



### 3.5.1 Coastal Foothills Spotted Gum – Ironbark Forest (Dry Sclerophyll Forest)

Occurs as an open forest on the knoll at the southern portion of the subject site. The overall community shows significant past disturbance and subsequent weed infestation.

The community is dominated by *Corymbia maculata* and *Eucalyptus siderophloia* with some *Eucalyptus acmenoides* scattered throughout. The mid stratum has a high abundance of *Lantana camara* and to a lesser extent, *Bursaria spinosa* and *Acacia maidenii*. The shrub layer is dominated by *Daviesia ulicifolia* and the ground cover is grassy with *Themeda australis*, *Dichelachne micrantha*, *Entolasia stricta*, *Echinopogon caespitosus* and *Aristida vagans* common.

This community is not dependent on the wetland and associated hydrology. Coastal Foothills Spotted Gum – Ironbark Forest is not listed as a Threatened Ecological Community.

### 3.5.2 Paperbark Swamp Forest (Swamp Sclerophyll Forest)

The Paperbark community on the subject site are restricted to more elevated ground and areas bordering the freshwater wetland complex. The Paperbark community at the centre of the reserve is the most mature, and has a scattered *Casuarina glauca* canopy over dense *Melaleuca* sub-canopy. Flora quadrat 3 is located in the northern portion, adjacent to the Water Couch-Triglochin Swamp Meadow community and flora quadrat 4 is located centrally in the core forested area.

The species composition within Q3 is typically dominated by the canopy species *Melaleuca linariifolia* and *M. styphelioides*. One juvenile *Ficus macrophylla* is also located in the quadrat. The vine *Parsonsia straminea* is found within the quadrat, however, it is more common in mature vegetation. Some *Melaleuca ericifolia* is present within the quadrat indicating frequent inundation; however, this species is more common in permanent swamp areas at the ecotone between the Paperbark community and the freshwater wetlands. The mid stratum is sparse or absent. The ground cover within the quadrat comprises *Bolboschoenus caldwellii*, *Eleocharis acuta*, *Paspalum distichum*, *Persicaria hydropiper* and *Juncus usitatus*.

Within Q4, floristic structure is similar to Q3; however, with the more permanent inundation, several other species are also present. These include *Enydra fluctuans*, *Juncus pallidus*,



*Ludwigia peploides* subsp. *montevidensis*; *Typha orientalis* and *Casuarina glauca*. Two epiphytic orchid species, *Dendrobium linguiforme* (Tongue Orchid) and *D. teretifolium* (Rat's Tail Orchid), occur on several *Casuarina glauca* trees. The weed Water Hyacinth is present in low and scattered numbers in this community.

The Paperbark Swamp Forest and Paperbark Woodland forms part of the NSW TSC Act-listed *Swamp Sclerophyll Forest on Coastal Floodplains EEC*.

### 3.5.3 Freshwater Wetland Complex (Freshwater Wetland)

The Freshwater Wetland Complex occurs in deeper depressions having a permanent or periodical inundation of fresh water, such that the species composition is comprised of water tolerant species. At the subject site the Freshwater Wetland Complex consists of three variations: Typha Reedland; Rushland Swamp/Open Water; and Water Couch-Triglochin Swamp Meadow.

Specifically, these mapped freshwater wetland variations range from open water bodies, with tall reeds and sedges, to a mixed reedland, rushland or swamp meadow integrating with the Paperbark Swamp Forest community. The integration is likely to be a dynamic and moving boundary, at the present time directed by seasonal and climatic conditions.

The Freshwater Wetland Complex forms part of the NSW TSC Act-listed *Freshwater Wetlands on Coastal Floodplains EEC*.

#### 3.5.3.1 Typha Reedland

The Typha Reedland dominates deeper permanently inundated areas within the reserve. The Typha Reedland generally borders the lagoon areas. The extent of Typha relates to the seasons and water levels. Q2 is located within this community variant. The dominant species are *Typha orientalis* (Broadleaf Cumbungi), *Schoenoplectus validus*, *Paspalum distichum* (Water Couch) *Eleocharis equisetina* and *Bolboschoenus caldwellii*.

#### 3.5.3.2 Rushland Swamp/Open Water

The Rushland Swamp is located in shallow semi-permanent and permanent water bodies. Transect T1 is located in this community in the South Swamp and the species diversity within this community is relatively low. The water level varies from deeper water to boggy substrate



in the survey transect. The community is dominated by *Bolboschoenus caldwellii*, *Eleocharis acuta* and *Paspalum distichum*. *Ludwigia peploides* subsp. *montevidensis*, *Spirodela punctata* and *Triglochin procera*.

The open water areas occupy large portions of the Main Swamp and the North Swamp. This community is very variable due to seasonal and local climatic conditions and is related to the extent of the Typha Reedland and Rushland Swamp. The results of the 2012 surveys were not significantly different to the 2010 surveys and the water depths are only slightly shallower.

### 3.5.3.3 Water Couch-Triglochin Swamp Meadow

The Water Couch-Triglochin Swamp Meadow is found at the northern end of the Main Swamp. The presence of old fence lines indicates the previous land use of the site for grazing purposes. The composition and structure of flora are indicative of some disturbance. This community is dominated by *Paspalum distichum*, *Triglochin* sp. and *Persicaria* sp. The Swamp Meadow is also fringed on the deeper inundations by Typha Reedland.

### 3.5.4 Altered Vegetation - Swamp Oak Forest (planted)

Two isolated sections of the subject site contain *Casuarina glauca* stands that have been physically planted. These communities are not natural and their composition does not adequately represent a natural community. *Casuarina glauca* is also found naturally throughout the Paperbark Swamp Forest.

### 3.5.5 Altered Vegetation - Disturbed/Kikuyu Grassland

The Kikuyu dominated grasslands and disturbed areas have a monoculture of Kikuyu or a weed dominated composition. Kikuyu Grass dominates large areas adjacent the south swamp and Coastal foothills Spotted Gum – Ironbark Forest community and north from the main swamp. These Kikuyu areas also contain significant Blackberry clumps which have been recently treated.

The rail line between the South Swamp and Main Swamp is infested by weeds; however, this is mainly restricted to the elevated area and is not impacting upon the swamp areas.



### 3.5.6 Endangered Ecological Communities

The vegetation mapping encompasses two Endangered Ecological Communities; *Freshwater Wetlands on Coastal Floodplains EEC*; and, *Swamp Sclerophyll Forest on Coastal Floodplains EEC*. The EEC areas are delineated previously in Figure 12. The EEC's occupy the majority of the reserve.

#### 3.5.6.1 Freshwater Wetlands

Freshwater Wetlands are associated with coastal areas subject to periodic flooding and in which standing fresh water persists for at least part of the year in most years. Soils are typically silts, muds or humic loams in low-lying parts of floodplains, alluvial flats, depressions, drainage lines, backswamps, lagoons and lakes but may also occur in backbarrier landforms where floodplains adjoin coastal sandplains (DEC 2005).

The species composition of freshwater wetlands at the subject site is indicative of the EEC as they are dominated by herbaceous plants and have few woody species. The vegetation composition (grassland, open water or sedgeland vegetation) is known to vary both spatially and temporally depending on the water regime.

Hexham Swamp and Pambalong Nature Reserve are recognised as important reserves for freshwater wetlands.

#### 3.5.6.2 Swamp Sclerophyll Forests

The Paperbark Swamp Forest is recognised as a Swamp Sclerophyll Forest EEC. The community is dominated by *Melaleuca linariifolia*, *M. ericifolia* and *M. styphelioides* (paperbarks) and scattered *Casuarina glauca*. This is indicative of a sclerophyllous community; however, it does lack a tree layer of eucalypts. The subject site was inundated at the time of surveying; however, previous reports indicate these areas become dry land during extended dry periods.

The groundcover was indicative of the EEC and is composed of abundant sedges, ferns, forbs, and grasses.



Within the Lower Hunter district, this community includes 'Swamp Mahogany-Paperbark Swamp Forest' (map unit 37), Riparian Melaleuca Swamp Woodland (map unit 42) and Melaleuca Scrub (map unit 42a) of NPWS (2000).

### 3.6 FAUNAL DIVERSITY

A total of 120 fauna species were recorded by Kleinfelder on the subject site in 2012/13 compared with 104 fauna species in 2011/12, 97 fauna species in 2010, 99 fauna species in 2009 and 107 fauna species in 2008 (Appendix 2).

Species recorded in 2012/13 comprised one fish, four frogs, four terrestrial mammals, one arboreal mammal, six reptile, 12 bat and 91 bird species. Of these, six species are listed as significant (Vulnerable) under the NSW TSC Act (Table 5).

Latham's Snipe (*Gallinago hardwickii*) which was recorded by Kleinfelder in 2009 and 2011/12 was also recorded during surveys in 2012/13. The annual Latham's Snipe count undertaken in the Reserve each December by the HBOC in 2012 detected 50 Latham's Snipes within Pambalong Nature Reserve.

**Table 5: Threatened fauna species recorded on the subject site.**

Scientific Name	Common Name	Legal status	Survey Method
<i>Falsistrellus tasmaniensis</i>	Eastern False Pipistrelle	V – TSC Act	Anabat recording (possible)
<i>Miniopterus australis</i>	Little Bentwing-bat	V – TSC Act	Anabat recording (confident)
<i>Miniopterus schreibersii oceanensis</i>	Eastern Bentwing-bat	V – TSC Act	Anabat recording (confident)
<i>Mormopterus norfolkensis</i>	Eastern Freetail-bat	V – TSC Act	Anabat recording (possible)
<i>Myotis macropus</i>	Large-footed Myotis	V – TSC Act	Anabat recording (possible)
<i>Vespadelus troughtoni</i>	Eastern Cave Bat	V – TSC Act	Anabat recording (possible)

NB: taxonomy for bats follows Churchill (2008)  
 V = vulnerable

Figure 13 provides a graph comparing total faunal diversity (excluding birds) and diversity per class (Fish, Amphibians, Reptiles, Mammals) in each survey year. The graph shows that both total diversity and diversity within classes across the years has remained relatively stable/slightly increased, with the exception of 2009 where total diversity was considerably lower (no reptile and fewer mammal species recorded).



