



APPENDIX D-6 FRC ENVIRONMENTAL FITZROY RIVER TURTLE SURVEY

Connors River Dam

Fitzroy River Turtle Survey, August 2010.

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1 Introduction and Survey Description

In August 2010, SunWater commissioned frc environmental to undertake a survey of the Fitzroy River turtle (*Rheodytes leukops*) across the Connor's River Dam study area.

Surveys were conducted over 7 days commencing the 7th August, from downstream of the proposed dam wall, through the proposed inundation area and upstream into a number of tributaries of the Connor's River. Figure 1.1 shows the survey sites, whilst Appendix A provides a description of each site. Raw 'pole-cam' and hand-held underwater video footage of turtles and other fauna from this survey is presented on the enclosed DVD

Conditions throughout the survey area were generally fine, but water clarity varied substantially, from very good to poor (< 40 cm) following rainfall. Heavy local rainfall on Tuesday August 10th significantly reduced in-water visibility and subsequently both slowed progress and reduced the likelihood of observing / capturing turtles. Temperatures (air) ranged from below 0 C over night, to approaching 30 C during most days, whilst daily rainfall ranged between 0 and 58 mm.

A total of 19 sites were visited (Table 1-1). All sites were surveyed during the day, 12 of these were re-visited and surveyed at night. At each site, surveys consisted of a combination of: muddling, dip-netting, snorkelling, evening spotlighting, remote underwater video, and ad-hoc observation, with the suite of methods employed dependent on the conditions encountered. Seine nets were not used because conditions were generally unsuitable. A summary of the sampling methods and effort employed at each site is presented in Table 1-1.

With the focus of this study being to assess the presence and distribution of the Fitzroy River turtle in the Connor's River Dam study area, the sampling effort afforded at each site was generally less than would be required to determine, for example, total abundance. The results of this survey are not intended to provide a detailed description of the population of Fitzroy River turtles in the study area. In particular, lesser confidence should be placed in the absence of Fitzroy River turtles at sites that could only be surveyed during the day. Steep banks (site 17) and heavy local rainfall (sites 6,8 and 9) restricted night surveys.

