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**DEPARTMENT OF FISHERIES AND FAUNA
WESTERN AUSTRALIA**

REPORT VII

**RESULTS OF
A BIOLOGICAL SURVEY
OF
THE MILLSTREAM AREA**

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**Published by the Director of Fisheries
and Fauna, Perth, under the authority
of the Hon. R. Davies, M.L.A.,
Minister for Fisheries and Fauna**

1971

DEPARTMENT OF FISHERIES AND FAUNA
WESTERN AUSTRALIA

RESULTS OF A BIOLOGICAL SURVEY
OF
THE MILLSTREAM AREA
(September 1969)

This report on the results of the tour of inspection was compiled by A.A. Burbidge,* with contributions from R.J. McKay,+ M.I.H. Brooker,++ and R.F. Dear.**

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INTRODUCTION

Millstream has long been recognised as an unique and outstanding area, both scenically and from a biological aspect. The area of prime interest consists of a series of deep pools in the bed of the Fortescue River (about 15 miles long including Gregory Gorge) and the springs and streams which feed them. Most of the springs are in the sides of the river bed but one of the largest is about 1½ miles to the south. This feeds a swift flowing stream running north into the river bed.

The first Europeans to see the area were the exploring party led by F. T. Gregory in 1861. He noted the palm trees and the fast running stream entering the river from the large springs near where the Millstream Station Homestead is now situated. The stream, he noted, was "strong enough to supply a large mill" hence the name of the area. (Gregory and Gregory, 1884; P. 63.)

Specimens of the fauna and flora were first collected by Gregory in 1861. Since then three different biological expeditions have visited the area as well as a number of transient parties. The first was F. Lawson Whitlock, who collected birds between July and November, 1922. (Whitlock, 1923.) The second was a Western Australian Museum Expedition in July 1958 (Ride, 1959) and the third, which was organised by the Department of Fisheries and Fauna, stayed there in September, 1969. This party consisted of R. J. McKay, Western Australian Museum; M. I. H. Brooker, Western Australian Herbarium; and T. Evans, R. F. Dear and A. A. Burbidge, Department of Fisheries and Fauna. The party also investigated a number of other fresh water situations in the Hamersley Range area in order to obtain comparative data. They were Kyalina Pool in the Hooley River and pools in Wittenoorn Gorge, Dales Gorge and Hamersley Gorge.

THE MILLSTREAM RESERVE

On 29 March, 1956, an "A" Class Reserve, No. 24392, was gazetted. This was for the purpose of "National Park" and was created at the suggestion of the Forests Department in order to preserve the Cadgeput trees (Melaleuca leucodendron) from utilization for timber. This small reserve of 1090 acres did not include any of the deep pools in the Fortescue River nor the

Springs which supplied them. The Reserves Bill of 1961 (assented to 28 November, 1961) amended the purpose of Reserve A 24392 to "National Park and the Conservation of Indigenous Flora and Fauna." This was done following a request from the Department of Fisheries and Fauna so that shooting could be better controlled in the area, by Honorary Wardens appointed under the Fauna Conservation Act. In fact, the Honorary Wardens' powers were little affected by this amendment since most of the Millstream locality is outside the Reserve.

On 18 October, 1964, the Reserve was vested in the Fauna Protection Advisory Committee, now the Western Australian Wild Life Authority.

FAUNA AND FLORA

MAMMALS

Only one mammal species is known from Millstream which is in any way dependent on the water supply; that is the Black Flying Fox (Pteropus alecto formerly P. gouldi.) During the survey large numbers (circa 200) were present. By day they roosted in palm trees near the station homestead and at dusk they flew out into the surrounding timbered areas where they feed. Millstream and the surrounding area is the only known Western Australian locality for this species outside the Kimberleys. It is possible that the Reddish Flying Fox (Pteropus scapulatus) occurs at Millstream although it has not been positively identified.

Euros (Macropus robustus) and Red Kangaroos (Megaleia rufa) drink at the pools, and dingos (Canis familiaris dingo) and the introduced house mouse (Mus musculus) have also been recorded. One interesting species is the small carnivorous marsupial (Antechinus rosamondae), but this inhabits spinifex grassland and would not be dependent on the water.

BIRDS

by R. F. Dear and A. A. Burbidge.

