

Grey-headed Flying Fox (*Pteropus poliocephalus*)

The Grey-headed Flying-fox (*Pteropus poliocephalus*) occurs along the eastern seaboard of Australia roosting in large communal aggregations known as 'camps'. These camps are used permanently, annually, or occasionally, varying in size from hundreds to many thousands of individuals, fluctuating according to food resources (Eby and Law, 2008; Parry-Jones and Augee, 1991; Tidemann, 1995). This species forages on nectar and pollen from flowers of canopy trees (particularly *Eucalyptus*, *Melaleuca* and *Banksia*) and fleshy fruits from rainforest trees and vines. This species is highly mobile, dispersing to sites as far as 40 km to forage and returning to the camp in one night, and seasonally they may move hundreds of kilometres in response to variation in food resource productivity which largely explains the extensive migration movement of this species (Eby and Law, 2008). Roost sites are typically located near water, such as lakes, rivers or the coast. Roost vegetation includes rainforest patches, stands of *Melaleuca*, mangroves and riparian vegetation, but colonies also use highly modified vegetation in urban and suburban areas.

Significant impact criteria

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:

- *lead to a long-term decrease in the size of an important population of a species*

The Grey-headed Flying-fox was not detected within the Study Area. This species roosts communally in large, established camps which may support several thousand individuals. The Action will not affect the foraging movements of this nocturnal species. The Action would not isolate any areas of habitat or cause significant habitat fragmentation that would affect the breeding, foraging or dispersive movements of this highly mobile species.

The Action would remove up to 18.06 ha of potential foraging habitat for this species.

This species has very large home range and may travel up to 50 km in a night to forage (Eby and Law 2008). The habitat to be removed would therefore make up a very small proportion of the home range of locally occurring individuals. Given the large areas of native vegetation in the locality, it is considered that the removal of habitats would be unlikely to lead to a long-term decrease in the size of the population.

- *reduce the area of occupancy of an important population*

The habitat to be removed does not represent breeding habitat (no camps identified) for the species and therefore any individuals utilising this habitat do not represent an important population. Additionally, the area of potential foraging habitat to be removed would constitute a very small proportion of the available habitat within the locality.

- *fragment an existing important population into two or more populations*

The Grey-headed Flying Fox is a highly mobile species. The Action will not introduce physical barriers that would fragment an existing important population into two or more populations.

- *adversely affect habitat critical to the survival of a species*

The draft national recovery plan (DECCW 2009) states that foraging habitat that meets at least one of the following criteria qualifies as critical habitat:

- productive during winter and spring, when food bottlenecks have been identified;
- known to support populations of > 30 000 individuals within an area of 50 km radius (the maximum foraging distance of an adult)
- productive during the final weeks of gestation, and during the weeks of birth, lactation and conception (September to May);
- productive during the final stages of fruit proposal and ripening in commercial crops affected by Grey-headed Flying-foxes (months vary between regions)

- known to support a continuously occupied camp.

The habitat within the Study Area does not support a continuously occupied roost camp and is unlikely to support a population of more than 30,000 individuals.

Habitats within the Study Area contain winter and spring-flowering eucalypts and may therefore qualify as critical foraging habitat as they would be productive during identified food bottlenecks. The resources present in the Study Area, however, are limited in comparison to available foraging resources in nearby areas. In this context the removal of 18.06 ha of foraging habitat is unlikely to threaten the survival of local populations of this species.

- *disrupt the breeding cycle of an important population*

No camps of the Grey-headed Flying Fox were detected within the Study Area. The Action is unlikely to disrupt the breeding cycle of an important population of the Grey-headed Flying-fox.

- *modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline*

The habitat onsite comprises small, isolated patches with a low-level of connectivity to surrounding habitat, or patches at the extremities of larger patches. Therefore, the loss of any potential habitat for these species within the Study Area would not isolate remaining habitat from other patches and it is unlikely that the Action would significantly reduce the area of available habitat such that it would lead to a decline of this species.

- *result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat*

The existing weed and feral animal threat levels are unlikely to change significantly due to the Action given the current agricultural use of the surrounding area. A site-specific CEMP will be prepared and implemented prior to the commencement of any clearing or construction works to ensure that impacts are minimised.

- *introduce disease that may cause the species to decline, or*

Australian bat Lyssavirus (ABL), Bat Paramyxovirus and Menangle Pig virus are recognised threats to the Grey-headed flying fox; however, the Action would not include activities that are likely to introduce these diseases.

- *interfere substantially with the recovery of the species.*

As discussed above, foraging habitat within the Study Area is consistent with the definition of habitat critical to the survival of the Grey-headed Flying-fox. The Action is therefore inconsistent with one of the stated objectives of the draft recovery plan (DEWHA 2009), which is to "identify and protect foraging habitat critical to the survival of Grey-headed Flying-foxes throughout their range". As discussed above, however, the 18.06 ha of foraging habitat to be removed represents a very small proportion of available foraging habitat for this highly mobile species. It is considered unlikely, therefore, that the Action would substantially interfere with the recovery of the species.

2019/20 Bushfire Impacts

An assessment of potential impacts of the 2019/2020 bushfires determined that moderate to large area of habitat for the Grey-headed Flying Fox were adversely affected by the fires (i.e. approximately 31% of the habitat within a 50km radius of the Development Site). The affected areas of habitat mainly occur to the southwest in the Yengo IBRA subregion and in the northwest near the Mummel Escarpment (**Figure 11**). Large areas of unaffected habitat for this species occurs throughout the Hunter IBRA subregion and to the north. Given that roosting camps are generally located within 20kms of regular food sources, it is unlikely that bushfires within Yengo will have any impact on populations that frequent the Study Area.

Conclusion

The Grey-headed Flying-fox (*Pteropus poliocephalus*) has a moderate to high likelihood of occurrence within the Study Area. The Action is unlikely to have a significant impact on this species, given:

- the lack of breeding habitat for this species within the Study Area;
- evidence of this species within the locality indicates this species has the potential to occur in the adjacent habitat;
- the habitat onsite comprises small, isolated patches with a low-level of connectivity to surrounding habitat, or patches at the extremities of larger patches;
- the Action is unlikely to introduce or increase number of invasive pest species or a disease that may cause the species to decline; and
- the Action would not interfere substantially with the recovery of this species.
- Large areas of habitat unaffected by the 2019/20 bushfires occur throughout the Hunter IBRA subregion.

References

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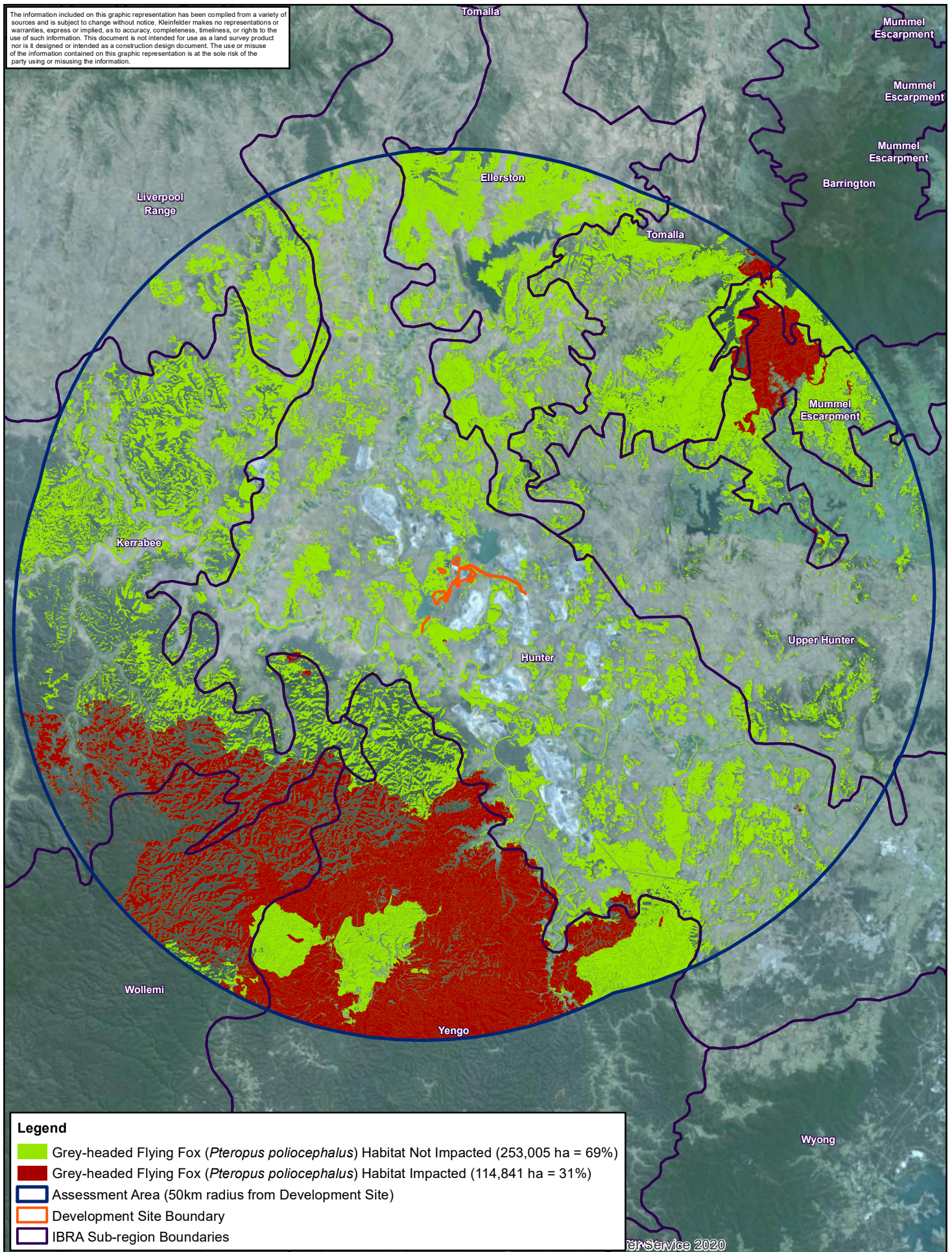
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Legend