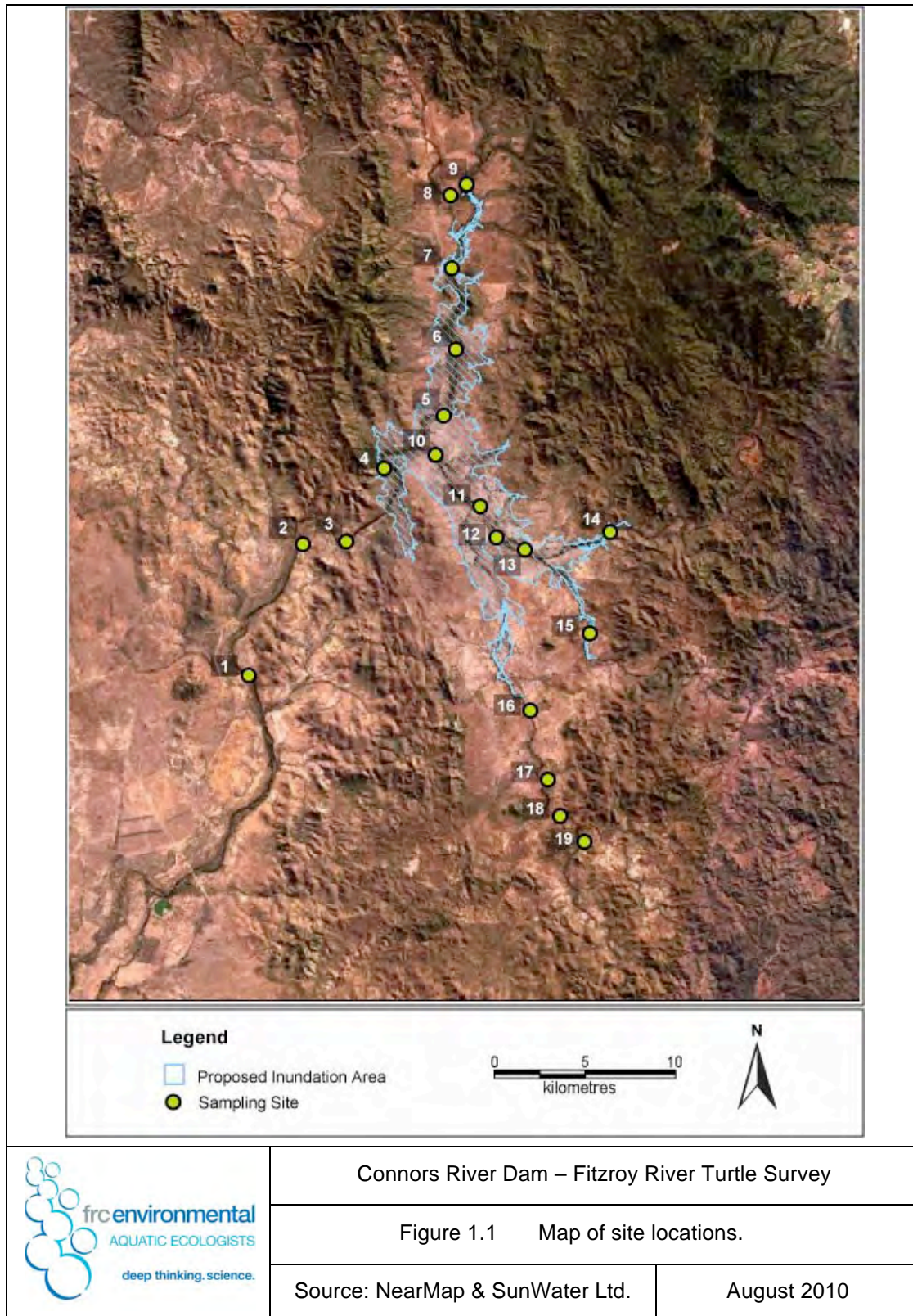


Table 1-1 Summary of sampling effort.

Site	Waterway	Night Sampling	Day Sampling	Effort (person hours)
1	Connors River	-	Muddle, Observation	1.5
2	Connors River	Spotlight, Dipnet, Muddle	Muddle, Observation	10.5
3	Connors River	Spotlight, Dipnet	Observation	9.0
4	Connors River	Spotlight, Dipnet, Muddle	Snorkel, Muddle, Observation	3.0
5	Murray Creek	Spotlight, Dipnet	Observation	4.5
6	Murray Creek	-	Observation	1.5
7	Murray Creek	Spotlight, Dipnet, Muddle	Observation	3.0
8	Murray Creek	-	Muddle, Observation	3.0
9	Murray Creek	-	Observation	1.5
10	Connors River	Spotlight, Muddle	Muddle, Observation	1.5
11	Connors River	Spotlight, Dipnet	Observation	3.0
12	Whelan Creek	Spotlight, Muddle	Muddle, Observation	1.5
13	Whelan Creek	Spotlight, Muddle	Camera, Observation	1.5
14	Cattle Creek	Spotlight, Dipnet, Muddle	Muddle, Observation	4.5
15	Whelan Creek	Spotlight, Muddle	Observation	2.0
16	Collaroy Creek	Spotlight, Dipnet	Observation	3.0
17	Collaroy Creek	-	Observation	1.0
18	Collaroy Creek	-	Muddle, Observation	1.5
19	Collaroy Creek	-	Observation	1.5

Figure 1.2

Mudde sampling at site 8.



Figure 1.3

Sampling with the pole-mounted video camera at site 13.



Figure 1.4

Dip-netting from the boat at night at site 14.



Figure 1.5

Dip-netting on foot at night at site 7.



Figure 1.6

Snorkelling at site 4.



2 Results

2.1 Habitat

The habitat values of each site surveyed are described in Appendix A. Habitat surveyed included shallow pools and glides, deep pools and runs, and riffles. Riparian vegetation was intact at all sites, and banks varied from shallow sloping sand and cobble, to steeply sloping earth. Bed substrates varied from fine silts and detritus to sands and cobbles. Most sites had elements of large woody debris. Below the proposed dam site, the river was commonly wide and deep, with the upper reaches of tributaries being of substantially reduced dimensions.

The recorded occurrence of turtles (including the Fitzroy River turtle) was not considered a definitive indication of distribution, as suitable habitat (including nesting banks) is present within many of the more substantial reaches surveyed (including those above the proposed inundation area).

