



3.1.3 Limitations to field surveys

The list fauna species recorded from this limited study should not be seen to be fully comprehensive, but as an indication of the species present at the time of the survey. A period of several seasons over several years would be needed to identify all the species present in an area, especially as some species are only apparent at certain times of the year, e.g. migratory birds, and require specific weather and seasonal conditions for optimum detection, e.g. frogs.

3.2 RESULTS

3.2.1 Literature Review Results

Previous fauna surveys and compilation lists prepared for the Region have identified 35 native mammals, 167 native birds, 28 native reptiles and 17 native frogs. A number of introduced species were also recorded (see Appendix 3).

Of those native species previously recorded, 30 are listed as vulnerable, endangered and/or migratory under the Schedules to the *EPBC* and/or *TSC Acts* (see Appendix 1). Additionally, a number of 'Regionally Significant' species have been previously recorded in the Region.

3.2.2 Fauna Species Recorded

By the completion of the current field surveys, eight (8) native mammals, two (2) amphibians, 21 native birds, three (3) reptiles and one (1) snail had been detected within, adjacent to, or flying over the Study Area, or identified from their characteristic calls (Table 3.1). Four (4) of these species are listed under the Schedules to the *EPBC* and/or *TSC Acts*, these being the:

- Cumberland Plain Land Snail *Meridolum corneovirens*;
- Powerful Owl *Ninox strenua*;
- Eastern False Pipistrelle *Falsistrellus tasmaniensis*; and
- Grey-headed Flying-fox *Pteropus poliocephalus*.

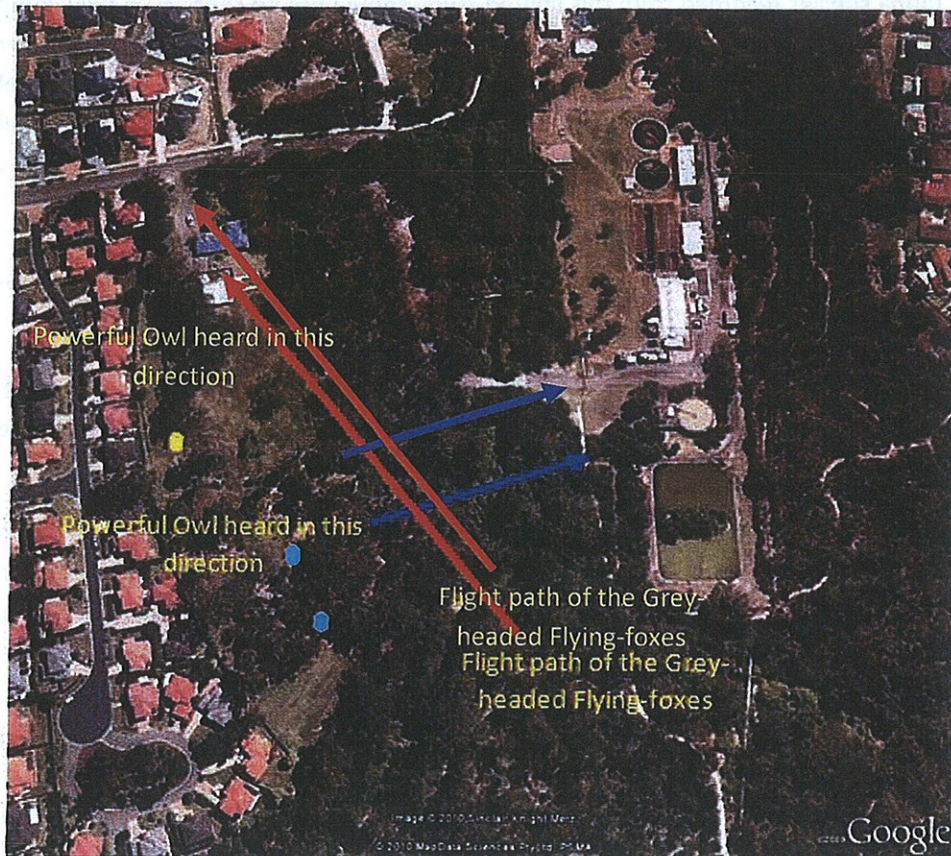
For reference, the general locations where these species were recorded are provided in **Error! Reference source not found..**

In addition to the native species recorded, a number of introduced animals were also detected, or indicated as occurring within the Study Area (Table 3.1).

The remainder of the native species recorded are 'Protected', as defined by the NSW *National Parks and Wildlife Act 1974*, but are considered to be 'common to abundant' throughout the Region. Such animals are all commonly recorded in association with residential areas, parks and urban bushland remnants. All of these species would be considered to be 'generalist animals' (Parsons *et al.* 2003).