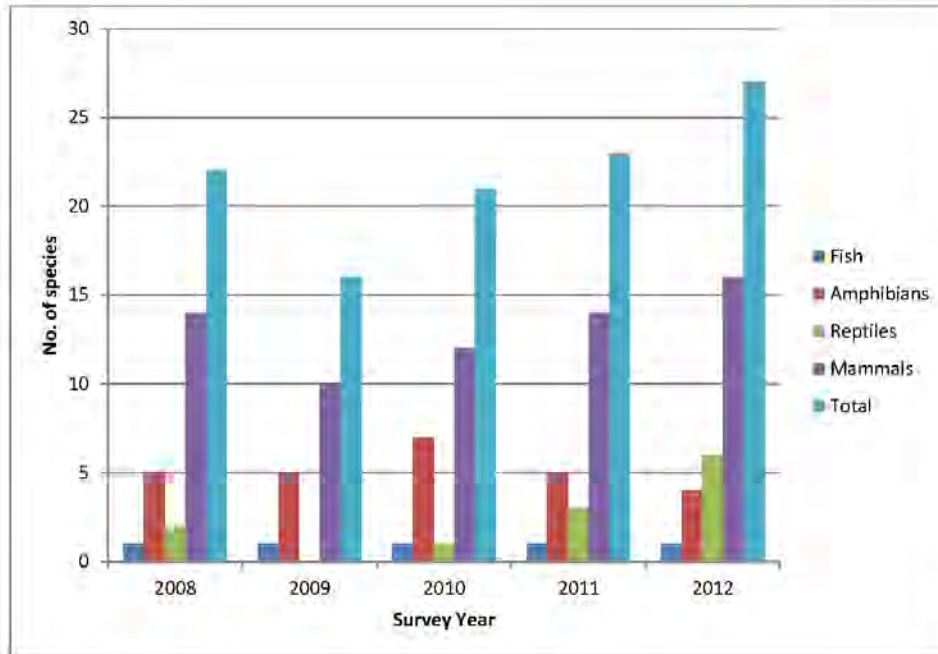


Figure 13: Faunal diversity (excluding birds) per survey year

Scats from a Wallaby species (*Macropus sp.*) and a Brushtail Possum (*Trichosurus vulpecula*), which have not been previously recorded at Pambalong, were found during spotlighting surveys. A Lesser Long-eared Bat (*Nyctophilus geoffroyi*) was captured in a harp trap and a Large-footed Myotis (*Myotis macropus*), both of which were also detected for the first time at Pambalong. The White-striped Mastiff-bat (*Tadarida australis*) was recorded for the second time since White's survey in 2000 using Anabat detection. This brings the total number of bat species recorded in the nature reserve to 19 which is considered a high diversity for the local area.

Sugar Gliders (*Petaurus breviceps*) previously recorded by White (2000) have not been recorded on site by any survey to date. Introduced competitors such as the House Mouse and Black Rat and predators such as the Red Fox, Feral Cat and Dog have the potential to reduce or wipe out native mammal populations. Of these feral species, all were recorded during the 2012 surveys, except the house mouse and feral cat. Future surveys will assist in confirming the ongoing presence or absence and abundance of these native species at the site.





Figure 14 shows changes in bird diversity at each of the five survey locations across the five year survey period. A total of 91 bird species were recorded on site in 2012/13, compared with 81 species in 2011/12, 75 species in 2010/11, 83 species in 2009/10 and 84 species in 2008/09. Ten new species not previously recorded by Kleinfelder were recorded during the 2012 surveys including the Black-winged Stilt, Comb-crested Jacana, Domestic Duck, Glossy Ibis, Great Egret, Little Egret, Southern Emu Wren, Striated Thornbill, White-eared Honeyeater and White-winged Triller.

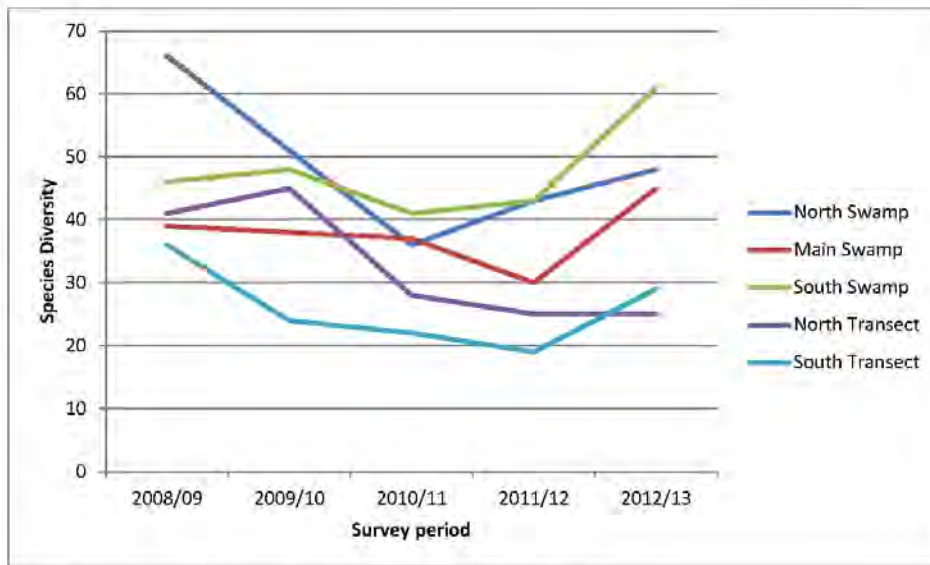


Figure 14: Bird diversity at survey sites per survey year

The Hunter Bird Observers Club was approached for their records in 2012. Fifty Latham's Snipe were recorded in 2012 while one Latham's Snipe was recorded on 20/1/11. Eight White-breasted Woodswallows were recorded on 28/1/11. Both of these species have previously been recorded in the reserve.

Total bird diversity has risen or remained stable across all sites. The north transect was the only site which did not experience a considerable increase in bird diversity. The south and north swamp locations have had at least a further 15 species detected from the previous survey. Two out of five sites have returned to levels recorded in 2008/09 but three still remained lower than the numbers initially detected in the baseline survey. Increased numbers in bird diversity across sites may be attributed to higher number of woodland birds being detected as vegetation around the survey points becomes more mature/thicker.



While total bird species diversity was similar between survey events, species composition was found to be quite variable between seasons and year-to-year. Surveys conducted in Spring almost always detect more species than those conducted in Autumn.

Waterbird counts have significantly increased with the greatest number of individual birds ever recorded at the site occurring in autumn 2013. Large numbers of Straw-necked Ibis and Cattle Egrets dominated the water body though considerable numbers of other water birds were also observed.

Factors likely to affect bird species detection between years include seasonality issues (e.g. arrival times of migratory species), flowering times of foraging resources for nectarivorous species, climatic conditions and individual species ecology (e.g. some species have a large home range and may be absent from the study area during surveys or have cryptic traits which make them more difficult to detect).

Photographs of each water body surveyed for birds and amphibians are provided in Appendix 3. Photographs from both the October 2011 and March 2012 survey period are provided to enable a visual comparison of the variability of water levels, areas of open water and aquatic vegetation occurring at each of the three water bodies.

### 3.7 NATURAL VARIATIONS DURING SURVEYS

It is acknowledged that water levels within Pambalong Nature Reserve fluctuate in response to local weather conditions. Local environmental conditions are also likely to affect the distribution and abundance of flora and fauna species within the swamp (predominantly amphibians and water birds).

It is also acknowledged that collection of bird species presence and abundance in only two seasons does not fully account for the total diversity likely to occur within the wetland. To address this, Kleinfelder incorporate any available records from the Birds Australia Atlas, Hunter Bird Observers Club and any other reputable sightings in addition to its own in each annual report.





## 4. CONCLUSIONS AND RECOMMENDATIONS

Monitoring of the Pambalong Nature Reserve has been undertaken in 2012/13 in accordance with the Flora and Fauna Management Plan for Abel Underground Coalmine (ecobiological 2007). This fifth annual monitoring report continues the data collection that will build a picture of what constitutes normal variation so that any impacts from subsidence can be identified and appropriate management actions can then be taken.

In all there were 101 flora (within the flora survey quadrats and transect) and 120 fauna species comprising one fish, four frog, 18 mammal (12 bat), 6 reptile, and 91 bird species recorded by Kleinfelder within Pambalong Nature Reserve during the 2012 survey period. The following threatened species were recorded during field surveys:

- Eastern False Pipistrelle (*Falsistrellus tasmaniensis*)
- Little Bentwing-bat (*Miniopterus australis*)
- Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis*)
- Eastern Freetail-bat (*Mormopterus norfolkensis*)
- Large-footed Myotis (*Myotis macropus*)
- Eastern Cave Bat (*Vespadelus troughtoni*)

The 2012 survey recorded 6 new flora species (4 native and 2 exotic). Flora species richness has remained relatively constant between the monitoring events in quadrats 1, 2 and 4 and the 50m transect, with a steady increase occurring at Q3. No significant changes to the vegetation community extent were recorded in the 2012 surveys.

Weed management has been conducted by OEH in the 2011/12 financial year aimed predominantly at restricting the spread of Water Hyacinth and Alligator Weed. It appears that the impact of spraying has been minimal.

Kikuyu grass continues to cover significant areas and any treatment over these areas would require follow up regeneration and rehabilitation of the preferred community type and



species. All other significant weed species identified in Pambalong Nature Reserve should continue to be monitored and managed if necessary.

The following recommendations are made to improve the reliability and robustness of future survey data (i.e. build a more reliable picture of what constitutes normal variation in the system) and to mitigate negative impacts on native flora and fauna:

- The installation of permanent water depth indicators in the Main and South Swamps would be useful to provide a quantitative water level during each survey event. Permission for installation should be sought from OEH and coordinated between involved parties.
- Ongoing control of noxious weeds is required (OEH responsibility).

