

1.	Introduction	4	
2.	Methods	6	
3.	Results	6	
3.1	Balonne River at St George		6
3.1.1	Water quality		6
3.1.2	Macrophytes		7
3.1.3	Fish		7
3.1.4	Macroinvertebrates		8
3.2	Balonne River at Mooramanna		9
3.2.1	Water quality		9
3.2.2	Macrophytes and algae		9
3.2.3	Fish		9
3.2.4	Macroinvertebrates		10
3.3	Balonne River at Whyenbah		10
3.3.1	Water quality		10
3.3.2	Macrophytes		11
3.3.3	Fish		11
3.3.4	Macroinvertebrates		12
3.4	Culgoa River at Whyenbah		13
3.4.1	Water quality		13
3.4.2	Macrophytes		13
3.4.3	Fish		13
3.4.4	Macroinvertebrates		14
3.5	Culgoa River at Cubbie		14
3.5.1	Water quality		15
3.5.2	Macrophytes		15
3.5.3	Fish		15
3.5.4	Macroinvertebrates		15
3.6	Culgoa River at Woolerbilla		16
3.6.1	Water quality		16
3.6.2	Macrophytes		17
3.6.3	Fish		17
3.6.4	Macroinvertebrates		17
3.7	Culgoa River at Balandool		18
3.7.1	Water quality		18
3.7.2	Macrophytes		19
3.7.3	Fish		19
3.7.4	Macroinvertebrates		19
3.8	Balonne Minor River at Meigunyah		20
3.8.1	Water quality		20
3.8.2	Macrophytes		21
3.8.3	Fish		21
3.8.4	Macroinvertebrates		21
3.9	Balonne Minor at Trafalgar		22
3.9.1	Water quality		22
3.9.2	Macrophytes		23
3.9.3	Fish		23
3.9.4	Macroinvertebrates		23
3.10	Donegri Ck (Narran River) at Dirranbandi		24
3.10.1	Water quality		24
3.10.2	Macrophytes		25

3.10.3 Fish	25
3.10.4 Macroinvertebrates	25
3.11 Narran River at Clyde	26
3.11.1 Water quality	26
3.11.2 Macrophytes	27
3.11.3 Fish	27
3.11.4 Macroinvertebrates	27
3.12 Narran River at Booligar	28
3.12.1 Water quality	28
3.12.2 Macrophytes	29
3.12.3 Fish	29
3.12.4 Macroinvertebrates	29
3.13 Balandool River at Cubbie	30
3.13.1 Water quality	30
3.13.2 Macrophytes and algae	31
3.13.3 Fish	31
3.13.4 Macroinvertebrates	31
3.14 Balandool River at Euraba	32
3.15 Bokhara River at Kirrima	32
3.15.1 Water quality	32
3.15.2 Macrophytes	33
3.15.3 Fish	33
3.15.4 Macroinvertebrates	33
3.16 Bokhara River at Koala	34
3.16.1 Water quality	35
3.16.2 Macrophytes	35
3.16.3 Fish	35
3.16.4 Macroinvertebrates	36
3.17 Warrego River at Shannonvale	37
3.17.1 Water quality	38
3.17.2 Macrophytes	38
3.17.3 Fish	38
3.17.4 Macroinvertebrates	39
3.18 Warrego River at Tinnenburra	39
3.18.1 Water quality	39
3.18.2 Macrophytes	39
3.18.3 Fish	39
3.18.4 Macroinvertebrates	40
3.19 Moonie River at Nindigully	40
3.19.1 Water quality	40
3.19.2 Macrophytes	40
3.19.3 Fish	40
3.19.4 Macroinvertebrates	41
3.20 Moonie River at Fenton	42
3.20.1 Water Quality	42
3.20.2 Macrophytes	43
3.20.3 Fish	43
3.20.4 Macroinvertebrates	43
3.21 Police Lagoon	45
3.21.1 Water Quality	45

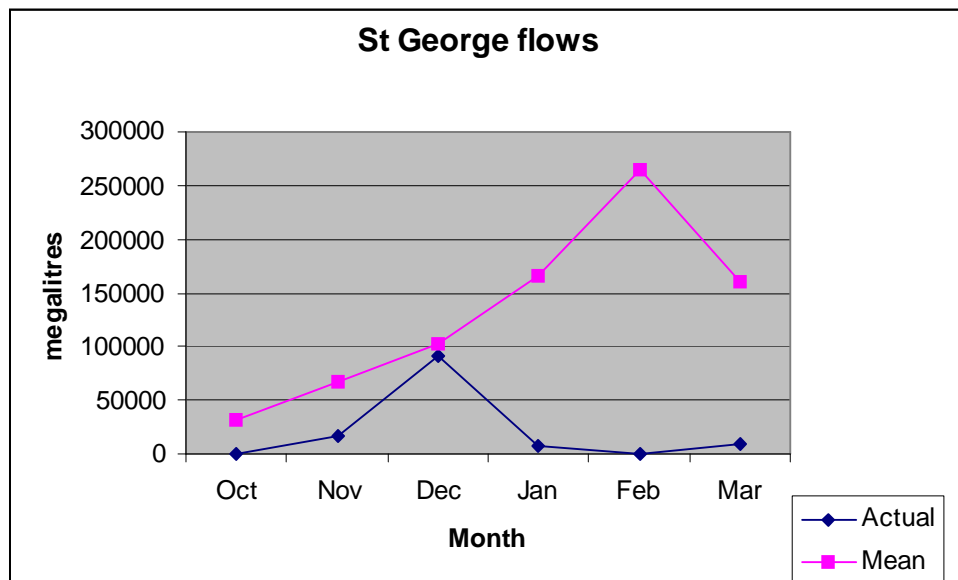
3.21.2 Macrophytes	45
3.21.3 Fish	45
3.21.4 Macroinvertebrates	45
3.22 Belah Waterhole	46
3.22.1 Water Quality	47
3.22.2 Macrophytes	47
3.22.3 Fish	47
3.22.4 Macroinvertebrates	48
3.23 Clyde Lagoon	48
3.23.1 Water Quality	48
3.23.2 Macrophytes	49
3.23.3 Fish	49
3.23.4 Macroinvertebrates	50
3.24 Chinaman Creek	52
3.24.1 Water Quality	52
3.24.2 Macrophytes	52
3.24.3 Fish	52
3.24.4 Macroinvertebrates	53
4. Discussion	54
4.1 Water quality	54
4.2 Macrophytes	55
4.3 Fish	55
4.4 Macroinvertebrates	57
4.5 Current Status	58
5. References	59

1. Introduction

This report represents the tenth since June 2000 recording the results of monitoring events sponsored by Smartrivers in the Lower Balonne.

Between November 2005 and the time of sampling in March / April 2006, the area had received poor summer flows (Figure 1.1) and a compensation flow. The flow deficit for the six-month period was 680,000ML. The natural flows in December were sufficient to reach all riverine sites in the Lower Balonne but the compensation flows in March did not reach those below the third bifurcation weir on the Balandool River because a log blocked that weir (Plate 1). Some of the floodplain sites with low commence-to-flow levels were also reached (Chinaman Ck and Narran at Clyde) but it appeared that Belah Waterhole, which is normally reached by such flows, missed out.

■ **Figure 1.1 Flows at St George from October 2005 compared to long term mean**



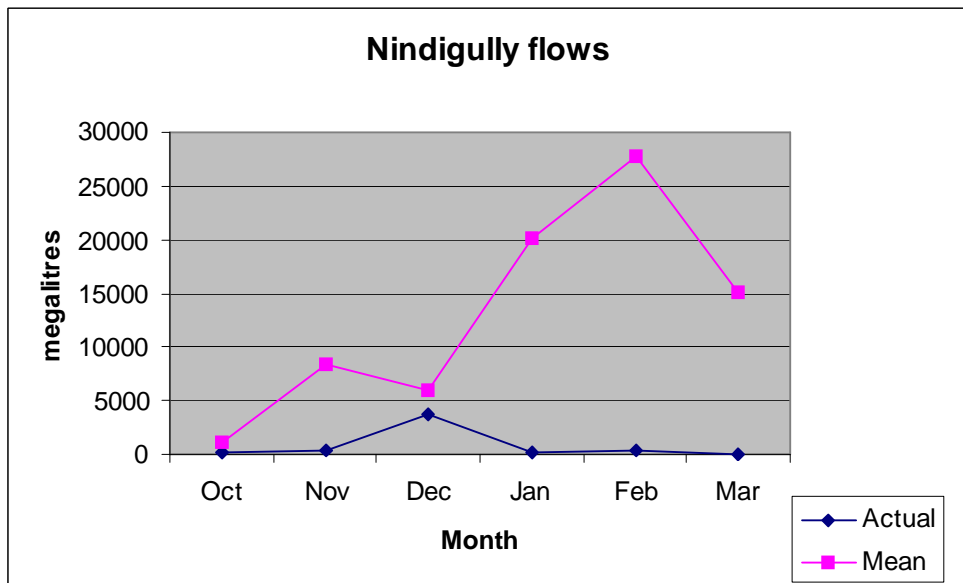
A compensation flow was released from Jack Taylor Weir just prior to sampling in March. The flow prevented macroinvertebrate sampling from being undertaken coincident with other sampling at river sites. Lagoon sites were largely unaffected by the flows so were sampled at the time. Macroinvertebrate sampling from river sites took place between May 10 and 12.

According to flow data received in early May 2006, the Warrego River did not flow at Cunnamulla between sampling events, though water was discharging from the low flow pipe at the time of sampling in late March. As a result, no macroinvertebrate samples were collected from Shannonvale or Tinnenburra. Flow was almost continuous at Fenton from mid-October to late February and while Nindigully showed similar results, it did not carry the same volume and ceased to flow for longer periods (Figure 1.2).

Plate 1. Log blocking the Balandool River at the third bifurcation weir



■ **Figure 1.2 Flows at Nindigully from October 2005 compared to long term mean flows**



2. Methods

Nineteen riverine and four floodplain sites were sampled in early late March / early April 2006. Most macroinvertebrate samples were collected in early May. 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 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. The dissolved oxygen probe commenced to give unreliable results and could not be recalibrated after a few days sampling. During logging the meter would suddenly revert to what appeared to be correct readings but then would just as suddenly produce clearly erroneous results.

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 usually a good cover of grass and trees. This was particularly the case on this occasion. The substrate is mainly deep silt with large outcroppings of conglomerate rock. The river is approximately 60m wide and contains a significant number of large snags, particularly near the gauge. Water level was just above baseflow as some of the *Juncus* was partly inundated. The compensation flow had recently ceased.

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, as would be expected following a flow release from Jack Taylor Weir. Temperature showed surprising variation with a clearly warmer surface layer. Conductivity was lower than May 2005 (cf 125-147 $\mu\text{S}/\text{cm}$) when the river was not flowing.

■ **Table 3-1.1 Water quality depth profiling at St George on March 31, 2006.**

Sample Time	Depth (m)	Temp (°C)	Dissolved Oxygen (%sat)	Conductivity (µS/cm)	Turbidity (NTU)	pH
1630	Surface	25.8		86	600	6.9
	0.5	25.4		86	600	6.9
	1.0	24.9		87	600	6.8
	2.0	24.3		88	600	6.7
	3.0	24.0		89	600	6.7

Overnight logging of water quality parameters was undertaken and only minor variation was evident except for dissolved oxygen and these values should be treated with caution. The recorded ranges for each parameter were:

Temperature: 24.3 – 25.0°C

Dissolved oxygen: 60 - 94% sat, 5.0 – 7.8mg/l

pH: 6.8 – 6.9

Conductivity: 87 - 90µS/cm

Turbidity: >600NTU.

3.1.2 Macrophytes

Persicaria grew strongly around the snags just downstream of the gauge (this patch has always been present) and had spread as four discrete patches towards the rocky area. Filamentous green alga was not evident while the water was flowing in late March but had re-grown significantly when sampled in early May. *Juncus* was sparsely distributed.

3.1.3 Fish

All nets were set at this site. **Table 3-1.2** shows the catch by netting technique. Four native species and two introduced were captured. The catch is in line with historical catches at this site though the lack of fish in the gill nets is unusual. The seine haul was restricted due to the steeply sloping bed, as was the width to which fyke net wings could be opened. While Yellowbelly in the fyke and seine nets ranged from 35 to 60mm in length, the carp in the fyke ranged from 196 to 412mm.

■ **Table 3-1.2 Results of fishing at St George in March 2006, by fishing method**

Species	Common name	Gill	Seine	Fyke	Bait	Total Numbers caught
<i>Macquaria ambigua</i>	Yellowbelly	1	3	3	1	8
<i>Nematolosa erebi</i>	Bony Bream		57	1		58
<i>Melanotaenia fluviatilis</i>	Rainbowfish		1			1
<i>Hypseleotris klunzingeri</i>	Carp Gudgeon		3		1	4
<i>Cyprinus carpio</i>	Carp	1		4		5
<i>Gambusia holbrooki</i>	Mosquitofish		1			1
Total Numbers		2	65	8	2	77

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

3.1.4 Macroinvertebrates

Two habitats were sampled at St George. Surber samples were collected from base rock or from silt with a covering of roots. This was undertaken approximately 6 weeks after flow ceased and the site had returned to baseflow water levels. A dip net sample was collected from *Persicaria*. A total of 20 discrete (non-overlapping) taxa were identified, 15 from the surbers and 12 from the dip net (**Table 3-1.3**). Four of the twelve taxa captured in the dip net were not found in the surber samples while 7 of the taxa found in the surbers were not found in the dip net. The surber fauna was dominated by ceratopogonids and chironominae while Chironominae, copepods and Palaeomonidae were particularly common in the dip net. Bait traps also collected 58 *Macrobrachium* (Palaeomonidae, prawns).

