# 1. Introduction

This report represents the eleventh since June 2000 recording the results of monitoring events sponsored by Smartrivers in the Lower Balonne. Due to the continued drought and lack of cropping by Smartrivers members, funding available for this monitoring period was reduced. Thirteen sites were sampled but data has been analysed and is presented for 7 sites. The remaining data will be analysed and reported when funding becomes available.

Since the most recent sampling in March / April 2006, very low levels of flow (<1ML/day) were recorded from mid-June to early August from Jack Taylor Weir but this did not reach Whyenbah. Larger, very patchy flows in mid-late October were not noted at Whyenbah so the unverified data may be in error. No other Lower Balonne channels, or the Moonie River, recorded flow between the sampling periods. The Warrego flowed at low levels (peak 2457ML/day) almost continuously from late April to early September.

# 2. Methods

Ten riverine and three floodplain sites were sampled in late October 2006. Sampling methods mirrored earlier events (Benson and Paton 2002) with respect to:

- Fish sampled by multiple gill and fyke nets, bait traps, seine and dip nets, with the actual nets deployed depending on site conditions, particularly the extent of water available.
- Water quality sampled by a multi-parameter data logging water quality meter (a Yeokal 611). This was used for depth stratified sampling and when recording overnight was set within 25cm of the surface.
- Macroinvertebrates sampled by replicated Surber samples in the edge habitat (dates varied due to flow as noted above).
- Specialised habitats sampled for macroinvertebrates by qualitative dip netting.

No investigation of riparian zones was undertaken as these have been described previously for most sites (SKM June 2000 report and DNRM unpublished).

Macroinvertebrates were sorted by staff in the EM/Hydrobiology laboratory and were identified and counted by staff of Applied Freshwater Science. The latter was performed on samples from seven sites while the sorted samples from other sites have been stored. The subsampling technique of Wrona *et al* (1982) was employed for larger samples.

# 3. Results

Results are initially presented by site. A regional appraisal is presented in the Discussion.

## *3.1 Balonne River at St George*

Not sampled.

## *3.2 Balonne River at Mooramanna*

Not sampled.

## *3.3 Balonne River at Whyenbah*

This site is within the pool formed by the bifurcation weirs and is just upstream of the bridge, within a popular camping and fishing area. The right bank has a relatively gentle slope while the left is very steep for about 4 metres above the water line. The substrate is black soil or fine sand. Grass cover was significantly reduced and there was little evidence of recent grazing by cattle. Water level was very low with the sand bar near the camping site exposed down to the rock bar. There was no flow.

### 3.3.1 Water quality

Overnight logging was undertaken at this site. Temperature varied over 9$^{o}$C and dissolved oxygen percentage saturation by 21. The recorded ranges for each parameter were:

Temperature: 16.5 – 25.6$^{o}$C
Dissolved oxygen: 71-92 % sat
pH: 7.1 – 7.4
Conductivity: 267 - 281µS/cm
Turbidity: >600NTU.

Results from spot water quality profiling are shown in **Table 3-3.1**. The water column was well mixed though temperature reduced with depth.

■ **Table 3-3.1 Water quality depth profiling at Whyenbah in October 2006.**

| Sample Time | Depth (m) | Temp ($^{o}$C) | Dissolved Oxygen (%sat) | Conductivity (µS/cm) | Turbidity (NTU) | pH |
|---|---|---|---|---|---|---|
| 1645 | Surface | 29.3 | NA | 188 | >600 | 7.6 |
| | 0.5 | 23.8 | | 182 | >600 | 7.6 |

Conductivity in April had been less than 100µS/cm as a result of a compensation flow.

### 3.3.2 Macrophytes

*Ludwidgia* and *Juncus,* occurred in patches but the *Ludwidgia* was only evidenced by a few strands.

### 3.3.3 Fish

All fishing nets were deployed at this site and the results are presented in **Table 3-3.1**. Six native species and one introduced were captured. A broad-shelled tortoise was captured in a fyke net.