Ongoing annual monitoring will be undertaken over the same time period each year describing the results of the current year's investigation and placing them in the context of the cumulative data. Additional data collected over the period of initial monitoring will be recorded for ongoing analytical purposes. At an appropriate time, statistical analysis will be applied to investigate whether any significant trends are developing. The future implications of any evident trends should be used to inform best practice measures to be incorporated into the Subsidence Management Plan (SMP).



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## APPENDIX 1: FLORA SPECIES

Family	Scientific Name	Common Name	Q1	Q2	Q3	Q4	T1
Acanthaceae	<i>Brunoniella australis</i>	Blue Trumpet	1				
Adiantaceae	<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>	Mulga Fern	1				
Alismataceae	<i>Alisma plantago-aquatica</i>	Water Plantain					
Amaranthaceae	<i>Alternanthera denticulata</i>	Lesser Joyweed					
Amaranthaceae	* <i>Alternanthera philoxeroides</i>	Alligator Weed				3	
Anthericaceae	<i>Arthropodium milleflorum</i>	Pale Vanilla-lily	1				
Apiaceae	* <i>Foeniculum vulgare</i>	Fennel					
Apiaceae	* <i>Hydrocotyle bonariensis</i>	Pennywort					
Apiaceae	<i>Centella asiatica</i>	Indian Pennywort		1			
Apocynaceae	* <i>Araujia sericifera</i>	Moth Vine					
Apocynaceae	* <i>Gomphocarpus fruticosus</i>	Wild Cotton					
Apocynaceae	<i>Parsonia straminea</i>	Monkey Rope			2		
Asparagaceae	* <i>Protasparagus aethiopicus</i>	Fern Asparagus					
Asteraceae	* <i>Ageratina adenophora</i>	Crofton Weed					
Asteraceae	* <i>Ambrosia tenuifolia</i>	Lacy Ragweed					1
Asteraceae	* <i>Aster subulatus</i>	Wild Aster					
Asteraceae	* <i>Bidens pilosa</i>	Cobblers peg	1				
Asteraceae	* <i>Cirsium vulgare</i>	Black Thistle					
Asteraceae	* <i>Conyza canadensis</i> var. <i>canadensis</i>	Canadian Fleabane					
Asteraceae	* <i>Conyza</i> sp.	Fleabane	1				
Asteraceae	* <i>Conyza sumatrensis</i>	Tall Fleabane					
Asteraceae	* <i>Cnassocephalum crepidioides</i>	Thickhead					
Asteraceae	* <i>Euchiton</i> sp.	Cudweed					
Asteraceae	* <i>Hypochaeris radicata</i>	Catsear	1				
Asteraceae	* <i>Senecio madagascariensis</i>	Fireweed	1		1		
Asteraceae	* <i>Sonchus oleraceus</i>	Milk Thistle		1			
Asteraceae	* <i>Tagetes minuta</i>	Stinking Roger					
Asteraceae	<i>Brachycome multifida</i> var. <i>dilatata</i>	Cut-leaf daisy	1				
Asteraceae	<i>Cotula coronopifolia</i>	Water Buttons					
Asteraceae	<i>Enydra fluctuans</i>						
Asteraceae	<i>Euchiton involucreatus</i>	Star Cudweed					
Asteraceae	* <i>Hypochaeris radicata</i>	Catsear					1
Asteraceae	<i>Ozothamnus diosmifolius</i>	White dogwood					
Asteraceae	<i>Senecio pterophorus</i>						



Family	Scientific Name	Common Name	Q1	Q2	Q3	Q4	T1
Asteraceae	<i>Sigesbeckia orientalis</i> subsp. <i>orientalis</i>	Indian Weed			4		
Asteraceae	<i>Vernonia cinerea</i> var. <i>cinerea</i>		1				
Asteraceae	<i>Vittadinia cuneata</i> var. <i>cuneata</i>	Fuzzweed	1				
Azollaceae	<i>Azolla filiculoides</i>	Pacific Azolla				6	1
Bignoniaceae	<i>Pandorea pandorana</i> subsp. <i>pandorana</i>	Wonga Wonga Vine	2				
Campanulaceae	<i>Wahlenbergia gracilis</i>	Native Bluebell					
Caryophyllaceae	* <i>Stellaria media</i>	Chickweed					
Casuarinaceae	<i>Casuarina glauca</i>	Swamp Oak		1		3	
Celastraceae	<i>Maytenus silvestris</i>	Orange Bark	1				
Ceratophyllaceae	<i>Ceratophyllum demersum</i>	Hornwort					1
Chenopodiaceae	<i>Einadia hastata</i>	Berry Saltbush					
Commelinaceae	* <i>Tradescantia albiflora</i>	Wandering Jew					
Commelinaceae	<i>Commelina cyanea</i>	Scurvy Weed	1				
Convolvulaceae	* <i>Ipomoea purpurea</i>	Common Morning Glory					
Convolvulaceae	<i>Dichondra repens</i>	Kidney weed	2				
Cyperaceae	* <i>Cyperus difformis</i>						
Cyperaceae	<i>Bolboschoenus caldwellii</i>			3	3	1	
Cyperaceae	<i>Cyperus gracilis</i>	Slender Flat-sedge	1				
Cyperaceae	<i>Cyperus inversa</i>						
Cyperaceae	<i>Cyperus odoratus</i>						1
Cyperaceae	<i>Eleocharis acuta</i>	Tall Spike-rush					
Cyperaceae	<i>Eleocharis equisetina</i>			3	2		1
Cyperaceae	<i>Eleocharis sphacelata</i>	Tall Spike-rush					1
Cyperaceae	<i>Fimbristylis dichotoma</i>	Common Fringe-sedge					
Cyperaceae	<i>Schoenoplectus subulatus</i>						
Cyperaceae	<i>Schoenoplectus validus</i>			3			2
Euphorbiaceae	* <i>Ricinus communis</i>	Castor Oil Plant					
Fabaceae - Caesalpinioideae	* <i>Senna pendula</i> subsp. <i>glabrata</i>	Cussia					
Fabaceae - Faboideae	* <i>Trifolium dubium</i>	Yellow Suckling Clover					
Fabaceae - Faboideae	* <i>Trifolium fragiferum</i>	Strawberry Clover					
Fabaceae - Faboideae	* <i>Trifolium repens</i>	White Clover					
Fabaceae - Faboideae	* <i>Vicia sativa</i>	Common Vetch					
Fabaceae - Faboideae	* <i>Vicia sativa</i>	Common Vetch					
Fabaceae - Faboideae	<i>Daviesia ulicifolia</i>	Gorse Bitter Pea	2				



Family	Scientific Name	Common Name	Q1	Q2	Q3	Q4	T1
Fabaceae - Faboideae	<i>Desmodium gunnii</i>	Slender Tick-trefoil					
Fabaceae - Faboideae	<i>Desmodium rhytidophyllum</i>	Tick-trefoil	1				
Fabaceae - Faboideae	<i>Desmodium varians</i>	Slender Tick-trefoil					
Fabaceae - Faboideae	<i>Glycine clandestina</i>	Twining Glycine					
Fabaceae - Faboideae	<i>Glycine tabacina</i>		1				
Fabaceae - Faboideae	<i>Hardenbergia violacea</i>	Purple Twining Pea	1				
Fabaceae - Faboideae	<i>Kennedia rubicunda</i>	Red Kennedy Pea					
Fabaceae - Faboideae	<i>Kennedia rubicunda</i>	Red Kennedy Pea					
Fabaceae - Faboideae	* <i>Vicia sativa</i>			1			
Fabaceae - Mimosoideae	<i>Acacia falcata</i>	Sickle Wattle					
Fabaceae - Mimosoideae	<i>Acacia fimbriata</i>						
Fabaceae - Mimosoideae	<i>Acacia implexa</i>	Hickory					
Fabaceae - Mimosoideae	<i>Acacia irrorata subsp irrorata</i>						
Fabaceae - Mimosoideae	<i>Acacia maidenii</i>	Maidens Wattle	2				
Gentianaceae	* <i>Centaurium erythraea</i>	Common Centaury					
Goodeniaceae	<i>Goodenia heterophylla</i>		2				
Haloragaceae	<i>Myriophyllum variifolium</i>						1
Iridaceae	* <i>Anomatheca laxa</i>		1				
Juncaceae	<i>Juncus continuus</i>				2		
Juncaceae	<i>Juncus pallidus</i>	Pale Rush					
Juncaceae	<i>Juncus usitatus</i>	Common Juncus	1	1			
Juncaginaceae	<i>Triglochin procerum</i>			2	1	1	
Juncaginaceae	<i>Triglochin striatum</i>	Streaked Arrowgrass					
Lamiaceae	<i>Plectranthus parviflorus</i>	Cocksbur Flower	1				
Lemnaceae	<i>Lemna disperma</i>					3	
Lemnaceae	<i>Spirodela punctata</i>	Duck Weed				4	1
Lobeliaceae	<i>Pratia purpurascens</i>	White root	1				
Lomandraceae	<i>Lomandra glauca</i>	Pale Mat-rush	1				
Lomandraceae	<i>Lomandra multiflora subsp. multiflora</i>	Iron Grass	2				
Loranthaceae	<i>Dendrophthoe vitellina</i>	Mistletoe	1				
Luzuriagaceae	<i>Eustrephus latifolius</i>	Wombat Berry	1				