Of all the animal groups, observations on birds are the most extensive. Records available include Whitlock (1923), Mees (1959), G. M. Storr (pers. comm.) on a visit in 1962, and the present survey which included a number of visits between July 1967 and September 1969. The comparative data for Kyalina

Pool in the Hooley River, Dales Gorge, and Hamersley Gorge is from a number of visits between July 1967, and September 1969.

In all, 108 species of birds are known from Millstream. The list includes birds resident in the arid spinifex country around the pools as well as from the pools, springs and running creeks in the area of interest. However, many of the species are restricted to the water or to the trees and reedy vegetation which surround the pools. Outstanding species in this category are the Black Bittern, Marsh Crake, Black-tailed Native Hen, Coot, Black Swan, kingfishers, Little Crebe, Pelican, Black Cormorant and Australian Darter. All these species are dependent on open water situations and are generally uncommon in the inland Pilbara. In addition a number of other rare species occur which are dependent on the thickets and trees surrounding the open water. These are the Golden-headed Fantail-Warbler, Western Warbler, Reed Warbler, and Black-tailed Tree Creeper.

The occurrence of the Golden-headed Fantail-Warbler is particularly interesting. This is a northern Australian species and, in Western Australia, Millstream is the only place it has been recorded outside the Kimberleys. The Yellow Silvereye and White-breasted Wood-Swallow are usually restricted to mangroves on the coast and Millstream is unusually far inland for them.

In summary, Millstream has by far the greatest diversity of birds in one place of anywhere in the Pilbara. (See Table 1.)

REPTILES

Species recorded:

CHELIDAE - Side-necked Tortoises

Chelodina steindachneri

GEKKONIDAE - Geckoes

Gehyra variegata

Heteronotia bynoei

Diplodactylus elderi

Nephrurus wheeleri cinctus

PYGOPODIDAE - Legless Lizards

Lialis burtoni

Delma fraseri

AGAMIDAE - Dragon Lizards

Amphibolurus caudicinctus

Physignathus longirostris

Amphibolurus i. isolepis

SCINCIDAE - Skinks

Ctenotus pantherinus

Cryptoblepharus boutoni metallicus

Sphenomorphus i. isolepis

Omolepida branchiale gastrostigma

Carlia sp.

Lerista frosti

VARANIDAE - Goannas

Varanus tristis

Varanus gouldi

BOIDAE - Pythons

Liasis olivaceus

ELAPIDAE - Snakes

Denisonia punctata

Brachysoma christeanum

Of the above species most have widespread distributions.

A few however, are of major interest. Lerista frosti has a very interesting distribution; its main range is along the Great Australian Bight from the Recherche Archipelago to the Eyre Peninsula. However, outlying populations are known from Palm Valley in Central Australia, Kookhabinna Gorge in the Barlee Range and from Millstream. The individuals from the last two localities are an undescribed race. The Carlia is probably an undescribed species unknown from other localities. Varanus tristis is represented at Millstream by an undescribed reddish race which is known only from a few other localities in the Hamersleys.

The following are dependent on the water:

Chelodinia teindachneri

Cryptoblepharus boutoni metallicus

Liasis olivaceus

Lerista frosti

FISH

by R. McKay, Western Australian Museum.

The survey concentrated its work on fish since they were thought the group most likely to show whether a high proportion of endemics might occur at Millstream. Previous workers have collected some but not all of the species listed. Several different locations were sampled:

1. CROSSING POOL.

25 September, 1969. This pool is upstream from the rock causeway built to carry the road from the station homestead towards the Roebourne - Wittenoom Road. The bottom was fine silt with a heavy growth of aquatic vegetation.

Fishes captured were:

Bony Bream

Fluvialosa erebi

Eel

Anguilla bicolor

Salmon Catfish

Arius australis

Catfish	Neosilurus glencoensis
Rainbow Fish	Melanotaenia nigrans
Spangled Perch	Therapon unicolor
Striped Perch	Therapon percoides
Bronze Perch	Therapon aheneus
Goby	Glossogobius giuris

2. CRYSTAL POOL.

25 September, 1969. An artificial pool containing small fishes. This site is being invaded by dense growth of Indian Fern.

