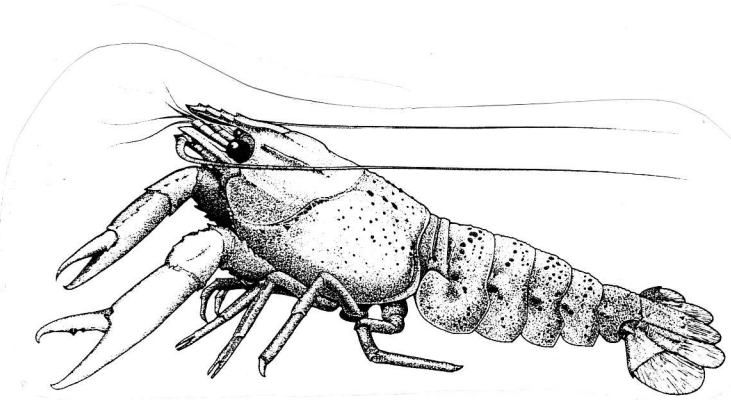
PRELIMINARY REPORT ON THE

AQUATIC FAUNA OF BUNGENDORE PARK AND WUNGONG BROOK



NEIL SARTI

July 1994

BUNGENDORE PARK MANAGEMENT COMMITTEE
in conjunction with
DEPARTMENT OF PLANNING & URBAN DEVELOPMENT

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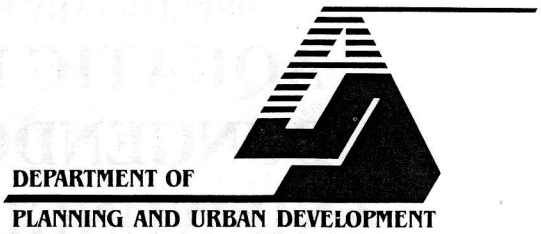

Funded by: Department of Planning and Urban Development

Cover illustration – Marron *Cherax tenuimanus*
after Fisheries Department 1989

BUNGENDORE PARK MANAGEMENT COMMITTEE

A community-based committee of the City of Armadale charged with the responsibility of the management and protection of Bungendore Park.

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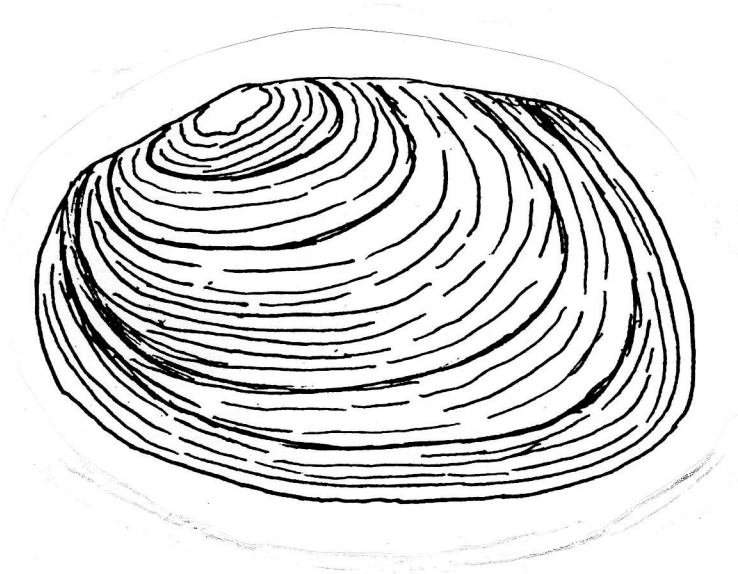


Freshwater Mussel *Hyridella carteri*

1. INTRODUCTION

Bungendore Park (↑A4561) is an "A" class reserve of approximately 500 hectares located about 5 kilometres by road from the City of Armadale. The area has high recreational, scientific and conservation value (Lewis, 1993). It is located on the western edge of the Darling Plateau close to the Wungong Dam. A small seasonal creek emanates from within Bungendore Park at Cooliabberra Spring and dissects the western boundary of the park. The southern edge of Bungendore Park is located within one kilometre of the westward flowing Wungong Brook downstream of the Wungong Dam.