Family	Scientific Name	Common Name	Q1	Q2	Q3	Q4	T1
Luzuriagaceae	<i>Geitonoplesium cymosum</i>	Scrambling Lily	1				
Malvaceae	* <i>Sida rhombifolia</i>	Paddy's Lucerne	1				
Menispermaceae	<i>Stephania japonica</i> var. <i>discolor</i>	Snake Vine	1				
Moraceae	<i>Ficus macrophylla</i>	Moreton Bay Fig			1		
Myoporaceae	<i>Eremophila debilis</i>	Winter Apple	1				
Myrsinaceae	<i>Myrsine variabilis</i>		2				
Myrtaceae	<i>Corymbia maculata</i>	Spotted Gum	3				
Myrtaceae	<i>Eucalyptus acmenoides</i>	White mahogany	2				
Myrtaceae	<i>Eucalyptus siderophloia</i>	Grey Ironbark	4				
Myrtaceae	<i>Eucalyptus tereticornis</i>	Forest Redgum					
Myrtaceae	<i>Melaleuca ericifolia</i>				3	4	
Myrtaceae	<i>Melaleuca linariifolia</i>	Flax-leaved Paperbark		1	5	4	
Myrtaceae	<i>Melaleuca styphelioides</i>				4		
Oleaceae	<i>Nolelaea longifolia</i>	Mock olive	1				
Onagraceae	* <i>Oenothera stricta</i>	Evening Primrose					
Onagraceae	<i>Epilobium billardierianum</i> subsp. <i>billardierianum</i>						
Onagraceae	<i>Ludwigia peploides</i> subsp. <i>montevicensis</i>	Water Primrose		2		2	1
Orchidaceae	<i>Dendrobium linguiforme</i>	Tongue Orchid				1	
Orchidaceae	<i>Dendrobium teretifolium</i>	Rat's Tail Orchid					
Oxalidaceae	<i>Oxalis perennans</i>		1				
Passifloraceae	* <i>Passiflora edulis</i>	Common Passionfruit	1				
Phormiaceae	<i>Dianella caerulea</i>	Blue Flax-lily	1				
Phormiaceae	<i>Dianella revoluta</i> var. <i>revoluta</i>	Blueberry Lily					
Phyllanthaceae	<i>Breynia oblongifolia</i>	Coffee Bush	1				
Phyllanthaceae	<i>Phyllanthus hirtellus</i>	Thyme Spurge					
Pittosporaceae	<i>Bursaria spinosa</i>	Box Thorn	2				
Plantaginaceae	* <i>Plantago lanceolata</i>	Lambs Tongue	1	2			
Poaceae	* <i>Andropogon virginicus</i>	Whisky Grass					
Poaceae	* <i>Axonopus fissifolius</i>	Narrow-leaved Carpet Grass					
Poaceae	* <i>Briza maxima</i>	Quaking Grass					
Poaceae	* <i>Bromus catharticus</i>	Prairie Grass					
Poaceae	* <i>Chloris gayana</i>	Rhodes Grass					
Poaceae	* <i>Cortaderia selkiana</i>	Pampas Grass					
Poaceae	<i>Digitaria parviflora</i>	Small-flowered Finger Grass	1				
Poaceae	* <i>Ehrharta erecta</i>	Panic Veldtgrass	1				
Poaceae	* <i>Eragrostis curvula</i>	African					



Family	Scientific Name	Common Name	Q1	Q2	Q3	Q4	T1
		Lovegrass					
Poaceae	<i>*Hyparrhenia hirta</i>	Coolatai Grass					
Poaceae	<i>*Lolium perenne</i>	Perennial Ryegrass					
Poaceae	<i>*Melinis repens</i>	Red Natal Grass					
Poaceae	<i>*Panicum maximum</i>	Guinea Grass					
Poaceae	<i>*Paspalum dilatatum</i>	Paspalum	1				
Poaceae	<i>*Paspalum uroillei</i>	Tall Paspalum					
Poaceae	<i>Paspalidium distans</i>		1				
Poaceae	<i>*Pennisetum clandestinum</i>	Kikuyu		2			
Poaceae	<i>*Polypogon monspeliensis</i>	Annual Beardgrass					
Poaceae	<i>*Setaria pumila</i>	Pale Pigeon Grass					
Poaceae	<i>*Setaria sphaecelata</i>	South African Pigeon Grass					
Poaceae	<i>*Setaria verticillata</i>	Whorled Pigeon Grass					
Poaceae	<i>*Sporobolus africanus</i>	Parramatta Grass					
Poaceae	<i>Aristida ramosa</i>	Three-awned Spear Grass	1				
Poaceae	<i>Aristida vagans</i>	Three-awned Spear Grass	1				
Poaceae	<i>Austrostipa</i> sp.						
Poaceae	<i>Capillipedium parviflorum</i>	Scented-top Grass					
Poaceae	<i>Cymbopogon refractus</i>	Barbed Wire Grass	1				
Poaceae	<i>Cynodon dactylon</i>	Couch		3	3		
Poaceae	<i>Dichelachne micrantha</i>	Shorthair Plumegrass	2				
Poaceae	<i>Digitaria ramularis</i>						
Poaceae	<i>Echinopogon caespitosus</i>	Tufted Hedghog Grass	1				
Poaceae	<i>Entolasia stricta</i>	Wiry panic	4				
Poaceae	<i>Impentia cylindrica</i>	Bladey grass	1				
Poaceae	<i>Lachnagrostis filiformis</i>		2		1		
Poaceae	<i>Microlaena stipoides</i> var. <i>stipoides</i>	Weeping Grass	1				
Poaceae	<i>Optismenus aemulus</i>	Basket Grass	1				
Poaceae	<i>Panicum simile</i>	Two Colour Panic	1				
Poaceae	<i>Paspalum distichum</i>	Water Couch		3			
Poaceae	<i>Themeda australis</i>	Kangaroo grass	3				
Poaceae	<i>Austrodanthonia tenuior</i>	Wallaby Grass					
Polygonaceae	<i>*Polygonum arenastrum</i>	Wireweed					





Family	Scientific Name	Common Name	Q1	Q2	Q3	Q4	T1
Polygonaceae	* <i>Rumex conglomeratus</i>	Clustered Dock		1	2		
Polygonaceae	* <i>Rumex crispus</i>	Dock			2		
Polygonaceae	<i>Persicaria decipiens</i>	Slender Knotweed			2		
Polygonaceae	<i>Persicaria hydropiper</i>	Water Pepper					
Pontederiaceae	* <i>Eichhornia crassipes</i>	Water Hyacinth				1	
Ranunculaceae	* <i>Ranunculus repens</i>	Creeping Buttercup					
Ranunculaceae	<i>Clematis glycinoides</i>	Old Mans Beard					
Ranunculaceae	<i>Ranunculus inundatus</i>	River Buttercup		2			
Rhamnaceae	<i>Alphitonia excelsa</i>	Red Ash	1				
Rosaceae	* <i>Rubus fruticosus</i> sp.agg	Blackberry					1
Rubiaceae	<i>Opercularia diphylla</i>		1				
Scrophulariaceae	<i>Bacopa monnieri</i>	Bacopa					
Solanaceae	* <i>Solanum mauritianum</i>	Wild Tobacco					
Solanaceae	* <i>Solanum nigrum</i>	Blackberry Nightshade					
Solanaceae	<i>Solanum brownii</i>	Violet Nightshade	1				
Solanaceae	<i>Solanum prinophyllum</i>	Forest Nightshade					
Typhaceae	<i>Typha orientalis</i>	Broadleaf Cumbungi		5	2		1
Verbenaceae	* <i>Lantana camara</i>	Lantana	3				
Verbenaceae	* <i>Verbena bonariensis</i>	Purpletop					
Violaceae	<i>Viola hederacea</i>	Ivy-leaved Violet					
Vitaceae	<i>Cayratia clematidea</i>	Native Grape					

\* denotes an introduced species.





## APPENDIX 2: FAUNA SPECIES RECORDED ON THE SUBJECT SITE

Table 1: Fauna species (excluding birds) recorded from trapping and nocturnal survey activities by Kleinfelder in baseline study (2008), 2009, 2010, 2011, 2012 and White (2000).

Scientific Name	Common Name	Method	2008	2009	2010	2011	2012	White (2000)	
<b>Fish</b>									
<i>Gambusia holbrooki</i>	Plague Minnow	Tadpole search	+	+	+	+	+	+	
			1	1	1	1	1	1	
<b>Amphibians</b>									
<i>Cornia signifera</i>	Common Eastern Froglet	Nocturnal amphibian survey	+		+	+	+		
<i>Limnodynastes peronii</i>	Striped Marsh Frog	Nocturnal amphibian survey	+	+	+	+	+		
<i>Litoria fallax</i>	Eastern Dwarf Tree Frog	Nocturnal amphibian survey	+	+	+	+	+		
<i>Litoria freycineti</i>	Freycinet's Frog	Nocturnal and diurnal survey						+	
<i>Litoria latopalmata</i>	Broad-palmed Frog	Nocturnal and diurnal survey			+			+	
<i>Litoria peronii</i>	Peron's Tree Frog	Nocturnal amphibian survey	+	+	+	+	+		
<i>Litoria tyleri</i>	Southern Laughing Tree Frog	Nocturnal amphibian survey	+	+	+	+	+		
<i>Litoria verreauxi</i>	Verreaux's Tree Frog	Nocturnal amphibian survey		+					
<i>Uperoleia laevisgata</i>	Smooth Toadlet	Nocturnal amphibian survey			+				
			5	5	7	5	4	2	
<b>Reptiles</b>									
<i>Pseudonaja textilis</i>	Eastern Brown Snake	Opportunistic sighting				+	+		
<i>Chelodina longicollis</i>	Eastern Long-necked Turtle	Opportunistic sighting				+		+	
<i>Eidamprus quoqyi</i>	Eastern Water Skink	Diurnal reptile survey						+	
<i>Amphibolurus muricatus</i>	Jacky Lizard	Diurnal reptile survey				+		+	
<i>Ctenotus robustus</i>	Robust Ctenotus	Diurnal reptile survey						+	



