

Preliminary Ecology Assessment for Stage 2 Kerosene Vale Ash Repository, Delta Electricity, NSW

October, 2006



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1. Biodiversity

1.1 Aims

This assessment aims to:

- assess the existing environment
- identify any Threatened species, populations or communities present or likely to occur on site
- evaluate potential impacts to biodiversity as a result of the proposal
- propose mitigation measures to minimise impacts to biodiversity.

1.2 Methods

Desktop review

Records of Threatened species were obtained from the Department of Environment and Conservation's Atlas of NSW Wildlife (Department of Environment and Conservation 2006) within 10 kilometres of the site. Details of Threatened species and communities and migratory species listed pursuant to the *Environment Protection and Biodiversity Conservation Act 1999* that could potentially occur within 10 kilometres were obtained using the Department of the Environment and Heritage Protected Matters Search Tool (Department of the Environment and Heritage 2006).

Available literature and reports for the site and surrounding areas were reviewed including:

- vegetation mapping of the Wallerawang 1:100, 000 map sheet (Benson & Keith 1990)
- previous ecological assessments of the site (Australian Museum and Business Services 1996; Hyder & ERM 2002)
- aerial photographs.

Site inspection

The site was inspected on 5 October 2006 to confirm findings of desk top review.

The quality of vegetation was assessed using parameters such as intactness, diversity, history of disturbance, weed invasion and health. Three categories were used to describe the condition of vegetation communities:

- Good: Vegetation still retains the species complement and structural characteristics of the pre-European equivalent. Such vegetation has usually changed very little over time and displays resilience to weed invasion due to intact ground cover, shrub and canopy layers.

- Medium: Vegetation generally still retains its structural integrity but has been disturbed and has lost some component of its original species complement. Weed invasion can be significant in such remnants.
- Poor: Vegetation that has lost most of its species and is significantly modified structurally. Often such areas now have a discontinuous canopy of the original tree cover, very few shrubs and exotic species, such as introduced pasture grasses or weeds, replacing much of the indigenous ground cover. Environmental weeds are often co dominant with the original indigenous species.

Fauna habitats were assessed by examining characteristics such as the structure and floristics of the canopy, understorey and ground vegetation, the structure and composition of the litter layer and other habitat attributes important for feeding, roosting and breeding. Indirect evidence of faunal activity such as scats, diggings, scratch marks etc was also investigated. The following criteria were used to evaluate habitat values:

- Good: A full range of fauna habitat components are usually present (for example, old-growth trees, fallen timber, feeding and roosting resources) and habitat linkages to other remnant ecosystems in the landscape are intact.
- Moderate: Some fauna habitat components are often missing (for example, old-growth trees, fallen timber), although linkages with other remnant habitats in the landscape are usually intact although sometimes degraded.
- Poor: Many fauna habitat elements in low quality remnants have been lost, including old growth trees (for example, due to past timber harvesting or land clearing) and fallen timber, and tree canopies are often highly fragmented. Habitat linkages with other remnant ecosystems in the landscape have usually been severely compromised by extensive past clearing.

2. Existing environment

No native vegetation is mapped as occurring within the site (Benson & Keith 1990). The site inspection, however, identified three communities within the site: Pine Plantation, Native Revegetation Area and Remnant Woodland. These are described in more detail below.

Pine Plantation

The pine plantation occurred in the south eastern section of the site occupying 12 hectares of the area. It was dominated by *Pinus radiata* (to 20 metres tall with canopy cover of 50 per cent). The understorey was sparse (five per cent cover) and consisted of scattered colonising native species (to five metres tall) such as *Cassinia arcuata*, *Acacia dealbata* and *Acacia buxifolia*. The ground cover was sparse and was dominated by introduced grasses and herbs such as *Plantago lanceolata* and *Rubus fruticosus*.

The pine plantation provided limited habitat for fauna. There was little ground cover and no hollows were evident. This area would provide limited resources for common species of bird and mammals including ringtail possums and rabbits.

This community does not correspond to a natural vegetation community and in poor condition.

