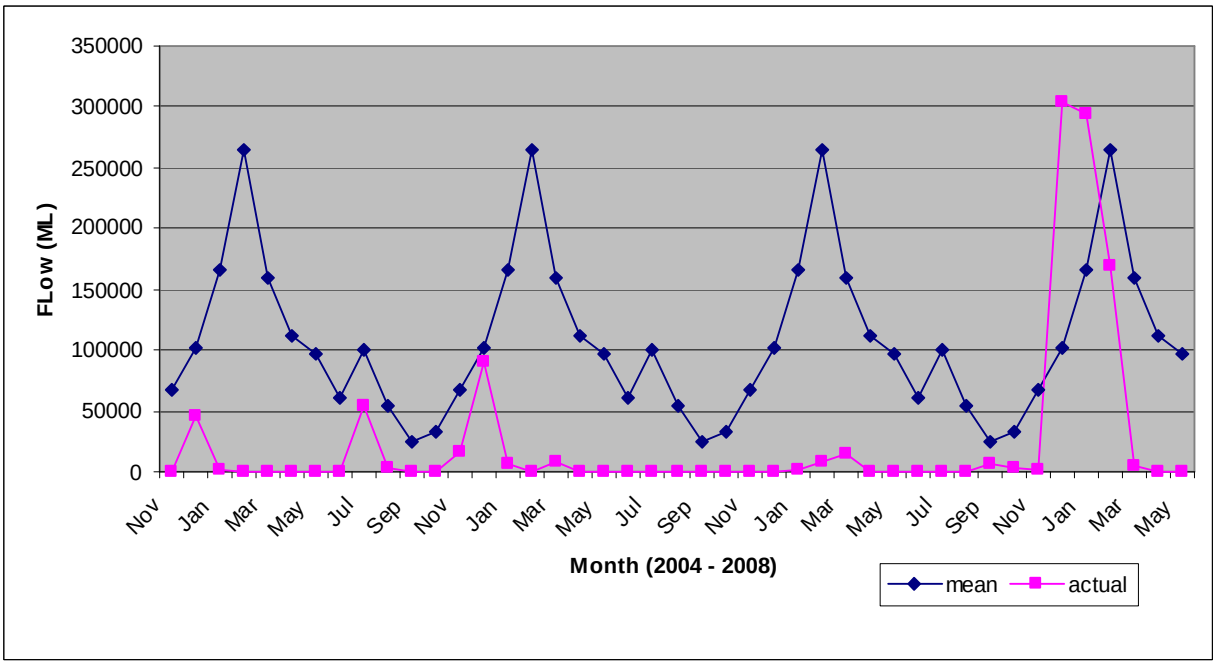
1. Introduction

This report represents the thirteenth since June 2000 recording the results of monitoring events sponsored by Smartrivers in the Lower Balonne. Drought and the resultant lack of cropping led to a reduced sampling effort in spring 2006 and autumn 2007 and cancellation of sampling in spring 2007. Due to the flooding in December 2007 and the cropping that followed, Smartrivers was able to support monitoring in autumn 2008 of 19 riverine and 10 floodplain sites. Sites on the Warrego River were not sampled as they are relatively the most expensive.

The 2007/8 summer saw the best flows in the system since January 2004 (**Figure 1**).

Figure 1. Monthly Flows from Jack Taylor Weir at St George from November 2004 to May 2008



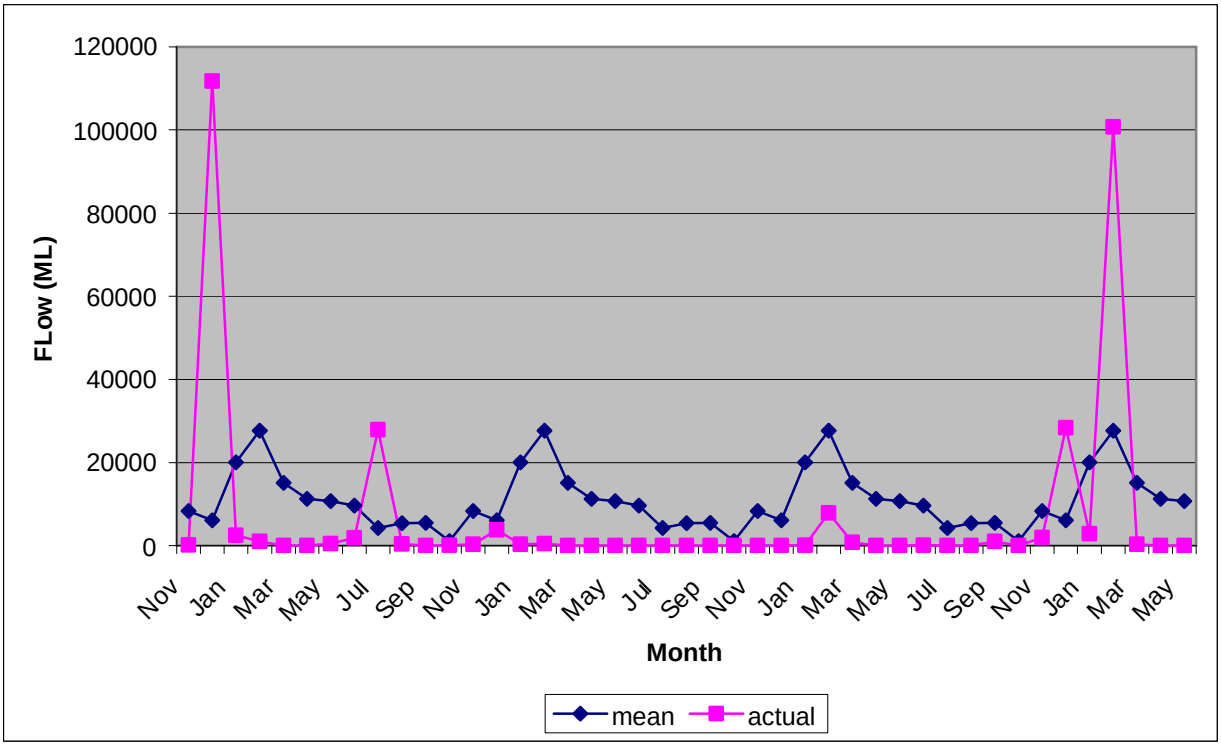
Flows came in a number of pulses with a peak of 50,509ML/d on January 25. This is at the upper end of the "small flood" range (medium commences at about 60,000ML/d and large at 120,000ML/d). The last record of a peak near this level was in January 2004 (peak 65,606ML/d). The flows in 2007-2008 were continuous over at least 3 months in all channels and reached most of the significant floodplain systems, including Briarie Ck which last flowed in March 2004. The exception was Police Lagoon at Dirranbandi which traditionally commences to flow at 60-65,000ML/d. This site has been dry since about December 2006. The full suite of floodplain sites was last available to be sampled in November 2004 (Table 1). Belah, Clyde and Chinaman are permanent but all others ceased to be sampled when they dried.

Table 1. Recent history of sampling of floodplain sites (A=Autumn; S=Spring)

	S2004	A2005	S2005	A2006	S2006	A2007	S2007	A2008
					Limited sampling	Limited sampling	No sampling	
Lower Plains	X							X
Beardie	X							X
Whyenbah	X	X						X
Police	X	X	X	X	X			
Belah	X	X	X	X				X
Clyde	X	X	X	X	X	X		X
Pilgra U/S	X							X
Pilgra D/S	X	X	X					X
Chinaman	X	X	X	X	X	X		X
Walla	X	X						X
Woolerbilla	X							X

The Moonie River at Nindigully also saw very low levels of flow between August 2005 and December 2007, with a peak in mid-February 2008 of 2661ML/d. Flows lasted 4 months, ceasing in mid-March.

Figure 2. Monthly Flows at Nindigully on the Moonie River from November 2004 to May 2008



2. Methods

Sites were sampled in early May 2008. 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.

Site physical characteristics were described using State of the Rivers sheets 3, 9 and 10.

Macroinvertebrates were sorted and identified by staff in the Ecowise laboratory. The subsampling technique of Marchant (1989) was employed for larger samples. For surber samples only one sample from Whyenbah was subsampled (to 50%) but 6 of the 10 dip net samples were subsampled to between 25 and 50% and the remaining 4 were subsampled to between 5% (Whyenbah lagoon and Clyde Lagoon) and 10% (Fenton and Trafalgar).

3. Results

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

3.1 Balonne River at St George

This site is adjacent the gauging station below Jack Taylor weir. The banks have a fairly gradual slope and a good cover of grass and trees. The substrate is mainly deep silt with large outcroppings of conglomerate rock. The river is approximately 60m wide and contained a significant number of large snags, particularly near the gauge. Water level was similar to previous low-water sampling events with a slight flow occurring.

3.1.1 Water quality

Spot water quality profiling was undertaken at the centre of the site (**Table 3-1.1**).The water column was well mixed.

Table 3-1.1 Water quality depth profiling at St George in May 2008.

Time	Depth	Temp	DO%sat	pH	Cond [µS/cm]	Turbidity
1015	Surface	18.3	85	7.5	158	569
	0.5	17.2	82	7.5	159	490
	1	17.2	81	7.5	159	578
	1.5	17.2	81	7.5	159	494
	2	17.1	81	7.4	159	521
	3.1	17.1	78	7.4	160	484

3.1.2 Macrophytes

A small patch of *Ludwidgia* ($3m^2$) grew on the eastern bank. *Persicaria* grew strongly around the snags just downstream of the gauge (this patch has always been present). Some *Azolla* and *Lemna* accumulated near the rocks, blown by the wind.

3.1.3 Fish

All nets were set at this site. **Table 3-1.2** shows the catch by netting technique. Three native species and one introduced were captured. The catch is less diverse and abundant than historical catches at this site.

■ **Table 3-1.2 Results of fishing at St George in May 2008, by fishing method**

Species	Common name	Gill	Seine	Fyke	Bait traps	Total Numbers caught
Macquaria ambigua	Yellowbelly	2	1	2		**5**
Nematolosa erebi	Bony Bream		4	1		**5**
Retropinna semoni	Smelt		16			**16**
Gambusia holbrooki	Mosquitofish		2			**2**
Total Numbers		**3**	**23**	**3**	**0**	**28**

3.1.4 Macroinvertebrates

Surber samples were collected from rock (2) and mud/silt substrates (3). A total of 20 discrete (non-overlapping) taxa were identified (**Table 3-1.3**). The surber fauna was of very low abundance, possibly reflecting recent inundation of the substrate. Bait traps also collected 24 *Macrobrachium* (Palaeomonidae, prawns) and two *Cherax* (Parastacidae, yabbies).

■ **Table 3-1.3 Numbers of aquatic macroinvertebrates recorded from St George**

	Edge surber	
	Mean	Stddev
Acarina	0.4	0.5
Cirolanidae	0.2	0.4
Copepoda	1.6	2.5
Palaeomonidae	0.6	0.5
Dytiscidae	0.2	0.4
Hydraenidae	2.2	2.5
Staphylinidae	0.4	0.5
Collembola	0.2	0.4
Chironominae	0.2	0.4
Orthocladiinae	0.2	0.4
Tanypodinae	0.2	0.4
Ceratopogonidae	4.6	8.6
Dolichopodidae	0.2	0.4
Tabanidae	0.6	1.3
Tipulidae	1.8	1.9
Baetidae	0.4	0.9

Caenidae	0.4	0.5
Corixidae	0.4	0.5
Lepidoptera	0.2	0.4
Epiproctophora	0.2	0.4
Taxa	**7.0**	**1.6**
Abundance	**15.2**	**7.4**
Total taxa		**20**

3.2 Balonne River at Mooramanna

This site is on a straight stretch of river just upstream from the Brookdale pump station. The channel was approximately 50m wide and of trapezoidal shape with parallel benches. The bed substrate is largely sand and the banks are mainly black clay. Site structure was almost identical to previous events. A very light scum covered the water surface. There was no flow.

3.2.1 Water quality

Overnight logging of water quality parameters was undertaken and minor variation was evident. Maxima tended to occur in the late afternoon or early evening and minima occurred in the early morning. The recorded ranges for each parameter were:

Temperature: 15.8 – 20.5^{o}C
Dissolved oxygen: 78 - 98% sat,
pH: 7.5 – 7.7
Conductivity: 171 - 174µS/cm
Turbidity: 306-365NTU.

Results from spot water quality profiling are shown in **Table 3-2.1**. The water column was well mixed.

■ **Table 3-2.1 Water quality depth profiling at Mooramanna in May 2008.**

Sample Time	Depth (m)	Temp. (^{o}C)	Dissolved Oxygen (%sat)	Conductivity (µS/cm)	Turbidity (NTU)	pH
1700	Surface	15.7	79	171	340	7.5
	0.5	15.7	78	171	372	7.5
	1.0	15.7	78	172	328	7.5

3.2.2 Macrophytes and algae

Juncus sp. was present on the edge. The fringe of benthic filamentous green algae was not noticeable.

3.2.3 Fish

Table 3-2.2 shows the fish catch by netting technique. All nets were set at this site. Five native species and one introduced were recorded.

■ **Table 3-2.2 Fish catch by fishing technique at Mooramanna in May 2008.**

Species	Common name	Gill	Seine	Fyke	Bait traps	Total Numbers caught
Macquaria ambigua	Yellowbelly	2	1	6		**9**
Tandanus tandanus	Eeltailed catfish	1				**1**
Hypseleotris klunzingeri	Western Carp Gudgeon		1			**1**
Melanotaenia fluviatilis	Rainbowfish		2			**2**
Retropinna semoni	Smelt		108	1		**109**
Gambusia holbrooki	Mosquitofish		5			**5**
Total Numbers		**3**	**117**	**7**	**0**	**127**

3.2.4 Macroinvertebrates

Surber samples were collected from sand/gravel and silt substrates on different sides of the river. Twenty discrete taxa were recorded at the site with copepods, Chironominae, ceratopogonids and corixids the most common (**Table 3-2.3**). Bait traps collected 28 *Macrobrachium*.

