral predators and herbivores from within the 5,822 ha fenced area will deliver benefits for Squirrel Gliders. It will provide a significant reduction in the operation of seven KTPs: *Competition and grazing by the feral European Rabbit, Competition and habitat degradation by Feral Goats, Herbivory and environmental degradation caused by feral deer, Predation and hybridisation by Feral dogs, Predation by the European Red Fox, Predation*

by feral cats, and Predation, habitat degradation, competition and disease transmission by Feral Pigs.

In summary, the proposed activity is unlikely to introduce or to significantly increase the impact of any relevant key threatening process in the proposal area. It is certain to reduce the impact of several key threatening processes.

## Conclusion

This Assessment of Significance has determined that the proposed activity is '*unlikely*' to have a '*significant effect*' on Squirrel Gliders or their habitat in the proposal area. Therefore, the proposed activity will not require a Species Impact Statement.

### **Microchiropteran Bats (Corben's Long-eared Bat, Eastern Cave Bat, Little Pied Bat, Large-eared Pied Bat and Yellow-bellied Sheath-tail-bat)**

*(a) in the case of a threatened species, whether the action proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,*

Little Pied Bat, Eastern Cave Bat and Large-eared Pied Bat are known to use derelict mine shafts for roosting and maternity purposes and tree hollows and crevices (Churchill, 2008) while the Corben's Long-eared Bat and Yellow-bellied Sheath-tail-bat use tree hollows, crevices and loose bark for roosting and maternity sites (NPWS, 2001a, NPWS, 2001b).

Microchiropteran bats are regarded as highly mobile fauna, extending their foraging ranges over tens of kilometres from their roosting site and are unlikely to rely on a single location for foraging (Pavey and Burwell, 2004, Pennay and Freeman, 2005).

OEH (2017d) identify the following threats to these species:

- Loss or modification of habitat.
- Application of pesticides in or adjacent to foraging areas.
- Clearing of vegetation including the removal of old hollow trees.
- Predation by feral cats at roost sites.
- Degradation of habitat through grazing and the consequent reduction in arthropod prey diversity and abundance.
- Altered fire regimes including too frequent burning of habitat that removes hollows that provide shelter.

The proposed activity is not likely to contribute significantly to these potential threats. The key points relating to the impact of the proposed activity are that:

- a) Approximately 48 ha is proposed for clearing along the entire 32 km perimeter of the conservation fence;
- b) This clearing will be implemented as a narrow strip averaging 15 m in width;
- c) A separate area of approximately 11 ha will be partially cleared for the proposed operations base; and
- d) One new management track (8.2 km long) will be created (3 ha clearing).

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of most this clearing will have no significant adverse impacts on the life cycles of microchiropteran bats as they are highly mobile, being able to forage over tens of kilometres over a single night, and they can easily cross cleared land.

AWC surveys have shown that hollow-bearing trees are widespread and common throughout the proposal area, despite the long history of logging and other forestry activities. A very small number of these would be removed and safeguards relating to the removal of hollow-bearing trees to minimise potential impacts on microchiropteran bats have been incorporated into this REF.

Therefore, it is *unlikely* that the proposal could have an adverse effect on the life cycle of these microchiropteran bat species such that a viable local population is likely to be placed at risk of extinction.

These microchiropteran bats species are not listed as an endangered population.

*(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*

- (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*
- (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,*

These microchiropteran bat species are not listed as an endangered ecological community or critically endangered ecological community.

*(c) in relation to the habitat of a threatened species, population or ecological community:*

- (i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*
- (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*
- (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,*

- (i) The proposed CFAI would result in habitat modification across about 62 ha. This is a tiny proportion of the total habitat area for these bat species within the proposal area and within the entire Pilliga forests.
- (ii) The proposal would not isolate or fragment habitats as microchiropteran bats are known to fly and forage across large cleared areas.
- (iii) The modification of habitats will be minor in the context of the total area of habitat available for the microchiropteran bats in the Pilliga forests. The proposed activity will result in the clearing or modification of approximately 62 ha within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of most of this clearing will have no significant impact on the habitat of microchiropteran bats. In addition, the proposed activity would create a 5,822 ha feral predator and herbivore free area which is expected to be of benefit to microchiropteran bats by improving the quality of habitats and removing feral predators. Given that large areas of forest and woodland would remain unaffected (including those within the proposed fenced area), it is unlikely that the habitat to be modified is important to the long-term survival of microchiropteran bat in the locality.