Scientific Name	Common Name	Method	2006	2009	2010	2011	2012	White (2000)
<i>Lampropholis delacati</i>	Garden Skink	Diurnal reptile survey					+	+
<i>Tiliqua scincoides</i>	Eastern Blue-tongued Lizard	Diurnal reptile survey					+	
<i>Physosiphilus lesueurii lesueurii</i>	Eastern Water Dragon	Opportunistic sighting	+				+	
<i>Pseudochis porphyriacus</i>	Red-bellied Black Snake	Opportunistic sighting	+		+	+	+	+
			2	0	1	3	6	6
<b>Terrestrial/ Scansorial Mammals</b>								
<i>Antechinus stuartii</i>	Brown Antechinus	Trapping	+		+			+
<i>Mus domesticus</i>	*House Mouse	Trapping	+	+				
<i>Petaurus breviceps</i>	Sugar Glider	Spotlighting						+
<i>Rattus fuscipes</i>	Bush Rat	Trapping	+					
<i>Rattus villosus</i>	*Black Rat	Trapping/spotlighting	+	+			+	+
<i>Vulpes vulpes</i>	*Red Fox	Opportunistic sighting				+	+	+
<i>Macropus sp.</i>	Wallaby sp.	Spotlighting					+	
<i>Canis lupus</i>	*Wild Dog	Spotlighting					+	
<i>Trichosurus vulpecula</i>	Brush-tail Possum	Spotlighting					+	
<i>Felis catus</i>	*House Cat	Spotlighting			+			
			4	2	3	2	5	4
<b>Bats</b>								
<i>Pteropus poliocephalus</i>	# Grey-headed Flying-fox	Spotlighting (2008) / dead animal observed in 2009	+	+				+
<i>Tadarida australis</i>	White-striped Mastiff-bat	Anabat analysis				#	+	+
<i>Chalinolobus gouldii</i>	Gould's Wattled Bat	Anabat analysis/trapping	+	+	+	+	+	+
<i>Chalinolobus morio</i>	Chocolate Wattled Bat	Anabat analysis/trapping			+	+		+
<i>Falsistrellus tasmaniensis</i>	# Eastern False Pipistrelle	Anabat analysis		+		+	+	
<i>Miniopterus australis</i>	# Little Bentwing-bat	Anabat analysis	+	+	+	+	+	+

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Scientific Name	Common Name	Method	2008	2009	2010	2011	2012	White (2000)
<i>Miniopterus oceanensis</i>	# Eastern Bentwing-bat	Anabat analysis	+	+			+	
<i>Mormopterus norfolkensis</i>	# East-coast Freetail-bat	Anabat analysis	+	+			+	
<i>Mormopterus sp. 2</i>	Eastern Freetail-bat	Anabat analysis	+			+	+	
<i>Nyctophilus sp.</i>	Unidentified Long-eared Bat	Anabat analysis	+		+	+	+	
<i>Nyctophilus gouldii</i>	Gould's Long-eared Bat	Trapping						+
<i>Nyctophilus geoffroyi</i>	Lesser Long-eared Bat	Trapping					+	
<i>Rhinolopus megaphyllus</i>	Eastern Horseshoe-bat	Anabat analysis				+		
<i>Saccolaimus flaviventris</i>	# Yellow-bellied Sheath-tail-bat	Anabat analysis			+			
<i>Scoteanax rizeppellii</i>	# Greater Broad-nosed Bat	Anabat analysis	+					
<i>Scolorepens orion</i>	Eastern Broad-nosed Bat	Anabat analysis			+	+		
<i>Vespardelus pumilus</i>	Eastern Forest Bat	Anabat analysis	+	+	+	+		
<i>Vespardelus troughtoni</i>	# Eastern Cave Bat	Anabat analysis				+	+	
<i>Vespardelus vulturnus</i>	Little Forest Bat	Trapping & Anabat analysis	+	+	+	+	+	+
<i>Myotis macropus</i>	# Large-footed Myotis	Anabat analysis					+	
			14	10	12	14	17	10

\* denotes an introduced species

# denotes a threatened species under the NSW TSC Act 1995

NB: Taxonomy for bats follows Churchill (2008).

Table 2: Bird species recorded along Transects by ecobiological during Spring 2008 compared with Spring 2009, Summer 2010, Spring 2011, Spring 2012.

Family	Scientific Name	Common Name	Spring 2008		Spring 2009		Summer 2010		Spring 2011		Spring 2012	
			North	South	North	South	North	South	North	South	North	South
Sturnidae	<i>Sturnus tristis</i>	*Common Myna			+							
Sturnidae	<i>Sturnus vulgaris</i>	*Common Starling			+							
Orniidae	<i>Sphecotheres veilloti</i>	Australasian Figbird										
Ptilidae	<i>Alisterus scapularis</i>	Australian King-Parrot										
Artamidae	<i>Cracticus tibicen</i>	Australian Magpie	+	+	+	+	+	+	+	+	+	+
Corvidae	<i>Corvus coronoides</i>	Australian Raven	+	+	+	+	+	+	+	+	+	+
Acrocephalidae	<i>Acrocephalus australis</i>	Australian Reed Warbler	+	+	+	+	+	+	+	+	+	+
Columbidae	<i>Geopelia humeralis</i>	Bar-shouldered Dove										
Meliphagidae	<i>Manorina melanophrys</i>	Bell Miner										
Campephagidae	<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike	+	+	+	+	+	+	+	+	+	+
Monarchidae	<i>Monarcha melanogalis</i>	Black-faced Monarch										
Acanthidae	<i>Gerygone mouki</i>	Brown Gerygone	+	+	+	+	+	+	+	+	+	+
Acanthidae	<i>Acanthiza pusilla</i>	Brown Thornbill	+	+	+	+	+	+	+	+	+	+
Meliphagidae	<i>Meliphaga brevirostris</i>	Brown-headed Honeyeater										
Cuculidae	<i>Cacomantis variolosus</i>	Brush Cuckoo	+	+	+	+	+	+	+	+	+	+
Ardeidae	<i>Ardea ibis</i>	Cattle Egret			+	+						
Cuculidae	<i>Scythrops novaehollandiae</i>	Channel-billed Cuckoo										
Campephagidae	<i>Coracina tenuirostris</i>	Cicadabird										
Columbidae	<i>Coccyzus lophotes</i>	Crested Pigeon	+	+	+	+	+	+	+	+	+	+
Corsciidae	<i>Eurystomus orientalis</i>	Dollarbird										
Estriidae	<i>Taeniopygia bichenovii</i>	Double-billed Finch										
Cuculidae	<i>Eudynamis orientalis</i>	Eastern Kool	+	+	+	+	+	+	+	+	+	+
Ptilinidae	<i>Ptilinopus eximius</i>	Eastern Rosella	+	+	+	+	+	+	+	+	+	+
Meliphagidae	<i>Acanthorhynchus tenuirostris</i>	Eastern Spinebill	+	+	+	+	+	+	+	+	+	+
Eupelidae	<i>Psophodes olivaceus</i>	Eastern Whipbird										
Petroicidae	<i>Eopsaltria australis</i>	Eastern Yellow Robin	+	+	+	+	+	+	+	+	+	+
Cuculidae	<i>Cacomantis flabelliformis</i>	Fan-tailed Cuckoo	+	+	+	+	+	+	+	+	+	+
Cacatuidae	<i>Eolophus roseicapillus</i>	Galah	+	+	+	+	+	+	+	+	+	+
Pachycephalidae	<i>Pachycephala pectoralis</i>	Golden Whistler	+	+	+	+	+	+	+	+	+	+
Cisticolidae	<i>Cisticola exilis</i>	Golden-headed Cisticola	+	+	+	+	+	+	+	+	+	+
Artamidae	<i>Cracticus torquatus</i>	Grey Butcherbird	+	+	+	+	+	+	+	+	+	+
Rhipididae	<i>Rhipidura albicarpa</i>	Grey Fantail										
Pachycephalidae	<i>Colluricincla harmonica</i>	Grey Shrike-thrush										
Cuculidae	<i>Chalcides basalis</i>	Horsfield's Bronze-Cuckoo	+	+	+	+	+	+	+	+	+	+
Halcyonidae	<i>Dacelo novaeguineae</i>	Laughing Kookaburra	+	+	+	+	+	+	+	+	+	+
Meliphagidae	<i>Meliphaga lewinii</i>	Lewin's Honeyeater										
Cacatuidae	<i>Cacatua sanguinea</i>	Little Corella										
Megaliidae	<i>Megalururus grammurus</i>	Little Grassbird	+	+	+	+	+	+	+	+	+	+
Monarchidae	<i>Grallina cyanoleuca</i>	Magpie-lark	+	+	+	+	+	+	+	+	+	+
Charadriidae	<i>Vanellus miles</i>	Masked Lapwing										
Nectarinidae	<i>Dicaeum hirundinaceum</i>	Mistlebeebird										
Meliphagidae	<i>Philemon corniculatus</i>	Noisy Friarbird	+	+	+	+	+	+	+	+	+	+





Family	Scientific Name	Common Name	Spring 2008		Spring 2009		Summer 2010		Spring 2011		Spring 2012	
			North	South	North	South	North	South	North	South	North	South
Meliphagidae	<i>Manorina melanoccephala</i>	Noisy Miner		+								
Oriolidae	<i>Oriolus sagittatus</i>	Olive-backed Oriole										+
Acroptilidae	<i>Aviceda subcristata</i>	Pacific Baza										+
Cuculidae	<i>Centropus phasianinus</i>	Pheasant Coucal										+
Artamidae	<i>Cracticus nigrogularis</i>	Pied Butcherbird										+
Artamidae	<i>Strepera graculina</i>	Pied Currawong										+
Rallidae	<i>Porphyrio porphyrio</i>	Purple Swamphen										+
Melopidae	<i>Merops ornatus</i>	Rainbow Bee-eater										+
Pelecanidae	<i>Trichoplossus haemacodius</i>	Rainbow Lorikeet										+
Estrildidae	<i>Necocheilus temporalis</i>	Red-browed Finch										+
Pachycephalidae	<i>Pachycephala rufiventris</i>	Rufous Whistler										+
Halcyonidae	<i>Todiramphus sanctus</i>	Sacred Kingfisher										+
Meliphagidae	<i>Myzomela sanguinolenta</i>	Scarlet Honeyeater										+
Cuculidae	<i>Chalcides lucidus</i>	Shining Bronze-Cuckoo										+
Trogonidae	<i>Zosterops lateralis</i>	Silvereye										+
Pardalipidae	<i>Pardalotus pectoratus</i>	Spotted Pardalote										+
Threskiornithidae	<i>Threskiornis spinicollis</i>	Straw-necked Ibis										+
Pardalipidae	<i>Acanthiza lineata</i>	Striated Thornbill										+
Caculidae	<i>Caculius galerita</i>	Sulphur-crested Cockatoo										+
Maluridae	<i>Malurus cyaneus</i>	Superb Fairy-wren										+
Megaluridae	<i>Megalurus timorensis</i>	Tawny Grassbird										+
Maluridae	<i>Malurus lamberti</i>	Varegated Fairy-wren										+
Accipitridae	<i>Aquila audax</i>	Wedge-tailed Eagle										+
Hirundinidae	<i>Hirundo neoxena</i>	Welcome Swallow										+
Artamidae	<i>Artamus leucorhynchus</i>	White-breasted Woodswallow										+
Acanthizidae	<i>Sericornis frontalis</i>	White-browed Scrubwren										+
Artidae	<i>Egretta novae-hollandiae</i>	White-faced Heron										+
Acanthizidae	<i>Gerygone olivacea</i>	White-throated Gerygone										+
Apodidae	<i>Hirundapus caudacutus</i>	White-throated Needletail										+
Rhipiduridae	<i>Rhipidura leucophrys</i>	Willie Wagtail										+
Columbidae	<i>Leucosarcia picata</i>	Wonga Pigeon										+
Acanthizidae	<i>Acanthiza nana</i>	Yellow Thornbill										+
Meliphagidae	<i>Lichenostomus chrysops</i>	Yellow-faced Honeyeater										+
			41	36	47	25	45	24	38	31	28	22

The list follows the taxonomy of Chiswick & Boles (2008).  
\* = introduced species

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Appendix 3  
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Table 3: Bird species recorded from the North Swamp by ecobiological during Spring 2008 / Autumn 2009 (baseline), Summer 2010 / Autumn 2011, Spring 2011 / Autumn 2012 and Spring 2012/Autumn 2013.