- Grey-headed Flying Fox (*Pteropus poliocephalus*) Habitat Not Impacted (253,005 ha = 69%)
- Grey-headed Flying Fox (*Pteropus poliocephalus*) Habitat Impacted (114,841 ha = 31%)
- Assessment Area (50km radius from Development Site)
- Development Site Boundary
- IBRA Sub-region Boundaries

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	PROJECT REFERENCE: 20214047 DATE DRAWN: 2021/03/17 23:40Version 1 DRAWN BY: G.Joyce	Impact of 2019-2020 Bushfires on Grey-headed Flying Fox (<i>Pteropus poliocephalus</i>) Habitat	FIGURE: 11
	DATA SOURCE: NSW DFSI - 2020 Commonwealth of Australia, Department of Agriculture, Water and the Environment (2012)	AGL Macquarie Analysis of Bushfire Impact on Habitats	

Koala (*Phascolarctos cinereus*)

The Koala is an arboreal marsupial with fur ranging from grey to brown above and is white below. It has large furry ears, a prominent black nose and no tail. It spends most of its time in trees and has long, sharp claws, adapted for climbing. Adult males weigh 6 - 12 kg and adult females weigh 5 - 8 kg. During breeding, males advertise with loud snarling coughs and bellows. The Koala has a fragmented distribution throughout eastern Australia from north-east Queensland to the Eyre Peninsula in South Australia. In New South Wales, koala populations are found on the central and north coasts, southern highlands, southern and northern tablelands, Blue Mountains, southern coastal forests, with some smaller populations on the plains west of the Great Dividing Range.

The Koala (*Phascolarctos cinereus*) is listed as vulnerable under the EPBC Act. This species was not detected within the Study Area during the assessment, based on the availability of habitat and the occurrence of local species records, this species has a low likelihood of occurrence.

Significant impact criteria

An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:

- *lead to a long-term decrease in the size of a population*

Five tree species listed under SEPP for Koala Habitat Protection (Koala SEPP 2021) occur within the Study Area: *Eucalyptus tereticornis*, *Eucalyptus punctata*, *Eucalyptus crebra*, *Eucalyptus moluccana* and *Angophora floribunda*. Within the Study Area, these five tree species only constitute >15% of the canopy cover within small portions of the site (within Vegetation Zone 1 – PCT 1691: Moderate-Good-CEEC, and Vegetation Zone 6 – PCT 1691: Plantation). As such, some areas of the study Area constitute Highly Suitable Habitat, as defined by the Koala SEPP

No evidence of Koala activity was identified during surveys conducted within the Study Area. However, there are four records of Koalas within 5kms of the Study Area, Due to the presence of 'highly suitable habitat' and 'recent' koala records within the locality, areas of the site meet the definition of Core Koala Habitat, as defined by the Koala SEPP.

Due to the limited extent of Core Koala Habitat and fact that Koalas were not detected within the Study Area during targeted surveys, it is unlikely that the Action will lead to the long-term decrease of any potentially occurring local population of the species.

- *reduce the area of occupancy of the species*

Due to the large home range sizes of the species, and availability of higher quality suitable habitat within the Development Site, it is unlikely that the Action would reduce the area of occupancy of any potentially occurring local population.

- *fragment an existing population into two or more populations*

The majority of habitat onsite comprises small, isolated patches with a low-level of connectivity to surrounding habitat, or patches located at the extremities of larger patches. The species is mobile and due to the availability of suitable habitat in the surrounding area, predominantly to the west of the impact area, it is unlikely that the Action will fragment any potentially occurring local population.

- *adversely affect habitat critical to the survival of a species*

Targeted surveys did not detect an evidence of Koala within the Study Area. However, some areas of the Study Area that contain vegetation with greater 15% Koala use trees are defined as Core Koala Habitat. Due to small area of habitat and their isolation from areas of higher quality habitat where the species has previously been detected, it is unlikely that the Study Area contains habitat critical to the survival of the species.

- *disrupt the breeding cycle of a population*

No individuals were identified during targeted surveys of the species. As such, no evidence of breeding was recorded. Limited records from within the locality also indicate that the species is unlikely to breed

within the Study Area. As such, it is unlikely that the Action will disrupt the breeding cycle of a locally occurring population.

- *modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline*

The majority of the habitat onsite comprises small, isolated patches with a low-level of connectivity to surrounding habitat, or patches that are at the extremities of larger patches. The loss of any potential habitat for these species within the Study Area would not isolate remaining habitat from other patches and it is unlikely that the Action would significantly reduce the area of habitat occupied by the species relative to its regional distribution.

- *result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat*

A site-specific CEMP will be prepared and implemented prior to the commencement of any clearing or construction works to ensure that impacts are minimised. Stringent management measures will prevent construction activities from introducing or spreading new or existing environmental and noxious weeds or plant and animal pathogens. As such, it is unlikely that the Action will result in invasive species becoming established in the habitat for the species.

- *introduce disease that may cause the species to decline, or*

A site-specific CEMP will be prepared and implemented prior to the commencement of any clearing or construction works to ensure that impacts are minimised. Management measures will prevent construction activities from introducing or spreading new or existing environmental and noxious weeds or plant and animal pathogens. As such, it is unlikely that the Action will result in the introduction of disease causing the species to further decline.

- *interfere with the recovery of the species.*

A recovery plan has not been prepared for the species.

2019/20 Bushfire Impacts

An assessment of potential impacts of the 2019/2020 bushfires determined that a moderate to large area of habitat for the Koala was adversely affected by the fires (i.e. approximately 38% of the habitat within a 50km radius of the Development Site). The affected areas of habitat mainly occur to the southwest in the Yengo IBRA subregion and in the northwest near the Mummel Escarpment (**Figure 12**). Large areas of unaffected habitat for this species occurs throughout the Hunter IBRA subregion and to the north. Due to the limited connectivity between areas of habitat within the Study Area and areas of higher quality habitat (with recent records of Koala) in the locality, it is unlikely that the value or importance of Koala habitat onsite has increased as a consequence of habitat loss from bushfire within the broader region.