■ **Table 3-3.1 Results of fishing the Balonne River at Whyenbah in October 2006, by fishing method**

| Species | Common name | Gill | Seine | Fyke | Bait | Total Numbers caught |
|---|---|---|---|---|---|---|
| *Maccullochella peeli* | Murray Cod | 1 | | | | **1** |
| *Macquaria ambigua* | Yellowbelly | 2 | 1 | | | **3** |
| *Nematolosa erebi* | Bony Bream | 1 | 2 | 3 | | **6** |
| *Hypseleotris klunzingeri* | Carp Gudgeon | | 13 | | | **13** |
| *Retropinna semoni* | Smelt | | 82 | | | **82** |
| *Tandanus tandanus* | Eel-tailed catfish | 2 | | | | **2** |
| *Cyprinus carpio* | Carp | 1 | | | | **1** |
| **Total Numbers** | | **7** | **98** | **3** | | **108** |

### 3.3.4 Macroinvertebrates

Surber samples were collected from sand / silt or coarse sand / gravel and some samples included algae. Fourteen discrete taxa were identified. Corixids, cladocerans and Chironominae were the most common taxa (**Table 3-3.2**). Twelve prawns were captured in bait traps.

■ **Table 3-3.2 Numbers of aquatic macroinvertebrates recorded from the Balonne River at Whyenbah**

| | Edge surber | |
|---|---|---|
| | **Mean** | **Stddev** |
| Oligochaeta | 3.3 | 4.8 |
| Acarina | 4.4 | 4.1 |
| Cladocera | 68.5 | 64.9 |
| Copepoda | 21.7 | 15.7 |
| Ostracoda | 30.9 | 23.4 |
| Dytiscidae | 1.6 | 2.2 |
| Ceratopogonidae | 39.0 | 34.3 |
| Chironominae | 47.8 | 21.6 |
| Tanypodinae | 13.5 | 14.2 |
| Baetidae | 2.4 | 5.4 |
| Caenidae | 9.8 | 8.2 |
| Corixidae | 97.1 | 70.2 |
| Gomphidae | 1.6 | 3.6 |
| Anisoptera | 0.8 | 1.8 |
| Leptoceridae | 4.4 | 4.1 |
| | | |
| **Taxa** | **10.0** | **2.8** |
| **Abundance** | **346.9** | **65.6** |
| **Total taxa** | | **14** |

## *3.4 Culgoa River at Whyenbah*

Not sampled.

## *3.5 Culgoa River at Cubbie*

This site is about 1km below the Cubbie Weir. The western bank has a very thin riparian zone on the outer side of the meander and it is eroding. The banks are steep with little or no vegetation but reasonable grass cover now exists on the inside of the meander on the downstream part of the bend. The inner side of the meander has a much better riparian zone above the top bank but little or no understorey because of accumulated leaf, bark and branch litter. Snags are plentiful in the water but little other specialised habitat exists. A debris dam exists at the downstream bend in the site. The substrate tends to be very compact clay.

The deepest part near the main snags reached about 2m but more commonly the depth peaked at less than 0.5m. The river reached approximately 10m wide in places but was represented by discontinuous pools.

No tracks or disturbances of the edge were observed. Eucalypt leaf litter formed significant accumulations in shallow areas and backwaters.

### 3.5.1 Water quality

Results from spot water quality profiling are shown in **Table 3-5.1**. The water column was well mixed. Conductivity and pH were noticeably higher than in April.

■ **Table 3-5.1 Water quality depth profiling, Culgoa River at Cubbie, October 2006**

| Sample Time | Depth (m) | Temp ($^{o}$C) | Dissolved Oxygen (%sat) | Conductivity (µS/cm) | Turbidity (NTU) | pH |
|---|---|---|---|---|---|---|
| 1400 | Surface | 23.9 | 150 | 189 | >600 | 6.2 |
| | 1.0 | 18.7 | 115 | 191 | >600 | 6.1 |

### 3.5.2 Macrophytes

No macrophytes or fringing aquatic plants were observed but filamentous algae grew at the waterline on snags.

### 3.5.3 Fish

Other than two gill nets, all nets were set at this site. Three native fish species and two introduced were identified in a catch of 52 individuals (**Table 3-5.2**). This mirrors November 2005 but seven natives were recorded in April 2006, though four species were each represented by single individuals at that time. The Yellowbelly measured 126mm and 150mm whereas large individuals are commonly encountered here. The Murray Cod measured 454mm and was captured at the same location as one measuring 437mm had been captured in April.

■ **Table 3-5.2 Results of fishing the Culgoa River at Cubbie in November 2006, by fishing method**

| Species | Common name | Gill | Seine | Fyke | Bait | Total Numbers caught |
|---|---|---|---|---|---|---|
| *Maccullochella peelii* | Murray cod | 1 | | | | **1** |
| *Macquaria ambigua* | Yellowbelly | | 1 | | 1 | **2** |
| *Retropinna semoni* | Smelt | | 40 | | | **40** |
| *Cyprinus carpio* | Carp | | | 8 | | **8** |
| *Gambusia holbrooki* | Mosquitofish | | 1 | | | **1** |
| **Total Numbers** | | **1** | **42** | **8** | **1** | **52** |

One long-necked tortoise was captured in a fyke net.