■ **Table 3-2.3 Numbers of aquatic macroinvertebrates recorded from Mooramanna**

	Edge surber	
	Mean	Stddev
Oligochaeta	5.2	7.5
Bivalvia	0.4	0.9
Spaeriidae	1.0	1.0
Ostracoda	1.2	1.3
Copepoda	501	500
Cladocera	0.8	0.1
Atyidae	0.2	0.4
Palaeomonidae	0.6	0.9
Dytiscidae	4.4	9.8
Hydrophilidae	15.0	19.1
Chironominae	62	54
Tanypodinae	12.6	24.9
Orthocladiinae	8.8	11.6
Chironomidae	13.4	18.6
Ceratopogonidae	44.6	34.9
Caenidae	32.0	32.7
Ephemeroptera	1.0	2.2
Notonectidae	0.4	0.5
Corixidae	45.6	60.2
Epiproctophora	0.2	0.4
Gomphidae	1.2	1.3
Leptoceridae	0.2	0.4

Trichoptera	0.2	0.4
Taxa	**12.0**	**3.3**
Abundance	**752**	**360**
Total taxa		**20**

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 no evidence of recent grazing by cattle. There was no flow.

3.3.1 Water quality

Overnight logging was undertaken at this site. There was little diurnal variation. The recorded ranges for each parameter were:

Temperature: 16.5 – 19.0^{o}C
Dissolved oxygen: 71-79 % sat
pH: 7.4 – 7.5
Conductivity: 168-169 µS/cm
Turbidity: 336-409 NTU.

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

■ **Table 3-3.1 Water quality depth profiling at Whyenbah in May 2008.**

Sample Time	Depth (m)	Temp (^{o}C)	Dissolved Oxygen (%sat)	Conductivity (µS/cm)	Turbidity (NTU)	pH
0730	Surface	16.5	71	169	372	7.4
	0.5	16.5	69	168	387	7.4
	1.0	16.4	68	169	381	7.4
	1.5	16.4	63	169	384	7.3

3.3.2 Macrophytes

Juncus, occurred in patches but the *Ludwidgia* that was usually present in a certain location was not visible, possibly submerged.

3.3.3 Fish

All fishing nets were deployed at this site and the results are presented in **Table 3-3.2**. Eight native species and two introduced were captured.

■ **Table 3-3.2 Results of fishing the Balonne River at Whyenbah in May 2008, by fishing method**

Species	Common name	Gill	Seine	Fyke	Bait	Total Numbers caught
Maccullochella peeli	Murray Cod	1				**1**
Macquaria ambigua	Yellowbelly			8		**8**
Nematolosa erebi	Bony Bream	2	4	1		**7**
Melanotaenia fluviatilis	Rainbowfish		3			**3**
Retropinna semoni	Smelt		678			**678**
Neosilurus hyrtlii	Hyrtl's tandan			1		**1**
Tandanus tandanus	Catfish			1		**1**
Leiopotherapon unicolor	Spangled perch		1			**1**
Cyprinus carpio	Carp	3				**3**
Gambusia holbrooki	Mosquitofish		3			**3**
Total Numbers		**6**	**689**	**11**		**706**

3.3.4 Macroinvertebrates

Surber samples were collected from sand (3) and mud (2) substrates. Sixteen taxa were recorded with copepods highly abundant and chironomids and ceratopogonids well represented (**Table 3-3.3**). Seventy-nine prawns were captured in bait traps.

■ **Table 3-3.3 Numbers of aquatic macroinvertebrates recorded from Whyenbah**

	Edge surber	
	Mean	Stddev
Oligochaeta	0.2	0.4
Ancylidae	0.4	0.9
Ostracoda	1.8	2.5
Copepoda	1869	767
Palaeomonidae	1.4	1.7
Hydraenidae	0.2	0.4
Hydrophilidae	3.2	5.2
Chironominae	45.2	34.6
Tanypodinae	8.6	5.6
Orthocladiinae	0.6	1.3
Chironomidae	0.2	0.4
Ceratopogonidae	42.2	30.8
Tabanidae	0.2	0.4
Caenidae	27	51
Ephemeroptera	2.8	6.3
Gerridae	1.2	2.2
Corixidae	9.8	8.2
Leptoceridae	1.2	2.7
Trichoptera	0.4	0.5

Taxa	**9.0**	**2.7**
Abundance	**2016**	**791**
Total taxa		**16**

3.4 Culgoa River at Whyenbah

This site is about 1.5 km downstream from the gauging station and weir and just upstream of an old bridge. Other than minor sand bar movement and some fresh growth of *Juncus*, the site was essentially the same as on previous sampling occasions. The was limited evidence of grazing and no flow.

3.4.1 Water quality

Water quality was measured in the pool at the base of a large red gum. Depth was less than 30 cm so only a surface reading was taken. Overnight logging was undertaken at this site. There was little diurnal variation. The recorded ranges for each parameter were:

Temperature: 13.4 – 16.0^{o}C
Dissolved oxygen: 77-86 % sat
pH: 7.5 – 7.7
Conductivity: 170-172 µS/cm
Turbidity: 267-311 NTU.

Results from spot water quality profiling are shown in **Table 3.4.1**.

- **Table 3-4.1 Water quality depth profiling at Culgoa River at Whyenbah in May 2008.**

Sample Time	Depth (m)	Temp. (^{o}C)	Dissolved Oxygen (%sat)	Conductivity (µS/cm)	Turbidity (NTU)	pH
0810	Surface	13.4	79	171	293	7.5

3.4.2 Macrophytes

No macrophytes were present and algal development was very limited.

3.4.3 Fish

All nets were used at this site, including two seine hauls. Three native species and two introduced were recorded (**Table 3-4.2**). Fish were of a range of sizes.

■ **Table 3-4.2 Results of fishing the Culgoa River at Whyenbah in May 2008, by fishing method**

Species	Common name	Gill	Seine	Fyke	Bait traps	Total Numbers caught
Macquaria ambigua	Yellowbelly	4	1	6	1	12
Nematolosa erebi	Bony Bream		5	5		10
Retropinna semoni	Smelt		16			16
Cyprinus carpio	Carp	1	1	2		4
Gambusia holbrooki	Mosquitofish		2			2
Total Numbers		**5**	**25**	**13**	**1**	**44**

3.4.4 Macroinvertebrates

Seventeen discrete taxa were recorded at the site with ceratopogonids, caenid mayflies and copepods being most common (**Table 3-4.3**). Bait traps captured 71 prawns and 21 yabbies.

■ **Table 3-4.3 Numbers of aquatic macroinvertebrates recorded from Culgoa River at Whyenbah**

	Edge surber	
	Mean	Stddev
Oligochaeta	0.6	0.5
Ostracoda	0.2	0.4
Copepoda	9.4	7.2
Cladocera	2.6	2.3
Palaeomonidae	2.2	1.3
Parastacidae	0.2	0.4
Chironominae	8.6	3.8
Tanypodinae	0.8	1.3
Orthocladiinae	0.2	0.4
Chironomidae	4.8	6.3
Ceratopogonidae	24.4	13.5
Culicidae	0.2	0.4
Baetidae	0.2	0.4
Caenidae	17.6	16.0
Ephemeroptera	0.6	1.3
Corixidae	0.2	0.4
Gomphidae	1.0	0.7
Ecnomidae	0.8	0.8
Leptoceridae	0.6	0.9
Trichoptera	2.8	2.9
Taxa	**11.4**	**1.7**
Abundance	**78.0**	**15.8**
Total taxa		**17**

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.

Goat tracks represented the only disturbance of the edge. There was no flow at the time of sampling of the water was at base channel levels and continuous in both directions.

3.5.1 Water quality

Overnight logging was undertaken at this site. There was little diurnal variation. The recorded ranges for each parameter were:

Temperature: 13.7 – 16.5^{o}C
Dissolved oxygen: 61-72 % sat
pH: 6.4 – 7.1
Conductivity: 164-166 µS/cm
Turbidity: 462-489 NTU.

Results from spot water quality profiling are shown in **Table 3-5.1**. The water column was well mixed.

- **Table 3-5.1 Water quality depth profiling, Culgoa River at Cubbie, May 2008**

Sample Time	Depth (m)	Temp (^{o}C)	Dissolved Oxygen (%sat)	Conductivity (µS/cm)	Turbidity (NTU)	pH
1550	Surface	13.7	60	165	531	7.3
	0.5	13.7	61	164	521	7.3
	1.0	13.6	56	165	490	7.2
	1.5	13.4	50	165	550	7.2
	1.8	14.2	68	164	583	7.3

3.5.2 Macrophytes

No macrophytes or fringing aquatic plants were observed.

3.5.3 Fish

All nets were set at this site. Four native fish species and three introduced were identified (**Table 3-5.2**).

■ **Table 3-5.2 Results of fishing the Culgoa River at Cubbie in May 2008, by fishing method**

Species	Common name	Gill	Seine	Fyke	Bait	Total Numbers caught
Macquaria ambigua	Yellowbelly	5		1		**6**
Retropinna semoni	Smelt		5			**5**
Nematolosa erebi	Bony bream	7	5	1		**13**
Neosilurus hyrtlii	Hyrtl's tandan			1		**1**
Cyprinus carpio	Carp	1	4			**5**
Carrasius auratus	Goldfish		1			**1**
Gambusia holbrooki	Mosquitofish		3			**3**
Total Numbers		**13**	**18**	**3**		**34**

One long-necked turtle *Chelodina longicollis* was captured in a fyke net.

3.5.4 Macroinvertebrates

Surber samples were collected from compact clay. Fifteen discrete taxa were recorded with microcrustaceans and caenid mayflies most common. Bait traps collected 21 *Macrobrachium.*

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

	Edge surber	
	Mean	Stdev
Oligochaeta	0.6	0.9
Acarina	0.2	0.4
Ancylidae	0.2	0.4
Ostracoda	0.4	0.9
Copepoda	94.4	39.0
Cladocera	19.8	21.7
Palaemonidae	0.4	0.9
Chironominae	6.6	5.5
Tanypodinae	1.4	2.6
Orthocladiinae	1.2	2.2
Chironomidae	1.0	2.2
Ceratopogonidae	9.4	4.9
Baetidae	0.2	0.4
Caenidae	11.8	9.2
Ephemeroptera	0.2	0.4
Gerridae	0.8	1.3
Corixidae	5.0	3.2
Taxa	**9.0**	**1.7**
Abundance	**153.6**	**61.1**
Total taxa		**15**

3.6 Culgoa at Woolerbilla

Due to new fences the usual site could not be accessed. A site approximately 750m downstream near the old windmill was sampled. It is very similar to the usual site in that it has a uniform trapezoidal bed and banks. Little vegetation exists on the sloping banks though the occasional tea tree or coolibah sits adjacent the water and provides root habitat. The riparian zone generally was in good condition and provided some snag and leaf / twig habitat. The river was not flowing when sampled and consisted of a single long pool to about 1.5m deep. There were no macrophytes and fringing benthic algae was sparse. There was evidence of cattle grazing.

3.6.1 Water quality

Results from spot water quality profiling are shown in **Table 3-6.1**. The water column was well mixed.

■ **Table 3-6.1 Water quality depth profiling at Woolerbilla in May 2008.**

Sample Time	Depth (m)	Temp. (^{o}C)	Dissolved Oxygen (%sat)	Conductivity (µS/cm)	Turbidity (NTU)	pH
1445	Surface	14.3	68	174	622	7.4
	0.5	13.3	64	173	616	7.4
	1.0	12.2	61	173	627	7.3
	1.5	12.2	59	173	626	7.3

3.6.2 Macrophytes

No macrophytes or fringing aquatic plants were noted.

3.6.3 Fish

Four native fish species plus one introduced were captured (**Table 3-6.2**).

■ **Table 3-6.2 Results of fishing the Culgoa River at Woolerbilla in May 2008, by fishing method**

Species	Common name	Gill	Seine	Fyke	Bait traps	Total Numbers caught
Macquaria ambigua	Yellowbelly	16				**16**
Nematolosa erebi	Bony Bream	2		2		**4**
Retropinna semoni	Smelt		4			**4**
Bidyanus bidyanus	Silver perch	1				**1**
Neosilurus hyrtlii	Hyrtl's tandan			1		**1**
Cyprinus carpio	Carp	1	1	1		**3**
Total Numbers		**20**	**5**	**4**	**0**	**29**

3.6.4 Macroinvertebrates

No specialised habitats were available for sampling. Surber samples were collected from compact clay/silt (3) or loose silt (2). Eighteen taxa were identified with cladocerans, copepods and corixids most common (**Table 3-6.3**). Thirteen prawns and one yabby were captured in bait traps. Prawns were abundant in seine and fyke nets.

■ **Table 3-6.3 Numbers of aquatic macroinvertebrates recorded from the Culgoa River at Woolerbilla**

	Edge surber	
	Mean	Stddev
Acarina	1.4	1.9
Oligochaeta	0.2	0.4
Ostracoda	0.6	1.3
Copepoda	21.2	23.8
Cladocera	170	263
Palaeomonidae	0.6	0.3
Hydraenidae	0.4	0.9
Chironominae	1.4	1.1
Tanypodinae	5.0	6.9
Orthocladiinae	2.8	3.8
Chironomidae	1.2	1.8
Ceratopogonidae	9.2	6.1
Diptera	0.2	0.4
Baetidae	0.2	0.4
Caenidae	6.0	5.1
Ephemeroptera	0.2	0.4
Hydrometra	0.2	0.4
Notonecta	0.8	0.8
Corixidae	10.6	11.7
Gomphidae	0.4	0.5
Leptoceridae	0.2	0.4
Trichoptera	0.2	0.4
Taxa	**10.0**	**2.7**
Abundance	**233**	**246**
Total taxa		**18**

3.7 Culgoa River at Balandool

The water level was relatively high, being continuous from the bridge to the downstream end of the sampling site. Pig and goat tracks were abundant and it appeared the sharp bend between the two main pools had scoured.