These waterbodies are very important biologically, providing either direct or indirect support for wildlife in Bungendore Park. In determining a sound management programme for Bungendore Park, baseline biological information on the aquatic fauna of the area is required. This report deals with the fishes, crustacea and aquatic invertebrates either previously reported or surveyed during the period from July to December 1993 from within Bungendore Park, and from an area of the Wungong Brook adjacent to the southern boundary of the park.

2. STUDY AREA

2.1 GEOMORPHOLOGY

Bungendore Park is situated on the western edge of the Darling Plateau, south east of Armadale in Western Australia. The region features a weathered landscape and has a topography of low relief. The lateritic soils of the plateau have been eroded at the western edge and to the south of the park to reveal granite bedrock.

A small seasonal creek emanates from within Bungendore Park at Cooliabberra Spring and dissects the western boundary of the park. After exiting the park it continues in a westerly direction onto the eastern edge of the Swan Coastal Plain where it joins the Wungong Brook south of Armadale. About one kilometre to the south of Bungendore Park, the permanently flowing Wungong Brook dissects the Darling Scarp through a granite bedrock valley. Drainage lines from Bungendore Park run south-westerly and south-easterly into the Wungong Brook valley.

2.2 CLIMATE

The Darling Plateau has a typically Mediterranean climate with a cool wet winter and a hot dry summer. The annual rainfall of about 1200 mm in the survey area is highly variable from year to year. Rainfall is highly seasonal with about 90% occurring within the period April to October (Seddon, 1972). Evaporation exceeds precipitation in all months except the period between May and August.

3. METHODS

The original intent of the survey was to provide collections of fish and crustaceans from the area. Collection sites were therefore chosen on the basis of the potential fish and crustacea habitat they provided and the accessibility of the site.

No regimented collecting programme was undertaken for aquatic insects, but some representative species were collected throughout the survey.

Collections were made with a small mesh hand scoop net used in the conventional manner along the periphery of the creeks. Small traps measuring 0.4 m long, 0.25 m high and 0.25 m wide, with a covering of 3 mm mesh and baited with dry cat food were laid at night and retained in the morning.

The location of collection sites is indicated in Map 1, and, for brevity, localities mentioned in the text are referred to by number.

Index to collection sites indicated on Map 1.

CS1 Shallow pool about 10 cm deep near source of Cooliabberra Spring;

CS2 Small rock pool about 50 cm deep in Cooliabberra Spring near western boundary of Bungendore Park;

WB1 Wide pool about 60 cm deep in Wungong Brook about 1 kilometre upstream from where the brook crosses South Western Highway;