Conclusion

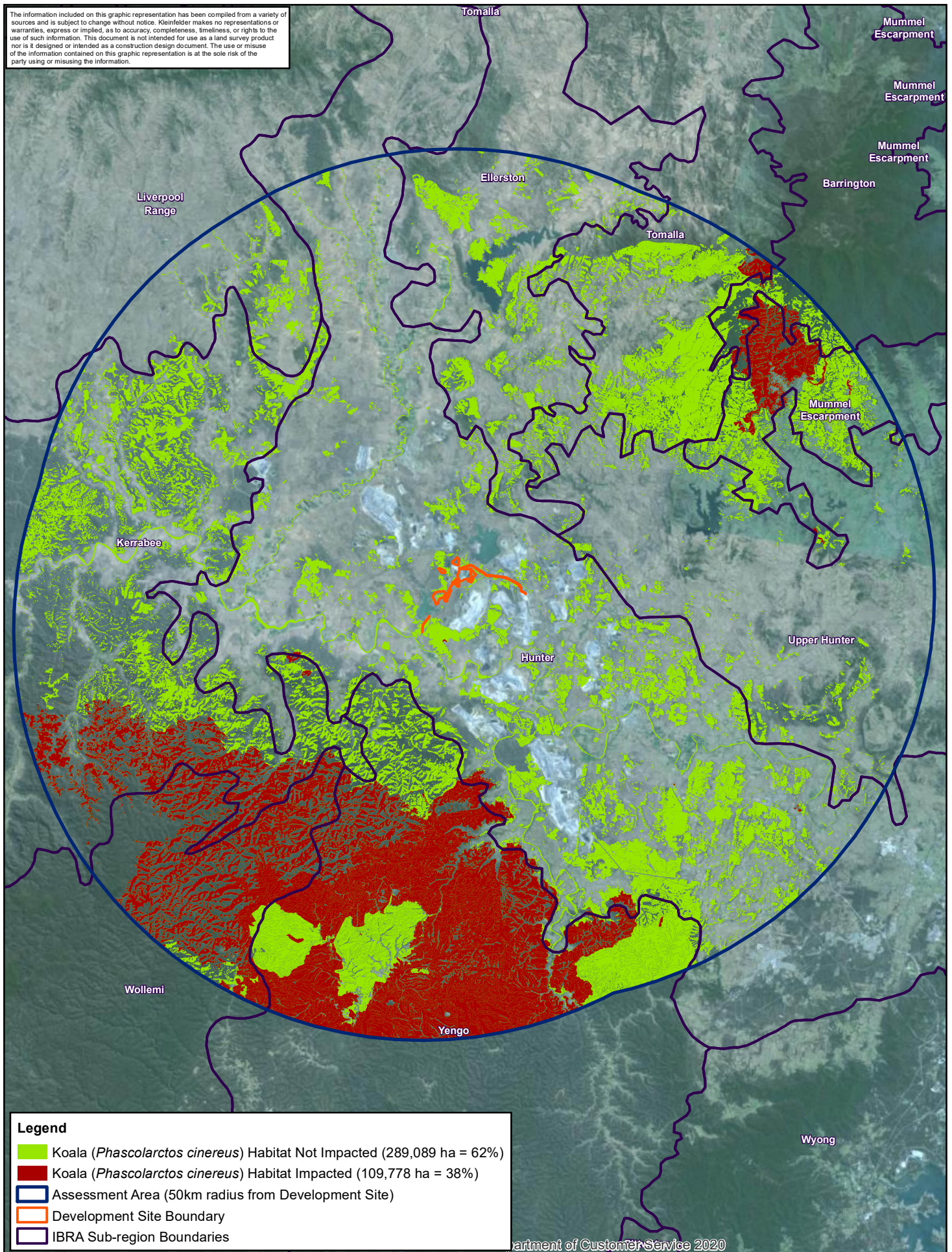
The species was assessed as having a low likelihood of occurrence within the Study Area. Targeted surveys for this species did not identify evidence of a Koalas. The Study Area was assessed as providing mainly dispersal habitat for the species. As there is a large amount of higher quality habitat within the surrounding areas of the Development Site that were unaffected by the 2019/20 bushfires, the removal of the habitat within the Development Site is unlikely to have a significant impact on any potentially occurring local population of the species.

References

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Legend

- Koala (*Phascolarctos cinereus*) Habitat Not Impacted (289,089 ha = 62%)
- Koala (*Phascolarctos cinereus*) Habitat Impacted (109,778 ha = 38%)
- Assessment Area (50km radius from Development Site)
- Development Site Boundary
- IBRA Sub-region Boundaries

0 2.5 5 10 15 20 25 km

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 DRAWN BY: G.Joyce
 DATA SOURCE:
 NSW DFSI - 2020
 Commonwealth of Australia, Department of
 Agriculture, Water and the Environment (2012)

**Impact of 2019-2020 Bushfires on
 Koala (*Phascolarctos cinereus*)
 Habitat**

AGL Macquarie
 Analysis of Bushfire Impact on Habitats

FIGURE:
12

Brush-tailed Rock Wallaby (*Petrogale penicillata*)

The Brush-tailed Rock Wallaby (*Petrogale penicillata*) is listed as vulnerable under the EPBC Act. This species was not detected within the Study Area and due to the lack of suitable habitat, the species has a low likelihood of occurrence.

The Brush-tailed Rock-wallaby has a characteristic, long and bushy, dark rufous-brown tail that is bushier towards its tip. It has long, thick, brown body-fur that tends to be rufous on the rump and greyer on the shoulders. The fur on its chest and belly are paler, and some individuals have a white blaze on their chest. It also has a characteristic white cheek-stripe and a black stripe from its forehead to the back of its head. The Brush-tailed Rock-wallaby is highly agile and can move swiftly and confidently through rugged and precipitous areas. This agility is attributed to their compact, muscular build, their long and flexible tail that is used for balance and their well-padded and rough textured feet that provide excellent traction. The average weight of this species is about 8 kg for males and 6 kg for females.

Habitat for the species includes rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges, often facing north.

Significant impact criteria

An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:

- *lead to a long-term decrease in the size of a population*

The species was not detected within the Study Area during the targeted surveys. The Study Area does not contain rocky escarpments, outcrops, cliffs or another habitat features consistent with the preferred habitat of this species. Therefore, it is unlikely that the Action will lead to the long-term decrease of any potentially occurring local population of the species.

- *reduce the area of occupancy of the species*

Due to the lack of habitat for the species within the Study Area and lack of evidence of a known resident population, it is unlikely that the Action would reduce the area of occupancy of any potentially occurring local population.

- *fragment an existing population into two or more populations*

Due to the lack of habitat for the species within the Study Area and lack of evidence of a known resident population, it is unlikely that the Action will fragment any potentially occurring local population.

- *adversely affect habitat critical to the survival of a species*

The Study Area does not contain rocky escarpments, outcrops, cliffs or other habitat features consistent with the preferred habitat of this species. As such, it is unlikely that the Study Area contains habitat critical to the survival of the species.

- *disrupt the breeding cycle of a population*

No individuals were identified during targeted surveys of the species. As such, it has been assumed that the Study Area does not form part of the breeding range of a local population (foraging and dispersal habitat only). As such, it is unlikely that the Action will disrupt the breeding cycle of a locally occurring population.

- *modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline*

The Study Area does not contain rocky escarpments, outcrops, cliffs or other habitat features consistent with the preferred habitat of this species. It is unlikely that the Action would significantly reduce the area of habitat occupied by the species relative to its regional distribution.

- *result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat*

A site-specific CEMP will be prepared and implemented prior to the commencement of any clearing or construction works to ensure that impacts are minimised. Stringent management measures will prevent construction activities from introducing or spreading new or existing environmental and noxious weeds or plant and animal pathogens. As such, it is unlikely that the Action will result in invasive species becoming established in the habitat for the species.

- *introduce disease that may cause the species to decline, or*

A site-specific CEMP will be prepared and implemented prior to the commencement of any clearing or construction works to ensure that impacts are minimised. Management measures will prevent construction activities from introducing or spreading new or existing environmental and noxious weeds or plant and animal pathogens. As such, it is unlikely that the Action will result in the introduction of disease causing the species to further decline.

- *interfere with the recovery of the species.*

The Action does not contravene the objectives of the National recovery plan (Menkhorst and Hynes (2010)).

2019/20 Bushfire Impacts

An assessment of potential impacts of the 2019/2020 bushfires determined that moderate to large areas of habitat for the Brush-tailed Rock Wallaby were adversely affected by the fires (i.e. approximately 34% of the habitat within a 50km radius of the Development Site). The affected areas of habitat mainly occur to the southwest in the Yengo IBRA subregion and in the northwest near the Mummel Escarpment (**Figure 13**). Large areas of unaffected habitat for this species occurs throughout the Hunter IBRA subregion and to the north. Given that the Study Areas lacks preferred habitat attributes of the Brush-tailed Rock Wallaby, loss of habitat through bushfire is unlikely to have increased the values of habitats within the Development Site.

Conclusion

The species was assessed as having a low likelihood of occurrence within the Study Area due to the lack of suitable habitat present. Large areas habitat unaffected by the 2019/20 bushfires occurs throughout the Hunter IBRA subregion The Activity is unlikely to have a significant impact on a local population of the species.

