HYDER ENVIRONMENTAL

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IMPACT ASSESSMENT STUDY FOR PROPOSED DAWSON DAM

TERRESTRIAL FAUNA

REPORT PREPARED FOR HYDER BY:

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PREFACE

This report examines likely impacts of the construction and operation of the proposed dam on terrestrial fauna.

The first phase of the field survey was undertaken by fauna specialist, Dr Amy Jansen, over a 10 day period in October 1996.

Supplementary work was undertaken in August 1997 in an attempt to address some criticisms direct by the Department of Environment at Dr Jansen's draft report. Dr Jansen stated clearly that her field sampling was constrained both by the time allocated for work and by her inability to use certain sampling techniques at the time due to unseasonable heavy rains. The supplementary survey also paid greater attention to invertebrates and to the importance of riparian habitats.

Due to Dr Jansen's was not available, the Queensland Museum was commissioned with the supplementary study. Dr Jansen's report constitutes Part A, and the report of the Queensland Museum is Part B of this document.

A study by the Queensland Museum of the fauna of the mound springs in the Taroom area ('boggomosses') was commissioned separately by the Department of Natural Resources and is the subject of a separate report. Nevertheless, because of the Museum's involvement in both studies, a measure of integration was assured.

The reader should appreciate that this report is only one in a series of technical investigations undertaken for the IAS and its findings need to be read in the context of the overall study.

The supplementary work which Queensland Museum undertook includes:

- a list of species of land snails, slaters and terrestrial vertebrates from the sites in the greater Taroom and surrounding areas which were surveyed during the supplementary survey and previous published survey of boggomosses. This list draws on the invertebrate records of the Queensland Museum's extensive database which includes more than 100,000 Queensland records;
- an annotated list of the extinct, endangered, vulnerable, rare and special cultural species as designated by Nature Conservation (wildlife) Regulation 1994, Subordinate Legislation No 474 of 1994.

The Part B supplementary study adds substantially to the fauna representation of the project area outline in Part A, and also presents considerable data for the greater Taroom area.

Part A draws attention to the importance of the riparian vegetation along the Dawson river and its tributaries as corridors for wildlife movement, and habitat and refugia for bird species as well as for some mammals, reptiles and frogs. Dr Jansen also stressed the need to re-establish any interruptions in the these vegetation corridors which would be caused by the development of a dam. The Queensland Museum confirms those findings and also points to the importance of the riparian habitats as refugia and as important corridors for the genetic mixing and dispersal of terrestrial invertebrates.

Part B also reinforces the importance of boggomosses as a component of the alluvial flat ecosystem, which because of the extensive clearing of this land unit for grazing and agriculture has become even more significant for the survival of land snails, such as the environmentally restricted species *Adclarkia dawsonensis* Stanisic 1996.

Dr Robert Thistlethwaite
Project Manager
Hyder Environmental

LIST OF TABLES

1. INTRODUCTION

A major water storage has been proposed for the Dawson River, with the dam to be constructed upstream of Nathan Gorge at 315.3 km AMTD, latitude 150°07' E, longitude 25°27' S. At the proposed maximum FSL of 185 EL, the impoundment area of 14,690 ha would extend upstream to the township of Taroom, with a river reach of approximately 75km.

The Dawson River is significant in originating further west of the coast than any other perennial river flowing east from the Great Divide in Queensland.

This study aimed to document terrestrial vertebrate populations and habitats in the area which would be affected by the reservoir and its immediate surrounds, and to assess likely impacts on those populations and habitats should the dam be constructed.

2. PRIOR STUDIES

The vertebrate fauna of the region were sampled intensively in the late 1970's by Crossman and Reimer (1986). Smaller studies have been conducted since that time to evaluate the possible effects of various development proposals for the area (Phillips 1995, Natural Resource Assessments 1995, Ison 1996). Crossman and Reimer (1986) reported a total of 48 species of mammals, 209 bird species, 52 reptile species and 19 species of amphibians. Ison (1996) reported an additional bird species, six reptile species, and a species of frog.

Based on Crossman and Reimer's study, on museum collections, and other published distribution references, the Toowoomba Office of the Department of Environment has compiled a list of the vertebrate species which are expected to occur in Taroom Shire. Some additional species expected to occur in the area were added to the list after consultation with DoE staff (Craig Eddy, pers. comm.), and from published distribution references (Blakers *et al* 1984).

The list of terrestrial vertebrates includes 13 species of birds, three species of mammals, one frog species, and nine species of reptiles, which are designated as *"Threatened"* (Endangered or Vulnerable) or *"Rare"* under the Queensland *Nature Conservation (Wildlife) Regulation 1994*: (see Table 1). Of these, the Red Goshawk and the Brush-tailed Rock-Wallaby are also listed as *Vulnerable* under the Australian *Endangered Species Protection Act 1992.* Under this Act, a species is declared to be Vulnerable if *"within the next 25 years, the species is likely to become endangered unless the circumstances and factors threatening its abundance, survival or evolutionary development cease to operate"*. Rare species are those which either have a relatively large population in a relatively restricted area or occur as small populations spread over a wide area.

Table 1 Vertebrate terrestrial fauna of conservation significance known or likely to occur in Taroom Shire.

Species	Common name	Status-Qld*	Status-ANCA#
BIRDS			
Calyptorhynchus lathami	Glossy Black-Cockatoo	Vulnerable	
Podiceps cristatus	Great Crested Grebe	Rare	
Nettapus coromandelianus	Cotton Pygmy-goose	Rare	
Ephippiorhynchus asiaticus	Black-necked Stork	Rare	
Lophoictinia isura	Square-tailed Kite	Rare	
Erythrotriorchis radiatus	Red Goshawk	Endangered	Vulnerable

Geophaps scripta	Squatter Pigeon	Vulnerable	
Ninox strenua	Powerful Owl	Vulnerable	
Tyto novaehollandiae	Masked Owl	Vulnerable	
Lichenostomus melanops	Yellow-tufted Honeyeater	Rare	
Grantiella picta	Painted Honeyeater	Rare	
Coracina maxima	Ground Cuckoo-shrike	Rare	
Poephila cincta	Black-throated Finch	Vulnerable	
MAMMALS			
Petrogale penicillata	Brush-tailed Rock-wallaby	Vulnerable	Vulnerable
Chalinolobus dwyeri	Large-eared Pied Bat	Rare	
Chalinolobus picatus	Little Pied Bat	Rare	
FROGS			
Cyclorana verrucosa		Rare	
REPTILES			
Diplodactylus taenicauda	Golden-tailed Gecko	Rare	
Paradelma orientalis	Brigelow Scaly Foot	Vulnerable	
Anomalopus brevicollis		Rare	
Anomalopus mackayi		Vulnerable	
Egernia rugosa	Yakka Skink	Vulnerable	
Ramphotyphlops broomi		Rare	
Acanthophis antarcticus	Common Death Adder	Rare	
Denisonia maculata	Ornamental Snake	Vulnerable	
Furina dunmalli	Dunmall's Snake	Vulnerable	

*Species listed under the Queensland *Nature Conservation (Wildlife) Regulation 1994*.
Species listed under the Australian *Endangered Species Protection Act 1992* administered by the Australian Nature Conservation Agency.

Table 2 lists the species of conservation significance which have been encountered during previous fauna surveys in the area.

Table 2 Vertebrate terrestrial species of conservation significance which have been encountered in Taroom Shire in previous fauna surveys

Scientific name	Common name	Qld Status	Survey
Podiceps cristatus	Great Crested Grebe	Rare	1
Nettapus coromandelianus	Cotton Pygmy-goose	Rare	1
Ephippiorhynchus asiaticus	Black-necked Stork	Rare	1
Calyptorhynchus lathami	Glossy Black-Cockatoo	Vulnerable	1
Geophaps scripta	Squatter Pigeon	Vulnerable	1
Ninox strenua	Powerful Owl	Vulnerable	1
Tyto novaehollandiae	Masked Owl	Vulnerable	1
Lichenostomus melanops	Yellow-tufted Honeyeater	Rare	1
Coracina maxima	Ground Cuckoo-shrike	Rare	1,2
Chalinolobus dwyeri	Large-eared Pied Bat	Rare	1
Chalinolobus picatus	Little Pied Bat	Rare	1,2?
Diplodactylus taenicauda	Golden-tailed Gecko	Rare	1
Egernia rugosa	Yakka Skink	Vulnerable	1
Furina dunmalli	Dunmall's Snake	Vulnerable	1
Cyclorana verrucosa		Rare	1

1 = Crossman and Reimer (1986)
2 = Ison (1996)

3. THE STUDY

3.1. Study Sites

The study area included that reach of the Dawson River between the township of Taroom and the Nathan Gorge, and out to the indicated full storage level of 185 m EL. Opportunistic observations were also made for comparison in surrounding areas.

Within the main study area, virtually the only remaining semi-natural habitat is to be found in a strip along the river, varying in width from about 50m to a few hundred metres. The surrounding areas have been cleared for grazing and cropping. The exceptions include some of the boggomosses which retain natural vegetation and have been fenced off from cattle impact. These boggomosses are the subject of a separate study and will not be discussed further here.

Four representative sites were selected for intensive sampling within the main study area Figure 1). These sites were the Taroom Town Common, Glebe Weir, Nathan Gorge, and Bundulla Road. Within the time constraints of the study, it was considered that these sites would be representative of the natural vegetation types to be inundated were the dam to proceed and could be adequately sampled. Three of the sites, the exception being the Glebe Weir Site, were also used by Ison (1996), enabling comparisons between the two studies.

3.1.1. Site 1 - Taroom Town Common

The Taroom Town Common site was selected as being representative of the upper reaches of the Dawson River, around Taroom. The topography is quite flat. The Town Common is close to Taroom, and is bounded on one side by the Dawson River and on the other by the Leichhardt Highway. It is used for grazing by moving stock and for recreation. The semi-natural habitat is dominated by *Eucalyptus coolabah* with some *E. tereticornis* along the river banks. The understorey along the river includes *Melaleuca linariifolia* and Lignum, *Muehlenbeckia cunninghamii*. Ungrazed areas have a dense grassy ground layer while, in other areas of the Common, grazing pressure has resulted in virtually bare ground. Sampled was undertaken downstream from the ford just outside town along the Town Common side of the river. An advantage of this site is that the area will be little affected by the proposed dam storage and thus can appropriately be included in any future vertebrate fauna monitoring program.

3.1.2. Site 2 - Glebe Weir

This site was selected as being representative of the lower reaches of the Dawson River prior to it entering the Nathan Gorge. The site is characterised by relatively steep banks sloping into the river with only the steep areas retaining natural vegetation. The upper end of this site was bounded by Glebe Weir, the riverine vegetation being separated from wheat fields by a fence and a narrow bitumen road. The area immediately adjacent to the weir wall on the northern side is a recreational park used for camping and fishing. Sampling was undertaken downstream of the weir, along the north bank of the river. The vegetation was similar to that at Site 1. The site would be drowned by the proposed dam construction.

3.1.3. Site 3 - Nathan Gorge

This site was selected as being representative of the upper reaches of Nathan Gorge and was located at the proposed dam (314km AMTD). The river flat area was dominated by *E. tereticornis* and *E. coolabah*, with a shrub layer of *Melaleuca*, *Callistemon* and *Livistona* palms. The site included extensive riparian boggomosses with a ground layer of dense ferns. Dense lilies occurred in other areas. The river flat was bounded on both sides by steep, layered, sandstone slopes, with typical sandstone vegetation including *Callitris, Casuarina* and *Eucalyptus* species forming the canopy and a

MAP 1

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Site 1
Site 2
Site 3
Site 4
Site 5
Site 6

DAM SITE AMTD 315.3 km
DAM SITE AMTD 313.9 km
NATHAN GORGE DAM SITE AMTD 307.3 km

Glebe Weir

TAROOM

Highway
Leichhardt
Fitzroy Development Road
Glenhoughton To Lake Murphy Road
Robinson Creek
Palm Tree Creek
Kallquists Rd.
Brodies Road
Bundulla Road
Glebe Weir
The Bend Rd.
Spring Ck Rd.
DAWSON RIVER
Cracow
Cabbage Tree Creek
Nathan Gorge Rd.
Nathan Gully
Price Ck
Cockatoo Creek
Glebe Rd.
Nathan Road
PRECIPICE NATIONAL PARK

LEGEND

- Proposed Maximum FSL EL 185
- Boggomoss locations
- Buildings

NOTES

1. The contours on this drawing have been taken from the 1995 survey.
2. Cadastral background obtained from Department of Natural Resources digital cadastral data base Shire of Taroom

0 5km

MAP PREPARED FOR HYDER BY

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QUEENSLAND GOVERNMENT
NATURAL RESOURCES

DAWSON DAM IMPACT ASSESSMENT STUDY

FULL SUPPLY LEVEL 185m

TERRESTRIAL FAUNA SAMPLE SITES

17/10/97

A3-6969080 RID TF 1

predominance of spinifex in the ground layer. The river flat and the northern sandstone slope of the gorge (on Spring Creek Station) was sampled.

3.1.4. Site 4 - Bundulla Road

This site is also broadly representative of the upper reaches of the Dawson River and was similar in most respects to Site 1, although more old-growth *E. tereticornis* was present. Cattle had been excluded from most of the riverine vegetation in this area so the grassy understorey was well developed. Again, the topography of this site was quite flat. The area would be flooded by the proposed dam, although not to any great depth. Sampling proceeded upstream along both sides of the river from the wooden bridge where Bundulla Rd crosses the river.

3.1.5. Opportunistic Sites

In addition to the main study sites, five opportunistic observations were made as follows:

Site 5 was located on Spring Creek, approximately 7km upstream from its intersection with the Dawson River and approximately 5km north of Site 3. The vegetation was similar to that at the gorge.

Site 6 was located on Nathan Gorge further downstream than Site 3 at the intersection of the Dawson River with Croker Gully. This site was similar in most respects to Site 3

Site 7 was *en route* between Taroom and the above sites, in the impoundment area of the proposed dam. This site included mainly cleared paddocks and cropping land.

Site 8 was at Lake Murphy, 12km by road northwest of Taroom. Lake Murphy is a Conservation Reserve around a perched lake dominated by old-growth *E. tereticornis* with a grassy understorey.

Site 9 was in a mixed Brigalow-Ooline community on the western side of the Taroom-Theodore Highway, approximately 4km north of Taroom.

3.2. Methods

The terrestrial fauna study was undertaken over a 25 day period, with the field study being conducted over the period 9 - 22 October 1996.

The weather was mostly warm and relatively humid, although early mornings were cool. There had been regular rains throughout the "dry" season so the vegetation was lush and green. Some heavy storms had preceded the commencement of the field work, and the need for reliable access to an extent governed the selection of sampling sites. Conditions were mostly fine except for the last three days when heavy rain reduced the sampling effort possible at Site 4.

Because of the pre-wet season rains, and the resultant abundance green feed and pools of water, at the time of the survey the wildlife were no longer dependent on scattered water holes and water sources such as the boggomosses, and were widely dispersed. The impact this would have on the fauna survey was well appreciated, and it became quickly apparent that in order to present a more complete picture of the vertebrate fauna population of the Taroom area, it would be necessary to conduct supplementary sampling in 1997 after an extended rainless period when the wildlife was again mainly concentrated on the area's water features.

A variety of methods were used to sample birds, mammals, reptiles and amphibians at the four selected sites, including Elliott trapping, harp trapping, bird censuses, spotlighting and general searches as outlined below.