The pool contained the following species:

Neosilurus glencøensis
Melanotaenia nigrans
Therapon aheneus
Glossogobius giuris

3. DEEP REACH.

25 September, 1969. An inlet into the deeper waters of this locality was sampled.

Fishes captured were:

Fluvialosa erebi
Melanotaenia nigrans
Therapon aheneus
Glossogobius giuris

Millstream supports all the fish species recorded from the fresh waters of the Fortescue River system. The great variety

of habitats present at Millstream makes this locality the most representative of the fish fauna of the area. The deep water of Deep Reach ensures the survival of fishes throughout prolonged droughts.

Other fresh-water situations in the Hamersley Range area were sampled for comparative purposes:

- (1) KYALINA POOL, Hooley River on Hooley Station,
27 September, 1969.

This pool was notable as it was shallow and contained no Bronze Perch (Therapon aheneus) but supported large numbers of Therapon unicolor (a Perch found in low numbers at other localities sampled.) Glossogobius was absent at this locality. Fishes:

Fluvialosa erebi

Melanotaenia nigrans

Therapon unicolor

- (2) HAMERSLEY GORGE POOL, 28 September, 1969. Fishes:

Fluvialosa erebi

Neosilurus glencoensis

Therapon aheneus

Therapon unicolor

No melanotaenids or gobies were observed in this pool.

- (3) WITTENOOM GORGE POOL, 30 September, 1969.

A deep pool with aquatic vegetation and rushes. Fishes were abundant here and a large collection was made.

Fluvialosa erebi

Neosilurus glencoensis

Melanotaenia nigrans

Therapon unicolor

Therapon percoides

Therapon aheneus

Glossogobius giuris

The most abundant fishes were *T. aheneus*, *G. giuris*, *M. nigrans* and *N. glencoensis*.

Conclusions

1. No fish were endemic to the Fortescue River as *Fluvialosa erebi*, *Melanotaenia nigrans*, *Arius australis*, *Neosilurus glencoensis*, *Anguilla bicolor*, *Therapon unicolor*, *Therapon percoides* and *Glossogobius giuris* are widely distributed species. *Therapon aheneus* is also found in the Ashburton River system.

2. The most permanent body of water along the course of the Fortescue River is undoubtedly the Millstream complex of pools and creeks fed by springs. A great diversity of habitats is to be found in the vicinity of Millstream, and all the fish species encountered during the survey were present at this locality. In times of prolonged drought, Millstream might act as a reservoir from which temporary pools like Kyalina Pool could be re-supplied after heavy rain.

AMPHIBIA.

Only two species of frogs are known from Millstream. The number of species would doubtless be enlarged considerably if collecting were done following rain.

Hyla rubella, the Desert Tree Frog, is widely distributed in the drier parts of Western Australia.

Glauertia russelli, is widespread in the Gascoyne, Ashburton and Pilbara (Main, 1965.)

INVERTEBRATES.

A number of invertebrate groups have been collected at Millstream but few have been identified. The only extensive work

available is that of Watson (1969) on the Odonata (Dragon Flies and Damsel Flies.) These are by far the most spectacular group of insects in the area, the various brightly coloured species being present in large numbers.

Of the 30 species recorded in north west Australia 29 have been recorded at Millstream. One full species (Nannophlebia injibandi) and two sub-species, Nososticta solida pilbara and Indictinogomphus australis dobsone are not known from elsewhere. A further seven species which are widely distributed in the Kimberleys and Northern Australia are known only from Millstream outside that area. These are Pseudagrion microcephalum, Ischnura aurora, Austrogomphus mjobergi, Crocothemis nigrifrons, Rhodothemis rufa lieftincki, Zyxomma elgneri and Rhyothemis graphiptera.

Many other aquatic invertebrates occur at Millstream but they have not been studied extensively and at present little is known of them. Because of the permanent nature of the pools and springs it is quite possible that further endemic species may be found.

FLORA

By M.I.H. Brooker,
Western Australian Herbarium.

