

Appendix 6

FAUNA MONITORING REPORT

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Whitehaven Coal Mine Fauna Monitoring November 2010

1.0 Preamble

The Whitehaven Coal Mine is in the process of being decommissioned and at this point in time rehabilitation has been carried out throughout the mine except for the explosive magazine area, a small quarry area near Plot 1 and the area around the workshop.

Eleven plots were monitored in late spring on the 3rd and 4th of November 2010 (and Plot 11 in the void of the Canyon extension area on the 6th of November). The last year's monitoring sample was conducted in early spring in October 2009 when there was an early warm spell. This year the spring temperature was lower than normal prompting the monitoring to be conducted in late spring. It was still unseasonably cold by the time this sample was undertaken.

There was an early spring cold spell with unseasonal low daytime temperatures. The daytime temperatures were in the mid-20°C and night time temperatures fell below 5 °C for the first couple of days - with temperatures getting below 10°C by midnight. The samples for this survey were conducted mostly in overcast conditions and gusty winds from the south during the day although in the first day the evening and night was calm with light winds.

The plot numbers used here are the same as those adopted in the last report, including the early rehabilitation plot which had been sown with a fresh cover crop in the void of the Canyon extension, now referred to as Plot 11.

2.0 Methods

The methods used for the various fauna groups and the nocturnal and bat call recordings and analyses are similar to those that has been described in previous reports.

The only significant variation in the methodology has been the deployment 20 roof tiles each in Plot 3 and Plot 10. They have been randomly laid flat on the ground in those plots since autumn 2010. This is to augment the refuges available in those plots for ground dwelling vertebrates which are devoid of any ground refuges other than having ephemeral forbes and grasses for ground cover. The tile augmented plots are marked accordingly in the Tables presented in this report.

An increased effort was made in this year's monitoring sample in the bat call recording due to a suspected reduced sensitivity in some of the equipment that was damaged from exposure to rain. Recordings were extended to the early mornings and the recently rehabilitated area in the void

in the Canyon extension was targeted for additional attention as it is accumulating a significant body of water as it fills.

3.0 Results

The following are summaries of the results of the year's late spring monitoring samples.

3.1 Birds

The bird species recorded during this monitoring sample are marked against the list that has known to occur since mining was carried out in the Canyon Extension. The numbers indicate the plots in which they were found and those recorded in the lease area outside these plots are marked with "L" and adjacent to the lease as "N".

The legal status of the species is marked as follows:

P = Protected, V = Vulnerable, U = Unprotected, # = Exotic.

^ = Species not recorded previously on the Whitehaven site.

Common Name	Scientific Name	Present in Plot No.	Status
1. Brown Quail	<i>Coturnix australis</i>		P
2. Australian Wood Duck	<i>Chenonetta jubata</i>	L	P
3. Grey Teal	<i>Anas gracilis</i>		P
4. Pacific Black Duck	<i>Anas superciliosa</i>	7	P
5. White-faced Heron	<i>Ardea novaehollandiae</i>	N	P
6. Straw-necked Ibis	<i>Theskiornis sinicollis</i>		P
7. Black-shouldered Kite	<i>Elanus notatus</i>	2, 10	P
8. Spotted Harrier	<i>Circus assimilis</i>		P
9. Brown Falcon	<i>Falco berigora</i>	9	P
10. Grey Falcon	<i>Falco hypoleucos</i>		V
11. Australian Hobby	<i>Falco longipennis</i>	L	P
12. Australian (Nankeen) Kestrel	<i>Falco cenchroides</i>	L, 8	P
13. Common Bronzewing	<i>Phaps chalcoptera</i>	L	P
14. Crested Pigeon	<i>Ocyphaps lophotes</i>	L, 5, 11	P
15. Glossy Black Cockatoo	<i>Calyptorhynchus latirostris</i>		V
16. Galah	<i>Cacatua roseicapilla</i>	L, 4, 6, 7, 8, 10, 11	P
17. Little Corella	<i>Cacatua sanguinea</i>	L	P
18. Sulphur-crested Cockatoo	<i>Cacatua galerita</i>	L, 1, 8, 9	P
19. Cockatiel	<i>Nymphicus hollandicus</i>	1, 11	P
20. Eastern Rosella	<i>Platycercus eximius</i>	1, 3, 4, 5, 7	P
21. Mallee Ringneck	<i>Platycercus zonarius</i>		P