3.7.1 Water quality

Results from spot water quality profiling are shown in **Table 3-7.1**. The water column was well mixed.

■ **Table 3-7.1 Water quality depth profiling at Culgoa River at Balandool in May 2008.**

Sample Time	Depth (m)	Temp. (°C)	Dissolved Oxygen (%sat)	Conductivity (µS/cm)	Turbidity (NTU)	pH
1230	Surface	14.4	64	183	510	7.6
	0.5	12.8	64	185	506	7.5

3.7.2 Macrophytes

No macrophytes or algal fringe were visible but a slight surface scum was evident.

3.7.3 Fish

All nets were set at this site. Five native species and two introduced were recorded (**Table 3-7.2**).

■ **Table 3-7.2 Results of fishing the Culgoa River at Balandool in May 2008, by fishing method**

Species	Common name	Gill	Seine	Fyke	Bait traps	Total Numbers caught
Macquaria ambigua	Yellowbelly	4	12	12		28
Nematolosa erebi	Bony Bream		19	5		24
Leiopotherapon unicolor	Spangled perch		1	1		2
Neosilurus hyrtlii	Hyrtl's tandan		3	79		82
Porochilus argenteus	Silver tandan			2		2
Cyprinus carpio	Carp	1	12	9		22
Gambusia holbrooki	Mosquitofish		3			3
Total Numbers		**5**	**50**	**108**	**0**	**163**

3.7.4 Macroinvertebrates

Surber samples were collected from compact mud substrate with a soft surface layer. A dip net sample was collected from suspended tree root. Fourteen taxa were recorded from the surbers while 24 were collected from the dip net for a site total of 28 (**Table 3-7.3**). Copepods, cladocerans and ceratopogonids were most common in the surbers while caenid mayflies were very common from the tree root. Eighteen prawns and 39 yabbies were captured in bait traps.

■ **Table 3-7.3 Numbers of aquatic macroinvertebrates recorded from the Culgoa River at Balandool.**

	Edge surber		Tree root
	Mean	Stddev	
Oligochaeta	0.8	1.3	7
Ancylidae			7
Oniscidae			30
Ostracoda	2.8	3.1	7
Copepoda	219	152	929
Cladocera	45.4	43.1	729
Palaeomonidae			17

Dytiscidae			3
Hydraenidae	0.4	0.5	100
Hydrochidae			3
Hydrophilidae			3
Chironominae	11.4	7.7	266
Tanypodinae	4.4	4.1	67
Orthocladiinae			43
Chironomidae	0.8	0.8	
Ceratopogonidae	26.8	21.0	
Chaoborinidae			3
Culicidae			7
Empididae			3
Baetidae			110
Caenidae	14.2	4.7	1752
Ephemeroptera			3
Gerridae	0.2	0.4	
Hydrometra			20
Veliidae			7
Notonecta	0.2	0.4	
Corixidae	12.8	22.9	
Epiprotocphora	0.2	0.4	
Zygoptera			10
Economidae			23
Leptoceridae			40
Trichoptera	0.6	0.6	63
Taxa	**10.0**	**2.0**	
Abundance	**341**	**193**	
Total taxa		**14**	**24**

3.8 Balonne Minor River at Meigunyah

Water level was quite low such that the lower end of the sampling reach near Middle Ck could not be reached so only the upper area was sampled. This section is fenced on the left bank so there was no evidence of disturbance by stock but goats had been in the area. There was no flow.

3.8.1 Water quality

Results from spot water quality profiling are shown in **Table 3-8.1**. The water column was well mixed.

■ **Table 3-8.1 Water quality profiling, Balonne Minor at Meigunyah, May 2008.**

Sample Time	Depth (m)	Temp (°C)	Dissolved Oxygen (%sat)	Conductivity (µS/cm)	Turbidity (NTU)	pH
1020	Surface	15.0	67	157	621	7.3
	0.5	14.1	63	156	631	7.2
	1.0	14.0	61	156	628	7.2

3.8.2 Macrophytes

No macrophytes and no fringing benthic algae were observed.

3.8.3 Fish

All nets were set. Four native fish species and one introduced were captured (**Table 3-8.2**). Fish were of a range of sizes but the smallest Carp was 79mm and the smallest Yellowbelly was 84mm (the largest being 433mm).

■ **Table 3-8.2 Results of fishing the Balonne Minor at Meigunyah in May 2008.**

Species	Common name	Gill	Seine	Fyke	Bait	Total Numbers
Macquaria ambigua	Yellowbelly	6		1		**7**
Nematolosa erebi	Bony bream	1	6	4		**11**
Retropinna semoni	Smelt		144			**144**
Leiopotherapon unicolor	Spangled perch		1			**1**
Cyprinus carpio	Carp	1	12	4		**17**
Total Numbers		**8**	**163**	**9**	**0**	**180**

3.8.4 Macroinvertebrates

Surber samples were collected from compact mud (2) and sand substrate (3). Eighteen taxa were recorded (**Table 3-8.3**). Copepods, Chironomids and ceratopogonids were most common. One hundred and twenty-six prawns and one yabby were captured in bait traps

■ **Table 3-8.3 Numbers of aquatic macroinvertebrates recorded from the Balonne minor River at Meigunyah**

	Edge surber	
	Mean	Stddev
Oligochaeta	0.2	0.4
Acarina	0.2	0.4
Bivalvia	0.2	0.4
Cirolanidae	0.2	0.4
Ostracoda	0.2	0.4
Copepoda	42.6	20.4
Cladocera	0.6	1.3
Palaeomonidae	1.6	1.1
Hydraenidae	0.2	0.4

Chironominae	24.0	28.5
Tanypodinae	0.8	0.4
Chironomidae	8.2	17.8
Ceratopogonidae	21.4	20.9
Culicidae	0.2	0.4
Caenidae	4.0	7.8
Ephemeroptera	0.2	0.4
Corixidae	1.0	1.0
Gomphidae	0.6	0.5
Atriplectididae	0.6	1.3
Leptoceridae	0.4	0.9
Taxa	**9.0**	**1.9**
Abundance	**107.4**	**44.9**
Total taxa		**18**

3.9 Balonne Minor at Trafalgar

This site is at the upper end of the weir pool. The water level was similar to that recorded on most other sampling occasions, that is, water entered the diversion channel and it could not be waded across. Many snags and tree trunks were submerged but all lignum and roots of riparian trees were exposed. No surface scum was observed. There was little disturbance of the edge though goat droppings were common.

3.9.1 Water quality

Spot readings are shown in **Table 3-9.1**. Mild stratification appears to be developing and the dissolved oxygen was low. Note that the water was significantly deeper but the meter battery failed.

■ **Table 3-9.1 Spot water quality readings – Balonne Minor at Trafalgar**

Sample Time	Depth (m)	Temp. (°C)	Dissolved Oxygen (%sat)	Conductivity (µS/cm)	Turbidity (NTU)	pH
1020	Surface	16.3	59	155	519	7.2
	0.5	13.4	49	155	474	7.1
	1.0	13.2	51	155	483	7.1

3.9.2 Macrophytes

No macrophytes were observed.

3.9.3 Fish

All nets were used at this site. Three native species and three introduced were captured (**Table 3-9.2**). A long neck turtle (*Chelodina longicollis*) was captured in a fyke net.

■ **Table 3-9.2 Results of fishing the Balonne Minor at Trafalgar in May 2008.**

Species	Common name	Gill	Seine	Fyke	Bait traps	Total Numbers
Macquaria ambigua	Yellowbelly		2	1		**3**
Nematolosa erebi	Bony Bream	12	10	6		**28**
Retropinna semoni	Smelt		4			**4**
Cyprinus carpio	Carp		3	1		**4**
Carrasius auratus	Goldfish	1	1			**2**
Gambusia holbrooki	Mosquitofish		7			**7**
Total Numbers		**13**	**27**	**8**	**0**	**48**

3.9.4 Macroinvertebrates

Five surbers were collected from areas of soft silt. A dip net sample was collected from tree root. Fourteen taxa were recorded from the surbers with copepods in very high numbers and ceratopogonids and caenid mayflies relatively common (**Table 3-9.3**). The dip net produced 19 taxa with copepods again very abundant followed by caenid mayflies, chironomids and oligochaetes. Sixteen prawns and eleven yabbies were captured in bait traps.

■ **Table 3-9.3 Numbers of aquatic macroinvertebrates recorded from the Balonne Minor at Trafalgar.**

	Edge surber		Tree root
	Mean	Stddev	
Oligochaeta	5.6	8.2	250
Ostracoda			20
Copepoda	2336	1142	17750
Cladocera	5.2	5.5	160
Palaeomonidae	1.4	1.1	20
Parastacidae			10
Dytiscidae			20
Hydraenidae			110
Chironominae	7.6	2.5	290
Tanypodinae	3.8	3.6	60
Orthocladiinae	0.6	0.9	10
Chironomidae			220
Ceratopogonidae	13.6	7.7	90
Tabanidae	2.0	4.5	10
Psychodidae			10
Baetidae	1.2	2.2	
Caenidae	10.8	8.4	490
Ephemeroptera	0.4	0.9	
Gerridae	0.8	1.8	
Corixidae	0.2	0.4	
Veliidae			10

Epiprotocphora			20
Libellulidae			10
Zygoptera			130
Calamoceratidae			10
Trichoptera	2.2	4.4	
Taxa	**9.2**	**1.3**	**19**
Abundance	**2391**	**1130**	**19700**
Total taxa		**14**	**22**

3.10 Donegri Ck (Narran River) at Dirranbandi

The water level was very low such that the river consisted of a series of disconnected pools. A number of pools of various shapes and sizes were samples. The deepest pool reached at least 1.5m deep while the other were shallower. There was no flow and no surface scum.

3.10.1 Water quality

Spot readings are shown in **Table 3-10.1**. The battery failed so no further data was collected.

- **Table 3-10.1 Spot water quality readings – Donegri Ck (Narran River)**

Sample Time	Depth (m)	Temp. (^{o}C)	Dissolved Oxygen (%sat)	Conductivity (µS/cm)	Turbidity (NTU)	pH
1545	Surface	14.6	66	155	548	7.3

3.10.2 Macrophytes

Patchy sedges occurred above the water line but there were no macrophytes.

3.10.3 Fish

All nets were set. Seven native species and two introduced were captured (**Table 3-10.2**).

■ **Table 3-10.2 Results of fishing at Donegri Creek in May 2008, by fishing method**

Species	Common name	Gill	Seine	Fyke	Bait traps	Total Numbers caught
Macquaria ambigua	Yellowbelly	6	9	4		19
Nematolosa erebi	Bony Bream		56	11		67
Leiopotherapon unicolor	Spangled perch		2			2
Retropinna semoni	Smelt		17			17
Hypseleotris klunzingeri	Carp gudgeon		1			1
Neosilurus hyrtlii	Hyrtl's tandan		2	3		5
Tandanus tandanus	Catfish			1		1
Cyprinus carpio	Common Carp	1				1
Carrasius auratus	Goldfish		4	5		9
Total Numbers		**7**	**91**	**24**	**0**	**122**

One river turtle *Emydura maquarii* and one long neck turtle *Chelodina longicollis* were captured in fyke nets.

3.10.4 Macroinvertebrates

The substrate was silty sand with leaf litter and some algae. Seventeen taxa were recorded with the most common being copepods and ceratopogonids (**Table 3-10.3**). Bait traps captured 36 prawns and 8 yabbies.

■ **Table 3-10.3 Numbers of aquatic macroinvertebrates recorded from Donegri Creek**

	Edge Surber	
	Mean	Stdev
Oligochaeta	1.2	1.3
Ostracoda	0.2	0.4
Copepoda	72.4	56.0
Cladocera	4.0	1.9
Palaeomonidae	1.4	1.7
Dytiscidae	0.2	0.4
Hydraenidae	0.2	0.4
Staphylinidae	0.2	0.4
Chironominae	1.8	1.6
Orthocladiinae	0.2	0.4
Ceratopogonidae	8.2	3.1
Tabanidae	0.2	0.4
Tipulidae	0.2	0.4
Caenidae	2.0	1.6
Gerridae	0.6	0.5
Notonectidae	0.2	0.4
Corixidae	0.8	1.8
Taxa	**8.2**	**3.0**
Abundance	**94.0**	**60.3**
Total taxa		**17**

3.11 Narran River at Clyde

There was no flow at the time of sampling and depths reached approximately 1.5m. The edges had been disturbed by goats, pigs and perhaps cattle.

3.11.1 Water quality

The results of spot measurements are shown in **Table 3-11.1**. Dissolved oxygen levels were very low below the surface and the water was very turbid.

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

Sample Time	Depth (m)	Temp (^{o}C)	Dissolved Oxygen (%sat)	Conductivity (µS/cm)	Turbidity (NTU)	pH
1045	Surface	17.8	99	152	966	7.5
	0.5	13.2	10	150	1028	7.5
	1.0	12.9	8	149	1051	7.4

3.11.2 Macrophytes

No macrophytes or benthic algae were recorded.

3.11.3 Fish

All nets were used at this site. The catch comprised of three native fish species and two introduced (**Table 3-11.2**). The fish were of a range of sizes including Yellowbelly from 37mm and Bony Bream from 41mm.