The northern province of the vegetation regions of Western Australia consists mainly of the Kimberley Division embracing the north of the State above latitude 20° and, in addition, joined to it by a narrow coastal region, a southern outlier, the Pilbara district, which extends to the tropic of Capricorn. The whole of the northern province is separated by virtual desert from the better-known south-west province whose botanical components, apart from the Australian element, reflect Antarctic relationships, while the northern province is characterized by the Indo-Melanesian element in the flora. This tropical element reaches its greatest diversity in the Kimberley division where the environment is more suitable. The southern outlier of the northern province, the Pilbara district, is a region of much lower rainfall and consequently the variety of the Indo-Melanesian floral element is much reduced and the remnants are only maintained in the most favourable situations.

Hence the few oases in the area provide a phytogeographic refugium where the floral elements to the north and the south combine to form small areas of lush vegetation which contrast greatly with the flora of the more typical Australian element which dominates the region outside of the few well-watered valleys.

Isolation as provided by refugia often allows for the evolution of species selected by nature for specific, biologically-limited environments resulting in a relatively high degree of endemism. Modification of environment by clearing or by the introduction of alien species will have deleterious effects on certain elements of the indigenous flora which may not be able to survive new conditions or which may not be able to compete with vigorous invading species. As a result the floral composition will be altered and adjustment by natural selection will be made with the probable loss of some species which amounts to extinction in the case of endemics which have not been sampled and grown elsewhere. By contrast, destruction of an environment will result in the wholesale loss of species from particular biological niches, extinction of endemics, and the development, again by natural selection, of a depauperate flora of a greatly reduced number of species.

The Pilbara district of the Northern Vegetation Province is a region of dry stony hills and tablelands drained by a few rivers whose flow is irregular but which contain isolated, more or less permanent water-holes or deep stretches of water. These oases support a tree, shrub, and herbaceous flora of great scenic and biological interest. During the extensive periods of no rainfall the water is maintained by underground springs. The present flora is adapted to such conditions and the area is rich in endemic plant species.

The oases differ in size and this is due mainly to the availability of water and the presence of a suitable substrate. Some of the well watered gorges of the Hamersley Ranges, such as Dales Gorge, support lush vegetation whose boundary is limited by the perpendicular rocky gorge walls. Millstream, on the Fortesque River, provides a quite different environment as the river here passes through a broad shallow valley. Both places provide valuable refugia for plant species; many common to both and others characteristic of one site and not the other. For scientific purposes especially, both types of environment should be preserved. It is easy to claim that endemic species can be collected and grown elsewhere for research purposes but, even assuming this is successful, the loss of such environments which exist now in virtually their biologically pristine states

would be a great loss to the scientific world especially considering the co-operation of conservationists internationally in current projects like those sponsored in the International Biological Program.

Considering more closely the flora of the Millstream area, the river here is bounded by stony hills with plant species typical of the Ereman Province. The ground is dominated by spinifex species (Triodia wiseana, T. pungens) with sporadic wattles (Acacia pyrifolia) and gums (Eucalyptus brevifolia, E. dichromophloia, E. patellaris.) The mud flats of the broad flood plain of the river support an entirely different flora dominated by river gum (E. camaldulensis) and cajeput (Melaleuca leucadendron), both to 70-80'. The latter species occurs throughout tropical Australia and as far north as the Moluccas. The Fortescue system is the southernmost locality in W.A. (Blake 1968) and Millstream provides by far the best habitat for it in this region. A less abundant though very attractive species is Sesbania formosa, a tree species of a predominantly tropical and subtropical genus of both hemispheres. By far the most important tree species of the site is the endemic palm, Livistona alfredii which is confined to Millstream and would naturally be in danger of extinction following the depletion of water reserves. The threshold conditions for its survival are not known. Because of its very restricted occurrence it may have evolved in response to present or near present conditions taking into account the as yet unknown degree of seasonal fluctuation in water availability.

Fairly dense vegetation grows beneath the open forest of the river flat. The drier stony beds support several species of Acacia shrubs (A. salicina, A. sclerosperma, A. leptocarpa, etc.); cockroach bush (Cassia notabilis) with the easily recognized yellow and black pods; another taller, Cassia-like shrub (Petalostylis labicheoides) with yellow and red flowers; a yellow hibiscus (Hibiscus panduriformis); a desert rose (Gossypium robinsonii) etc. The lower, mainly herbaceous layer is presumed to be only poorly known because collections were made in a particularly dry season and specimens obtained were mainly growing in or near permanent water. Particularly abundant are the tall sedges Scirpus littoralis, and Cladium procerum, smaller sedges Cyperus vaginatus and Elaeocharis atropurpurea. The bamboo reed (Phragmites) on one tributary creek appears to be rare. The tall red Typha augustifolia occurs usually in association with Scirpus littoralis and seemed unusually deficient in inflorescences.