22. Red-rumped Parrot	<i>Psephotus haematonotus</i>	L	P
23. Mulga Parrot	<i>Psephotus varius</i>		P
24. Southern Boobook	<i>Ninox novaeseelandiae</i>	L	P
25. Laughing Kookaburra	<i>Dacelo novaeguineae</i>	11	P
26. Superb Fairy-wren	<i>Malurus cyaneus</i>	L	P
27. White-winged Wren	<i>Malurus leucopterus</i>	2, 6, 10	P
28. Variegated Fairy-wren	<i>Malurus lamberti</i>		P
29. Striated Pardalote	<i>Pardalotus striatus</i>		P
30. Noisy Miner	<i>Manorina melanocephala</i>	L,1, 4, 7	P
31. Grey-crowned Babbler	<i>Pomatostomus temporalis</i>	L, 4, 5, 7	V
32. Magpie-lark (Pee Wee)	<i>Myiagra inquieta</i>	3	P
33. Black-faced Cuckoo-strike	<i>Coracina novaehollandiae</i>	L	P
34. Grey Butcherbird	<i>Cracticus torquatus</i>	N	P
35. Pied Butcherbird	<i>Cracticus nigrogularis</i>	L, 1, 4	P
36. Australian Magpie	<i>Gymnorhina tibicen</i>	3, 5, 6, 7,8, 9, 11	P
37. Grey Currawong	<i>Strepera versicolor</i>		P
38. Australian Raven	<i>Corvus coronoides</i>	6	P
39. Little Crow	<i>Corvus bennetti</i>	5	P
40. White-winged Chough	<i>Corcorax melanorhamphos</i>	N	P
41. Apostlebird	<i>Struthidea cinerea</i>	1, 5, 7	P
42. Richard's Pipit	<i>Anthus novaeseelandiae</i>	10	P
43. Common Starling#	<i>Sturnus vulgaris</i>	6	U
44. Brown Songlark	<i>Cincloramphus cruralis</i>		P
45. Domestic (Feral) Pigeon#	<i>Columba livia</i>	N	U
46. Stubble Quail	<i>Coturnix pectoralis</i>	N	P
47. White-browed Scrubwren	<i>Sericornis frontalis</i>		P
48. Australasian Grebe	<i>Tachybaptus novaehollandiae</i>	L	P
49. Hoary-headed Grebe	<i>Poliiocephalus poliocephalus</i>	L	p
50. Tawny Frogmouth^	<i>Podargus strigoides</i>	L, 5	P
51. Black-fronted Dotterel^	<i>Charadrius melanops</i>	L	P
52. Spiny-cheek Honeyeater^	<i>Acanthagenys rufogularis</i>	9	P
53. Singing Honeyeater^	<i>Lichenostomus virescens</i>	3	P
54. Yellow-rumped Thornbill	<i>Acanthiza chrysorrhoa</i>	2	p
55. Bar-Shouldered Dove	<i>Geopelia humeralis</i>	L	P
56. Diamond Dove	<i>Geopelia cuneata</i>	L	P
57. Southern Boobook Owl	<i>Ninox novaeseelandiae</i>	L	P
58. Willy Wagtail	<i>Rhipidura leucophrys</i>	3	P
59. Brown Songlark^	<i>Cincloramphus cruralis</i>	10	P

Two apparently separate families of Grey-crowned Babblers were recorded during this late spring monitoring on this mine site this year - one family on the western side and the other in the southern part of the mine. There was no sign of any other family groups around the Whitehaven Mine.