### 3.5.4 Macroinvertebrates

Surber samples were collected from compact or soft clay with leaf litter and from a leaf litter pile. No dip net samples were collected. Thirteen taxa were identified from the edge habitat (**Table 3-5.3**). The most common elements were ceratopogonids, copepods, and caenids. Bait traps collected 3 *Macrobrachium*.

■ **Table 3-5.3. Numbers of aquatic macroinvertebrates recorded from Culgoa River at Cubbie**

| | Edge surber | |
|---|---|---|
| | **Mean** | **Stdev** |
| Nematoda | 1.0 | 2.2 |
| Oligochaeta | 18.9 | 20.6 |
| Cladocera | 23.1 | 9.1 |
| Copepoda | 45.6 | 27.5 |
| Ostracoda | 10.2 | 10.6 |
| Palaeomonidae | 4.3 | 9.5 |
| Ceratopogonidae | 59.3 | 34.6 |
| Chironominae | 17.7 | 16.6 |
| Tanypodinae | 25.6 | 24.1 |
| Baetidae | 8.1 | 9.5 |
| Caenidae | 29.4 | 31.0 |
| Corixidae | 2.1 | 4.8 |
| Leptoceridae | 3.1 | 4.7 |
| | | |
| **Taxa** | **9.0** | **2.0** |
| **Abundance** | **248.4** | **134.5** |
| **Total taxa** | | **13** |

## *3.6 Culgoa River at Woolerbilla*

This site was sampled and will be reported at a later date.

## *3.7 Culgoa River at Balandool*

Not sampled.

## *3.8 Balonne Minor River at Meigunyah*

Water level was very low such that there was no water for about 50m below the weir and depth beyond that rarely reached 1m. The normal site could not be reached so nets were set approximately 500m upstream. Numerous snags of various sizes were evident. There was no evidence of disturbance by stock or feral animals.

### 3.8.1 Water quality

No water quality data were collected.

### 3.8.2 Macrophytes

No macrophytes and very little fringing benthic algae were observed.

### 3.8.3 Fish

All nets were set. Six native fish species and two introduced were captured (**Table 3-8.1**). The catch was much smaller than that in April when Bony Bream and Hyrtl's tandan dominated, the latter in the fyke net set above the then flowing riffle.

■ **Table 3-8.1 Results of fishing the Balonne Minor at Meigunyah in October 2006.**

| Species | Common name | Gill | Seine | Fyke | Bait | Total Numbers |
|---|---|---|---|---|---|---|
| *Maccullochella peeli* | Murray Cod | 1 | | | | **1** |
| *Macquaria ambigua* | Yellowbelly | 2 | | 2 | | **4** |
| *Hypseleotris klunzingeri* | Carp Gudgeon | | 14 | | | **14** |
| *Retropinna semoni* | Smelt | | 21 | | | **21** |
| *Tandanus tandanus* | Eel-tailed catfish | | | 1 | | **1** |
| *Neosilurus hyrtlii* | Hyrtl's tandan | | | 1 | | **1** |
| *Cyprinus carpio* | Carp | 3 | | 18 | | **21** |
| *Gambusia holbrooki* | Mosquitofish | | 2 | | | **2** |
| **Total Numbers** | | **6** | **37** | **22** | | **65** |

One broad shelled tortoise was captured in a gill net and three further in the fyke nets, along with one long-necked tortoise.

### 3.8.4 Macroinvertebrates

Surber samples were collected from compact clay with a soft surface. There was little or no alga or leaf litter. Fourteen taxa were recorded with Cladocera, corixids and copepods most common. One yabby and one prawn were captured in bait traps.