*(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),*

There is no declared area of outstanding biodiversity value as listed under the BC Act within the vicinity of the proposed CFAI.

*(e) whether the proposed development or activity is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.*

The proposed activity – reintroducing regionally extinct mammals – is not recognised as a key threatening process (KTP) under schedule 3 of the BC Act. However, two KTPs are relevant to the proposed activity: the *Clearing of native vegetation* and *Removal of hollow-bearing trees*.

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of this clearing will have no material adverse impact on the habitat of these species.



AWC surveys have shown that hollow-bearing trees are widespread and common throughout the proposal area, despite the long history of logging and other forestry activities. A very small number of these would be removed and safeguards relating to the removal of hollow-bearing trees to minimise potential impacts on microchiropteran bats have been incorporated into this REF.

The removal of feral predators and herbivores from within the 5,822 ha fenced area will produce benefits for bats. It will provide a significant reduction in the operation of seven KTPs: *Competition and grazing by the feral European Rabbit*, *Competition and habitat degradation by Feral Goats*, *Herbivory and environmental degradation caused by feral deer*, *Predation and hybridisation by Feral dogs*, *Predation by the European Red Fox*, *Predation by feral cats*, and *Predation, habitat degradation, competition and disease transmission by Feral Pigs*.

In summary, the proposed activity is *unlikely* to introduce or to significantly increase the impact of any relevant key threatening process in the proposal area. It is certain to reduce the impact of several key threatening processes.

## Conclusion

This Assessment of Significance has determined that the proposed activity is '*unlikely*' to have a '*significant effect*' on Corben's Long-eared Bat, Eastern Cave Bat, Little Pied Bat, Large-eared Pied Bat and Yellow-bellied Sheath-tail-bat or their habitats. Therefore, the proposed activity will not require a Species Impact Statement.

## Rufous Bettong

*(a) in the case of a threatened species, whether the action proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,*

Rufous Bettong can be found in a variety of forests from tall, moist eucalypt forest to open woodland, with a tussock grass understorey (Claridge et al., 2007). In NSW it has largely vanished from inland areas, but there are sporadic, yet unconfirmed records from the Pilliga and Torrington districts (OEH, 2017d).

OEH (2017d) identify the following threats to this species:

- Changes to the grassy understorey by inappropriate burning and grazing.
- Competition from rabbits.
- Predation by feral cats and foxes, whose numbers appear to increase when dingoes are reduced through baiting.
- Loss of habitat through clearing, logging and collection of fallen timber.
- Poor knowledge of the species' abundance and distribution in the western parts of its range.

The proposed activity is not likely to contribute significantly to these potential threats. The key points relating to the impact of the proposed activity are that:

- a) Approximately 48 ha is proposed for clearing along the entire 32 km perimeter of the conservation fence;
- b) This clearing will be implemented as a narrow strip averaging 15 m in width;
- c) A separate area of approximately 11 ha will be partially cleared for the proposed operations base; and
- d) One new management track (8.2 km long) will be created (3 ha clearing).

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. This represents a very small percentage of the habitat that is available to any local Rufous Bettong population, with the majority of relevant habitat within and adjoining being unaffected.

In addition, the clearing is linear (12-15 m wide) and is therefore not likely to impact substantially on any individual home ranges.

The proposed action involves the establishment of a conservation fence that will prevent any bettongs moving from within the feral-free area to outside of the feral-free area. This is not likely to have an adverse impact on the life cycle of this species at this location because there are adequate resources available to bettongs either side of the fence.

- Any bettongs inside the proposed fence will have the threats of feral predation removed and are likely to increase in population.
- The increased control of feral predators outside the fence may also deliver an increase in the population outside the fence.
- Noting that the fence is a barrier to movement between the two populations, AWC will monitor the population inside and outside the fence: if there is any risk to the genetic viability of either population, AWC will carry out an exchange of animals between the two populations.

In light of the above, it is *unlikely* that the proposed activity will have an adverse impact on the life cycle of this species (and so the action is not likely to place a viable local population at risk of extinction).

Rufous Bettong is not listed as an endangered population.

*(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*

- (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*
- (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,*

Rufous Bettong is not listed as an endangered ecological community or critically endangered ecological community.