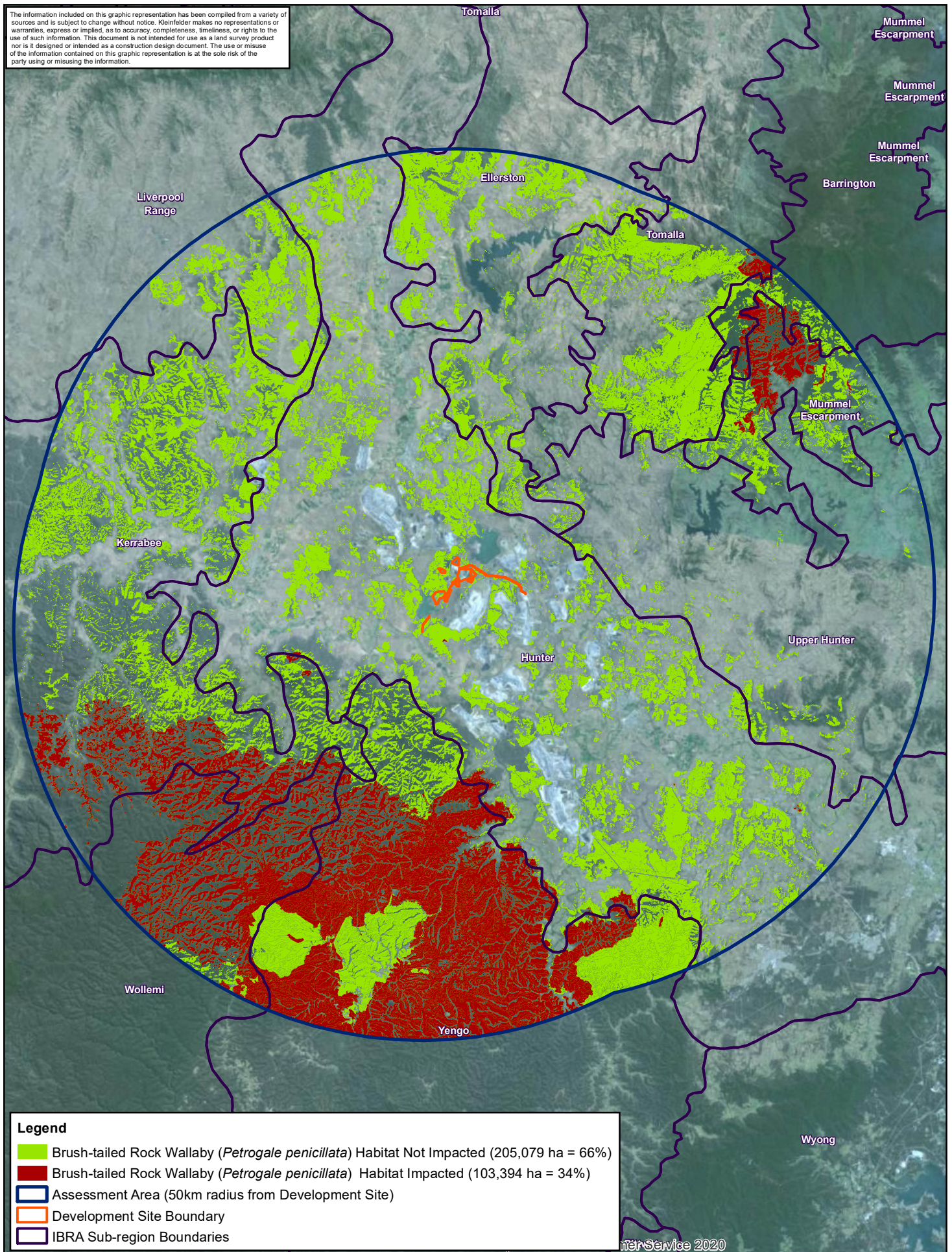
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Office of Environment and Heritage (2019). *Threatened biodiversity profile search*. Available: <https://www.environment.nsw.gov.au/threatenedSpeciesApp/>. Accessed September 2019.

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Legend

- Brush-tailed Rock Wallaby (*Petrogale penicillata*) Habitat Not Impacted (205,079 ha = 66%)
- Brush-tailed Rock Wallaby (*Petrogale penicillata*) Habitat Impacted (103,394 ha = 34%)
- Assessment Area (50km radius from Development Site)
- Development Site Boundary
- IBRA Sub-region Boundaries

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	PROJECT REFERENCE: 20214047 DATE DRAWN: 2021/03/19 12:54 Version 1 DRAWN BY: G.Joyce	Impact of 2019-2020 Bushfires on Brush-tailed Rock Wallaby (<i>Petrogale penicillata</i>) Habitat	FIGURE: 13
	DATA SOURCE: NSW DFSI - 2020 Commonwealth of Australia, Department of Agriculture, Water and the Environment (2012)	AGL Macquarie Analysis of Bushfire Impact on Habitats	

Striped Legless Lizard (*Delma impar*)

The Striped Legless Lizard (*Delma impar*) is listed as vulnerable under the EPBC Act. The species occurs in the Southern Tablelands, the South West Slopes, the Upper Hunter and possibly on the Riverina. Populations are known in the Goulburn, Yass, Queanbeyan, Cooma, Muswellbrook and Tumut areas. Also occurs in the Australian Capital Territory (ACT), Victoria and south-eastern South Australia. The species is found mainly in Natural Temperate Grassland but has also been captured in grasslands that have a high exotic component, and in secondary grassland near Natural Temperate Grassland and occasionally in open Box-Gum Woodland. Habitat is where grassland is dominated by perennial, tussock-forming grasses such as *Themeda australis* (Kangaroo Grass), spear-grasses (*Austrostipa* spp.) and tussock grasses (*Poa* spp.), and occasionally wallaby grasses (*Rytidosperma* spp.). It is sometimes found in grasslands with significant amounts of surface rocks, which are used for shelter. This species actively hunts for spiders, crickets, moth larvae and cockroaches, and goes below ground or under rocks or logs over winter (OEH, 2019).

This species was detected within the Study Area during the assessment at Borrow Pit 4.

Significant impact criteria

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:

- *lead to a long-term decrease in the size of an important population of a species*

The Striped Legless Lizard occurs in the Southern Tablelands, the South West Slopes, the Upper Hunter and possibly on the Riverina. Populations are known in the Goulburn, Yass, Queanbeyan, Cooma, Muswellbrook and Tumut areas. Also occurs in the ACT, Victoria and south-eastern South Australia (OEH 2019). Occurrence of the species in the Muswellbrook area is a range extension for the species, with the first being recorded at the Muswellbrook Common in 2013 (approximately 15 km north-west of the Study Area). Additionally, the species was recorded approximately 5 km to the west of the site in 2018, as part of surveys for the Maxwell Coal Project.

Targeted surveys identified evidence of a population within the Study Area. The species was detected twice at the same location within Borrow Pit 4, where a large patch of woodland vegetation occurs (on the edge of Bull Oak Woodland under an old fence post). It could not be clarified if two individuals were detected, or the same individual was captured twice (second individual captured had a dropped tail).

An 'important population' is defined as a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:

- Key source populations either for breeding or dispersal;
- Populations that are necessary for maintaining genetic diversity, and/or
- Populations that are near the limit of the species range.

The Referral Guidelines for the species (DSEWPac 2011) state that an important population of the Striped Legless Lizard is one that meets at least one of the above criteria and is likely to be a viable over the long-term.

Based on the distribution of the species in NSW, this population is near the northern limit of the species range. As only one to two individuals were identified during targeted surveys (tile arrays and active searches), an assessment of the viability of the population is difficult to assess, while the species can be cryptic and hard to detect, it would be anticipated that if a viable population of the species occurs within the Study Area additional individuals would have been recorded. Surveys conducted for the Maxwell Coal Project to the west of the Study Area identified a total of 26 specimens (16 living individuals and 10 sloughs (shed skins)).

The Conservation Advice for the species identifies the Muswellbrook population as an important population. The individuals identified within the Study Area are approximately 15 km from the Muswellbrook population, and approximately 5 km from another identified population to the west, and

are as such likely to form a separate sub-population of the species. However, as the Study Area is at the northern extent of the species range, the precautionary principle has been applied and the individuals have been assessed as forming part of an important population.

Within the Study Area it is estimated that of the 184.43 ha of available habitat occurs, approximately 122.97 ha will be removed for the Action. All areas of vegetation, with the exception of the grasslands, were assessed as suitable habitat for the species. Grassland areas were excluded due to the lack of grass cover, and/or other refugia (i.e. logs, fence posts, rocky area) within these areas.

Due to the low number of individuals identified within the Study Area, and as the distribution of the species in the surrounding area is unknown, long-term impacts on the local population are uncertain. Within the Study Area and the surrounding vegetation large areas of similar habitat occur, if occupied the long-term impacts on the species are unlikely to be significant.

- *reduce the area of occupancy of an important population*

It is estimated that of the 184.43 ha of available habitat within the Study Area, approximately 122.97 ha will be removed for the Action. While there is a large area of surrounding potentially suitable habitat in the area, the proposal has the potential to reduce the area of occupancy of the population. However, mitigation measures will be implemented as part of the Action to limit impacts on the species during works (pre-clearing and clearing protocols, and translocation protocols if individuals identified), and all Borrow Pit areas will be rehabilitated upon the completion of works.

- *fragment an existing important population into two or more populations*

The habitat onsite primarily comprises small, isolated patches with a low-level of connectivity to surrounding habitat, or patches at the extremities of larger patches. With the exception of Borrow Pit 4, where an expanse of Bull Oak Woodland occurs. However, this vegetation is connected to habitat to the west/ north-west but has limited connectivity to the east/south-east. Therefore, the loss of any potential habitat for these species within the Study Area would not isolate remaining habitat from other patches and it is unlikely that the Action would fragment an existing population into two or more populations.

- *adversely affect habitat critical to the survival of a species*

Habitat critical to the survival of the Striped Legless Lizard is likely to include sites that possess more than one of the following characteristics (from Conservation Advice):

- **Provides breeding habitat:** The presence of two or more adult individuals or juveniles (lizards <70 mm snout to vent length) is confirmed on site and a habitat assessment confirms that the site contains complex grass structures including areas of tussocks with high biomass, surface rocks or invertebrate burrows necessary as sites for oviposition and which provide protection for eggs from disturbance. This may include sites with exotic grasses.
- **Provides foraging habitat:** the site is floristically diverse with little to no disturbance and is connected to other nearby grasslands or grassy woodlands.
- **Provides refuge from disturbance events:** within the Likely to occur modelled distribution and contains surface rocks arthropod burrows or suitable cracks in soil.
- **Provides for long term protection from development:** the site is currently covenanted for conservation management or has existing sympathetic management practices.
- **Has connectivity value and contributes to the evolutionary potential of the species in the wild across its natural geographical range:** The site is or forms part of a large area of habitat that is not in an urban area or zoning, and contains and is connected to breeding habitat or to a site subject to conservation management.