■ **Table 3-8.2 Numbers of aquatic macroinvertebrates recorded from the Balonne Minor at Meigunyah.**

| | Edge surber | |
|---|---|---|
| | **Mean** | **Stddev** |
| Nematoda | 4.1 | 5.6 |
| Oligochaeta | 3.4 | 5.3 |
| Ancylidae | 2.4 | 5.4 |
| Cladocera | 66.2 | 16.9 |
| Copepoda | 43.4 | 46.3 |
| Ostracoda | 5.1 | 5.1 |
| Ceratopogonidae | 5.4 | 5.5 |
| Chironominae | 19.2 | 16.6 |
| Tanypodinae | 13.3 | 10.1 |
| Baetidae | 1.2 | 2.7 |
| Caenidae | 1.2 | 2.7 |
| Corixidae | 51.8 | 66.3 |
| Gomphidae | 1.1 | 2.4 |
| Anisoptera | 2.4 | 5.4 |
| Leptoceridae | 1.0 | 2.2 |
| | | |
| **Taxa** | **7.8** | **1.8** |
| **Abundance** | **221.1** | **103.4** |
| **Total taxa** | | **14** |

## *3.09 Balonne Minor at Trafalgar*

This site was sampled and will be reported at a later date.

## *3.10 Donegri Ck (Narran River) at Dirranbandi*

Not sampled.

## *3.11 Narran River at Clyde*

The site consisted of two remnant pools each about 50m long, 3-5m wide and rarely greater than 0.5m deep. There were signs of recent use by cattle but not pigs.

### 3.11.1 Water quality

The results of spot measurements are shown in **Table 3-11.1**. Conductivity and pH were markedly higher than in April.

■ **Table 3-11.1 Spot water quality readings – Narran River at Clyde**

| Sample Time | Depth (m) | Temp (°C) | Dissolved Oxygen (%sat) | Conductivity (µS/cm) | Turbidity (NTU) | pH |
|---|---|---|---|---|---|---|
| 1415 | Surface | 26.6 | 156 | 276 | >600 | 7.6 |
| | 1.0 | 26.2 | 159 | 275 | >600 | 7.5 |

### 3.11.2 Macrophytes

No macrophytes were recorded. Benthic algal growth on the edge was very weakly developed.

### 3.11.3 Fish

Gill nets and one fyke net were not used at this site. The catch comprised of five native fish species and two introduced (**Table 3-11.2**). Spangled perch and Mosquitofish had been captured in April while Carp gudgeons had not. The Goldfish were between 107mm and 183mm.

■ **Table 3-11.2 Results of fishing the Narran River at Clyde in October 2006, by fishing method**

| Species | Common name | Gill | Seine | Fyke (1) | Bait | Total number caught |
|---|---|---|---|---|---|---|
| *Macquaria ambigua* | Yellowbelly | | 1 | | | 1 |
| *Nematolosa erebi* | Bony Bream | | 15 | | | 15 |
| *Hypseleotris klunzingeri* | Carp gudgeon | | 1 | | | 1 |
| *Retropinna semoni* | Smelt | | 14 | | | 14 |
| *Neosilurus hyrtlii* | Hyrtl's tandan | | 1 | | | 1 |
| *Cyprinus carpio* | Carp | | 1 | 6 | | 7 |
| *Carrasius auratus* | Goldfish | | 1 | 4 | | 5 |
| **Total Numbers** | | **NA** | **34** | **10** | **0** | **44** |

### 3.11.4 Macroinvertebrates

No specialised habitats were available to sample at this site. Surbers were collected from soft clay/sand. Eight discrete taxa were recorded with ceratopogonids, cladocerans and copepods most common (**Table 3-11.3**). One prawn and one *Cherax* were captured in bait traps and they were also captured in the seine hauls.

■ **Table 3-11.3 Numbers of aquatic macroinvertebrates recorded from the Narran River at Clyde**

| | Edge Surber | |
|---|---|---|
| | **Mean** | **Stdev** |
| Oligochaeta | 13.0 | 16.8 |
| Cladocera | 55.5 | 36.5 |
| Copepoda | 29.3 | 18.2 |
| Ceratopogonidae | 60.1 | 40.5 |
| Chironominae | 3.6 | 3.2 |
| Tanypodinae | 22.7 | 9.6 |
| Caenidae | 18.8 | 9.3 |
| Leptoceridae | 7.3 | 10.0 |
| | | |
| **Taxa** | **6.6** | **1.1** |
| **Abundance** | **210.3** | **110.9** |
| **Total Taxa** | | **8** |

## *3.12 Narran River at Booligar*

This site was sampled and will be reported at a later date.

## *3.13 Balandool River at Cubbie*

Not sampled.

## *3.14 Balandool River at Euraba*

Dry.

## *3.15 Bokhara River at Kirrima*

The normal site and the weir pool at the downstream end were dry so the upstream end of the weir pool was sampled. There was a considerable amount of snag habitat and some tea tree roots reached the water. Filamentous algal growth on the edge was minor. The channel was black clay, trapezoidal in shape and with very bare banks. The pool was several hundred metres long, about 15m wide but in the area sampled it was less than 50cm deep. The surrounding area was very dry and the ground cover consisted of dry Lignum and roly-poly. Feral goats frequent this area.