Figure 3.1: Threatened species locations



Not to scale

Key	
	Cumberland Plain Land Snail
	Powerful Owl
	Eastern False Pipistrelle
	Grey-headed Flying -fox

3.3 CONSERVATION VALUE OF THE STUDY AREA TO NATIVE FAUNA

Consultation of known literature and database sources identified 28 threatened fauna species and one (1) fauna population of State and/or National conservation significance (as listed under the *TSC* and/or *EPBC Acts*), and known to have been recorded during past studies of the Study Region.

While it is acknowledged that these species have been previously recorded within the Study Region, given the modified nature of the Study Area and previous location records provided by DECCW, it is expected that, of those State and Nationally listed threatened species previously recorded in the



Study Region, 13 species have the potential to utilise or be recorded within the Study Area. These species were targeted during the fauna surveys.

When assessing the extent of likely impact of the Proposal on the local and regional presence of these species, their occurrence on site, life cycle requirements, home range areas, movement patterns and interbreeding needs were considered.

With consideration to the conservation status of the Cumberland Land Snail located under native trees on the western side of the property, UBM recommends that prior to any construction work commencing, a further targeted search for this threatened mollusc be undertaken, preferably immediately after rain. If live snails are found, then Council is to be advised and permission for a translocation strategy should be sought. It should however be noted that Council is the determining authority for the preparation of a Species Impact Statement, and given the highly localised occurrence of the Cumberland Land Snail on the property, it is possible that they will waive the requirement for a Species Impact Statement. However, recommendation #1 (below) has been included in this Report as the Seven-part Test assessed the potential impact on the species' habitat as 'significant' and therefore the authors are required to recommend a Species Impact Statement.

Giving consideration to the Assessment Criteria provided under Section 5A of the *NSW Environmental Planning and Assessment Act 1979*, it is considered that, in regards to the presence of THE CUMBERLAND PLAIN LAND SNAIL, any future development of the Subject Property would have a significant effect on this species, it's population and habitat. Therefore, should any future development of the Property be considered, the preparation of a Species Impact Statement is recommended.

Though the nationally listed GREY-HEADED FLYING-FOX was observed flying over the Subject Property during the course of the field survey, it is not considered that this species is reliant upon the resources offered by the site. Therefore, it is considered that the Proposal can proceed as planned WITHOUT requiring referral of the matter to the Federal Minister for the Environment, Heritage and the Arts (DEWHA) for further consideration or approval.

Table 3.1: Threatened species potentially present within the Study Area

* - habitat requirements were generally extracted from Frith (1997), Cogger (2000), Van Dyck and Strahan (2003), Churchill (2009), DECCW Species Profiles (2009b) and the NSW Scientific Committee (2009), with other references used being identified in the bibliography.

Note: distances are approximations only.

SPECIES	LISTING	CLOSEST RECORDING (APPROXIMATE ONLY)	POTENTIAL UTILISATION OF STUDY AREA	LIKELY IMPACT
AVES				
Gang-gang Cockatoo (<i>Callocephalon fimbriatum</i>)	TSC Act		Unlikely	May fly over the study area on occasion. Not considered to be significantly affected by the proposed subdivision and development of the Subject Site. Therefore, an Assessment of Significance is not required for this species.
Glossy Black Cockatoo (<i>Calyptorhynchus lathami</i>)	TSC Act	~1.1km	Unlikely	At the time of investigation, no individuals of this species were observed or heard calling and no specific feed trees were observed within the Study Area. It is widely believed that Glossy Black Cockatoos prefer to live in rugged country, where extensive clearing has not taken place (DECCW 2009b). The Study Area is heavily disturbed and although this species has been recorded within the Region, it: - does not occur in the Study Area, or - will not use the habitats within the Subject Site on occasion, or - will not be influenced by off-site impacts of the proposal. Therefore, an Assessment of Significance is not required for this species.
Varied Sittella (<i>Daphoenositta chrysoptera</i>)	TSC Act		Unlikely	May fly over the study area on occasion. Not considered to be significantly affected by the proposed subdivision and development of the Subject Site. Therefore, an Assessment of Significance is not required for this species.