A principal tributary creek flowing north from Crystal Pool near the Millstream homestead is of particular interest because of the habitat provided by the swiftly-flowing creek beneath a forest of cajeput and palms. Here, rooted in the mud below water level is an extremely lush growth of the soft fern Ceratopteris thalictroides, a species not seen in other gorges in the Hamersley area. The still pools contain the common leaf floating Potamogeton javanicus. Growing away from the flowing water but in damp mud were the delicate herbs Lobelia quadrangularis and Peplidium humifusum. On the drier river flats were the strong-smelling Stemodia grossa, the prostrate herb Euphorbia australis and occasional dense 'stands' of the yellow composite Flaveria australasica and the practically leafless white-flowered Samolus junceus. Because of the dry season grasses were rare. Cynodon dactylon formed a mat on shaded damp muddy areas. There were occasional specimens of scented grass Cymbopogon ambiguus, and little other.

Because of the broad valley aspect of the Millstream pools it does not provide the most favourable environment for some plant species which require permanently shaded, permanently wet habitats. Such a habitat is seen at Hamersley Gorge where two fern species survive on the walls of a narrow chimney opening into the gorge itself. These species are also present in greater abundance at Dales Gorge where the gorge sides provide a suitable habitat, in addition, for a trailing trigger plant (Stylidium alsinoides) not seen in the other gorges.

From the brief survey possible it has been readily seen that the gorge type environment of Dales Gorge and the open valley environment of Millstream provide favourable biological refugia which mostly have plant species in common yet support others with distinct preferences for one or the other. Within the Pilbara district, Millstream appears to be the unique site as most oases are of the shaded gorge type which are nowhere near as accessible as the open valley. Millstream is of prime biological interest because of the occurrence of the endemic palm and the peculiar fern habitat created by the permanent flow of water from Crystal Pool.

Some of the plant species at Millstream (* - also
collected or seen at Hamersley Gorge, + - also
collected or seen at Dales Gorge.)

Water Plants

- Ceratopteris thalictroides Brongn.
- Cladium procerum R.Br.
- + * Cyperus vaginatus R.Br.
- * Elaeocharis atropurpurea (Retz.) Kunth.
- Phragmites vulgaris (Lamk.) Crep.
- + Potamogeton javanicus Hassk.
- + * Scirpus littoralis Schrader.
- + Typha augustifolia Linn.

Herbs, Grasses

- Chenopodium murale L.
- Cymbopogon exaltatus (R.Br.) Domin.
- Cynodon dactylon Pers.
- Euphorbia australis Boiss.
- Flaveria australasica Hook.
- + Lobelia quadrangularis R.Br.
- Peplidium humifusum Diels.
- Pluchella rubelliflora (F. Muell.) Druce.
- Pterigeron odorus (F. Muell.) Benth.
- + * Stemodia grossa Benth.
- + * Triodia pungens R.Br.
- + * T. wiseana C.A. Gardner.

Shrubs

- Acacia ancistrocarpa Maiden & Blakely.
- A. bivenosa D.C.
- A. cuthbertsonii Luehm.
- A. holosericea A. Cunn.
- + A. pyrifolia D.C.
- A. salicina Lindl.
- A. sclerosperma F. Muell.
- A. tumida F. Muell.
- A. umbellata A. Cunn. ex Benth.
- A. victoriae Benth.
- Capparis spinosa L.
- + * Cassia notabilis F. Muell.
- Codonocarpus cotinifolius (Desf.) F. Muell.
- + * Ficus platypoda A. Cunn.
- Gossypium robinsonii F. Muell.
- Hibiscus panduriformis Burm. fil.
- Melaleuca glomerata F. Muell.

Petalostylis labicheoides R.Br.
Pimelea ammocharis F. Muell.
Prosopis juliflora DC.
Psoralea lachnostachys F. Muell.
Ptilotus calostachyus F. Muell.
Ptilotus exaltatus Nees.
Samolus junceus R. Br.
Sida rhombifolia L.
Solanum diversiflorum F. Muell.
Stylobasium spathulatum Desf.