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

	Edge surber		Macrophyte dip
	Mean	Stddev	
Nematoda	2.0	2.0	
Oligochaeta	2.8	2.3	
Cirolanidae	0.4	0.9	8
Cladocera	2.8	3.3	
Copepoda	8.4	2.6	52
Ostracoda	1.6	1.7	2
Atyidae	0.4	0.9	18
Palaeomonidae	2.4	2.6	34
Dytiscidae			2
Hydrophilidae			2
Ceratopogonidae	66.4	41.2	24
Chironominae	101.6	55.5	68
Orthocladinae			
Tanypodinae	12.4	6.8	2
Baetidae			2
Caenidae	2.8	4.1	
Corixidae	8.0	9.7	
Hydrometridae			2
Gomphidae	1.2	1.8	
Leptoceridae	0.4	0.9	
Taxa	9.6	1.7	12
Abundance	213.6	65.0	216
Total taxa		15	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 is approximately 50m wide and of trapezoidal shape with parallel benches. The bed substrate is largely sand and the banks are mainly black clay. The compensation flow had largely passed this site such that water levels were close to base flow levels and there was evidence of recent recession of water levels through about 1m. Maximum depth possibly reached 2m on the western edge. Several scattered tea tree seedlings to 2m in height grew in the water on the sand bars. The track into the site had been recently graded such that the erosion had been filled in. No drainage or flow diversion whoa buoys were used so it is expected that the track will simply erode and re-form the gully.

3.2.1 Water quality

Results from spot water quality profiling are shown in **Table 3-2.1**. The water column was well mixed though temperature decreased slightly with depth.

■ **Table 3-2.1 Water quality depth profiling at Mooramanna on 28 March 2006.**

Sample Time	Depth (m)	Temp (°C)	Dissolved Oxygen (%sat)	Conductivity (µS/cm)	Turbidity (NTU)	pH
1400	Surface	26.7	NA	93	>600	6.8
	0.5	25.7		90	>600	6.7
	1.0	24.8		90	>600	6.7

3.2.2 Macrophytes and algae

Rice sedge and some *Juncus* sp. were present on the edge. The fringe of benthic filamentous green algae was not noted and was probably submerged by the recent flow.

3.2.3 Fish

Table 3-2.2 shows the fish catch by netting technique. All nets were set at this site. Five native fish species and one introduced were recorded. Yellowbelly were recorded from 34mm to 340mm in length.

■ **Table 3-2.2 Fish catch by fishing technique at Mooramanna in April 2006.**

Species	Common name	Gill	Seine	Fyke	Bait	Total Numbers caught
<i>Macquaria ambigua</i>	Yellowbelly	2	3	4	1	10
<i>Nematolosa erebi</i>	Bony Bream	1	37	1		39
<i>Hypseleotris klunzingeri</i>	Carp Gudgeon		8*	1		9
<i>Melanotaenia fluviatilis</i>	Rainbowfish		7			7
<i>Retropinna semoni</i>	Smelt		24			24
<i>Gambusia holbrooki</i>	Mosquitofish		7			7
Total Numbers		3	86	6	1	96

* includes one *Hypseleotris* sp 4.

3.2.4 Macroinvertebrates

Surber samples were collected on 28 March from sand (2) and silt substrate (3). The material may have been recently inundated by the compensation flow. Twelve discrete taxa were recorded at the site with all taxa showing very low abundance with ceratopogonids the only exception (**Table 3-2.3**). Bait traps collected 85 *Macrobrachium*.

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

	Edge surber	
	Mean	Stddev
Nematoda	1.0	2.2
Oligochaeta	3.0	4.5
Cladocera	0.2	0.4
Copepoda	1.0	1.2
Ostracoda	0.4	0.9
Palaeomonidae	0.4	0.5
Ceratopogonidae	32.6	15.3
Chironominae	6.0	5.8
Tanypodinae	9.2	6.0
Caenidae	2.4	3.6
Corixidae	1.8	2.0
Gomphidae	0.8	0.8
Taxa	7.2	1.8
Abundance	58.8	19.8
Total taxa		12

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. The compensation flow had just ceased but the sand bar near the camping area was fully submerged. Grass cover on the eastern bank was excellent and there was no evidence of recent grazing by cattle. The access to the water for boats had been recently graded including a turning area that reached the very edge of the channel. No drainage was provided. Re-growth of gum and tea-tree seedlings was continuing with little apparent loss. There was no evidence of recent grazing or access by feral animals.

3.3.1 Water quality

Overnight logging was undertaken at this site. Little variation was evident. The recorded ranges for each parameter were:

Temperature: 23.3 – 24.8°C

Dissolved oxygen: NA

pH: 6.7 – 6.9

Conductivity: 91 - 93µS/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 on 28 March 2006.**

Sample Time	Depth (m)	Temp (°C)	Dissolved Oxygen (%sat)	Conductivity (µS/cm)	Turbidity (NTU)	pH
0945	Surface	26.2	NA	94	>600	6.9
	0.5	24.1		91	>600	6.7
	1.0	23.5		92	>600	6.6
	1.5	23.4		92	>600	6.7

3.3.2 Macrophytes

Ludwigia and *Juncus*, occurred in patches but the large patch of *Ludwigia* noted in November 2005 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**. Five native species and two introduced were captured. Eight native species had been captured in November, including a single Murray Cod (at 25mm length), single *Tandanus tandanus* and 23 Hyrtls Tandans. and Only one Yellowbelly on this occasion was longer than 46mm (being 152mm).

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

Species	Common name	Gill	Seine	Fyke	Bait	Total Numbers caught
<i>Macquaria ambigua</i>	Yellowbelly		3	8	1	12
<i>Nematolosa erebi</i>	Bony Bream		31	3		34
<i>Hypseleotris klunzingeri</i>	Carp Gudgeon		16			16
<i>Melanotaenia fluviatilis</i>	Rainbowfish		8			8
<i>Retropinna semoni</i>	Smelt		17			17
<i>Cyprinus carpio</i>	Carp	1				1
<i>Gambusia holbrooki</i>	Mosquitofish		19			19
Total Numbers		1	94	11	1	107

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

3.3.4 Macroinvertebrates

Surber samples were collected on 28 March from sand or silt and some samples included leaf litter. A dip net sample was collected from *Ludwigia*. Twenty-six discrete taxa were identified. Chironominae and Ceratopogonidae were the most common taxa in surber samples while chironomids and baetid mayflies were most common in the dip net (**Table 3-3.2**). One hundred and fifteen prawns were captured in bait traps and they were common in the seine haul.

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

	Edge surber		Macrophyte dip
	Mean	Stddev	
Nematoda	0.4	0.9	
Oligochaeta			1
Physidae			1
Cirolanidae			1
Copepoda	0.4	0.5	2
Ostracoda	0.6	0.3	8
Atyidae	0.2	0.4	4
Palaeomonidae	1.6	1.8	6
Dytiscidae	0.2	0.4	
Gyrinidae			1
Hydrophilidae	0.2	0.4	5
Ceratopogonidae	42.6	18.8	5
Chironominae	51.2	27.7	89
Orthoclaadiinae			15
Tanypodinae	3.0	0.7	17
Baetidae	0.4	0.5	25
Caenidae	3.2	2.6	
Corixidae	1.2	2.7	
Gerridae			6
Mesoveliidae			7
Notonectidae			1
Pleidae			1
Veliidae			9
Pyralidae			3
Gomphidae	0.4	0.5	
Zygoptera			4
Taxa	6.8	1.3	22
Abundance	105.4	31.6	212
Total taxa		14	

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. The compensation flow caused the river to flow sluggishly and the full width of the baseflow channel was covered, at times to over 1.5m in depth. There was evidence of recent grazing, including of sedges well above the waterline. The vegetation on the plains to the west of the site was dominated by roly-poly and lignum in poor health. Recently germinated Noogurra burr was common, particularly near the bridge. The site could only be accessed from the western side so the boat could not be used.

3.4.1 Water quality

Water quality was measured on the western side opposite the large red gum. Results from spot water quality profiling are shown in **Table 3.4.1**. Dissolved oxygen is not reported as it was thought unreliable (e.g. supersaturated at 1m depth). Conductivity was significantly reduced compared to the result from May 2005 (320µS/cm).

■ **Table 3-4.1 Water quality profiling, Culgoa River at Whyenbah, March 27 2006.**

Sample Time	Depth (m)	Temp. (°C)	Dissolved Oxygen (%sat)	Conductivity (µS/cm)	Turbidity (NTU)	pH
1100	Surface	24.5		93	>600	6.7
	1.0	24.4		93	>600	6.8

3.4.2 Macrophytes

No macrophytes or algae were noted.

3.4.3 Fish

Six native fish species and two introduced were recorded (**Table 3-4.2**). The catch from November had included one Murray Cod, one Silver Perch, two Goldfish and 69 Smelt but had not included Spangled perch, *Tandanus* or Hyrtl's tandan. Yellowbelly ranged between 35mm and 257mm in length, *N. hyrtlii* from 100mm to 253mm and Bony bream from 30mm to 102mm.

■ **Table 3-4.2 Results of fishing the Culgoa River at Whyenbah in March 2006, by fishing method**

Species	Common name	Gill	Seine	Fyke	Bait	Total Numbers caught
<i>Macquaria ambigua</i>	Yellowbelly		2	7		9
<i>Leiopotherapon unicolor</i>	Spangled perch			2		2
<i>Nematolosa erebi</i>	Bony Bream		21	15		36
<i>Hypseleotris klunzingeri</i>	Carp Gudgeon		4			4
<i>Tandanus tandanus</i>	Eeltail catfish			1		1
<i>Neosilurus hyrtlii</i>	Hyrtl's tandan			10		10
<i>Cyprinus carpio</i>	Carp	3		6		9
<i>Gambusia holbrooki</i>	Mosquitofish		5			5
Total Numbers		3	32	41	0	76

3.4.4 Macroinvertebrates

Surber samples were collected on May 10 from fine clay with little silt and no algae. Sixteen discrete taxa were recorded at the site with copepods and ceratopogonids dominating (**Table 3-4.3**). Bait traps captured 17 prawns.

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

	Edge surber	
	Mean	Stddev
Acarina	0.4	0.9
Nematoda	0.8	0.1
Oligochaeta	5.2	3.0
Spaeriidae	0.4	0.9
Ancylidae	0.4	0.9
Cladocera	1.2	1.8
Copepoda	79.2	81.6
Ostracoda	2.0	2.4
Atyidae	0.4	0.9
Palaeomonidae	3.2	3.0
Ceratopogonidae	60.8	20.3
Chironominae	14.8	13.1
Tanypodinae	2.4	2.6
Caenidae	7.6	5.5
Corixidae	5.2	6.3
Leptoceridae	0.4	0.9
Taxa	9.0	2.0
Abundance	184.4	112.9
Total taxa		16

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. Goats or kangaroos, presumably, had grazed this grass. 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 river was flowing when sampled and had been about 0.6m higher. The deepest part near the main snags probably reached about 3m but more commonly the depth peaked at less than 1.2m. The river varied from 10-25m wide but was more usually at the lower end of that range.

No tracks or disturbances of the edge were observed but goat droppings were very common and some were being removed by truck from a nearby paddock at the time of sampling.

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, pH and temperature were noticeably lower than in November.

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

Sample Time	Depth (m)	Temp (°C)	Dissolved Oxygen (%sat)	Conductivity (µS/cm)	Turbidity (NTU)	pH
1330	Surface	22.7	NA	94	>600	6.2
	1.0	20.5		95	>600	6.1

3.5.2 Macrophytes

No macrophytes, fringing aquatic plants or filamentous algae were observed.

3.5.3 Fish

All nets were set at this site. Seven native fish species and two introduced were identified in a catch of 79 individuals (**Table 3-5.2**). Only three native species had been recorded in November 2005 but Bony bream, Rainbowfish and Mosquitofish were recorded in May 2005. Four native species were each represented by single individuals on this occasion. Large Yellowbelly were again common and the smallest was 154mm. The Murray Cod measured 437mm. Bony bream as small as 47mm were recorded though many were between 100mm and 163mm.