*(c) in relation to the habitat of a threatened species, population or ecological community:*

- (i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*
- (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*
- (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,*

- (i) The proposed CFAI would result in habitat modification across about 62 ha. This is a tiny proportion of the total habitat area for the species (if it is present) within the proposed proposal area and within the entire Pilliga forests.
- (ii) The proposal would isolate the fenced area from remaining portions of the Pilliga for any Bettong population. The population in the fenced area is likely to increase significantly. AWC will monitor the population inside and outside the fence: if there is any risk to the genetic viability of the either population, AWC will carry out an exchange of animals between the two populations.
- (iii) The modification of habitats will be minor in the context of the total area of habitat available for any Rufous Bettongs present in the Pilliga forests. The proposed activity will result in the clearing or modification of approximately 62 ha within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The linear nature of the clearing further reduces its impact on any bettongs. In addition, the proposed activity would create a 5,822 ha feral predator and herbivore free area which will deliver a significant increase in the Rufous Bettong population inside the feral-free area (if such a population exists). Given that large areas of forest and woodland would remain unaffected (including those within the proposed fenced area), it is unlikely that the

habitat to be modified is important to the long-term survival of any Rufous Bettongs in the locality.

(d) *whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),*

There is no declared area of outstanding biodiversity value as listed under the BC Act within the vicinity of the proposed CFAI.

(e) *whether the proposed development or activity is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.*

The proposed activity – reintroducing extinct mammals – is not recognised as a key threatening process (KTP) under schedule 3 of the BC Act. However, two KTPs are relevant to the proposed activity: the *Removal of dead wood and dead trees*, and *Clearing of native vegetation*.

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. Because the area to be cleared is a tiny fraction of the habitats available to any Rufous Bettongs in the Pilliga, any adverse impacts on an existing population will be minor.

The proposed activity will result in the retention (but relocation) of dead wood and the removal of dead trees if they occur directly on the path of the conservation fence and other infrastructure. The minor amounts of dead wood that would be relocated are not expected to have significant impacts on the species.

The removal of feral predators and herbivores from within the 5,822 ha fenced area will produce substantial benefits to any Rufous Bettongs in the area, delivering a significant increase in its population. It will provide a significant reduction in the operation of seven KTPs: *Competition and grazing by the feral European Rabbit*, *Competition and habitat degradation by Feral Goats*, *Herbivory and environmental degradation caused by feral deer*, *Predation and hybridisation by Feral dogs*, *Predation by the European Red Fox*, *Predation by feral cats*, and *Predation, habitat degradation, competition and disease transmission by Feral Pigs*.

In summary, the proposed activity is *unlikely* to introduce or to significantly increase the impact of any relevant key threatening process in the proposal area. It is certain to reduce the impact of several key threatening processes.

## **Conclusion**

This Assessment of Significance has determined that the proposed activity is *'unlikely'* to have a *'significant effect'* on Rufous Bettong or their habitats. Indeed, the proposed conservation fence is likely to substantially increase the population of any population within the feral predator-free area. Therefore, the proposed activity will not require a Species Impact Statement.

## **Stripe-faced Dunnart**

(a) *in the case of a threatened species, whether the action proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,*

The Stripe-faced Dunnart inhabits native dry grasslands and low dry shrublands, often along drainage lines (OEH, 2017d).

Stripe-faced Dunnart are likely to occur within the vicinity of the proposed CFAI.

OEH (2017d) identify the following threats to this species:

- Clearing of dry grassland and shrubland habitat for agriculture.
- Heavy grazing and trampling of habitat by domestic stock.

- Frequent and extensive fire in dry grasslands and low dry shrublands.
- Predation by foxes and feral cats.
- Removal of fallen timber.
- Dunnarts are very sensitive to the organophosphorus pesticide fenitrothion which is used to control locusts. Even sublethal intoxication causes lethargy and temporary immobilization, thus increasing vulnerability to predation.

The proposed activity is not likely to contribute significantly to these potential threats. The key points relating to the impact of the proposed activity are that:

- a) Approximately 48 ha is proposed for clearing along the entire 32 km perimeter of the conservation fence;
- b) This clearing will be implemented as a narrow strip averaging 15 m in width;
- c) A separate area of approximately 11 ha will be partially cleared for the proposed operations base; and
- d) One new management track (8.2 km long) will be created (3 ha clearing).

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. Because the area to be cleared is a tiny fraction of the habitats available to Stripe-faced Dunnarts in the Pilliga, and is mostly linear, any adverse impacts on the population will be minor. In addition, proposed pre-disturbance surveys are expected to identify any Stripe-faced Dunnarts in the affected area and these would be moved to undisturbed sites.