■ **Table 3-11.2 Results of fishing the Narran River at Clyde in May 2008, by fishing method**

Species	Common name	Gill	Seine	Fyke	Bait	Total number caught
Macquaria ambigua	Yellowbelly	2	7	4		13
Nematolosa erebi	Bony Bream		7	7		14
Retropinna semoni	Smelt		3			3
Cyprinus carpio	Carp	4		6	1	11
Gambusia holbrooki	Mosquitofish		2			2
Total Numbers		**6**	**19**	**17**	**1**	**43**

3.11.4 Macroinvertebrates

No specialised habitats were available to sample at this site. Surbers were collected from firm clay with an overlying layer of silt. Fifteen discrete taxa were recorded with ceratopogonids and copepods most common (**Table 3-11.3**). Eighteen prawns and 12 yabbies were captured in bait traps.

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

	Edge Surber	
	Mean	**Stdev**
Hydridae	0.2	0.4
Ostracoda	2.4	2.9
Copepoda	27.8	18.9
Palaeomonidae	0.6	0.9
Dytiscidae	1.6	3.0
Hydrophilidae	0.4	0.9
Chironominae	8.4	8.0
Tanypodinae	0.6	0.9
Chironomidae	1.0	2.2
Ceratopogonidae	29.4	18.0
Chaoborinidae	0.6	0.5
Diptera	0.2	0.4
Caenidae	3.6	3.3
Ephemeroptera	0.2	0.4
Corixidae	12.0	10.4
Epiproctophora	0.2	0.4
Economidae	0.2	0.4
Leptoceridae	0.2	0.4
Trichoptera	0.2	0.4
Taxa	**8.8**	**2.2**
Abundance	**89.8**	**40.9**
Total Taxa		**15**

3.12 Narran River at Booligar

The water level was such that some flow was evident from the main pool. This allowed some nets to be set upstream of the fence. No cattle were present and the area appeared to not have been grazed heavily. Depth reached at least 2m in the downstream pool.

3.12.1 Water quality

The results of spot measurements are shown in **Table 3-12.1**. The water was very turbid with a shallow warm surface layer and an odd pH inversion.

■ **Table 3-12.1 Spot water quality readings – Narran River at Booligar**

Sample Time	Depth (m)	Temp (°C)	Dissolved Oxygen (%sat)	Conductivity (µS/cm)	Turbidity (NTU)	pH
1500	Surface	16.3		156	1085	6.3
	0.5	13.4		156	1036	6.6
	1.0	12.8		155	922	7.2
	1.5	12.8		155	994	7.2

3.12.2 Macrophytes

No macrophytes were observed.

3.12.3 Fish

All nets were set. Four native fish species and two introduced were captured (**Table 3-12.2**). The Spangled perch ranged from 90mm to 230mm in length while Yellowbelly in fyke nets ranged from 52 to 86mm.

■ **Table 3-12.2 Results of fishing the Narran River at Booligar in May 2008.**

Species	Common name	Gill	Seine	Fyke	Bait	Total Number caught
Macquaria ambigua	Yellowbelly	7		4		11
Nematolosa erebi	Bony Bream	2	22	5		29
Leiopotherapon unicolor	Spangled perch	1		11		12
Neosilurus hyrtlii	Hyrtl's tandan			10		10
Cyprinus carpio	Carp	2		1		3
Carrasius auratus	Goldfish		2			2
Total Numbers		**12**	**24**	**31**	**0**	**67**

3.12.4 Macroinvertebrates

Surbers were collected from soft silt with an algal smear. Twenty-two taxa were recorded. The fauna was dominated by microcrustaceans, caenid mayflies and chironomids (**Table 3-12.3**). Bait traps collected 9 prawns and 7 yabbies.

■ **Table 3-12.3 Numbers of aquatic macroinvertebrates recorded from the Narran River at Booligar**

	Edge surber	
	Mean	Stddev
Oligochaeta	0.4	0.5
Hydridae	0.2	0.4
Acarina	0.6	0.9
Ancylidae	5.8	9.1
Planorbidae	0.2	0.4
Ostracoda	2.8	2.0
Copepoda	80.8	38.1

Cladocera	22.0	13.7
Palaeomonidae	1.2	1.3
Dytiscidae	0.2	0.4
Hydraenidae	0.6	0.9
Chironominae	10.0	4.6
Tanypodinae	0.8	1.8
Orthocladiinae	4.2	0.8
Chironomidae	5.0	11.2
Ceratopogonidae	4.8	3.1
Culicidae	0.2	0.4
Baetidae	1.8	0.8
Caenidae	22.8	25.9
Ephemeroptera	0.4	0.9
Gerridae	0.4	0.5
Corixidae	2.2	4.4
Macromiidae	0.4	0.5
Leptoceridae	1.0	0.7
Trichoptera	1.2	2.7
Taxa	**14.2**	**3.3**
Abundance	**170**	**72.8**
Total taxa		**22**

3.13 Balandool River at Cubbie

The original site was sampled both upstream and downstream of the bridge. Depth did not exceed 30cm and the site consisted of isolated pools. Benthic algae were not observed. There was no evidence of recent use by cattle but goat droppings were observed.

3.13.1 Water quality

Spot water quality measurements were taken from the centre of the channel and results are shown in **Table 3-13.1**.

- **Table 3-13.1 Spot water quality readings – Balandool River at Cubbie**

Sample Time	Depth (m)	Temp. (^{o}C)	Dissolved Oxygen (%sat)	Conductivity (µS/cm)	Turbidity (NTU)	pH
1245	surface	14.6	76	229	904	6.7

3.13.2 Macrophytes and algae

No macrophytes or algae were observed.

3.13.3 Fish

No gill nets and only one fyke net were placed at this site due to the depth and size of the pools. Four native species and one introduced were recorded (**Table 3-13.2**).

■ **Table 3-13.2 Results of fishing the Balandool River at Cubbie in May 2008.**

Species	Common name	Gill	Seine	Fyke(1)	Bait traps	Total Numbers caught
Macquaria ambigua	Yellowbelly		3	6		9
Leiopotherapon unicolor	Spangled perch		1	2		3
Nematolosa erebi	Bony Bream		6			6
Retropinna semoni	Smelt		5			5
Cyprinus carpio	Carp			4		4
Total Numbers		**NA**	**15**	**12**	**0**	**27**

3.13.4 Macroinvertebrates

Surber samples were collected from soft mud substrate with little or no algae or leaf litter. Sixteen taxa were recorded with Cladocera, ceratopogonids and caenid mayflies dominating the catch (**Table 3-13.3**). Bait traps collected 13 prawns and 52 yabbies. They were also common in the fyke net.

■ **Table 3-13.3 Numbers of aquatic macroinvertebrates recorded from the Balandool River at Cubbie.**

	Edge surber	
	Mean	Stddev
Oligochaeta	0.2	0.4
Acarina	0.4	0.5
Ostracoda	0.4	0.5
Copepoda	256	62
Cladocera	22.6	28.1
Palaeomonidae	0.6	0.5
Hyraenidae	0.2	0.4
Chironominae	5.0	1.9
Tanypodinae	10.8	2.6
Orthocladiinae	0.6	0.5
Chironomidae	0.8	1.3
Ceratopogonidae	73.2	26.2
Culicidae	3.8	1.9
Caenidae	70.2	62.1
Ephemeroptera	1.6	2.5
Corixidae	0.4	0.9
Economidae	0.2	0.4
Leptoceridae	0.2	0.4
Trichoptera	0.6	0.9
Taxa	**11.2**	**2.3**
Abundance	**448**	**104**
Total taxa		**16**

3.14 Balandool River at Euraba

The water level was very low, generally less than 30cm deep. Cattle were noted but there was generally a low level of disturbance.

3.14.1 Water quality

Spot water quality measurements were taken from the centre of the channel and results are shown in **Table 3-14.1**.

- **Table 3-14.1 Spot water quality readings – Balandool River at Euraba**

Sample Time	Depth (m)	Temp. (°C)	Dissolved Oxygen (%sat)	Conductivity (µS/cm)	Turbidity (NTU)	pH
1615	surface	13.1	?	235	673	6.8

3.14.2 Macrophytes

No macrophytes were observed.

3.14.3 Fish

Only the seine net and bait traps were used at this site and captured two native species plus one introduced (**Table 3-14.2**).

- **Table 3-14.2 Results of fishing the Balandool River at Euraba in May 2008.**

Species	Common name	Gill	Seine	Fyke	Bait traps	Total Numbers caught
Macquaria ambigua	Yellowbelly		2			2
Nematolosa erebi	Bony Bream		6			6
Gambusia holbrooki	Mosquitofish		8			8
Total Numbers		**NA**	**16**	**NA**	**0**	**16**

3.14.4 Macroinvertebrates

Surber samples were collected from soft silt. Twenty taxa were recorded and the most common were copepods, corixids and caenid mayflies (**Table 3-14.3**). Bait traps captured 6 prawns and 52 *Cherax.*

- **Table 3-14.3 Numbers of aquatic macroinvertebrates recorded from Balandool River at Euraba in May 2008**

	Edge surber	
	Mean	Stddev
Oligochaeta	0.4	0.9
Acarina	0.6	1.3
Ostracoda	1.6	1.5
Copepoda	247	42
Cladocera	8.6	8.1
Dytiscidae	0.6	0.9

Hydrophilidae	0.2	0.4
Chironominae	9.0	8.0
Tanypodinae	6.8	10.2
Orthocladiinae	4.0	5.4
Chironomidae	0.4	0.5
Ceratopogonidae	20.0	9.2
Culicidae	0.2	0.4
Ephydridae	0.4	0.5
Tabanidae	0.2	0.4
Baetidae	0.4	0.5
Caenidae	26.6	17.3
Corixidae	45.8	41.2
Epiproctophora	1.2	1.8
Gomphidae	0.2	0.4
Leptoceridae	2.4	2.9
Trichoptera	0.6	1.3
Taxa	**11.6**	**2.3**
Abundance	**377**	**42.1**
Total taxa		**20**

3.15 Bokhara River at Kirrima

Water only reached from the weir to the road crossing, not below. Within the weir, water coverage was extensive. Disturbance by stock and feral animals was evident. The site sampled was a mix of below the weir and immediately above the weir wall in a remnant pool.

3.15.1 Water quality

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

- **Table 3-15.1 Spot water quality readings – Bokhara River at Kirrima**

Sample Time	Depth (m)	Temp (^{o}C)	Dissolved Oxygen (%sat)	Conductivity (µS/cm)	Turbidity (NTU)	pH
1445	Surface	23	86	203	423	7.6

3.15.2 Macrophytes

No macrophytes were observed.

3.15.3 Fish

No gill nets were set because of the limited depth. Three native species and two introduced were captured (**Table 3-15.2**).

■ **Table 3-15.2 Results of fishing the Bokhara River at Kirrima in May 2008.**

Species	Common name	Gill	Seine	Fyke	Bait	Total Numbers caught
Macquaria ambigua	Yellowbelly		2			**2**
Nematolosa erebi	Bony Bream		3	2		**5**
Leiopotharapon unicolor	Spangled perch		2	1	1	**4**
Cyprinus carpio	Carp			1		**1**
Gambusia holbrooki	Mosquitofish		1			**1**
Total Numbers		**NA**	**8**	**4**	**1**	**13**

3.15.4 Macroinvertebrates

Surber samples were collected from soft clay. Twenty taxa were recorded with cladocerans, caenid mayflies and copepods most common (**Table 3-14.3**). Bait traps captured 62 prawns and 20 *Cherax.*

■ **Table 3-14.3 Numbers of aquatic macroinvertebrates recorded from Bokhara River at Kirrima in May 2008**

	Edge surber	
	Mean	Stddev
Oligochaeta	0.4	0.9
Ancylidae	0.2	0.4
Ostracoda	0.4	0.5
Copepoda	46.4	16.5
Cladocera	180	153
Atyidae	0.2	0.4
Palaeomondae	1.2	1.1
Hydraenidae	0.6	0.9
Chironominae	2.2	2.4
Tanypodinae	1.0	1.7
Orthocladiinae	0.2	0.4
Chironomidae	2.2	2.7
Ceratopogonidae	26.6	18.7
Culicidae	0.2	0.4
Caenidae	85.0	45.0
Ephemeroptera	4.0	3.8
Mesoveliidae	0.2	0.4
Veliidae	0.4	0.5
Corixidae	0.4	0.9
Epiproctophora	0.2	0.4
Calamoceratidae	0.2	0.4
Economidae	0.4	0.5
Trichoptera	0.2	0.4

Taxa	**10.6**	**2.3**
Abundance	**353**	**100**
Total taxa		**20**

3.16 Bokhara River at Koala

The site is basically a long and near-permanent pool. The pool was continuous from the bridge and it reached over 1.0m in depth. There was evidence of use by cattle but not to extent of previous sampling occasions when the water level was low. There was no flow at the time of sampling.

3.16.1 Water quality

Overnight logging of water quality parameters produced the following range of results:
Temperature: 12.7 – 14.2^{o}C
Dissolved oxygen: malfunction
pH: 7.5 – 7.6
Conductivity: 177-179 µS/cm
Turbidity: 619 - 661 NTU.

3.16.2 Macrophytes

Ludwidgia covered approximately 5% of the water surface. *Azolla* was represented by a thin line along the waters edge and occasional patches in open water.

3.16.3 Fish

No fyke nets were used at this site but two seine hauls were attempted and captured four native species and one introduced (**Table 3-16.1**).