Mammal trapping was conducted under Permit No. W0/001577/96/SAA from the Queensland Department of Environment, Toowoomba. Common and scientific names used follow Cogger (1992) for reptiles and amphibians, Christidis and Boles (1994) for birds and Strahan (1995) for mammals.

3.2.1. Elliott trapping

A total of 40 traps were laid approximately 10 m apart along a transect at each site. At Sites 1, 2 and 4 the transects followed the river and all traps were between 2 and 30m from the river. At Site 3 half of the traps were laid along a transect sloping down the sandstone scarp while the other half were laid along the river flat and amidst the boggomosses. Traps were baited with rolled oats and vanilla essence and every second trap also contained salami. Traps were rebaited each afternoon and opened for three nights at each site. (However, at Site 4 heavy rain occurred on the first and second nights of trapping and consequently the traps were not opened on the second night). Traps were checked before 0800 hours each morning and any captured animals were identified and immediately released.

3.2.2. Harp trapping

A harp trap was used in an attempt to capture bats in the area. The trap was set for one night beside the river at Site 1, two nights at Site 2, and two nights at Spring Creek Station, not far from Site 3. Inclement weather prevented its use at Site 4. No bats were captured.

3.2.3. Bird censuses

Once in the morning, starting at approximately 0530 hours, and once again in the afternoon, from approximately 1530 hours, point counts were conducted at each site. During each period, six 10 minute counts were conducted along a transect paralleling the river, with points approximately 200m apart. All birds seen and heard in each 10 minute period within a 100 m radius were recorded and their numbers tallied. Notes were also made on whether the birds were heard only, seen flying only, seen on the ground, or seen using foliage within the point count area. Other birds identified outside the point count areas and between counts were also noted.

Abundance ratings for the species recorded during point counts were determined as follows: (R) Rare = one individual recorded during only one point count at a site; (U) Uncommon = recorded during only 2-3 point counts or less than five individuals noted at a site; (C) Common = recorded during 4-8 point counts or with 6-14 individuals noted at a site; and (A) Abundant = recorded during more than 9 of the 12 point counts or with at least 15 individuals noted at a site. Other species not recorded during point counts were given an (I) for Incidental records.

3.2.4. Spotlighting

One night of spotlighting was carried out at each site and also at Lake Murphy. The majority of time was spent searching trees for arboreal mammals and birds but at least 20-30 minutes was also spent at each site searching for frogs on the ground near the river.

Spotlighting was conducted along a transect following the river at each site as well as along established tracks at Sites 1 and 2. At Lake Murphy spotlighting was conducted along the walking track. During each spotlighting period a tape of Powerful Owl calls was played to see if a response could be elicited from resident birds within hearing range. No responses were detected. Table 3 shows the time spent and approximate area searched at each site.

Table 3 Time spent and area searched during spotlighting at each site.

Site	Date	Time	Search time	Area searched
1	10/10/96	1910-2105	1:55h	1500x100m
2	13/10/96	1905-2030	1:25h	900x100m
3	17/10/96	1900-2050	1:50h	800x100m
4	20/10/96	1900-2030	1:30h	1000x150m
Lake Murphy	12/10/96	1930-2040	1:10h	3000x100m

3.2.5. Reptile and Amphibian searches

In the middle of the day some time was spent at each site turning over logs and rocks, and stripping bark off trees to look for small reptiles and frogs. Table 4 shows the time spent at each site and the approximate area searched.

Table 4 Time spent and area searched during reptile and amphibian searches at each site.

Site	Date	Time	Search time	Area searched	Habitat
1	10/10/96	0845-1015	1:30h	200x100m	River flat
2	12/10/96	1350-1450	1:00h	400x50m	River bank
3	16/10/96	0830-1000	1:30h	200x50m	Sandstone cliffs
		1500-1530	0:30h	100x50m	River flat
4	19/10/96	1400-1515	1:15h	200x50m	River flat

3.2.6. Opportunistic observations

Additional notes were taken on all vertebrates seen or heard which were not recorded during formal collection/observation periods at each site. The same was done at the additional sites mentioned above.

4. RESULTS

All terrestrial vertebrate species encountered during this study are listed in Table 5, along with abundance ratings at each site for the birds recorded during point counts, and presence at particular sites for the remaining groups.

Table 5 Species encountered during fauna surveys in Taroom Shire 9/10/96 - 21/10/96.

BIRDS		Site				
Common name	Scientific name	1	2	3	4	Other
Yellow Thornbill	*Acanthiza nana*					9
Buff-rumped Thornbill	*Acanthiza reguloides*			U		
Azure Kingfisher	*Alcedo azurea*				I	6
Australian Brush-turkey	*Alectura lathami*					9
Australian King-Parrot	*Alisterus scapularis*			U		6
Grey Teal	*Anas gracilis*					8
Pacific Black Duck	*Anas superciliosa*		I	U	U	8
Darter	*Anhinga melanogaster*					8
Richard's Pipit	*Anthus novaeseelandiae*					7
Red-winged Parrot	*Aprosmictus erythropterus*		C			5
Wedge-tailed Eagle	*Aquila audax*		I		I	9,7

BIRDS		Site				
Common name	Scientific name	1	2	3	4	Other
Intermediate Egret	*Ardea intermedia*	I	I			8
White-necked Heron	*Ardea pacifica*			I		
Australian Bustard	*Ardeotis australis*		I		I	5,7
White-breasted Woodswallow	*Artamus leucorynchus*		U			
Sulphur-crested Cockatoo	*Cacatua galerita*	I	U	C	C	6
Fan-tailed Cuckoo	*Cacomantis flabelliformis*			U		
Pheasant Coucal	*Centropus phasianinus*	R	R	U	I	
Emerald Dove	*Chalcophaps indica*			U		
Australian Wood Duck	*Chenonetta jubata*		I			6
Spotted Bowerbird	*Chlamydera maculata*			I		
Horsfield's Bronze-Cuckoo	*Chrysococcyx basalis*			I		
Speckled Warbler	*Chthonicola sagittata*					9
Grey Shrike-thrush	*Colluricincla harmonica*	C	C	C	C	9
Rock Dove (Feral Pigeon)*	*Columba livia*	I				
Black-faced Cuckoo-shrike	*Coracina novaehollandiae*	C	U		U	
White-bellied Cuckoo-shrike	*Coracina papuensis*	U	R			
White-winged Chough	*Corcorax melanorhamphos*	I				
White-throated Treecreeper	*Cormobates leucophaeus*			C		6
Little Crow	*Corvus bennetti*	C	A	C	A	6
Pied Butcherbird	*Cracticus nigrogularis*		R		R	7
Grey Butcherbird	*Cracticus torquatus*	U	R	I	U	9,8
Pallid Cuckoo	*Cuculus pallidus*	U	C			8
Black Swan	*Cygnus atratus*					8
Laughing Kookaburra	*Dacelo novaeguineae*	U	I	U	U	6,8
Mistletoebird	*Dicaeum hirundinaceum*			R		9,6
Emu	*Dromaius novaehollandiae*					7
White-faced Heron	*Egretta novaehollandiae*	R	R			
Black-shouldered Kite	*Elanus axillaris*		I			7
Black-fronted Dotterel	*Elseyornis melanops*		I			
Blue-faced Honeyeater	*Entomyzon cyanotis*		I			5
Galah	*Eolophus roseicapilla*		C		C	7,8
Eastern Yellow Robin	*Eopsaltria australis*			U		9,6
Dollarbird	*Eurystomus orientalis*		I	I	C	
Nankeen Kestrel	*Falco cenchroides*		U		I	
Bar-shouldered Dove	*Geopelia humeralis*	U	I	C		
Peaceful Dove	*Geopelia striata*	A	C	R	A	
Squatter Pigeon	*Geophaps scripta*					7
White-throated Gerygone	*Gerygone olivacea*	R	C	A	C	6
Magpie-lark	*Grallina cyanoleuca*	C	C	R	C	9,6,8
Brolga	*Grus rubicunda*		I			
Australian Magpie	*Gymnorhina tibicen*		U	I	U	9
White-bellied Sea-Eagle	*Haliaeetus leucogaster*		I			
Whistling Kite	*Haliastur sphenurus*	I	U	I		6,8
Fairy Martin	*Hirundo ariel*		I			
Tree Martin	*Hirundo nigricans*					8
White-plumed Honeyeater	*Lichenostomus penicillatus*	A	A		U	
Brown Honeyeater	*Lichmera indistincta*			C		6
Superb Fairy-wren	*Malurus cyaneus*		I			
Variegated Fairy-wren	*Malurus lamberti*	C			C	
Red-backed Fairy-wren	*Malurus melanocephalus*	C	C	C	C	
Yellow-throated Miner	*Manorina flavigula*		I			
White-throated Honeyeater	*Melithreptus albogularis*			A	U	
Brown-headed Honeyeater	*Melithreptus brevirostris*			U	U	
Black-chinned Honeyeater	*Melithreptus gularis*	U				
Rainbow Bee-eater	*Merops ornatus*	U		I		

BIRDS		Site				
Common name	Scientific name	1	2	3	4	Other
Jacky Winter	*Microeca fascinans*		I			
Restless Flycatcher	*Myiagra inquieta*	C	C		C	
Leaden Flycatcher	*Myiagra rubecula*	I	I	C	C	9
Scarlet Honeyeater	*Myzomela sanguinolenta*			U		6
Plum-headed Finch	*Neochmia modesta*		I			
Cotton Pygmy-goose	*Nettapus coromandelianus*					8
Southern Boobook	*Ninox novaeseelandiae*	I	I	I	I	8
Nankeen Night Heron	*Nycticorax caledonicus*	I			I	
Cockatiel	*Nymphicus hollandicus*	U	R		C	7
Crested Pigeon	*Ocyphaps lophotes*		I		C	7
Olive-backed Oriole	*Oriolus sagittatus*	I		I	I	8
Rufous Whistler	*Pachycephala rufiventris*	U	C		U	9
Striated Pardalote	*Pardalotus striatus*		C	U	C	
House Sparrow*	*Passer domesticus*					7
Australian Pelican	*Pelecanus conspicillatus*		I			6
Great Cormorant	*Phalacrocorax carbo*					6
Little Pied Cormorant	*Phalacrocorax melanoleucos*		I			6,8
Little Black Cormorant	*Phalacrocorax sulcirostris*					8
Little Friarbird	*Philemon citreogularis*	A	C	R	C	9,6,8
Noisy Friarbird	*Philemon corniculatus*			A		6
Pale-headed Rosella	*Platycercus adscitus*	R	C	U	R	
Tawny Frogmouth	*Podargus strigoides*					6,8
Grey-crowned Babbler	*Pomatostomus temporalis*		I			5
Grey Fantail	*Rhipidura fuliginosa*	U				
Willie Wagtail	*Rhipidura leucophrys*	A	A	R	C	8
Rufous Fantail	*Rhipidura rufifrons*			R		6
Channel-billed Cuckoo	*Scythrops novaehollandiae*					7
White-browed Scrubwren	*Sericornis frontalis*		U	C	U	6
Weebill	*Smicrornis brevirostris*	I	U	U	A	
Pied Currawong	*Strepera graculina*			C		6
Apostlebird	*Struthidea cinerea*		I			7,9
Common Starling*	*Sturnus vulgaris*					7
Australasian Grebe	*Tachybaptus novaehollandiae*					8
Double-barred Finch	*Taeniopygia bichenovii*	U	I		I	
Sacred Kingfisher	*Todiramphus sanctus*	A	A		U	8
Rainbow Lorikeet	*Trichoglossus haematodus*	A	U	C	I	6,8
Barn Owl	*Tyto alba*					5
Masked Lapwing	*Vanellus miles*		I			
Silvereye	*Zosterops lateralis*	R		U	R	9,6

MAMMALS		Site				
Common name	Scientific name	1	2	3	4	Other
Eastern Grey Kangaroo	Macropus giganteus					7
House Mouse*	Mus musculus		X	X	X	
Rabbit*	Oryctolagus cuniculus		X			
Greater Glider	Petauroides volans		X	X		8
Sugar Glider	Petaurus breviceps				X	
Koala	Phascolarctos cinereus		S@			8#
Black Rat*	Rattus rattus			X		
Pig*	Sus scrofa			X		
Short-beaked Echidna	Tachyglossus aculeatus					7
Common Brushtail Possum	Trichosurus vulpecula	X			X	

REPTILES		Site				
Common name	Scientific name	1	2	3	4	Other
	Carlia pectoralis			X		
Frilled Lizard	Chlamydosaurus kingii					6
	Cryptoblepharus virgatus	X			X	
Common Tree Snake	Dendrelaphis punctulata			X		7
	Diporiphora australis			X		
Eastern Water Skink	Eulamprus quoyii				X	
	Gehyra dubia	X			X	
Bynoe's Gecko	Heteronotia binoei			X		
Carpet Python	Morelia spilota		X		X	
Bearded Dragon	Pogona barbata					7
Red-bellied Black Snake	Pseudechis porphyriacus					7
Keelback	Tropidonophis mairii					6
Lace Monitor	Varanus varius	X	X		X	

FROGS		Site				
Common name	Scientific name	1	2	3	4	Other
Cane Toad*	Bufo marinus	X	X	X		
	Cyclorana brevipes	X				
Striped Burrowing Frog	Litoria alboguttata				X	
Green Tree Frog	Litoria caerulea	X	X	X	X	
	Litoria latopalmata	X	X	X	X	
Lesuer's Frog	Litoria lesueri	X	X	X	X	
Peron's Tree Frog	Litoria peronii	X	X	X	X	
Desert Tree Frog	Litoria rubella	X	X			

* Introduced species
@S = scratch marks seen on tree
heard
Abundance ratings for recorded bird species:

(R) Rare = one individual recorded during only one point count at a site
(U) Uncommon = recorded during only 2-3 point counts or less than five individuals noted at a site
(C) Common = recorded during 4-8 point counts or with 6-14 individuals noted at a site
(A) Abundant = recorded during more than 9 of the 12 point counts or with at least 15 individuals noted at a site
(I) Incidental = other species not recorded during point counts

The number of mammals, reptiles and amphibians encountered during the study is recorded in Table 6.

Table 6 Mammals, amphibians and reptiles encountered during Elliott trapping, daytime searches and spotlighting at Sites 1 - 4 along the Dawson River. (For search/capture effort for each activity at each site, refer Tables 3, 4).

MAMMALS			Site			
Common name	Scientific name	Effort	1	2	3	4
House Mouse	Mus musculus	Trapping		2	6	1
Greater Glider	Petauroides volans	Spotlighting		3	3	
Sugar Glider	Petaurus breviceps	Trapping				1
Koala	Phascolarctos cinereus	Search		S*		
Black Rat	Rattus rattus	Trapping			1	
Common Brushtail Possum	Trichosurus vulpecula	Spotlighting	10#			2@

REPTILES			Site			
Common name	Scientific name	Effort	1	2	3	4
	Carlia pectoralis	Search			1	
	Cryptoblepharus virgatus	Search	1			1
	Gehyra dubia	Search	3			1
Bynoe's Gecko	Heteronotia binoei	Spotlighting			1	
		Search			4	
Lace Monitor	Varanus varius	Search	1			

FROGS			Site			
Common name	Scientific name	Effort	1	2	3	4
Cane Toad	Bufo marinus	Trapping	2	>5	>5	
		Spotlighting	>10			
	Cyclorana brevipes	Search	1			
Striped Burrowing Frog	Litoria alboguttata	Spotlighting				1
Green Tree Frog	Litoria caerulea	Trapping	1	1	>5	2
		Spotlighting				
		Search	1			
	Litoria latopalmata	Spotlighting	8	3	2	3
		Search		3		1
Lesuer's Frog	Litoria lesueri	Spotlighting	2	3	1	>12
Peron's Tree Frog	Litoria peronii	Spotlighting	1	4	1	3
Desert Tree Frog	Litoria rubella	Spotlighting	1	2		
		Search	2			

* scratch marks seen on tree
# this count does not include three juveniles being carried on the backs of their mothers.
@ this count does not include one juvenile being carried on the back of its mother.

