Threatened Species of Mambo Wetlands Reserve, Salamander Bay NSW

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1.0 Introduction

Mambo Wetlands Reserve is located at Salamander Bay, Port Stephens NSW. It covers 175 hectares of saltwater and freshwater wetlands and forest and is drained by Mambo Creek into Salamander Bay. The reserve is bounded by Foreshore Drive to the north, Port Stephens Drive to the west, Salamander Way to the south and Sandy Point Road to the east. Residential properties adjoin the reserve to the southwest, south and east, while the Salamander Bay shopping and council precinct adjoins to the southeast. To the north, the reserve abuts the Salamander Bay shoreline.

The reserve is the hub of several wildlife corridors. It is linked to the east via Kingfisher Reserve to Lily (Gan Gan) Hill. To the south the reserve is linked to Kingfisher Reserve and thence to Tomaree National Park in the east and Tilligerry Nature Reserve in the west. The reserve is also linked via Boronia Gardens and the Wanda Wetlands Reserve in the west, to the foreshore reserves along Cromarty Bay and subsequently to the Tilligerry Nature Reserve. The northern part of Mambo Wetlands Reserve which is subject to tidal inundation is part of the Port Stephens – Great Lakes Marine Park.

The purpose of this report is to document the presence of threatened flora and fauna species and threatened ecological communities within the reserve and to determine if it meets criteria for nomination as a Wetlands of International Importance under the Ramsar Convention Criterion 2: *'A wetland should be considered internationally important if it supports vulnerable, endangered, or critically endangered species or threatened ecological communities.'* (Ramsar Convention on Wetlands 1999)

2.0 Methodology

Records of threatened species identified within and around the reserve were obtained from publicly available reports containing results of flora and fauna surveys, together with assessment of other threatened species that could potentially utilise the reserve. The reports were produced to support development applications, proposed civil works and management plans for the reserve. Four studies are summarized in the following section.

Historical records of bird surveys conducted by groups and individuals in and around the reserve were collated and threatened species records identified. Records from 29 surveys conducted between 1999 and 2016 were used.

To further support knowledge of birds utilising the reserve and confirm the presence of previously identified threatened species, regular weekly surveys were conducted within the different vegetation communities in the reserve. Because of the dense nature of much of the wetland vegetation, surveying was limited to existing tracks within forest in the western section of the reserve and open woodland in the east. Elsewhere, surveys were conducted from accessible points or walking tracks around the margins of the wetland. Accessible areas were surveyed using a 500 m area search method and access points were surveyed with a 2 ha 20 minute method (Birdlife Australia 2018). A total of 41 surveys were conducted between February 2017 and February 2018. Shorebirds that used the intertidal sandflats on Salamander Bay were surveyed separately on 22 occasions between 1999 and 2018.

Reporting rates[1] of birds recorded were calculated from all surveys (70) and compared with BirdLife Australia records for the Hunter Region from 1998-2016.

3.0 Previous Studies

A number of formal and informal studies have been conducted for various parts of the reserve by environmental consultants and local government.

The Port Stephens Council Comprehensive Koala Plan of Management (2002), identified koala habitat in the reserve based on vegetation mapping and koala surveys. Mahogany/Paperbark Swamp Forest (**Figure 1**) around the eastern margin of the wetland was identified as preferred habitat and Moist Coastal Apple Forest and Mahogany/Paperbark Swamp Forest in the west and southwest of the reserve was identified as supplementary habitat.

General Flora and Fauna (2004) conducted a study of flora and fauna along a narrow strip of land at the rear of residences backing onto the reserve in the southwest corner, along the southern edge and on a section of the eastern edge of the reserve. This survey was conducted on behalf of Port Stephens Council to assess the potential impact of a proposed Asset Protection Zone on threatened species, populations or ecological communities. The study involved field surveys and literature reviews.

Port Stephens Council (2006) produced the Mambo Wetlands Plan of Management (MWPoM) which included complete flora and fauna species lists for the reserve compiled from field surveys and literature reviews. Seven vegetation communities were described in the reserve based on those identified in the Lower Hunter and Central Coast Regional Environmental Management Strategy (National Parks and Wildlife Service 2000). These were Estuarine Mangrove Complex, Estuarine Saltmarsh Complex, Mahogany/Paperbark Swamp Forest, Coastal Sand Woodland, Freshwater Gahnia Swamp Forest, Moist Coastal Apple Forest and Paperbark/Swamp Oak Complex. See **Figure 1**.