■ **Table 3-16.1 Results of fishing the Bokhara River at Koala in May 2008.**

Species	Common name	Gill	Seine (2)	Fyke	Bait traps	Total Numbers caught
Macquaria ambigua	Yellowbelly	6	1			**7**
Nematolosa erebi	Bony Bream	3	3			**6**
Leiopotherapon unicolor	Spangled perch		1			**1**
Retropinna semoni	Smelt		1			**1**
Cyprinus carpio	Carp	1				**1**
Total Numbers		**10**	**6**	**NA**	**0**	**16**

3.16.4 Macroinvertebrates

Surber samples were collected from soft silt substrate. A dip net sample was collected from a mixture of *Ludwidgia* and *Azolla.* Twenty-six taxa were recorded, 19 from the surbers and 20 from the dip net. The dominant taxa in both surbers and dip nets were copepods, ostracods and corixids (**Table 3-16.2**). Bait traps captured 4 prawns.

■ **Table 3-16.2 Numbers of aquatic macroinvertebrates recorded from Bokhara River at Koala in May 2008**

	Edge surber		Macrophyte
	Mean	Stddev	dip net
Hydridae	0.8	1.1	
Acarina	0.6	0.5	
Glossiphoniidae			4
Ancylidae			32
Physidae			24
Cladocera	3.4	5.5	8
Copepoda	528	210	1724
Ostracoda	154	230	240
Palaeomonidae	0.2	0.4	4
Crustacea	0.2	0.4	8
Dytiscidae	0.6	1.3	36
Hydraenidae			20
Hydrochidae			4
Chironominae	3.0	4.1	36
Tanypodinae	19.4	12.3	56
Orthocladiinae			80
Chironomidae	11.0	12.7	
Ceratopogonidae	10.4	9.5	20
Ephydridae	0.2	0.4	
Culicidae			4
Diptera	0.2	0.4	4
Baetidae	0.4	0.9	48
Caenidae	40.8	31.2	116
Ephemeroptera	4.6	8.7	8
Notonectidae	0.4	0.5	
Corixidae	56.0	43.3	144
Hemiptera			8
Epiproctophora	1.6	2.6	
Coenagrionidae	0.2	0.4	
Libellulidae	0.2	0.4	
Zygoptera	0.4	0.9	20
Leptoceridae	2.0	1.9	8
Trichoptera	10.6	10.9	20
Taxa	**13.0**	**2.8**	**20**
Abundance	**849**	**262**	**2676**
Total taxa	**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 such that the downstream riffle was only just not flowing. No macrophytes were present. Disturbance to the edge appeared to be caused by a range of grazing animals.

3.19.1 Water quality

No water quality data is available for this site.

3.19.2 Macrophytes

No macrophytes were observed but occasional *Juncus* was at or just below the waterline and the *Schoenoplectus* near the gauge was surrounded by water. Some filamentous algal film was present in areas sheltered from the wind.

3.19.3 Fish

All nets were set. Three native fish species and two introduced were recorded (**Table 3-19.1**). Yellowbelly in the seine hauls were between 23 and 93mm fork length. Bony Bream were a range of sizes.

■ **Table 3-19.1 Results of fishing the Moonie River at Nindigully in May 2008.**

Species	Common name	Gill	Seine	Fyke	Bait	Total Numbers caught
Macquaria ambigua	Yellowbelly	2	1	3		**6**
Nematolosa erebi	Bony Bream	5	17	3		**25**
Tandanus tandanus	Freshwater catfish	2				**2**
Cyprinus carpio	Carp	1		1		**2**
Carrasius auratus	Goldfish			1		**1**
Total Numbers		**10**	**18**	**8**	**0**	**36**

Single long-neck turtles were captured in fyke and seine nets.

3.19.4 Macroinvertebrates

Surber samples were collected from clay. Eighteen taxa were identified with the most common being copepods, cladocerans and corixids (**Table 3-19.2**). Forty-two *Macrobrachium* were captured in bait traps.

■ **Table 3-19.2 Macroinvertebrates captured at Nindigully in May 2008**

	Edge surber	
	Mean	Stddev
Oligochaeta	0.4	0.5
Ostracoda	2.0	2.3
Copepoda	105	61
Cladocera	23	39
Palaeomonidae	0.8	1.8
Dytiscidae	0.2	0.4
Staphylinidae	0.2	0.4
Chironominae	0.2	0.4
Tanypodinae	2.0	2.0
Orthocladiinae	1.0	1.2
Ceratopogonidae	3.6	4.8
Culicidae	0.2	0.4
Tabanidae	0.2	0.4
Baetidae	0.4	0.9
Caenidae	0.6	0.9
Notonectidae	0.4	0.5
Corixidae	8.0	5.3
Leptoceridae	0.2	0.4
Taxa	**8.6**	**1.7**
Abundance	**148**	**93**
Total taxa		**18**

3.20 Moonie River at Fenton

The fringe of benthic filamentous green algae was not noted and while there was no surface scum, there was an algal windrow. The weather was overcast with occasional showers.

3.20.1 Water Quality

Overnight logging of water quality parameters was undertaken at this site. The recorded ranges for each parameter were:
Temperature: 15.1 – 16.0^{o}C
Dissolved oxygen: 34 - 45% sat
pH: 7.3 – 7.3
Conductivity: 175 - 176µS/cm
Turbidity: 541-682NTU.

3.20.2 Macrophytes

Ludwidgia covered approximately 5% of the water surface.

3.20.3 Fish

All nets were deployed at this site. Two native species and two introduced were captured (**Table 3-20.1**). This is very similar to historical catches. The fish captured in all nets tended to be relatively large and healthy but unlike many other occasions, small Bony bream were recorded in the seine net.

Table 3-20.1 Results of fishing at Fenton in May 2008.

Species	Common name	Gill	Seine	Fyke	Bait traps	Total Numbers caught
Macquaria ambigua	Yellowbelly	11		2		**13**
Nematolosa erebi	Bony Bream	49	24	4		**77**
Cyprinus carpio	Carp	2				**2**
Gambusia holbrooki	Mosquitofish		2			**2**
Total Numbers		**62**	**26**	**6**		**94**

A long neck turtle was recorded in a fyke net.

3.20.4 Macroinvertebrates

Surber samples were collected from both soft and compact silt. A dip net sample was collected from *Ludwidgia.* Thirty taxa were identified with the most common in surbers being copepods, ceratopogonids and cladocerans while in the dip net the most common were cladocerans, copepods, protoneurids and baetids (**Table 3-20.2**). Bait traps captured 10 *Macrobrachium*.

- **Table 3-20.2 Macroinvertebrates captured at Fenton in May 2008**

	Edge surber Mean	Stddev	Macrophyte dip
Oligochaeta	2.6	3.0	
Acarina	0.8	0.4	50
Sphaeridae	0.2	0.4	
Ancylidae	1.8	2.2	10
Physidae			20
Ostracoda	3.4	2.7	120
Copepoda	129	136	8720
Cladocera	45	63	42100
Palaeomonidae	1.6	1.1	100
Dytiscidae	0.6	1.3	
Hydraenidae			40
Hydrochidae			50
Chironominae	16.2	15.0	850
Tanypodinae	11.6	9.4	700
Orthocladiinae	4.4	4.8	410
Chironomidae	17	29	10
Ceratopogonidae	69	78	90
Culicidae	0.2	0.4	100
Muscidae			40

Baetidae	7.6	9.1	1960
Caenidae	0.6	0.5	20
Ephemeroptera	2.8	2.6	
Gerridae	0.4	0.5	10
Mesoveliidae			110
Notonectidae			10
Saldidae			10
Veliidae			90
Corixidae	7.6	9.2	20
Epiproctophora	0.2	0.4	
Protoneuridae			30
Zygoptera	2.8	4.8	3650
Ecnomidae	0.4	0.9	
Leptoceridae	1.0	1.0	190
Trichoptera	2.0	2.3	100
Taxa	**16.4**	**0.9**	**25**
Abundance	**328**	**279**	**59610**
Total taxa	**21**		

3.21 Lower Plains Lagoon

This site was last sampled in May and November 2004. The pool was approximately 300m X 200m in a T shape and up to 1m deep but mostly less than 30cm deep. It contained very few snags, little fringing vegetation and no algae.

3.21.1 Water Quality

Spot water quality data are shown in **Table 3-21.1**. The water column was well mixed and very turbid.

■ **Table 3-21.1 Spot water quality readings –Lower Plains Lagoon May 2008**

Sample Time	Depth (m)	Temp (^{o}C)	Dissolved Oxygen (%sat)	Conductivity (µS/cm)	Turbidity (NTU)	pH
0945	Surface	14.5	70	180	1830	7.4
	0.5	13.9	70	179	1812	7.4

3.21.2 Fish

Two gill nets could not be set due to the limited deep water. Three native species and three introduced were captured with Silver tandan a new record for the area. All fish captured were in very good health. While the Bony bream were all less than 48mm long, the Spangled perch ranged from 42 mm to 130 mm and the Carp were all greater than 164mm. Four long neck turtles were captured in a gill net.

Table 3-21.2 Results of fishing Lower Plains Lagoon in May 2008.

Species	Common name	Gill (2)	Seine	Fyke	Bait traps	Total Numbers caught
Nematolosa erebi	Bony Bream		8			**8**
Leiopotherapon unicolor	Spangled perch		1	4		**5**
Porochilis argenteus	Silver tandan			1		**1**
Cyprinus carpio	Carp		1	2		**3**
Carrasius auratus	Goldfish			1		**1**
Gambusia holbrooki	Mosquitofish		8			**8**
Total Numbers		**0**	**18**	**8**	**0**	**26**

3.21.3 Macrophytes

No macrophytes were observed.

3.21.4 Macroinvertebrates

Surber samples were collected from soft silt substrate. No dip net samples were collected. Seventeen discrete taxa were identified with the most common being ceratopogonids, ostracods and corixids. Sixteen *Macrobrachium* were recorded from bait traps.

- **Table 3-21.3 Macroinvertebrates captured at Lower Plains Lagoon in May 2008**

	Edge surber	
	Mean	**Stddev**
Temnocephala	1.0	1.7
Acarina	0.4	0.5
Ostracoda	140	308
Copepoda	23	27
Cladocera	0.4	0.9
Dytiscidae	4.6	4.9
Hydraenidae	0.4	0.5
s-f Chironominae	5.6	4.9
s-f Orthocladinae	28.4	17.6
Ceratopogonidae	128	113
Culicidae	0.2	0.4
Tabanidae	0.2	0.4
Baetidae	0.8	0.8
Notonectidae	1.8	1.8
Corixidae	31.4	17.3
Libellulidae	0.2	0.4
Leptoceridae	0.8	0.8
Taxa	**10.4**	**0.5**
Abundance	**367**	**384**
Total taxa		**17**

3.22 Beardie Lagoon

Like Lower Plains Lagoon, this site was added and last sampled in 2004. The two channels held water and the depth was generally about 40cm with occasional deeper pockets. Sorghum was planted to within 5m on the northern bank and the eastern bank had been cleared other than a thin line of lignum. No foam or scum was noted and cattle and goats grazed nearby. Noogoora burr and other herbs were noted near the waters edge. The waters edge was covered in woody debris (sticks) presumably washed in from recently cleared areas. This prevented using the seine net.

3.22.1 Water Quality

Spot water quality data are shown in **Table 3-22.1**. The water showed relatively high conductivity, oxygen and pH, indicating the pool is drying out.

- **Table 3-22.1 Spot water quality readings – Beardie Lagoon in May 2008**

Sample Time	Depth (m)	Temp (^{o}C)	Dissolved Oxygen (%sat)	Conductivity (µS/cm)	Turbidity (NTU)	pH
1300	Surface	19.0	96	318	498	8.0

3.22.2 Fish

Seine netting was not conducted at this site. The Bony bream ranged from 190 to 277mm; Carp from 184 to 211 and the Silver tandan was 72mm long. A long-necked turtle was captured in a fyke net.

- **Table 3-22.2 Results of fishing Beardie Lagoon in May 2008.**

Species	Common name	Gill	Seine	Fyke	Bait traps	Total Numbers caught
Nematolosa erebi	Bony Bream	11				**11**
Leiopotherapon unicolor	Spangled perch	1				**1**
Porochilis argenteus	Silver tandan			1		**1**
Cyprinus carpio	Carp			4		**4**
Total numbers		**12**	**NA**	**5**	**0**	**17**

3.22.3 Macrophytes

Patches of *Lignum* represented the only macrophytes observed.

3.22.4 Macroinvertebrates

Surber samples were collected from sandy mud. A dip net was collected from Lignum. Twenty discrete taxa were collected. Copepods, corixids and ceratopogonids were most common in surber samples while chironomids, copepods and corixids dominated the dip net. Two *Macrobrachium* and 4 *Cherax* were captured in bait traps.

■ **Table 3-22.3 Macroinvertebrates captured at Beardie Lagoon in May 2008**

	Edge surber Mean	Stddev	Macrophyte dip
Oligochaeta	0.6	0.9	6
Acarina	0.2	0.4	
Ancylidae	0.2	0.4	
Ostracoda	3.2	6.1	6
Copepoda	415	303	104
Cladocera	1.2	1.3	
Dytiscidae	2.6	4.2	4
Hydraenidae	0.2	0.4	10
Chironominae	4.6	4.2	154
Orthocladiinae	5.0	3.4	16
Tanypodinae			30
Chronomidae			2
Ceratopogonidae	12.6	10.5	10
Tabanidae	0.4	0.5	
Baetidae	10.4	12.2	
Caenidae	0.8	1.1	2
Ephemeroptera			2
Notonectidae	0.2	0.4	
Corixidae	33.6	20.7	96
Coenagrionidae	0.8	1.8	
Zygoptera			2
Hydropsychidae			2
Leptoceridae	4.0	6.2	24
Trichoptera			10
Taxa	**10.2**	**1.9**	**14**
Abundance	**496**	**336**	**480**
Total taxa	**18**		

3.23 Whyenbah Lagoon

This lagoon is adjacent the Balonne River at Whyenbah and had not been sampled since autumn 2005 as it had not filled. Ninety percent of the pool was greater than 1m deep and it held water for its full length. The water was turbid but there was no scum. There was no damage to the banks from stock.