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

Species	Common name	Gill	Seine	Fyke	Bait	Total Numbers caught
<i>Maccullochella peelii</i>	Murray cod	1				1
<i>Macquaria ambigua</i>	Yellowbelly	9		3		12
<i>Leiopotherapon unicolor</i>	Spangled perch			1		1
<i>Nematolosa erebi</i>	Bony Bream	1	11	32		44
<i>Melanotaenia fluviatilis</i>	Rainbowfish		1			1
<i>Retropinna semoni</i>	Smelt		11			11
<i>Neosilurus hyrtlilii</i>	Hyrtl's tandan			1		1
<i>Cyprinus carpio</i>	Carp	4		1		5
<i>Gambusia holbrooki</i>	Mosquitofish		3			3
Total Numbers		15	26	38	0	79

One broad-shelled tortoise and one long-necked tortoise were captured in fyke nets.

3.5.4 Macroinvertebrates

Surber samples were collected on 10 May from compact clay with some surface silt and leaf litter. No dip net samples were collected. Fourteen taxa were identified from

the edge habitat (**Table 3-5.3**). The most common elements were copepods, ceratopogonids and chironomids. Bait traps collected 52 *Macrobrachium* and 2 *Cherax*.

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

	Edge surber	
	Mean	Stdev
Nematoda	2.0	2.4
Oligochaeta	5.2	4.4
Ancylidae	0.4	0.9
Cladocera	1.2	1.8
Copepoda	139.6	105.2
Ostracoda	2.4	2.6
Palaeomonidae	2.0	1.4
Ceratopogonidae	84.4	31.7
Chironominae	28.8	28.0
Tanypodinae	4.8	3.0
Caenidae	8.0	11.8
Corixidae	3.6	5.4
Gerridae	0.4	0.9
Leptoceridae	1.6	1.7
Taxa	9.2	2.7
Abundance	284.4	106.3
Total taxa		14

3.6 Culgoa River at Woolerbilla

This site is on a straight stretch of river and has a uniform trapezoidal bed and banks. Some grass has shot on the sloping banks and this is unusual here. The river was flowing when sampled and reached a depth of about 2m though most was less than 1m. The channel was up to 25m wide. Fringing benthic alga was not observed. A red gum on the western bank that had been shattered by lightning and partly burnt in spring had re-shot. The surrounding countryside was very barren whereas that between Dirranbandi and Hebel carried more grass, apparently the result of passing storms in summer.

3.6.1 Water quality

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

■ **Table 3-6.1 Water quality depth profiling at Woolerbilla in April 2006.**

Sample Time	Depth (m)	Temp (°C)	Dissolved Oxygen (%sat)	Conductivity (µS/cm)	Turbidity (NTU)	pH
1230	Surface	25.7	NA	110	>600	6.7
	1.0	23.5		112	>600	6.6

3.6.2 Macrophytes

No macrophytes or fringing aquatic plants were noted.

3.6.3 Fish

All nets were set at this site. Four native fish species plus two introduced were captured (**Table 3-6.2**). A catch of low diversity and abundance is common at this site. The gill net catch tended to be of relatively large fish (e.g. Yellowbelly between 412 and 462mm) while the seine captured Yellowbelly between 36 and 58mm in length.

■ **Table 3-6.2 Results of fishing the Culgoa River at Woolerbilla in April 2006, by fishing method**

Species	Common name	Gill	Seine	Fyke	Bait	Total Numbers caught
<i>Macquaria ambigua</i>	Yellowbelly	4	5	2		11
<i>Nematolosa erebi</i>	Bony Bream	7	11			18
<i>Retropinna semoni</i>	Smelt		7			7
<i>Neosilurus hyrtlilii</i>	Hyrtl's tandan			5		5
<i>Cyprinus carpio</i>	Carp	1	1			2
<i>Gambusia holbrooki</i>	Mosquitofish		7			7
Total Numbers		12	31	7	0	50

A broad-shelled tortoise was captured in a fyke net.

3.6.4 Macroinvertebrates

No specialised habitats were available for sampling. Surber samples were collected on May 11 from compact or soft clay, often with some eucalypt litter but no algae. Fourteen taxa were identified with copepods, ceratopogonids and chironominae the most common (**Table 3-6.3**). NB MANY FEWER TAXA THAN LAST TIME. Seventy-three prawns and 3 yabbies were captured in bait traps.

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

	Edge surber	
	Mean	Stddev
Nematoda	1.2	2.7
Oligochaeta	3.6	1.7
Cladocera	9.6	6.7
Copepoda	73.2	23.3
Ostracoda	6.4	3.6
Atyidae	0.4	0.9
Palaeomonidae	2.4	1.7
Ceratopogonidae	61.6	42.4
Chironominae	28.8	13.5
Tanypodinae	2.4	2.6
Baetidae	0.8	1.1
Caenidae	11.2	5.4
Corixidae	11.6	10.1
Leptoceridae	0.8	1.1
Taxa	10.4	1.3
Abundance	214.0	25.6
Total taxa		14

3.7 Culgoa River at Balandool

The river was flowing at this site. Maximum depth was about 2.0m and the channel width reached 20m. This appeared to be the peak water level for this event. All but the steepest banks have more grass than is seen at Woolerbilla. *Juncus versitatus* had browned off and gone to seed. Most snags were in the water but tea tree roots were still largely above the water level. There was no evidence of grazing animals and limited evidence of pig activity. A backwater just above the downstream pool contained water separated from the flowing channel and this water was black.

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 profiling at Culgoa River at Balandool in April 2006.**

Sample Time	Depth (m)	Temp (°C)	Dissolved Oxygen (%sat)	Conductivity (µS/cm)	Turbidity (NTU)	pH
1430	Surface	24.5	NA	115	>600	6.6
	1.0	24.4		115	>600	6.5

Overnight logging was undertaken at this site. Little variation was evident. The recorded ranges for each parameter were:

Temperature: 22.4 – 24.3°C

Dissolved oxygen: NA

pH: 6.5 – 6.6

Conductivity: 116 - 119µS/cm

Turbidity: >600NTU.

3.7.2 Macrophytes

No algal fringe was noted but *Juncus* was common in patches.

3.7.3 Fish

All nets were set at this site. Four native fish species and three introduced were recorded (**Table 3-7.2**). Smelt had been captured in November 2005. Yellowbelly in the fyke and seine nets were between 29 and 44mm while no Bony bream were less than 85mm.

■ **Table 3-7.2 Results of fishing the Culgoa River at Balandool in March 2006, by fishing method**

Species	Common name	Gill	Seine (2)	Fyke	Bait	Total Numbers caught
<i>Macquaria ambigua</i>	Yellowbelly	2	5	4		11
<i>Leiopotherapon unicolor</i>	Spangled perch			1		1
<i>Nematolosa erebi</i>	Bony Bream	1	4			5
<i>Neosilurus hyrtlilii</i>	Hyrtl's tandan			5		5
<i>Cyprinus carpio</i>	Carp	1		3		4
<i>Carrasius auratus</i>	Goldfish		4	1		5
<i>Gambusia holbrooki</i>	Mosquitofish		36			36
Total Numbers		4	49	14	0	67

Two long-necked tortoises were captured in a fyke net.

3.7.4 Macroinvertebrates

Surber samples were collected on 11 May from compact and soft clay with at times significant amounts of tea tree litter but no algae. Fifteen taxa were recorded (**Table 3-7.3**). Copepods were the most common element. Twelve *Macrobrachium* and 12 *Cherax* were collected in bait traps and *Cherax* of a range of sizes were common in the seine hauls and fyke nets.

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

	Edge surber	
	Mean	Stddev
Acarina	0.4	0.9
Nematoda	1.6	0.9
Oligochaeta	2.4	2.6
Ancylidae	0.4	0.9
Cladocera	14.0	8.6
Copepoda	48.8	18.0
Ostracoda	8.4	8.2
Ceratopogonidae	90.4	27.0
Chironominae	12.8	6.3
Tanypodinae	8.4	4.6
Tipulidae	0.8	1.1
Caenidae	0.4	0.9
Corixidae	12.8	10.6
Anisoptera	0.8	1.8
Leptoceridae	1.2	1.1
Taxa	10.2	1.5
Abundance	203.6	56.0
Total taxa		15.0

3.8 Balonne Minor River at Meigunyah

This site was not sampled in November 2005 due to lack of access. On this occasion the riffle at the lower end was flowing though the water level dropped about 10cm overnight as the river stopped flowing. This left only about 5cm depth in the riffle. Generally the water level was higher than on most recent sampling occasions such that maximum depth exceeded 2m. All major snags were submerged or largely submerged.

3.8.1 Water quality

■ **Table 3-8.1 Water quality profiling, Balonne Minor at Meigunyah, 27 March 2006.**

Sample Time	Depth (m)	Temp (°C)	Dissolved Oxygen (%sat)	Conductivity (µS/cm)	Turbidity (NTU)	pH
1520	Surface	27.1	106	93	>600	6.9
	0.5	23.3	105	90	>600	6.6
	1.0	23.2	102	90	>600	6.5
	2.0	23.1	95	90	>600	6.6

Overnight logging was undertaken at this site. Little variation was evident. Conductivity and pH were noticeably lower than in May 2005. The recorded ranges for each parameter were:

Temperature: 23.0 – 23.3°C
 Dissolved oxygen: 63 - 92% sat; 5.4 – 7.9mg/l
 pH: 6.7 – 6.9
 Conductivity: 85 - 90µS/cm
 Turbidity: >600NTU.

3.8.2 Macrophytes

No macrophytes were observed. Fringing benthic algal growth was not observed but there was a slight surface scum.

3.8.3 Fish

One fyke net could not be set due to the water depth. Six native fish species and one introduced were captured (**Table 3-8.1**). When last sampled in May 2005 single Silver Perch and Rainbowfish were also captured but the total catch was much lower (122). Yellowbelly in the seine and fyke nets ranged from 25mm to 83mm while that in the gill net was 414mm. The largest Bony bream was only 125mm while the Hyrtl's tandan ranged from 76mm to 224mm.

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

Species	Common name	Gill	Seine	Fyke (1)	Bait	Total Numbers
<i>Macquaria ambigua</i>	Yellowbelly	1	4	1		6
<i>Leiopotherapon unicolor</i>	Spangled perch		2	4		6
<i>Nematolosa erebi</i>	Bony Bream		120	25		145
<i>Hypseleotris klunzingeri</i>	Carp Gudgeon		31			31
<i>Retropinna semoni</i>	Smelt		51			51
<i>Neosilurus hyrtl</i>	Hyrtl's tandan			107		107
<i>Cyprinus carpio</i>	Carp	12	1		1	14
Total Numbers		13	209	137	1	360

Two broad-shelled tortoises were captured in the fyke net.

3.8.4 Macroinvertebrates

Three surber samples were collected from sand / gravel and two from silt. There was little or no algae. Thirteen taxa were recorded with ceratopogonids, copepods and chironominae most common. One hundred and eight prawns and 5 yabbies were captured in bait traps while large numbers of prawns and several very small yabbies were captured in the seine haul.

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

	Edge surber	
	Mean	Stddev
Oligochaeta	3.2	2.7
Sphaeriidae	2.4	2.6
Cladocera	0.8	1.8
Copepoda	82.4	100.9
Ostracoda	2.8	2.3
Cirolanidae	0.4	0.9
Palaeomonidae	1.6	1.7
Ceratopogonidae	104.8	105.9
Chironominae	45.6	14.6
Tanypodinae	6.4	5.7
Caenidae	4.4	3.0
Corixidae	9.2	13.1
Leptoceridae	0.4	0.9
Taxa	8.4	1.9
Abundance	264.4	151.7
Total taxa		13

3.9 Balonne Minor at Trafalgar

This site is at the upper end of the weir pool and includes areas both upstream and downstream of the recently modified Cubbie intake channel. The water level was similar to that recorded in November, that is, it was very low. Many snags and tree trunks were submerged but all lignum and roots of riparian trees were exposed. Maximum depth was about 2m. There was little disturbance of the edge though goat droppings were common. The surrounding countryside was extremely dry with very limited grass growth.

3.9.1 Water quality

Results from spot water quality profiling are shown in **Table 3-9.1**. The water column was well mixed.

■ **Table 3-9.1 Water quality profiling, Balonne Minor at Trafalgar, April 2006.**

Sample Time	Depth (m)	Temp (°C)	Dissolved Oxygen (%sat)	Conductivity (µS/cm)	Turbidity (NTU)	pH
1400	Surface	22.6	NA	109	>600	6.3
	0.5	21.0		107	>600	6.2
	1.0	20.9		108	>600	6.2
	1.5	20.8		108	>600	6.2

3.9.2 Macrophytes

No macrophytes were observed. Fringing benthic algal growth was mild and growth on snags at the waterline was common.

3.9.3 Fish

All nets were used at this site. Three native fish species and three introduced were captured (**Table 3-9.1**). Spangled perch had been captured in November 2005. Bony bream covered the full range of sizes, as did Yellowbelly.

■ **Table 3-9.1 Results of fishing the Balonne Minor at Trafalgar in April 2006.**

Species	Common name	Gill	Seine	Fyke	Bait	Total Numbers
<i>Macquaria ambigua</i>	Yellowbelly	4	2	1		7
<i>Nematolosa erebi</i>	Bony Bream	2	44	6		52
<i>Neosilurus hyrtlilii</i>	Hyrtl's tandan			8		8
<i>Cyprinus carpio</i>	Carp	2				2
<i>Carrasius auratus</i>	Goldfish		2			2
<i>Gambusia holbrooki</i>	Mosquitofish		8			8
Total Numbers		8	56	15	0	79

Two broad-shelled and two long-necked tortoises were captured in fyke nets.

