Fish Survey

Leopardwood Park

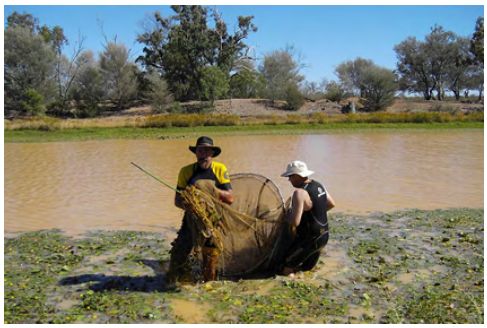
Bulloo River catchment, western Queensland

April 2007

Adam Kerezsy
Australian Rivers Institute
Griffith University
Nathan
Queensland 4111
Email: kerezsy@hotmail.com
Mobile: 0429 981 062
Home: (07) 3284 1626

Abstract

A survey of freshwater fish was undertaken in the Bulloo River catchment on Leopardwood Park station, approximately 20 kilometres north of the township of Adavale, on April 9 and 10, 2007. Three sites were utilised, including one main channel site and two waterhole sites. Water quality parameters such as temperature, dissolved oxygen, conductivity, pH and turbidity were measured at each site, and a total of 806 fish comprising 8 species were sampled, measured and returned to the water alive.



(Photo: Daisy Richardson)

Introduction

The Bulloo-Bancannia Basin in western Queensland is currently poorly studied with regard to fish communities. The results of surveys carried out in 1986 and 1989 and reported on by Midgley *et al.* (1991) confirm the presence of 6 species in the Basin, including bony bream, *Nematolosa erebi*, a catfish, *Neosiluris* sp., a gudgeon, *Hypseleotris* sp., desert rainbowfish, *Melanotaenia splendida tatei*, golden perch, *Macquaria ambigua*, spangled perch, *Leiopotherapon unicolor* and Welch's grunter, *Bidyanus welchi*. In addition, museum records include a single specimen of purple-spotted gudgeon, *Mogurnda adspersa* (Queensland Museum) and the alien mosquitofish, *Gambusia affinis* (Australian Museum) as also occurring in the Bulloo-Bancannia Basin (Midgley *et al.* 1991).

Though not technically part of the Lake Eyre Basin, Wager and Unmack included the Bulloo-Bancannia Basin in a government publication relating to fish of the Lake Eyre Basin in 2000. The species mentioned in this publication as occurring within the Bulloo-Bancannia include those mentioned above, with certain qualifications. Wager and Unmack (2000) list three species of catfish, including Hyrtl's tandan, *Neosiluris hyrtlii*, silver tandan, *Porochilus argenteus* and a third undescribed species, the false-spined catfish, known from only two specimens. They list the golden perch (yellowbelly) occurring in the Bulloo as *Macquaria* sp. rather than *Macquaria ambigua*, thus reflecting common thought and genetic research suggesting that the populations of golden perch in different Australian drainage divisions may be different species or subspecies. Wager and Unmack record two possible species of carp gudgeons from the Bulloo-Bancannia – the western carp gudgeon, *Hypseleotris klunzingeri* and the undescribed Midgley's carp gudgeon, *Hypseleotris* sp., and in addition to Welch's grunter, also record Barcoo grunter, *Scortum barcoo*, from the Bulloo-Bancannia.

In general, existing studies and knowledge suggest that the fish fauna of the Bulloo-Bancannia is likely to be a subset of the species from the nearby Thomson/Barcoo/Cooper catchment in the adjacent Lake Eyre Basin, with notable

omissions being Australian smelt, *Retropinna semoni*, and Cooper Creek catfish, *Neosiluroides cooperensis*.

Targeted studies of specific areas throughout the Bulloo-Bancannia Basin are likely to improve the accuracy of knowledge of fish populations and their distribution within the Basin. Completion of these surveys (such as the work presented here) also has the potential to lay a foundation upon which to conduct more specific research concerning fish life histories in the Bulloo-Bancannia Basin, particularly with regard to breeding and recruitment of fish species in a hydrologically highly variable system.