One family of up to seven birds was attending to several near-independent young in the vicinity of the nine discernable nests around Plots 4 (although three of these nests have not been used this season). This suggests that this listed vulnerable species has persisted around this mining lease and has bred successfully in the remaining woodland area.

There has been an increase in the species richness and diversity of the birds recorded in and around this mine site. As the habitat patch quality increases with the above average rainfall that has occurred over the last year and the progress of the successful rehabilitation, more of the woodland species, like honeyeaters are being recorded visiting the Whitehaven Coal Mine Site.

This late spring sampling has recorded more frequent sightings of some seed feeding species, particularly the pigeons and dove although grass parrots are still relatively uncommon – given the abundance of grass seeds currently available.

Nocturnal raptors like the Southern Boobook Owl and Tawny Frogmouth are also starting to frequent more areas of this mine as the night activities have, by and large, ceased.

It is interesting to note the persistent occurrence of the exotic Common Starling around this mine site. It is a species that previously had not been recorded in the areas around this mine during its proposal and is apparently occurring more commonly in the district (along with domestic pigeons). However, it might just have been the result of seasonal variations in local distributions that has been affected by present or recent the weather conditions and/or agricultural activities.

The absence of quails is noteworthy and may be the result of the common occurrence of foxes in this area.

3.2 Mammals

The mammal species recorded during this monitoring sampling are marked against the list of species previously known to have occurred there. The numbers indicate the plots in which they were found and those recorded in the lease area outside these plots are marked with "L".

Status: P = Protected, V = Vulnerable, U = Unprotected, # = Exotic.

Exotic species that have been listed as a Key Threatening Process are marked with "+".

Common Name	Scientific Name	Present in plot No.	Status
1. Brush-tailed Possum	<i>Trichosurus vulpecula</i>		P
2. Swamp Wallaby	<i>Wallabia bicolor</i>	L	P
3. Eastern Grey Kangaroo	<i>Macropus giganteus</i>	L, 1, 2, 3, 5, 6, 7, 8, 9, 10, 11	P
4. Red-necked Wallaby	<i>Macropus rufogriseus</i>		P

5. House Mouse#	<i>Mus domesticus</i>	6, 10	U
6. European Rabbit #+	<i>Oryctolagus cuniculus</i>	L, 1, 4, 6, 10	U
7. European Red Fox #+	<i>Vulpes vulpes</i>	L, 3, 8	U
8. Feral Cat #+	<i>Felis catus</i>	L	U
9. Domestic Dog #	<i>Canis lupus familiaris</i>		U
10. Echidna	<i>Tachyglossus aculeatus</i>		P
11. Brown Hare#	<i>Lepus europaeus</i>	L	U
12. Euro	<i>Macropus robustus</i>	L, 1, 3, 4, 6, 8, 9, 11	P
13. Red Kangaroo^	<i>Macropus rufus</i>	L	P
14. Sheep#	<i>Ovis aries</i>	8	U
15. Wild Pig#	<i>Sus scrofa</i>	5	U

The non-volant mammal diversity has not changed substantially since before this mine was established although the larger macropods are becoming more common, especially the Euro that has taken to frequenting the rehabilitated elevated areas. It would be interesting to see if the more cryptic species like the Red-neck Wallaby and Echidna will start to frequent the more advanced rehabilitated areas adjacent to the woodland remnants in the near future.

It is noteworthy that a large male Red Kangaroo was observed on top the rehabilitation area. This is a species associated more with the arid habitat. The area around Gunnedah is probably close to its eastern limits. It is thus most likely to be a remnant from the populations that must have moved east during the last drought.

This season's monitoring sampling also recorded foxes and cats to be common in and around this mine site. There is also an apparent reversal in the ratios of rabbits to hares, due probably to the increase in food availability and ground cover with the improved seasonal conditions favouring rabbit survival.