In addition, the establishment of the fenced area would result in the creation of a 5,822 ha area free of feral cats and foxes and large feral herbivores. With predation by cats and foxes, and modification of habitat by introduced herbivores, being identified threats to this species, the proposal will deliver a significant positive effect in terms of the life cycle of the species. It is *unlikely* that the proposed activity will have an adverse impact on the life cycle of this species (and so the action is not likely to place a viable local population at risk of extinction).

Stripe-faced Dunnart is not listed as an endangered population.

*(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*

- (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*
- (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,*

Stripe-faced Dunnart is not listed as an endangered ecological community or critically endangered ecological community.

*(c) in relation to the habitat of a threatened species, population or ecological community:*

- (i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*
- (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*
- (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,*

- (i) The proposed CFAI would result in habitat modification across about 62 ha. This is a tiny proportion of the total habitat area for the species (if it is present) within the proposal area and within the entire Pilliga forests.
- (ii) The proposal would not isolate or fragment habitats as clearing will only occur along narrow strips through the habitats.
- (iii) The modification of habitats will be minor in the context of the total area of habitat available for Stripe-faced Dunnarts in the Pilliga forests. The proposed activity will result in the clearing or modification of approximately 62 ha within an area of

35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. In addition, the proposed activity would create a 5,822 ha feral predator and herbivore free area which is expected to be of benefit to Stripe-faced Dunnarts by improving the quality of habitats and removing feral predators. Given that large areas of forest and woodland would remain unaffected (including those within the proposed fenced area), it is unlikely that the habitat to be modified is important to the long-term survival of Stripe-faced Dunnarts in the locality.

(d) *whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),*

There is no declared area of outstanding biodiversity value as listed under the BC Act within the vicinity of the proposed CFAI.

(e) *whether the proposed development or activity is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.*

The proposed activity – reintroducing extinct mammals – is not recognised as a key threatening process (KTP) under schedule 3 of the BC Act. However, two KTPs are relevant to proposed activity: the *Removal of dead wood and dead trees*, and *Clearing of native vegetation*.

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. Because the area to be cleared is a tiny fraction of the habitats available to any Stripe-faced Dunnarts in the Pilliga, any adverse impacts on a population will be minor.

The proposed activity will result in the retention (but relocation) of dead wood and the removal of dead trees if they occur directly on the path of the conservation fence and other infrastructure. The minor amounts of dead wood that would be relocated are not expected to have significant impacts on the species.

The removal of feral predators and herbivores from within the 5,822 ha fenced area will produce substantial benefits to Stripe-faced Dunnarts in the area. It will provide a significant reduction in the operation of seven KTPs: *Competition and grazing by the feral European Rabbit*, *Competition and habitat degradation by Feral Goats*, *Herbivory and environmental degradation caused by feral deer*, *Predation and hybridisation by Feral dogs*, *Predation by the European Red Fox*, *Predation by feral cats*, and *Predation, habitat degradation, competition and disease transmission by Feral Pigs*.

In summary, the proposed activity is *unlikely* to introduce or to significantly increase the impact of any relevant key threatening process in the proposal area. It is certain to reduce the impact of several key threatening processes.

## **Conclusion**

This Assessment of Significance has determined that the proposed activity is *'unlikely'* to have a *'significant effect'* on Stripe-faced Dunnart or their habitats. In addition, the proposed conservation fence is likely to increase general longevity and reproductive success following the removal of feral predators and an improvement in habitat quality. Therefore, the proposed activity will not require a Species Impact Statement.

## **Pale-headed Snake**

(a) *in the case of a threatened species, whether the action proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,*

The Pale-headed Snake is a highly cryptic species that occurs in dry eucalypt forests and woodlands, cypress pine forest and occasionally in rainforest (Fitzgerald et al., 2010, OEH, 2017d). They are known to spend weeks at a time hidden in tree hollows.

Pale-headed Snakes are likely to occur within the vicinity of the proposed CFAI, but this is most likely to be confined to riparian habitats based on the known ecology of the species (Fitzgerald et al., 2010).

OEH (2017d) identify the following threats to this species:

- Clearing and fragmentation of habitat.
- Forestry practices which result in loss of old or dead trees.
- Too frequent burning for fuel reduction or grazing management which destroys old and dead trees and removes understorey vegetation.
- Illegal collection of snakes from the wild.
- Disturbance to riparian habitat from the installation and maintenance of easements.