The site is unlikely to meet the majority of the above criteria; however, breeding habitat cannot be ruled out. Of the individuals identified within the Impact Area, one was identified as being approximately 50 – 60 mm in length (snout to vent length). As such, a juvenile lizard was possibly identified.

Habitat assessment of the Study Area for the species identified that the site contains marginal habitat across the majority of the site due to historical disturbance from cattle grazing lack of substantiable areas of tussock forming grasses and low grass density. There are some grassy areas which contain higher density of groundcover and increased sheltering opportunities for the species. The site also contains some scattered debris (logs, fence posts, metal sheets) and cow pats.

Due to the habitat not being assessed as optimal for the species and as surveys conducted during peak activity period (November – December) only identified a low number of individuals (one to two) it is unlikely that the Study Area contains habitat critical to the survival of the species. However, if a larger population is present, the habitat could be important for the species. There is a larger area of similar habitat in the areas surrounding the impact area that will be retained.

- *disrupt the breeding cycle of an important population*

Clearing activities of the proposal within habitat for the species will be avoided, where possible, during breeding and through to egg hatching periods for the species, November to February (November to December mating, December to January egg laying, and January to February hatching). As such, impacts on the breeding cycle of the species will be minimised.

- *modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline*

There is a large area of potentially suitable habitat for the species present within the Development Site, to the west/north-west of the Study Area. Therefore, the loss of any potential habitat for this species within the Impact Area would not isolate remaining habitat from other patches and it is unlikely that the Action would significantly reduce the area of available habitat such that it would lead to the decline of these species.

- *result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat*

The existing weed and feral animal threat levels are unlikely to change significantly due to the Action given the current agricultural use of the surrounding area. A site-specific CEMP will be prepared and implemented prior to the commencement of any clearing or construction works to ensure that impacts are minimised.

- *introduce disease that may cause the species to decline, or*

The Action would not include activities that area likely to introduce any disease, fungus or virus to the local populations of the species.

- *interfere substantially with the recovery of the species.*

The activities which comprise the Action are not inconsistent with the recovery plan for the species (Smith and Robertson 1999), and the Action would not interfere substantially with the recovery of the species given habitat resources for these species would remain outside of the Study Area, such that the species are likely to persist in the landscape.

2019/20 Bushfire Impacts

An assessment of potential impacts of the 2019/2020 bushfires determined that a very small area of habitat for the species was adversely affected by the fires (i.e. approximately 2% of the habitat within a 50km radius of the Development Site). The affected area occurs approximately 40km southeast of the Development Site near the borders of the Hunter and Yengo IBRA subregions (**Figure 14**). Populations of the species occur the Southern Tablelands, the South West Slopes, the Upper Hunter and possibly on the Riverina. Populations are known in the Goulburn, Yass, Queanbeyan, Cooma, Muswellbrook and Tumut areas. The species also occurs in the ACT, Victoria and south-eastern South Australia.

Conclusion

Approximately 184.43 ha of suitable habitat for this species occurs within the Study Area, approximately 122.97 ha will be removed for the Action. Twenty-three records occur within the locality (OEH, 2019). Targeted surveys for this species within the Study Area identified one to two individuals at the same location (on different days) within Borrow Pit 4. Due to the lack of bushfire impacts in the Hunter IBRA subregion, it is unlikely that populations were affected by the fires in the locality. Due to the uncertainty around the status of the population within the Study Area (size, importance, breeding potential), the potential for the proposal to have a significant impact on the species is uncertain.

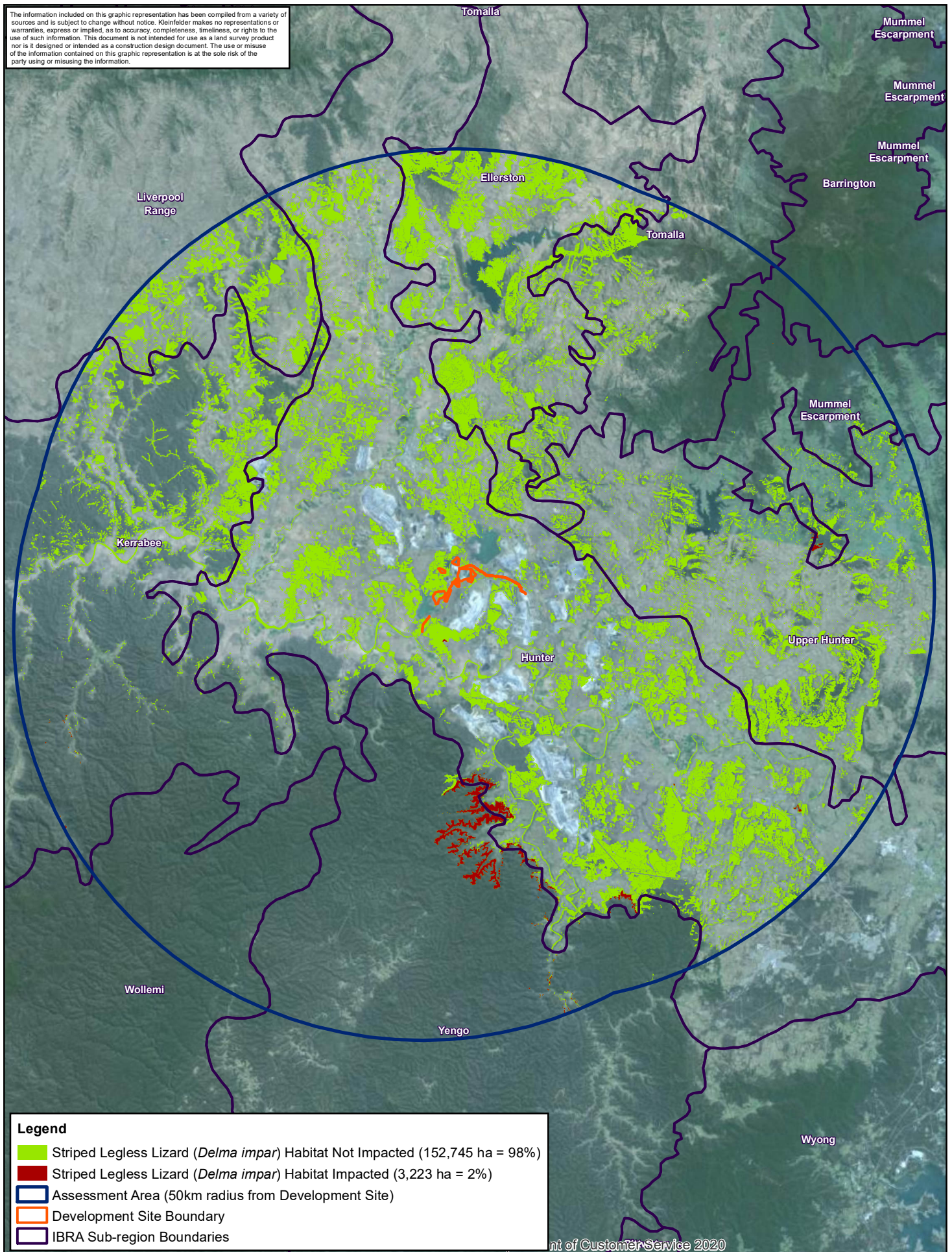
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Legend

- Striped Legless Lizard (*Delma impar*) Habitat Not Impacted (152,745 ha = 98%)
- Striped Legless Lizard (*Delma impar*) Habitat Impacted (3,223 ha = 2%)
- Assessment Area (50km radius from Development Site)
- Development Site Boundary
- IBRA Sub-region Boundaries

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PROJECT REFERENCE: 20214047
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DRAWN BY: G.Joyce
DATA SOURCE: NSW DFSI - 2020 Commonwealth of Australia, Department of Agriculture, Water and the Environment (2012)

Impact of 2019-2020 Bushfires on
Striped Legless Lizard
(*Delma impar*) Habitat

AGL Macquarie
Analysis of Bushfire Impact on Habitats

FIGURE:

14

Pink-tailed Worm-lizard (*Aprasia parapulchella*)

The Pink-tailed Worm-lizard (*Aprasia parapulchella*) is listed as vulnerable under the EPBC Act. The Pink-tailed Legless Lizard is only known from the Central and Southern Tablelands, and the South Western Slopes. There is a concentration of populations in the Canberra/Queanbeyan Region. Other populations have been recorded near Cooma, Yass, Bathurst, Albury and West Wyalong. This species is also found in the ACT.

The species is a member of the family *Pygopodidae* and is a small, legless and very slender lizard that lives underground, growing to about 25 cm in length, nearly half of which is tail. The snout and the tail are rounded and blunt. The presence of small hind-limb flaps distinguishes it from a juvenile snake. Colouration is predominantly grey-brown to pale grey, with a slightly darker head and nape and a paler underside. The end part of the tail is pinkish to reddish-brown. Each dorsal scale has a short dark mark, forming indistinct, broken, longitudinal stripes that often come together on the tail. There are no external ear openings.