Trees

- + * Eucalyptus brevifolia F. Muell.
- + * E. camaldulenses Dehn.
- * E. dichromophloia F. Muell.
- E. microtheca F. Muell.
- E. patellaris F. Muell.
- Grevillea pyramidalis A. Cunn.
- Hakea lorea R.Br.
- Livistona alfredii F. Muell.
- + * Melaleuca leucadendron Linn.
- Sesbania formosa (F. Muell.) N.T. Burbidge.

The ponds at Millstream contain two unidentified though distinct algae - one of the Characeae and one of the Chlorophyceae.

Some of the Plant Species occurring at Hamersley Gorge but not at Millstream.

Ferns

- + Adiantum capillus-veneris L.
- + Pteris vittata L.

Herbs

- + Trichodesma zeylanicum (Linn.) R.Br.

Shrubs

- Acacia maitlandii F. Muell.
- A. pruinocarpa Tindale
- + Tephrosia rosea (F. Muell.) Benth.

Trees

Brachychiton australe (Schott.) Terr.
+ Eucalyptus papuana F. Muell.

Some of the Plant Species occurring at Dales Gorge
but not at Millstream or Hamersley Gorge.

Herbs, Grasses

Coleus scutellarioides Benth.
Lobelia quadrangularis R.Br.
Stylidium alsinoides R.Br.
Themeda australis (R.Br.) Stapf.

Shrubs

Abutilon fraseri Hook.
Atalaya hemiglauca (F. Muell.) Benth.
Psoralea leucantha F. Muell.

Trees

Callitries intratropica R.T. Baker et H.G. Sm.
Eucalyptus gamophylla F. Muell.

WATER UTILISATION

Water from bores placed into the aquifer feeding the Millstream springs is being utilised as a water supply for industrial and residential developments associated with iron ore exploitation. Water may also be pumped from Deep Reach Pool. Present proposals allow for up to 8,000,000 gallons per day to be taken. This is believed to be the maximum which can be obtained without exceeding the average recharge into the aquifer.

There appears to be some doubt as to the extent of underground springs feeding the pools in the bed of the Fortescue River but in general the aquifer is a saucer shaped basin which overflows at the Millstream Springs. Thus if exploitation lowers the level of water in the aquifer it could lead to a reduction or even a cessation of flow from some or

all of the springs. If this happened it would have a drastic effect on the aquatic and water-dependent vegetation and the animals it supports. The pools in the bed of the Fortescue River would still be filled by the river when it flows from time to time but it is possible that the water level in the pools, and hence the surrounding water table, would fall due to evaporation.

The most drastic effect, however, would be on "MILL STREAM" itself. This fast flowing stream supports a unique vegetation and habitat which would be rapidly lost if the spring feeding the stream were to dry up. Since the bores are quite close to this spring it would appear to be a relatively simple matter to pump water into the stream from the bores should the spring output be significantly reduced. A similar procedure could be employed in areas fed by other springs.

A further problem is the possibility of a dam being built on the Fortescue River. Gregory Gorge, downstream from Millstream has been investigated as one possible site for a dam. If a dam were built and the resulting lake flooded some or all of the Millstream area much of the unique assemblage of plants and animals might be lost. Any planning for such a dam should take this into account.

ACKNOWLEDGEMENTS

The authors would like to thank the Kennedy Family of Millstream Station for their assistance and hospitality. Dr. G.M. Storr and Mr. J. Bannister of the Western Australian Museum identified the reptiles and mammals collected and provided information on previous records. Mr. D. Bryden of the Western Australian Public Works Department advised on the water utilisation scheme.

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TABLE 1.
MILLSTREAM BIRD LIST.