The proposed activity is not likely to contribute significantly to these potential threats. The key points relating to the impact of the proposed activity are that:

- a) Approximately 48 ha is proposed for clearing along the entire 32 km perimeter of the conservation fence;
- b) This clearing will be implemented as a narrow strip averaging 15 m in width;
- c) A separate area of approximately 11 ha will be partially cleared for the proposed operations base; and
- d) One new management track (8.2 km long) will be created (3 ha clearing).

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. Because the planned sites of the infrastructure and conservation fence avoid riparian zones, the preferred habitat of the Pale-headed Snake, the disturbance will affect an extremely tiny fraction of the habitat available to the species in the Pilliga. In addition, proposed pre-disturbance surveys are expected to identify any Pale-headed Snakes in the affected area and these would be moved to undisturbed sites.

With consideration of these factors, it is *unlikely* that the proposal could have an adverse effect on the life cycle of Pale-headed Snake such that a viable local population is likely to be placed at risk of extinction.

Pale-headed Snake is not listed as an endangered population.

*(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*

- (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*
- (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,*

Pale-headed Snake is not listed as an endangered ecological community or critically endangered ecological community.

*(c) in relation to the habitat of a threatened species, population or ecological community:*

- (i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*
- (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*
- (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,*

- (i) The proposed CFAI would result in habitat modification across about 62 ha (avoiding riparian zones). This is a tiny proportion of the total habitat area for the species within the proposal area and within the entire Pilliga forests.
- (ii) The proposal would not isolate or fragment habitats as clearing will only occur along narrow strips through the habitats (avoiding riparian zones).

(iii) The modification of habitats will be minor in the context of the total area of habitat available for the Pale-headed Snake in the Pilliga forests. The proposed activity will result in the clearing or modification of approximately 62 ha within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of most of this clearing (avoiding riparian zones) will have no significant impact on the habitat of Pale-headed Snakes. In addition, the proposed activity would create a 5,822 ha feral predator and herbivore free area which is expected to be of benefit to Pale-headed Snakes by improving the quality of habitats and reducing feral predation. Given that large areas of forest and woodland would remain unaffected (including those within the proposed fenced area), it is unlikely that the habitat to be modified is important to the long-term survival of Pale-headed Snake in the locality.

(d) *whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),*

There is no declared area of outstanding biodiversity value as listed under the BC Act within the vicinity of the proposed CFAI.

(e) *whether the proposed development or activity is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.*

The proposed activity – reintroducing extinct mammals – is not recognised as a key threatening process (KTP) under schedule 3 of the BC Act. However, three KTPs are relevant to the proposed activity: *Removal of dead wood and dead trees*, *Loss of hollow-bearing trees* and *Clearing of native vegetation* is of relevance to this species.

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The narrow, linear nature of this clearing (avoiding riparian zones) is unlikely to have a negative impact on Pale-headed Snake given their ability to cross roads where they occur across their range.

AWC surveys have shown that hollow-bearing trees are widespread and common throughout the proposal area, despite the long history of logging and other forestry activities. The removal of a limited number of hollow-bearing trees (avoiding riparian zones) during clearing for the proposed fence would have a negligible impact on availability of suitable hollows and not have adverse impacts on life cycles of Pale-headed Snake.

The proposed activity will result in the retention (but relocation) of dead wood and the removal of dead trees if they occur directly on the path of the conservation fence and other infrastructure. The minor amounts of dead wood that would be relocated are not expected to have significant impacts on the species.

The removal of feral predators and herbivores from within the 5,822 ha fenced area will deliver benefits for the Pale-headed Snake. It will provide a significant reduction in the operation of seven KTPs: *Competition and grazing by the feral European Rabbit*, *Competition and habitat degradation by Feral Goats*, *Herbivory and environmental degradation caused by feral deer*, *Predation and hybridisation by Feral dogs*, *Predation by the European Red Fox*, *Predation by feral cats*, and *Predation, habitat degradation, competition and disease transmission by Feral Pigs*.

In summary, the proposed activity is *unlikely* to introduce or to significantly increase the impact of any relevant key threatening process in the proposal area. It is certain to reduce the impact of several key threatening processes.

## **Conclusion**

This Assessment of Significance has determined that the proposed activity is *'unlikely'* to have a *'significant effect'* on Pale-headed Snake or their habitats. Therefore, the proposed activity will not require a Species Impact Statement.

## Sloane's Froglet

*(a) in the case of a threatened species, whether the action proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,*

Sloane's Froglet typically occurs in periodically inundated areas in grassland, woodland and even disturbed habitats such as roadside drains (Knight, 2013, OEH, 2017d).