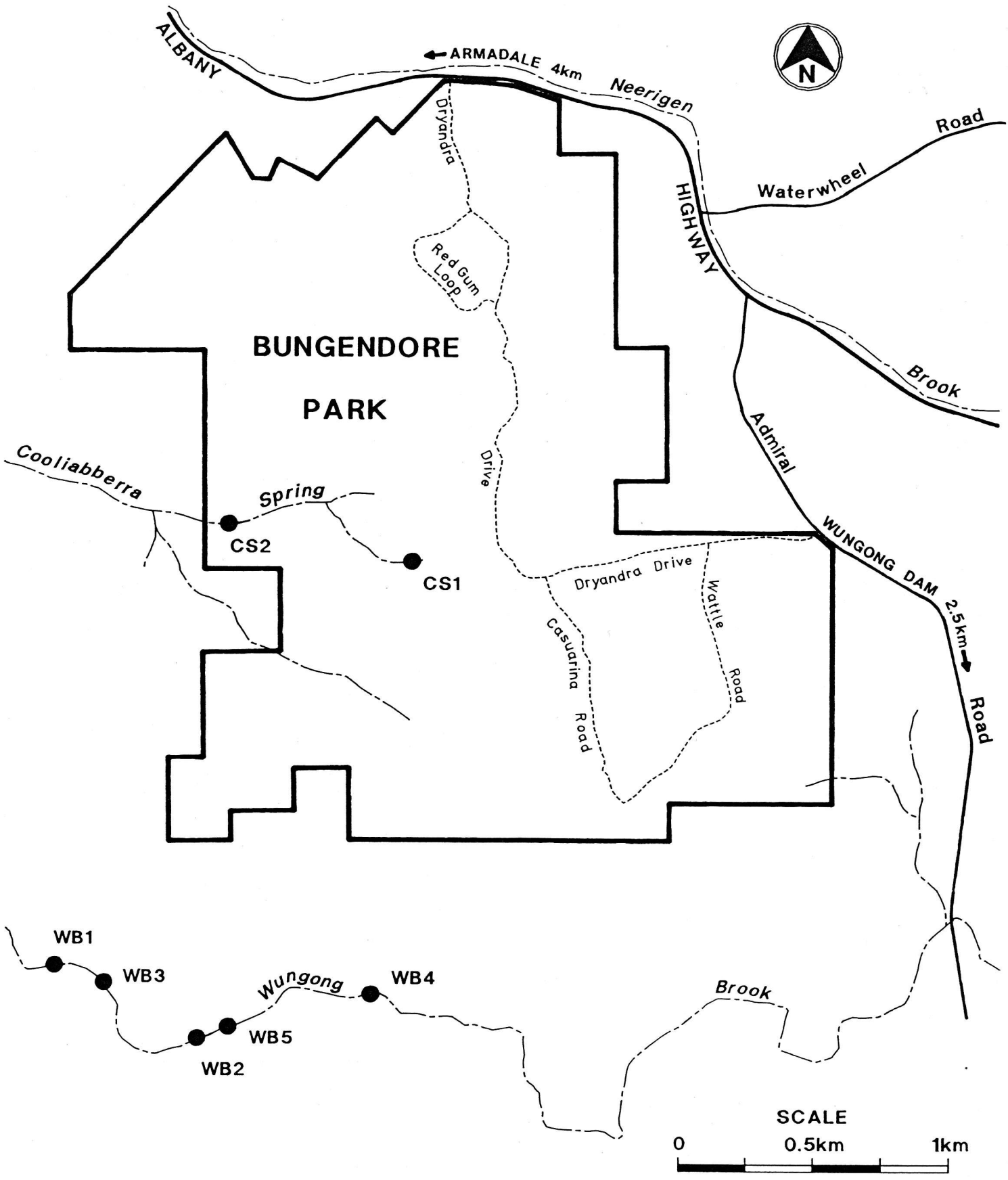
WB2 Wungong Brook immediately below WB5 gauging dam;

WB3 Rock pool about 40 cm deep in Wungong Brook at small ford near pipeline outflow about 1.2 kilometres upstream from the highway;

WB4 Pool about 1 m deep in Wungong Brook at second bridge about 2 kilometres upstream from the highway;

WB5 Gauging dam about 1.5 kilometres upstream from the highway.

It has not been possible to identify all specimens to species rank. All specimens have been deposited at the Western Australian Museum, Perth.



Map 1. Location of collection sites

4. RESULTS

An annotated list of species is presented below. Measurements are given either as standard length (SL) for fish or total length (TL) along the longest part of the body for other fauna. Where possible the type locality is enclosed in brackets following the reference to the original description for each species. The popular names used for fish in the species notes follow those given in Allen, 1982.

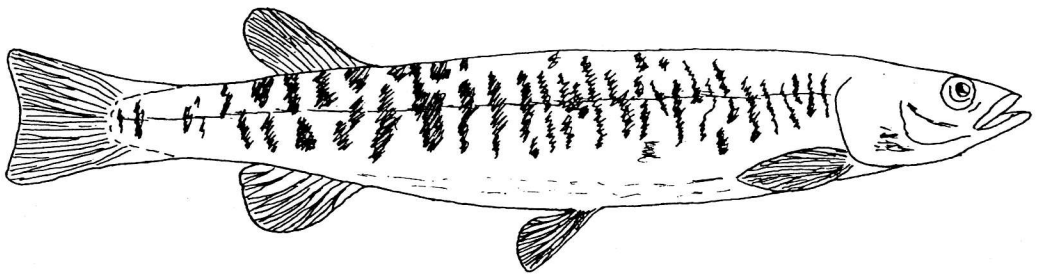
4.1 PISCES

FAMILY SALMONIDAE
Oncorhynchus mykiss Walbaum, 1792 (North America).
Rainbow Trout

Rainbow Trout have been introduced into many of the large dams and rivers of the south-west of Western Australia. Common maximum size 400 mm SL. Recorded from the Wungong Brook (Coy, 1979) and the Wungong Dam, where stomach contents were found to contain crustaceans, insects and small fish (Pusey and Morrison, 1989). Specimens have been caught in the vicinity of WB1 (R. Johnstone, pers. comm.). Introduced into all Australian states except Queensland, and the Northern Territory. In Western Australia it is found in coastal streams.