2.2 Fitzroy River Turtle (*Rheodytes leukops*)

Fitzroy River turtle were sighted¹ / captured at six sites across the survey area. A summary of the Fitzroy River turtle abundance is presented in Table 2-1. Details of turtle abundance, behaviour, sex, and habitat at each site are set out in Table 2-2.

Table 2-1 Summary of Fitzroy River turtle at survey sites.

Site	Number captured / sighted ¹	Catch per Unit Effort	Sampling Method
2	3 / 1	0.38	Night muddle and spotlight
3	0 / 1	0.11	Night Spotlight
4	2 / 4	2.00	Night Spotlight
7	0 / 2	0.67	Night Spotlight
11	2 / 0	0.67	Night Spotlight
13	0 / 1	0.67	Day observation

¹ Sightings refer to 'confirmed sightings', where the observer was able to get to within approx. 1 m of the turtle.

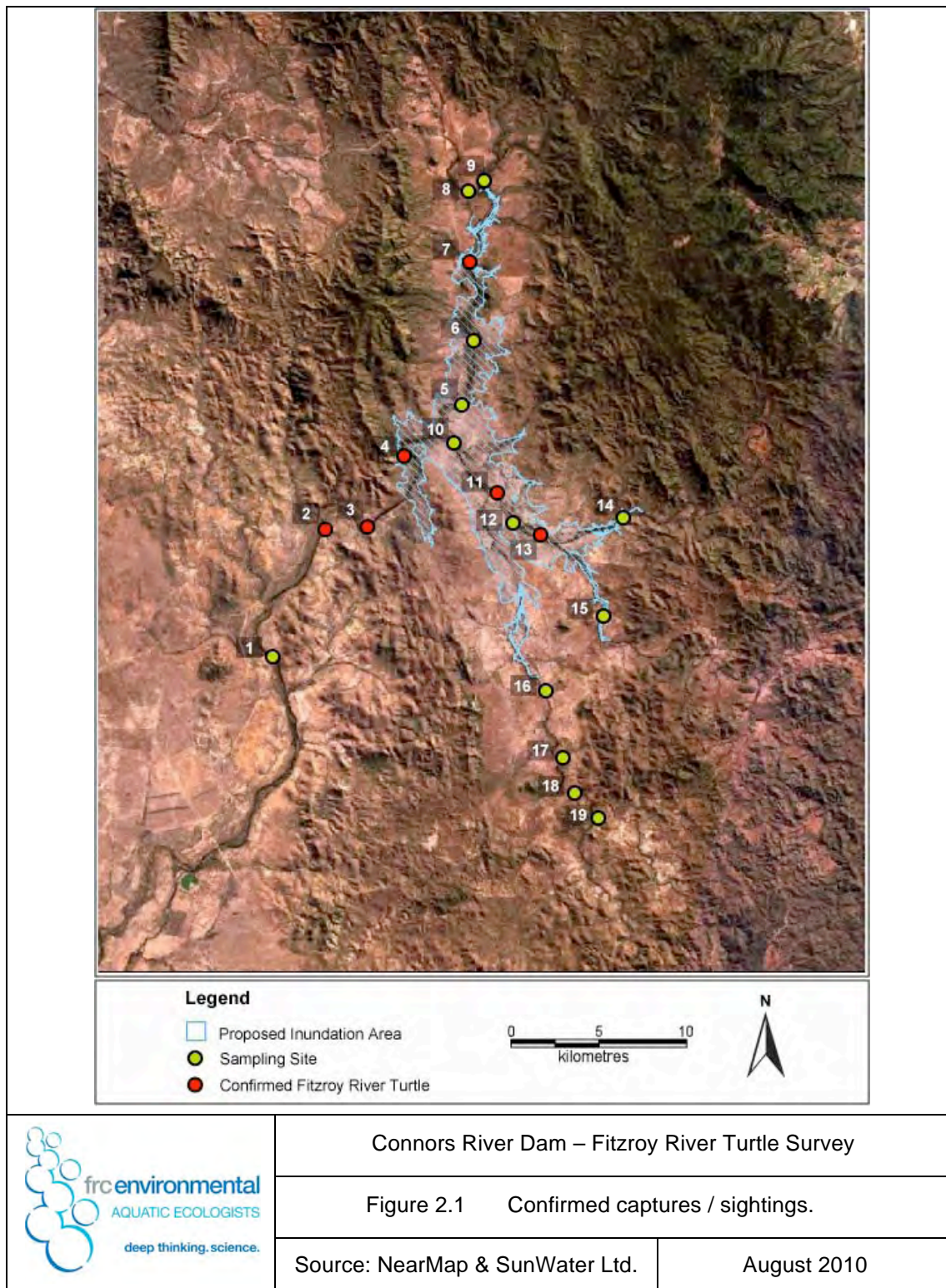


Table 2-2 Details of Fitzroy River turtles observed at survey sites.