3.23.1 Water Quality

Spot water quality data are shown in **Table 3-23.1**.

■ **Table 3-23.1 Spot water quality readings – Whyenbah Lagoon in May 2008**

Sample Time	Depth (m)	Temp (°C)	Dissolved Oxygen (%sat)	Conductivity (µS/cm)	Turbidity (NTU)	pH
1545	Surface	14.0	70.4	167	542	7.4
	0.5	13.9	70.0	167	530	7.4
	1.0	13.9	70.2	167	540	7.4

Overnight logging of water quality parameters produced the following range of results:
Temperature: 14.0 – 15.9°C
Dissolved oxygen: 68 - 76% sat;
pH: 7.0 – 7.6
Conductivity: 167 - 168µS/cm
Turbidity: 461 - 505 NTU.

3.23.2 Macrophytes

Ludwidgia covered about 1% of the water surface. Isolated lignum plants reached the water.

3.23.3 Fish

All nets were deployed at this site. Four native species and one introduced were captured (**Table 3-23.2**). Yellowbelly in seine and fyke nets were generally between 68 and 94mm in length. A long-necked turtle was captured in a fyke net.

■ **Table 3-23.2 Results of fishing Whyenbah Lagoon in May 2008.**

Species	Common name	Gill	Seine	Fyke	Bait traps	Total Numbers caught
Macquaria ambigua	Yellowbelly		1	7		**8**
Nematolosa erebi	Bony Bream	4	7	19		**30**
Leiopotherapon unicolor	Spangled Perch			1		**1**
Retropinna semoni	Smelt		1			**1**
Cyprinus carpio	Carp			5		**5**
Total Numbers		**4**	**9**	**32**	**0**	**45**

3.23.4 Macroinvertebrates

Surber samples were collected from mud. A dip net sample was taken amongst tree root. Thirty-twoe taxa were collected; 25 by dip net and 24 by surber (**Table 3-23.3**). The most common taxa in surbers were corixids, chironomids and ceratopogonids. Common taxa in the dip net were chironomids, zygoptera and leptocerids. Bait traps captured 5 *Macrobrachium.*

■ **Table 3-23.3 Macroinvertebrates captured at Whyenbah Lagoon**

	Edge surber		Tree root dip
	Mean	Stddev	
Oligochaeta	2.2	3.9	80
Acarina	1.2	1.3	40
Ancylidae	0.2	0.4	20

Physidae	0.2	0.4	
Ostracoda	8.6	9.4	300
Copepoda	13.8	11.3	20
Cladocera	11.4	12.1	160
Palaeomonidae			20
Parastacidae			20
Dytiscidae	1.2	2.7	20
Hydraenidae			40
Chironominae	20.0	18.3	1740
Tanypodinae	11.4	6.1	300
Orthocladiinae	0.4	0.9	
Chironomidae	3.6	4.3	
Chaoborinidae	0.4	0.9	
Ceratopogonidae	19.4	11.0	280
Culicidae			20
Tabanidae	0.2	0.4	
Tipulidae	0.2	0.4	
Baetidae	1.6	1.7	240
Caenidae	7.8	3.8	300
Ephemeroptera	1.8	2.2	
Gerridae			20
Mesoveliidae			80
Pleidae			40
Veliidae	0.2	0.4	20
Corixidae	29.4	33.2	80
Epiproctophora	0.2	0.4	20
Protoneuridae			20
Zygoptera			580
Gomphidae	0.8	0.4	
Calamoceratidae	0.2	0.4	20
Economidae	0.2	0.4	
Leptoceridae	2.2	2.7	340
Trichoptera	6.2	3.7	
Taxa	**15**	**2.2**	**25**
Abundance	**145**	**37**	**4820**
Total taxa	**24**		

3.24 Police Lagoon

DRY. The summer flood levels just failed to reach the commence-to-flow level of this lagoon.

3.25 Belah Waterhole

The water level was generally between 0.5m and 1.0m, occasionally deeper. Lignum was touching the water. A thin algal scum was evident on the water surface when the wind dropped. There was no evidence of recent cattle grazing.

3.25.1 Water Quality

Spot water quality data are shown in **Table 3-25.1**. The water column was well mixed.

- **Table 3-25.1 Spot water quality readings – Belah Lagoon in May 2008**

Sample Time	Depth (m)	Temp (°C)	Dissolved Oxygen (%sat)	Conductivity (µS/cm)	Turbidity (NTU)	pH
0845	Surface	13.6	64	190	648	7.4
	0.5	13.6	63	190	630	7.4
	0.9	13.6	63	190	617	7.3

3.25.2 Macrophytes

No macrophytes were recorded and benthic green filamentous alga was uncommon. A light scum was apparent when the wind dropped.

3.25.3 Fish

All nets were deployed at this site. Three native species and two introduced were recorded (**Table 3-25.2**). It has been very uncommon during the sampling program to capture small carp but those in the seine net were between 62 and 75mm in length.

- **Table 3-25.2 Results of fishing Belah Waterhole in May 2008.**

Species	Common name	Gill	Seine	Fyke	Bait traps	Total Numbers caught
Macquaria ambigua	Yellowbelly	1	1			**2**
Nematolosa erebi	Bony Bream	1	1			**2**
Leiopotherapon unicolor	Spangled Perch			1		**1**
Cyprinus carpio	Common Carp		5		3	**8**
Gambusia holbrooki	Mosquitofish		15			**15**
Total Numbers		**2**	**22**	**1**	**3**	**28**

3.25.4 Macroinvertebrates

Five surber samples were collected from mud substrate and a dip net from lignum (**Table 3-25.3**). Twenty-two taxa were identified. Ceratopogonids, micro-crustacea and corixids dominated the surbers while chironomids, micro-crustacea and ceratopogonids were most common in the dip net. Bait traps captured 31 *Cherax*, along with three carp.

- **Table 3-25.3 Macroinvertebrates captured at Belah Waterhole**

	Edge Surber Mean	Stdev	Macrophyte dip
Oligochaeta	0.4	0.5	8
Ancylidae	0.6	0.9	20
Planorbidae			4
Ostracoda	32.6	21.7	4
Copepoda	44.4	42.9	92
Cladocera	9.4	12.1	16
Dytiscidae	5.4	6.5	
Hydraenidae			12
Hydrochidae			4
Hydrophilidae	0.2	0.4	8
Chironominae	8.0	5.7	584
Tanypodinae	5.0	4.0	12
Orthocladiinae	0.6	0.9	8
Chironomidae	0.6	1.3	4
Ceratopogonidae	78.8	54.5	40
Ephydridae	0.4	0.5	
Tabanidae	0.2	0.4	
Diptera			4
Baetidae	0.2	0.4	
Caenidae			
Ephemeroptera	0.4	0.9	
Notonectidae			
Corixidae	26.8	13.4	4
Ecnomidae			16
Leptoceridae			4
Trichoptera			28
Taxa	**10.0**	**0.7**	**16**
Abundance	**214**	**48**	**872**
Total taxa	**15**		

3.26 Clyde Lagoon

This lagoon has no snags and riparian vegetation only exists between the fences at the windmill. The lagoon was over 100m long, 25m wide and up to 2.5m deep. The edges were steep such that seine and fyke nets were only effective to a short distance from the edge. The dredged spoil to the west showed some growing coolibah and black wattle. The pile was also eroding and depositing small sediment piles in the lagoon.

3.26.1 Water Quality

Spot water quality data are shown in **Table 3-26.1**. The water column was well mixed but with a warmer, more highly oxygenated surface layer, though dissolved oxygen was generally low.

■ **Table 3-26.1 Spot water quality readings – Clyde Lagoon in May 2008**

Sampling Time	Depth (m)	Temp. (^{o}C)	DO (% sat.)	Conductivity (µS/cm)	Turbidity	pH
1330	Surface	16.1	46	193	752	7.8
	0.5	16.0	45	193	744	7.7
	1.0	15.3	35	194	765	7.7
	1.5	15.0	34	194	766	7.7
	2.0	14.8	30	194	796	7.6
	2.3	14.7	29	194	1009	7.6

Overnight logging of water quality parameters produced the following range of results:
Temperature: 15.6 – 20.6^{o}C
Dissolved oxygen: 40 - 113% sat;
pH: 7.7 – 7.9
Conductivity: 192 - 197µS/cm
Turbidity: 661 - 745 NTU.

Dissolved oxygen peaked in the early evening then rapidly declined and had just started to rise when logging ceased at 7:45am.

3.26.2 Macrophytes

Ludwidgia occurred over approximately 5% of the edge.

3.26.3 Fish

All nets were set at this site **(Table 3-26.2)**. Five native species and two introduced were captured. Most species were represented by fish of various sizes, including Yellowbelly from 78mm to 352mm and Bony bream from 23mm to 223mm. A long neck turtle was captured in a fyke net.

■ **Table 3-26.2 Results of fishing Clyde lagoon in May 2008.**

Species	Common name	Gill	Seine	Fyke	Bait traps	Total Numbers caught
Macquaria ambigua	Yellowbelly	7	1	18		**26**
Nematolosa erebi	Bony Bream	7	35	17		**59**
Leiopotherapon unicolor	Spangled Perch		1	1		**2**
Porochilis argenteus	Silver tandan			9		**9**
Neosilurus hyrtlii	Hyrtl's tandan			10		**10**
Cyprinus carpio	Carp	1	1	4		**6**
Carrasius auratus	Goldfish		1			**1**
Total Numbers		**15**	**39**	**59**	**0**	**113**

3.26.4 Macroinvertebrates

Surber samples were collected from soft silt and a dip net sample was collected from *Ludwidgia.* Twenty-five taxa were identified (**Table 3-26.3**) in total, 18 from the dip net and 17 from the surbers. The surber fauna was dominated by micro-crustacea and ceratopogonids while the dip net was strongly dominated by micro-crustaceans and zygoptera. Ninety-five *Macrobrachium* and one *Cherax* were captured in bait traps.

- **Table 3-26.3 Macroinvertebrates captured at Clyde Lagoon**

	Edge Surber Mean	Stdev	Macrophyte dip
Oligochaeta	1.0	1.4	
Hydridae	0.2	0.4	
Acarina			40
Ostracoda	82	156	2640
Copepoda	152	39	540
Cladocera	8.4	8.4	13980
Palaeomonidae	1.8	0.8	40
Dytiscidae	0.6	1.3	
Hydraenidae	0.2	0.4	20
Hydrochidae			60
Hydrophilidae			40
Chironominae	9.4	3.9	280
Tanypodinae	3.6	2.2	180
Orthocladiinae	0.2	0.4	100
Chironomidae	1.2	1.3	
Chaoborinidae	0.2	0.4	
Ceratopogonidae	54	28	440
Culicidae			80
Tabanidae	0.2	0.4	
Baetidae			380
Caenidae	6.2	8.2	260
Ephemeroptera	0.2	0.4	
Mesoveliidae			140
Corixidae	4.4	4.7	
Protoneuridae			100
Zygoptera			1580
Gomphidae	0.2	0.4	
Leptoceridae			40
Taxa	**10.8**	**1.3**	**18**
Abundance	**325**	**182**	**20940**
Total taxa	**17**		

3.27 Pilgra Lagoon Upstream

The lagoon has not been sampled since 2004. It is approximately 45m wide and greater than 300m long with a shallow convex shape. Maximum depth was approximately 1.0m. The substrate was very soft sandy silt. Some snags were present Disturbance by stock or goats was minor. A surface algal film was blown by the wind.

3.27.1 Water Quality

Results from spot water quality sampling are shown in **Table 3-27.1**. The water column was well mixed.

- **Table 3-27.1 Spot water quality readings – Pilgra Ustream in May 2008**

Sampling Time	Depth (m)	Temp. (°C)	DO (% sat.)	Conductivity (µS/cm)	Turbidity	pH
1630	Surface	14.4	75	219	824	7.7
	0.5	14.4	76	219	831	7.7
	1.0	14.4	75	219	863	7.7

Overnight logging of water quality parameters produced the following range of results:
Temperature: 14.5 – 18.0°C
Dissolved oxygen: 73 - 90% sat;
pH: 7.6 – 7.8
Conductivity: 219 - 221µS/cm
Turbidity: 665 - 762 NTU.

3.27.2 Fish

All nets were deployed. Four native species and three introduced were captured (**Table 3-27.2**). Small fish were common in fyke and seine nets, for example Yellowbelly ranged between 52mm and 63mm. As lagoons are not stocked, these species had bred locally. Carp of various sizes were captured with many less than 60mm.

- **Table 3-27.2 Results of fishing Pilgra Lagoon Upstream in May 2008.**

Species	Common name	Gill	Seine	Fyke	Bait traps	Total Numbers caught
Macquaria ambigua	Yellowbelly	3	4			**7**
Nematolosa erebi	Bony Bream		20	1		**21**
Leiopotherapon unicolor	Spangled Perch		1			**1**
Neosiluris hyrtlii	Hyrtl's tandan			1		**1**
Cyprinus carpio	Carp		23	4	11	**38**
Carrasius auratus	Goldfish		1			**1**
Gambusia holbrooki	Mosquitofish		16			**16**
Total Numbers		**2**	**65**	**6**	**11**	**85**

3.27.3 Macrophytes

No macrophytes were present.