3.9.4 Macroinvertebrates

Five surbers were collected on May 10 from soft clay with some filamentous algae and occasional leaf litter. A dip net sample was collected from hanging roots of a tea tree. Twenty taxa were recorded with copepods and ceratopogonids being the most common in the surbers but orthoclads and decapods most common in the dip net (**Table 3-9.2**). Eighteen prawns were captured in bait traps but yabbies were not observed by any means.

■ **Table 3-9.2 Numbers of aquatic macroinvertebrates recorded from the Balonne Minor at Trafalgar.**

	Edge surber		Tree root dip
	Mean	Stddev	
Nematoda	0.4	0.9	
Oligochaeta	8.0	2.8	
Hyriidae			3
Cirolanidae			22
Copepoda	142.0	82.6	4
Ostracoda	1.2	1.8	
Atyidae			1
Palaeomonidae	2.4	2.6	43
Parastacidae			34
Elmidae			1
Ceratopogonidae	56.8	29.5	3
Chironominae	14.8	7.8	4
Orthoclaadiinae			131
Tanypodinae	3.2	3.0	20
Culicidae			23
Caenidae	4.4	4.8	5
Corixidae	1.2	2.7	11
Zygoptera			1
Ecnomidae			1
Leptoceridae			4
Taxa	7.0	1.9	17
Abundance	234.4	100.3	311
Total taxa		10	20

3.10 Donegri Ck (Narran River) at Dirranbandi

The river was not flowing when sampled. The reach sampled was approximately 200m long and consisted of three pools on consecutive meanders. The outer edge of each meander was very steep with little vegetation while the inner edge was well treed. The regrowth noted in several areas is continuing with several well established saplings. A significant surface scum was present on the downstream pool and it included wattle flowers. Fishers and campers had frequented the deepest pool and significant litter was scattered about.

3.10.1 Water quality

Results from spot water quality profiling are shown in **Table 3-10.1**. The water column showed surprisingly strong thermal stratification and pH was noticeably higher in the surface layer.

■ **Table 3-10.1 Water quality depth profiling at Donegri Creek in April 2006.**

Sample Time	Depth (m)	Temp (°C)	Dissolved Oxygen (%sat)	Conductivity (µS/cm)	Turbidity (NTU)	pH
1330	Surface	27.6	NA	106	>600	6.5
	0.5	20.8		105	>600	6.1
	1.0	20.4		103	>600	6.0

3.10.2 Macrophytes

Juncus was common in patches while some *Ludwigia* was present on the upstream pool.

3.10.3 Fish

All nets were set at this site. Seven native fish species and two introduced were captured (**Table 3-10.2**). A single Murray Cod and four Goldfish were recorded in November 2005. *Porochilus rendahli* is a new record for the Lower Balonne and has only recently been recorded in the Balonne above Beardmore Dam (DPI pers. comm.) Yellowbelly covered the full size range from 34mm and Hyrtl's tandan ranged from 119mm to 225mm.

■ **Table 3-10.2 Results of fishing at Donegri Creek in April 2006, by fishing method**

Species	Common name	Gill	Seine	Fyke	Bait	Total Numbers caught
<i>Macquaria ambigua</i>	Yellowbelly	4	4	3		11
<i>Leiopotherapon unicolor</i>	Spangled perch		1	1		2
<i>Nematolosa erebi</i>	Bony Bream	4	150	5		159
<i>Hypseleotris klunzingeri</i>	Carp Gudgeon		1			1
<i>Retropinna semoni</i>	Smelt		20			20
<i>Neosilurus hyrtlii</i>	Hyrtl's tandan			8		8
<i>Porochilus rendahli</i>	Rendahl's tandan			2		2
<i>Cyprinus carpio</i>	Carp	5		12	1	18
<i>Gambusia holbrooki</i>	Mosquitofish		1			1
Total Numbers		13	177	31	1	222

Two short-necked tortoises were recorded from gill nets and another from a fyke net.

3.10.4 Macroinvertebrates

On May 11 two surbers were collected from sand, two from soft silt and one from solid clay. Some algae, scum and leaf litter were present. Twelve taxa were recorded with the most common being copepods and ceratopogonids (**Table 3-10.3**). Seventy-five prawns and one yabby were recorded from bait traps.

■ **Table 3-10.3 Numbers of aquatic macroinvertebrates recorded from Donegri Creek (Narran River)**

	Edge Surber	
	Mean	Stdev
Nematoda	1.6	2.6
Oligochaeta	7.6	5.2
Sphaeriidae	2.0	2.0
Cladocera	0.4	0.9
Copepoda	74.8	87.6
Ostracoda	2.4	5.4
Palaeomonidae	2.4	3.3
Ceratopogonidae	50.0	26.6
Chironominae	18.0	4.9
Tanypodinae	0.8	1.1
Caenidae	12.8	8.3
Leptoceridae	1.2	1.8
Taxa	7.8	0.8
Abundance	174.0	101.9
Total taxa		12

3.11 Narran River at Clyde

Water was continuous in both directions at the site and reached 1.5m deep though most was much less. Width rarely reached 10m. The compensation flow was still occurring so the river was flowing sluggishly. There were no macrophytes and *Juncus* was common on and near a sand bar just upstream and also scattered along the bank. A very limited filamentous algal ring was present when sampled for macroinvertebrates along with a slight surface scum partly comprised of wattle flower parts. There were no signs of recent use by cattle and no recent germination of riparian plants.

3.11.1 Water quality

The results of spot measurements are shown in **Table 3-11.1**. Surface conductivity in May 2005 was 409 and in November was 155 so the effect of the summer and compensation flows is evident.

■ **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	26.2	93	118	>600	5.9
	1.0	23.1	86	113	>600	6.0

3.11.2 Macrophytes

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

3.11.3 Fish

All nets were used at this site. The catch comprised of five native fish species and three introduced (**Table 3-11.2**). The tandans ranged from 92 to 194mm in length while the Yellowbelly in the fyke ranged from 46mm to 62mm.

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

Species	Common name	Gill	Seine	Fyke	Bait	Total Numbers caught
<i>Macquaria ambigua</i>	Yellowbelly	2		5		7
<i>Leiopotherapon unicolor</i>	Spangled Perch			1		1
<i>Nematolosa erebi</i>	Bony Bream	1	7	4		12
<i>Retropinna semoni</i>	Smelt		12			12
<i>Neosilurus hyrtlii</i>	Hyrtil's tandan			9		9
<i>Cyprinus carpio</i>	Carp	2				2
<i>Carrasius auratus</i>	Goldfish			2		2
<i>Gambusia holbrooki</i>	Mosquitofish		4			4
Total Numbers		5	23	21	0	49

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

3.11.4 Macroinvertebrates

No specialised habitats were available to sample at this site. Surbers were collected from firm clay/sand with some algae, leaf litter and scum. Nineteen discrete taxa were recorded with copepods and ceratopogonids most common (**Table 3-11.3**). Sixty prawns and 8 *Cherax* were captured in bait traps and they were also captured in fyke nets. Several large *Cherax* attacked fish in the gill nets.

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

	Edge Surber	
	Mean	Stdev
Acarina	0.4	0.9
Oligochaeta	2.0	2.8
Ancylidae	1.6	3.6
Cladocera	3.6	2.2
Copepoda	52.8	41.7
Ostracoda	28.4	14.6
Palaeomonidae	0.4	0.9
Parastacidae	0.4	0.9
Ceratopogonidae	36.4	18.1
Chironominae	27.2	22.7
Tanypodinae	13.2	9.1
Culicidae	1.6	3.6
Muscidae	0.4	0.9
Baetidae	3.6	5.0
Caenidae	18.0	10.3
Corixidae	13.6	15.1
Gerridae	0.8	1.1
Gomphidae	0.4	0.9
Leptoceridae	1.6	1.7
Taxa	11.0	1.0
Abundance	206.4	36.6
Total Taxa		19

3.12 Narran River at Booligar

The water level was much higher than in November 2005 such that the downstream riffle was about 5m wide and 15cm deep but it was not flowing. Depth in the main pool was over 2m in parts. There had been no recent cattle access and there was no evidence of other animals using the pool. Local rain had caused erosion of the banks and one gully on the western side delivered a significant sediment pile into the main pool.

3.12.1 Water quality

Spot water quality readings were collected from the centre of the main pool and showed slight variation of temperature with depth while other parameters varied little (**Table 3-12.1**).

■ **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
1430	Surface	25.5	NA	167	>600	6.6
	0.5	22.0		167	>600	6.4
	1.0	21.9		170	>600	6.4
	2.0	21.9		170	>600	6.4

3.12.2 Macrophytes

Small *Juncus* were scattered at the sides of the main pool. Filamentous alga was poorly developed.

3.12.3 Fish

One gill net was not set due to the lack of deep water. Five native fish species and three introduced were captured (**Table 3-12.2**). Spangled perch, Smelt and Mosquitofish were not captured in November 2005 though they were recorded in low numbers in May 2005. The size selectivity of the nets was clearly shown by this catch. Bony bream in the seine ranged from 35 to 88mm; in the fyke nets the range was 40 to 179mm, and in the gill nets the range was 207 to 278mm. Yellowbelly in the fyke ranged from 132 to 264mm while those from the gill nets were between 252 and 380mm. The tandans were between 111 and 214mm in length.

■ **Table 3-12.2 Results of fishing the Narran River at Booligar in April 2006.**

Species	Common name	Gill	Seine	Fyke	Bait	Total Numbers caught
<i>Macquaria ambigua</i>	Yellowbelly	11		13		24
<i>Leiopotherapon unicolor</i>	Spangled Perch			1		1
<i>Nematolosa erebi</i>	Bony Bream	21	23	29		73
<i>Retropinna semoni</i>	Smelt		10			10
<i>Neosilurus hyrtl</i>	Hyrthl's tandan			41		41
<i>Cyprinus carpio</i>	Carp	2		5	1	8
<i>Carrasius auratus</i>	Goldfish			2		2
<i>Gambusia holbrooki</i>	Mosquitofish		7			7
Total Numbers		34	40	91	1	166

3.12.4 Macroinvertebrates

Surbers were collected on May 11 from firm sandy silt (4) and soft silt (1) with some leaf litter. Little benthic alga was present but a strong surface scum was pushed to the downstream end of the site, which at this stage no longer entered the riffle area. Fifteen taxa were recorded. The fauna was dominated by copepods and ceratopogonids (**Table 3-12.3**). Bait traps collected 62 prawns and 6 yabbies. Both were also common in either seine or fyke nets.

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

	Edge surber	
	Mean	Stddev
Acarina	0.4	0.9
Nematoda	1.6	1.5
Oligochaeta	0.8	0.8
Cladocera	9.8	8.4
Copepoda	76.2	44.3
Ostracoda	6.4	7.0
Atyidae	0.2	0.4
Hydrophilidae	0.4	0.9
Ceratopogonidae	27.8	31.0
Chironominae	9.8	5.5
Orthoclaadiinae	8.4	13.5
Tanypodinae	9.8	3.6
Culicidae	2.4	5.4
Muscidae	0.4	0.9
Caenidae	6.2	5.3
Taxa	9.6	1.1
Abundance	160.6	32.4
Total taxa		15

3.13 Balandool River at Cubbie

The river in this location has a shallow trapezoidal shape with bare banks of black clay. The height from the bed to the top of the bank is about 3.5m. There are no benches but the site is on a meander bend of the main channel near where a small anabranch rejoins. All the vegetation adjacent the river was very healthy while that just a short distance away was very dry.

The river was flowing sluggishly when sampled. The pool was about 15m wide and the downstream bend was 4-5m wide. Depth reached possibly 1m but rarely exceeded 50cm. It appeared the water level had recently receded perhaps 0.5m. Water backed up the side channel about 40m. There was no evidence of disturbance by stock or feral animals.

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**. Conductivity was much lower than in May 2005 (416µS/cm).

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

Sample Time	Depth (m)	Temp (°C)	Dissolved Oxygen (%sat)	Conductivity (µS/cm)	Turbidity (NTU)	pH
1530	Surface	20.8		105	>600	6.4

The ranges recorded overnight for each parameter were:

Temperature: 17.8 – 22.5°C

Dissolved oxygen: NA

pH: 6.3 – 6.6

Conductivity: 105 - 109µS/cm

Turbidity: >600 NTU.

3.13.2 Macrophytes and algae

No macrophytes and very little fringing algae were observed.

3.13.3 Fish

Two gill nets were not set due to the depth. Four native fish species and three introduced were recorded (**Table 3-13.2**). Bony bream was not captured in November 2005. The Spangled perch were between 70mm (next smallest was 109mm) and 166mm while the Yellowbelly were between 32 and 265mm and the tandans between 102 and 133mm, though most were around 120mm.