A total of 136 species were encountered: 105 birds, 10 mammals, 8 frogs and 13 reptiles. Of these, two species – the Squatter Pigeon and the Cotton Pygmy-goose – were listed in Table 1 as being of conservation significance. The Squatter Pigeons were seen along the Glebe Weir Rd, just outside the impoundment area, while the Cotton Pygmy-geese were seen at Lake Murphy.

Table 7 illustrates that the difference in diversity between sites was not consistent between the different faunal groups.

Table 7 Faunal diversity ranking on a descending scale of 1 (highest diversity) to 4 (lowest diversity)

Site		Birds	Native mammals[1]	Frogs	Reptiles
No	Name	Ranking			
1	Town Common	4	2	1	3
2	Glebe Weir[2]	1	1	2	4
3	Nathan Gorge	2	2	4	2
4	Bundulla Road	3	1	3	1

1 - Native mammal diversity was low at all sites, with only two species being encountered at Glebe Weir and Bundulla Rd, and only one species at Nathan Gorge and the Town Common.
2 - Bird diversity at Glebe Weir included a number of water birds not found at the other sites

Overall, Glebe Weir had the highest number of species (68), the Town Common had the lowest (49) while Nathan Gorge (with 53 species) and Bundulla Rd (with 54 species) were intermediate. However, in terms of overall diversity, these differences between sites are not great.

An additional 11 species of birds and two species of reptiles were recorded at Sites: 5 (Spring Creek) and 6 (further downstream within Nathan Gorge). These sites can be considered extensions of the Nathan Gorge site, and would bring overall diversity at that site to 66 species, similar to that found at Glebe Weir even though the water birds which were associated with the open water at the Glebe Weir were not present.

With the exception of frogs, the sites that will be flooded by the dam (Sites 2,3,4) have a greater overall vertebrate diversity than the site which will not be flooded (the Town Common). This is not unexpected, the Town Common being at best a semi-natural habitat and adjacent to a town. The other sites on the Dawson River are all comparatively remote from human interference, although of course the Glebe Weir Recreation Reserve does attract a steady flow of visitors and campers.

A number of bird species were noted to be breeding at the time of the survey. They included: Peaceful Dove, Variegated Fairy-wren, Red-backed Fairy-wren, Weebill, Little Crow, Sacred Kingfisher and Cockatiel. The latter two are dependent on tree hollows in large old trees for nest sites. The Greater Gliders present at Glebe Weir and Nathan Gorge are also dependent on tree hollows for roosting during the day.

No Koalas were found during the survey, but definite signs of them were seen at Glebe Weir and a male was heard calling at Lake Murphy. They are clearly present in the area, although probably at low densities.

Feral species recorded included the Cane Toad, House Mouse, Black Rat, Rabbit, Pig, Common Starling and House Sparrow. Of these, only the Cane Toad was recorded in abundance.

5. IMPACTS AND MITIGATION

5.1. Impacts

5.1.1. Loss of riparian vegetation in the impoundment

The riparian vegetation along the Dawson River between Taroom and Nathan Gorge is clearly important habitat for a large number of bird species, as well as for some mammals, reptiles and frogs.

The great majority of the birds recorded during this survey are considered to be forest or woodland inhabitants which could not persist in an entirely agricultural landscape. A large number, too, are considered birds of the coastal forests and ranges. Their presence inland is due largely to the riverine vegetation of the Dawson River which serves as a corridor allowing penetration from the coast. Such species include the Australian Brush-turkey, Emerald Dove, Australian King-Parrot, Rufous Fantail and Leaden Flycatcher. The riverine vegetation acts similarly as a corridor for mammal species such as the Koala, Sugar Glider and Greater Glider (Gordon 1992).

Consisting as it does of a large number of old-growth (mature and senile) trees, the riverine vegetation also provides critical nesting and roosting habitat for species dependent on tree hollows, such as Laughing Kookaburras, Sacred Kingfishers, White-throated Treecreepers, all parrots and cockatoos, owls, and Greater Gliders,. Similar areas of old-growth trees with nesting habitat for tree

hollow dependent species occur on some of the larger boggomosses, and also in the cluster of wetlands of which the Lake Murphy Conservation Park forms part.

Lake Murphy is a breeding area for water birds and an important refuge for tree hollow dependent species. Lake Murphy is included in the Directory of Important Wetlands in Australia under *Palm Tree and Robinson Creeks* (BBS010QL, p209, Australian Nature Conservation Agency 1996), which is described as a good example of seasonal and semi-permanent wetland in the Taroom area with groves of a *Livistona* sp.

Thus a significant impact on terrestrial fauna of the proposed development of the Dawson Dam will result from

- the loss of the riverine vegetation along the Dawson River between the AMTD 315.3 dam site and the tailgaters near Taroom,
- the loss of some riverine vegetation for about 5 km up Palm Tree Creek from its confluence with the Dawson (only with FSL 185 m)
- the loss (at EL 185 m) of vegetation on **x** of the larger inundated boggomosses, and
- the consequent isolation of Lake Murphy, which although remaining an important refuge for tree hollow dependent species will have restricted movement into and out of this important wetland area.

Some 58% of the 69 boggomosses located and surveyed in the special study by the Department of Environment's Queensland Herbarium (Fensham & Wilson 1997) will be flooded, including **y** larger boggomosses which have old-growth habitat.

5.1.2. Downstream habitat loss

Further clearing of remnant natural vegetation downstream of the Dawson Dam for agriculture can be expected to impact adversely all the Endangered, Vulnerable and Rare fauna species listed in Table 1. However, it is impossible to comment on the extent of this impact as the further area which may be cleared for agricultural pursuits is conjectural. However, given the extensive loss of natural habitats that has already occurred and the comparatively small remaining areas of suitable habitat, the impact is likely to be significant,.

5.1.3. Vulnerable species

The vegetation loss resulting from dam construction will significantly reduce the habitat available for two Vulnerable species: the Powerful Owl and the Ornamental Snake. The Powerful Owl, encountered during the survey by Crossman and Reimer (1986), requires tall open forest with large old-growth trees for nesting hollows for feeding and breeding (Blakers *et al.* 1984). Although the Powerful Owl was not encountered during this survey, it possibly still occurs in the area, and would be confined to the riverine vegetation, perhaps some of the larger boggomosses, and to Lake Murphy.

The Ornamental Snake is confined to riverine Eucalypt woodland habitat, and although there is no record of collection from the Dawson River, it is likely to occur there (Craig Eddy, pers. comm.).

5.1.4. Koalas

While the Koala is not considered to be a Threatened species in Queensland, or even Rare, it is significant as a symbol of conservation efforts for habitat preservation along the east coast of Australia. Koalas are likely to use the boggomosses and the riverine vegetation as refuges in times of drought and as movement corridors for dispersal (Melzer 1992, Alistair Melzer pers. comm. as cited in Natural Resource Assessments 1995). While there is probably only a small population of Koalas

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PART B

TABLE OF CONTENTS

Although many terrestrial invertebrates can be significant food sources for the larger vertebrates, a comprehensive survey of all the invertebrates in this time-limited supplementary study was not practical and land snails and slaters (terrestrial isopods) were selected as representative invertebrate groups for sampling. Land snails and slaters are considered particularly important environmental indicators because of their extreme sensitivity to moisture which is a key ecological factor in determining areas of significant biodiversity. In the case of land snails their utility in identifying small vine thicket refugia which house other significant biota has already been demonstrated (Solem, 1991; Stanisic, 1997). Land snails also have the advantage of providing post-mortem evidence of their presence through their shell remains thus obviating the need to interfere with living individuals. Both groups are numerically and taxonomically tractable. The QM has available expertise and a very large database of records for both groups which allow samples to be put into local and regional context.

However, more relevantly, the land snails and slaters highlighted significant components of the environment in the BOSFA report and, for this reason primarily, were chosen for the supplementary survey.

Considerable data on the terrestrial insect and spider faunas of the Taroom area are presented in the BOSFA study. These data are herein referenced only where they add significantly to the main conclusions derived from the vertebrates, land snails and slaters.

Many other invertebrate groups were collected in the BOSFA study but, for reasons outlined above, were not included in the formal report. However, all specimens, as is the case with all material collected in the Dawson River Study by staff of the QM, are safely housed in its collections and may be accessed at a future date.

Riparian habitats were given specific attention in the supplementary study since these were considered to be important refugial areas and potential corridors for terrestrial fauna in an otherwise semi-arid environment. These were assessed both up and downstream of the proposed dam site. In particular, the effects of interrupted water flow on downstream environments was carefully considered when selecting sites for additional sampling and interpreting results.

2. METHODOLOGY

2.1 BACKGROUND

The survey work completed in this supplementary study was greatly influenced by the field surveys carried out by the authors for the BOSFA report. Although the terms of reference of that study were intentionally restrictive in their scope, the authors extended the field study to cover the greater Taroom area so that the specific results achieved for the boggomosses and other spring-fed areas could be placed into a local and regional context. Initial survey work for the BOSFA study was carried out in June-September 1996. However, because of the need to survey the insects in the wetter times of the year, additional field work on the vertebrates and other invertebrate groups were also carried out in the period November-February 1997. Thus, the report contains considerable faunal data relevant to the present study.

All of those relevant data from the BOSFA report are included in the current report and duly acknowledged. However, additional information that was not considered central to the core

elements of the present study, but which may be of general interest to management providers, can be accessed from that report. These are noted where appropriate.

2.2 SURVEY

The survey results reflect the work completed by the authors for the BOSFA report and the supplementary field work carried out in the Taroom area in the period 13-22 August 1997.

2.3 SITE SELECTION

The rationale for site selection is outlined in the Appendices to the BOSFA report. In brief, the underlying thrust was to sample a wide range of habitat types concentrating on those with suspected high levels of biodiversity in order to establish species' presence. In particular the study aimed to include sample sites which covered the major habitat types. These included brigalow, vine thickets, ooline, boggomosses, alluvial flats, eucalypt forest and riparian habitats. Because of the large number of collecting sites included in the BOSFA study (see Tables 2,3) and considering their wide habitat coverage both types inside and outside the impoundment area, only one new site was added to the sampling programme in the supplementary study. This site (SS1) was at the Bundulla Road crossing of the Dawson River and was equivalent to Site 4 in Dr Jansen's report. The distribution of major collecting sites used in this study is presented in Figure 1. The greater part of the supplementary survey consisted of revisiting several key sites sampled in the BOSFA study in order to expand the data set of vertebrates and invertebrates recorded in the field. In all a total of 66 unique sites were sampled for invertebrate and vertebrate groups including 32 which were boggomosses. Several were visited on more than one occasion and a full list of collecting sites together with habitat descriptions is provided in the BOSFA report.

2.4 SAMPLING TECHNIQUES

Various sampling techniques were utilised. Some are outlined below and more detail is available in the BOSFA report.

2.4.1 Vertebrates.

The process of recording terrestrial vertebrates concentrated on scoring the presence of species and not on their commonness. Several techniques were used. An attempt was made to use them uniformly across the range of sites but the major aim was to score presence of as many species as possible, not to achieve statistically uniform data for population analysis of a few species.

(i) *Sight and sound identification.* Most of the vertebrates were identified this way, especially birds and frogs.

(ii) *Pitfall traps.* These consist of 2-litre ice cream containers sunk in the ground with their open top level with the ground surface so that ground-dispersing animals fall in. Ethylene glycol is used as a non-evaporative liquid preservative in the traps. A fibreglass cover is pinned over the trap to exclude rain and larger animals. This method is particularly effective for small lizards and frogs.

(iii) *Spotlighting.* Spotlighting focussed on sampling a selection of sites representative of the major habitat types.

(iv) *Mammal traps.* Lines of Elliott traps were used early in the BOSFA study but were rendered largely ineffective for native mammals because of a House Mouse plague. Several additional lines were set during the supplementary survey using bacon, oats and peanut butter as bait.

2.4.2 Land snails

Most land snails live in the litter zone usually sealed underneath rocks or logs (sometimes inside). Some species may be free sealers and lay in the litter beneath logs or where litter is accumulated against rocks and vegetation. Others occasionally burrow into the soil. A minority live arboreally. Because the vast majority of land snails (slugs are an exception) have a shell, which is left behind for some time after death, it is possible to sample these molluscs post mortem. Collecting techniques are comparatively simple but rely on experienced land snail collectors. All land snail families were surveyed.

(i) *Hand-collecting*. Involves searching out all suspected microhabitats for live snails and collecting all encountered live snails and dead shells. Search time was usually 1 hour per site. Hand-collecting was carried out only during the day because experience has shown that night collecting does not appear to have much advantages except in exceptionally wet circumstances. Furthermore the ability to find very small species (<5mm in shell diameter) is greatly reduced at night. The size of the area searched varied depending on the extent of the habitat available at any particular site but was usually less than 50m x 50m.

(ii) *Litter collecting*. A small quantity of leaf litter (including the top layer of loose soil which usually contains partially decomposed leaves) was collected from each site and subsequently 'dry-sorted' by eye and microscope in the laboratory. This method enables the recovery of the dead shells of numerous tiny species which might otherwise go unnoticed in routine collecting, It is an important adjunct to hand-collecting and a very good way of determining the total snail community present in an area.

2.4.3 Slaters

All sites were hand collected for slaters. As well, sites were pitfalled wherever possible. Significant numbers of slaters were also collected as part of the general insect and spider collecting programmes for the BOSFA study.

2.4.4 Insects and spiders

These groups were not included in the supplementary survey. However information on the spiders and insects may be found in the appendices to the BOSFA report. Collecting techniques used for these groups are detailed in that report.

2.4.5 Other invertebrates

These were collected using the wide variety of invertebrate techniques outlined in the BOSFA report.

2.5 Specimen processing

Techniques for specimen processing are detailed in the Appendices of the BOSFA report.

2.6 Identification and classification

Specimen data and records obtained during the supplementary and BOSFA surveys were verified by relevant expert scientists at the QM. In some cases outside knowledge had to be sought (see BOSFA report). Relevant classificatory sources are acknowledged in the preface to Table 1.

2.7 DATABASE SEARCH

The QM's databases for land snails, slaters, birds, herpetofauna and mammals were searched for additional records within the survey area. These are extensive and consist of more than 100, 000 records for vertebrates and more than 200, 000 records for land snails. These records combined with the expert knowledge of Museum scientists, were used to assess the local, regional and national significance of this fauna.

3. RESULTS

A full list of the vertebrates, land snails and slaters are presented in Table 1. The more significant aspects of the findings are presented below.

3.1 LAND SNAILS

More than 1200 specimens were collected during the supplementary and BOSFA studies at 47 different sites. These belonged to 26 species of which 3 are commonly encountered introductions. Table 3 of Appendix A of the BOSFA report shows the distribution of land snail species across collecting sites collected during that survey. No new data on site distribution were uncovered during the supplementary survey.