FAMILY GALAXIIDAE
Galaxias occidentalis Ogilby, 1899: 157 (south of Perth, Western Australia).
Western Minnow

The Western Minnow is a relatively gregarious species usually found swimming in small schools on or near the surface where it feeds almost exclusively on terrestrial insects. It prefers fast flowing water in larger streams, but may be found in other temporary waterbodies such as lakes during periods of inundation (Sarti and Allen, 1978). Common maximum size 85 – 100 mm SL. A specimen 48 mm SL was collected from site WB2. A small school was observed in the vicinity of WB3. Endemic to Western Australia where it is known from coastal streams between Albany and Guilderton.



Western Minnow *Galaxias occidentalis*

FAMILY PLOTOSIDAE

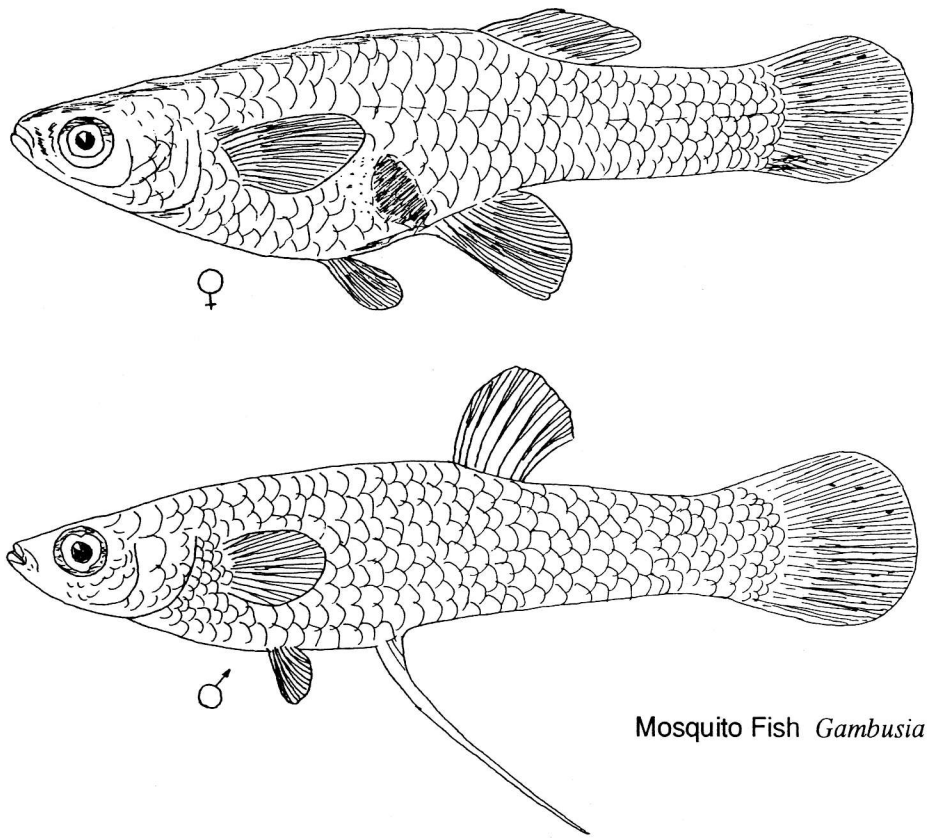
Tandanus bostocki Whitley, 1944: 260 (Serpentine River, Western Australia).
Freshwater Cobbler

The Freshwater Cobbler is a solitary, bottom dwelling species generally found in slow flowing water at the downstream end of pools. Mainly carnivorous, the diet includes crustaceans and molluscs. Common maximum size 370 mm TL. Recorded from the Wungong Dam by Pusey and Morrison, 1989. Specimens have been caught in the vicinity of WB1 (R. Johnstone, pers. comm.). Endemic to Western Australia where it is known from coastal streams between Walpole and Guilderton.