■ **Table 3-13.2 Results of fishing the Balandool River at Cubbie in April 2006.**

Species	Common name	Gill	Seine	Fyke	Bait	Total Numbers caught
<i>Macquaria ambigua</i>	Yellowbelly	3	5	3		11
<i>Leiopotherapon unicolor</i>	Spangled perch			19		19
<i>Nematolosa erebi</i>	Bony bream		22	20		42
<i>Neosilurus hyrtlilii</i>	Hyrtl's tandan			57		57
<i>Cyprinus carpio</i>	Carp			10	1	11
<i>Carrasius auratus</i>	Goldfish		2	1		3
<i>Gambusia holbrooki</i>	Mosquitofish		11			11
Total Numbers		3	40	110	1	154

3.13.4 Macroinvertebrates

Surber samples were collected on 11 May from soft mud substrate with little or no algae or leaf litter but some surface scum. Seventeen taxa were recorded with ceratopogonids, copepods and corixids most common (**Table 3-13.3**). Fifty-three prawns and 9 yabbies were captured in bait traps.

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

	Edge surber	
	Mean	Stddev
Nematoda	0.4	0.9
Oligochaeta	4.4	2.2
Ancylidae	0.8	1.8
Cladocera	0.8	1.1
Copepoda	64.8	32.1
Ostracoda	6.0	3.5
Parastacidae	0.4	0.9
Ceratopogonidae	111.6	71.3
Chironominae	22.0	19.1
Tanypodinae	5.6	2.6
Culicidae	0.4	0.9
Muscidae	0.4	0.9
Baetidae	0.8	1.8
Caenidae	2.0	2.4
Corixidae	47.2	47.0
Gerridae	0.4	0.9
Leptoceridae	0.8	1.1
Taxa	9.8	1.3
Abundance	268.8	60.3
Total taxa		17

3.14 Balandool River at Euraba

Dry.

3.15 Bokhara River at Kirrima

The river was still flowing but the water level appeared to have dropped about 1m in recent times. The channel below the weir was generally about 6m wide and rarely more than 0.5m deep. There was very little timber in the water and the channel was a black clay trapezoidal shape with very bare banks. 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 50m downstream from the weir 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 (°C)	Dissolved Oxygen (%sat)	Conductivity (µS/cm)	Turbidity (NTU)	pH
1430	Surface	22.8	NA	111	>600	6.7
	0.5	20.8		110	>600	6.5

3.15.2 Macrophytes

No macrophytes or filamentous algae were observed.

3.15.3 Fish

Two gill nets were not used at this site due to depth restrictions. Nets were placed in the channel downstream from the weir. Five native species of fish plus one introduced were captured (**Table 3-15.2**). Yellowbelly ranged from 36 to 49mm and Bony bream from 31 to 67mm.

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

Species	Common name	Gill	Seine	Fyke	Bait	Total Numbers caught
<i>Macquaria ambigua</i>	Yellowbelly		13			13
<i>Leiopotherapon unicolor</i>	Spangled perch			4		4
<i>Nematolosa erebi</i>	Bony Bream		11	5		16
<i>Melanotaenia fluviatilis</i>	Rainbowfish		2			2
<i>Retropinna semoni</i>	Smelt		1			1
<i>Gambusia holbrooki</i>	Mosquitofish		11			11
Total Numbers		0	38	9	0	47

Two broad-shelled tortoises and one long-necked were captured in fyke nets.

3.15.4 Macroinvertebrates

Surber samples were collected on May 11 from soft silt with no algae and very little litter. A dip net sample was collected from tea tree root. Twenty-four taxa were recorded, 19 from the surbers and fifteen from the dip net. The dominant taxon in surbers was Copepoda, with ceratopogonids and chironomids also relatively abundant (**Table 3-15.3**). Copepods and culicids were the most common elements in the dip net. Bait traps captured 156 prawns and 13 *Cherax*. They were also both very common in seine and fyke nets.

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

	Edge surber		Tree root dip net
	Mean	Stddev	
Nematoda	5.6	2.2	
Oligochaeta	2.0	1.4	
Cirolanidae			36
Cladocera	5.2	5.9	
Copepoda	328.0	33.5	5
Ostracoda	23.2	40.8	
Atyidae	0.4	0.9	
Palaeomonidae	0.4	0.9	8
Parastacidae			39
Dytiscidae			2
Ceratopogonidae	44.8	49.7	1
Chironominae	41.6	15.0	12
Orthocladiinae	2.0	1.4	107
Tanypodinae	19.6	9.9	47
Culicidae	4.0	6.2	43
Ephydriidae	0.4	0.9	1
Muscidae	0.4	0.9	
Caenidae	8.4	9.4	2
Corixidae	18.4	24.1	8
Gerridae	6.8	14.1	
Notonectidae	0.4	0.9	
Zygoptera			1
Ecnomidae	1.2	1.1	
Leptoceridae			1
Taxa	12.2	1.8	15
Abundance	512.8	109.4	313
Total taxa		19	24

3.16 Bokhara River at Koala

The site is basically a long and near-permanent pool that has increased in water level since November. The pool ranged between 20 and 40m wide and up to 1.5m deep, though most was less than 0.5m. *Ludwigia* and *Azolla* lined nearly 100% of the waterway, leaving only a few metres of clear water in the centre. *Juncus* and *Persicaria* near the boat entry point was common and healthy. The riparian Lignum was almost in the water. Coolibah and wattle seedlings approached 1m in height amongst the Lignum near the dead gum downstream. Benthic filamentous alga was uncommon. Recent stock access had apparently been limited to the western side.

3.16.1 Water quality

Spot water quality measurements were taken from the centre of the channel and results are shown in **Table 3-16.1**. The water column was well mixed.

■ **Table 3-16.1 Spot water quality readings – Bokhara River at Koala**

Sample Time	Depth (m)	Temp (°C)	Dissolved Oxygen (%sat)	Conductivity (µS/cm)	Turbidity (NTU)	pH
1630	Surface	23.6	NA	104	>600	6.3
	0.5	23.5		104	>600	6.3
	1.0	23.4		105	>600	6.3

Overnight water quality data were recorded at this site. The ranges recorded overnight for each parameter were:

Temperature: 20.5 – 23.3°C

Dissolved oxygen: NA

pH: 6.3 – 6.4

Conductivity: 100 - 103µS/cm

Turbidity: >600 NTU.

3.16.2 Macrophytes

Ludwigia and *Azolla* were significant in the water while *Juncus* occurred sporadically and a patch (6m²) of *Persicaria* continued to develop just upstream of the boat entry point.

3.16.3 Fish

All nets were used at this site and captured four native species plus three introduced (**Table 3-16.2**). The seine net encountered a lot of alga that rolled in mud so extraction of fish may not have been complete. In November 2005 only Yellowbelly, large numbers of Goldfish and a few Mosquitofish were recorded. On this occasion Yellowbelly captured in fyke and seine nets ranged from 36 to 115mm while those in the gill nets reached 502mm and were healthy ripe females. The Spangled perch in the gill net was 243mm in length.

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

Species	Common name	Gill	Seine	Fyke	Bait	Total Numbers caught
<i>Macquaria ambigua</i>	Yellowbelly	6	2	2	1	11
<i>Leiopotherapon unicolor</i>	Spangled perch	1	1	10		12
<i>Nematolosa erebi</i>	Bony Bream	7	1			8
<i>Neosilurus hyrtlilii</i>	Hyrtl's tandan			9		9
<i>Cyprinus carpio</i>	Carp	3		3		6
<i>Carrasius auratus</i>	Goldfish		5	1		6
<i>Gambusia holbrooki</i>	Mosquitofish		9			9
Total Numbers		17	18	25	1	61

A large broad-shelled tortoise was captured in a gill net.

3.16.4 Macroinvertebrates

Surber samples were collected on 11 May from relatively firm mud and usually included some *Ludwigia* roots and *Azolla*. A dip net sample was collected from a mixture of *Ludwigia* and *Azolla*. Twenty-six taxa were recorded, 21 from the surbers and 20 from the dip net. The dominant taxa in surbers were ceratopogonids, copepods and oligochaetes (**Table 3-15.3**) while atyids and ostracods were the most common element in the dip net. Bait traps captured 39 prawns and 2 *Cherax*.

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

	Edge surber		Macrophyte
	Mean	Stddev	dip net

Nematoda	14.0	5.3	
Oligochaeta	25.6	25.1	2
Ancylidae	1.2	1.8	
Physidae			12
Gastropoda	1.6	2.6	
Cladocera	5.2	5.8	4
Copepoda	30.0	38.7	16
Ostracoda	14.4	14.1	44
Atyidae	0.4	0.9	124
Palaeomonidae			10
Hydrophilidae			2
Ceratopogonidae	40.8	52.2	2
Chironominae	14.4	5.4	14
Orthoclaadiinae	0.4	0.9	8
Tanypodinae	15.6	11.1	20
Culicidae	0.4	0.9	8
Muscidae	0.4	0.9	
Tipulidae	0.4	0.9	
Baetidae	0.8	1.8	
Corixidae			2
Mesoveliidae			2
Naucoridae			2
Veliidae	0.4	0.9	2
Pyralidae	0.4	0.9	4
Coenagrionidae	2.4	4.3	10
Anisoptera	1.6	2.6	
Zygoptera			22
Leptoceridae	1.2	1.8	
Taxa	11.0	3.4	20
Abundance	171.6	155.6	310
Total taxa		21	26

3.17 Warrego River at Shannonvale

The site consists of a long pool with a sand / gravel substrate. There was reasonable flow at the time of sampling with the release pipe at the base of the weir about ½ full. The pool was a maximum of about 2m deep and only small areas of the sand bars on the opposite bank were exposed. Dozer tracks were evident on these banks. The side channel near the camp held water and almost connected to the river at the boat entry point. Noogoora burr was not observed. Evidence of fishers, campers and motorcycle riders was common. A scum composed largely of wattle flowers was present of the water surface.

3.17.1 Water quality

Spot water quality measurements were taken from near the centre of the channel adjacent to the logger site. Results are shown in **Table 3-17.1**. Turbidity was higher than commonly recorded at this site and may reflect disturbance by the flow event.

■ **Table 3-17.1 Spot water quality readings – Warrego River at Shannonvale**

Sample Time	Depth (m)	Temp (°C)	Dissolved Oxygen (%sat)	Conductivity (µS/cm)	Turbidity (NTU)	pH
1630	Surface	26.3	NA	92	>600	6.7
	0.5	24.7		92	>600	6.5
	1.0	22.9		96	>600	6.3
	1.5	22.7		96	>600	6.3

Overnight logging of water quality parameters was undertaken at this site. The recorded ranges for each parameter were:

Temperature: 23.6 – 25.5°C

Dissolved oxygen: NA

pH: 6.6 – 6.7

Conductivity: 93 - 96µS/cm

Turbidity: >600.

3.17.2 Macrophytes

No macrophytes were recorded and filamentous green alga was very poorly developed.

3.17.3 Fish

All nets were deployed at this site. Six species of native fish plus two introduced were captured (**Table 3-17.2**). Silver perch and Goldfish were the only species not captured in November 2005. The number of Bony bream was much higher on this occasion and most were less than 50mm long. The Hyrtl's tandans were between 138 and 223mm in length.

■ **Table 3-17.2 Results of fishing the Warrego River at Shannonvale in April 2006.**

Species	Common name	Gill	Seine	Fyke	Bait	Total Numbers caught
<i>Macquaria ambigua</i>	Yellowbelly	1	3	2		6
<i>Bidyanus bidyanus</i>	Silver perch		1	1		2
<i>Nematolosa erebi</i>	Bony Bream	2	1000	75		1077
<i>Hypseleotris klunzingeri</i>	Carp Gudgeon		45			45
<i>Retropinna semoni</i>	Smelt		24			24
<i>Neosilurus hyrtlii</i>	Hyrtl's tandan			66		66
<i>Cyprinus carpio</i>	Carp	5		1		6
<i>Carrasius auratus</i>	Goldfish			1		1
Total Numbers		8	1073	146	0	1227

3.17.4 Macroinvertebrates

No macroinvertebrate samples were collected as the river had recently risen. Twenty-five *Macrobrachium* and 5 *Cherax* were captured in bait traps. Prawns were also captured in fyke and seine nets.

3.18 Warrego River at Tinnenburra

On this occasion the river was continuous at the site and flowing very slowly through the culvert. Marks on the bank suggested the water level had been up by as much as 1.4m. The surrounding countryside was absolutely bare. The substrate was firm red clay silt overlaying sand. A few isolated snags occurred in places and there was very little alga. Disturbance to the edge was very limited.

3.18.1 Water quality

Results of spot water quality samples are shown in **Table 3-18.1**. The sample was collected from mid-stream just downstream from the floodgate.

■ **Table 3-18.1 Spot water quality readings – Warrego River at Tinnenburra**

Sample time	Depth (m)	Temp (°C)	Dissolved Oxygen (%sat)	Conductivity (µS/cm)	Turbidity (NTU)	pH
1100	Surface	24.2	NA	126	433	6.5
	1.0	22.8		126	>600	6.3

3.18.2 Macrophytes

No macrophytes were observed and the algal fringe was not present.