### 3.15.1 Water quality

Spot water quality measurements were taken from the centre of the channel and results are shown in **Table 3-15.1**.

■ **Table 3-15.1 Spot water quality readings – Bokhara River at Kirrima (US)**

| Sample Time | Depth (m) | Temp (°C) | Dissolved Oxygen (%sat) | Conductivity (µS/cm) | Turbidity (NTU) | pH |
|---|---|---|---|---|---|---|
| 1230 | Surface | 22.4 | 116 | 203 | >600 | 7.5 |
| | 0.5 | 18.0 | 103 | 198 | >600 | 7.5 |

### 3.15.2 Macrophytes

No macrophytes or filamentous algae were observed.

### 3.15.3 Fish

No gill nets were used at this site due to depth restrictions. Five native species of fish plus two introduced were captured (**Table 3-15.2**). In April, at the site downstream from the weir, Spangled perch and Mosquitofish had been captured but Hyrtl's tandan, Carp and Goldfish had not. No small Yellowbelly or Bony Bream were captured, as had been the case in April.

■ **Table 3-15.2 Results of fishing the Bokhara River at Kirrima in October 2006.**

| Species | Common name | Gill | Seine | Fyke | Bait | Total Numbers caught |
|---|---|---|---|---|---|---|
| *Macquaria ambigua* | Yellowbelly | | 1 | 3 | | **4** |
| *Nematolosa erebi* | Bony Bream | | 3 | | | **3** |
| *Melanotaenia fluviatilis* | Rainbowfish | | 1 | | | **1** |
| *Retropinna semoni* | Smelt | | 1 | | | **1** |
| *Neosilurus hyrtlii* | Hyrtl's tandan | | | 1 | | **1** |
| *Cyprinus carpio* | Carp | | | 14 | | **14** |
| *Carrasius auratus* | Goldfish | | 3 | 2 | | **5** |
| **Total Numbers** | | **NA** | **9** | **20** | **0** | **29** |

### 3.15.4 Macroinvertebrates

Surber samples were collected from soft or firm clay with little algae and some litter. Sixteen taxa were recorded. The most common taxa were ostracods, corixids and nematodes (**Table 3-15.3**). Bait traps returned a zero catch, unlike April at the flowing downstream site when they captured 156 prawns and 13 *Cherax.*

■ **Table 3-15.3 Numbers of aquatic macroinvertebrates recorded from Bokhara River at Kirrima in October 2006**

| | Edge surber | |
|---|---|---|
| | **Mean** | **Stddev** |
| Nematoda | 32.8 | 13.4 |
| Oligochaeta | 16.0 | 10.2 |
| Bivalvia | 0.8 | 1.8 |
| Ancylidae | 2.4 | 3.6 |
| Cladocera | 20.8 | 21.1 |
| Copepoda | 17.6 | 8.3 |
| Ostracoda | 77.6 | 45.8 |
| Ceratopogonidae | 10.4 | 12.2 |
| Chironominae | 20.8 | 12.5 |
| Tanypodinae | 19.2 | 9.5 |
| Tipulidae | 0.8 | 1.8 |
| Baetidae | 5.6 | 4.6 |
| Caenidae | 9.6 | 6.7 |
| Corixidae | 72.0 | 21.0 |
| Anisoptera | 2.4 | 3.6 |
| Zygoptera | 0.8 | 1.8 |
| Leptoceridae | 1.6 | 3.6 |
| | | |
| **Taxa** | **12.2** | **0.8** |
| **Abundance** | **311.2** | **75.6** |
| **Total taxa** | | **16** |

## *3.16 Bokhara River at Koala*

The site is basically a long and near-permanent pool and while it was still continuous the water level had decreased from about 1.5m maximum depth in March to about 30cm. *Ludwidgia* and *Azolla* lined nearly 100% of the eastern side of the waterway but there was no *Ludwidgia* on the western bank. Most of the edge had been affected by recent stock access. The substrate was very soft silt.

### 3.16.1 Water quality

Overnight water quality data were recorded at this site. The ranges recorded overnight for each parameter were:
Temperature: 20.3 – 23.1$^{o}$C
Dissolved oxygen: 95 – 165 % sat
pH: 8.2 – 8.4
Conductivity: 295 - 302µS/cm
Turbidity: 572 - >600 NTU.