SPECIES	LISTING	CLOSEST RECORDING (APPROXIMATE ONLY)	POTENTIAL UTILISATION OF STUDY AREA	LIKELY IMPACT
Barking Owl (<i>Ninox connivens</i>)	TSC Act	~1.8km	Unlikely	Though targeted this species was not recorded. Whilst this owl may fly over the Study Area on occasion the development of the Subject Site is not considered to be significantly affect its local viability. An Assessment of Significance is not required for this species.
Powerful Owl (<i>Ninox strenua</i>)	TSC Act	~1.0km	Possible	Species recorded during the course of the field survey. Therefore an Assessment of Significance is required.
INVERTEBRATES				
Cumberland Plain Land Snail (<i>Meridolum corneovirens</i>)	TSC Act	~1.3km	High	Species recorded during the course of the field survey. Therefore an Assessment of Significance is required.
MAMMALS				
Yellow-bellied Sheathail-bat (<i>Saccopteryx flaviventris</i>)	TSC Act		Unlikely	Whilst targeted and whilst other microchiropterans were recorded, this species was not detected. The works are not expected to reduce the extent of foraging or sheltering resources available to this microchiropteran. An Assessment of Significance is not required for this species.
Eastern Freetail-bat (<i>Mormopterus norfolkensis</i>)	TSC Act		Unlikely	Whilst targeted and whilst other microchiropterans were recorded, this species was not detected. The works are not expected to reduce the extent of foraging or sheltering resources available to this microchiropteran. An Assessment of Significance is not required for this species.



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SPECIES	LISTING	CLOSEST RECORDING (APPROXIMATE ONLY)	POTENTIAL UTILISATION OF STUDY AREA	LIKELY IMPACT
Eastern False Pipistrelle (<i>Falsistrellus tasmaniensis</i>)	TSC Act		High	Species recorded during the course of the field survey. Therefore an Assessment of Significance is required.
Eastern Bentwing-bat (<i>Miniopterus schreibersii</i> <i>oceanensis</i>)	TSC Act	~3.1km	Unlikely	Species requires caves and suitable cave substitutes to roost and breed in, these resources not being recorded within the Subject Site. Loss of some insect attracting plants not considered to have a significant effect on the foraging needs of this species. Though targeted, this species was not recorded. An Assessment of Significance is not required for this species.
Large-footed Myotis (<i>Myotis adversus</i>)	TSC Act		Unlikely	Species favours water bodies and drainage lines, these habitat types not being recorded within the Study Area. An Assessment of Significance is not required for this species.
Greater Broad-nosed Bat (<i>Scoteanax rueppellii</i>)	TSC Act		Unlikely	Whilst targeted and whilst other microchiropterans were recorded, this species was not detected. The works are not expected to reduce the extent of foraging or sheltering resources available to this microchiropteran. An Assessment of Significance is not required for this species.
Grey Headed Flying Fox (<i>Pteropus poliocephalus</i>)	EPBC Act and TSC Act	~0.8km	High	Species recorded during the course of the field survey. Therefore an Assessment of Significance is required.



3.4 ASSESSMENTS OF SIGNIFICANCE

3.4.1 Cumberland Plain Land Snail

The Cumberland Plain Land Snail (*Meridolum corneovirens*) is listed as an endangered species on Schedule 1 of the *TSC Act*. This snail occupies dry woodlands and forests that occur on the Cumberland Plain, sheltering under leaf litter, logs, urban refuse and decaying matter (NPWS 1999). Where possible this snail will burrow into loose soil. The Cumberland Plain Land Snail is a detritus feeder and is often found feeding on fungi (NPWS 1999). Breeding is related to climatic conditions, the species being dependant on precipitation for breeding opportunities (S. Clarke, pers.comm. 2004).

The Cumberland Plain Land Snail does not require a large area to maintain a locally viable population. Surveys have found that, within very short distances (up to 2m), the populations are highly structured and after a distance of 350m the populations are random (Clark, 2004). Threats to the occurrence of this species include clearing of bush and urban expansion. As areas of suitable habitat are cleared, the Cumberland Plain Land Snail continues to become displaced, isolated, fragmented and locally extinct. The Cumberland Plain Land Snail's current known distribution is in an area roughly bounded by Cattai (to the north), Picton (to the south), Prospect Reservoir (to the east) and Yarramundi (to the west).

The presence of this species within the Study Area was confirmed through the collection of several characteristic snail shells. These were collected from under a pile of branches that were present along the western boundary of the Study Area within the modified grassland (@Easting 312985 Northing 6267799).

The subdivision and subsequent development of the Subject Property is likely to require the removal of the habitats in which this species were recorded. The development of the site is also expected to require the clearing of native vegetation, the establishment of maintained/mown lawns, the introduction of landscaped gardens and the erection of barriers to the movement patterns of this species.