The Pink-tailed Worm-lizard's habitat includes primary and secondary grassland, grassy woodland and woodland communities, and the species usually inhabits sloping sites that contain rocky outcrops or scattered, partially buried rocks (Robertson and Heard 2008; Wong et al. 2011).

This species was not detected within the Study Area during the assessment and there are no records of the species within the locality.

Significant impact criteria

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:

- *lead to a long-term decrease in the size of an important population of a species*

The pink-tailed worm-lizard occurs in NSW, Victoria and the ACT where it is widely but patchily distributed along the foothills of the western slopes of the Great Dividing Range between Bendigo in Victoria and Gunnedah in NSW (Wong et al. 2011). The species' distribution is highly fragmented across this range and occurs on a variety of land tenures. In Victoria its distribution is not fully known, but it is centred around Bendigo and thought to encompass Big Hill Range to the south, Marong to the west and Sugarloaf Range to the east (Robertson and Heard 2008; Wong et al. 2011). In NSW the species is only known from the Central and Southern Tablelands and the South Western Slopes, where sites are widespread, but highly isolated from each other (Wong et al. 2011; NSW OEH 2014). The species is known from many sites in the ACT, mainly distributed along the Murrumbidgee and Molonglo River corridors as well as some of the hills within Canberra Nature Park (Osborne and Jones 1995; Wong et al. 2011). The species has a wide altitudinal range, from 180 m near Bendigo to 815 m in the ACT (Wong et al. 2011)

Targeted surveys identified no evidence of a population within the Study Area. Very few areas occur within the Study Area that support rocky outcrops or scattered, partially buried rocks. Due to a lack of evidence of occurrence of resident population and the unsuitability of the habitat, impacts on the species are unlikely to be significant.

- *reduce the area of occupancy of an important population*

A resident population of the species was not identified within the Study Area; hence, an important population has not been identified for which the area of occupancy will be reduced.

- *fragment an existing important population into two or more populations*

A resident population of the species was not identified within the Study Area; hence, it is unlikely that an existing important population would be fragmented into two or more populations.

- *adversely affect habitat critical to the survival of a species*

No individuals of the species were identified within the Study Area. Additionally, very few areas of suitable habitat were identified, hence, it is unlikely that the activity will adversely affect habitat that is critical to the survival of the species.

- *disrupt the breeding cycle of an important population*

No individuals of the species were identified within the Study Area; hence, there is no evidence of breeding of an important population. It is unlikely that the activity would disrupt the breeding cycle of an important population of this species.

- *modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline*

The loss of small areas of habitat for this species within the Impact Area would not isolate remaining habitat to be retained outside the Study Area. It is unlikely that the Action would significantly reduce the area of available habitat such that it would lead to the decline of these species.

- *result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat*

The existing weed and feral animal threat levels are unlikely to change significantly due to the Action given the current agricultural use of the surrounding area. A site- CEMP will be prepared and implemented prior to the commencement of any clearing or construction works to ensure that impacts are minimised.

- *introduce disease that may cause the species to decline, or*

The Action would not include activities that are likely to introduce any disease, fungus or virus to the local populations of the species.

- *interfere substantially with the recovery of the species.*

No recovery plan has been developed for the species. The Action would not interfere substantially with the recovery of the species given habitat resources for these species would remain outside of the Study Area, such that the species are likely to persist in the landscape.

2019/20 Bushfire Impacts

An assessment of potential impacts of the 2019/2020 bushfires determined that a very small area of habitat for the species was adversely affected by the fires (i.e. approximately 1% of the habitat within a 50km radius of the Development Site). The affected area occurs approximately 40km southeast of the Development Site near the borders of the Hunter and Yengo IBRA subregions, and to the north-east in the Mummel Escarpment (**Figure 15**). Populations of the species occur in the Central and Southern Tablelands, and the South Western Slopes. There is a concentration of populations in the Canberra/Queanbeyan Region. Other populations have been recorded near Cooma, Yass, Bathurst, Albury and West Wyalong. Populations are also known in the Goulburn, Yass, Queanbeyan, Cooma, Muswellbrook and Tumut areas. The species also occurs in the ACT, Victoria and south-eastern South Australia.

Conclusion

No records of the Pink-tailed Worm-lizard (*Aprasia parapulchella*) occur within the locality. Targeted surveys for this species within the Study Area identified no individuals. Large areas of habitat within the Hunter IBRA subregion were unaffected by the 2019/20 bushfires. As such, the proposal is unlikely to significantly impact the species in the locality.

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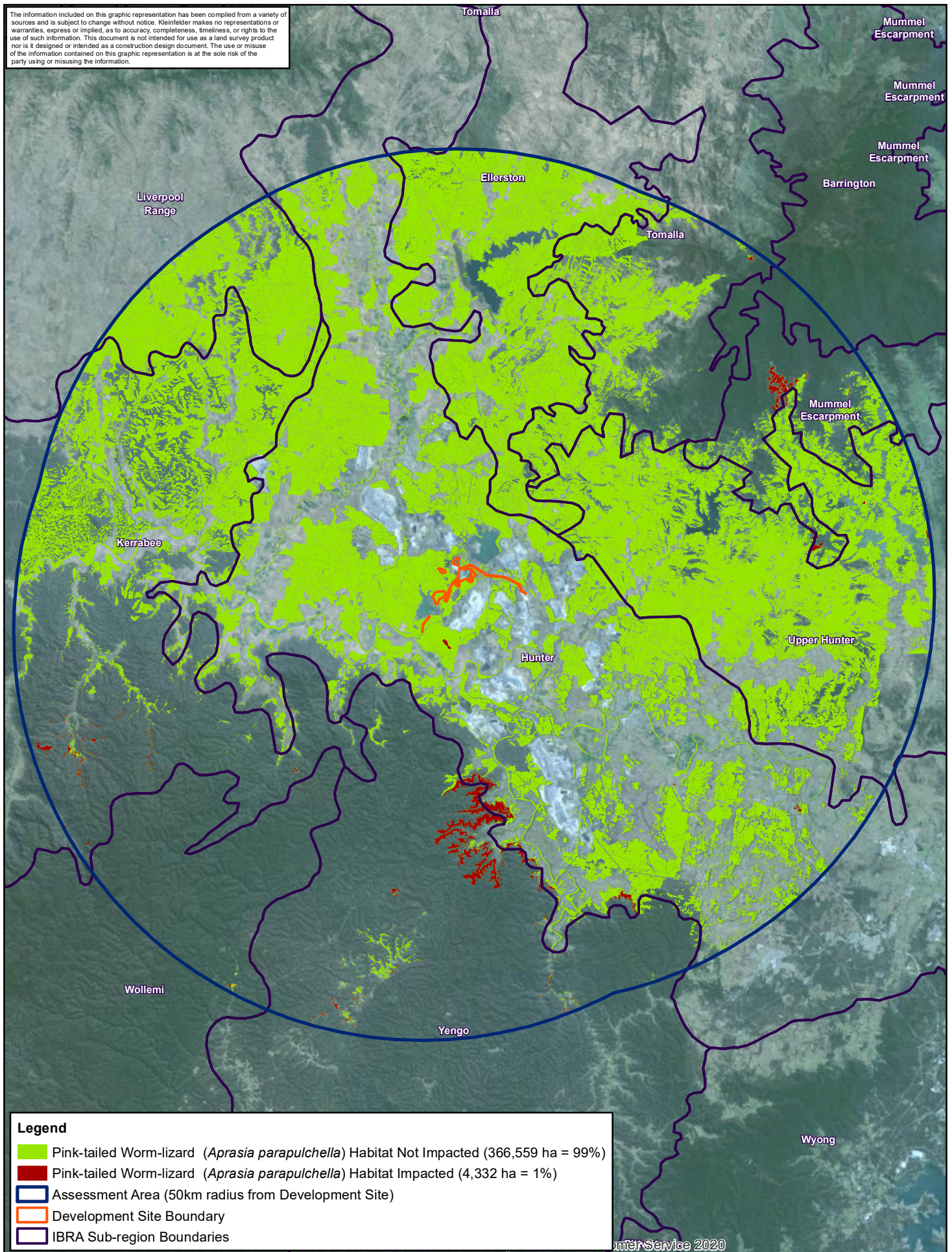
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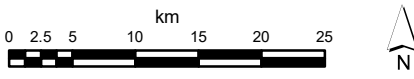

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Legend

- Pink-tailed Worm-lizard (*Aprasia parapulchella*) Habitat Not Impacted (366,559 ha = 99%)
- Pink-tailed Worm-lizard (*Aprasia parapulchella*) Habitat Impacted (4,332 ha = 1%)
- Assessment Area (50km radius from Development Site)
- Development Site Boundary
- IBRA Sub-region Boundaries

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	<p>PROJECT REFERENCE: 20214047</p> <p>DATE DRAWN: 2021/03/19 12:53 Version 1</p> <p>DRAWN BY: G.Joyce</p> <p>DATA SOURCE: NSW DFSI - 2020 Commonwealth of Australia, Department of Agriculture, Water and the Environment (2012)</p>	<p>Impact of 2019-2020 Bushfires on Pink-tailed Worm-lizard (<i>Aprasia parapulchella</i>) Habitat</p> <p>AGL Macquarie Analysis of Bushfire Impact on Habitats</p>	<p>FIGURE: 15</p>
			

Central Hunter Valley Eucalypt Forest and Woodland

The CEEC comprises eucalypt woodlands and open forests, typically with a shrub layer of variable density and/or a grassy ground layer. It occurs in the Hunter River catchment (including the Goulburn Valley), commonly known as the Hunter Valley, or Hunter Region, in north-eastern NSW. The ecological community is mainly in the Central Hunter Valley, in the Muswellbrook, Singleton and Cessnock Local Government Areas (LGA). Across its range, one or more of a complex of four eucalypt tree species typically dominate the canopy, namely *Eucalyptus crebra* (Narrow-leaved Ironbark), *Corymbia maculata* (Spotted Gum), *E. dawsonii* (Slaty Gum) and *E. moluccana* (Grey Box). Under certain circumstances a fifth species, *Allocasuarina luehmannii* (Bulloak), may be part of the mix of dominants, in sites previously dominated by one or more of the above four eucalypt species. The composition of the ecological community at a particular site is influenced by the size of the site, recent rainfall, and drought conditions and by its disturbance history (including clearing, grazing and fire) (DoE, 2015).