Sloane's Froglet may occur within the ephemeral wetlands within and adjacent to the proposed fence.

OEH (2017d) identify the following threats to this species:

- Fragmentation and degradation of habitat and water quality through clearing.
- Drought and longer term climate change impacts on the presence, persistence and seasonality of water at breeding sites. This in turn impacts on recruitment and persistence of populations.
- Changes in water availability, flow and flooding regimes in creeks, rivers, floodplains and wetlands.
- The susceptibility of Sloane's Froglet to the amphibian chytrid fungus is not known.
- Loss of habitat via urbanisation and development.
- Habitat degradation from inappropriate stock grazing (cattle)

The proposed activity is not likely to contribute significantly to these potential threats. The key points relating to the impact of the proposed activity are that:

- a) Approximately 48 ha is proposed for clearing along the entire 32 km perimeter of the conservation fence;
- b) This clearing will be implemented as a narrow strip averaging 15 m in width;
- c) A separate area of approximately 11 ha will be partially cleared for the proposed operations base; and
- d) One new management track (8.2 km long) will be created (3 ha clearing).

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. Because the planned sites of the infrastructure and conservation fence avoid wetlands and riparian zones, the preferred habitat of the Sloane's Froglet, any habitat disturbance will be an extremely tiny fraction of the habitat available to them in the Pilliga.

It is *unlikely* that the proposal could have an adverse effect on the life cycle of Sloane's Froglet such that a viable local population is likely to be placed at risk of extinction.

Sloane's Froglet is not listed as an endangered population.

*(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*

- (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*
- (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,*

Sloane's Froglet is not listed as an endangered ecological community or critically endangered ecological community.

*(c) in relation to the habitat of a threatened species, population or ecological community:*

- (i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*
- (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*
- (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,*



- (i) The proposed CFAI would result in the removal of about 62 ha of native vegetation, none of this considered potential habitat for Sloane's Froglet. No wetland would be removed by the proposal.
  - (ii) The proposal would not isolate or fragment other areas of potential habitat for Sloane's Froglet.
  - (iii) No area of wetland would be removed, modified, fragmented or isolated.
- (d) *whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),*

There is no declared area of outstanding biodiversity value as listed under the BC Act within the vicinity of the proposed CFAI.

- (e) *whether the proposed development or activity is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.*

The proposed activity – reintroducing extinct mammals – is not recognised as a key threatening process (KTP) under schedule 3 of the BC Act. However, one KTP is relevant to the proposed activity: *Clearing of native vegetation*.

Under the FM Act, one KTP, *Degradation of native riparian vegetation* is also relevant given potential erosion and sedimentation impacts.

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. The clearing will have no impact on the potential habitat of the Sloane's Froglet given that no clearing of wetland areas would occur.

The proposed activity has the potential to result in minor erosion or sedimentation in riparian habitats, but any riparian areas potentially affected by clearing would be extremely small in the context of the whole riparian network within the proposal area. In any event, the potential impacts will be fully mitigated by standard control methods which would be included in AWC's plans and operations. In addition, the removal of large herbivores from the proposed fenced area will remove an existing, serious cause of erosion and sedimentation in riparian habitats.

The removal of feral predators and herbivores from within the 5,822 ha fenced area will deliver benefits for Sloane's Froglet. It will provide a significant reduction in the operation of seven KTPs: *Competition and grazing by the feral European Rabbit, Competition and habitat degradation by Feral Goats, Herbivory and environmental degradation caused by feral deer, Predation and hybridisation by Feral dogs, Predation by the European Red Fox, Predation by feral cats, and Predation, habitat degradation, competition and disease transmission by Feral Pigs.*

In summary, the proposed activity is *unlikely* to introduce or to significantly increase the impact of any relevant key threatening process in the proposal area. It is certain to reduce the impact of several key threatening processes.

## **Conclusion**

This Assessment of Significance has determined that the proposed activity is *'unlikely'* to have a *'significant effect'* on Sloane's Froglet or their habitats. Therefore, the proposed activity will not require a Species Impact Statement.

## **Cobar Greenhood**

- (a) *in the case of a threatened species, whether the action proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,*

Cobar Greenhood occurs in eucalypt woodlands, open mallee and Cypress pine, on low stony ridges and slopes in skeletal sandy-loam soils (OEH, 2017d, Cunningham et al., 2011).