The overall results of the surveys are generally in accord with the conclusions of Stanisic (1994, 1996) which suggest relatively low levels of diversity at individual collecting sites within the Brigalow Lands. Nearly all sites sampled yielded less than 10 species (many less than 5). Some boggomoss sites yielded no land snails because of the nature of the habitat which was essentially aquatic. However, in these cases land snails were often found in the surrounding scrub which appeared to acquire benefit from the perennial moisture supply of the mound spring. Most numbers of species were found at Nathan Gorge (BS14) [15 spp.] and along Cabbage Tree Creek (BS38) [10 spp.]. These sites, in particular the riverine vine thicket at Nathan Gorge, yielded many more species than at most of the 'woodland' sites and demonstrate the importance of moist riparian habitats in semi-arid countryside. Other collecting sites to yield significant numbers of species comprised boggomoss environments and included the areas adjacent to Boggomoss 10 (BS11) [8 spp.], Boggomoss 8 (BS17) [8 spp.], Boggomoss 25 (BS33) [7 spp.] and the areas adjacent to Boggomosses 4 & 5 (BS6) and Boggomoss 1 (BS1) [both with 6 spp]. Excluding these sites most numbers of species occurred in typical land snail refugia such as rock outcrops (BS24) [7 spp] and along watercourses (riparian environments) (BS40 & BS41) [5 spp.].

A search of the QM land snail database revealed that a total of 103 species are recorded for the Queensland Brigalow Lands Biogeographic Region. A more localised search of the database for the greater Taroom area (as defined by the grid square delimited by co-ordinates 24°50'S- 25°50'S and 149°20'E-150°20'E) showed only 20 species recorded for the area. Scrutiny of these database records show that the survey has provided the first records of 10 species for this area although most of these species are known to occur within the Brigalow Lands. A few species showed significant range extensions. An additional 4 species, shown to occur in the area by the database, were not recorded in the survey. These are noted in Table 1. Hence a total fauna of 30 species have now been found in this relatively small area, compared with approximately 100 for the entire Brigalow Belt.

A comprehensive analysis of the species is presented in the BOSFA report. The most significant were:-

- *Elsothera hewittorum* Stanisic, 1996.

A comparatively rare species largely unknown prior to this survey. Prefers moist refugia including several boggomosses (Boggomosses 4, 5, 13 and 15) on Boggomoss Reserve and Mount Rose Station. It is considered a local indicator of special moist refugia (Stanisic, 1996). The nearest relatives (congeners) of this species are in central western New South Wales and eastern South Australia.

- *Adclarkia dawsonensis* Stanisic, 1996.

An environmentally restricted species occurring in coolibah habitats on the Quaternary alluvia of the Dawson River and some of its tributaries from Taroom to Theodore. This species defines what is now a highly degraded community type. Its occurrence is greatest at the Dawson River crossing on the Isla-Delusion Road where disturbance of the natural vegetation appears to be minimal. Its occurrence on Boggomoss 8 on Mount Rose Station is probably due to the fact that these perennially moist environments are the last vestiges of the coolibah communities in this area. Otherwise the only living population is known to occur at the crossing of the Dawson on the Isla-Delusion Road. These are the only known living populations of a species whose nearest relatives are probably in eastern South Australia (Stanisic, 1996).

3.2 SLATERS

A total of 15 species of slater were found during the surveys. These are listed in Table 1. No additional records were obtained from the QM database. Thirteen (13) of these species are undescribed. Most significant were:-

- *Spherillo* sp. A. This undescribed species has only been found in the Dawson River Basin. Although found on the boggomosses, it is also found in riverine areas, vine thickets on slopes and ooline scrub.
- *Acanthodillo* sp. A. An undescribed species known only from boggomosses and vine thickets in Cabbage Tree Gorge.
- *Hanoniscus* sp. A. An undescribed, litter-dwelling species of uncertain familial affinity known only from boggomosses and nearby vine thickets.

3.3 OTHER TERRESTRIAL INVERTEBRATES

Significant insect and spider species are presented in Appendices C & D of the BOSFA report. The more notable include several species of an unusual wolf spider belonging to the primitive *Venin* (Family Glycoside). The spider diversity of the Boggomosses is unusually high compared with records for the surrounding area; a significant northern extension of the range of the southern Queensland *Pelechorhynchus fulvus* (Family Pelecorhynchidae); a new species of the unique Australian genus *Aphylum* (Family Aphylidae). This is a group of sap-sucking bugs hitherto known only from South Australia, Victoria and New South Wales; a significant westward extension of *Gwahiria bifoveata* (Family Diapriidae), otherwise known from high-rainfall coastal areas; a significant northern extension of the range of the scorpion fly *Harpobittacus christine* (Family Bittacidae); first records of the family Mengenellidae from Australia.

3.4 VERTEBRATES

The study significantly increased the number of vertebrate species listed in Dr Jansen's report. As well, the survey and search of the QM database added the following number of species to Crossman & Reimer's (1986) detailed list of the Taroom area: four mammals, seven birds, nineteen reptiles and one frog. As noted by Crossman & Reimer (1986) the Taroom area forms an interface between inland semi-arid lands to the west and the higher

rainfall areas of the coast to the east. This overlap of eastern and western elements is reflected in the larger wildlife of the area. The area is not highlighted as a significant biogeographic area nor do the vertebrates emphasise any of the habitats as faunistically unique.

3.4.1 Significant vertebrates

This report identifies the following special species as designated by *Nature Conservation (Wildlife) Regulation 1994, Subordinate Legislation No. 474 of 1994*: Mammals, 1 endangered, 2 rare, 3 special cultural; Birds, 1 extinct, 1 endangered, 6 vulnerable, 9 rare; Reptiles, 4 vulnerable, 3 rare; Amphibia, 1 rare. A case by case assessment of these species, detailing potential impacts and future management strategies, is presented at the end of this report (Appendix 1).

4. CONCLUSIONS

The main points to emerge from the results of this study are that:

- The terrestrial vertebrate fauna includes 30 species listed as extinct, endangered, vulnerable, rare or special cultural species under Queensland legislation. Probably, a further four of these species are probably extinct in the Taroom area, and another six probably are not found in the area to be inundated. Very little can be predicted about the effect of the inundation on the other species. The major effect will be loss of habitat by inundation. For slow-moving species there is the distinct possibility of drowning.

- There is a significant terrestrial invertebrate fauna in the greater Taroom area. This fauna exists mainly along water courses and in secondary moist refugia such as the boggomosses and vine thickets.

- There are components of this fauna such as land snails and slaters which highlight the regional significance of these refugia within the broader Brigalow Belt.

- The Taroom boggomosses are an important archipelago of moist refugia which in some cases support significant invertebrates highlighted by the very localised land snails *Adclarkia dawsonensis* and *Elsothera hewittorum* .

- The moist riparian habitats of the Dawson River and its tributaries, particularly in the vicinity of Nathan Gorge, are important refugia which support considerable invertebrate biodiversity.

- The moist riparian refugia in the greater Taroom area probably act as important corridors for the genetic mixing and dispersal of terrestrial invertebrates which include locally restricted species and some with the greater part of their distribution elsewhere. Regionally the greater Taroom area has probably been part of an important biogeographic dispersal corridor for terrestrial fauna in the past. Interruption to these corridors by the dam impoundment should be compensated by revegetation in order to maintain past connections.

- The restriction of the land snail *Adclarkia dawsonensis* to the coolibah habitats of the alluvial flats of the Taroom-Theodore region highlights these habitats as a particularly important biotype in the Dawson River drainage area.

- Boggomosses form an important component of the alluvial flat ecosystem but because of extensive clearing of this land unit for grazing and agriculture have become even more significant for the survival of land snails at a local level.

- The riparian habitat at the crossing of the Dawson River on the Isla-Delusion Road (AD 4) is a particularly significant refugium. Compared with other riverine environments along the Dawson River between Taroom and Theodore it is reasonably undisturbed. It is in the vicinity of a stock reserve and should be considered for reservation. It is also liable to be affected by the interruption to water flow which will accompany the completion of the dam. Considerable thought need to be given to the implementation and maintenance of a system of environmental flow which will maintain this and similar riparian communities downstream of the impoundment.

5. COMMENTS ON DR AMY JANSEN'S DRAFT TERRESTRIAL FAUNA REPORT .

In our opinion the time which was made available for the completion of the initial report was insufficient to allow a comprehensive field survey of the study site to be undertaken. However, rather than being seen as a reflection on Dr Jansen's methodology, this shortcoming appears linked to time constraints which were set out in the original submission. A similar criticism could be levelled at this supplementary report in regard to the limited nature of the field survey. Short term field trapping for establishing species presence, particularly during unfavourable times of the year, will generally be flawed by the effects of faunal response to seasonal factors such as temperature, rainfall and daylength.

While a more comprehensive faunal survey would have been an ideal outcome of Dr Jansen's terrestrial fauna study, her specific aim was to determine, within a relatively short time frame, the impacts of building the proposed dam. Large scale faunal surveys are required for most areas of Australia but are liable to be beset by a number of practical problems. Apart from the sheer logistic issues created by the large range of specific collecting techniques to be employed and the potentially immense number of specimens and species to be processed, there would also be problems associated with identifications. For many invertebrate groups in particular, either the taxonomic expertise is unavailable or the fauna too poorly known for them to be useful in contributing to the determination of the significant environmental impacts of the proposed dam.

This supplementary study adds substantially to the fauna representation of the project area outlined in Dr Jansen's report and also presents considerable data for the greater Taroom area. Although sites in this latter category fall outside the impoundment area for the proposed dam, the data provided by the collections made there provided important information for assessing the overall significance of the fauna of the proposed impoundment area.

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TABLE 1. List of species of land snails, slaters and terrestrial vertebrates from the sites in the greater Taroom and surrounding areas. which were surveyed during the supplementary and BOSFA studies.

Exotic animals are indicated by *I*. Special fauna , for example, endangered, vulnerable and rare, as defined by *Nature Conservation (Wildlife) Regulation 1994, Subordinate Legislation No. 474 of 1994*, are detailed in Appendix 1. In the following, scientific names of land snails follow Smith (1992), isopods follow Vandel (1972), mammals, frogs, and reptiles follow Ingram & Raven (1991), birds follow Christidis & Boles (1994) and Pizzey & Knight (1997).

LAND SNAILS
PUPILLIDAE
Gastrocopta pediculus (Shuttleworth, 1852)
Gastrocopta hedleyi Pilsbry, 1917
Pumilicopta bifurcata Solem, 1989
Cylindrovertilla hedleyi Pilsbry, 1920
Pupoides pacificus (Pfeiffer, 1846)
SUBULINIDAE
Eremopeas tuckeri (Pfeiffer, 1846)
Lamellaxis gracilis (Hutton, 1834) *I*
RHYTIDIDAE
Rhytididae BL 2
PUNCTIDAE
Punctididae BL 1
Punctidae BL 2
CHAROPIDAE
Elsothera hewittorum Stanisic, 1996
Discocharopa aperta (Moellendorff, 1888)
Charopidae BL 6
HELICODISCIDAE
Stenopylis coarctata (Moellendorff, 1894)
SUCCINEIDAE
Succineidae BL 1
HELICARIONIDAE
Helicarionidae BL 1
Helicarionidae BL 2
Helicarionidae BL 12
ZONITIDAE
Hawaiia minuscula (Binney, 1840) *I*
LIMACIDAE
Deroceras panormitanum (Lessona & Pollonera, 1882) *I*
CAMAENIDAE
Figuladra mattea (Iredale, 1933)
Sphaerospira mossmani (Brazier, 1875).
Xanthomelon pachystylum (Pfeiffer, 1845)
Neveritis misella (Gude, 1907)
Trachiopsis mucosa (Cox, 1868)
Pallidelix greenhilli (Cox, 1866)
Adclarkia dawsonensis Stanisic, 1996
Camaenidae BL 1
Camaenidae BL 10
Camaenidae BL 17

SLATERS
PHILOSCIDAE
Laevophiloscia sp. A
ARMIDILLIDAE

Australiodilla bifrons
Cubaris sp. A
Cubaris sp. B
Cubaris sp. C
Cubaris sp. D
Spherillo grossus
Spherillo sp. A
Spherillo sp. B
Acanthodillo sp. A
ONISCIDAE
Hanoniscus sp. A
TRACHELIPIDAE
Nagurus sp. A
PORCELLIONIDAE
*Porcellionides pruinosusi**I*

MAMMALS

ORNITHORHYNCHIDAE	
Ornithorhynchus anatinus	Platypus
TACHYGLOSSIDAE	
Tachyglossus aculeatus	Short-beaked Echidna
DASYURIDAE	
Planigale maculata	Common Planigale
Sminthopsis macroura	Stripe-faced Dunnart
Sminthopsis murina	Common Dunnart
PERAMELIDAE	
Isoodon macrourus	Northern Brown Bandicoot
PHASCOLARCTIDAE	
Phascolarctos cinereus	Koala
PETAURIDAE	
Petaurus breviceps	Sugar Glider
Petaurus norfolcensis	Squirrel Glider
Petaurus australis	Yellow-bellied Glider
PSEUDOCHEIRIDAE	
Petauroides volans	Greater Glider
PHALANGERIDAE	
Trichosurus vulpecula	Common Brushtail Possum
ACROBATIDAE	
Acrobates pygmaeus	Feathertail Glider
POTOROIDAE	
Aepyprymnus rufescens	Rufous Bettong
MACROPODIDAE	
Onychogalea fraenata	Bridled Naitail Wallaby
Macropus dorsalis	Black-striped Wallaby
Macropus giganteus	Eastern Grey Kangaroo
Macropus parryi	Whiptail Wallaby
Macropus robustus	Common Wallaroo
Macropus rufogriseus	Red-necked Wallaby
Petrogale herberti	Herbert's Rock-wallaby
Wallabia bicolor	Swamp Wallaby
PTEROPODIDAE	
Pteropus scapulatus	Little Red Flying-fox
EMBALLONURIDAE	
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat
MOLOSSIDAE	
Mormopterus beccarii	Beccari's Mastiff-bat
Mormopterus planiceps	Little Mastiff-bat
VESPERTILIONIDAE	

Chalinolobus dwyeri	Large Pied Bat
Chalinolobus gouldii	Gould's Wattle Bat
Chalinolobus nigrogriseus	Hoary Bat
Chalinolobus picatus	Little Pied Bat
Eptesicus pumilis	Little Cave Bat
Miniopterus schreibersii	Common Bent-winged Bat
Nyctophilus geoffroyi	Lesser Long-eared Bat
Scotorepens greyii	Little Broad-nosed Bat
LEPORIDAE	
Lepus capensis	Brown Hare*I*
Oryctolagus cuniculus	Rabbit*I*
MURIDAE	
Hydromys chrysogaster	Water Rat
Melomys cervinipes	Fawn-footed Melomys
Pseudomys delicatulus	Delicate Mouse
Pseudomys gracilicaudatus	Eastern Chestnut Mouse
Mus musculus	House Mouse*I*
Rattus rattus	Black Rat*I*
Rattus fuscipes	BushRat
Rattus tunneyi	Pale Field-rat
CANIDAE	
Canus familiaris dingo	Dingo
Vulpes vulpes	Fox*I*
FELIDAE	
Felis catus	Feral Cat*I*
SUIDAE	
Sus scrofa	Feral Pig*I*
BOVIDAE	
Capra hircus	Feral Goat*I*