While temperature was much the same as recorded in March, pH had increased by 2 units and conductivity had increased by 200%.

### 3.16.2 Macrophytes

*Ludwidgia* and *Azolla* were significant.

### 3.16.3 Fish

Gill nets could not be set due to the depth of water. The seine net captured a lot of mud so was not working at maximum efficiency. Two native and three introduced species were captured (**Table 3-16.2**). Bony bream and Hyrtl's tandan had also been captured in April. Yellowbelly ranged from 101mm to 335mm while Goldfish ranged from 20mm to 164mm.

■ **Table 3-16.2 Results of fishing the Bokhara River at Koala in October 2006.**

| Species | Common name | Gill | Seine | Fyke | Bait | Total Numbers caught |
|---|---|---|---|---|---|---|
| *Macquaria ambigua* | Yellowbelly | NA | | 4 | | **4** |
| *Leiopotherapon unicolor* | Spangled perch | | | 1 | | **1** |
| *Cyprinus carpio* | Carp | | 1 | 5 | | **6** |
| *Carrasius auratus* | Goldfish | | 3 | 18 | | **21** |
| *Gambusia holbrooki* | Mosquitofish | | 8 | | 2 | **10** |
| **Total Numbers** | | **NA** | **12** | **28** | **2** | **42** |

### 3.16.4 Macroinvertebrates

Surber samples were collected from very soft mud and usually included some *Ludwidgia* roots, filamentous alga and *Azolla.* A dip net sample was collected from a mixture of *Ludwidgia* and *Azolla.* Nineteen taxa were recorded, 16 from the surbers and 9 from the dip net. The dominant taxa in surbers were copepods, oligochaetes and corixids (**Table 3-15.3**) while copepods and cladocerans were the most common elements in the dip net. Bait traps failed to capture any crustaceans.

■ **Table 3-16.3 Numbers of aquatic macroinvertebrates recorded from Bokhara River at Koala in October 2006**

| | Edge surber Mean | Stddev | Macrophyte dip net |
|---|---|---|---|
| Nematoda | 5.5 | 5.2 | |
| Oligochaeta | 47.1 | 29.8 | |
| Cladocera | 2.2 | 5.0 | 222 |
| Copepoda | 193.2 | 45.2 | 500 |
| Ostracoda | 11.6 | 16.7 | 167 |
| Elmidae | 2.2 | 5.0 | |
| Ceratopogonidae | 16.9 | 13.2 | 11 |
| Chironominae | 4.2 | 5.8 | 33 |
| Orthocladiinae | | | 11 |
| Tanypodinae | 22.1 | 9.4 | 44 |
| Tipulidae | 1.7 | 3.7 | |
| Baetidae | 2.0 | 4.5 | |
| Corixidae | 27.2 | 20.7 | |
| Notonectidae | 3.3 | 7.5 | |
| Aeshnidae | | | 11 |
| Coenagrionidae | | | 22 |
| Libellulidae | 2.9 | 4.0 | |
| Hydroptilidae | 1.7 | 3.7 | |
| Leptoceridae | 1.2 | 2.7 | |
| | | | |
| **Taxa** | **7.8** | **2.0** | **9** |
| **Abundance** | **345.0** | **90.4** | **1022** |
| **Total taxa** | | **16** | **19** |

## *3.17 Warrego River at Shannonvale*

Not sampled.

## *3.18 Warrego River at Tinnenburra*

Not sampled.

## *3.19 Moonie River at Nindigully*

The water level at this site was the lowest seen since sampling commenced. Depth occasionally reached 1m but was generally less than 40cm. The substrate was very deep silt. The waterbody contained few snags. No macrophytes were present.

Filamentous alga grew strongly near the waterline. The only disturbance to the edge appeared to be caused by birds.

### 3.19.1 Water quality

Results of spot water quality samples are shown in **Table 3-19.1**. Conductivity and pH have continued to rise since November 2005.

■ **Table 3-19.1 Spot water quality readings – Moonie River at Nindigully**

| Sample time | Depth (m) | Temp (°C) | Dissolved Oxygen (%sat) | Conductivity (µS/cm) | Turbidity (NTU) | pH |
|---|---|---|---|---|---|---|
| 1600 | Surface | 25.7 | 198 | 278 | >600 | 7.8 |

### 3.19.2 Macrophytes

No macrophytes were observed and the fringe of benthic filamentous green alga was very well developed.