Approximately 32.39 ha of Central Hunter Valley eucalypt forest and woodland CEEC was identified within the Study Area. Note an additional approximately 11.17 ha of woodland vegetation of PCT 1691 - Central Hunter Box - Ironbark Woodland (Vegetation Zone 2) has been mapped within the Study Area; however, these areas were not assessed as meeting the condition threshold as outlined in the listing advice for Central Hunter Valley eucalypt forest and woodland (DoE, 2015).

Significant impact criteria

An action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will:

- *reduce the extent of an ecological community*

The area of CEEC mapped within the Study Area comprises part of a larger extent of the CEEC in the locality. Within the Study Area, the majority of the CEEC occurs around the Salt Cake Landfill, within Borrow Pit 4 and along the Northern High Pressure Pipeline area, with smaller or more isolated patches occurring around the Ash Dam, along the western portion of the Ash Line, within Borrow Pits 2 and 3, adjacent to Borrow Pit 1, and along the Southern HP area. Approximately 32.39 ha was mapped within the Study Area (see **Figure 16**). Within the surrounding Bayswater Power Station and Liddell Sites, a much larger extent of the community occurs (previously mapped by Kleinfelder 2017). Primarily within the vicinity of the current Study Area, the occurrence of the community is from the Plashett Dam north, on the western side of the Freshwater Dam and Bayswater Power Station, through to the southern extent of the Liddell Ash Dam. Within this area adjoining the current Study Area, there is over 700 ha of the CEEC.

Approximately 13.72 ha of the CEEC would be removed for the Action. This total removal equates to approximately 42% within the Study Area, and 1.9% within the broader Development Site. As such, while the proposal will reduce the extent of the CEEC within, it is unlikely to significantly impact on the occurrence of the CEEC in the locality.

- *fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines*

The CEEC exists within the Study Area in a fragmented state due to historical vegetation clearing activities for agricultural development and the construction of roads and other infrastructure. Areas of the CEEC to be removed for the Action are comprised of isolated woodland patches and edges of larger woodland patches, which are subject to edge effects. Within the Study Area, the majority of the CEEC occurs around the Salt Cake Landfill, within Borrow Pit 4 and along the Northern HP area, with smaller or more isolated patches occurring around the Ash Dam, along the western portion of the Ash Line, within Borrow Pits 2 and 3, adjacent to Borrow Pit 1, and along the Southern HP area.

The majority of the woodland vegetation removal will occur from within Borrow Pit 4. Within Borrow Pit 4 the CEEC predominately occurs in the northern portion of the Borrow Pit, with a small patch in the south. This vegetation is connected to the south-east (patchy) and to the north and north-west (more continuous patches) of the Borrow Pit. The removal of the vegetation within Borrow Pit 4 would increase fragmentation of areas of the CEEC occurring to the north-west and south-east of the Borrow Pit. However, the vegetation occurring to the south-east is already highly fragmented (consists of scattered patches of the CEEC).

Impact on the CEEC within the Salt Cake Landfill is unlikely to contribute to fragmentation as it will occur at the edge of a patch of the community. Due to the limited width of the clearing proposed along the HP Pipe clearing areas and the Ash Line (maximum 10 m wide), and as these portions of the impact area already contain pipeline easements, any impacts on vegetation within these portions of the Development Site is unlikely to significantly increase fragmentation. Additionally, clearing of the isolated patches within Borrow Pits 2 and 3, and around the Ash Dam is also unlikely to significantly contribute to fragmentation of the CEEC as these patches are either already isolated, or occur on the edge of larger patches of the community.

- *adversely affect habitat critical to the survival of an ecological community*

As per the Conservation Advice for the CEEC, areas which meet the minimum condition thresholds and the associated buffer zones (30 m) are considered critical to the survival of the CEEC (DoE, 2015). The proposed Action will impact on 13.72 ha of the CEEC. This total removal equates to approximately 42% within the Study Area, and 1.9% within the broader Development Site to the west of the Study Area. As such, while the proposal will impact on habitat critical to survival of the species, it is unlikely to adversely affect critical habitat in the locality due to the relatively small impact.

- *modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns*

The CEEC is unlikely to be a Groundwater Dependent Ecosystem (GDE). Due to the location of the vegetation (higher in the landscape), and dominant soil type (Clay) it is unlikely that the roots of the vegetation would be able to penetrate to the groundwater. However, where depth to the groundwater is reduced, and more penetrable soils (sandy) are present, there is the potential for this vegetation to be facultative phreatophyte (opportunistically groundwater dependant) and could potentially be impacted by modification to the groundwater. There is the potential for impacts on the groundwater due to the Action within and surrounding the Salt Cake Landfill. However, based on the modelling (see Groundwater report) it is unlikely that the salt concentrations at the top of the water table would increase above existing background levels, as such it is not considered that there would be a significant impact on the vegetation in the vicinity of the Salt Cake Landfill due to salinity.

There is also the potential to modify surface water drainage patterns due to the Action. The various portions of the disturbance area intersect a number of Creeks and smaller drainage lines. Impacts of the Action on these drainage lines could include reduction in water quantity flowing down stream, and/or modification to water quality downstream. The majority of the drainage lines that could be potentially impacted are already modified due to historical land practices, particularly Pikes Creek and Tinkers Creek through the existing Ash Dam and Coal Handling Plant, respectively, which stream flows are already modified due to existing infrastructure. As such, impacts on drainage patterns and potential water quality are not likely to be substantial such that the Action has a significant indirect impact on occurrences of the CEEC downstream of the Action. Furthermore, works within the CHP are being conducted improve water quality, and implementation of appropriate erosion and sedimentation control measures as part of the Project will minimise the potential for impacts to water quality.

- *cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting*

A maximum of 13.72 ha of this community would be removed as part of the Action. Areas of this CEEC outside of the Study Area would not be subject to burning, flora or fauna harvesting, or other activities which are likely to result in the decline or loss of a functionally important species within the CEEC. Edge effects following the Action are likely to be similar to current edge effects and therefore, the species composition of retained areas is likely to be similar. Additionally, upon the completion of clay extraction works within each Borrow Pit, these areas will be rehabilitated. A rehabilitation plan for the Borrow Pits will be prepared, locally endemic species will be used for rehabilitation where available consisting of appropriate vegetation communities, using locally sourced seeds/plants.

- *cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to:*
 - *assisting invasive species, that are harmful to the listed ecological community, to become established, or*

- *causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community, or*

A site-specific CEMP will be prepared and implemented prior to the commencement of any clearing or construction works to ensure that impacts are minimised. Stringent management measures will prevent construction activities from introducing or spreading new or existing environmental and noxious weeds or plant and animal pathogens. As such, it is unlikely that the Action will result in invasive species becoming established in the habitat for the CEEC.

It is not anticipated that any novel activities involving the use of fertilisers, herbicides or other chemicals will be introduced to the subject site that would pose a threat to the CEEC.

- *interfere with the recovery of an ecological community.*

No recovery plan is currently in place, or recommended, for this CEEC (DoEE, 2019). The Action would not interfere substantially with the recovery of this community given larger areas of the CEEC would remain outside of the Study Area, such that the community is likely to persist in the landscape.

2019/20 Bushfire Impacts

An assessment of potential impacts of the 2019/2020 bushfires determined that a very small area of the CEEC was adversely affected by the fires (i.e. approximately 1% within a 50km radius of the Development Site). The affected area occurs approximately 40km southeast of the Development Site near the borders of the Hunter and Yengo IBRA subregions (**Figure 3**). The CEEC mainly occurs in the Central Hunter Valley, in the Muswellbrook, Singleton and Cessnock LGA. It is therefore unlikely that this CEEC was directly impacted by the bushfires.