BIRDS

CASUARIIDAE	
Dromaius novaehollandiae	Emu
MEGAPODIIDAE	
Alectura lathami	Australian Brush-turkey
PHASIANIDAE	
Coturnix pectoralis	Stubble Quail
ANATIDAE	
Dendrocygna eytoni	Plumed Whistling-Duck
Dendrocygna arcuata	Wandering Whistling-Duck
Cygnus atratus	Black Swan
Chenonetta jubata	Australian Wood Duck
Stictonetta naevosa	Freckled Duck
Nettapus coromandelianus	Cotton Pygmy-goose
Anas platyrhynchos	Mallard*I*
Anas superciliosa	Pacific Black Duck
Anas rhynchotis	Australasian Shoveler
Anas gracilis	Grey Teal
Aythya australis	Hardhead
PODICIPEDIDAE	
Podiceps cristatus	Great Crested Grebe
Tachybaptus novaehollandiae	Australasian Grebe
Poliocephalus poliocephalus	Hoary-headed Grebe
ANHINGIDAE	
Anhinga melanogaster	Darter
PHALACROCORACIDAE	
Phalacrocorax melanoleucos	Little Pied Cormorant
Phalacrocorax sulcirostris	Little Black Cormorant

Phalacrocorax carbo	Great Cormorant
PELECANIDAE	
Pelecanus conspicillatus	Australian Pelican
ARDEIDAE	
Egretta novaehollandiae	White-faced Heron
Ardea pacifica	White-necked Heron
Ardea alba	Great Egret
Ardea garzetta	Little Egret
Ardea intermedia	Intermediate Egret
Nycticorax caledonicus	Nankeen Night Heron
THRESKIORNITHIDAE	
Plegadis falcinellus	Glossy Ibis
Threskiornis molucca	Australian White Ibis
Threskiornis spinicollis	Straw-necked Ibis
Platalea regia	Royal Spoonbill
Platalea flavipes	Yellow-billed Spoonbill
CICONIIDAE	
Ephippiorhynchus asiaticus	Black-necked Stork
ACCIPITRIDAE	
Aviceda subcristata	Pacific Baza
Elanus axillaris	Black-shouldered Kite
Milvus migrans	Black Kite
Haliastur sphenurus	Whistling Kite
Haliaeetus leucogaster	White -bellied Sea-Eagle
Accipiter fasciatus	Brown Goshawk
Accipiter cirrhocephalus	Collared Sparrowhawk
Aquila audax	Wedge-tailed Eagle
FALCONIDAE	
Falco berigora	Brown Falcon
Falco longipennis	Australian Hobby
Falco peregrinus	Perigrine Falcon
Falco cenchroides	Nankeen Kestrel
GRUIDAE	
Grus rubicunda	Brolga
RALLIDAE	
Porzana tabuensis	Spotless Crake
Porphyrio porphyrio	Purple Swamphen
Gallinula tenebrosa	Dusky Moorhen
Fulica atra	Eurasian Coot
OTIDIDAE	
Ardeotis australis	Australian Bustard
TURNICIDAE	
Turnix pyrrhothorax	Red-chested Button-quail
Turnix varia	Painted Button-quail
SCOLOPACIDAE	
Gallinago hardwickii	Latham's Snipe
Calidris acuminata	Sharp-tailed Sandpiper
PEDIONOMIDAE	
Pedionomus torquatus	Plains-wanderer
ROSTRATULIDAE	
Rostratula benghalensis	Painted Snipe
JACANIDAE	
Irediparra gallinacea	Comb-crested Jacana
BURHINIDAE	
Burhinus grallarius	Bush Stone-curlew
RECURVIROSTRIDAE	
Himantopus himantapus	Black-winged Stilt
CHARADRIIDAE	

Elseyornis melanops	Black-fronted Dotterel
Erythrogonys cinctus	Red-kneed Dotterel
Vanellus tricolor	Banded Lapwing
Vanellus miles	Masked Lapwing
LARIDAE	
Phaethon rubricauda	Red-tailed Tropicbird
Larus novaehollandiae	Silver Gull
Chlidonias hybridus	Whiskered Tern
COLUMBIDAE	
Columba livia	Feral Pigeon*I*
Chalcophaps indica	Emerald Dove
Phaps chalcoptera	Common Bronzewing
Ocyphaps lophotes	Crested Pigeon
Geophaps scripta	Squatter Pigeon
Geopelia cuneata	Diamond Dove
Geopelia striata	Peaceful Dove
Geopelia humeralis	Bar-shouldered Dove
Leucosarcia melanoleuca	Wonga Pigeon
CACATUIDAE	
Calyptorhynchus banskii	Red-tailed Black-Cockatoo
Calyptorhynchus lathami	Glossy Black-Cockatoo
Calyptorhynchus funereus	Yellow-tailed Black-Cockatoo
Cacatua roseicapilla	Galah
Cacatua galerita	Sulphur-crested Cockatoo
Nymphicus hollandicus	Cockatiel
PSITTACIDAE	
Trichoglossus haematodus	Rainbow Lorikeet
Trichoglossus chlorolepidotus	Scaly-breasted Lorikeet
Glossopsitta pusilla	Little Lorikeet
Alisterus scapularis	Australian King-Parrot
Aprosmictus erythropterus	Red-winged Parrot
Platycercus adscitus	Pale-headed Rosella
Northiella haematogaster	Blue Bonnet
Psephotus haematonotus	Red-rumped Parrot
Psephotus pulcherrimus	Paradise Parrot
Neophema pulchella	Torquoise Parrot
Melopsittacus undulatus	Budgerigar
CUCULIDAE	
Cuculus pallidus	Pallid Cuckoo
Cacomantis variolosus	Brush Cuckoo
Cacomantis flabelliformis	Fan-tailed Cuckoo
Chrysococcyx basalis	Horsfield's Bronze-Cuckoo
Chrysococcyx lucidus	Shining Bronze-Cuckoo
Eudynamys scolopacea	Common Koel
Scythrops novaehollandiae	Channel-billed Cuckoo
CENTROPODIDAE	
Centropus phasianinus	Pheasant Coucal
STRIGIDAE	
Ninox novaeseelandiae	Southern Boobook
Ninox strenua	Powerful Owl
TYTONIDAE	
Tyto novaehollandiae	Masked Owl
Tyto alba	Barn Owl
PODARGIDAE	
Podargus strigoides	Tawny Frogmouth
CAPRIMULGIDAE	
Eurostopodus mystacalis	White-throated Nightjar
AEGOTHELIDAE	

Aegotheles cristatus	Australian Owlet-nightjar
APODIDAE	
Hirundapus caudacutus	White-throated Needletail
Apus pacificus	Fork-tailed Swift
ALCEDINIDAE	
Alcedo azurea	Azure Kingfisher
HALCYONIDAE	
Dacelo novaeguineae	Laughing Kookaburra
Todiramphus macleayii	Forest Kingfisher
Todiramphus pyrrhopygia	Red-backed Kingfisher
Todiramphus sanctus	Sacred Kingfisher
MEROPIDAE	
Meropus ornatus	Rainbow Bee-eater
CORACIIDAE	
Eurystomus orientalis	Dollarbird
CLIMACTERIDAE	
Cormobates leucophaeus	White-throated Treecreeper
Climacteris picumnus	Brown Treecreeper
MALURIDAE	
Malurus cyaneus	Superb Fairy-wren
Malurus melanocephalus	Red-backed Fairy-wren
Malurus lamberti	Variegated Fairy-wren
PARDALOTIDAE	
Pardalotus punctatus	Spotted Pardalote
Pardalotus striatus	Striated Pardalote
Sericornis frontalis	White-browed Scrubwren
Chthonicola sagittata	Speckled Warbler
Smicrornis brevirostris	Weebill
Gerygone fusca	Western Gerygone
Gerygone olivacea	White-throated Gerygone
Acanthiza pusilla	Brown Thornbill
Acanthiza apicalis	Inland Thornbill
Acanthiza reguloides	Buff-rumped Thornbill
Acanthiza chrysorrhoa	Yellow-rumped Thornbill
Acanthiza nana	Yellow Thornbill
Acanthiza lineata	Striated Thornbill
MELIPHAGIDAE	
Acanthagenys rufogularis	Spiny-cheeked Honeyeater
Plectorhyncha lanceolata	Striped Honeyeater
Philemon corniculatus	Noisy Friarbird
Philemon citreogularis	Little Friarbird
Entomyzon cyanotis	Blue-faced Honeyeater
Manorina melanocephala	Noisy Miner
Manorina flavigula	Yellow-throated Miner
Meliphaga lewinii	Lewin's Honeyeater
Lichenostomus chrysops	Yellow-faced Honeyeater
Lichenostomus virescens	Singing Honeyeater
Lichenostomus fuscus	Fuscous Honeyeater
Lichenostomus leucotis	White-eared Honeyeater
Lichenostomus melanops	Yellow-tufted Honeyeater
Lichenostomus penicillatus	White-plumed Honeyeater
Melithreptus gularis	Black-chinned Honeyeater
Melithreptus brevirostris	Brown-headed Honeyeater
Melithreptus albogularis	White-throated Honeyeater
Melithreptus lunatus	White-naped Honeyeater
Lichmera indistincta	Brown Honeyeater
Myzomela sanguinolenta	Scarlet Honeyeater
Acanthorhynchus tenurirostris	Eastern Spinebill

PETROICIDAE	
Microeca fascinans	Jacky Winter
Petroica goodenovii	Red-capped Robin
Petroica rosea	Rose Robin
Eopsaltria australis	Eastern Yellow Robin
POMATOSTOMIDAE	
Pomatostomus temporalis	Grey-crowned Babbler
CINCLOSOMATIDAE	
Psophodes olivaceus	Eastern Whipbird
NEOSITTIDAE	
Daphoenositta chrysoptera	Varied Sittella
PACHYCEPHALIDAE	
Pachycephala pectoralis	Golden Whistler
Pachycephala rufiventris	Rufous Whistler
Colluricincla megarhyncha	Little Shrike-thrush
Colluricincla harmonica	Grey Shrike-thrush
DICRURIDAE	
Myiagria rubecula	Leaden Flycatcher
Myiagra cyanoleuca	Satin Flycatcher
Myiagra alecto	Shining Flycatcher
Myiagra inquieta	Restless Flycatcher
Grallina cyanoleuca	Magpie-lark
Rhipidura rufifrons	Rufous Fantail
Rhipidura fuliginosa	Grey Fantail
Rhipidura leucophrys	Willie Wagtail
Dicrurus bracteatus	Spangled Drongo
CAMPEPHAGIDAE	
Coracina novaehollandiae	Black-faced Cuckoo-shrike
Coracina papuensis	White-bellied Cuckoo-shrike
Coracina tenuirostris	Cicadabird
Coracina maxima	Ground Cuckoo-shrike
Lalage sueurii	White-winged Triller
ORIOLIDAE	
Oriolus sagittatus	Olive-backed Oriole
Sphecotheres viridis	Figbird
ARTAMIDAE	
Artamus leucorynchus	White-breasted Woodswallow
Artamus superciliosus	White-browed Woodswallow
Artamus cinereus	Black-faced Woodswallow
Artumus cyanopterus	Dusky Woodswallow
Artamus minor	Little Woodswallow
Cracticus torquatus	Grey Butcherbird
Cracticus nigrogularis	Pied Butcherbird
Gymnorhina tibicen	Australian Magpie
Strepera graculina	Pied Currawong
CORVIDAE	
Corvus coronoides	Australian Raven
Corvus orru	Torresian Crow
CORCORACIDAE	
Corcorax melanorhamphos	White-winged Chough
Struthidea cinerea	Apostlebird
PTILONORHYNCHIDAE	
Chlamydera maculata	Spotted Bowerbird
ALAUDIDAE	
Mirafra javanica	Singing Bushlark
MOTACILLIDAE	
Anthus novaeseelandiae	Richard's Pipit
PASSERIDAE	

Passer domesticus	House Sparrow*I*
Taeniopygia guttata	Zebra Finch
Taeniopygia bichenovii	Double-barred Finch
Neochmia modesta	Plum-headed Finch
Neochmia ruficauda	Star Finch
Neochmia phaeton	Crimson Finch
Neochmia temporalis	Red-browed Finch
Lonchura castaneothorax	Chestnut-breasted Mannikin
DICAEIDAE	
Dicaeum hirundinaceum	Mistletoebird
HIRUNDINIDAE	
Cheramoeca leucosternus	White-backed Swallow
Hirundo neoxena	Welcome Swallow
Hirundo nigricans	Tree Martin
Hirundo ariel	Fairy Martin
SYLVIIDAE	
Acrocephalus stentoreus	Clamorous Reed Warbler
Megalurus timoriensis	Tawny Grassbird
Cincloramphus mathewsi	Rufous Songlark
Cisticola exilis	Golden-headed Cisticola
ZOSTEROPIDAE	
Zosterops lateralis	Silvereye
STURNIDAE	
Sturnus vulgaris	Common Starling*I*

AMPHIBIANS

BUFONIDAE	
Bufo marinus	Cane Toad*I*
HYLIDAE	
Cyclorana novaehollandiae	Eastern Snapping-Frog
Litoria alboguttata	Greenstripe Frog
Litoria caerulea	Green Treefrog
Litoria fallax	Eastern Sedgefrog
Litoria latopalmata	Broad-palmed Rocketfrog
Litoria lesueuri	Stony-creek Frog
Litoria peronii	Emerald-spotted Treefrog
Litoria rubella	Naked Treefrog
MYOBATRACHIDAE	
Crinia parinsignifera	Beeping Froglet
Limnodynastes fletcheri	Barking Frog
Limnodynastes ornatus	Ornate Burrowing Frog
Limnodynastes peroni	Striped Marshfrog
Limnodynastes salmini	Salmon-striped Frog
Limnodynastes tasmaniensis	Spotted Marshfrog
Limnodynastes terraereginae	Scarlet-sided Pobblebonk
Pseudophryne major	Great Brown Broodfrog
Pseudophryne raveni	Copper-backed Broodfrog
Uperoleia rugosa	Chubby Gungan

REPTILES

CHELONIIDAE	
Chelodina longicollis	Eastern Long-necked Tortoise
Elseya latisternum	Saw-shelled Tortoise
Emydura macquarii	Murray Tortoise
GEKKONIDAE	
Diplodactylus steindachneri	
Diplodactylus taenicauda	Golden-tailed Gecko
Diplodactylus vittatus	Wood Gecko

Diplodactylus williamsi	
Gehyra dubia	
Heteronotia binoei	Bynoe's Gecko
Oedura rhombifer	
Oedura robusta	Robust Velvet Gecko
Oedura tryoni	Southern Spotted Velvet Gecko
Saltuarius salebrosus	
Underwoodisaurus milii	Thick-tailed Gecko
PYGOPODIDAE	
Lialis burtonis	Burton's Snake Lizard
Paradelma orientalis	
Pygopus nigriceps	Hooded Scaly-foot
SCINCIDAE	
Anomalopus brevicollis	
Anomalopus leuckartii	
Anomalopus verreauxi	
Carlia pectoralis	
Carlia schmeltzii	
Cryptoblepharus plagiocephalus	
Cryptoblepharus virgatus	
Ctenotus robustus	
Cyclodomorphus gerrardii	Pink-tongue Skink
Egernia modesta	
Egernia rugosa	Yakka Skink
Egernia striolata	Tree Skink
Eulamprus brachysoma	
Eulamprus martini	
Lampropholis delicata	
Lerista fragilis	
Lerista muelleri	
Lerista punctatovittata	
Lygisaurus foliorum	
Lygisaurus timlowi	
Morethia boulengeri	
Morethia taeniopleura	Fire-tailed Skink
Sphenomorphus quoyii	Water Skink
Tiliqua scincoides	Eastern Blue-tongue
AGAMIDAE	
Diporiphora australis	
Gemmatophora nobbi	Nobbi
Physignathus lesueurii	Eastern Water Dragon
Pogona barbata	Bearded Dragon
VARANIDAE	
Varanus gouldii	Sand Monitor
Varanus tristis	
Varanus varius	Lace Monitor
TYPHLOPIDAE	
Ramphotyphlops ligatus	
Ramphotyphlops proximus	
BOIDAE	
Aspidites melanocephalus	Black-headed Python
Morelia spilota	Carpet Snake
COLUBRIDAE	
Boiga irregularis	Brown Tree Snake
Dendrelaphis punctulata	Green Tree Snake
Tropidonophis mairii	Freshwater Snake
ELAPIDAE	
Acanthophis antarcticus	Common Death Adder

Cacophis harriettae	White-naped Snake
Demansia psammophis	Yellow-faced Whip Snake
Demansia torquata	Collared Whip Snake
Furina diadema	Red-naped Snake
Hoplocephalus bitorquatus	Pale-headed Snake
Oxyuranus scutellatus	Taipan
Pseudechis australis	Mulga Snake
Pseudonaja textilis	Eastern Brown Snake
Rhinoplocephalus nigrescens	Eastern Small-eyed Snake
Simoselaps australis	Coral Snake
Vermicella annulata	Common Bandy-Bandy

APPENDIX 1

SPECIAL SPECIES

The following is an annotated list of the extinct, endangered, vulnerable, rare and special cultural species as designated in *Nature Conservation (Wildlife) Regulation 1994, Subordinate Legislation No. 474 of 1994.*

MAMMALS

BRIDLED NAILTAIL WALLABY.