3.18.3 Fish

This was one of the rare occasions upon which all nets could be placed at this site. Five native species and no introduced were captured (**Table 3-18.2**). This is the same overall result as November 2005 except that *Hypseleotris* spp and Rainbowfish were recorded in November whereas Silver perch and Hyrtl's tandan were not. These species were also captured in May 2005. The Silver perch were all between 11 and 18mm in length, the Yellowbelly were 16, 123 and 260mm, and the tandans were from 129 to 199mm. Some of the latter were silver in colour.

■ **Table 3-18.2 Results of fishing the Warrego River at Tinnenburra in March 2006.**

Species	Common name	Gill	Seine	Fyke	Bait	Total Numbers caught
<i>Macquaria ambigua</i>	Yellowbelly	1	1	1		3
<i>Bidyanus bidyanus</i>	Silver perch		10		2	12
<i>Nematolosa erebi</i>	Bony Bream			2		2
<i>Retropinna semoni</i>	Smelt		5			5
<i>Neosilurus hyrtlilii</i>	Hyrtl's tandan			13		13
Total Numbers		1	16	16	2	35

3.18.4 Macroinvertebrates

Surber samples were not collected due to the flow. One *Macrobrachium*, 2 *Cherax* and 6 crabs (*Holthuisiana*) were recorded from bait traps.

3.19 Moonie River at Nindigully

The water level at this site was much lower than in November such that there was no flow and the downstream riffle section held no water. No *Ludwigia* was present and the *Schoenoplectus* near the gauge was completely out of the water. 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**. The water column was well mixed but with a slightly warmer surface layer. Conductivity and pH have risen since November.

■ **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
1625	Surface	23.4	NA	145	>600	6.7
	0.5	21.1		146	>600	6.4
	1.0	20.3		149	>600	6.4

3.19.2 Macrophytes

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

3.19.3 Fish

All nets were set at this site. Five native fish species and two introduced were recorded (**Table 3-19.2**). Smelt was not recorded in November 2005 but Goldfish was. The total catch is within the historical range and the species complement is relatively good. It is unusual to capture smaller specimens of any species at Nindigully but on this occasion Yellowbelly ranged from 41mm, Bony bream from 38mm and the Spangled perch was 73mm in length.

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

Species	Common name	Gill	Seine	Fyke	Bait	Total Numbers caught
<i>Macquaria ambigua</i>	Yellowbelly	6	1	2		9
<i>Leiopotherapon unicolor</i>	Spangled perch		1			1
<i>Nematolosa erebi</i>	Bony Bream	21	7	11		39
<i>Hypseleotris klunzingeri</i>	Carp Gudgeon		2			2
<i>Retropinna semoni</i>	Smelt		1			1
<i>Cyprinus carpio</i>	Carp	4			1	5
<i>Gambusia holbrooki</i>	Mosquitofish		12			12
Total Numbers		31	24	13	1	69

A broad-shelled tortoise was captured in a fyke net.

3.19.4 Macroinvertebrates

Surber samples were collected in April. Three were from firm mud with significant litter and algae and two were from soft mud. Nineteen taxa were identified (**Table 3-19.3**). Ceratopogonids, cladocera and copepods were most abundant. Twenty-eight *Macrobrachium* were captured in bait traps and moderate numbers were recorded in the seine haul.

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

	Edge surber	
	Mean	Stddev
Acarina	0.8	0.4
Nematoda	0.2	0.4
Oligochaeta	2.8	0.8
Ancylidae	1.8	1.3
Cladocera	35.4	31.2
Copepoda	29.4	12.8
Ostracoda	3.0	1.9
Atyidae	0.2	0.4
Palaeomonidae	2.6	1.7
Ceratopogonidae	64.0	66.3
Chironominae	19.8	5.5
Orthoclaadiinae	2.2	1.1
Tanypodinae	15.2	5.1
Tabanidae	0.2	0.4
Baetidae	5.2	3.0
Caenidae	9.8	9.8
Corixidae	1.6	3.0
Gomphidae	0.2	0.4
Libellulidae	0.4	0.5
Taxa	14.0	1.2
Abundance	194.8	69.6
Total taxa		19

3.20 Moonie River at Fenton

The pool was continuous in both directions, generally about 20m wide and with a maximum depth of about 1.5m. *Juncus* and *Schoenoplectus* occurred in patches. *Ludwigia* also occurred in several patches on both sides and the most significant patch near the boat entry point extended about 8m over the water. The grass cover on the banks was reasonable and there was no evidence of recent cattle use. The fringe of benthic filamentous green alga was strongly developed and a significant surface scum was pushed to one side by the breeze.

3.20.1 Water Quality

Spot water quality data are shown in **Table 3-20.1**. A thin layer of warm surface water was evident.

■ Table 3-20.1 Spot water quality readings – Fenton April 2006

Sample Time	Depth (m)	Temp (°C)	Dissolved Oxygen (% sat.)	Conductivity (µS/cm)	Turbidity (NTU)	pH
1315	Surface	25.0	NA	118	>600	6.8
	0.5	22.0		118	>600	6.5
	1.0	21.8		119	>600	6.5

3.20.2 Macrophytes

Juncus was common on the far bank and in patches on the near bank while *Schoenoplectus* was more common near the boat entry area. The fringe of benthic filamentous green algae was strongly developed.

3.20.3 Fish

All nets were deployed at this site. Two native species and three introduced were captured (Table 3-20.2). This is very similar to historical catches. The fish captured in all nets tended to be relatively large and healthy, such as two Bony bream exceeding 300mm in length and the only Yellowbelly recorded was 445mm in length. Several small Bony bream were recorded from the seine hauls, both of which were effected by sticks and snags.

■ Table 3-20.2 Results of fishing at Fenton in April 2006.

Species	Common name	Gill	Seine	Fyke	Bait	Total Numbers caught
<i>Macquaria ambigua</i>	Yellowbelly	1				1
<i>Nematolosa erebi</i>	Bony Bream	66	3			69
<i>Cyprinus carpio</i>	Carp	2		1		3
<i>Carrasius auratus</i>	Goldfish			1		1
<i>Gambusia holbrooki</i>	Mosquitofish		8			8
Total Numbers		69	11	2	0	82

Three long-necked tortoises were captured in fyke or gill nets.

3.20.4 Macroinvertebrates

Surber samples were collected in April from compact clay with algae, often in areas of very sloping bank. A dip net sample was collected from *Ludwidgia*. Thirty-four discrete taxa were identified with 26 taxa collected from the surbers and 23 from the dip net. The most common taxon in the surbers was Copepoda while in the dip net they were baetids and oligochaetes (Table 3-20.3). Bait traps captured 4 *Macrobrachium* and they were not noted in fyke or seine nets. Yabbies were not recorded.

■ **Table 3-20.3 Macroinvertebrates captured at Fenton in April 2006**

	Edge surber		Macrophyte dip
	Mean	Stddev	
Acarina	1.0	1.2	
Nematoda	0.2	0.4	
Oligochaeta	2.4	1.1	32
Physidae			6
Ancylidae	1.0	1.0	
Planorbidae	0.8	1.1	
Cladocera	6.8	6.8	
Copepoda	54.6	56.5	10
Ostracoda	1.8	3.5	13
Atyidae			2
Palaeomonidae	0.6	0.9	1
Dytiscidae			1
Hydraenidae			1
Hydrophilidae	0.2	0.4	2
Ceratopogonidae	2.0	1.2	11
Chironominae	3.6	1.5	14
Orthocladiinae	2.2	3.2	21
Tanypodinae	2.6	1.9	21
Culicidae	0.4	0.5	3
Muscidae	0.4	0.5	1
Tabanidae	0.6	1.3	
Baetidae	4.6	2.4	64
Caenidae	0.2	0.4	
Corixidae	14.2	4.5	4
Gerridae	0.2	0.4	
Mesoveliidae			
Notonectidae	0.4	0.5	
Pleidae			2
Veliidae			3
Pyralidae			
Aeschnidae			3
Coenagrionidae			3
Libellulidae	1.8	1.3	
Anisoptera	5.4	4.0	4
Zygoptera	0.4	0.5	18
Leptoceridae	0.4	0.5	
Taxa	15.2	3.6	23
Abundance	108.8	66.0	240
Total taxa		26	34

3.21 Police Lagoon

The lagoon had dried considerably since November and now consisted of two pools separated by about 50m. The northernmost pool commenced at the boat entry point and continued for about 80m upstream. It was generally about 12m wide and less than 0.5m deep. The downstream pool was >100m long, up to 25m wide and 1.5m deep on the western edge though this quickly sloped up to <0.5m. *Ludwigia* was very common in the downstream pool. *Sesbania* was very common on the dry bed and there was one significant patch of Noogoora burr. There was very little evidence of disturbance to the waters' edge and filamentous algae was weakly developed.

3.21.1 Water Quality

The download malfunctioned and the data was lost.

3.21.2 Macrophytes

Nardoo occurred in extensive patches in recently dried backwaters and generally as a thin band adjacent to the water's edge. *Juncus* was also common in the riparian zone but some distance from the present waterline. *Ludwigia* lined about 90% of the western edge of this pool and two patches each about 10m long were present on the eastern bank. The fronds extended over 5m into the lagoon. The upstream pool had one patch about 5m long.

3.21.3 Fish

Two gill nets were not deployed at this site due to depth restrictions. Three native fish species and one introduced were captured (**Table 3-21.2**). The species complement had been identical in May and November 2005 but Yellowbelly were not recorded at those times and Rainbowfish were. This lagoon is not stocked and has not received flow since February 2004. Fish tended to be larger than at most riverine sites. Bony Bream captured in the gill nets were consistently in the size range 225-250mm while those in the seine and fyke nets were commonly between 60 and 130mm. Yellowbelly ranged from 138mm to 345mm in length.

■ **Table 3-21.2 Results of fishing at Police Lagoon in April 2006.**

Species	Common name	Gill	Seine	Fyke	Bait	Total Numbers caught
<i>Macquaria ambigua</i>	Yellowbelly	8	3	2		13
<i>Leiopotherapon unicolor</i>	Spangled Perch		1			1
<i>Nematolosa erebi</i>	Bony Bream	22	94	15	1	132
<i>Cyprinus carpio</i>	Carp	1		11	4	16
Total Numbers		31	98	28	5	162

3.21.4 Macroinvertebrates

Surber samples were collected from firm mud with a soft surface layer. Algae and leaf litter were generally present in minor amounts. A dip net sample was collected from *Ludwigia*. Twenty-six taxa were collected, 16 from the surbers and 22 from the dip net (**Table 3-21.3**). The most common taxa in surbers were Corixidae, Chironominae

and Ostracoda while the dip net was dominated by Copepoda and Cladocera. Seventy-four *Macrobrachium* and 2 *Cherax* were captured in bait traps and small numbers of prawns were recorded in the seine net.

■ **Table 3-21.3 Macroinvertebrates captured at Police Lagoon**

	Edge surber		Macrophyte dip
	Mean	Stddev	
Acarina	7.2	9.5	
Nematoda	0.2	0.4	
Oligochaeta	2.0	1.6	
Cladocera	0.2	0.4	110
Copepoda	3.8	1.9	220
Ostracoda	28.0	62.6	2
Palaeomonidae			2
Dytiscidae	1.0	2.2	2
Hydrophilidae			4
Ceratopogonidae	15.8	10.1	
Chironominae	30.0	14.4	59
Orthoclaadiinae	0.6	0.9	41
Tanypodinae	1.6	1.8	2
Culicidae			4
Tabanidae			1
Baetidae			9
Caenidae	1.4	1.3	1
Corixidae	91.0	40.0	7
Gerridae	0.2	0.4	1
Mesoveliidae			1
Notonectidae	0.8	1.1	14
Veliidae			4
Pyralidae			11
Aeschnidae			2
Zygoptera			1
Leptoceridae	0.6	0.9	3
Taxa	9.2	1.3	22
Abundance	184.4	91.0	501
Total taxa		16	26

3.22 Belah Waterhole

It did not appear that the compensation flow had reached this site, which is odd because this system normally commences to flow at those levels. The water level was slightly lower than last November. The edge was very stable except where cattle accessed the water near the boat entry point and on the opposite bank about 50m

downstream. Green filamentous alga grew strongly near the waterline. Cattle were grazing in the vicinity.

3.22.1 Water Quality

Results from spot water quality sampling are shown in **Table 3-22.1**.

■ **Table 3-22.1 Spot water quality readings –Belah Waterhole in April 2006**

Sample Time	Depth (m)	Temp (°C)	Dissolved Oxygen (% sat.)	Conductivity (µS/cm)	Turbidity (NTU)	pH
1615	Surface	22.7	NA	243	>600	6.9
	0.5	20.0		241	>600	6.6

Overnight logging of water quality parameters produced the following range of results:

Temperature: 18.3 – 22.0°C

Dissolved oxygen: NA

pH: 7.1 – 7.2

Conductivity: 241 - 247µS/cm

Turbidity: >600 NTU.

Conductivity was lower than recorded in November but not as low as would be expected if the compensation flow had reached the site.

3.22.2 Macrophytes

Juncus grew strongly in patches, such as on the small island near the boat entry point and growth of green filamentous alga was strong.