To consider the potential for the Proposal to have an adverse impact on the Cumberland Plain Land Snail, an assessment using the criteria provided under Section 5A of the *Environmental Planning and Assessment Act 1979* has been undertaken.

3.4.1.1 Cumberland Plain Land Snail.

(a) *In the case of a threatened species, whether the action proposed 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.*

A local population is defined as: the population that occurs within the Study Area unless the existence of contiguous or proximal occupied habitat and the movement of individuals or exchange of genetic material across the boundary can be demonstrated. Therefore the snails recorded within the Study Area are considered to indicate the presence of a locally viable population. Any future development of the Subject Property would result in the removal of this species habitat and the erection of barriers to



its movement and interbreeding patterns. The removal of this species habitat, and the development of the site, will therefore place this species at risk of extinction.

- (b) *In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.*

An 'endangered population' is defined as a "population specified in Part 2 of Schedule 1" of the TSC Act. Therefore the Cumberland Plain Land Snail is not an endangered population.

- (c) *In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:*

- (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.*

An 'Endangered Ecological Community' means an ecological community specified in Part 3 of Schedule 1 of the TSC Act. The Cumberland Plain Land Snail is not listed as an Endangered Ecological Community.

- (d) *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 action proposed,*

Any future residential development of the Subject Property is expected to result in the removal of all portions of this species habitat.

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

The development of the Subject Property would cause this species habitat to become further fragmented and isolated. The works would erect barriers (such as exotic lawns and building footprints) that would isolate those individuals recorded from other populations. Areas to the west of the Subject Site are already cleared and developed. The proposal is expected to reflect the character of the adjacent subdivision.

- (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.*

Based on the information presented in the literature, where viable populations of this animal area recorded, due to the fragmented nature of this species habitat throughout its distribution range, any area of habitat is likely to be important for the long-term survival of the Cumberland Plain Land Snail.

- (e) *Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).*



The Subject Property or Study Area are not listed as critical habitat under Part 3, Division 1 of the TSC Act. Critical habitat for the Cumberland Plain Land Snail is yet to be defined.

(f) Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.

There are no relevant recovery plans or threat abatement plans in relation to the Cumberland Plain Land Snail.

(g) Whether the action proposed constitutes or 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.

Currently 31 Key Threatening Processes for mainland NSW are listed under Schedule 3 of the TSC Act. Of these, "clearing of native vegetation" and "removal of dead wood and trees" would be applicable to the current Proposal. The subdivision and subsequent development of the Subject Property in the future would result in the clearing of native vegetation and the removal of dead wood and trees, these resources being important to the local occurrence of the Cumberland Plain Land Snail. Therefore the development would be considered to constitute a Key Threatening Process.

3.4.1.2 Expected impact on the Cumberland Plain Land Snail.

The rezoning and subsequent development of the Subject Property is considered to remove habitat important to the local (i.e. within the Study Area) occurrence of the Cumberland Plain Land Snail. The works would result in the removal of this species habitat and the erection of barriers to its movement patterns. The proposed future development of the Subject Property is therefore considered to have a significant effect on the local viability of this species, resulting in its local extinction.

As any future development of the Subject Property is considered likely to have a significant effect on this species, it is recommended that a Species Impact Statement be prepared.

3.4.2 Powerful Owl

The Powerful Owl (*Ninox strenua*) was recorded during the course of the field investigation. Characteristic calls of this species were heard during the spotlighting session, these heard emanating east of the Subject Site before and during the call playback session. The Powerful Owl is listed as 'Vulnerable' under Schedule 2 of the NSW TSC Act.

The Powerful Owl favours wet to dry eucalypt forests with a dense understorey. Nesting occurs in large hollows, nearly always in the trunk or top of a mature eucalypt. When not breeding, this bird will roost during the day within the shelter provided by a dense understorey, such as a bushy eucalypt or vine forest, usually clutching the remains of the previous nights' meal. Estimates of the home range of the Powerful Owl are between 600 and 1450 hectares in size.

Although hollow-bearing trees are present within the Subject Site, it is not considered that this species would be breeding within this area. The Study Area would form a component of the Powerful Owl's foraging area, though the overall value of this compared to the adjacent bushland areas is considered to be minimal.



The rezoning and subsequent development of the Subject Property would result in the removal of some native vegetation that provides potential foraging opportunities for this species (i.e. by providing resources for its prey species). The works would also remove several hollow-bearing trees though these are not considered to be important for the breeding requirements of this species.