Species name: Bridled Nailtail Wallaby *Onychogalea fraenata.*
Distribution:
Local: Extinct.
Queensland: Restricted to an area of about 11,000ha in Central Queensland (Strahan, 1983). Reintroduced elsewhere.
Extralimital: Extinct in New South Wales and Victoria.
Population Status: Extinct in the Taroom area.
Conservation Status: Endangered.
Population Health: Not applicable.
Habitat Preferences: Not applicable.
Barriers/corridors: Not applicable.
Sensitivity to Habitat Modifications: Not applicable.
Effects from the proposed Activity: Not applicable.
Amelioration Measures including Habitat Restoration: Not applicable.
Ability of a Species to Recover: Not applicable.
Recovery Plans: Not applicable.
On-going Monitoring/audit Programmes: Not applicable.

2. LARGE PIED BAT.

Species name: Large Pied Bat *Chalinolobus dwyeri.*
Distribution:
Local: Recorded as scarce by Crossman & Reimer (1986).
Queensland: Interior, sub-arid Southern Queensland.
Extralimital: Interior, sub-arid Northern New South Wales.
Population Status: Recorded as scarce by Crossman & Reimer (1986).
Conservation Status: Rare.
Population Health: Unknown.
Habitat Preferences: Well-wooded habitats with daytime roosts of caves, tunnels, mines and abandoned nests of martins (Strahan, 1983).
Barriers/corridors: The species is vagile.
Sensitivity to Habitat Modifications: Unknown.
Effects from the proposed Activity: Unknown.
Amelioration Measures including Habitat Restoration: None planned.
Ability of a Species to Recover: Unknown.
Recovery Plans: None planned.
On-going Monitoring/audit Programmes: None planned.

3. LITTLE PIED BAT.

Species name: Little Pied Bat *Chalinolobus picatus.*
Distribution:
Local: Recorded as scarce by Crossman & Reimer (1986).
Queensland: Interior, arid and sub-arid of Western and Southern Queensland.
Extralimital: Interior, arid Western New South Wales and Easren SouthAustralia.
Population Status: Recorded as scarce by Crossman & Reimer (1986).
Conservation Status: Rare.
Population Health: Unknown.

Habitat Preferences: Arid habitats - providing water is available - with daytime roosts of caves and mine-shafts (Strahan, 1983).
Barriers/corridors: The species is vagile.
Sensitivity to Habitat Modifications: Unknown.
Effects from the proposed Activity: Unknown.
Amelioration Measures including Habitat Restoration: None planned.
Ability of a Species to Recover: Unknown.
Recovery Plans: None planned.
On-going Monitoring/audit Programmes: None planned.

4. PLATYPUS
Species name: Platypus *Ornithorhynchus anatinus*.
Distribution:

Local: Two records from the Dawson River (Crossman & Reimer, 1986).
State: Eastern watersheds, but was once occurred in much of the Condamine River.
Extralimital: Tasmania; also coastal New South Wales, Victoria and southeastern South Australia

Population Status: Unknown.
Conservation Status: Special Cultural.
Population Health: Unknown.
Habitat Preferences: Clear pools, streams, creeks and rivers.
Barriers/corridors: Blocking of waterway by weirs and the creation of unsuitable aquatic habitats.
Sensitivity to Habitat Modifications: The Platypus has not been significantly affected by impacts from forestry, farming and grazing throughout its range. However, it is sensitive to pollution and any activity that destroys its crustacean prey.
Effects from the proposed Activity: Siltation will affect their crustacean prey. While Platypus feed in the water of dams, inundation often destroys the banks of creeks that are favoured for breeding (S. Van Dyck, pers. comm.).
Amelioration Measures including Habitat Restoration: Environmental flow of the river downstream of the dam should be maintained. Soil should not to be released into the water.
Ability of a Species to Recover: Platypuses are found in human-modified areas as long as the creeks are not destroyed or polluted.
Recovery Plans: None planned.
On-going Monitoring/audit Programmes: None planned.

5. SHORT-BEAKED ECHIDNA.
Species name: Short-beaked Echidna *Tachyglossus aculaetus*.
Distribution:

Local: Recorded as uncommon by Crossman & Reimer (1986).
State: All of the State.
Extralimital: Tasmania and Australia

Population Status: Recorded as uncommon by Crossman & Reimer (1986). Ingram & Stanisic (1997) said it was recorded from boggomosses several times during their survey.
Conservation Status: Special Cultural.
Population Health: Unknown.
Habitat Preferences: Most terrestrial habitats.
Barriers/corridors: Barriers are land cleared for farming and grazing and expanded waterways made by weirs.
Sensitivity to Habitat Modifications: The echidna has not been significantly affected by impacts from forestry, farming and grazing throughout its range.
Effects from the proposed Activity: In the initial stages, flooding will create wider, water barriers to cross and may result in isolation and drowning of animals.
Amelioration Measures including Habitat Restoration: During the initial stages of flooding, regular checks should be carried out to save echidnas from the possibility of drowning. Individuals isolated by rising water should be captured and moved to safety.
Ability of a Species to Recover: Echidnas are found in human-modified areas.
Recovery Plans: None planned.
On-going Monitoring/audit Programmes: None planned.

6. KOALA

Species name: Koala *Phascolarctos cinereus*.

Distribution:

Local: Recorded as uncommon by Crossman & Reimer (1986).
State: Widespread in eastern Queensland.
Extralimital: Southern, eastern Australia.

Population Status: Recorded as uncommon by Crossman & Reimer (1986).

Conservation Status: Special Cultural.

Population Health: Unknown

Habitat Preferences: Found in areas with suitable food trees, from tall open forest to open woodland. Koalas occur in areas modified by humans such as residential developments and farm land.

Barriers/corridors: Barriers are land cleared for farming and grazing and expanded waterways made by weirs.

Sensitivity to Habitat Modifications: Koalas are able to exist in human-made habitats but they are sensitive to completely removing or drowning the trees.

Effects from the proposed Activity: Inundation will result in the loss of food trees. Also, in the initial stages, flooding will create wider, water barriers to cross and may result in isolation and drowning of animals.

Amelioration Measures including Habitat Restoration: During the initial stages of flooding, regular checks should be carried out to save Koalas from the possibility of drowning. Koalas isolated by rising water should be captured and moved to safe trees. Also, a planting program should be instigated to replace the loss of food trees in the catchment area.

Ability of a Species to Recover: Koala can live in human-modified environment.

Recovery Plans: If needed, this should be done in association with the Shire and Department of Environment.

On-going Monitoring/audit **Programmes**: None planned.

BIRDS

1. PARADISE PARROT.

Species name: Paradise Parrot *Psephotus pulcherrimus*.

Distribution:

Local: Records from John Gilbert's diary from the ill-fated Leichhardt Expedition (Crossman & Reimer, 1986).
Queensland: Coastal Central Queensland inland and south to northern New South Wales.
Extralimital: Northern Central New South Wales.

Population Status: The last authenticated sighting of the species was in November 1927 (Forshaw, 1978).

Conservation Status: Extinct.

Population Health: Not applicable.

Habitat Preferences: Open woodland and scrubby grasslands where termite mounds, in which they nested, abounded. Their distribution nearly coincided with the Brigalow Biogeographical Region.

Barriers/corridors: Not applicable.

Sensitivity to Habitat Modifications: Not applicable.

Effects from the proposed Activity: Not applicable.

Amelioration Measures including Habitat Restoration: Not applicable.

Ability of a Species to Recover: Not applicable.

Recovery Plans: Not applicable.

On-going Monitoring/audit Programmes: Not applicable.

2. STAR FINCH.

Species name: Star Finch *Neochmia ruficauda.*

Distribution:

Local: Extinct.
Queensland: Now restricted to Northwestern Queensland and Southwestern Cape York Peninsula.
Extralimital: Northern Western Australia and Northern Territory

Population Status: Extinct in Taroom area. Once widespread in eastern Queensland (Holmes, 1996).
Conservation Status: Endangered.
Population Health: Not applicable.
Habitat Preferences: Not applicable.
Barriers/corridors: Not applicable.
Sensitivity to Habitat Modifications: Not applicable.
Effects from the proposed Activity: Not applicable.
Amelioration Measures including Habitat Restoration: Not applicable.
Ability of a Species to Recover: Not applicable.
Recovery Plans: Not applicable.
On-going Monitoring/audit Programmes: Department of Environment have a program presently in place for Queensland.

3. PLAINS-WANDERER
Species name: Plains-wanderer *Pedionomus torquatus.*
Distribution:
Local: Record from Isla Gorge (*Bird Observer* 689:84, 1989).
Queensland: South Central and South western.
Extralimital: South Western Northern Territory, Eastern South Australian and Western New South Wales and Victoria.
Population Status: Unknown.
Conservation Status: Vulnerable.
Population Health: Unknown.
Habitat Preferences: Sparse treeless grasslands to saltbush or low shrubland. Also areas with old grain crops (Pizzey & Knight, 1997).
Barriers/corridors: The species is vagile.
Sensitivity to Habitat Modifications: It is negatively affected by loss of its habitat.
Effects from the proposed Activity: Unknown.
Amelioration Measures including Habitat Restoration: None planned.
Ability of a Species to Recover: Unknown.
Recovery Plans: None planned.
On-going Monitoring/audit Programmes: None planned.

4. SQUATTER PIGEON.
Species name: Squatter Pigeon *Geophaps scripta* southern subspecies.
Distribution:
Local: Recorded as uncommon by Crossman & Reimer (1986).
Queensland: From the middle of Cape York Peninsula through Eastern Queensland.
Extralimital: Northern Central New South Wales.
Population Status: Recorded as uncommon by Crossman & Reimer (1986).
Conservation Status: Vulnerable.
Population Health: Unknown.
Habitat Preferences: Seldom far from water in woodlands with short grass. Also rocky or sandy ground or newly burned grass or bush (Pizzey & Knight, 1997).
Barriers/corridors: The species is vagile.
Sensitivity to Habitat Modifications: It is negatively affected by destruction of its habitat.
Effects from the proposed Activity: Unknown.
Amelioration Measures including Habitat Restoration: None planned.
Ability of a Species to Recover: Unknown.
Recovery Plans: None planned.
On-going Monitoring/audit Programmes: None planned.

5. GLOSSY BLACK-COCKATOO.
Species name: Glossy Black-cockatoo *Calyptorhynchus lathami.*
Distribution:
Local: Listed as "uncommon" by Crossman & Reimer (1986).
Queensland: Eastern Queensland from Eungella National Park south to the NSW border.
Extralimital: Eastern NSW and Victoria with an isolated population on Kangaroo Island, SA.

Population Status: Sedentary, declining (Pizzey & Knight, 1997).
Conservation Status: Vulnerable.
Population Health: Unknown.
Habitat Preferences: Found within a range of forests, woodlands, trees bordering watercourses and in partially cleared land. Their distribution is patchy because they rely on the seeds of *Allocasuarina* trees for food. Also, for nesting, they are reliant on hollow dead trees or large, hollow limbs on live trees.
Barriers/corridors: The bird is vagile.
Sensitivity to Habitat Modifications: Sensitive to loss of food and nesting habitat from clearing and hot fires.
Effects from the Proposed Activity: Food trees will be lost as well as large trees that have hollow nesting sites.
Amelioration Measures including Habitat Restoration: Special attention should be given to maintain hollow trees untouched by inundation.
Ability of a Species to Recover: Unknown.
Recovery Plans: None planned.
On-going Monitoring/audit Programmes: None planned.

6. RED-TAILED TROPICBIRD
Species name: Red-tailed Tropicbird *Phaethon rubricauda.*
Distribution:
Local: Crossman & Reimer (1986) noted that a single specimen was known
Queensland: Seas of the eastern coast.
Extralimital: Seas off Western Australia and NSW. Southern oceans.
Population Status: Vagrant, accidental.
Conservation Status: Vulnerable.
Population Health: Unknown.
Habitat Preferences: Open seas and their islands.
Barriers/corridors: Not applicable.
Sensitivity to Habitat Modifications: Not applicable.
Effects from the proposed Activity: None.
Amelioration Measures including Habitat Restoration: None.
Ability of a Species to Recover: Not applicable.
Recovery Plans: Not applicable.
On-going Monitoring/audit Programmes: Not applicable.

7. CRIMSON FINCH.
Species name: Crimson Finch *Neochmia phaeton*
Distribution:
Local: Extinct in the Taroom area (Crossman & Reimer, 1986).
Queensland: Northern and Northwestern Queensland.
Extralimital: Northern Northern Territory and Western Australia.
Population Status: Extinct in the Taroom area (Crossman & Reimer, 1986).
Conservation Status: Vulnerable.
Population Health: Not applicable.
Habitat Preferences: Not applicable.
Barriers/corridors: Not applicable.
Sensitivity to Habitat Modifications: Not applicable.
Effects from the proposed Activity: Not applicable.
Amelioration Measures including Habitat Restoration: Not applicable.
Ability of a Species to Recover: Not applicable.
Recovery Plans: Not applicable.
On-going Monitoring/audit Programmes: Not applicable.

8. POWERFUL OWL.
Species name: Powerful Owl *Ninox strenua.*
Distribution:
Local: Recorded as scarce in the area by Crossman & Reimer (1986).
Queensland: From Eungella NP south to the NSW border.

Extralimital: eastern NSW and southeastern Australia.
Population Status: Uncommon (Pizzey & Knight, 1997).
Conservation Status: Vulnerable.
Population Health: Unknown.
Habitat Preferences: Occurs in dry and wet eucalypt forest. Nests in hollows usually in large eucalypts.
Barriers/corridors: The bird is vagile.
Sensitivity to Habitat Modifications: These birds are very sensitive to habitat modification.
Effects from the Proposed Activity: The bird is scarce in the area. However, it will be affected by the loss of nesting.
Amelioration Measures including Habitat Restoration Special attention should be given to maintain hollow trees untouched by inundation.
Ability of a Species to Recover: Little is known. However, will occupy human-modified habitats (Chafer, 1992; Sansom, 1991).
Recovery Plans: None planned.
On-going Monitoring/audit Programmes: None planned.