3.22.3 Fish

All nets were deployed at this site. Five native fish species (with *Hypseleotris* pooled) and two introduced were recorded (**Table 3-22.1**). Hyrtl's tandan and Goldfish were captured in November 2005 but not in May 2005. Bony bream in the fyke and seine nets were predominantly in the 40-50mm range while no Yellowbelly less than 240mm in length were recorded.

■ **Table 3-22.1 Results of fishing Belah Waterhole in April 2006.**

Species	Common name	Gill	Seine	Fyke	Bait	Total Numbers caught
<i>Macquaria ambigua</i>	Yellowbelly	8		1		9
<i>Leiopotherapon unicolor</i>	Spangled Perch			1		1
<i>Nematolosa erebi</i>	Bony Bream	8	58	16		82
<i>Hypseleotris klunzingeri</i>	Carp Gudgeon		3*			2
<i>Retropinna semoni</i>	Smelt		1			1
<i>Cyprinus carpio</i>	Carp	1				1
<i>Gambusia holbrooki</i>	Mosquitofish		12			12
Total Numbers		17	74	18	0	109

* includes one *Hypseleotris* sp 4

3.22.4 Macroinvertebrates

Five surber samples were collected on April 3 from firm silt substrates, some with filamentous alga or leaf litter (**Table 3-22.2**). Twelve taxa were identified and all were in low abundance. Bait traps captured 15 *Cherax* and 52 *Macrobrachium*. Both were also recorded in good numbers from fyke and seine nets and several yabbies were attacking fish caught in the gill nets.

■ **Table 3-22.2 Macroinvertebrates captured at Belah Waterhole**

	Edge surber	
	Mean	Stddev
Oligochaeta	4.2	5.5
Cladocera	0.4	0.5
Copepoda	6.0	4.9
Ostracoda	0.2	0.4
Palaemonidae	1.4	1.9
Dytiscidae	0.2	0.4
Ceratopogonidae	7.6	1.8
Chironominae	6.0	4.9
Orthoclaadiinae	0.6	0.9
Tanypodinae	2.0	2.4
Caenidae	0.8	1.1
Corixidae	10.0	10.7
Taxa	7.0	2.9
Abundance	39.4	17.5
Total taxa		12

3.23 Clyde Lagoon

The water level was significantly higher than previous and filled the main channel to within 20m of the access track and continued for several hundred metres upstream of the site. The bases of most *Ludwigia* plants was submerged such that an area near shore was clear of the floating fronds, which reached the surface a few metres from shore and covered several metres on the surface. Some new germination was evident at the waterline and coolibah germination was strong at the downstream end on the eastern side. *Ludwigia* covered approximately 50% of the edge. It is suspected that the rise in water level was mainly related to the compensation flow as relatively dry cattle dung was found in the seine haul. There was little evidence of recent access by cattle. The edges were steep such that seine and fyke nets were only effective to a short distance from the edge.

3.23.1 Water Quality

Spot water quality data are shown in **Table 3-23.1**. The water column was well mixed but with a very clear surface layer of warm water with supersaturated levels of dissolved oxygen. Conductivity was 100µS/cm less than in November 2005, pH was

over one unit lower, dissolved oxygen showed very strong stratification and turbidity in November was about 185NTU.

■ **Table 3-23.1 Spot water quality readings – Clyde Lagoon on 26 March 2006**

Sample Time	Depth (m)	Temp (°C)	Dissolved Oxygen (% sat.)	Conductivity (µS/cm)	Turbidity (NTU)	pH
1625	Surface	30.5	149	157	>600	7.2
	0.5	23.2	67	155	>600	6.6
	1.0	22.9	55	156	>600	6.7
	2.0	22.8	62	157	>600	6.7
	3.0	22.6	58	157	>600	6.2

Overnight logging of water quality parameters produced the following range of results:

Temperature: 22.6 – 23.3°C

Dissolved oxygen: 38 - 60% sat; 3.3 – 5.1mg/l

pH: 6.8 – 7.0

Conductivity: 155 - 160µS/cm

Turbidity: >600 NTU.

Quite clearly the probe was placed slightly below the thermocline and in the stable lower layer.

3.23.2 Macrophytes

Ludwigia occurred over approximately 50% of the edge. Filamentous algae grew well on the stems and *Azolla* was common. Benthic filamentous alga was insignificant on the edge. Spiny Mud Grass (*Pseudoraphis spinescens*) was common in the wetted area upstream.

3.23.3 Fish

All nets were set at this site (**Table 3-23.2**). The efficiency of seine and fyke nets was hampered by the steeply sloping edge and the propensity of *Azolla* and *Ludwigia*. Five native fish species and three introduced were captured. The *Porochilus* is a new record for the region. It was first recorded in this catchment by DPI only 2 years ago but this was upstream of Beardmore Dam. Unlike many other sites, including the Narran River nearby, there were no small Yellowbelly captured here while Spangled Perch varied from 53mm to 170mm, Hyrtl's tandan from 141 to 205mm and Bony bream from 28 to 255mm.

■ **Table 3-23.2 Results of fishing Clyde lagoon in March 2006.**

Species	Common name	Gill	Seine	Fyke	Bait	Total Numbers caught
<i>Macquaria ambigua</i>	Yellowbelly	2				2
<i>Nematolosa erebi</i>	Bony Bream	15	36	4		55
<i>Leiopotherapon unicolor</i>	Spangled Perch			3	1	4
<i>Neosilurus hyrtlilii</i>	Hyrtl's tandan			7		7
<i>Porochilus rendahli</i>	Rendahl's tandan			1		1
<i>Cyprinus carpio</i>	Carp	1		1		2
<i>Carrasius auratus</i>	Goldfish			3		3
<i>Gambusia holbrooki</i>	Mosquitofish		15			15
Total Numbers		18	51	19	1	89

A broad shelled tortoise and a long-necked tortoise were captured in fyke nets.

3.23.4 Macroinvertebrates

Surber samples were collected from soft recently inundated clay with *Azolla* or rotted roots of *Ludwidgia*. A dip net sample was collected from *Ludwidgia*. Twenty-three discrete taxa were identified (**Table 3-23.3**) in total, 14 from the surbers and 20 from the dip net. Ceratopogonids and copepods were the most common taxa in surber samples while copepods dominated the dip net. Thirty-four *Macrobrachium* were captured in bait traps and they were also common in the seine haul. Yabbies also attacked fish captured in the gill nets.

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

	Edge Surber Mean	Stdev	Macrophyte dip
Acarina	0.8	1.1	
Nematoda	0.8	0.8	
Oligochaeta	0.2	0.4	2
Cladocera	1.6	1.5	13
Copepoda	23.2	21.0	190
Ostracoda	0.6	0.5	39
Atyidae			35
Palaeomonidae	5.4	2.9	2
Parastacidae	0.6	0.9	
Hydraenidae			2
Hydrophilidae			3
Ceratopogonidae	58.0	29.7	36
Chironominae	15.2	6.8	15
Orthoclaadiinae	0.2	0.4	6
Tanypodinae			5
Culicidae			1
Caenidae	0.2	0.4	
Corixidae	0.8	1.3	
Gerridae			1
Mesoveliidae			3
Notonectidae	0.4	0.5	3
Veliidae			8
Pyralidae			2
Coenagrionidae			2
Zygoptera			4
Taxa	8.2	1.6	20
Abundance	108.0	41.0	372
Total taxa		14	23

3.24 Chinaman Creek

The water level did not appear to be effected by the compensation flow as the banks were dry and all *Juncus* and red gum roots were exposed. The sand bar with regrowth upstream was largely exposed. The length of the pool was complete in both directions. Fringing green alga was moderately developed and there was no macrophyte growth in the water or a surface scum. A patch of *Juncus* (5m x 2m) grew about 1.0m above the waterline just upstream from the bridge while *Persicaria* now grew in two patches (6m² and 2m²) just downstream from the bridge. The edge appeared undisturbed. Young riparian trees were in good condition.

3.24.1 Water Quality

Spot water quality data are shown in **Table 3-24.1**. The water column was well mixed though temperature showed a strong gradient. Conductivity and pH were noticeably lower than in November.

■ **Table 3-24.1 Spot water quality readings – Chinaman Ck in April 2006**

Sample Time	Depth (m)	Temp (°C)	Dissolved Oxygen (% sat.)	Conductivity (µS/cm)	Turbidity (NTU)	pH
1500	Surface	24.9	NA	143	>600	6.6
	0.5	19.3		139	>600	6.2
	1.0	19.0		139	>600	6.3
	2.0	19.0		265	>600	6.2

Overnight logging of water quality parameters produced the following range of results:

Temperature: 19.1 – 19.9°C

Dissolved oxygen: NA

pH: 6.4 – 6.6

Conductivity: 140 – 144 µS/cm

Turbidity: >600 NTU.

Clearly the probe was just below the surface layer.

3.24.2 Macrophytes

Fringing green alga was very well developed and there was no macrophyte growth in the water or surface scum. A patch of *Juncus* (5m x 2m) grew about 1.0m above the waterline just upstream from the bridge while a patch of *Persicaria* grew 5m downstream.

3.24.3 Fish

All nets were deployed at this site. Five native fish species and two introduced were captured (**Table 3-24.2**). This is the same overall result as November 2005 except that Goldfish were recorded then and Mosquitofish were not. The Yellowbelly in fyke and seine nets ranged from 32mm to 127mm in length while the Bony bream did not exceed 50mm and most were less than 35mm in length.

■ **Table 3-24.2 Results of fishing Chinaman Creek in April 2006.**

Species	Common name	Gill	Seine	Fyke	Bait	Total Numbers caught
<i>Macquaria ambigua</i>	Yellowbelly	1	2	4		7
<i>Leiopotherapon unicolor</i>	Spangled Perch		1			1
<i>Nematolosa erebi</i>	Bony Bream	1	30	1		32
<i>Retropinna semoni</i>	Smelt		116			116
<i>Neosilurus hyrtlil</i>	Hyrtl's tandan			3		3
<i>Cyprinus carpio</i>	Carp			1		1
<i>Gambusia holbrooki</i>	Mosquitofish		3			3
Total Numbers		2	152	9	0	163

3.24.4 Macroinvertebrates

Surber samples were collected in April from firm silt with some algae and some litter. Fifteen taxa were recorded with ceratopogonids and chironomids most common (**Table 3-24.3**). Bait traps captured 21 *Macrobrachium* and 3 *Cherax*.

■ **Table 3-24.3 Macroinvertebrates captured at Chinaman Creek**

	Edge surber	
	Mean	Stddev
Nematoda	0.4	0.5
Oligochaeta	1.0	1.0
Ancylidae	1.2	2.7
Cladocera	1.6	2.3
Copepoda	16.2	14.3
Ostracoda	1.6	1.5
Palaeomonidae	1.8	1.5
Parastacidae	0.2	0.4
Ceratopogonidae	30.6	33.0
Chironominae	32.2	7.7
Orthoclaadiinae	0.4	0.5
Tanypodinae	1.6	1.8
Baetidae	0.2	0.4
Caenidae	18.0	11.0
Leptoceridae	0.6	0.9
Taxa	8.8	0.8
Abundance	107.6	23.8
Total taxa		15

4. Discussion

4.1 Water quality

Table 4-1.1 summarises the results from all sites sampled in autumn 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 varied from extreme at Clyde Lagoon to not present at St George. Generally those sites that were flowing showed well-mixed water columns while those that had been stable for some time showed more marked vertical stratification. The strong stratification at Donegri was surprising. The surface layer of warm water, often also higher in pH and, when it could be ascertained, dissolved oxygen, was apparently very thin because overnight logging wherein the probe is placed just 25cm below the surface, often clearly showed that the probe was below this layer. Overnight variations tended to be slight.

Conductivity tended to be markedly lower than in May 2005 and somewhat lower than November, probably as a result of the flows since those times. There was a trend of slightly increasing conductivity in a downstream direction. Floodplain sites unaffected by the compensation flow showed higher conductivity than riverine sites.

Turbidity exceeded the range of the meter at most sites. It appears that these low level compensation flows are sufficient to stir bottom sediments and keep them suspended.

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

	Temperature °C	Dissolved O ₂ % sat	Conductivity µS/cm	Turbidity NTU	pH
Balonne-St George	24.3-25.0	60-94	87-90	>600	6.8-6.9
Balonne-Mooramanna	26.7		93	>600	6.8
Balonne at Whyenbah	23.3-24.8		91-93	>600	6.7-6.9
Culgoa at Whyenbah	24.3		93	>600	6.7
Culgoa at Cubbie	22.7		94	>600	6.2
Culgoa at Woolerbilla	25.7		110	>600	6.7
Culgoa at Balandool	22.4-24.3		119	>600	6.5-6.6
Balonne Minor - Meigunyah	23.0-23.3	63-92	85-90	>600	6.7-6.9
Balonne Minor - Trafalgar	22.6		109	>600	6.3
Narran at Donegri	27.6		106	>600	6.5
Narran at Clyde	26.2	93	118	>600	5.9
Narran at Booligar	25.5		167	>600	6.6
Balandool on Cubbie	17.8-22.5		105-109	>600	6.3-6.6
Bokhara at Kirrima	22.8		111	>600	6.7
Bokhara at Koala	20.5-23.3		100-103	>600	6.3-6.4
Warrego-Shannonvale	23.6-25.5		93-96	>600	6.3-6.7
Warrego-Tinnenburra	24.2		126	433	6.5
Moonie at Nindigully	23.4		145	>600	6.7
Moonie at Fenton	25.0		118	>600	6.8
Police Lagoon					
Belah Creek	18.3-22.0		241-247	>600	7.1-7.2
Clyde Lagoon	22.6-23.3		155-160	>600	6.8-7.0
Chinaman Ck	19.1-19.9		140-144	>600	6.4-6.6

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.