Remnant Woodland

The remnant woodland occurred in the western section of the site occupying 0.7 hectares of the area. It was an open woodland with a shrubby understorey and a grassy round cover. The woodland contained a mix of eucalypts (to 20 metres tall with canopy cover of 30 per cent) including *Eucalyptus fastigata*, *Eucalyptus rossii*, *Eucalyptus viminalis* and *Eucalyptus dives*. The understorey was moderately dense and was dominated by colonising species such as *Cassinia arcuata*, *Acacia dealbata*, and *Acacia melanoxylon*. The ground cover was dominated by native grasses and herbs such as *Themeda australis*, *Dianella revoluta*, *Lomandra multiflora*, *Austrostipa* spp. and *Austrodanthonia laevis*.

The remnant woodland contained trees up to 20 metres tall, some of which had small hollows that may be used by hollow dependant mammals or birds. The ground layer includes fallen trees and logs and branches and a moderate cover of native grasses and leaf litter. Fauna observed within this area include common, disturbance tolerant species such as the Blue Tongue Lizard, Wombat, Eastern Grey Kangaroo as well as introduced species such as the Rabbit.

This community corresponds to Tablelands Grassy Woodland Complex as described by Benson and Keith (Benson & Keith 1990) and was in moderate condition.

Native Revegetation area

The Native Revegetation Area covers the majority of the site occupying 21 hectares of the area. This area has been highly disturbed in the past and has previously been used for ash storage. This area has been replanted within native species and some natural regeneration was also evident. Species recorded within this area included *Cassinia arcuata*, *Acacia dealbata*, *Acacia melanoxylon*, *Acacia spectabilis*, *Hakea dactyloides* as well as *Eucalyptus* saplings (to eight metres tall). The ground cover in this area was sparse and consisted of grasses and weeds such as *Panicum simile*, *Plantago lanceolata* and *Rubus fruticosus*.

This area offered limited resources for native fauna. No mature trees were present and the ground cover was very bare with little to no leaf litter present. However senescent plantings, particularly *Acacia* spp., provided scattered cover. Fauna observed within this area included common, disturbance tolerant species such as Eastern Grey Kangaroo as well as introduced species such as the Rabbit.

This community does not correspond to a natural vegetation community and was in poor condition.

2.1 Sawyers Creek Realignment

Sawyers Creek was realigned in the 1970's. This realignment runs along the northern boundary of Stage 2. Native aquatic and riparian vegetation had colonised parts of this area and common species of frog were heard calling.

The old creek alignment has been highly disturbed and has been mined and filled. The original creek bank was not evident. This area consisted of introduced grassland and Pine Forest. Willows were evident lining the old creek alignment.

3. Impacts to biodiversity

The proposal would include the clearing of the pine plantation and the revegetation area as well as realignment of Sawyers Creek. No clearing or disturbance of the remnant woodland would be required.

No Threatened species, populations or communities were recorded within the site. A total of seven Threatened species of plant and 28 Threatened species of animal has been recorded within 10 kilometres of the site. These species are unlikely to occur or be dependant on the resources within the site (refer to *Appendices A and B*).

There is likely to be some loss of aquatic vegetation as a result of the creek realignment. This vegetation would not be critical to the survival of Threatened species. Species of animal using this resource would generally be able to move in response to the altered creek alignment and would not be adversely affected (refer to *Appendices A and B*).

The proposal is unlikely to significantly impact Threatened biodiversity or the ecological values of the site. Given the highly disturbed nature of the site, there are no specific mitigation measures related to biodiversity.