Gary Worth Project Consulting (2009) prepared a Statement of Effects on Threatened Flora and Fauna for a proposed subdivision of Lot 284 DP 806310, Salamander Bay. The subdivision was for an extension to the Salamander Bay shopping centre, immediately adjacent to the south-eastern margin of the wetland. A fauna and flora assessment was conducted by Wildthing Environmental Consultants that involved field studies and literature reviews.

Wildthing Environmental Consultants (2017) prepared a Statement of Environmental Effects in support of a Development Application for Lot 566 DP 27353 which covers 5.6 ha located immediately adjacent to the western side of the reserve. A fauna and flora assessment was conducted that involved field studies and literature reviews.

Surveys of birds on and adjacent to the reserve were conducted by various individuals and groups between 1999 and 2018. These were Tomaree Bird Watchers (5 surveys), Tom Clarke (1 survey), Graeme Stevens (16 surveys), anonymous surveys from the BirdLife Australia Atlas (2 surveys), environmental consultants (4 surveys), local government (1 survey) and surveys conducted during this study (41 surveys).

[1] Reporting rate (RR) = (Number of surveys in which species recorded/Number of surveys conducted)%

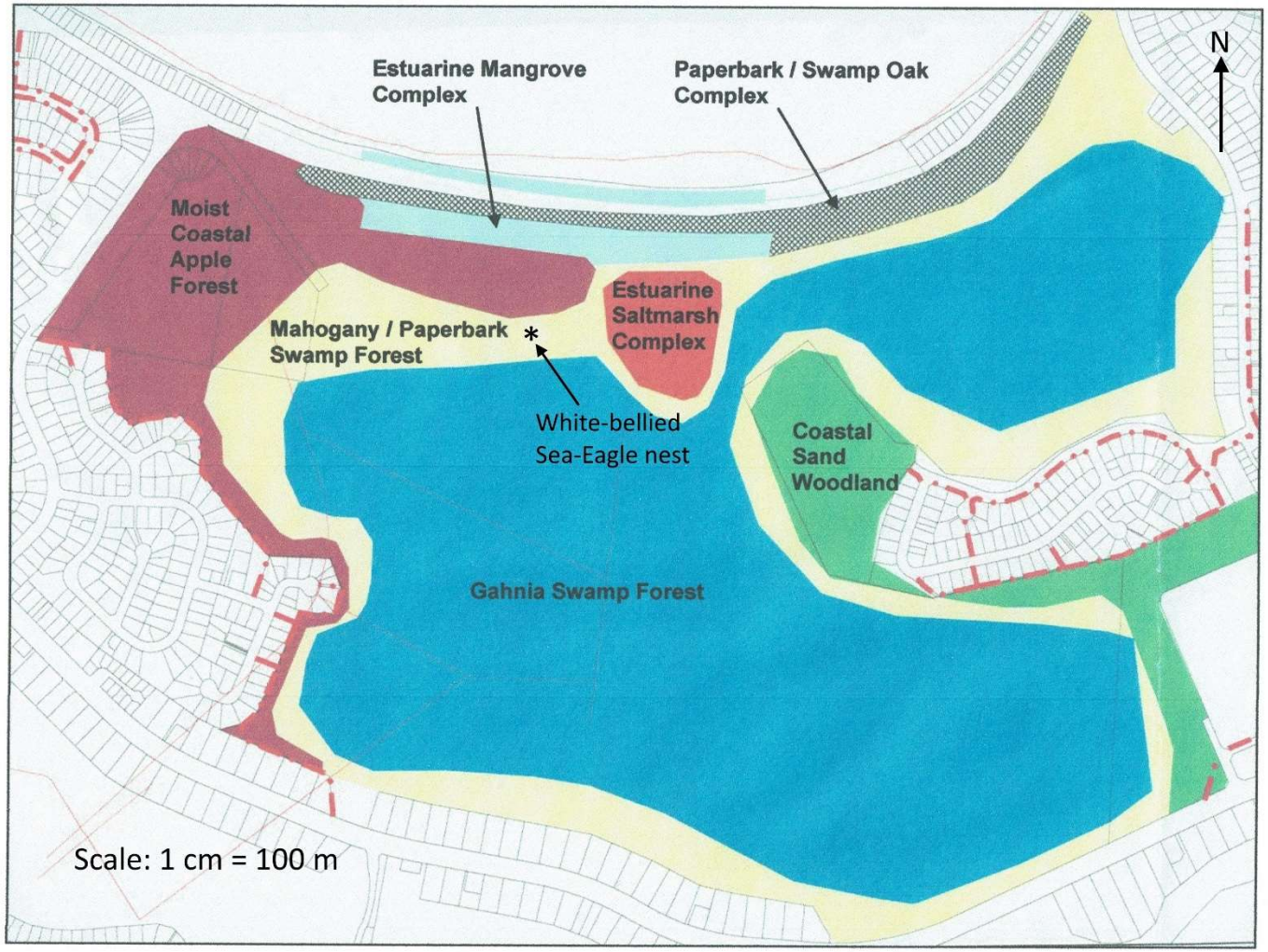

Figure 1. Vegetation Communities, Mambo Wetlands Reserve (Port Stephens Council, January 2006)

4.0 Results

Seventeen threatened flora and fauna species and four endangered ecological communities were identified within and adjacent to the reserve. These are summarized in **Table 1**.

In addition to the species identified through field studies a list of other species that could potentially utilise the reserve was compiled from assessments conducted as part of these studies. These are summarised in the **Appendix**.

Table 1. Threatened species recorded in Mambo Wetlands Reserve.

Common Name	Scientific Name	BCA 2016	EPBC 1999
Mammals			
Koala	*Phascolarctos cinereus*	V	V
Brush-tailed Phascogale	*Phascogale tapoatafa*	V	
Squirrel Glider	*Petaurus norfolcensis*	V	
Grey-headed Flying-fox	*Pteropus poliocephalus*	V	
Little Bent-wing Bat	*Miniopterus australis*	V	
Greater Broad-nosed Bat	*Scoteanax rueppellii*	V	
Amphibians			
Wallum Froglet	*Crinia tinnula*	V	
Birds			
Eastern Curlew	*Numenius madagascariensis*		CE
Bar-tailed Godwit	*Limosa lapponica*		V
Eastern Osprey	*Pandion cristatus*	V	