9. GREAT CRESTED GREBE.
Species name: Great Crested Grebe *Podiceps cristatus*.
Distribution:
Local: Crossman & Reimer (1986) mentioned one record from the area.
Queensland: Over much of the State
Extralimital: Tasmania and most of Australia. Irregular inland.
Population Status: Unknown.
Conservation Status: Rare.
Population Health: Unknown.
Habitat Preferences: Generally still, shallow fresh water areas including dams.
Barriers/corridors: The species is vagile.
Sensitivity to Habitat Modifications: It is negatively affected by the pollution and elimination of its habitat.
Effects from the proposed Activity: The species should be positively affected by the increase in wetlands.
Amelioration Measures including Habitat Restoration: None planned.
Ability of a Species to Recover: The species should be positively affected by the increase in wetlands.
Recovery Plans: None planned.
On-going Monitoring/audit Programmes: None planned.

10. COTTON PYGMY-GOOSE
Species name: Cotton Pygmy-goose *Nettapus coromandelianus*.
Distribution:
Local: Recorded as uncommon in the area by Crossman & Reimer (1986).
Queensland: Eastern Queensland.
Extralimital: Northeastern New South Wales; also Southeastern Asia, the Indo-Australian Archipelago and the Philippines.
Population Status: Recorded as uncommon by Crossman & Reimer (1986).
Conservation Status: Rare.
Population Health: Unknown.
Habitat Preferences: Deeper freshwater swamps, lagoons and dams with waterplants (Pizzey & Knight, 1997).
Barriers/corridors: The species is vagile.
Sensitivity to Habitat Modifications: It is negatively affected by the pollution and elimination of its habitat.
Effects from the proposed Activity: The species should be positively affected by the increase in wetlands.
Amelioration Measures including Habitat Restoration: None planned.
Ability of a Species to Recover: The species should be positively affected by the increase in wetlands.
Recovery Plans: None planned.
On-going Monitoring/audit Programmes: None planned.

11. BLACK-NECKED STORK.

Species name: Black-Necked Stork *Ephippiorhynchus asiaticus.*

Distribution:

Local: Recorded as uncommon in the area by Crossman & Reimer (1986).

Queensland: Coastal and sub-coastal Queensland.

Extralimital: Coastal and sub-coastal Northern Australia and New South Wales. Also Southeastern Asia and the Indo-Australian Archipelago.

Population Status: Recorded as uncommon in the area by Crossman & Reimer (1986).

Conservation Status: Rare.

Population Health: Unknown.

Habitat Preferences: Wetlands and their edges.

Barriers/corridors: The species is vagile.

Sensitivity to Habitat Modifications: It is negatively affected by the elimination of its habitat

Effects from the proposed Activity: The species might be positively affected by the increase in wetlands.

Amelioration Measures including Habitat Restoration: None planned.

Ability of a Species to Recover: The species should be positively affected by the increase in wetlands.

Recovery Plans: None planned.

On-going Monitoring/audit Programmes: None planned.

12. PAINTED SNIPE.

Species name: Painted Snipe *Rostratula benghalensis.*

Distribution:

Local: Recorded as scarce in the area by Crossman & Reimer (1986).

Queensland: Most of the State.

Extralimital: New South Wales, Victoria, Northern Territory and Western Australia. Also in the Indo-Australian Archipelago.

Population Status: Recorded as scarce in the area by Crossman & Reimer (1986).

Conservation Status: Rare.

Population Health: Unknown.

Habitat Preferences: Well-vegetated shallows and margins of wetlands.

Barriers/corridors: The species is vagile.

Sensitivity to Habitat Modifications: It is negatively affected by the elimination of its habitat.

Effects from the proposed Activity: The species might be positively affected by the increase in wetlands.

Amelioration Measures including Habitat Restoration: None planned.

Ability of a Species to Recover: The species might be positively affected by the increase in wetlands.

Recovery Plans: None planned.

On-going Monitoring/audit Programmes: None planned.

13. TORQUOISE PARROT.

Species name: Torquoise Parrot *Neophema pulchella.*

Distribution:

Local: Extinct.

Queensland: Southeastern Queensland.

Extralimital: Eastern New South Wales and Northeastern Victoria.

Population Status: Not applicable.

Conservation Status: Rare.

Population Health: Not applicable.

Habitat Preferences: Not applicable.

Barriers/corridors: Not applicable.

Sensitivity to Habitat Modifications: Not applicable.

Effects from the proposed Activity: Not applicable.

Amelioration Measures including Habitat Restoration: Not applicable.

Ability of a Species to Recover: Not applicable.

Recovery Plans: Not applicable.

On-going Monitoring/audit Programmes: Not applicable.

14. BLACK-CHINNED HONEYEATER.
Species name: Black-chinned Honeyeater *Melithreptus gularis.*
Distribution:
Local: Recorded as uncommon in the area by Crossman & Reimer (1986).
Queensland: Recorded over most of Queensland accept the extreme Southwest.
Extralimital: Also recorded from New South Wales, Victoria, Northern Territory and Western Australia.
Population Status: Recorded as uncommon in the area by Crossman & Reimer (1986).
Conservation Status: Rare.
Population Health: Unknown.
Habitat Preferences: Woodland to open forest with thick undergrowth.
Barriers/corridors: The species is vagile and seasonally nomadic.
Sensitivity to Habitat Modifications: It is negatively affected by the elimination of its habitat.
Effects from the proposed Activity: Unknown.
Amelioration Measures including Habitat Restoration: None planned.
Ability of a Species to Recover: Unknown.
Recovery Plans: None planned.
On-going Monitoring/audit Programmes: None planned.

15. YELLOW-TUFTED HONEYEATER.
Species name: Yellow-tufted Honeyeater *Lichenostomus melanops.*
Distribution:
Local: Recorded as uncommon in the area by Crossman & Reimer (1986).
Queensland: Central and Southeastern Queensland.
Extralimital: Southeastern Australia.
Population Status: Recorded as uncommon in the area by Crossman & Reimer (1986).
Conservation Status: Rare.
Population Health: Unknown.
Habitat Preferences: Open forest to woodland with undergrowth and shrub layers.
Barriers/corridors: The species is vagile.
Sensitivity to Habitat Modifications: It is negatively affected by the elimination of its habitat.
Effects from the proposed Activity: Unknown.
Amelioration Measures including Habitat Restoration: None planned.
Ability of a Species to Recover: Unknown.
Recovery Plans: None planned.
On-going Monitoring/audit Programmes: None planned.

16. GROUND CUCKOO-SHRIKE.
Species name: **Ground Cuckoo-shrike** *Coracina maxima.*
Distribution:
Local: Recorded as scarce in the area by Crossman & Reimer (1986).
Queensland: Most of Queensland accept Cape York Peninsula.
Extralimital: Over most of Australia but usually absent from the coast.
Population Status: Recorded as scarce in the area by Crossman & Reimer (1986).
Conservation Status: Rare.
Population Health: Unknown.
Habitat Preferences: Open grasslands with live or dead trees.
Barriers/corridors: The species is vagile.
Sensitivity to Habitat Modifications: It is negatively affected by the elimination of its habitat.
Effects from the proposed Activity: Unknown
Amelioration Measures including Habitat Restoration: None planned.
Ability of a Species to Recover: Unknown.
Recovery Plans: None planned.
On-going Monitoring/audit Programmes: None planned.

17. FRECKLED DUCK

Species name: Freckled Duck *Stictonetta naevosa.*

Distribution:

Local: Recorded from Taroom (Redhead, 1988).

Queensland: Southern Queensland.

Extralimital: Tasmania, Victoria, Western Austrlaia, South Australia, and New South Wales.

Population Status: Unknown.

Conservation Status: Rare.

Population Health: Unknown.

Habitat Preferences: Large well-vegetated swamps; in dry periods moves to open lakes (Pizzey & Knight, 1997).

Barriers/corridors: The species is vagile.

Sensitivity to Habitat Modifications: It is negatively affected by the pollution and elimination of its habitat.

Effects from the proposed Activity: The species could be positively affected by the increase in wetlands.

Amelioration Measures including Habitat Restoration: None planned.

Ability of a Species to Recover: The species could be positively affected by the increase in wetlands.

Recovery Plans: None planned.

On-going Monitoring/audit Programmes: None planned.

REPTILES

1. FITZROY RIVER TURTLE.

Species name: Fitzroy River Turtle *Rheodytes leukops.*

Distribution:

Local: Recorded as uncommon in the area by Crossman & Reimer (1986).

Queensland: Fitzroy River System (Legler & Cann, 1980).

Extralimital: Queensland only.

Population Status: Unknown. I.E.P (1996) did not locate the species in Nathan Gorge areas.

Conservation Status: Vulnerable.

Population Health: Unknown.

Habitat Preferences: In habited rivers have high water-clarity and are characterised by large, deep pools with rocky, gravelly or sandy substrates connected by shallow riffles. As well, extensive beds of Ribbon Weed (*Vallisneria* sp.) are usually associated (Cogger *et al.* 1993).

Barriers/corridors: Weir walls and turbid water.

Sensitivity to Habitat Modifications: The species negatively affected by turbidity and deep sedimentation (Cogger *et al.* 1993).

Effects from the proposed Activity: Unknown. This aquatic species, although not part of the brief, is included here for completeness.

Amelioration Measures including Habitat Restoration: None planned.

Ability of a Species to Recover: Unknown.

Recovery Plans: None planned.

On-going Monitoring/audit Programmes: None planned.

2. *PARADELMA ORIENTALIS.*

Species name: *Paradelma orientalis.*

Distribution:

Local: Expedition range, west of Taroom during the Queensland Museum survey. Cogger *et al.* (1993) mentions a concentration of museum specimens from the Cracow area.

Queensland: Brigalow Biogeographical area east of the Great Dividing Range in Central to Southern Queensland.

Extralimital: Found only in Queensland.

Population Status: Unknown.

Conservation Status: Vulnerable.

Population Health: Unknown.

Habitat Preferences: Brigalow or eucalypt woodland with an understorey of Brigalow and sparse, tussock grass ground cover, on grey , cracking clay soils (Cogger *et al.*, 1993).

Barriers/corridors: Barriers are the Dawson River and the cleared farm land of the Taroom area.
Sensitivity to Habitat Modifications: Cogger *et al.* (1993) suggested a combination of activities that have contributed to the decline of the species, These were: overgrazing by cattle, clearance of habitat for agriculture and cattle grazing, pasture improvement, crop production and native forest logging.
Effects from the proposed Activity: Unknown. Possible drownings. The species has not been recorded in the proposed area of inundation.
Amelioration Measures including Habitat Restoration: None proposed.
Ability of a Species to Recover: Unknown.
Recovery Plans: None planned.
On-going Monitoring/audit Programmes: None planned.

3. YAKKA SKINK.
Species name: Yakka Skink *Egernia rugosa.*
Distribution:

Local: Crossman & Reimer (1986) said the species was uncommon.
Queensland: Subhumid to semi-arid eastern interior (Wilson & Knowles, 1988).
Extralimital: Queensland only.

Population Status: Unknown. It is very secretive.
Conservation Status: Vulnerable. Cogger et al. (1993) designated the species "rare or insufficiently known".
Population Health: Unknown.
Habitat Preferences: ***Woodlands***: It excavates a burrow system below low vegetation. Also found hiding in hollow logs, root systems of fallen trees and under rocks (Wilson & Knowles, 1988).
Barriers/corridors: Barriers are clearing from farming and grazing and the Dawson River.
Sensitivity to Habitat Modifications: Unknown.
Effects from the proposed Activity: Flooding of habitat and drownings.
Amelioration Measures including Habitat Restoration: None planned
Ability of a Species to Recover: Unknown.
Recovery Plans: None planned
On-going Monitoring/audit Programmes: None planned

4. DUNMALL'S SNAKE.
Species name: **Dunmall's Snake** *Glyphodon dunmalli.*
Distribution:

Local: Expedition range.
Queensland: Southeastern interior of Queensland.
Extralimital: Queensland only.

Population Status: Unknown.
Conservation Status: Vulnerable.
Population Health: Unknown.
Habitat Preferences: preferred habitat is Brigalow forest or woodland growing on cracking black clay and clay loam soils (Cogger *et al.*, 1993).
Barriers/corridors: Barriers are clearing from farming and grazing and the Dawson River.
Sensitivity to Habitat Modifications: Unknown.
Effects from the proposed Activity: Flooding of habitat and drownings.
Amelioration Measures including Habitat Restoration: None planned.
Ability of a Species to Recover: Unknown.
Recovery Plans: None planned.
On-going Monitoring/audit Programmes: None planned.

5. GOLDEN-TAILED GECKO.
Species name: Golden-tailed Gecko *Diplodactylus taenicaudus.*
Distribution:

Local: Crossman & Reimer (1986) recorded it is common.
Queensland: Central coast to the southeastern interior.
Extralimital: Queensland only.

Population Status: Common (Crossman & Reimer, 1986).
Conservation Status: Rare. Cogger et al. (1993) designated the species "rare or insufficiently known".

Population Health: Unknown.
Habitat Preferences: Open forest and woodlands especially with the native pines of *Callitris*.
Barriers/corridors: Barriers are clearing from farming and grazing and the Dawson River.
Sensitivity to Habitat Modifications: It is eliminated by the removal of trees. However, is found in human modified areas and their structures.
Effects from the proposed Activity: Loss of trees and drowning.
Amelioration Measures including Habitat Restoration: None planned.
Ability of a Species to Recover: Unknown.
Recovery Plans: None planned.
On-going Monitoring/audit Programmes: None planned.

6. *ANOMALOPUS BREVICOLLIS.*
Species name: *Anomalopus brevicollis*.
Distribution:

Local: Recorded from near Theodore and Cracow (Ingram & Stanisic, 1997).
Queensland: Mid-eastern Queensland south to Cracow, Southeastern Queensland.
Extralimital: Queensland Only.

Population Status: Unknown.
Conservation Status: Rare. Not mentioned by Cogger *et al.* (1993).
Population Health: Unknown.
Habitat Preferences: Found in a broad range of habitats fro open forest to rainforest.
Barriers/corridors: Unknown.
Sensitivity to Habitat Modifications: Unknown.
Effects from the proposed Activity: Unknown. The species probably doesn't occur in the proposed area of inundation.
Amelioration Measures including Habitat Restoration: None planned.
Ability of a Species to Recover: Unknown.
Recovery Plans: None planned.
On-going Monitoring/audit Programmes: None planned.

7. COMMON DEATH ADDER.
Species name: **Common Death Adder** *Acanthopis antarcticus*.
Distribution:

Local: One record from Taroom (Ingram & Stanisic, 1997).
Queensland: From the humid Northeast south to South Central and Souheastern Queensland.
Extralimital: Widespread disjunct populations throughout southern and eastern Australia (Wilson & Knowles, 1988).

Population Status: Unknown.
Conservation Status: Rare. Cogger *et al.* (1993) lists the species as rare or insufficiently known.
Population Health: Unknown.
Habitat Preferences: Wide variety of habitats from rainforest and woodland to coastal heathlands.
Barriers/corridors: Barriers are clearing from farming and grazing and the Dawson River.
Sensitivity to Habitat Modifications: Death Adders have been declining probably because of disturbance of habitat. As well, they have been poisoned by Cane Toads, *Bufo marinus* (Wilson & Knowles, 1988).
Effects from the proposed Activity:
Amelioration Measures including Habitat Restoration: None planned.
Ability of a Species to Recover: Unknown.
Recovery Plans: None planned.
On-going Monitoring/audit Programmes: None planned.

AMPHIBIA
20. *CYCLORANA VERRUCOSUS.*
Species name: *Cyclorana verrucosus*.
Distribution:

Local: Crossman & Reimer (1986) collected two specimens from a dry creek bed.
Queensland: Unknown.
Extralimital: Unknown.