3.4.3 Powerful Owl – Seven part test.

(a) "...in the case of a threatened species, whether the action proposed 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 Powerful Owl was heard calling from the east, outside the immediate Study Area. During the field survey this species was not detected within the Study Area itself. Though the future development of the Subject Property would remove some vegetation available to the life cycle needs of this species' prey, the loss of this is not considered to affect the viability of the local Powerful Owl population. This species is not expected to be utilising the Subject Property or Study Area as a breeding or roosting site. Any future development of the Subject Property would not place this species at risk of extinction in this locality.

(b) "...in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction..."

An 'endangered population' is defined as a "population specified in Part 2 of Schedule 1" of the TSC Act. Therefore the Powerful Owl is not an endangered population.

(c) "...in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

- (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..."*

An Endangered Ecological Community means an ecological community specified in Part 3 of Schedule 1 of the TSC Act. The Powerful Owl is not listed as an endangered ecological community.

(d) "...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 action proposed...", and*

A small number of isolated eucalypts are likely to be cleared as a result of the proposal. Whilst this is the case, this vegetation is contained within an area that has been previously modified and disturbed, within which, no habitat important to the local occurrence of the Powerful Owl was observed.



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

The Powerful Owl is a highly mobile species and can easily traverse across open spaces, woodland canopies and urban environments. As such the proposal would not isolate any currently interconnecting or proximate areas of habitat available for use by this species.

- (ii) *"...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 loss of the vegetation present within the Subject Property and Study Area, compared to the larger, more extensive and better developed habitat within the adjacent vegetated areas, is not considered to be important to the long term survival of the Powerful Owl in this locality.

- (e) *"...whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly)..."*

The Subject Property and Study Area are not listed as critical habitat under Part 3, Division 1 of the TSC Act. Critical habitat for the Powerful Owl is yet to be defined.

- (f) *"...whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan..."*

A recovery plan has not yet been drafted or finalised for the Powerful Owl. Ten (10) Priority Actions have been identified for this species (DECC 2010); none of which are the responsibility of the proponent.

- (g) *"...whether the action proposed constitutes or 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..."*

Currently 31 Key Threatening Processes for mainland NSW are listed under Schedule 3 of the TSC Act. Of these, in regards to the presence of the Powerful Owl, the "clearing of native vegetation", the "loss of hollow bearing trees" and the "removal of dead wood and dead trees" would be applicable to the proposal.

Whilst the rezoning and subsequent development of the Subject Property would require the removal of some native vegetation and hollow-bearing trees, the loss of this is not considered to present a threat to the local occurrence of the Powerful Owl. As such, it is not considered that the Proposal would constitute a Key Threatening Process such that the life cycle requirements of the Powerful Owl would be compromised.

Expected Impact on the Powerful Owl

The undertaking of the proposal would not disturb, remove, modify or fragment any habitats critical to the life cycle requirements of the Powerful Owl. Although a small amount of clearing would occur due to the development of the site, the works would primarily be located within a modified grassland environment, this habitat type not being critical to the presence of this species.



It is NOT considered that the Proposal would have a significant impact on the Powerful Owl, its population or habitat. Therefore, the preparation of a Species Impact Statement that further considers the impacts of the Proposal on this species is NOT REQUIRED.

3.4.4 Eastern False Pipistrelle

The Eastern False Pipistrelle usually roosts in tree hollows though they have also been known to occupy caves and buildings. This species usually inhabit sclerophyll woodlands with insect attracting plants and a relatively continuous canopy. The Eastern False Pipistrelle prefers wet habitats with trees that are greater than 20m in height. This species eats a variety of invertebrates including moths, weevils and ants. They tend to fly within or just below the canopy and have been known to forage 12km from identified roosting sites.

3.4.5 Eastern False Pipistrelle (*Falsistrellus tasmaniensis*) – Seven-part test.

a) *"...in the case of a threatened species, whether the life cycle of the species is likely to be disrupted such that a viable local population of the species is likely to be placed at risk of extinction..."*

Any future development of the Subject Property would require the removal of one (1) hollow-bearing tree from the modified grassland environment (this being a dead stag). The loss of this tree, compared to the extent of similar resources retained within the adjacent bushland areas, is not considered to affect the local viability of this species at this location. The development of the site would not affect the local viability of the Eastern False Pipistrelle population such that it is placed at risk of extinction. With the retention of the adjacent bushland, it is expected that this species would be recorded on site post-development.

(b) *"...in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction..."*

An 'endangered population' is defined as a "population specified in Part 2 of Schedule 1" of the TSC Act. Therefore the Eastern False Pipistrelle is not an endangered population.

(c) *"...in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:*

- (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 Eastern False Pipistrelle and is not listed as an endangered ecological community.

(d) *"...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 action proposed...", and*