COMMON NAME	SCIENTIFIC NAME	A	B	C	D	E	F	G
Emu	Dromaius novaehollandiae	X			X	X		
Little Grebe	Podiceps novaehollandiae	X			X	X	X	
Pelican	Pelecanus conspicillatus	X	X		X	X		
Black Cormorant	Phalacrocorax carbo				X	X		
Little Pied Cormorant	Phalacrocorax melanoleucos				X	X		
Australian Darter	Anhinga rufa	X			X	X		
White-faced Heron	Ardea novaehollandiae	X	X		X	X	X	
White-necked Heron	Ardea pacifica	X	X		X	X		
Nankeen Night Heron	Nycticorax caledonicus	X	X		X	X		
Black Bittern	Dupetor flavicollis	X	X		X	X		
Straw-necked Ibis	Threskiornis spinicollis	X	X		X	X		
Yellow-billed Spoonbill	Platalea flavipes	X	X		X	X		
Black Swan	Cygnus atratus	X	X		X	X		
Black Duck	Anas superciliosa	X	X		X	X		
Grey Teal	Anas gibberifrons	X	X		X	X		
Maned Goose	Chenonetta jubata			X				
Black Kite	Milvus migrans	X	X					
Whistling Eagle	Haliastur sphenurus	X						

Whitlock 1922

Mees 1958

Storr 1962

Dear 1969

Also at Kyalina Pool

Also at Dales Gorge

Also at Hammersley Gorge

	A	B	C	D	E	F	G
Collared Sparrow-Hawk	X						
Australian Little Eagle	X	X				X	X
Wedge-tailed Eagle	X	X					
Spotted Harrier	X				X		
Swamp Harrier		X					
Little Falcon		X	X	X	X		X
Brown Hawk		X					
Kestrel	X				X		
Little Quail	X				X		
Marsh Crane	X				X		
Black-tailed Native Hen	X				X		
Coot	X				X		
Australian Bustard	X	X			X		
Black-fronted Dotterel	X	X			X		
Southern Stone Curlew	X				X		
Peaceful Dove	X	X			X		X
Diamond Dove	X	X			X		X
Common Bronzewing	X	X			X		
Crested Pigeon	X	X			X		
Red-plumed Pigeon	X	X			X		
Flock Pigeon	X	X			X		
Little Corella			X	X			
Galah			X	X			
Cockatiel	X	X			X		X
Twenty-eight Parrot	X	X			X		X
Budgerygah	X	X			X		X
Pallid Cuckoo	X	X			X		X
Narrow-billed Bronze Cuckoo	X	X			X		X
Pheasant-Coucal	X	X			X		X
Boobook Owl	X	X			X		X
Tawny Frogmouth	X	X			X		X
Owlet-Nightjar	X	X			X		X
Spotted Nightjar	X	X			X		X
Accipiter civrocephalus							
Hieraetus morphnoides							
Aquila audax				X		X	
Circus assimilis					X		
Circus approximans				X	X		
Falco longipennis			X	X	X		
Falco berigora			X	X	X		
Falco cenchroides			X	X	X		
Turnix velox				X			
Porzana pusilla				X			
Tribonyx ventralis				X			
Fulica atra				X			
Eupodotis australis				X			
Charadrius melanops				X			
Burhinus magnirostris				X			
Geopelia striata			X	X			
Geopelia cuneata			X	X			
Phaps chalcoptera			X	X			
Ocyphaps lophotes			X	X			
Lophophaps ferruginea			X	X			
Histriophaps histrionica			X	X			
Cacatua sanguinea			X	X			
Cacatua roseicapilla			X	X			
Leptolophus hollandicus			X	X			
Barnardius zonarius			X	X			
Melopsittacus undulatus			X	X			
Cuculus pallidus			X	X			
Chrysococcyx basalis			X	X			
Centropus phasianinus			X	X			
Ninox novaeseelandiae			X	X			
Podargus strigoides			X	X			
Aegotheles cristatus			X	X			
Eurostopodus guttatus			X	X			