Family	Scientific Name	Common Name	Spring 2008	Autumn 2008	Spring 2009	Autumn 2009	Summer 2010	Autumn 2010	Spring 2011	Autumn 2011	Spring 2012	Autumn 2012	Spring 2013	Autumn 2013
Struriidae	<i>Sturnus tristis</i>	*Common Myra	+											
Struriidae	<i>Sturnus vulgaris</i>	*Common Starling	+		+									
Anatidae	<i>Anas platyrhynchos</i>	*Northern Mallard	+											
Columbidae	<i>Streptopelia chinensis</i>	*Spotted Dove	+						+					
Amniptidae	<i>Auriparus melanoleucus</i>	Australasian Darter	+											
Podicepsidae	<i>Podiceps novaehollandiae</i>	Australasian Grebe	+											+
Anatidae	<i>Anas rhynchotis</i>	Australasian Shoveler	+											
Falconidae	<i>Falco longipennis</i>	Australian Hobby							+					
Artamidae	<i>Cracticus tibicen</i>	Australian Magpie							+					+
Pelecanidae	<i>Pelecanus conspicillatus</i>	Australian Pelican												
Corvidae	<i>Corvus coronoides</i>	Australian Raven	+						+					+
Acrocephalidae	<i>Acrocephalus australis</i>	Australian Reed-Warbler	+											
Threskionthidae	<i>Threskionia meluoca</i>	Australian White Ibis	+						+					
Anatidae	<i>Chenonetta jubata</i>	Australian Wood Duck	+											+
Meliphagidae	<i>Manorina melanophrys</i>	Bell Miner	+											
Anatidae	<i>Cygnus atratus</i>	Black Swan	+						+					+
Campephagidae	<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike	+											
Recurvirostridae	<i>Himantopus himantopus</i>	Black-winged Stilt	+											+
Acanthizidae	<i>Acanthiza pusilla</i>	Brown Thornbill	+											
Cuculidae	<i>Cacornanthis verobolus</i>	Brush Cuckoo	+											
Ardeidae	<i>Ardea alba</i>	Cattle Egret	+						+					+
Cuculidae	<i>Scolopax novaehollandiae</i>	Channel-billed Cuckoo	+											
Anatidae	<i>Anas castanea</i>	Chestnut Teal	+						+					+
Jacaniidae	<i>Irediparra gallinacea</i>	Comb-crested Jacana	+											
Columbidae	<i>Cyphops lophotes</i>	Crested Pigeon	+											
Rallidae	<i>Gallinula tenebrosa</i>	Dusky Moorhen	+											+
Cuculidae	<i>Eudynamis orientalis</i>	Eastern Keel	+											
Ptilinidae	<i>Ptilinopus eximius</i>	Eastern Rosella	+											
Meliphagidae	<i>Acanthorhynchus tenuirostris</i>	Eastern Spinebill	+											
Eupetidae	<i>Psophodes olivaceus</i>	Eastern Whippbird	+						+					+
Petroicidae	<i>Eopsaltria australis</i>	Eastern Yellow Robin	+											
Rallidae	<i>Fulica alba</i>	Eurasian Coot	+						+					+
Cuculidae	<i>Cacornanthis flabelliformis</i>	Fan-tailed Cuckoo	+											
Pachycephalidae	<i>Pachycephala pectoralis</i>	Golden Whistler	+											
Cisticolidae	<i>Cisticola exilis</i>	Golden-headed Cisticola	+											
Ardeidae	<i>Ardea alba</i>	Great Egret	+											
Artamidae	<i>Cracticus torquatus</i>	Grey Butcherbird	+											
Rhipiduridae	<i>Rhipidura albiscapa</i>	Grey Fantail	+						+					+
Anatidae	<i>Anas gracilis</i>	Grey Teal	+											+
Anatidae	<i>Aythya australis</i>	Hardhead	+											
Ardeidae	<i>Ardea intermedia</i>	Intermediate Egret	+											
Halcyonidae	<i>Dacelo novaeguineae</i>	Laughing Kookaburra	+						+					+

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Family	Scientific Name	Common Name	Spring 2008	Autumn 2008	Spring 2009	Autumn 2010	Summer 2010	Autumn 2010	Spring 2011	Autumn 2012	Spring 2012	Autumn 2013
Meliphagidae	<i>Meliphaga lewinii</i>	Lewin's Honeyeater		+					+		+	
Phalacrocoracidae	<i>Phalacrocorax sulcirostris</i>	Little Black Cormorant	+		+	+	+			+		+
Cuculidae	<i>Cacatua sanguinea</i>	Little Corella		+								
Megaluridae	<i>Megalurus grammurus</i>	Little Grassbird		+	+	+			+			+
Phalacrocoracidae	<i>Phalacrocorax melanoleucus</i>	Little Pied Cormorant	+	+	+	+	+		+			+
Monarchidae	<i>Grallina cyanoleuca</i>	Maggie-lark	+	+	+	+	+		+			+
Charadriidae	<i>Vanellus miles</i>	Masked Lapwing	+	+	+	+	+		+			+
Nectarinidae	<i>Dicaeum hirundinaceum</i>	Mistlebeebird										
Meliphagidae	<i>Philemon corniculatus</i>	Noisy Friarbird		+								
Meliphagidae	<i>Manorina melanoccephala</i>	Noisy Miner		+								
Anatidae	<i>Anas superciliosa</i>	Pacific Black Duck	+	+	+	+	+		+			+
Cuculidae	<i>Centropus phasianus</i>	Pheasant Coucal			+							
Artamidae	<i>Cracticus nigropennis</i>	Pied Butcherbird	+	+	+	+	+		+			+
Phalacrocoracidae	<i>Phalacrocorax varius</i>	Pied Cormorant	+	+	+	+	+		+			+
Rallidae	<i>Porphyrio porphyrio</i>	Purple Swamphen	+	+	+	+	+		+			+
Psittacidae	<i>Trichoglossus haematodus</i>	Rainbow Lorikeet	+	+	+	+	+		+			+
Esrididae	<i>Neochma temporalis</i>	Red-browed Finch	+	+	+	+	+		+			+
Threskornithidae	<i>Platalea regia</i>	Royal Spoonbill	+	+	+	+	+		+			+
Pachycephalidae	<i>Pachycephala rufiventris</i>	Rufous Whistler	+	+	+	+	+		+			+
Halcyonidae	<i>Todiramphus sanctus</i>	Secret Kingfisher	+	+	+	+	+		+			+
Meliphagidae	<i>Myzomela sanguinolenta</i>	Scarlet Honeyeater	+	+	+	+	+		+			+
Troglodytidae	<i>Zosterops lateralis</i>	Silvereye	+	+	+	+	+		+			+
Pardalipidae	<i>Pardalotus punctatus</i>	Spotted Pardalote	+	+	+	+	+		+			+
Threskornithidae	<i>Threskornis spinicollis</i>	Straw-necked Ibis	+	+	+	+	+		+			+
Caculidae	<i>Cacatua galerita</i>	Sulphur-crested Cockatoo	+	+	+	+	+		+			+
Maluridae	<i>Malurus cyaneus</i>	Superb Fairy-wren	+	+	+	+	+		+			+
Accipitridae	<i>Circus approximans</i>	Swamp Harrier	+	+	+	+	+		+			+
Maluridae	<i>Malurus lamberti</i>	Vari-gated Fairy-wren	+	+	+	+	+		+			+
Anatidae	<i>Dendrocygna arcuata</i>	Wandering Whistling Duck	+	+	+	+	+		+			+
Accipitridae	<i>Aquila audax</i>	Wedge-tailed Eagle	+	+	+	+	+		+			+
Hirundinidae	<i>Hirundo neoxena</i>	Welcome Swallow	+	+	+	+	+		+			+
Accipitridae	<i>Haliaeetus spheerulus</i>	Whistling Kite	+	+	+	+	+		+			+
Accipitridae	<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	+	+	+	+	+		+			+
Artamidae	<i>Artamus leucorhynchus</i>	White-breasted Woodswallow	+	+	+	+	+		+			+
Acanthizidae	<i>Sericornis frontalis</i>	White-browed Scrubwren	+	+	+	+	+		+			+
Ardeidae	<i>Egretta novaehollandiae</i>	White-faced Heron	+	+	+	+	+		+			+
Ardeidae	<i>Ardea pacifica</i>	White-necked Heron	+	+	+	+	+		+			+
Rhipiduridae	<i>Rhipidura leucophrys</i>	White Westral	+	+	+	+	+		+			+
Columbidae	<i>Leucosarcia picata</i>	Wonga Pigeon	+	+	+	+	+		+			+
Acanthizidae	<i>Acanthiza mana</i>	Yellow Thornbill	+	+	+	+	+		+			+
Threskornithidae	<i>Platalea flavipes</i>	Yellow-billed Spoonbill	+	+	+	+	+		+			+
Meliphagidae	<i>Lichenostomus chrysops</i>	Yellow-faced Honeyeater	+	+	+	+	+		+			+

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Table 4: Bird species recorded from the Main Swamp by ecobiological during Spring 2008 / Autumn 2009 (baseline), Summer 2010 / Autumn 2010, Spring 2011 / Autumn 2011 and Spring 2012/Autumn 2013.