There were signs of sheep frequenting the rehabilitated area around Plot 8 and the presence of feral pigs in the southern area of the mine around Plot 5. These species, if left unchecked, can undermine the success of the rehabilitation program on the mine site.

3.3 Microbats

The following bats were recorded in the various plots during these monitoring samples. Species present on the various plots are indicated with a dash (-) in the table below.

Status: P = Protected, U = Unprotected

Common Name	Scientific Name	Status	Plot 1	Plot 3	Plot 5	Void
			8.0hrs	9.0hrs	8.75hrs	7.0hrs
1. White-striped Mastiff-bat	<i>Nyctinomus (Tadarida) australis</i>	P	-	-		-
2. Little Mastiff-bats	<i>Mormopterus spp</i> (" <i>planiceps</i> " complex)	P	-	-	-	-

3. Beccari's Mastiff-bat	<i>Mormopterus beccarii</i>	P											?
4. Chocolate Wattled Bat	<i>Chalinolobus morio</i>	P						-					-
5. Gould's Wattled Bat	<i>Chalinolobus gouldii</i>	P	-					-					-
6. Little Forest Bat	<i>Vespadelus vulturnus</i>	P	-					-					-
7. Little Broad-nosed Bat	<i>Scotorepens greyii</i>	P	-					-					-
8. Yellow-bellied Sheath-tail Bat	<i>Saccolaimus flaviventris</i>	V	-					-					-
9. Long-eared Bats	<i>Nyctophilus spp</i>	P						-					-
10. Western Broad-nosed Bat	<i>Scotorepens balstoni</i>	P						-					-
11. Little Pied Bat	<i>Chalinolobus picatus</i>	V	-										

It is interesting to note that Beccari's Mastiff-bat appears to only frequent the recently rehabilitated void area. However, due to the availability of adequate reference call sequence for comparison, the presence of Beccari's Mastiff-bat locally remains largely problematic together with the other *Mormopterus* spp. in this region. There are at least two other species of undescribed *Mormopterus* in the area - *Mormopterus* sp3 and *Mormopterus* sp4 which can be separated from their characteristic call frequencies at 25KHz and 30KHz respectively but they have been recorded constantly lower than the apparent reference call frequencies range for the western slopes— only by about 1.0KHz lower.

It is noteworthy that Little Pied Bat, a rare listed vulnerable species, has been identified in the control woodland in Plot 1 call sample.

Note also that there is still no way of differentiating *Nyctophilus* species from zero-crossing analyses of their calls alone. However, the call patterns suggest that there are two species (*N. gouldii* and *N. geoffroyi*) present¹, one with a lower frequency than the other—down to about 35 KHz.

This additional sampling effort that included both a special element (to include the void in the Canyon extension) and, a temporal element (extending to early morning pre-dawn recordings) of the forest and pasture rehabilitation plots record a full complement of the microbat fauna likely to occur in this locality.

3.4 Reptiles

The following reptiles, all protected species, were recorded on the various plots. Species present on the various plots are indicated with a dash (-) in the table below.

Common Name	Scientific Name	P1	P2	P3*	P4	P5	P6	P7	P8	P9	P10*	P11
1. Basalt Snake-lizard	<i>Delma plebeia</i>			-							-	
2. Lace Monitor	<i>Varanus varius</i>											
3. Wall Skink	<i>Cryptoblepharus pulcher+</i>	-			-			-				
4. Tree-crevice Skink	<i>Egernia striolata</i>		-	-	-				-	-		

¹ See Van Dyke and Strahan (2008) 3rd Ed "The Mammals of Australia" re: *N. timoriensis*.