Methods

Study area

Leopardwood Park is situated approximately 20 kilometres north of the township of Adavale on the Bulloo River. In April 2007, both the Bulloo itself and numerous waterholes contained comparatively high water levels due to recent flooding and elevated flows in the catchment (Vin Richardson, personal communication). The Bulloo River, which is situated between the Murray-Darling Basin and the Lake Eyre Basin, is characterised by features common to neighbouring rivers such as the Paroo and Warrego (in the Murray-Darling Basin) and the Thomson and Barcoo (in the Lake Eyre Basin). Consequently, the main channel of the Bulloo is similar to western Murray-Darling rivers, whereas the presence of outlying waterholes separate from the main channel is similar to waterholes of the Lake Eyre Basin.

For the purposes of the survey, three sites were chosen. The first site was in the main channel of the Bulloo River, whereas sites 2 and 3 were in waterholes (Figure 1).

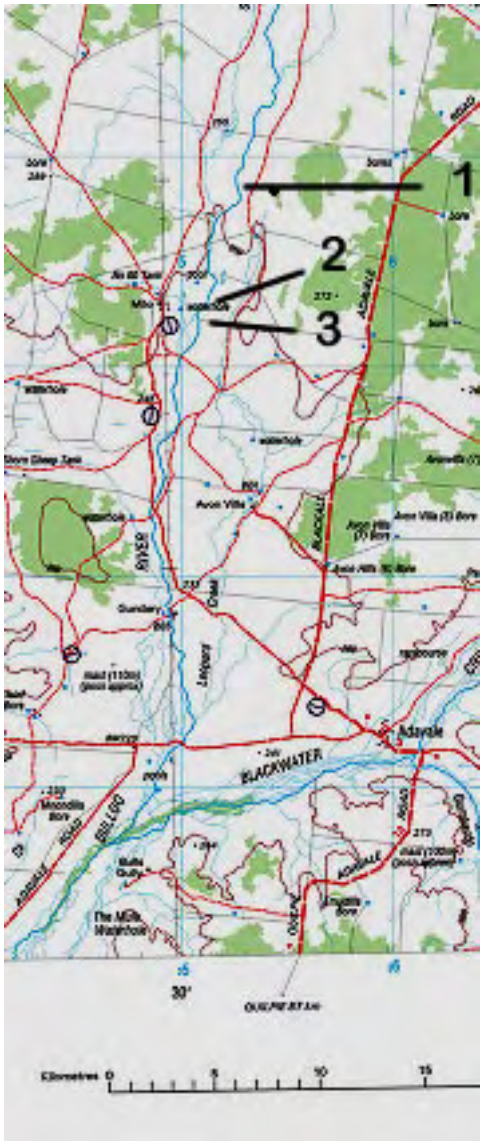


Figure 1. A map of sites sampled during the April survey. Site 1 is situated on the main channel of the Bulloo River. Sites 2 and 3 are waterhole sites.

Sampling methods

Water quality parameters such as temperature, dissolved oxygen, conductivity, pH and turbidity were tested at each site, and estimations relating to length, width and depth of each river section or waterhole were also recorded.

Fish were sampled using a combination of two small (2mm) and two large-meshed (13mm) fyke nets set overnight and by a 5 minute larval trawl comprising a funnel-

shaped 500 micron mesh trawl net manually dragged through the water column. All fish were held in water-filled buckets upon the emptying of nets. Fish were then identified, measured (standard length in millimetres) and returned to the water alive. All sampling work was carried out under a scientific research permit (General Fisheries Permit No: PRM03315D) and under a Griffith University Animal Ethics Agreement.

Results

Water quality results are summarised in Table 1.

In general, water quality results were consistent with the recent flooding in the Bulloo catchment, with conductivity (salinity) levels comparatively low. Visibility was higher in the main channel site than in either waterhole.