### 3.19.3 Fish

Two gill nets were not set due to depth limitations. Two native fish species and two introduced were recorded (**Table 3-19.2**). It is unusual not to catch Yellowbelly at this site. Besides Yellowbelly, Spangled perch and Carp gudgeon were also captured in April. The April catch was unusual for the number of small individuals recorded but on this occasion it was a return to larger specimens.

■ **Table 3-19.2 Results of fishing the Moonie River at Nindigully in October 2006.**

| Species | Common name | Gill (2) | Seine | Fyke | Bait | Total Numbers caught |
|---|---|---|---|---|---|---|
| *Nematolosa erebi* | Bony Bream | 22 | | 6 | | **28** |
| *Retropinnna semoni* | Smelt | | 1 | | | **1** |
| *Cyprinus carpio* | Carp | 2 | | 2 | | **4** |
| *Gambusia holbrooki* | Mosquitofish | | | 1 | | **1** |
| **Total Numbers** | | **24** | **1** | **9** | **0** | **34** |

### 3.19.4 Macroinvertebrates

Surber samples were collected from very soft mud with a strong algal cover in very shallow water. Fourteen taxa were identified (**Table 3-19.3**). Ostracods, corixids and ceratopogonids were most abundant. Nine *Macrobrachium* were captured in bait traps.

■ **Table 3-19.3 Numbers of aquatic macroinvertebrates recorded from Nindigully**

| | Edge surber | |
|---|---|---|
| | **Mean** | **Stddev** |
| Nematoda | 1.8 | 3.5 |
| Oligochaeta | 7.6 | 7.4 |
| Cladocera | 4.4 | 3.6 |
| Copepoda | 6.8 | 1.6 |
| Ostracoda | 165.2 | 166.4 |
| Dytiscidae | 0.5 | 1.1 |
| Elmidae | 0.2 | 0.4 |
| Ceratopogonidae | 38.0 | 15.4 |
| Chironominae | 0.7 | 1.1 |
| Tanypodinae | 23.0 | 14.9 |
| Baetidae | 5.3 | 2.5 |
| Caenidae | 0.8 | 1.8 |
| Corixidae | 52.5 | 32.2 |
| Anisoptera | 0.5 | 1.1 |
| | | |
| **Taxa** | **9.4** | **1.1** |
| **Abundance** | **307.3** | **210.2** |
| **Total taxa** | | **14** |

## *3.20 Moonie River at Fenton*

Not sampled.

# 4. Discussion

The discussion will necessarily be less general or speculative than normal, given the low number of sites sampled relative to earlier sampling events.

## *4.1 Water quality*

**Table 4-1.1** summarises the results from all sites sampled in spring 2006. Note that the time series data represents overnight recordings rather than 24 hr recordings hence often does not include the middle of the day. Spot recordings on the other hand tend to be taken when logged data is not recorded.

Stratification was often clear with respect to temperature and dissolved oxygen. Variations recorded overnight tended to be similar to that recorded with depth.

Conductivity and pH tended to be markedly higher than in April 2006 when the river was flowing.

Turbidity exceeded the range of the meter at most sites.

- **Table 4-1.1 Summary Water Quality Data for autumn 2006.**

| | Temperature °C | Dissolved $O_2$ % sat | Conductivity µS/cm | Turbidity NTU | pH |
|---|---|---|---|---|---|
| Balonne at Whyenbah | 16.5 – 25.6 | 71-92 | 267 - 281 | >600 | 7.1 – 7.4 |
| Culgoa at Cubbie | 23.9 | 150 | 189 | >600 | 6.2 |
| Balonne Minor - Meigunyah | | | | >600 | |
| Narran at Clyde | 26.6 | 156 | 276 | >600 | 7.6 |
| Bokhara at Kirrima | 22.4 | 116 | 203 | >600 | 7.5 |
| Bokhara at Koala | 20.3 – 23.1 | 95 – 165 | 295 - 302 | >600 | 8.2 – 8.4 |
| Moonie at Nindigully | 25.7 | 198 | 278 | >600 | 7.8 |

Note: Ranges are from overnight logged data. Single data points are surface recordings from stratification data.

## *4.2 Macrophytes*

Macrophytes were very limited in their distribution and *Ludwidgia* remained the most commonly encountered species but it was only significant at one riverine site, Koala, where it is always common. *Azolla* was occasionally seen but was also only significant at Koala. The fringe of benthic filamentous green alga varied greatly in its development. *Juncus* was common though patchy and generally sparse.