FAMILY POECILIIDAE

Gambusia holbrooki Girard, 1859 (North America).
Mosquito Fish, Gambusia

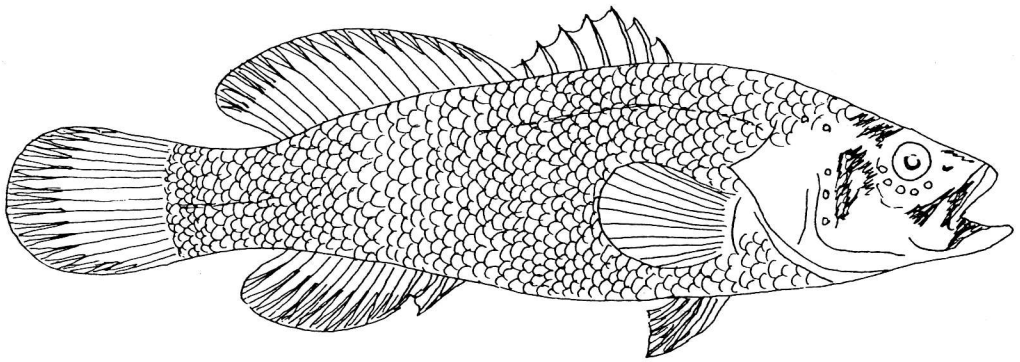
The Mosquito Fish was introduced to the Perth area by health authorities in the period between 1934 and 1940 (Mees, 1977), apparently to control mosquito larvae. However, in this regard its effect has been negligible. It competes directly with some species of native fish and has become a pest in many waterbodies throughout the south west of Western Australia. A gregarious species, it can tolerate extremes of temperature, oxygen and salinity. The diet consists of aquatic insects and small crustaceans. Common maximum size generally 50 mm SL. Specimens 8 – 27 mm SL were collected at WB4. Introduced to many parts of Australia. In Western Australia it is found from just west of Hopetoun to just north of Geraldton.



Mosquito Fish *Gambusia holbrooki*

FAMILY PERCICHTHYIDAE
Bostockia porosa Castelnau, 1873: 126 (Western Australia).
Nightfish

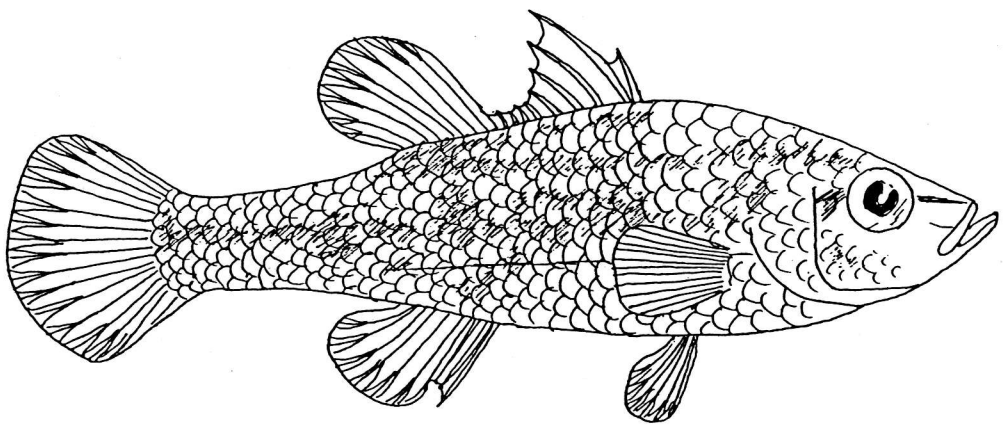
The Nightfish is a solitary, bottom dwelling species. It is nocturnal and feeds on a variety of crustaceans, small fishes, and aquatic insects. During daylight it remains hidden among vegetation and under stones. Common maximum size generally 75 – 100 mm SL. Specimens 18 – 60 mm SL were collected from sites WB2 and WB3. Endemic to south-western Western Australia where it is found from the Albany district to Guilderton.



Nightfish *Bostockia porosa*

FAMILY KUHLIIDAE
Edelia vittata Castelnau, 1873: 124 (Western Australia).
Western Pygmy Perch

The Western Pygmy Perch is a slightly gregarious, bottom dwelling species. It is able to tolerate rises in salinity and temperature fluctuations (0.5° – 32° C) (Shipway, 1949) and feeds on caddis-fly larvae (Trichoptera). Maximum size about 60 mm SL. Specimens 17 – 45 mm SL were collected from sites WB2 and WB3. Endemic to south-western Western Australia where it is found from the Phillips River to the Moore River.