5. South-eastern Morethia Skink	<i>Morethia boulengeri</i>	-	-	-	-								
6. Eastern Striped (Robust) Skink	<i>Ctenotus robustus</i>												
7. Eastern Bearded Dragon	<i>Pogona barbata</i>												
8. Variegated (Tree) Dtella	<i>Gehyra variegata</i>								-				
9. Red-bellied Black Snake	<i>Pseudechis porphyriacus</i>												
10. Dwarf Skink [^]	<i>Menetia greyii</i>			-	-				-				
11. Burrowing Skink [^]	<i>Anomalopus leuckartii</i>			-									

* indicates plots augmented with roof tiles.

+ cf *C. virgatus* and *C. carnabyi*.

[^] Not recorded in the original survey for the mine proposal.

This late spring sample recorded two additional species, one was exclusive to the tile-treated Plot 3.

It is noteworthy that as in this current late spring sample, last year's early spring sample also did not record the larger reptile species like the dragons and monitors. These species are known to occur previously in various plots or elsewhere on this mine site.

Only the rehabilitation sites, Plot 6 - the west-facing rehabilitated plot -and recently rehabilitated plot in the void (Plot 11) had no reptile recorded on them. Neither of these plots has had logs placed on them.

There was mixed success with the two plots that had tiles deployed in them. The number of species recorded in Plot 3 increased from three to five compared to spring 2009 sample. By contrast, only one species was recorded in Plot 10, albeit they were different species on the two different occasions. One explanation for the disparity could be that the density of ground cover which developed in Plot 10 this season was much thicker tussocks and this only favoured burrowing species like *Delma* spp.

3.5 Amphibians

The following frogs, all protected species, have been observed previously in the various dams on the Whitehaven mining lease.

The numbers indicate the plots in which they were found and those recorded in the lease area outside these plots are marked with "L" and adjacent to the lease as "N".

Common Name	Scientific Name	Present in plot No.
1. Peron's Tree Frog	<i>Litoria peronii</i>	L
2. Green Tree Frog	<i>Litoria caerulea</i>	L, 1
3. Desert Tree Frog	<i>Litoria rubella</i>	N
4. Striped Marsh Frog	<i>Limnodynastes peronii</i>	L
5. Spotted Marsh Frog	<i>Limnodynastes tasmaniensis</i>	N

6. Broad-palmed Frog	<i>Litoria latopalmata</i>	L
7. Wrinkled Toadlet	<i>Uperoleia rugosa</i>	L
8. Ornate Burrowing Frog [^]	<i>Platyplectrum ornatum</i>	L

[^] Not recorded in the original survey for the mine proposal.

Except for Plot 1, no frog species was recorded in any of the plots during these monitoring samples.

The amphibian community seemed to have responded well to the higher than average rainfall that had occurred since the drought broke last year. Some frog breeding activity was observed during this late spring sample in many of the waterholes the Whitehaven Mine, notwithstanding the unseasonally cold spring temperatures.

The Ornate Burrowing Frog was recorded for the first time on this mine site although it is not an uncommon species that has a wide distribution.

4.0 Comments

It is too early to tell if the deployment of tiles on plots devoid of any structural ground cover is an apt non-invasive method to adopt to detect small ground dwelling fauna compared to live trapping techniques. Early results suggest that the use of tile will allow the easier detection of species if it is present.

It has also been useful in indicating the possible disparity in the effectiveness of sampling at various ground cover densities, for example, in Plot 3, 19 of the 20 randomly placed tiles were able to be detected within the routine sampling strategy, but in Plot 10 only 11 of the 20 could be detected.

The tiles appear to assist in the detection of these species by preserving the remnants of the presence of reptile (sloughs, egg shells - and eggs) and act as shelter and depository for nesting material of small mammals – both exotic species, like House Mouse as well as native species, like *Planigale*(see Tarrawonga report).

Finally, now that the profile of the final land form in the Whitehaven Coal Mine has been achieved, considerations for the future post-mining land use of this area should be considered in relation to the long-term conservation and management of the local fauna. This is notwithstanding that it does not appear to have suffered unduly from Whitehaven Coal Mine's operations and activities thus far.

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