Family	Scientific Name	Common Name	Spring 2008	Autumn 2008	Spring 2009	Autumn 2010	Summer 2010	Autumn 2010	Spring 2011	Autumn 2011	Spring 2012	Autumn 2013
Sturnidae	<i>Sturnus tristis</i>	*Common Wyna							+			
Sturnidae	<i>Sturnus vulgaris</i>	*Common Starling										
Anhinga	<i>Anhinga melanogaster</i>	Australasian Darter									+	
Podicipedidae	<i>Tachybaptus novaehollandiae</i>	Australasian Grebe	+								+	
Ardeidae	<i>Cracticus tibicen</i>	Australian Magpie				+						
Ardeidae	<i>Corvus coronoides</i>	Australian Raven			+							+
Ardeidae	<i>Acrocephalus australis</i>	Australian Reed-Warbler							+			+
Ardeidae	<i>Threskiornis molucca</i>	Australian White Ibis									+	+
Ardeidae	<i>Chenonetta jubata</i>	Australian Wood Duck										+
Meliphagidae	<i>Manorina melanophrys</i>	Black Miner				+						
Anatidae	<i>Cygnus atralis</i>	Black Swan									+	+
Campophagidae	<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike										
Recurvirostridae	<i>Himantopus himantopus</i>	Black-winged Stilt									+	
Ardeidae	<i>Acridothera pusilla</i>	Brown Thornbill										+
Cuculidae	<i>Cacomantis variolosus</i>	Brush Cuckoo										
Ardeidae	<i>Ardea ibis</i>	Cattle Egret								+		+
Cuculidae	<i>Scolopax novaehollandiae</i>	Channel-billed Cuckoo										+
Anatidae	<i>Anas castanea</i>	Chestnut Teal									+	+
Campophagidae	<i>Coracina tenuirostris</i>	Cicadabird										
Coraciidae	<i>Eurystomus orientalis</i>	Dollardbird										+
Rallidae	<i>Gallinula tenebrosa</i>	Dusky Moorhen									+	+
Ardeidae	<i>Ardea modesta</i>	Eastern Great Egret										
Meliphagidae	<i>Acanthorhynchus tenuirostris</i>	Eastern Spinebill										+
Eupetidae	<i>Psophodes olivaceus</i>	Eastern Whipbird										
Petroicidae	<i>Eopsaltria australis</i>	Eastern Yellow Robin										+
Rallidae	<i>Fulica atra</i>	Eurasian Coot									+	+
Hirundinidae	<i>Petrochelidon ariel</i>	Fairy Martin										
Cuculidae	<i>Cacomantis labelliformis</i>	Fan-tailed Cuckoo										+
Cacatidae	<i>Ecophagus roseicapilla</i>	Galah										+
Threskiornithidae	<i>Plegadis falcinellus</i>	Glossy Ibis										
Pachycephalidae	<i>Pachycephala pectoralis</i>	Golden Whistler										+
Cisticolidae	<i>Cisticola exilis</i>	Golden-headed Cisticola										
Phalacrocoracidae	<i>Phalacrocorax carbo</i>	Great Cormorant										+
Ardeidae	<i>Ardea alba</i>	Great Egret										+
Ardeidae	<i>Cracticus torquatus</i>	Grey Butcherbird										+
Rhipiduridae	<i>Rhipidura alboscapa</i>	Grey Fantail										+
Ardeidae	<i>Ardea alba</i>	Grey Teal										+
Anatidae	<i>Anas gracilis</i>	Grey Teal										+
Anatidae	<i>Aythya australis</i>	Hardhead										+
Ardeidae	<i>Mesophox intermedia</i>	Intermediate Egret										+
Scopaciidae	<i>Gallinago hardwickii</i>	Latham's Snipe										+





Family	Scientific Name	Common Name	Spring 2008	Autumn 2008	Spring 2009	Autumn 2010	Summer 2010	Autumn 2011	Spring 2011	Autumn 2012	Spring 2012	Autumn 2013
Halcyonidae	<i>Dacelo novaeguineae</i>	Laughing Kookaburra		+								
Monarchidae	<i>Myiagra rubecula</i>	Leadren Flycatcher	+						+			
Meliphagidae	<i>Meliphaga lewinii</i>	Lewin's Honeyeater										
Phalacrocoracidae	<i>Phalacrocorax subterostrius</i>	Little Black Cormorant			+							
Megaliidae	<i>Megalurys gramineus</i>	Little Grassbird			+					+		+
Phalacrocoracidae	<i>Phalacrocorax melanoleucus</i>	Little Pied Cormorant	+								+	+
Monarchidae	<i>Grallina cyanoleuca</i>	Maggie-lark	+	+	+							
Charadriidae	<i>Vanellus miles</i>	Maskee Lapwing		+								
Nectarinidae	<i>Dicaeum hircundinaceum</i>	Mistlebeebird										
Meliphagidae	<i>Manorina melanoccephala</i>	Noisy Miner	+									
Orolidae	<i>Orolia sagittatus</i>	Olive-backed Oriole			+							
Anatidae	<i>Anas superciliosa</i>	Pacific Black Duck	+	+	+						+	+
Artamidae	<i>Cracticus nigrogularis</i>	Pied Butcherbird										
Phalacrocoracidae	<i>Phalacrocorax varius</i>	Pied Cormorant										+
Artamidae	<i>Strepera gracillirnis</i>	Pied Curlew										
Rallidae	<i>Porphyrio porphyrio</i>	Purple Swamphen	+	+	+							+
Pitaciidae	<i>Trichoglossus haemadobus</i>	Rainbow Lorikeet			+							
Estrildidae	<i>Neochmia temporalis</i>	Red-browed Finch		+								+
Pachycephalidae	<i>Pachycephala rufiventris</i>	Rufous Whistler		+								
Halcyonidae	<i>Todiramphus sanctus</i>	Sacred Kingfisher	+									
Meliphagidae	<i>Myzomela sanguinolenta</i>	Scarlet Honeyeater										+
Cuculidae	<i>Chalcops lucidus</i>	Shining Bronze-Cuckoo	+									
Troglodytidae	<i>Zosterops lateralis</i>	Silvereye		+								+
Threskornithidae	<i>Threskornis spinicollis</i>	Straw-necked Ibis	+									
Caculuridae	<i>Caculus galerita</i>	Sulphur-crested Cockatoo	+									
Maluridae	<i>Malurus cyaneus</i>	Superb Fairy-wren	+	+	+							+
Accipitridae	<i>Circus approximans</i>	Swamp Harrier	+									+
Megaluridae	<i>Megalurus timonensis</i>	Tawny Grassbird			+							
Maluridae	<i>Malurus lamberti</i>	Variagated Fairy-wren		+	+							+
Accipitridae	<i>Aquila audax</i>	Wedge-tailed Eagle			+							
Hirundinidae	<i>Hirundo neoxena</i>	Welcome Swallow	+									+
Accipitridae	<i>Haliaeetus spiliurus</i>	Whistling Kite	+									
Artamidae	<i>Artamus leucorhynchus</i>	White-breasted Woodswallow	+									
Acantizidae	<i>Sericornis frontalis</i>	White-browed Scrubwren										+
Ardeidae	<i>Egretta novaehollandiae</i>	White-faced Heron	+	+								+
Ardeidae	<i>Ardea jascifica</i>	White-necked Heron										+
Rhipiduridae	<i>Rhipidura leucophrys</i>	Willie Wagtail	+	+								+
Acantizidae	<i>Acanthiza nana</i>	Yellow Thornbill		+	+							+
Meliphagidae	<i>Lichenostomus chrysops</i>	Yellow-faced Honeyeater	+									+
			31	22	26	22	32	12	22	17	30	32





Table 5: Bird species recorded from the South Swamp by ecobiological during Spring 2008 / Autumn 2009 (baseline), Summer 2010 / Autumn 2011, Spring 2011 / Autumn 2012 and Spring 2012/Autumn 2013.