White-bellied Sea-Eagle	*Haliaeetus leucogaster*	V	
Powerful Owl	*Ninox strenua*	V	
Glossy Black-Cockatoo	*Calyptorhynchus lathami*	V	
Little Lorikeet	*Glossopsitta pusilla*	V	
Varied Sittella	*Daphoenositta chrysoptera*	V	
Dusky Woodswallow	*Artamus cyanopterus*	V	
Flora Species			
Drooping Red Gum	*Eucalyptus parramattensis ssp. decadens*	V	V
Ecological Communities			
Sydney Freshwater Wetlands in the Sydney Basin BioRegion		E	
Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner BioRegions		E	
Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner BioRegions.		E	
Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner BioRegions.		E	

V = Vulnerable, E = Endangered, CE = Critically Endangered

Mammals

Six threatened mammalian species have been recorded in the reserve

The Koala (*Phascolarctos cinereus*) has been regularly recorded in the reserve by local residents and conservation groups. The conservation status of the Koala in Australia is vulnerable (Environment Protection and Biodiversity Conservation Act 1999) (EPBC Act 1999) as well as in NSW (Biodiversity Conservation Act 2016) (BC Act 2016). The Koala was

recorded during studies by General Flora and Fauna (2004), Wildthing Environmental Consultants (2017) and was recorded on seven occasions during the course of this study. Gary Worth Project Consulting (2009) recorded the Koala on the proposed subdivision immediately adjacent to the southeast of the reserve.

Brush-tailed Phascogale (*Phascogale tapoatafa)*. The conservation status of the Brush-tailed Phascogale in NSW is vulnerable (BC Act 2016). It was recorded by Gary Worth Project Consulting (2009). General Fauna and Flora (2004), and Wildthing Environmental Consultants (2017) considered the species likely to utilise the study area.

Squirrel Glider (Petaurus norfolcensis). The conservation status of the Squirrel Glider in NSW is vulnerable (BC Act 2016). It was recorded by General Fauna and Flora (2004), Gary Worth Project Consulting (2009), and Wildthing Environmental Consultants (2017) considered the species likely to utilise the study area.

Grey-headed Flying-fox (*Pteropus poliocephalus*). The conservation status of the Grey-headed Flying-fox is vulnerable in both NSW (BC Act 2016) and federally (EPBC Act 1999). It was recorded by General Flora and Fauna (2004), Gary Worth Project Consulting (2009) and Wildthing Consulting Consultants (2017). It was also recorded in the MWPoM (2006) fauna species list.