	A	B	C	D	E	F	G
Blue-winged Kookaburra	X	X	X	X		X	X
Sacred Kingfisher	X		X	X	X	X	
Red-backed Kingfisher	X		X				X
Bee-eater	X	X	X				
Singing Bush-lark	X	X	X				
White-back Swallow				X			
Welcome Swallow	X			X			
Tree Martin	X	X		X	X	X	X
Fairy Martin	X			X	X		
Australian Pipit	X	X		X	X		
Ground Cuckoo-Shrike	X			X	X		
Black-faced Cuckoo-Shrike	X			X	X		
White-winged Triller	X		X	X	X		
Grey-crowned Babbler	X	X	X	X	X		
Spinifex-bird	X	X		X			
Golden-headed Fantail Warbler	X	X		X			
Reed Warbler	X	X		X			
Brown Songlark	X	X		X			
Rufous Songlark	X	X		X			
Blue-and-white Wren	X	X	X	X	X		
Variiegated Wren	X	X	X	X	X		
Western Warbler	X	X	X	X			X
Rufous-crowned Emu-Wren	X	X		X			
Weebill	X	X	X	X			
Striated Grass Wren	X	X	X	X		X	
Chrimson Chat	X	X	X	X			
Red-capped Robin	X	X		X	X		
Hooded Robin	X	X		X			
Willy Wagtail	X	X		X			
Rufous Whistler	X	X		X			
Western Shrike-Thrush	X	X		X			
Crested Bell-Bird	X	X	X	X			
Black-tailed Tree-Creeper	X	X		X			
Dacelo leachii							
Halcyon sancta							
Halcyon pyrrhopygia							
Merops ornatus							
Mirafra javanica							
Cheramoeca leucosternum							
Hirundo neoxena							
Petrochelidon nigricans							
Petrochelidon ariel							
Anthus novaeseelandiae							
Pteropodocys maxima							
Coracina novaehollandiae							
Lalage sueurii							
Pomatostomus temporalis							
Eremiornis carteri							
Cisticola exilis							
Aerocephalus stentoreus							
Cinclorhamphus cruralis							
Cinclorhamphus mathewsi							
Malurus leuconotus							
Malurus lamberti							
Gerygone fusca							
Stipiturus ruficeps							
Smicrornis brevirostris							
Amytornis striatus							
Epthianura tricolor							
Petroica goodenovii							
Petroica cucullata							
Rhipidura leucophrys							
Pachycephala rufiventris							
Colluricincla rufiventris							
Oresica gutturalis							
Climacteris melanura							

	A	B	C	D	E	F	G
Mistletoe-bird	X						
Red-tipped Diamond-bird	X	X	X	X		X	
Red-browed Diamond-bird	X						X
Yellow Silvereye	X	X	X				
Brown Honeyeater		X					
Pied Honeyeater		X					
Singing Honeyeater		X		X			
Grey-headed Honeyeater	X	X	X	X			
White-plumed Honeyeater	X	X	X	X			X
Golden-breasted Honeyeater	X	X					
Yellow-throated Miner	X	X		X			X
Painted Finch	X	X	X	X			X
Zebra Finch	X	X	X	X			X
Star Finch	X	X	X	X			X
Magpie-Lark	X	X	X	X			X
White-breasted Wood-Swallow							
Masked Wood-Swallow	X	X	X	X			
Black-faced Wood-Swallow	X	X	X	X			
Little Wood Swallow	X	X	X	X			
Black-throated Butcher-bird	X	X	X	X			X
Black-beaked Magpie	X	X	X	X			X
Spotted Bower-bird	X	X	X	X			X
Crow		X	X	X			X
Little Crow	X	X	X	X			X
Dicaeum hirundinaceum							
Pardelotos substriatus							
Pardalotus rubricatus		X	X	X			
Zosterops lutea		X	X	X			
Lichmera indistincta		X	X	X			
Certhionyx variegatus		X	X	X			
Meliphaga virescens		X	X	X			
Meliphaga keartlandi		X	X	X			
Meliphaga penicillata		X	X	X			
Melithreptus gularis		X	X	X			
Manorhina flavigula		X	X	X			
Emblema picta		X	X	X			
Taeniopygia castanotis		X	X	X			
Bathilda ruficauda		X	X	X			
Grallina cyanoleuca		X	X	X			
Artamus leucorhynchus		X	X	X			
Artamus personatus		X	X	X			
Artamus cinereus		X	X	X			
Artamus minor		X	X	X			
Cracticus nigrogularis		X	X	X			
Gynrorhina tibicens		X	X	X			
Chlamydera maculata		X	X	X			
Corvus cecillae		X	X	X			
Corvus bennetti		X	X	X			

Also recorded at Kyalina Pool but not at Millstream:

Pink-eared Duck
Marsh Sandpiper

Malacorhynchus membranaceus
Tringa stagnatilis

No additional species at Dales Gorge or Hamersley Gorge.