Family	Scientific Name	Common Name	Spring 2008	Autumn 2008	Spring 2009	Autumn 2009	Spring 2011	Autumn 2011	Spring 2012	Autumn 2013
Sturnidae	<i>Sturnus tristic</i>	*Common Myna					+			
Sturnidae	<i>Sturnus vulgaris</i>	*Common Starling								
Amniidae	<i>Aimophila melanogaster</i>	Australasian Drifter						+		
Oriolidae	<i>Siphocathartes vielholti</i>	Australasian Figbird								
Podicipedidae	<i>Tachybaptus novaehollandiae</i>	Australasian Grebe		+					+	+
Psittacidae	<i>Alisterus scapularis</i>	Australian King-Parrot								
Artamidae	<i>Cracticus tibicen</i>	Australian Magpie		+						+
Pelecanidae	<i>Pelecanus conspicillatus</i>	Australian Pelican							+	
Corvidae	<i>Corvus coronoides</i>	Australian Raven		+						+
Acrocephalidae	<i>Acrocephalus australis</i>	Australian Reed-Warbler		+						
Threskiornithidae	<i>Threskiornis molucca</i>	Australian White Ibis								
Anatidae	<i>Chenonetta jubata</i>	Australian Wood Duck								
Alcedinidae	<i>Ceyx azureus</i>	Azure Kingfisher								
Alcedinidae	<i>Alcedo azurea</i>	Azure Kingfisher								
Meliphagidae	<i>Manorina melanophrys</i>	Bell Miner		+						
Anatidae	<i>Cygnus atralis</i>	Black Swan		+						
Campophagidae	<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike								
Acanthizidae	<i>Acanthiza pusilla</i>	Brown Thornbill		+						
Cuculidae	<i>Cacomantis variolosus</i>	Brush Cuckoo								
Ardeidae	<i>Ardea ibis</i>	Cattle Egret								
Cuculidae	<i>Scolopax novaehollandiae</i>	Channel-billed Cuckoo								
Anatidae	<i>Anas castanea</i>	Chestnut Teal								
Campophagidae	<i>Coracina tenuirostris</i>	Cicadabird		+						
Coraciidae	<i>Eurystomus orientalis</i>	Dollabird								
Anatidae	<i>Anas platyrhynchos</i>	Domestic Duck								
Rallidae	<i>Gallinula tenuirostris</i>	Dusky Moorhen		+						
Cuculidae	<i>Eudynamis orientalis</i>	Eastern Koel								
Psittacidae	<i>Platycercus eximius</i>	Eastern Rosella								
Meliphagidae	<i>Acanthorhynchus tenuirostris</i>	Eastern Spinebill								
Eupelidae	<i>Psophodes olivaceus</i>	Eastern Whipbird								
Petrochelidonidae	<i>Eopsaltria australis</i>	Eastern Yellow Robin								
Rallidae	<i>Fulica atra</i>	Eurasian Coot								
Hirundinidae	<i>Petrochelidon ariel</i>	Fairy Martin								
Cuculidae	<i>Cacomantis labelliformis</i>	Fan-tailed Cuckoo								
Caculidae	<i>Eodophus roseicapillus</i>	Galah								
Threskiornithidae	<i>Plegadis falcinellus</i>	Glossy Ibis								
Pachycephalidae	<i>Pachycephala pectoralis</i>	Golden Whistler								
Cisticolidae	<i>Cisticola exilis</i>	Golden-headed Cisticola								
Phalacrocoracidae	<i>Phalacrocorax carbo</i>	Great Cormorant								
Ardeidae	<i>Ardea alba</i>	Great Egret								
Artamidae	<i>Cracticus torquatus</i>	Grey Butcherbird								







Family	Scientific Name	Common Name	Spring 2006	Autumn 2006	Spring 2009	Autumn 2010	Summer 2010	Autumn 2011	Spring 2011	Autumn 2012	Spring 2012	Autumn 2013
Maluridae	<i>Malurus lamberti</i>	Variegated Fairy-wren										
Hirundinidae	<i>Hirundo neoxena</i>	Welcome Swallow	+	+	+	+	+	+	+	+	+	+
Accipitridae	<i>Haliaeetus leucogaster</i>	Whistling Kite	+		+							
Accipitridae	<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle										
Artamidae	<i>Artamus leucorhynchus</i>	White-breasted Woodswallow	+	+	+	+	+	+	+	+	+	+
Acanthizidae	<i>Sericornis frontalis</i>	White-browed Scrubwren										
Meliphagidae	<i>Lichenostomus leucotis</i>	White-eared Honeyeater		+					+			
Ardeidae	<i>Ardea pacifica</i>	White-necked Heron	+		+							
Ardeidae	<i>Ardea pacifica</i>	White-necked Heron	+		+							
Campophagidae	<i>Lalage tricolor</i>	White-winged Triller										
Rhipiduridae	<i>Rhipidura leucophrys</i>	Willie Wagtail	+	+	+	+	+	+	+	+	+	+
Acanthizidae	<i>Acanthiza nana</i>	Yellow Thornbill										
Meliphagidae	<i>Lichenostomus chrysops</i>	Yellow-faced Honeyeater	+		+							+
			46	31	47	29	36	29	32	30	48	34

Table 6: Roosting bird count results from the Main Swamp during Spring 2008 / Autumn 2009 (baseline), Summer 2010 / Autumn 2011, Spring 2011 / Autumn 2012 and Spring 2012/Autumn 2013.

Family	Scientific Name	Common Name	18/08/08 - 7:15pm	5/9/09 - 7:40pm	19/11/09 - 7:50pm	23/3/10 - 7:40pm	23/12/10 - 8:40pm	29/03/2011 - 9pm	19/07/11 - 7:20pm	20/3/12 - 7:20 pm	21/11/12 - 7:50pm	5/3/13 - 7:15pm
Ardeidae	<i>Ardea ibis</i>	Cattle Egret	57	170	67	26	26	188	80			120
Ardeidae	<i>Ardea pacifica</i>	White-necked Heron	1									
Ardeidae	<i>Egretta novaehollandiae</i>	White-faced Heron								4		20
Phalacrocoracidae	<i>Phalacrocorax carbo</i>	Great Cormorant				2	2		15			2
Phalacrocoracidae	<i>Phalacrocorax sulcirostris</i>	Little Black Cormorant	17	10	5	14	14	1	5	5	15	
Phalacrocoracidae	<i>Phalacrocorax melanoleucos</i>	Little Pied Cormorant			8	3						6
Threskiornithidae	<i>Threskiornis molucca</i>	Australian White Ibis	9	50	37	44	2	1	1			5
Phalacrocoracidae	<i>Phalacrocorax varius</i>	Pied Cormorant										10
Threskiornithidae	<i>Threskiornis spinicollis</i>	Straw-necked Ibis	125	40	8	3						400
		<b>No. of individuals</b>	<b>209</b>	<b>270</b>	<b>125</b>	<b>60</b>	<b>42</b>	<b>2</b>	<b>190</b>	<b>104</b>	<b>15</b>	<b>563</b>





**APPENDIX 3 - WATER BODY PHOTOGRAPHS**



Plate 1: Stretched photograph of South Swamp taken in November 2011.



Plate 2: Stretched photograph of South Swamp taken in March 2012.



Plate 3: Stretched photograph of Main Swamp taken in November 2011.

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Plate 4: Stitched photograph of Main Swamp taken in March 2012.



Plate 5: Stitched photograph of North Swamp taken in November 2011.

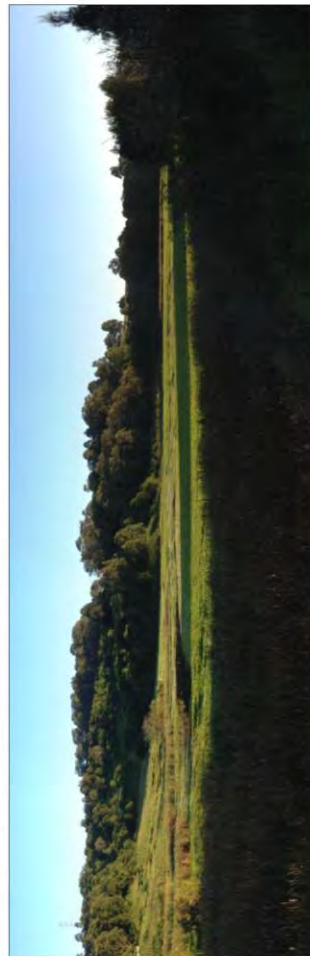


Plate 6: Photograph of North Swamp taken in March 2012.

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## APPENDIX 3: STAFF CONTRIBUTIONS

The following staff were involved in the compilation of this report.

Name	Qualification	Title/Experience	Contribution
Gilbert Whyte	PhD	Ecologist (Botanist)	Flora and fauna survey effort and report writing
Daniel O'Brien	B. Sc. Env & Mgt (Hons)	Ecologist (Zoologist/Herpetologist)	Fauna survey effort and report writing
Luke Foster	B. Sc. Env & Mgt M. Env Sci	Ecologist (mammologist)	Fauna survey effort, anabat and hair analysis.
Shawn Capararo	B. Bio.Sc	Senior Ecologist/ Botanist	Fauna survey effort
Gayle Joyce	B. Sc (Forestry) (Hons)	GIS Officer	Map preparation

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## APPENDIX 4: LICENSING

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Kleinfelder-Ecobiological employees involved in the current study are licensed or approved under the National Parks and Wildlife Act 1974 (License Number: SL100730, Expiry: 31st March 2013) and the Animal Research Act 1985 to harm/trap/release protected native fauna and to pick for identification purposes native flora and to undertake fauna surveys.



## APPENDIX 5: PAMBALONG NATURE RESERVE ENHANCEMENT PROJECT

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23 August 2012

Leonie Winner  
Conservation Volunteers  
Northern NSW Regional Manager  
518 Hunter Street Newcastle NSW 2300

Dear Leonie,

**Re: Pambalong Nature Reserve Enhancement Project**

As advised by email, The Donaldson Conservation Trust is pleased to advise that it is happy to support your application requesting funding for the Pambalong Nature Reserve Enhancement Project.

Please regard this letter as acceptance of the cost estimate and authorisation to proceed with the work as outlined in your email of 14/8/12.

Please find below the relevant Abel Mine contact details.

<b>Donaldson Coal Pty Limited</b> PO Box 2275, Greenhills NSW 2323	Tony Sutherland – Technical Services Manager – Underground Operations	Telephone: (02) 4015 1105 Facsimile: (02) 4015 1199 Email: <a href="mailto:Tony.Sutherland@gcl.com.au">Tony.Sutherland@gcl.com.au</a> <a href="mailto:bill.huuskjes@southcoal.com.au">mailto:bill.huuskjes@southcoal.com.au</a>
	Phil Brown – Environment Manager	Telephone: (02) 4931 0502 Facsimile: (02) 4934 2736 Email: <a href="mailto:Phil.Brown@gcl.com.au">Phil.Brown@gcl.com.au</a>

Any variations to the scope of work and cost estimate provided must be approved in writing by the Donaldson Coal Conservation Trust prior to associated works being conducted. If this does not occur, invoiced fees and expenses in regard to these works may not be paid.

Could you please provide a monthly update as to status of the project. The next Donaldson Coal Conservation Trust meeting is scheduled for the 22 October 2012 and we would like to update the Trustees on the status at this meeting.

All invoices should be made out to:

Donaldson Coal Pty Limited  
PO Box 2275  
Greenhills NSW 2323

and be emailed to both [accountspayable@gcl.com.au](mailto:accountspayable@gcl.com.au) and [Tony.Sutherland@gcl.com.au](mailto:Tony.Sutherland@gcl.com.au).

We look forward to working with you on this project.

Yours sincerely,

Tony Sutherland  
Chairman - Donaldson Coal Conservation Trust

Cc Ms Kathleen Straw, NPWS



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