4. References

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Appendix A

Plant Threatened Species
Information

Scientific Name	Common Name	TSC Act	EPBC Act	ROTAP	Habitat	Likely to occur
<i>Boronia deanei</i>		V	V	3Va	Occurs from Lithgow district to Naibaugh National Park where it grows in wet heath (Harden 2002), often at the margins of open forest adjoining swamps or along streams (Department of Environment and Conservation 2005).	No
<i>Derwentia blakelyi</i>		V		2K	Restricted to the western Blue Mountains, from Clarence to Peel River and Coricudgy Range, near Mt Horrible and on Nullo Mountain. Grows in eucalypt forest, 650-950 metre altitude, often in moist areas. Known locations all have small population sizes (Department of Environment and Conservation 2005; Royal Botanic Gardens 2006, 2005 #404).	No
<i>Eucalyptus cannonii</i>		V	V	2Vi	Restricted to Rylstone to upper Wolgan Valley where it is locally common. Grows in sclerophyll woodland on shallow soil on rises (Royal Botanic Gardens 2006).	No
<i>Eucalyptus pulverulenta</i>	Silver-leaved Gum	V	V	3V	Tree or mallee to 10 metres high, rare and scattered, in small stands almost in the understorey of grassy woodland on relatively poor soil; from Bathurst to Bombala (Royal Botanic Gardens 2006). It grows in shallow soils as an understorey plant in open forest, typically dominated by Brittle Gum (<i>Eucalyptus mannifera</i>), Red Stringybark (<i>E. macrorhyncha</i>), Broad-leaved Peppermint (<i>E. dives</i>), Silvertop Ash (<i>E. sieberi</i>) and Apple Box (<i>E. bridgesiana</i>) (Department of Environment and Conservation 2005).	No
<i>Pultenaea glabra</i>	Smooth Bush-pea	V	V	3Va	Restricted to the higher Blue Mountains, it has been recorded from the Katoomba-Hazelbrook and Mount Victoria areas, with unconfirmed sightings in the Mount Wilson and Mount Irvine areas. All known populations occur within the Blue Mountains Local Government Area. It grows on swamp margins, hillslopes, gullies and creekbanks and occurs within dry sclerophyll forest and tall damp heath on sandstone (Department of Environment and Conservation 2005; Royal Botanic Gardens 2006).	No
<i>Pultenaea setulosa</i>			V	3K	Occurs in central coast, central and northern tablelands and western slopes bioregions west to Gilgandra district. It grows in dry sclerophyll forest (Royal Botanic Gardens 2006).	No
<i>Thesium australe</i>	Austral Toadflax	V	V	3Vi	Grows in grassland or woodland often in damp sites. It is a semi-parasitic herb and hosts are likely to be <i>Themeda australis</i> and <i>Poa</i> spp. (Harden 1992).	No

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Royal Botanic Gardens 2006, *PlantNet - The Plant Information Network System of Botanic Gardens Trust (version 2.0)*, Royal Botanic Gardens, <<http://plantnet.rbgsyd.nsw.gov.au/>>.

Appendix B

Animal Threatened Species
Information

Scientific Name	Common Name	TSC Act	EPBC Act	Habitat	Likely to occur
Amphibians					
<i>Heleporus australiacus</i>	Giant Burrowing Frog	V	V	Appears to exist as two distinct populations: a northern population largely confined to the sandstone geology of the Sydney Basin, from Wollemi National Park in the north and extending south to Jervis Bay; and a southern population occurring in disjunct pockets from about Narooma south into eastern Victoria. In the northern population there is a marked preference for sandstone ridgetop habitat and broader upland valleys. In these locations the frog is associated with small headwater creeklines and along slow flowing to intermittent creeklines. The vegetation is typically woodland, open woodland and heath and may be associated with 'hanging swamp' seepage lines and where small pools form from the collected water. They have also been observed occupying artificial ponded structures such as fire dams, gravel 'borrows', detention basins and box drains that have naturalised over time and are still surrounded by other undisturbed habitat. In the southern population, records from Narooma, Bega, Bombala and eastern Victoria appear to be associated with Devonian igneous and sedimentary formations and Ordovician metamorphics and are generally from more heavily timbered areas. However, again there appears to be an association with ridgetops, headwaters and slow flowing streams. Do not appear to inhabit areas that have been cleared for agriculture or for urban development. Breed in summer and autumn in burrows in the banks of small creeks. Often spends significant periods of time underground during unfavourable conditions and to avoid detection during the day (Cogger 2000; NSW National Parks and Wildlife Service 2001a).	No
<i>Litoria littlejohni</i>	Heath Frog	V	V	Distributed along the eastern slopes of the Great Dividing Range from Watagan State Forest near Wyong, south to Buchan in north-eastern Victoria. It appears to be restricted to sandstone woodland and heath communities at mid to high altitude. It forages both in the tree canopy and on the ground, and it has been observed sheltering under rocks on high exposed ridges during summer. It is not known from coastal habitats (NSW Scientific Committee 2000).	No
Invertebrates					
<i>Paralucia spinifera</i>	Bathurst Copper Butterfly	E1	V	Occurs above 850 m elevation, at sites with a south-west to north-west aspect, usually where direct sunlight reaches the habitat, and with extremes of cold such as regular winter snowfalls or heavy frosts. Occurs in open woodland or open forest with a sparse understorey that is dominated by the shrub, Blackthorn <i>Bursaria spinosa</i> subsp. <i>lasiophylla</i> . The butterflies generally remain in the vicinity of <i>B. spinosa</i> subsp. <i>lasiophylla</i> , and are rarely observed more than 10 m distant from the plant. The Copper Butterfly lifecycle relies on a mutualistic relationship with the ant, <i>Anonychomyra itinerans</i> . The butterflies emerge between August (later at higher altitude sites) and November, with a two-week peak of activity in September (Department of Environment and Conservation 2005).	No