Little Bent-wing Bat *(Miniopterus australis)*. The conservation status of the Little Bent-wing Bat in NSW is vulnerable (BC Act 2016). It was recorded by General Flora and Fauna (2004). It was also recorded in the MWPoM (2006) fauna species list and was considered likely to utilise the area by Gary Worth Project Consulting (2009).

Greater Broad-nosed Bat (*Scoteanax rueppellii*). The conservation status of the Greater Broad-nosed Bat in NSW is vulnerable (BC Act 2016). It was recorded by General Flora and Fauna (2004). It was also recorded in the MWPoM (2006) fauna species list and was considered likely to utilise the area by Gary Worth Project Consulting (2009).

Amphibians

A single threatened amphibian species has been recorded in the reserve.

Wallum Froglet (*Crinia tinnula*). The conservation status of the Wallum Froglet in NSW is vulnerable (BC Act 2016). It was recorded by General Fauna and Flora (2004), Gary Worth Project Consulting (2009) and Wildthing Environmental Consultants (2017).

Birds

Nine threatened bird species recorded in or near the reserve.

Eastern Curlew (*Numenius madagascariensis*). The conservation status of the Eastern Curlew in Australia is critically endangered (EPBC Act 1999). It is a summer migrant in the Hunter Region and has a declining trend in the Hunter estuary (Stuart 2016). It was recorded by Graeme Stevens in 2006, 2007 and 2008, and on five occasions during this study on the intertidal sandflats adjacent to the Estuarine Mangrove Complex (**Figure 1**). The reporting rate for this study is 45.5% and the reporting rate for the Hunter Region from the BirdLife Australia Atlas is 10.5%. The reporting rate is considerably higher than the overall Hunter Region and may indicate that the area provides important habitat for this species.

Bar-tailed Godwit (*Limosa lapponica*). The conservation status of the Bar-tailed Godwit in Australia is vulnerable (EPBC Act 1999). It is a summer migrant in the Hunter Region but has a declining trend (Stuart 2016). It was recorded by Graeme Stevens in 2008 and on four

occasions during this study on the intertidal sandflats adjacent to the Estuarine Mangrove Complex (**Figure 1**). The reporting rate for this study is 22.7% and the reporting rate for the Hunter Region from the Birdlife Australia Atlas is 8.1%. The reporting rate is higher than the overall Hunter Region and may indicate that the area provides important habitat for this species.

Eastern Osprey (*Pandion cristatus*). The conservation status of the Eastern Osprey in NSW is vulnerable (BC Act 2016). It is a common resident in the Hunter Region (Stuart 2016). It was recorded on five occasions during the course of this study and was considered likely to utilise the study area by Wildthing Environmental Consultants (2017). The reporting rate for this study is 5.7% and the reporting rate for the Hunter Region from the Birdlife Australia Atlas is 4.4%.

White-bellied Sea-Eagle (*Haliaeetus leucogaster*). The conservation status of the White-bellied Sea-Eagle in NSW is vulnerable (BC Act 2016). It is a common resident in the Hunter Region (Stuart 2016). It was recorded by Tom Clarke in 2004, by Graeme Steven in 2007 and 2008, by Wildthing Environmental Consultants (2016), and is recorded in the MWPoM (2006) fauna species list. It was recorded on 16 occasions during this study and an active nest was located within the reserve (32º 43' 52.14"S, 152º 5' 34.62"E) in November 2017. The reporting rate for this study is 30.0% and the reporting rate for the Hunter Region from the BirdLife Australia Atlas is 14.9%. The reporting rate is higher than the overall Hunter Region and may indicate that the reserve is important habitat for this species.

Powerful Owl (*Ninox strenua*). The conservation status of the Powerful Owl in NSW is vulnerable (BC Act 2016). It is an uncommon resident in the Hunter Region (Stuart 2016). It was recorded by the Tomaree Bird Watchers in 2016 and is recorded in the MWPoM (2006) fauna species list. It was recorded nearby the reserve by General Flora and Fauna in 2004, and was considered likely to utilise the study area by Gary Worth Project Consulting (2009) and Wildthing Environmental Consultants (2017). The reporting rate for this study is 2.9% and the reporting rate for the Hunter Region from the BirdLife Australia Atlas is 0.6%.