Site	Habitat	Depth	Behaviour	Carapace length (cm)	Sex ²
2	Log tangle	0.7 m	Resting	—	Female
2	Log tangle	0.5 m	Resting	—	Female
2	Riffle	0.1 m	Courting	24.8	Female
2	Riffle	0.1 m	Courting	—	Male
3	Log tangle	0.8 m	Resting	—	Female
4	Rocks	0.9 m	Resting	24.7	Female
4	Open water	0.3 m	Swimming	—	Female
4	Open water	0.5 m	Swimming	—	Female
4	Open water	0.3 m	Swimming	—	Female
4	Open water	0.7 m	Swimming	23.7	Female
4	Open water	0.5 m	Swimming	24.5	Female
7	Log tangle	0.6 m	Resting	—	Female
7	Open water	0.3 m	Swimming	—	Female
11	Log tangle	0.5 m	Resting	—	Female
11	Open water	0.2 m	Swimming	25.1	Female
13	Log tangle	Surface	Surfacing	—	Female

² Sex determination of *R. leukops* based on external features (inc. tail length) should not be considered definitive.

Figure 2.2

Close up of Fitzroy River turtle captured at site 2.



Figure 2.3

Fitzroy River turtle being released at site 11.



2.3 Carapace, Eggs and Eggshell

Eggshells were photographed and collected at sites 1 and 4. Based on both size of the eggshells and the time of year of the survey, it is considered likely that all collected shells are from white-throated snapping turtle nests.

No carapaces or intact eggs were observed during the survey.

Figure 2.4

Eggshells at site 4, with illustration of scale.



2.4 Other Turtles

The white-throated snapping turtle (*Elseya albagula*) and Krefft's River turtle (*Emydura krefftii*) were also recorded in the survey area. Details of their abundance at each site are set out in Table 2-3.

Table 2-3 Summary of other turtle species observed at the survey sites.

Site	<i>Elseya albagula</i>			<i>Emydura krefftii</i>			Sampling Method
	Male	Female	Size (cm)	Male	Female	Size (cm)	
2	0	3	35.0	0	0	—	Night muddle, day observation
3	2	0	—	0	0	—	Night spotlight
7	0	1	38.0	0	0	—	Night muddle
8	1	0	37.0	0	0	—	Day muddle
14	0	2	42.0	1	5	25 – 32	Night spotlight
16	0	0	—	2	0	27 – 30	Night spotlight

Figure 2.5

A Krefft's River turtle (*Emydura krefftii*) at site 14.



Figure 2.6

A white throated snapping turtle at site 8.







Figure 2.7

Fitzroy River turtle and white-throated snapping turtle side by side at site 2.



Appendix A Habitat Description for Individual Survey Sites.

Site	Description	Photograph	
<p>Site 1 Easting: 713283 Northing: 7553461</p>	<p>This site was relatively narrow (5 m) and shallow (0.5m). The banks were steeply sloped, but stable. The riparian zone ranged between 20 m on the right and 50 m on the left banks respectively. The vegetation was dominated by Melaleuca trees less than 10 m high. Instream habitat included small amounts of woody debris, trailing bank vegetation, instream vegetation and roots. The substrate was dominated by cobbles, pebbles and sand.</p>		
<p>Site 2 Easting: 716071 Northing: 7560281</p>	<p>This site included a shallow riffle (0.8 m) and a deep pool (>4 m). A large (> 2 km) pool was located immediately upstream. The river was wide (20 m) with moderately stable banks. The riparian zone ranged between 20 m on the left bank and 30 m on the right bank. Melaleuca trees greater than 10 m high dominated the vegetation. Instream habitat was dominated by large woody debris with undercut banks and overhanging vegetation and traces of small woody debris, trailing bank vegetation and detritus. The substrate was dominated by silt/clay, with small amounts of cobble, pebble, gravel and sand.</p>		

Site 3

Easting: 718146

Northing: 750464

This site comprised a long (>500 m), wide (50 m), deep (>4 m) pool. The banks were moderately stable with riparian vegetation between 20 m and 30 m wide on the left and right banks respectively. The dominant vegetation was Melaleuca trees greater than 10 m tall. Instream habitat included small and large woody debris, trailing bank and instream vegetation and roots, and detritus. The substrate was dominated by silt/clay with some sand present.