Table 1. Water quality parameters at Leopardwood Park, April 9, 2007

Site name	Site no.	Length (m)	Width (m)	Maximum depth (m)	Temperature (degrees celsius)	Dissolved oxygen (%)	Conductivity (microsiemens)	pH	Turbidity (cm)
Main	1	1000	20	1.2	22	52	98.5	7	20
House	2	200	15	3+	25	42	29	7	5
Shed	3	500	30	3+	24.7	60	30	7	5

Fish results are summarised in Table 2.

A total of 806 individual fish were sampled comprising eight species. All species have previously been recorded from the Bulloo-Bancannia Basin. The presence of glassfish, *Ambassis* sp., can be considered significant. This species was not recorded by either Midgley *et al.* (1991) or Wager and Unmack (2000). In addition, there are no records of glassfish in the Bulloo catchment held at the Queensland Museum (Jeff Johnson, personal communication). Glassfish are only listed as present in the Bulloo River in the general text by Allen *et al.* (2002). The most common species at Leopardwood Park were Hyrtl's tandan and spangled perch. Hyrtl's tandan occurred in waterhole sites but not in the main

channel site, whereas spangled perch occurred in all sites. Silver tandan, carp gudgeon and rainbowfish were also absent from the main channel site.

Table 2. Fish species occurring at Leopardwood Park in April 2007, including numbers of individuals sampled at each site.

Species	Common name	Main Channel	House w'hole	Shed w'hole
Nematolosa erebi	Bony bream	55	31	14
Macquaria sp.	Yellowbelly	13	1	3
Neosiluris hyrtlii	Hyrtl's tandan	0	297	43
Porochilus argenteus	Silver tandan	0	24	6
Hypseleotris sp.	Carp gudgeon	0	11	28
Leiopotherapon unicolor	Spangled perch	86	16	126
Melanotaenia splendida tatei	Desert rainbowfish	0	6	9
Ambassis sp.	Glassfish	0	20	17

There was considerable variation in the lengths of sampled fish (Table 3), indicating that recruitment of several species may have occurred during – or immediately after – the period of flooding and elevated flows in the Bulloo River which preceded the survey.

Table 3. Length ranges of sampled fish at Leopardwood Park in April, 2007

Species	Range of lengths sampled (standard length in mm)
Bony bream	32 - 250
Yellowbelly	70 - 265
Hyrtl's tandan	75 - 230
Silver tandan	75 - 150
Carp gudgeon	7 - 14
Spangled perch	35 - 210
Rainbowfish	23 - 46
Glassfish	10 - 45

Discussion, conclusion and recommendations

The fish species sampled at Leopardwood Park in April 2007 were predominantly species previously identified as present in the Bulloo-Bancannia Basin. However, neither Barcoo or Welch's grunter were sampled, and the two species previously reported from the Basin in extremely small numbers, the undescribed false-spined catfish (2) and the purple-spotted gudgeon (1) also were not detected. No alien species were sampled at Leopardwood Park.

The survey sampled glassfish of the Ambassidae family at Leopardwood Park, however earlier surveys and literature relating to the Bulloo-Bancannia Basin has not mentioned the presence of this species (Midgley *et al.* 1991; Wager & Unmack 2000). The only published record of this species from the Bulloo River is in Allen *et al.* (2002) The presence of glassfish at Leopardwood Park suggests that this species probably has a patchy distribution within the Bulloo-Bancannia Basin.

Results from the current survey indicate that the fish fauna of the Bulloo-Bancannia Basin is likely to be a subset of the Cooper/Thomson/Barcoo fauna of the Lake Eyre Basin rather than a subset of the north-western rivers of the Murray-Darling Basin. In recent surveys of the Warrego River between Charleville and the New South Wales border, Balcombe *et al.* (2006) sampled eel-tailed catfish, *Tandanus tandanus*, silver perch, *Bidyanus bidyanus* and alien species such as carp, *Cyprinus carpio*, goldfish, *Carassius auratus* and mosquitofish, *Gambusia holbrooki*. However, none of these species were sampled at Leopardwood Park.