Glossy Black-Cockatoo (*Calyptorhynchus lathami*). The conservation status of the Glossy Black-Cockatoo in NSW is vulnerable (BC Act 2016). It is an uncommon resident in the Hunter region (Stuart 2016). It is recorded in the MWPoM (2006) fauna species list and was considered likely to utilise the area by Gary Worth Project Consulting (2009). The reporting rate for this study is 1.4% and the reporting rate for the Hunter Region from the BirdLife Australia Atlas is 0.7%.

Little Lorikeet (*Glossopsitta pusilla*). The Conservation status of the Little Lorikeet in NSW is vulnerable (BC Act 2016). It is a common resident in the Hunter Region (Stuart 2016). It was recorded in the study area by Graeme Stevens in 2009, the Tomaree Bird Watchers in 2016 and was considered likely to utilise the area by Wildthing Environmental Consulting (2016). The reporting rate for this study is 2.9% and the reporting rate for the Hunter Region from the BirdLife Australia Atlas is 5.8%.

Varied Sittella (*Daphoenositta chrysoptera*). The conservation status of the Varied Sittella in NSW is vulnerable (BC Act 2016). It is a common resident in the Hunter Region (Stuart 2016). It was recorded in the study area by the Tomaree Bird Watchers in 2002 and 2005, by Graeme Stevens in 2007 and 2015, during the course of this study on six occasions and is recorded in the MWPoM (2006) fauna species list. The reporting rate for this study is 15.7% and the reporting rate for the Hunter Region from the BirdLife Australia Atlas is 3.7%. The reporting rate is considerably higher than the overall Hunter Region and may indicate that the reserve is important habitat for this species.

Dusky Woodswallow (*Artamus cyanopterus*). The conservation status of the Dusky Woodswallow in NSW is vulnerable (BC Act 2016). It is a summer migrant in the Hunter Region (Stuart 2016). It was recorded in the study area by the Tomaree Bird Watchers in 2005, by General Flora and Fauna in 2004, by Graeme Stevens in 2006, 2007 and 2008, by Tom Clarke in 2007 and was recorded on six occasions during this study. It is also recorded in the MWPoM (2006) fauna species list. The reporting rate for this study is 21.4% and the reporting rate for the Hunter Region from the BirdLife Australia Atlas is 3.5%. The reporting rate is considerably higher than the overall Hunter Region and may indicate that the reserve is important habitat for this species.

Flora

A number of vegetation traverses and targeted surveys were conducted by consulting groups for threatened flora species. Only one threatened species was identified in the reserve.

Drooping Red Gum (*Eucalyptus parramattensis ssp. decadens)*. The conservation status of the Drooping Red Gum in vulnerable in Australia (EPBC Act 1999) as well as in NSW (BC Act 2016). It was recorded in the reserve by Gary Worth Project Consulting (2009). It was also recorded by General Flora and Fauna (2004) but was considered to have been planted as part of site rehabilitation.

Endangered Ecological Communities

Four ecological communities with a conservation status of endangered (BC Act 2016) have been identified in the reserve.

Sydney Freshwater Wetlands in the Sydney Basin BioRegion. General Flora and Fauna identified the presence of this community which is represented by the Freshwater Gahnia Swamp Forest vegetation community described in the MWPoM (2006). It is the largest community and occurs throughout the centre of the. See **Figure 1**.

Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner BioRegions. General Flora and Fauna (2004) and Wildthing Environmental Consultants (2017) identified the presence of this community which is represented by the Mahogany/Paperbark Swamp Forest vegetation community described in the MWPoM (2006). Gary Worth Project Consulting (2009) also identified this community on the proposed subdivision adjacent to the southeast corner of the reserve. The community occurs as a narrow buffer zone surrounding the Freshwater Gahnia Swamp Forest. See **Figure 1**.

Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner BioRegions. General Flora and Fauna identified the presence of this community which is represented by the Estuarine Saltmarsh Complex vegetation community described in the MWPoM (2006). The conservation status of this community under the EPBC Act (1999) is vulnerable. The community occurs in the north of the reserve where it is intermittently inundated. See **Figure 1**.

Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner BioRegions. This community was recognised during this study and is represented by the Paperbark/Swamp Oak Complex vegetation community described in the MWPoM (2006). The community is present as a narrow zone in the north of the reserve adjacent to the Estuarine Mangrove Complex. See **Figure 1**.

5.0 Conclusions

The presence of seventeen threatened flora and fauna species and four endangered ecological communities within Mambo Wetlands Reserve confirms that it meets Criterion 2 for nomination as a Wetlands of International Importance under the Ramsar Convention on Wetlands (1999).