Conclusion

Approximately 32.39 ha of the CEEC has been mapped within the Study Area. A total of 13.72 ha will be removed by the Action. It is unlikely that this removal will cause a significant impact to the CEEC given that:

- The CEEC is well represented in the locality in a similar state to that represented in the Study Area.
- The Action will not cause significant fragmentation of the CEEC given that it already exists in the Study Area in a highly fragmented state.
- No indirect impacts of the Action have been identified that are likely to have a significant impact on the area of the CEEC that will be retained within the Study Area and the adjacent areas.
- The existing weed and feral animal threat levels are unlikely to change significantly following completion of the Action.
- It is unlikely that the CEEC was directly impacted by the 2019/20 bushfires.

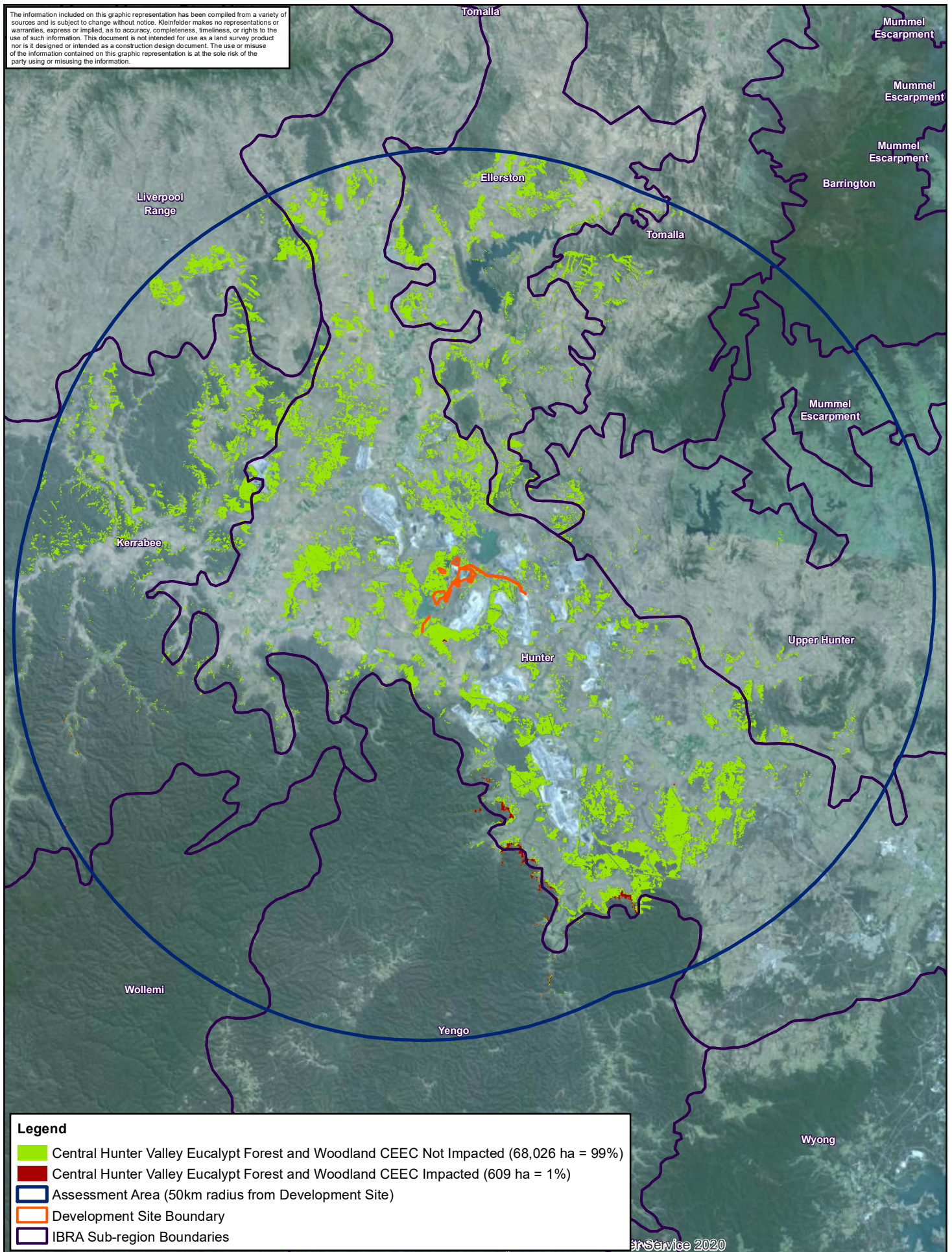
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Legend

- Central Hunter Valley Eucalypt Forest and Woodland CEEC Not Impacted (68,026 ha = 99%)
- Central Hunter Valley Eucalypt Forest and Woodland CEEC Impacted (609 ha = 1%)
- Assessment Area (50km radius from Development Site)
- Development Site Boundary
- IBRA Sub-region Boundaries

0 2.5 5 10 15 20 25 km

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 DATA SOURCE:
 NSW DFSI - 2020
 Commonwealth of Australia, Department of
 Agriculture, Water and the Environment (2012)

**Impact of 2019-2020 Bushfires on
 Central Hunter Valley Eucalypt
 Forest and Woodland CEEC Habitat**

AGL Macquarie
 Analysis of Bushfire Impact on Habitats

FIGURE:
16

White-throated Needletail (*Hirundapus caudacutus*)

The White-throated Needletail (*Hirundapus caudacutus*) is listed as a migratory species under the EPBC Act. This species was not identified during the assessment; however, based on habitat availability, the species has a moderate to low likelihood of occurrence in aerial habitat within the Study Area.

The White-throated Needletail (*Hirundapus caudacutus*) is a large swift with a thickset, cigar-shaped body, stubby tail and long pointed wings. Sexes are alike, with no seasonal variation, and juveniles are separable with good visibility (Higgins, 1999). The White-throated Needletail is generally gregarious when in Australia, sometimes occurring in large flocks, comprising hundreds or thousands of birds, though they are occasionally seen singly, and occasionally occur in mixed flocks with other aerial insectivores, including Fork-tailed Swifts (*Apus pacificus*) and Fairy Martins (*Hirundo ariel*) (Learnmonth, 1950, 1951; McMicking, 1925; Wheeler, 1959). The White-throated Needletail is widespread in eastern and south-eastern Australia. In eastern Australia, it is recorded in all coastal regions of Queensland and NSW, extending inland to the western slopes of the Great Divide and occasionally onto the adjacent inland plains (Barrett *et al.*, 2003; Blakers *et al.*, 1984; Higgins, 1999). The White-throated Needletail breeds in Asia (Chantler, 1999; de Schauensee, 1984; Dement'ev and Gladkov, 1951; Ornithological Society of Japan, 2000). In Australia, the White-throated Needletail is almost exclusively aerial, from heights of less than 1 m up to more than 1000 m above the ground (Coventry, 1989; Tarburton, 1993; Watson, 1955).

Significant impact criteria

An action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will:

- *substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species*

Terrestrial habitat will be disturbed for the proposed activity; however, the White-throated Needletail is almost exclusively aerial when foraging and is unlikely to utilise the terrestrial vegetation within the Study Area. Habitat for this migratory species will not be destroyed or isolated by the Action.

- *result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species, or*

The Action is unlikely to cause an increase in pest species that are harmful to this migratory species, especially considering that the species is almost exclusively aerial and is unlikely to interact with terrestrial vertebrate species.

- *seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.*

The species is highly mobile and can readily move between habitats. The Action is therefore unlikely to disrupt or interfere with the natural behaviour of this species.

2019/20 Bushfire Impacts

Given that this species is mainly an aerial forager, assessing the potential impacts of the 2019/20 bushfires is difficult and impact assessment mapping has not been conducted. Note that this species is not listed under the BC Act and therefore BioNet Threatened Species to Plant Community Types Association data (DPIE 2020) is not available. Based on the broad range of habitat types utilised by this highly mobile species, it is likely that large areas of habitat, which were unaffected by the 2019/20 bushfires, occur within the Hunter IBRA subregion.

Conclusion

The action is unlikely to have a significant impact on this species, given:

- the lack of breeding habitat for this species within the Study Area;
- this species is almost exclusively aerial and unlikely to utilise the terrestrial habitat present onsite;
- this species is highly transitory and able to move between different habitats easily;
- the Action is unlikely to introduce or increase number of invasive pest species or a disease that may cause the species to decline; and
- large areas of habitat unaffected by the 2019/20 bushfires occur throughout the Hunter IBRA subregion.

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4. CONCLUSION

It was concluded that for the majority of the EPBC listed threatened species, ecological communities and migratory species identified within the Development Site or identified as having suitable habitat within the disturbance footprint, the Project is unlikely to have a significant impact. Following the review of potential impacts of the 2019/20 bushfires, this conclusion remains unchanged due to the lack of habitat impacted by the fires within the Hunter IBRA sub region and within a 50 km radius of the Study Area. As such, the value of habitats, for each threatened species, within the Development Site is unlikely to have increased in value or importance, as a result of bushfire impacts within the broader region.

If you have any questions regarding this assessment, please get in touch at your earliest convenience.

Yours sincerely,

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