The fish results from Leopardwood Park indicate that the Bulloo River may be in good ecological condition when compared with the rivers of the north-western Murray-Darling Basin, however surveys of other sections of the river further downstream are recommended in order to validate this at a larger spatial scale. The biggest threats to the integrity of the aquatic fauna of the Bulloo River at Leopardwood Park would be

introductions of foreign aquatic animals to the waterholes, including bait species such as redclaw crayfish, alien species such as carp, goldfish and mosquitofish and introductions of hatchery-reared angling species such as yellowbelly (principally because of the risk of disease introduction, but also because hatchery-bred yellowbelly would not be derived from Bulloo broodstock).

The results from the current survey indicate that all fish species sampled at Leopardwood Park occur in breeding populations, as juveniles of all species were sampled. Prior studies in both the South Australian Lake Eyre Basin (Puckridge 1999) and in Cooper Creek (Arthington *et al.* 2005) have suggested that in dryland river systems with unpredictable flow and flooding cycles, the breeding of some species may be advantaged by elevated flows or a series of floods. It is suggested that a follow-up survey during another season and perhaps at a similar time of year following a drier summer be undertaken in order to yield more detailed information regarding possible linkages between fish recruitment (breeding) and elevated flows.

In summary, there is a considerable lack of detailed data and research that has occurred to date relating to aquatic ecology within the Bulloo-Bancannia Basin. Results from this survey indicate that the Bulloo River at Leopardwood Park appears to provide suitable habitat for at least 8 species of native Australian fish, including glassfish, a species not commonly recorded from the Bulloo catchment. No alien fish species were found in April 2007.

Acknowledgements

Adam Kerezsy thanks Vin Richardson for stopping for a yap at the BP in Blackall back in June 2006. Without that chance conversation, there'd probably be no survey and no report. Adam also thanks Mick Brigden for his help throughout April 2007, and Angus Emmott for his continued support and detailed knowledge of the natural history of western Queensland. Adam and Mick both thank Vin, Jenny, Daisy and Max Richardson

for allowing them access to the waterways of Leopardwood Park, for their hospitality, their barbeque, their interest and their enthusiasm. We wish them all every success.

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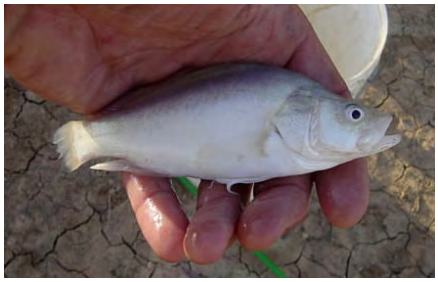
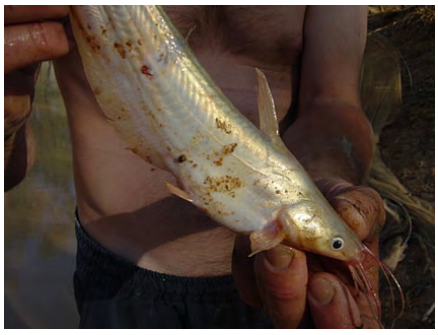
Appendix: Fish occurring at Leopardwood Park, Bulloo River, Queensland.


Bony bream (Photo: Adam Kerezsy)


Yellowbelly or golden perch (Photo: Adam Kerezsy)


Hyrtl's tandan or moonfish (Photo: Angus Emmott)


Silver tandan (Photo: Adam Kerezsy)

Appendix: Fish occurring at Leopardwood Park, Bulloo River, Queensland (2).

Spangled perch or bobby cod (Photo: Mick Brigden)

Carp gudgeon (Photo: Adam Kerezsy)

Desert rainbowfish (Photo: Adam Kerezsy)

Glassfish, northwest ambassis or Western chanda perch (Photo: Angus Emmott)