3.27.4 Macroinvertebrates

Five surber samples were collected from deep silt, one with leaf litter and algae. No dip net samples were collected. Thirteen discrete taxa were recorded with micro-crustacea, corixids and ceratopogonids most common (**Table 3-27.3**). Bait traps captured one *Macrobrachium* and 24 *Cherax*.

- **Table 3-27.3 Macroinvertebrates captured at Pilgra Lagoon Upstream**

	Edge surber	
	Mean	Stddev
Oligochaeta	0.2	0.4
Ostracoda	4.4	6.4
Copepoda	31.4	7.6
Cladocera	19.6	7.4
Dytiscidae	0.2	0.4
s-f Chironominae	10.2	3.9
s-f Tanypodinae	2.0	1.2
s-f Orthocladiinae	1.8	2.2
Chironomidae	1.6	2.2
Ceratopogonidae	14.8	8.0
Baetidae	1.6	1.5
Caenidae	6.6	4.6
Ephemeroptera	0.6	1.3
Corixidae	23.2	19.5
Leptoceridae	0.6	0.9
Trichoptera	0.4	0.5
Taxa	**10.6**	**2.3**
Abundance	**119**	**13**
Total taxa		**13**

3.28 Pilgra Lagoon Downstream

The lagoon was continuous in both directions, about 40m wide and generally less than 1.0m deep. The substrate was firm sandy silt. No snags were noted and alga was sparse near the edge. Disturbance of the edge was minimal. There was no foam or scum.

3.28.1 Water Quality

Spot water quality data are shown in **Table 3-28.1**. The water column was well mixed and oxygenated.

- **Table 3-28.1 Spot water quality readings –Pilgra Lagoon downstream in May 2008**

Sampling Time	Depth (m)	Temp. (°C)	DO (% sat.)	Conductivity (µS/cm)	Turbidity	pH
1300	Surface	17.7	99	318	453	8.2
	0.5	16.1	90	318	454	8.1
	1.0	14.9	82	317	607	8.0

3.28.2 Macrophytes
No macrophytes were present.

3.28.3 Fish
All nets were deployed. Four native species and two introduced were captured (**Table 3-28.2**). The fish were not as small as those at Pigra US though Spangled perch as small as 58mm were captured.

- **Table 3-28.2 Results of fishing Pilgra Lagoon Downstream in May 2008.**

Species	Common name	Gill	Seine	Fyke	Bait traps	Total Numbers caught
Macquaria ambigua	Yellowbelly	3	2	3		**8**
Nematolosa erebi	Bony Bream	2	3	8		**13**
Leiopotherapon unicolor	Spangled Perch		1	4		**5**
Neosiluris hyrtlii	Hyrtl's tandan			10		**10**
Cyprinus carpio	Carp		3	27	9	**39**
Gambusia holbrooki	Mosquitofish		1			**1**
Total Numbers		**5**	**10**	**52**	**9**	**76**

3.28.4 Macroinvertebrates
Surber samples were collected from compact mud with some leaf litter. No dip net sample was collected. Thirteen taxa were recorded (**Table 3-28.3**). Ceratopogonids, ostracods and copepods were most common. Bait traps captured 32 *Macrobrachium* and 2 *Cherax*. They were also present in seine hauls and fyke nets.

- **Table 3-28.3 Macroinvertebrates captured at Pilgra Lagoon Downstream**

	Edge surber	
	Mean	Stddev
Acarina	0.4	0.9
Oligochaeta	1.6	2.5
Ancylidae	0.4	0.5
Cladocera	0.2	0.4
Copepoda	60.0	33.2
Ostracoda	67.0	55.7
Ceratopogonidae	74.2	60.9
Chironominae	8.8	6.4
Orthocladiinae	0.6	1.3
Tanypodinae	3.6	1.5
Tipulidae	0.6	0.9
Caenidae	0.4	0.5
Corixidae	14.4	5.3
Taxa	**8.4**	**1.8**
Abundance	**232**	**129**
Total taxa		**13**

3.29 Chinaman Creek

Water levels were higher than in recent times such that the sand bars upstream of the bridge were submerged. The length of the pool was complete in both directions. There was no macrophyte growth in the water but a mild surface scum. The edge appeared undisturbed. Habitat was mainly provided by tree roots, the bridge structure and twigs / branches / leaves.

3.29.1 Water Quality

Spot water quality data are shown in **Table 3-29.1**. The water column was well mixed and oxygenated with a warmer surface layer.

■ **Table 3-29.1 Spot water quality readings – Chinaman Creek in May 2008**

Sampling Time	Depth (m)	Temp. (°C)	DO (% sat.)	Conductivity (µS/cm)	Turbidity	pH
1050	Surface	18.2	79	166	589	7.3
	0.5	14.3	69	165	507	7.4
	1.0	14.2	68	164	602	7.3
	1.5	14.2	68	164	596	7.3

3.29.2 Macrophytes

No macrophytes were present.

3.29.3 Fish

All nets were deployed at this site. Four native species and two introduced were captured (**Table 3-29.2**). The size range of most species was variable but included small specimens of Bony bream, Yellowbelly and Carp.

■ **Table 3-29.2 Results of fishing Chinaman Creek in May 2008.**

Species	Common name	Gill	Seine	Fyke	Bait traps	Total Numbers caught
Macquaria ambigua	Yellowbelly	1		7		**8**
Nematolosa erebi	Bony Bream	11	6	12		**29**
Neosilurus hyrtlii	Hyrtl's tandan			1		**1**
Porochilus argenteus	Silver tandan			1		**1**
Cyprinus carpio	Carp	1	2			**3**
Gambusia holbrooki	Mosquitofish		64			**64**
Total Numbers		**13**	**72**	**21**	**0**	**106**

3.29.4 Macroinvertebrates

Surber samples were collected from both soft and firm silt. Sixteen taxa were recorded with copepods, chironomids and caenid mayflies most common (**Table 3-29.3**), though no taxa were abundant. Bait traps captured 3 *Macrobrachium.*

■ **Table 3-29.3 Macroinvertebrates captured at Chinaman Creek**

	Edge surber	
	Mean	Stddev
Oligochaeta	0.4	0.5
Acarina	0.2	0.4
Ancylidae	0.2	0.4
Ostracoda	0.6	0.5
Copepoda	25.2	26.6
Hydrophilidae	0.2	0.4
Chironominae	6.4	4.0
Orthocladiinae	4.4	2.1
Ceratopogonidae	4.8	3.6
Tabanidae	0.2	0.4
Baetidae	0.6	0.9
Caenidae	6.0	2.0
Corixidae	0.8	1.3
Gomphidae	0.2	0.4
Ecnomidae	0.2	0.4
Leptoceridae	0.2	0.4
Taxa	**8.2**	**2.2**
Abundance	**50.6**	**33.8**
Total taxa		**16**

3.30 Walla Lagoon

Maximum depth in the lagoon was less than 1m. Water was continuous in both directions (>300m total) and generally 60m wide. The waters edge was basically undisturbed with no evidence of grazing animals. The substrate was fine silt. A few small snags and piles of twigs and small branches / leaves and some tree roots provided the structural habitat.

3.30.1 Water Quality

Spot water quality data are shown in **Table 3-30.1**. The water column was well mixed and oxygenated with a warmer surface layer.

■ **Table 3-30.1 Spot water quality readings – Walla Lagoon in May 2008**

Sampling Time	Depth (m)	Temp. (^{o}C)	DO (% sat.)	Conductivity (µS/cm)	Turbidity	pH
1100	Surface	16.8	90	272	483	7.9
	0.5	13.6	70	272	555	7.7
	0.9	13.4	67	273	538	7.6

3.30.2 Macrophytes
No macrophytes were observed.

3.30.3 Fish
All nets were deployed. Five native species and two introduced were captured (**Table 3-30.2**). Many of the specimens across the species captured in fyke and seine nets were small.

■ **Table 3-30.2 Results of fishing Walla Lagoon in May 2008.**

Species	Common name	Gill	Seine	Fyke	Bait traps	Total Numbers caught
Macquaria ambigua	Yellowbelly			5		**5**
Nematolosa erebi	Bony Bream	2	4	30		**36**
Leiopotherapon unicolor	Spangled perch			15		**15**
Neosilurus hyrtlii	Hyrtl's tandan			1		**1**
Porochilus argenteus	Silver tandan			3		**3**
Cyprinus carpio	Carp		5	77	5	**87**
Gambusia holbrooki	Mosquitofish		16			**16**
Total Numbers		**2**	**25**	**131**	**5**	**163**

3.30.4 Macroinvertebrates
Surber samples were collected from firm silt with a soft surface coating. Sixteen discrete taxa were recorded with ceratopogonids, copepods and corixids the most common (**Table 3-30.3**). Ten *Cherax* was captured in a bait traps and *Macrobrachium* were also present in fyke nets.

■ **Table 3-30.3 Macroinvertebrates captured at Walla Lagoon**

	Edge surber	
	Mean	Stddev
Oligochaeta	0.6	0.9
Acarina	0.2	0.4
Ancylidae	0.2	0.4
Ostracoda	6.8	10.4
Copepoda	51.4	47.3
Cladocera	0.8	0.8
Dytiscidae	2.6	2.8
Coleoptera	0.2	0.4
Chironominae	7.0	4.0
Tanypodinae	5.0	4.2
Orthocladiinae	0.8	0.4
Chironomidae	3.4	5.5
Ceratopogonidae	84.2	71.4
Baetidae	1.6	1.5
Caenidae	1.6	1.5

Ephemeroptera	0.8	0.8
Notonectidae	0.2	0.4
Corixidae	13.0	10.0
Trichoptera	0.4	0.5
Taxa	**12.0**	**1.5**
Abundance	**180**	**46**
Total taxa		**16**

3.31 Woolerbilla Lagoon

The lagoon extended from beyond the fence line to over 100m downstream and was a maximum of 1.0m deep. Eucalypt litter (flowers leaves and twigs) was deposited around the edge but there was no substantial structural habitat in the water. Some pig, cattle and goat tracks were evident.

3.31.1 Water Quality

Spot surface water quality data were collected from this site (**Table 3-31.1**). The water column was well mixed, highly turbid and with relatively high pH.

- **Table 3-31.1 Spot water quality readings – Woolerbilla Lagoon in May 2008**

Sampling Time	Depth (m)	Temp. (^oC)	DO (% sat.)	Conductivity (µS/cm)	Turbidity	pH
1410	Surface	14.2	78	375	700	8.1
	0.5	13.8	73	375	678	8.1

Overnight logging of water quality parameters produced the following range of results:
Temperature: 13.2 – 18.0^{o}C
Dissolved oxygen: 72 - 112% sat;
pH: 8.2 – 8.4
Conductivity: 372 - 377µS/cm
Turbidity: 569 - 759 NTU.

Late in the afternoon the surface water became supersaturated with oxygen but this level rapidly declined in the evening.

3.31.2 Macrophytes

No macrophytes were observed.

3.31.2 Fish

All nets were set. Four native species and three introduced were captured (**Table 3-31.2**). While no very small Carp or Goldfish were recorded (smallest 101mm and 99mm respectively), several of the Yellowbelly, Spangled perch and Bony bream were. A long neck turtle was captured in a fyke net.

■ **Table 3-31.2 Results of fishing Woolerbilla Lagoon in May 2008.**

Species	Common name	Gill	Seine	Fyke	Bait traps	Total Numbers caught
Macquaria ambigua	Yellowbelly	1	1			2
Nematolosa erebi	Bony Bream	5	3	5		13
Leiopotherapon unicolor	Spangled Perch		2	5		7
Retropinna semoni	Smelt		1			1
Cyprinus carpio	Carp	2	1	13	54	70
Carrasius auratus	Goldfish			3		3
Gambusia holbrooki	Mosquitofish		8			8
Total Numbers		**8**	**16**	**26**	**54**	**104**

3.31.4 Macroinvertebrates

Surber samples were collected from soft silt with algae. Seventeen discrete taxa were collected with copepods, ceratopogonids, corixids and ostracods most common (**Table 3-31.3**). Two *Macrobrachium* and 11 *Cherax* were captured in bait traps.

■ **Table 3-31.3 Macroinvertebrates captured at Woolerbilla Lagoon**

	Edge surber	
	Mean	Stddev
Oligochaeta	0.2	0.4
Acarina	0.4	0.5
Ostracoda	23.8	43.6
Copepoda	265	155
Cladocera	54	67
Dytiscidae	12.4	17.9
Hydrophilidae	0.4	0.5
Chironominae	5.2	4.2
Tanypodinae	0.6	1.3
Orthocladiinae	2.4	2.1
Chironomidae	0.4	0.9
Ceratopogonidae	68	109
Ephydridae	0.2	0.4
Tabanidae	0.2	0.4
Baetidae	2.8	2.9
Caenidae	0.8	0.4
Ephemeroptera	0.2	0.4
Corixidae	50	31
Leptoceridae	1.2	1.3
Taxa	**11.2**	**0.8**
Abundance	**487**	**136**
Total taxa		**17**

3.32 Briarie Creek

Briarie Ck is rarely sampled because it does not hold water for long once flow ceases. It was last sampled in May 2004. This pool was isolated, about 15m wide and up to 30cm deep. The banks have a gradual slope and the riparian zone comprises eucalypt woodland with very sparse low trees and a very sparse grassy ground cover. The adjacent vegetation was coolibah tall open woodland and native grassland. Roly-poly was very common. Cattle and other animals had been accessing the waterhole. There were minor snags and debris piles in the water and coolibah roots above the water line.

3.32.1 Water Quality

Spot surface water quality data were collected from this site (**Table 3-32.1**). The data describes an isolated pool which is drying out.