Population Status: The identity of the specimens is in doubt. They could not be located in the Queensland Museum where most of the specimens of Crossman & Reimer (1986) are housed. Also Ingram & Raven (1991) doubted the reality of this species.
Conservation Status: Rare.
Population Health: Unknown.
Habitat Preferences: Unknown.
Barriers/corridors: Unknown.
Sensitivity to Habitat Modifications: Unknown.
Effects from the proposed Activity: Unknown.
Amelioration Measures including Habitat Restoration: None planned.
Ability of a Species to Recover: Unknown.
Recovery Plans: None planned.
On-going Monitoring/audit Programmes: None planned.

TABLE 2. Major boggomoss sites (after Ingram & Stanisic, 1997).

BM #1	25°26′08 ″S: 150°01′32 ″E
BM #2	25°26′07 ″S: 150°01′25 ″E
BM #3	25°26′04 ″S: 150°01′22 ″E
BM #4	25°25′57 ″S: 150°01′33 ″E
BM #5	25°25′58 ″S: 150°01′31 ″E
BM #6	25°27′24 ″S: 150°01′33 ″E
BM #7	25°27′21 ″S: 150°01′35 ″E
BM #8	25°27′14 ″S: 150°01′45 ″E
BM #9	25°34′12 ″S: 149°48′02 ″E
BM #10	25°31′00 ″S: 150°03′25 ″E
BM #11	25°27′52 ″S: 150°03′19 ″E
BM #12	25°27′08 ″S: 150°08′12 ″E
BM #13	25°27′39 ″S: 150°01′38 ″E
BM #14	25°27′34 ″S: 150°01′44 ″E
BM #15	25°27′37 ″S: 150°01′12 ″E
BM #16	25°27′28 ″S: 150°01′13 ″E
BM #17	25°27′12 ″S: 150°01′11 ″E
BM #18	25°25′05 ″S: 150°01′28 ″E
BM #19	25°25′02 ″S: 150°01′18 ″E
BM #20	25°24′51 ″S: 150°01′13 ″E
BM #21	25°27′09 ″S: 150°02′31 ″E
BM #22	25°27′09 ″S: 150°02′30 ″E
BM #23	25°26′58 ″S: 150°02′30 ″E
BM #24	25°25′42 ″S: 150°01′33 ″E
BM #25	25°25′44 ″S: 150°01′17 ″E
BM #26	25°27′46 ″S: 150°04′43 ″E
BM #27	25°27′34 ″S: 150°07′36 ″E
BM #28	25°27′30 ″S: 150°07′36 ″E
BM #29	25°26′45 ″S: 150°01′47 ″E
BM #30	25°28′36 ″S: 150°07′34 ″E
BM #31	25°28′36 ″S: 150°07′37 ″E
BM #32	25°28′42 ″S: 150°07′48 ″E

TABLE 3. Taroom boggomoss study collecting sites (BS, AD) (after Ingram & Stanisic, 1997)

BS 1	Adjacent to Boggomoss #1	Grassy woodland	25°26′07 ″S: 150°01′24 ″E
BS 2	Between BM2 & 3	Grassy woodland	25°26′03 ″S: 150°01′25 ″E
BS 3	Near Boggomoss #3	Grassy woodland	25°26′03 ″S: 150°01′25 ″E
BS 4	In Boggomoss #3	Reeds, coolibahs	See Table 2
BS 6	Between Boggomoss #4 & #5 and Boggomoss Creek	Brigalow, eucalypt association	25°25′53 ″S: 150°01′33 ″E
BS 7	Boggomoss #4 & #5	Reeds, grasses	See Table 2
BS 8	Near Boggomoss #6 & #7	Eucalypt woodland	See Table 2
BS 9	Boggomoss #9	Reeds, grasses, low shrubs	See Table 2
BS 10	Boggomoss #9; nearby on hill	Grazed woodland	25°34′10 ″S: 149°48′02 ″E
BS 11	Boggomoss #10	Grazed open grass in eucalypt woodland	See Table 2
BS 12	Balcarris Station homestead	Garden	25°30′17 ″S: 150°03′32 ″E
BS 13	Boggomoss #11	Cleared paddock	See Table 2
BS 14	Nathan Gorge, Dawson River	Ferns, riverine	25°27′08 ″S: 150°08′12 ″E
BS 15	Ooline scrub 9km N of Taroom on Theodore road	Ooline	25°35′04 ″S: 149°46′01 ″E
BS 16	Near Boggomoss #6 & #7 & #8	Open eucalypt woodland	25°27′20 ″S: 150°01′34 ″E
BS 17	On Boggomoss #8	Coolibah, shrubs	See Table 2
BS 18	On Boggomoss #13	Coolibah, shrubs	See Table 2
BS 19	On Boggomoss #7	Coolibah	See Table 2
BS 20	Around Boggomoss #13	Paddock	25°27′38 ″S: 150°01′37 ″E
BS 21	Around Boggomoss #14	Paddock	25°27′33 ″S: 150°01′42 ″E
BS 22	On Boggomoss #15	Coolibah, shrubs	See Table 2
BS 23	On Boggomoss #17	Coolibah, shrubs	See Table 2
BS 24	Hill, Mt Rose Station	Vine thicket on sandstone mountain	25°24′37 ″S: 149°57′47 ″E
BS 25	On Boggomoss #18 Otto's property	Tall eucalypts	See Table 2
BS 26	Near Boggomoss #18	Grassland	25°25′05 ″S: 150°01′33 ″E
BS 27	Boggomoss #19	Tall eucalypts	See Table 2
BS 28	Near Boggomoss #19	Brigalow/eucalypts	25°25′01 ″S: 150°01′18 ″E
BS 29	On Boggomoss #20	Tall eucalypts	See Table 2
BS 30	Around Boggomoss #20	Paddock	25°24′50 ″S: 150°01′12 ″E
BS 31	On Boggomoss #21	Coolibah, shrubs	See Table 2

TABLE 3. Continued			
BS 32	Around Boggomoss #25	Eucalypt woodland	25°25′43 ″S: 150°01′16 ″E
BS 33	On Boggomoss #25		See Table 2
BS 34	Ooline Scrub 7km. N of Taroom along Theodore Road	Ooline	25°36′04 ″S: 149°46′07 ″E
BS 35	Dawson River near Spring Creek Station	Spring fed area on river banks	25°27′34 ″S: 150°07′36 ″E
BS 36	Spring Creek Station; Spring Creek crossing	Spring edged by palms, eucalypts and brush	25°26′17 ″S: 150°05′11 ″E
BS 37	Lake Murphy	Eucalypt woodland	25°29′07 ″S: 149°39′31 ″E
BS 38	Cabbage Tree Creek Gorge	Palms, vine thicket, riverine	25°27′00 ″S: 150°10′10 ″E
BS 39	On ridge above Cabbage Tree Creek	Open woodland with spinifex ground cover	25°26′49 ″S: 150°10′08 ″E
BS 40	Cockatoo Creek, 34 km from Taroom along Cracow Road.	Eucalypt woodland along watercourse	25°34′05 ″S: 150°05′08 ″E
BS 41	Blackboy Creek, 12 km from Taroom along Cracow Road	Thicket	25°38′09 ″S: 149°54′27 ″E
BS 42	Boggomoss #21	See BS 31	
BS 43	Adjacent to Boggomoss #21	Woodland	25°38′10 ″S: 149°54′29 ″E
BS 44	Boggomoss #29	Rushes	25°26′45 ″S: 150°01′47 ″E
BS 45	Adjacent to Boggomoss #20	See BS 30	
BS 46	On Boggomoss #20	See BS 29	
BS 47	On Boggomoss #19	See BS 27	
BS 48	Adjacent to Boggomoss #19	See BS 28	
BS 49	Boggomoss #25	See BS 33	
BS 50	In Boggomoss #4 & #5	See BS 7	
BS 51	Adjacent to Boggomoss #4 & #5	See BS 6	
BS 52	Boggomoss #2	Reeds, grass	See Table 2
BS 53	On Boggomoss #3	See BS 4	
BS 54	Boggomoss #1	Reeds, grass	See Table 2
BS 55	Adjacent to Boggomoss #2	See BS 2	
BS 56	Adjacent to Boggomoss #1	See BS 1	
BS 57	Adjacent to Boggomoss #3	See BS 3	
BS 58	On Boggomoss #15	See BS 22	
BS 59	On Boggomoss #13	See BS 18	
BS 60	On Boggomoss #6	Paddock	See Table 2
BS 61	On Boggomoss #7	See BS 19	
BS 62	On Boggomoss #8	See BS18	

TABLE 3. Continued			
BS 63	Hill, Mt Rose Station	See BS 24	
BS 64	Mt Rose Station, adjacent to BS 24	Woodland	25°25′02 ″S: 149°57′43 ″E
BS 65	Ooline scrub 9km N of Taroom on Theodore Road	See BS 15	
BS 66	Price Creek; Boggomoss #30	Reeds, eucalypts	See Table 2
BS 67	Price Creek; Boggomoss #31	Reeds	See Table2
BS 68	Price Creek: Boggomoss #32	Reeds	See Table 2
BS 69	Nathan Gorge; Dawson River	See BS 14	
BS 70	Cabbage Tree Creek Gorge	See BS 38	
BS 71	Nunbank	Pulled scrub	25°31′12 ″S: 149°37′18 ″E
BS 72	Nathan Gorge Camp; Dawson River	See BS 14	
BS 73	Bottle-tree Scrub; Taroom - Cracow Road	Vine thicket	25°33′12 ″S: 150°07′30 ″E
BS 74	Glebe Weir Camping Ground	Eucalypt woodland	25°27′56 ″S: 150°08′05″E
BS 75	Brodies Road; 14.5 km NE of Taroom	*Callitris* forest on sandstone hill	
BS 76	Palm Tree Creek; 5 km N of Taroom along Theodore Road	Palms, eucalypt woodland	25°30′07 ″S: 149°46′42 ″E

AD #1	Theodore on the Dawson River	Eucalypt, disturbed riverine woodland	24°57′26 ″S: 150°04′24 ″E
AD #2	Boam Creek crossing on Theodore - Cracow Road	Eucalypt woodland, cleared	25°02′00 ″S: 150°09′01 ″E
AD #3	Ox Track Creek crossing		25°06′44 ″S: 150°10′46 ″E
AD #4	Dawson River crossing on Isla-Delusion Road	Palms/Eucalypt	25°11′01″S: 150°10′57 ″E
AD #5	Isla Corge NP	Vine Thickets	25°10′38 ″S: 150°00′33 ″E
AD #6	Near Glebe Weir	Eucalypt woodland	25°27′39 ″S: 150°02′31 ″E
AD #7	Expedition Range near Robinson Gorge NP	Eucalypt woodland	25°19′23 ″S: 149°17′30 ″E
AD #8	Expedition Range Road, Glenleigh Station	Vine thicket	25°24′13 ″S: 149°27′49 ″E
AD #9	Lake Murphy	See BS 37	
AD #10	Expedition Range Road along Robinson Creek	Palms/Coolibah swamp	25°29′37 ″S: 149°43′30 ″E
AD #11	Banks of Robinson Creek opposite Lake Murphy	Palms/eucalypt woodland	25°29′16 ″S: 149°39′45 ″E
AD #12	Palm Tree Creek crossing along Theodore road	Palms/eucalypt woodland	25°30′07 ″S: 149°46′42 ″E
AD #13	Ooline scrub 7km N of Taroom on Theodore road	See BS34	
AD #14	Cockatoo Creek, 34km from Taroom alon Cracow Road	See BS 40	

BM = boggomoss; BS, AD = general boggomoss study collecting sites.

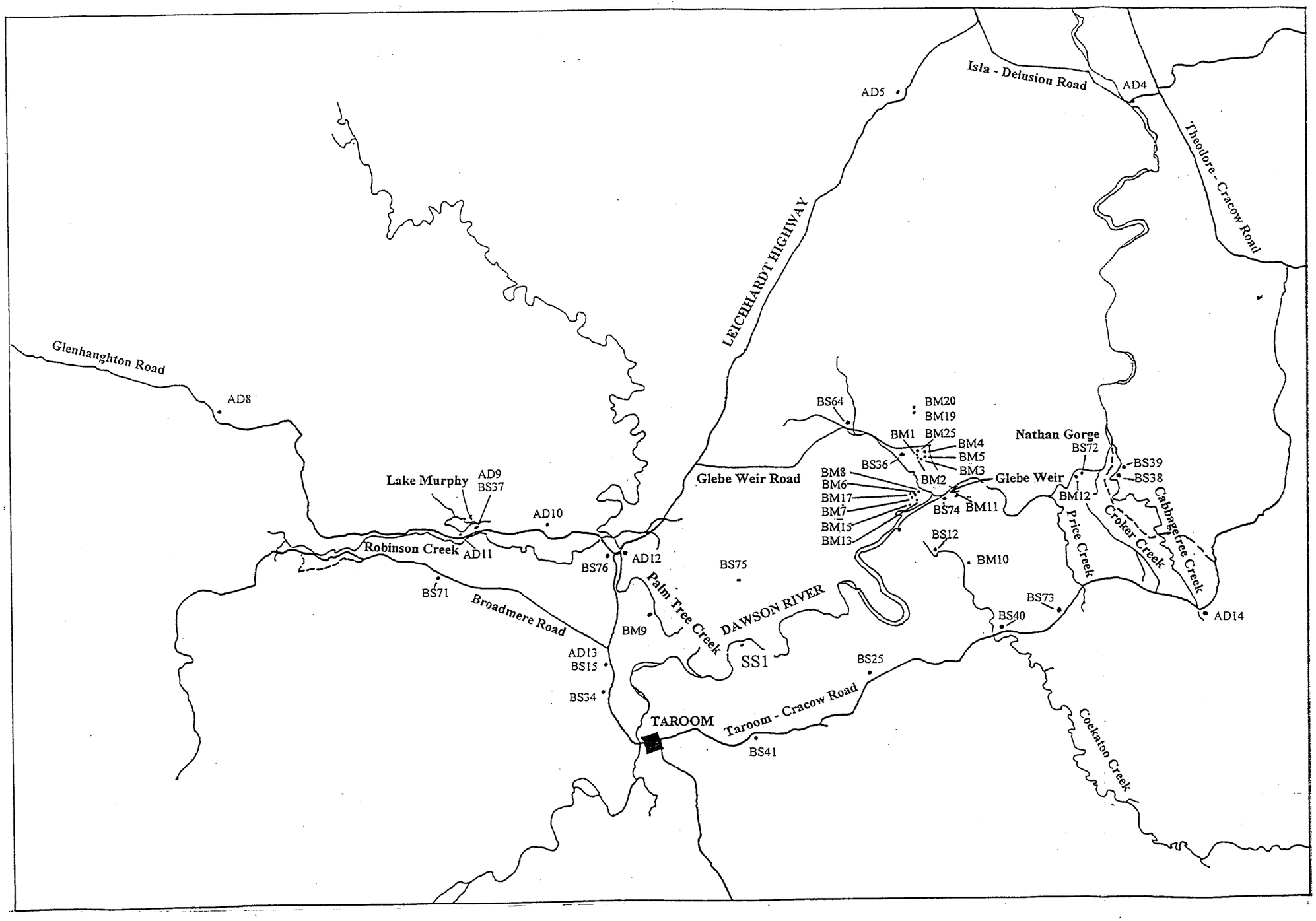

Figure 1. Major collecting sites used in this study (Modified from Ingram & Stanisic, 1997).