## *4.3 Fish*

In a total catch of 374 individuals, nine native species of fish (with *Hypseleotris* pooled) were identified from six river sites in the Lower Balonne, and two from the single reference site. Three introduced species were captured at test sites and two at the reference site.

**Table 4-3.1** summarises the fish catch across all sites. Shading in the table marks each river and sites are placed from upstream to downstream within each river. The number of native species recorded at river test sites varied between 2 and 6. The number of individuals captured varied from 29 to 108 at test river sites and was 34 at the reference site. The use of the various fishing nets varied somewhat among sites on this sampling occasion.

The most abundant species at test sites was Smelt (46.5%) followed by Carp (16.8%), Goldfish (9.1%) and gudgeons (8.2%).

Introduced species contributed 29.7% of the catch at test river sites, which is higher than has been the case in recent times.

■ **Table 4-3.1. Summary of fish catch by site; October 2006**

| Site | *Maccullochella peelii peelii* | *Maquaria ambigua* | *Leipotherapon unicolor* | *Bidyanus bidyanus* | *Nematalosa erebi* | *Hypseleotris spp* | *Melanotaenia fluviatilis* | *Retropinna semoni* | *Tandanus tandanus* | *Neosilurus hyrtlii* | *Porochilus rendahli* | *Cuprinus carpio* | *Carrasius auratus* | *Gambusia holbrooki* | Total count | Natives | Introduced |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Whyenbah | 1 | 3 | | | 6 | 13 | | 82 | 2 | | | 1 | | | 108 | 6 | 1 |
| Meigunyah | 1 | 4 | | | | 14 | | 21 | 1 | 1 | | 21 | | 2 | 65 | 6 | 2 |
| Culgoa at Cubbie | 1 | 2 | | | | | | 40 | | | | 8 | | 1 | 52 | 3 | 2 |
| Bokhara at Kirrima | | 4 | | | 3 | | 1 | 1 | | 1 | | 14 | 5 | | 29 | 5 | 2 |
| Bokhara at Koala | | 4 | 1 | | | | | | | | | 6 | 21 | 10 | 42 | 2 | 3 |
| Narran at Clyde | | 1 | | | 15 | 1 | | 14 | | 1 | | 7 | 5 | | 44 | 5 | 2 |
| Nindigully | | | | | 28 | | | 1 | | | | 4 | 1 | | 34 | 2 | 2 |

## *4.4 Macroinvertebrates*

**Table 4-4.1** summarises the macroinvertebrate data for all sites.

The 35 surber samples and 1 dip net sample produced 11,995 individuals and 26 discrete taxa. The single dip net added two taxa to the total, both odonates.

■ **Table 4-4.1 Summary of macroinvertebrate data recorded in April/May 2006**

| | Mean taxa (Surbers) | Taxa (dips) | Taxa Total | Individuals (surber) |
|---|---|---|---|---|
| Balonne at Whyenbah | 10.0 +/- 2.8 | | 14 | 347 +/- 66 |
| Culgoa at Cubbie | 9.0 +/- 2.0 | | 13 | 248 +/- 135 |
| Balonne Minor at Meigunyah | 7.8 +/- 1.8 | | 14 | 221 +/- 103 |
| Narran at Clyde | 6.6 +/- 1.1 | | 8 | 210 +/- 111 |
| Bokhara at Kirrima | 12.2 +/- 0.8 | | 16 | 311 +/- 76 |
| Bokhara at Koala | 7.8 +/- 2.0 | 8 | 16 | 345 +/- 90 |
| Moonie at Nindigully | 9.4 +/- 1.1 | | 14 | 307 +/- 210 |

The most common taxa were copepods (20.9%), ostracods (15.2%) and corixids (13.8%). The most abundant five taxa contributed 73.4% of the total catch while 17 taxa each contributed less than 1%. The abundance per site was surprisingly uniform.

The number of *Macrobrachium* and *Cherax* recorded in bait traps was unusually low.

## *4.5 Current Status*

Drought conditions continued prior to the sampling period with no flow in any system, though the Balonne may have had some flow but this will be checked when verified data is available.

Water quality results reflected the low water levels and lack of flow.

The fish species complement was in line with historical results given the sites sampled, but the number of Bony Bream is surprisingly low while the numbers of introduced fish is disappointingly high. The low diversity and abundance at Nindigully is also in agreement with historic sampling.

Macroinvertebrate data is most affected by the relatively low sampling effort as the number of taxa varies significantly with the number of sites and number of habitats sampled.

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