Western Pygmy Perch *Edelia vittata*

4.2 CRUSTACEA

Decapoda
FAMILY PARASTACIDAE
Cherax tenuimanus (Smith)

Chaeraps tenuimanus Smith, 1912: 144 (Margaret River, Western Australia).
Marron

The Marron is a solitary, mutually aggressive species. During daylight it remains hidden among vegetation, submerged logs and under stones, foraging activity not occurring until sunset. Marron are primarily detrital feeders although they are also opportunist carnivores and include other marron in their diet (Morrissy, 1976). Maximum size 385 mm TL although animals of this size extremely rare. Very common in the Wungong Brook where specimens 56 – 77 mm TL were collected from sites WB2, WB3, WB4 and WB5. A decaying marron carcass with a carapace measuring 101 mm TL was found at site WB3. Endemic to south-western Western Australia where it is found from Esperance to Geraldton.

FAMILY PALAEMONIDAE
Palaemonetes australis Dakin, 1915: 571 (Upper Swan Bridge, Western Australia).
Freshwater Shrimp

The Freshwater Shrimp is known to be euryhaline and able to tolerate a salinity range from fresh to 35 ‰. Generally inactive during the day, it is a detrital feeder and has been recorded from the Wungong Dam by Pusey and Morrison, 1989. Common maximum size generally 30 mm TL. Endemic to south-western Western Australia it is found in both lentic and lotic environments, but rarely in areas of strong current flow.

Amphipoda
Amphipod

Freshwater Amphipods are common in freshwater bodies where they are confined to southern Australia (Williams, 1980). They are detritivores, feeding on decaying plant and animal matter. Specimens 6 mm TL were collected from sites CS1, CS2 and WB1.

Isopoda
Isopod

Isopods are common in freshwater bodies throughout Australia. They are detritivores, feeding on diatoms and organic debris. A specimen 8 mm TL was collected from site CS2.

4.3 MOLLUSCA

Bivalvia
FAMILY UNIONIDAE
Hyridella carteri (Iredale)

Velesunio carteri Iredale, 1934: 57 (Perth district).
Freshwater Mussel

The Freshwater Mussel is found on or half-buried in sandy or muddy substrates usually in groups of two or three individuals. It is a filter feeder and adapted to intermittent stream flow. It is believed to be able to be able to resist dehydration by sealing the shell, reducing its metabolic rate, and surviving on stored lipids (Storey and Edward, 1989). Maximum size about 60 mm TL. Specimens 32 – 53 mm TL were collected from sites WB3 and WB4. Endemic to freshwater systems throughout southern Western Australia.

Gastropoda
FAMILY LYMNAEIDAE
Lymnaea columella (Say)

Pseudosuccinea columella Say, 1817: 14 (North America).
Lymnaeid Aquatic Snail

The Lymnaeid Aquatic Snail is known to be an intermediate host in the transmission of the trematode *Fasciola hepatica* (liver fluke of sheep). A specimen 9 mm TL was collected from site WB2. Previously recorded from wetlands on the Swan Coastal Plain (Hembree and George, 1978; Davis and Rolls, 1987). Introduced from North America and now widespread throughout southern Australia.

4.4 INSECTA

Odonata
Zygoptera

Damselfly nymphs are carnivorous and generally associated with weed or decomposing plant material. Specimens of one species of damselfly nymph 11 mm TL were collected from sites CS1 and CS2. Another species 6 mm TL was collected from site WB1.

Hemiptera
Corixidae

Three species of Waterboatmen and Backswimmer were collected from sites WB1, WB2 and WB4. Waterboatmen were observed at site WB5.

Trichoptera

Caddisfly larvae construct protective cases and generally feed on plant tissue although some are predatory. Two species of Caddisfly larva were collected from sites WB1 and WB2.

4.5 HIRUDINEA

FAMILY GLOSSIPHONIIDAE
Clepsine sp.
Swimming Freshwater Leeches

The Swimming Freshwater Leeches commonly feed on the body fluids of freshwater gastropods. Often found on the underside of rocks and leaves of emergent plants or free swimming. Specimens 35 mm TL (contracted) were collected from sites WB2 and WB3.