Scientific Name	Common Name	TSC Act	EPBC Act	Habitat	Likely to occur
Birds					
<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo	V		Occurs in wetter forests and woodland from sea level to an altitude over 2000 metres, timbered foothills and valleys, coastal scrubs, farmlands and suburban gardens (Pizzey & Knight 1997).	May occur but would not be dependant on resources within site
<i>Gallinago hardwickii</i>	Latham's Snipe		M	Occurs in freshwater or brackish wetlands generally near protective vegetation cover. This species feeds on small invertebrates, seeds and vegetation. It migrates to the northern hemisphere to breed (Garnett & Crowley 2000).	No
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle		M	Occurs in coastal areas including islands, estuaries, inlets, large rivers, inland lakes and reservoirs. Builds a huge nest of sticks in tall trees near water, on the ground on islands or on remote coastal cliffs (Pizzey & Knight 1997).	No
<i>Hirundapus caudacutus</i>	White-throated Needletail		M	Occurs in airspace over forests, woodlands, farmlands, plains, lakes, coasts and towns. Breeds in the northern hemisphere and migrates to Australia in October-April (Pizzey & Knight 1997).	No
<i>Lathamus discolor</i>	Swift Parrot	E1	EM	Breeding occurs in Tasmania, majority migrates to mainland Australia in autumn, overwintering, particularly in Victoria and central and eastern NSW, but also south-eastern Queensland as far north as Duaringa. Until recently it was believed that in New South Wales, swift parrots forage mostly in the western slopes region along the inland slopes of the Great Dividing Range but are patchily distributed along the north and south coasts including the Sydney region, but new evidence indicates that the forests on the coastal plains from southern to northern NSW are also extremely important. In mainland Australia is semi-nomadic, foraging in flowering eucalypts in eucalypt associations, particularly box-ironbark forests and woodlands. Preference for sites with highly fertile soils where large trees have high nectar production, including along drainage lines and isolated rural or urban remnants, and for sites with flowering <i>Acacia pycnantha</i> , is indicated. Sites used vary from year to year. (Garnett & Crowley 2000),(Swift Parrot Recovery Team 2001).	No
<i>Melanodryas cucullata</i>	Hooded Robin	V		Found in south-eastern Australia, generally east of the Great Dividing Range. Found in eucalypt woodland and mallee and acacia shrubland. This is one of a suite of species that has declined in woodland areas in south-eastern Australia (Garnett & Crowley 2000; Traill & Duncan 2000).	May occur but would not be dependant on resources within site
<i>Monarcha melanopsis</i>	Black-faced Monarch		M	Occurs in rainforests, eucalypt woodlands, coastal scrubs, damp gullies in rainforest, eucalypt forest and in more open woodland when migrating (Pizzey & Knight 1997).	No
<i>Myiagra cyanoleuca</i>	Satin Flycatcher		M	Occurs in heavily vegetated gullies, in forests and taller woodlands. During migration it is found in coastal forests, woodlands, mangroves, trees in open country and gardens (Pizzey & Knight 1997).	No