- **Table 3-32.1 Spot water quality readings – Briarie Creek in May 2008**

Sampling Time	Depth (m)	Temp. (^{o}C)	DO (% sat.)	Conductivity (µS/cm)	Turbidity	pH
1015	Surface	19.2	104	390	612	8.8

3.32.2 Macrophytes

No macrophytes were observed.

3.32.3 Fish

No gill or fyke nets were set due to depth restrictions and 9 bait traps were used. Two native species and two introduced were captured (**Table 3-32.2**). Bony bream measures from 28mm to 105mm and the carp was 92mm.

- **Table 3-32.2 Results of fishing Briarie Creek in May 2008.**

Species	Common name	Gill	Seine	Fyke	Bait traps	Total Numbers caught
Nematolosa erebi	Bony Bream		9			9
Leiopotherapon unicolor	Spangled Perch				1	1
Cyprinus carpio	Carp		1			1
Gambusia holbrooki	Mosquitofish		93			93
Total Numbers		**NA**	**103**	**NA**	**1**	**104**

3.32.4 Macroinvertebrates

Surber samples were collected from soft silt. Eleven discrete taxa were collected with copepods strongly dominating but ceratopogonids, corixids and chironomids common (**Table 3-32.3**). Two *Macrobrachium* and 11 *Cherax* were captured in bait traps.

■ **Table 3-31.3 Macroinvertebrates captured at Briarie Creek**

	Edge surber	
	Mean	Stddev
Ostracoda	3.2	2.0
Copepoda	487	203
Cladocera	10.2	9.7
Parastacidae	0.2	0.4
Dytiscidae	11.4	9.1
Hydrophilidae	0.4	0.5
Chironominae	17.4	8.3
Tanypodinae	6.6	4.0
Chironomidae	0.2	0.4
Ceratopogonidae	26.4	22.5
Corixidae	19.6	11.1
Trichoptera	0.2	0.4
Taxa	**8.8**	**1.1**
Abundance	**583**	**225**
Total taxa		**11**

4. Discussion

4.1 Water quality

Table 4-1.1 summarises the results from all sites sampled in autumn 2008. 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 during times of the day that logged data is not recorded.

The water column was well mixed at most sites though a thin warmer surface layer with higher levels of dissolved oxygen was noted at some sites.

Turbidity was high at most sites, irrespective of whether they were riverine or floodplain.

Beardie Lagoon and Briaire Ck both show signs of drying out; high pH, supersaturation of oxygen in the late afternoon followed by oxygen depletion in the morning, and high conductivity.

Conductivity and pH tended to be higher in the lagoons, particularly those that had been isolated for longer.

■ **Table 4-1.1 Summary Water Quality Data for May 2008.**

	Temperature °C	Dissolved O_2 % sat	pH	Conductivity µS/cm	Turbidity NTU
Balonne-St George	18.3	85	7.5	158	569
Balonne-Mooramanna	15.8-20.5	78-98	7.5-7.7	171-174	306-365
Balonne at Whyenbah	16.5-19.0	71-79	7.4-7.5	168-169	336-409
Culgoa at Whyenbah	13.4-16	77-86	7.5-7.7	170-172	267-311
Culgoa at Cubbie	13.7-16.5	61-72	6.4-7.1	164-167	462-489
Culgoa at Woolerbilla	14.3	68	7.4	174	622
Culgoa at Balandool	14.4	64	7.6	183	510
Balonne Minor-Meigunyah	15	67	7.3	157	621
Balonne Minor-Trafalgar	16.3	59	7.2	155	519
Narran at Donegri	14.6	66	7.3	155	548
Narran at Clyde	17.8	99	7.5	152	966
Narran at Booligar	16.3	-	6.3	156	1085
Balandool on Cubbie	14.6	76	6.7	229	904
Balandool at Euraba	13.1	-	6.8	235	673
Bokhara at Kirrima	23	86	7.6	203	423
Bokhara at Koala	12.7-14.2	-	7.5-7.6	177-179	619-661
Warrego-Shannonvale	*Not sampled*				
Warrego-Tinnenburra	*Not sampled*				
Moonie at Nindigully	-	-	-	-	-
Moonie at Fenton	15.1-16.0	34-45	7.5-7.5	175-176	541-682
Beardie Lagoon	19	96	7.9	318	498
Lower Plains	14.5	70	7.4	180	1830
Whyenbah Lagoon	14.0-15.9	68-76	7.0-7.6	167-168	461-505
Police Lagoon	DRY	DRY	DRY	DRY	DRY
Belah Creek	13.6	64	7.4	190	648
Clyde Lagoon	15.6-20.6	40-113	7.7-7.9	192-197	661-745
Briairie Creek	19.2	104	8.8	390	
Pilgra U/S	14.5-18.0	73-90	7.6-7.8	219-221	665-762
Pilgra D/S	17.7	99	8.2	318	453
Chinaman Ck	18.2	79	7.3	166	589
Walla Lagoon	16.8	90	7.9	272	483
Woolerbilla Lagoon	14.3	68	7.4	174	622

Note: Ranges are from overnight logged data. Single data points are surface recordings from stratification data. River or floodplain systems are either shaded or unshaded. Lagoons are below the bold line. NA=Not Available.

4.2 Macrophytes

Macrophytes were very limited in their distribution and abundance. *Ludwidgia* was observed at 4 sites with a peak coverage of 5%. *Azolla* was seen at two sites only and with a peak abundance of 1%. The fringe of benthic filamentous green alga was not evident. *Juncus* was common though patchy and generally sparse.

4.3 Fish

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. Bold lines separate river sites from floodplain sites and native species from introduced. In a total catch of 2652 individuals, eleven native species and three introduced were recorded. Introduced fish comprised 23% of the catch.

■ **Table 4-3.1. Total abundance results from all sampling methods for each fish species captured at each site.**

	Common Name	Murray Cod	Silver Perch	Golden Perch	Spangled Perch	Australian Smelt	Western Carp Gudgeon	Murray River Rainbowfish	Bony Bream	Freshwater Catfish	Silver Tandan	Hyrtils Catfish	Carp	Goldfish	Gambusia
Site	**Scientific name**	*Maccullochella peelii*	*Bidyanus bidyanus*	*Macquaria ambigua*	*Leiptherapon unicolor*	*Retropinna semoni*	*Hypseleotris klunzingeri*	*Melanotaenia fluviatilis*	*Nematalosa erebi*	*Tandanus Tandanus*	*Porochilus argenteus*	*Neosilurus hyrtlii*	*Cyprinus carpio*	*Carassius auratus*	*Gambusia holbrooki*
Balonne @ St George				5		16			5						2
Balonne @ Mooramana				9		109	1	2							5
Balonne @ Whyenbah		1		8	1	678		3	7	1		1	3		3
Culgoa @ Whynebah				12		16			10				4		2
Culgoa @ Cubbie				6		5			13			1	5	1	3
Culgoa @ Woolerbilla			1	16		4			4			1	3		
Culgoa @ Balandool				28	2				24		2	82	22		3
Balonne Minor @ Meigunyah				7	1	144			11				17		
Balonne Minor @ Trafalgar				3		4			28				4	2	7
Narran @ Donegri				19	2	17	1		67	1		5	1	9	
Narran @ Clyde				13		3			14				11		2
Narran @ Booligar				11	12				29			10	3	2	
Bokhara @ Kirrama				2	4				5				1		1
Bokhara @ Koala				7	1	1			6				1		
Balandool @ Cubbie				9	3	5			6				4		
Balandool @ Euraba				2					6						8
Moonie @ Nindigully				6					25	2			2	1	
Moonie @ Fenton				13					77				2		2
Sum river sites		**1**	**1**	**176**	**26**	**1002**	**2**	**5**	**337**	**4**	**2**	**100**	**83**	**15**	**38**
Beardie's Lagoon					1				11		1		4		
Lower Plains					5				8		1		3	1	1
Whyenbah Lagoon				8	1	1			30				5		
Belah Ck				2	1				2				8		15
Pilgara U/S				7	1				21			1	38	1	16
Pilgara D/S				8	5				13			10	39		1
Chinaman Ck				8					29		1	1	3		64
Walla				5	15				36		3	1	87		16
Woolerbilla Lagoon				2	7	1			13				70	3	8
Brairy Ck					1				9				1		93
Clyde Lagoon				26	2				59		9	10	6	1	
SUM Lagoons		**0**	**0**	**66**	**63**	**2**	**0**	**0**	**231**	**0**	**15**	**23**	**264**	**6**	**214**
Grand Total		**1**	**1**	**242**	**65**	**1004**	**2**	**5**	**568**	**4**	**17**	**123**	**347**	**21**	**252**

Only 6 native species and 3 introduced were captured in floodplain waterbodies and introduced species comprised 55% of the catch at these sites. Small carp were particularly abundant at floodplain sites.

The number of native species recorded at river test sites varied between 2 and 8 and the number of introduced species varied from 1 to 3. The use of the different fishing nets varied somewhat among sites on this sampling occasion so direct comparisons are not always valid.

The most abundant species at test sites were Smelt, Bony bream and Yellowbelly. At floodplain sites the most abundant species were Carp, Bony bream and Goldfish. The very low catch of carp gudgeon was surprising.

An interesting feature of the data was the large number of very small Yellowbelly, Bony bream, carp and occasionally other species, presumably produced in response to the summer flow.

4.4 Macroinvertebrates

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

- **Table 4-4.1 Summary of macroinvertebrate data from May 2008**

	Taxa (surber)	Taxa (dip)	Taxa Total	Individuals (surber)
Balonne at St George	7.0 +/- 1.6		20	15 +/- 7
Balonne at Mooramanna	12.0 +/- 2.3		20	752 +/- 360
Balonne at Whyenbah	9.0 +/- 2.7		16	2016 +/- 791
Culgoa at Whyenbah	11.4 +/- 1.7		17	78 +/- 16
Culgoa at Cubbie	9.0 +/- 1.7		15	154 +/- 61
Culgoa at Woolerbilla	10.0 +/- 2.7		18	233 +/- 246
Culgoa at Balandool	10.0 +/- 2.0		14	341 +/- 143
Balonne Minor at Meigunyah	9.0 +/- 1.9		18	107 +/- 45
Balone Minor at Trafalgar	9.2 +/- 1.3		14	2391 +/- 1130
Narran at Donegri	8.2 +/- 3.0		17	94 +/- 60
Narran at Clyde	8.8 +/- 2.2		15	90 +/- 41
Narran at Booligar	14.2 +/- 3.3		22	170 +/- 73
Balandool on Cubbie	11.2 +/- 2.3		16	448 +/- 104
Balandool on Euraba	11.6 +/- 2.3		20	377 +/- 42
Bokhara at Kirrima	10.6 +/- 2.3		20	353 +/- 100
Bokhara at Koala	13.0 +/- 2.8		21	849 +/- 262
Moonie at Nindigully	8.6 +/- 1.7		18	14 8+/ -93
Moonie at Fenton	16.4 +/- 0.9		21	328 +/- 279
Beardie Lagoon	10.2 +/- 1.9		18	496 +/- 336
Lower Plains Lagoon	10.4 +/- 0.5		17	367 +/- 384
Whyenbah Lagoon	15.0 +/- 2.2		24	145 +/- 37
Belah Creek	10.0 +/- 0.7		15	214 +/- 48
Pilgra U/S	10.6 +/- 2.3		13	119 +/- 13
Pilgra D/S	14.8 +/- 1.8		18	284 +/- 185
Chinaman Ck	8.2 +/- 2.2		16	51 +/- 34
Walla Lagoon	12.0 +/- 1.9		15	181 +/- 46
Woolerbilla Lagoon	11.2 +/- 0.8		17	487 +/- 136
Clyde Lagoon	10.8 +/- 1.3		17	325 +/- 182
Briarie Ck	8.8 +/- 1.1		11	583 +/- 225

Note: Taxa total column shows the surber total then site total in brackets.

A trend observed in several earlier data sets wherein the number of taxa and / or the number of individuals per surber sample increased downstream within various rivers, is evident with respect to taxa in the Narran, Balandool, Bokhara and Moonie and with respect to abundance in the Balonne, Balonne Minor, Culgoa, Narran (within statistical confidence), Bokhara and Moonie. The consistency of this observation deserves attention.

The 145 surber samples and 10 dip net samples produced 182,229 individuals and 62 discrete taxa. The total number of taxa recorded from surber samples was 49 while from the dip nets it was 48. These statistics reverse the trend of decreasing diversity and abundance recorded in recent years of drought.

Floodplain sites and riverine sites showed similar diversity and abundance and each was highly variable between sites.

The most common taxa in surbers were copepods (67.1%), ceratopogonids, cladocera, ostrocods and corixids. These taxa provided 88.5% of the total catch. The most common taxa in dip nets were cladocerans, copepods, zygopteran, Chironominae and caenids. These taxa provided 88.3% of the total catch.

The number of *Macrobrachium* and *Cherax* recorded in bait traps was highly variable but both taxa were widespread, the former being captured at all but two sites and the latter at 20 of the 29 sites sampled.

4.5 Current Status

The summer flows of 2007-8 were the best in four years and reached most floodplain sites, many of which had been dry for 3 years. Those sites were rapidly colonised by macroinvertebrates and fish and significant breeding occurred both here and in the river, as evidenced by the size range of fish captured. Unfortunately this statement was also true of the introduced species with Carp and Gambusia capitalising on the available floodplain habitat.

The flows were still only at the upper end of the small flood range so did not reach some of the higher floodplain sites. The program to date, despite running for 9 years, has not included a major flood event. Interestingly though, there is no evidence of the weirs in the system acting as a blockage to fish movement as the species complement is relatively uniform, taking habitat differences into account. Clearly they can by-pass the weirs in relatively small flood events.

The solid and rapid recovery following this flow event is encouraging given the severity of the preceding drought years.

5. References

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