5. DISCUSSION

The aquatic fauna of Bungendore Park and the Wungong Brook recorded during the survey consisted of twenty taxa. Included in the fauna were six species of fish, four species of crustacea, two species of mollusc, seven species of insect and one species of leech. Only two species of crustacea and one species of insect were recorded from Bungendore Park and of these only one species of crustacea, an amphipod, was recorded from both Bungendore Park and the Wungong Brook.

The fish fauna of the survey area is comparable to other streams in the northern Jarrah forest of the Darling Plateau (Pusey *et al.*, 1989). All of the fish recorded are principle inland species (Allen, 1982) and are restricted to inland waters throughout their life history. The indigenous species (Western Pygmy Perch *Edelia vittata*, Nightfish *Bostockia porosa*, Western Minnow *Galaxias occidentalis* and Freshwater Cobbler *Tandanus bostocki*) are endemic to south-western Western Australia and have relatively restricted distributions. The exotic species (Rainbow Trout *Oncorhynchus mykiss* and Mosquito Fish *Gambusia holbrooki*) have been introduced throughout the world.

Only fourteen aquatic invertebrate species were collected and this is considered incomplete. Other streams in the northern Jarrah forest have recorded 110 taxa (Bunn *et al.*, 1986). The difference can be attributed to the lack of concerted invertebrate collecting during the survey. Initial collections concentrated only on fish and crustacea. During some latter collections however, samples were taken of other invertebrates. Invertebrate collections by Bunn *et al.*, 1986 were conducted over a full year and therefore took account of the great seasonal diversity in insect and other invertebrate populations. Most of the aquatic invertebrates collected during this survey are endemic to south-western Western Australia and have relatively restricted distributions. The largest and most common aquatic invertebrate was the Marron *Cherax tenuimanus*.

Streams in south-western Western Australia have a depauperate aquatic fauna in comparison with that of south-eastern Australia. Bunn and Davies, 1990 proposed that the major factors contributing to this reduced diversity were the insular nature of the area, a previous history of aridity, and an extremely low level of primary productivity.

Given more localised consideration, the survey area was quite small and only covered that part of the Wungong Brook and Cooliabberra Spring passing through the Darling Scarp. Considerable differences in species composition could exist between the Wungong Brook east of the Wungong Dam and the Wungong Brook on the Swan Coastal Plain west of the Darling Scarp. The factors likely to control species diversity are stream permanency, stream gradient, salinity, pH, dissolved oxygen and water temperature.

The lack of fish and large crustacea in Cooliabberra Spring is believed to be the result of non-permanent stream flow and the steep gradient of the stream. Although the Western Pygmy Perch, Nightfish and Western Minnow are able to recolonise temporary streams during winter and spring (Hutchinson, 1991), they may avoid steep stream gradient. The same situation is likely to apply to the Marron. Freshwater Cobbler and Mosquito Fish have a preference for low gradient streams and although Rainbow Trout prefer steep gradient streams, they also require permanency (Hutchinson, 1991).

Bungendore Park is located adjacent to major urban areas and this trend is likely to continue (Seddon, 1972). In that context, Bungendore Park is important as a potential refuge for wildlife. Furthermore, both the Wungong Brook and Cooliabberra Spring are believed to be very important biologically, providing either direct (through the supply of water, food and habitat) or indirect (through the supply of food and habitat dependent on the waterbodies) support for wildlife in Bungendore Park.

The maintenance of the Wungong Brook and Cooliabberra Spring in good condition is therefore important to the overall management of Bungendore Park. Further collection of aquatic invertebrates is required so that complete baseline biological information on the aquatic fauna of the area is available.

6. ACKNOWLEDGEMENTS

Financial assistance for this survey was provided by the Department of Planning and Urban Development. Shirley Slack-Smith and Dianne Jones of the Western Australian Museum provided species identifications. Keren, Michael and Lauren Sarti provided valuable assistance in the field. Barry Hutchins of the Western Australian Museum provided some field collecting materials and access to the fish collections of that institution. The cover illustration is reprinted with the kind permission of the Fisheries Department of Western Australia; Christine Davis drew the map. Kim Sarti provided useful comments on the manuscript and prepared the layout of this report.

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