Scientific Name	Common Name	TSC Act	EPBC Act	Habitat	Likely to occur
<i>Rhipidura rufifrons</i>	Rufous Fantail		M	Occurs in a range of habitats including the undergrowth of rainforests/wet eucalypt forests/gullies, monsoon forests paperbarks, sub-inland and coastal scrubs, mangroves, watercourses, parks and gardens. When migrating they may also be recorded on farms, streets and buildings. Migrates to SE Australia in October-April to breed, mostly in or on the coastal side of the Great Dividing Range (Pizzey & Knight 1997).	No
<i>Rostratula benghalensis</i>	Painted Snipe	E1	VM	Inhabits shallow, vegetated, temporary or infrequently filled wetlands, including where there are trees such as <i>Eucalyptus camaldulensis</i> (River Red Gum), <i>E. populnea</i> (Poplar Box) or shrubs such as <i>Muehlenbeckia florulenta</i> (Lignum) or <i>Sarcocornia quinqueflora</i> (Samphire). Feeds at the water's edge and on mudflats on seeds and invertebrates, including insects, worms, molluscs and crustaceans. Males incubate eggs in a shallow scrape nest (Garnett & Crowley 2000).	No
<i>Stagonopleura guttata</i>	Diamond Firetail	V		Occurs in a range of eucalypt dominated communities with a grassy understorey including woodland, forest and mallee. Most populations occur on the inland slopes of the dividing range. Feed on seeds, mostly of grasses (Garnett & Crowley 2000).	May occur but would not be dependant on resources within site
<i>Xanthomyza phrygia</i>	Regent Honeyeater	E1	EM	Occurs mostly in box-ironbark forests and woodland and prefers the wet, fertile sites such as along creek flats, broad river valleys and foothills. Riparian forests with Casuarina cunninghamiana and Amyema cambagei are important for feeding and breeding. Important food trees include <i>Eucalyptus sideroxylon</i> (Mugga Ironbark), <i>E. albens</i> (White Box), <i>E. melliodora</i> (Yellow Box) and <i>E. leucoxydon</i> (Yellow Gum) (Garnett & Crowley 2000).	No
Mammals					
<i>Aepyprymnus rufescens</i>	Rufous Bettong	V		Distribution: From Cooktown in north Queensland, to north-east NSW, where it occurs east of the Dividing Range. In Queensland, it still occurs on both sides of the Great Divide. Macrohabitat: Found in a variety of forest types from wet sclerophyll to dry open woodland, where grass tussocks or fallen timber are present. Also known to occupy a mosaic of open forest and grasslands. Microhabitat: It appears to prefer a more open forest structure, with a sparse shrub layer and a diverse ground cover. Builds nests in grass tussocks and under logs. Strongly associated with dry sclerophyll forest particularly those dominated by Spotted Gum (NSW National Parks and Wildlife Service 1999a).	No
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	V	V	Occurs in moderately wooded habitats and roosts in caves, mine tunnels and the abandoned, bottle-shaped mud nests of Fairy Martins. Thought to forage below the forest canopy for small flying insects (Churchill 1998).	No
<i>Dasyurus maculatus</i>	Spotted-tailed Quoll	V	E	Occurs from the Bundaberg area in south-east Queensland, south through NSW to western Victoria and Tasmania. In NSW, it occurs on both sides of the Great Dividing Range and north-east NSW represents a national stronghold (NSW National Parks and Wildlife Service 1999a). Occurs in wide range of forest types, although appears to prefer moist sclerophyll and rainforest forest types, and riparian habitat. Most common in large unfragmented	No