4.2 Macrophytes

Macrophytes were very limited in their distribution and *Ludwigia* remained the most commonly encountered species but it was only significant at one riverine site, Koala, where it is always common and on two floodplain sites (Clyde and Police). *Azolla* was occasionally seen but was also only significant at Koala. Nardoo was present at one lagoon site. The fringe of benthic filamentous green alga was poorly developed at those sites that had been affected by the compensation flow or natural flows but was often pronounced at stable sites. Spiny mud grass was well developed at one lagoon site where it covered a boggy area. *Persicaria* was noticeable at several riverine sites and *Juncus* was common though patchy and generally sparse.

4.3 Fish

In a total catch of 3453 individuals, ten native species of fish (with *Hypseleotris* pooled) were identified from fifteen river sites in the Lower Balonne, seven from the four floodplain sites and seven from the four river reference sites. Three introduced species were captured at both test and reference sites. The number of taxa is in accord with historical sampling and the species list only varies with respect to rare occurrences such as *Porochilus*.

The total catch is only 47 greater than in November 2005 and from the same number of sites overall. However the overall abundance at river test sites was 40% less than that captured in November and that at river reference sites was 17% greater. At test sites this related mainly to major decreases in the catch of Smelt and small Goldfish and to increased catches of several species but mainly Bony bream and Hyrtl's tandan. Similar changes with respect to the relative abundance of native fish species were seen in the Warrego River. No Silver Perch were captured in the Warrego in November but 14 small specimens were captured during this sampling event. Sporadic occurrence of good numbers of Silver Perch has been observed at these sites.

Overall abundance increased by 52% at lagoon sites, despite one less site being sampled. Similar temporal changes in species abundance were seen at lagoon sites but the changes were not consistent between sites, possibly partly due to the different commence-to-flow levels of these lagoons. Interestingly there was a significant change in the catch at Police Lagoon despite this system being isolated since February 2004. It is also not stocked so while that may explain part of the increase in the catch of Yellowbelly at some river sites, it does not explain it here. Similarly it is tempting to suggest that the change in the proportion of Spangled perch caught in the lagoons relative to the proportion caught in the river between November and April (59% cf 12%) represents a movement from one environment to another. However, when one considers that the catch at Police lagoon alone increased by 1000% to now represent 18% of the total catch of Spangled perch, and no immigration or emigration was possible from that environment, the reasoning is less certain.

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 3 and 7. Floodplain sites recorded between 3 and 5 native species while river reference sites recorded between 2 and 6 native species. The number of individuals captured varied from 47 to 360 at

test river sites and from 89 to 163 at test lagoon sites. At reference sites the number of individuals captured varied from 35 to 1227. The use of the various fishing nets varied little among sites on this sampling occasion.

The most diverse native fauna was found at Donegri Ck and Culgoa at Cubbie (7 species), followed by Culgoa at Whyenbah, Balonne Minor at Meigunyah and the Warrego at Shannonvale (6 species). The least diverse fauna was recorded at the Moonie River at Fenton (2 native species), Balonne Minor at Trafalgar and Police Lagoon (3 species).

The most commonly encountered species were Yellowbelly and Bony bream (23 of 23 sites in total), Carp (20 sites) and Mosquitofish (19 sites). The most abundant species overall was Bony bream followed by Hyrtl's tandan, Smelt and Yellowbelly.

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

Site	<i>Maccullochella peelii peelii</i>	<i>Maquaria ambigua</i>	<i>Leipotheapon unicolor</i>	<i>Bidyanus bidyanus</i>	<i>Nematalosa erebi</i>	<i>Hypseleotris spp</i>	<i>Melanotaenia fluviatilis</i>	<i>Retropinna semoni</i>	<i>Tandanus tandanus</i>	<i>Neosilurus hyrtl</i>	<i>Porochilus rendahli</i>	<i>Cuprinus carpio</i>	<i>Carrasius auratus</i>	<i>Gambusia holbrooki</i>	Total count	Natives	Introduced
St George	0	8	0	0	58	4	1	0	0	0	0	5	0	1	77	4	2
Mooramanna	0	10	0	0	39	9	7	24	0	0	0	0	0	7	88	5	1
Whyenbah	0	12	0	0	34	16	8	17	0	0	0	1	0	19	107	5	2
Culgoa at Whyenbah	0	9	2	0	36	4	0	0	1	10	0	9	0	5	76	6	2
Culgoa at Cubbie	1	12	1	0	44	0	1	11	0	1	0	5	0	3	79	7	2
Culgoa at Woolerbilla	0	11	0	0	18	0	0	7	0	5	0	2	0	7	50	4	2
Culgoa at Balandool	0	11	1	0	5	0	0	0	0	5	0	4	5	36	67	4	3
Meigunyah	0	6	6	0	145	31	0	51	0	107	0	14	0	0	360	6	1
Trafalgar	0	7	0	0	52	0	0	0	0	8	0	2	2	8	79	3	3
Balandool on Cubbie	0	11	19	0	42	0	0	0	0	57	0	11	3	11	154	4	3
Bokhara at Kirrima	0	13	4	0	16	0	2	1	0	0	0	0	0	11	47	5	1
Bokhara at Koala	0	11	12	0	8	0	0	0	0	9	0	6	6	9	61	4	3
Donegri Ck	0	11	2	0	159	1	0	20	0	8	2	18	0	1	222	7	2
Narran at Clyde	0	7	1	0	12	0	0	12	0	9	0	2	2	4	49	5	3
Narran at Booligar	0	24	1	0	73	0	0	10	0	41	0	8	2	7	166	5	3
River summary	1	145	49	0	644	52	11	129	1	260	2	82	20	121	1517	10	3
Belah Waterhole	0	9	1	0	82	3	0	1	0	0	0	1	0	12	109	5	2
Police Lagoon	0	13	1	0	132	0	0	0	0	0	0	16	0	0	162	3	1
Clyde Lagoon	0	2	4	0	55	0	0	0	0	7	1	2	3	15	89	5	3
Chinaman Ck	0	7	1	0	32	0	0	116	0	3	0	1	0	3	163	5	2
Lagoon summary	0	31	7	0	301	3	0	117	0	10	1	20	3	30	523	7	3
Test site summary	1	176	56	0	945	55	11	246	1	270	3	102	23	151	2040	10	3
Shannonvale	0	6	0	2	1077	45	0	24	0	66	0	6	1	0	1227	6	2
Tinnenburra	0	3	0	12	2	0	0	5	0	13	0	0	0	0	35	5	0
Nindigully	0	9	1	0	39	2	0	1	0	0	0	5	0	12	69	5	2
Fenton	0	1	0	0	69	0	0	0	0	0	0	3	1	8	82	2	3
Reference summ	0	19	1	14	1187	47	0	30	0	79	0	14	2	20	1413	7	3

All native fish species except Smelt were more abundant at test river sites than they had been in November. Carp and Mosquitofish numbers were also higher but Goldfish were significantly lower. Relative abundance across the habitats sampled is shown in Table 4-3.2. The figures for reference rivers are strongly influenced by the large number of Bony bream recorded from the seine haul at Shannonvale and those for lagoons by the number of Smelt recorded from the seine haul at Chinaman Ck.

■ **Table 4-3.2 Proportional composition of the fish catch across habitats**

	Test river	Test lagoon	Reference river	Overall
Bony bream	42.5	57.6	84.0	62.0
Hyrtl's tandan	17.1	1.9	5.6	10.0
Yellowbelly	9.6	5.9	1.3	5.6
Smelt	8.5	22.4	2.1	8.0
Gudgeons	3.4	0.6	3.3	3.0
Spangled perch	3.2	1.3	0.1	1.7
Carp	5.4	3.8	1.0	3.4
Goldfish	1.3	0.6	0.1	0.7
Mosquitofish	8.0	5.7	1.4	5.0

Introduced species contributed 15% of the catch at test river sites, 10% at lagoon sites and 3% at reference river sites. The reference rivers were again very different from each other with the Warrego showing a moderate to high diversity of native species (5 and 6), a relatively abundant fauna at one site, good numbers of Silver perch and Hyrtl's tandan and very low representation of introduced species (0.6%) while the Moonie showed similar or lower diversity (5 and 2), low to moderate abundance (69 and 82), no Silver perch or Hyrtl's tandan and 19% of the total catch was introduced species. Even so, this is a better result for the Moonie than was that of November 2005.

4.4 Macroinvertebrates

Table 4-4.1 summarises the macroinvertebrate data for all sites. 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 only evident with respect to taxa in the Balonne Minor and Moonie and with respect to abundance in the Balonne Minor. Given that these rivers only have two sites on them, this result has a probability of occurrence of 50% purely by chance.

The 105 surber samples and 8 dip net samples produced 22,476 individuals and 46 discrete taxa. The total number of taxa recorded from surber samples was 39 while from the dip nets it was 40. This reverses a trend over recent sampling events of a reduction in the number of individuals and the number of taxa per sample. The number of taxa per surber sample remains relatively low.

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

	Mean taxa (Surbers)	Taxa (dips)	Taxa Total	Individuals (surber)
Balonne at St George	9.6 +/- 1.7	12	20	214 +/- 65
Balonne at Mooramanna	7.2 +/- 1.8		12	59 +/- 20
Balonne at Whyenbah	6.8 +/- 1.3	22	26	105 +/- 32
Culgoa at Whyenbah	9.0 +/- 2.0		16	184 +/- 113
Culgoa at Cubbie	9.2 +/- 2.7		14	284 +/- 106
Culgoa at Woolerbilla	10.4 +/- 1.3		14	214 +/- 26
Culgoa at Balandool	10.2 +/- 1.5		15	204 +/- 56
Balonne Minor at Trafalgar	7.0 +/- 1.9	17	20	234 +/- 100
Balonne Minor at Meigunyah	8.4 +/- 1.9		13	264 +/- 152
Narran at Donegri	7.8 +/- 0.8		12	174 +/- 110
Narran at Clyde	11.0 +/- 1.0		19	206 +/- 37
Narran at Booligar	9.6 +/- 1.1		15	161 +/- 32
Balandool on Cubbie	9.8 +/- 1.3		17	269 +/- 60
Balandool on Euraba	NA			NA
Bokhara at Kirrima	12.2 +/- 1.8	15	24	513 +/- 109
Bokhara at Koala	11.0 +/- 3.4	20	26	172 +/- 156
Belah Creek	7.0 +/- 2.9		12	39 +/- 18
Police Lagoon	9.2 +/- 1.3	22	26	184 +/- 91
Clyde Lagoon	8.2 +/- 1.6	20	23	108 +/- 41
Chinaman Ck	8.8 +/- 0.8		15	108 +/- 24
Warrego at Shannonvale	NA			NA
Warrego at Tinnenburra	NA			NA
Moonie at Nindigully	14.0 +/- 1.2		19	195 +/- 70
Moonie at Fenton	15.2 +/- 3.6	23	26	109 +/- 66

Abundance and diversity were probably reduced at sites recently affected by the flow, such as Mooramanna and Whyenbah. Floodplain sites generally showed slightly lower abundance than riverine sites and this is the opposite of what has generally been seen to date.

The most common taxa in surbers were copepods (32.9%), ceratopogonids (27.1%) and Chironominae (13.3%). The most common taxa in dip nets were copepods (20.2%), Orthocladiinae (13.3%) and Chironominae (11.1%). At many sites, and particularly in dip net samples, many of the individuals were noted as being very early instars or recent hatchlings.

The number of *Macrobrachium* and *Cherax* recorded in bait traps continued to be relatively high.

4.5 Current Status

Drought conditions continued prior to the sampling period with only a minor flow in December and a compensation flow during the early part of sampling.

Water quality results were good, possibly due to the extended low-level flows prior to and during sampling.

The fish species complement was in line with historical results but the distribution and abundance of Hyrtl's tandan was quite unexpected, as was the large number of small Yellowbelly. *Porochilus rendahli* is a new record for the Lower Balonne and

has only recently been recorded in the Balonne above Beardmore Dam (DPI pers. comm.). Prior to this it was only known from rivers further west. The changes in native species relative abundance were evident at both test and reference sites so probably reflect conditions over the entire region rather than specific conditions in the Lower Balonne. The very good results at Warrego River sites continues to be in stark contrast to that from our two reference sites on the Moonie River. DNRM&W has recently commenced a study on the Moonie and our sites at Nindigully and Fenton are included.

It is encouraging that the trend of decreasing abundance and taxonomic richness per sample amongst the macroinvertebrates was reversed on this occasion. This may in part reflect recolonisation following the low summer flows as sites samples during that event, or sites not affected by the event, continue to show relatively poor results.

5. References

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