Five of the threatened bird species recorded within the reserve, Eastern Curlew, Bar-tailed Godwit, White-bellied Sea-Eagle, Varied Sittella and Dusky Woodswallow have reporting rates considerably higher than the overall Hunter Region, which may indicate the reserve is important habitat for these species.

Further studies to confirm the presence of some of the species listed in **Appendix A** would provide additional support for the reserve's international importance.

References

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APPENDIX

Other threatened species that could potentially utilise Mambo Wetlands Reserve habitat

Common Name	Scientific Name	Consultant	BC Act 2016	EPBC Act 1999
Flora Species				
Grove's Paperbark	*Melaleuca groveana*	GFF	V	
Red Helmet Orchid	*Corybas dowlingii*	WEC	E	
Leafless Tongue Orchid	*Cryptostylis hunteriana*	GFF, GWPC, WEC	V	V
Tomaree Doubletail	*Diuris arenaria*	GFF, GWPC, WEC	E	
Black-eyed Susan	*Tetratheca juncea*	GFF	V	V
Netted Bottlebrush	*Callistemon linearifolius*	GWPC, WEC	V	
Biconvex Paperbark	*Melaleuca biconvexa*	WEC	V	V
Noah's False Chickweed	*Lindernia alsinoides*	WEC	E	
Maundia	*Maundia triglochinoides*	WEC	V	
White-flowered Wax-plant	*Cynanchum elegans*	WEC	E	E
Tall Knotweed	*Persicaria elatior*	WEC	V	V
Amphibian Species				
Mahony's Toadlet	*Uperoleia mahonyi*	WEC	E	
Green and Gold Bell Frog	*Litoria aurea*	GWPC, WEC	E	V
Birds				
Superb Fruit-Dove	*Ptilinopus superbus*	WEC	V	
Rose-crowned Fruit-Dove	*Ptilinopus regina*	WEC	V	
Australian Painted Snipe	*Rostratula australis*	GWPC, WEC	E	E
Australasian Bittern	*Botaurus poiciloptilus*	GWPC, WEC	E	E
Black Bittern	*Ixobrychus flavicollis*	GFF, WEC	V	
Square-tailed Kite	*Lophoictinia isura*	WEC	V	
Little Eagle	*Hieraaetus morphnoides*	WEC	V	
Eastern Grass Owl	*Tyto capensis*	GWPC	V	
Masked Owl	*Tyto novaehollandiae*	GWPC, WEC	V	
Powerful Owl	*Ninox strenua*	GWPC, WEC	V	
Barking Owl	*Ninox connivens*	GWPC, WEC	V	
Glossy Black-Cockatoo	*Calyptorhynchus lathami*	GFF, GWPC, WEC	V	
Swift Parrot	*Lathamus discolor*	GFF, GWPC, WEC	E	CE
Regent Honeyeater	*Xanthomyza phrygia*	GFF, GWPC, WEC	CE	CE
Scarlet Robin	*Petroica boodang*	WEC	V	
Mammals				
Eastern Pygmy-possum	*Cercartetus nanus*	GWPC, WEC	V	
Common Planigale	*Planigale maculata*	WEC	V	
Eastern Chestnut Mouse	*Pseudomys gracilicaudatus*	GWPC, WEC	V	
Eastern Falsistrelle	*Falsistrellus tasmaniensis*	GWPC, WEC	V	
Yellow-bellied Sheathtail-bat	*Saccolaimus flaviventris*	GFF, GWPC, WEC	V	V
Little Bentwing-bat	*Miniopterus australis*	GWPC, WEC	V	
Large Bentwing-bat	*Miniopterus schreibersii oceanensis*	GFF, GWPC, WEC	V	
Eastern Freetail Bat	*Mormopterus norfolkensis*	GFF, GWPC, WEC	V	
Eastern Myotis	*Myotis macropus*	WEC	V	
Greater Broad-nosed Bat	*Scoteanax rueppellii*	GWPC, WEC	V	
Eastern Cave Bat	*Vespadelus troughtoni*	GFF, GWPC, WEC	V	
Invertebrates				
Giant Dragonfly	*Petalura gigantea*	GWPC, WEC	E	

GFF-General Flora and Fauna, GWPC-Gary Worth Project Consulting, WEC-Wildthing Environmental Consultants
V-Vulnerable, E-Endangered, CE-Critically Endangered