Scientific Name	Common Name	TSC Act	EPBC Act	Habitat	Likely to occur
				patches of forest. It has also been recorded from dry sclerophyll forest, open woodland and coastal heathland, and despite its occurrence in riparian areas, it also ranges over dry ridges. Nests in rock caves and hollow logs or trees. Feeds on a variety of prey including birds, terrestrial and arboreal mammals, small macropods, reptiles and arthropods (NSW National Parks and Wildlife Service 1999b, 1999a).	
<i>Falstirellus tasmaniensis</i>	Eastern False Pipistrelle	V		Usually roosts in tree hollows in higher rainfall forests. Sometimes found in caves (Jenolan area) and abandoned buildings. Forages within the canopy of dry sclerophyll forest. It prefers wet habitats where trees are more than 20 metres high (Churchill 1998).	No
<i>Miniopterus schreibersii</i>	Eastern Bent-wing Bat	V	C	Usually found in well timbered valleys where it forages on small insects above the canopy. Roosts in caves, old mines, stormwater channels and sometimes buildings and often return to a particular nursery cave each year (Churchill 1998).	No
<i>Nyctophilus bifax</i>	Eastern Long-eared Bat	V	V	Occurs in a range of tropical habitats from rainforest to dry sclerophyll woodland and is often found in riparian vegetation. It catches prey in the air and also takes insects from foliage and the ground or other hard surfaces. It roosts in tree hollows and in the roofs of buildings (Strahan 1995).	No
<i>Petrogale penicillata</i>	Brush-tailed Rock-wallaby	E1	V	Occurs in inland and sub-coastal south eastern Australia where it inhabits rock slopes. It has a preference for rocks which receive sunlight for a considerable part of the day. Windblown caves, rock cracks or tumbled boulders are used for shelter. Occur in small groups or "colonies" each usually separated by hundreds of metres (NSW National Parks and Wildlife Service 2003a).	No
<i>Phascolarctos cinereus</i>	Koala	V		Found in sclerophyll forest. Throughout New South Wales, Koalas have been observed to feed on the leaves of approximately 70 species of eucalypt and 30 non-eucalypt species. However, in any one area, Koalas will feed almost exclusively on a small number of preferred species. The preferred tree species vary widely on a regional and local basis. Some preferred species in NSW include Forest Red Gum <i>Eucalyptus tereticornis</i> , Grey Gum <i>E. punctata</i> , Monkey Gum <i>E. cypellocarpa</i> and Ribbon Gum <i>E. viminalis</i> . In coastal areas, Tallowwood <i>E. microcorys</i> and Swamp Mahogany <i>E. robusta</i> are important food species, while in inland areas White Box <i>E. albens</i> , Bimble Box <i>E. populnea</i> and River Red Gum <i>E. camaldulensis</i> are favoured (NSW National Parks and Wildlife Service 1999c, 2003b).	No
<i>Potorous tridactylus</i>	Long-nosed Potoroo	V	V	Disjunct distribution along coastal south-east Australia from near Gladstone in Queensland, to south-west Victoria and in Tasmania. Found from sea level up to 1500 metres in altitude generally in areas with rainfall greater than 760 millimetres. In NSW, it is found throughout coastal and subcoastal areas. Occurs in a range of habitats: coastal forest and woodland with a moderately dense heathy understorey, dense coastal scrubs or heath, wet and dry sclerophyll forest and sub-tropical, warm temperate and cool temperate rainforest of the eastern slopes and highlands. Often associated with gullies and forest ecotones. Open	No

Scientific Name	Common Name	TSC Act	EPBC Act	Habitat	Likely to occur
				areas are used for foraging while areas of dense groundcover or understorey provide areas for shelter and protection from predators. Relatively thick ground cover is a major habitat requirement and it seems to prefer areas with light sandy soils. Feeds at dusk on roots, tubers, fungi, insects and their larvae and other soft bodied animals in the soil. Moves up and down slope as food resources become seasonally available (Johnston 1995; NSW National Parks and Wildlife Service 1999a).	
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	V	V	Occurs in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps. Urban gardens and cultivated fruit crops also provide habitat for this species. Feeds on the flowers and nectar of eucalypts and native fruits including lilly pillies. It roosts in the branches of large trees in forests or mangroves (Churchill 1998; NSW National Parks and Wildlife Service 2001b).	No
<i>Scoteanax rueppellii</i>	Greater Broad-nosed Bat	V		The preferred hunting areas of this species include tree-lined creeks and the ecotone of woodlands and cleared paddocks but it may also forage in rainforest. Typically it forages at a height of 3-6 metres but may fly as low as one metre above the surface of a creek. It feeds on beetles, other large, slow-flying insects and small vertebrates. It generally roosts in tree hollows but has also been found in the roof spaces of old buildings (Churchill 1998).	No
Reptiles					
<i>Eulamprus leuraensis</i>	Blue Mountains Water Skink	E1	E	Occurs in the central Blue Mountains in riparian and swampy areas in montane forests and heaths (Cogger 2000). Occurs at high elevation: the lowest altitude recorded for this species is 560 metres at Williams Ridge, south of Hazelbrook, NSW. It is restricted to an isolated and naturally fragmented habitat of sedge and shrub swamps that have boggy soils and appear to be permanently wet. The vegetation in these swamps typically takes the form of a sedgeland interspersed with shrubs, but may occur as a dense shrub thicket. The lizard is semi-aquatic and is active on warm, sunny days from September until late April. It feeds on grasshoppers, flies, moths, weevils and wasps and small fruit (Department of Environment and Conservation 2005).	No
<i>Hoplocephalus bungaroides</i>	Broad-headed Snake	E1	V	A nocturnal species that occurs in association with communities occurring on Triassic sandstone within the Sydney Basin. Typically found among exposed sandstone outcrops with vegetation types ranging from woodland to heath. Within these habitats they generally use rock crevices and exfoliating rock during the cooler months and tree hollows during summer (Webb, J.K. & Shine 1994; Webb, J.K. & Shine 1998).	No

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