Cobar Greenhood may occur within the vicinity of the proposed CFAI as it is known from the Pilliga East State Forest (OEH, 2017b). It was not recorded during surveys of the CFAI by AWC botanists.

OEH (2017d) identify the following threats to this species:

- Feral goats, rabbits and pigs (grazing, browsing and erosion). Rabbits have been known to dig up the tubers
- Habitat degradation (the granite ridge and rocky slope habitats are particularly vulnerable to the detrimental impacts of feral goats).
- Weed infestation and competition (may limit the species).
- Climate change as these orchids grow on the arid extreme of known range for orchid species. If the western areas become drier the range of this species may be restricted to the east
- Lack of information on species locations and population sizes
- Disturbance by feral pigs
- Grazing by stock during flowering period is detrimental
- Weed infestation and competition which degrade the vegetation community.

The proposed activity is not likely to contribute significantly to these potential threats. The key points relating to the impact of the proposed activity are that:

- a) Approximately 48 ha is proposed for clearing along the entire 32 km perimeter of the conservation fence;
- b) This clearing will be implemented as a narrow strip averaging 15 m in width;
- c) A separate area of approximately 11 ha will be partially cleared for the proposed operations base; and
- d) One new management track (8.2 km long) will be created (3 ha clearing).

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. Because the area to be cleared is a tiny fraction of the habitats available to any Cobar Greenhoods in the Pilliga, any adverse impacts on the population (if a population occurs) will be minor.

It is *unlikely* that the proposal could have an adverse effect on the life cycle of Cobar Greenhood such that a viable local population is likely to be placed at risk of extinction.

Cobar Greenhood is not listed as an endangered population.

*(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*

- (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*
- (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,*

Cobar Greenhood is not listed as an endangered ecological community or critically endangered ecological community.

*(c) in relation to the habitat of a threatened species, population or ecological community:*

- (i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*
- (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*
- (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,*

- (i) The proposed CFAI would result in habitat modification across about 62 ha. This is a tiny proportion of the total habitat area for the species (if it is present) within the proposal area and within the entire Pilliga forests.
- (ii) The proposal would not isolate or fragment habitats as clearing will only occur along narrow strips through the habitats.
- (iii) The modification of habitats will be minor in the context of the total area of habitat available for any Cobar Greenhoods present in the Pilliga forests. The proposed activity will result in the clearing or modification of approximately 62 ha within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. In addition, the proposed activity would create a 5,822 ha feral predator and herbivore free area which is expected to be of benefit to any Cobar Greenhoods by improving the quality of habitats. Given that large areas of forest and woodland would remain unaffected (including those within the proposed fenced area), it is unlikely that the habitat to be modified is important to the long-term survival of any Cobar Greenhoods in the locality.

(d) *whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),*

There is no declared area of outstanding biodiversity value as listed under the BC Act within the vicinity of the proposed CFAI.

(e) *whether the proposed development or activity is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.*

The proposed activity – reintroducing extinct mammals – is not recognised as a key threatening process (KTP) under schedule 3 of the BC Act. However, one KTP is relevant to the proposed activity: *Clearing of native vegetation*.

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. Because the area to be cleared is a tiny fraction of the habitats available to any Cobar Greenhoods in the Pilliga, any adverse impacts on an existing population will be minor.

The removal of feral predators and herbivores from within the 5,822 ha fenced area will produce substantial benefits to any Cobar Greenhoods in the area. It will provide a significant reduction in the operation of seven KTPs: *Competition and grazing by the feral European Rabbit, Competition and habitat degradation by Feral Goats, Herbivory and environmental degradation caused by feral deer, Predation and hybridisation by Feral dogs, Predation by the European Red Fox, Predation by feral cats, and Predation, habitat degradation, competition and disease transmission by Feral Pigs*.

In summary, the proposed activity is *unlikely* to introduce or to significantly increase the impact of any relevant key threatening process in the proposal area. It is certain to reduce the impact of several key threatening processes.

## **Conclusion**

This Assessment of Significance has determined that the proposed activity is '*unlikely*' to have a '*significant effect*' on Cobar Greenhood or their habitats. Therefore, the proposed activity will not require a Species Impact Statement.

## **Pine Donkey Orchid**

(a) *in the case of a threatened species, whether the action proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,*

Pine Donkey Orchid is sporadically distributed on the western slopes of NSW including the Pilliga SCA and NP (OEH, 2017b). It usually occurs in woodland and forest among grass, often with cypress pine. Soils are generally sandy, occurring on flats or small rises.

Pine Donkey Orchid has relatively wide distribution in NSW, according to existing records in the NSW BioNET database. It was not detected in the CFAI during surveys by AWC botanists.

OEH (2017d) have identified the following threats to this species:

- Habitat clearing and modification. The species requires a grassy component to the ground layer to provide some protection and moisture-retaining litter.
- The short duration of its flowering means that it will be impossible to detect when some developments are assessed for their impact on threatened species.
- Feral animal impacts. The sandy soils and grassy open areas where this orchid grows are vulnerable to rabbit and goat disturbance.
- Weed competition.

The proposed activity is not likely to contribute significantly to these potential threats. The key points relating to the impact of the proposed activity are that:

- a) Approximately 48 ha is proposed for clearing along the entire 32 km perimeter of the conservation fence;
- b) This clearing will be implemented as a narrow strip averaging 15 m in width;
- c) A separate area of approximately 11 ha will be partially cleared for the proposed operations base; and
- d) One new management track (8.2 km long) will be created (3 ha clearing).

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. Because the area to be cleared is a tiny fraction of the habitats available to any Pine Donkey Orchids in the Pilliga, any adverse impacts on the population will be minor. In addition, appropriate fire management is also likely to restore grassy habitats through some portions of the Pilliga forests. Grassy habitats are considered important habitat for this species. The removal and control of feral animals will also benefit the species, should it occur. Both of these factors are significant long-term benefits to Pine Donkey Orchid should it occur there.

It is *unlikely* that the proposal could have an adverse effect on the life cycle of Pine Donkey Orchid such that a viable local population is likely to be placed at risk of extinction.

Pine Donkey Orchid is not listed as an endangered population in the Pilliga.

*(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*

- (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*
- (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,*

Pine Donkey Orchid is not listed as an endangered ecological community or critically endangered ecological community.

*(c) in relation to the habitat of a threatened species, population or ecological community:*

- (i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*
- (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*
- (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,*

- (i) The proposed CFAI would result in habitat modification across about 62 ha. This is a tiny proportion of the total habitat area for the species (if it is present) within the proposal area and within the entire Pilliga forests.

- (ii) The proposal would not isolate or fragment habitats as clearing will occur primarily along a narrow strip.
- (iii) The modification of habitats will be minor in the context of the total area of habitat available for any Pine Donkey Orchids present in the Pilliga forests. The proposed activity will result in the clearing or modification of approximately 62 ha within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. In addition, the proposed activity would create a 5,822 ha feral predator and herbivore free area which is expected to be of benefit to Pine Donkey Orchids by improving the quality of habitats, and appropriate fire management is likely to restore grassy habitats in parts of the Pilliga forests. Given that large areas of forest and woodland would remain unaffected (including those within the proposed fenced area), it is unlikely that the habitat to be modified is important to the long-term survival of any Pine Donkey Orchids in the locality.

(d) *whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),*

There is no declared area of outstanding biodiversity value as listed under the BC Act within the vicinity of the proposed CFAI.

(e) *whether the proposed development or activity is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.*

The proposed activity – reintroducing extinct mammals – is not recognised as a key threatening process (KTP) under schedule 3 of the BC Act. However, one KTP is relevant to the proposed activity: *Clearing of native vegetation*.

The proposed activity will result in the clearing or modification of approximately 62 ha of habitat within an area of 35,632 ha (0.2%), which is embedded within more than 500,000 ha of continuous habitat in the Pilliga forests. Because the area to be cleared is a tiny fraction of the habitats available to any Pine Donkey Orchids in the Pilliga, any adverse impacts on an existing population will be minor.

The removal of feral predators and herbivores from within the 5,822 ha fenced area will produce substantial benefits to any Pine Donkey Orchids in the area. It will provide a significant reduction in the operation of seven KTPs: *Competition and grazing by the feral European Rabbit, Competition and habitat degradation by Feral Goats, Herbivory and environmental degradation caused by feral deer, Predation and hybridisation by Feral dogs, Predation by the European Red Fox, Predation by feral cats, and Predation, habitat degradation, competition and disease transmission by Feral Pigs.*

In summary, the proposed activity is *unlikely* to introduce or to significantly increase the impact of any relevant key threatening process in the proposal area. It is certain to reduce the impact of several key threatening processes.

## Conclusion

This Assessment of Significance has determined that the proposed activity is *'unlikely'* to have a *'significant effect'* on Cobar Greenhood or their habitats. Therefore, the proposed activity will not require a Species Impact Statement.

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