View upstream



View across large pool

Site 4

Easting: 720034

Northing: 7564360

This site was moderately wide (15 m) and deep (1 – 1.5 m). The banks were stable. Riparian vegetation was between 15 m wide on the left bank and 20 m wide on the right bank and dominated by Melaleuca. Instream habitat was dominated by large woody debris, with overhanging and trailing bank vegetation, and detritus also present. The substrate was dominated by silt/clay and sand with some cobble, pebble and gravel.



View above riffle habitat



View upstream

Site 5

Easting: 722868

Northing: 7566949

This site was wide (40 m) and deep (4.5 m). The banks were moderately stable. Riparian vegetation ranged between 20 m and 25 m wide on the left and right banks respectively. It was dominated by eucalypts greater than 10 m tall. Instream habitat was dominated by large woody debris with some small woody debris, overhanging vegetation, detritus, and undercut banks. The substrate was dominated by sand with silt/clay and gravel.



View upstream



View of log tangle mid reach

Site 6

Easting: 723646

Northing: 7570440

This site was moderately wide (15 m) and deep (<2 m). The banks were moderately stable with riparian vegetation consisting of eucalypt, melaleuca, and callistemon. Instream habitat comprised small and large woody debris, overhanging vegetation, detritus and some undercut banks. The substrate was sand dominant with cobble, pebble, gravel and silt/clay.



View upstream



View of nesting habitat

Site 7

Easting: 723506

Northing: 7574660

This site was wide (25 m) and deep (>4 m). Riparian vegetation was 20 m wide on the left bank and 25 m wide on the right bank. It comprised eucalypt and callistemon less than 10 m tall. Instream habitat included large woody debris and overhanging vegetation with some small woody debris and trailing bank vegetation. The substrate was dominated by silt/clay with some sand, cobble and pebble.



View upstream



View of nesting habitat

Site 8

Easting: 723513

Northing: 7578467

This site was narrow (7 m) and shallow (0.5 m) with stable banks. Riparian vegetation width was 30 m and 15 m on the left and right banks respectively. The vegetation was dominated by eucalypt and callistemon greater than 10 m. Instream habitat included small and large woody debris, trailing bank vegetation and some undercut banks. The substrate was silt/clay dominant with some sand, cobble, pebble and gravel.



View upstream



View of log tangle

Site 9

Easting: 724236

Northing: 7578939

This site was narrow (6 m) with shallow (<1 m) and deep (>2 m) sections. Riparian vegetation was 25 m wide on the left bank and 30 m wide on the right bank. It consisted of eucalypt, casuarina and callistemon. Instream habitat included large woody debris, overhanging and trailing bank vegetation. The substrate was dominated by silt/clay with sand and some gravel.



View upstream



View of woody debris

Site 10

Easting: 722517

Northing: 7564918

This site was narrow (8 m) and shallow (0.5 m). The riparian zone width was 15 m on the left bank and 20 m on the right bank. Eucalypts and melaleuca dominated the riparian vegetation. Instream habitat consisted of large and small woody debris, some undercut banks, trailing bank vegetation and detritus. The substrate was dominated by silt/clay and sand with some cobble, pebble and gravel.



View upstream

Site 11

Easting: 724656

Northing: 7562272

This site was moderately wide (35 m) and deep (2 m). Instream habitat was dominated by large woody debris with some small woody debris, trailing bank vegetation and detritus. The riparian zone was wide, 40 m and 50 m on the left and right banks respectively. The riparian vegetation consisted of eucalypts, melaleuca and callistemon. The substrate was dominated by silt/clay with some sand.



View upstream



View downstream

Site 12

Easting: 725484

Northing: 7560711

This site included a braided channel. The southern braid was dry, while the northern braid was narrow (8 m) and shallow (0.5 m). The riparian zone was wide, 40 m on the left bank and 30 m on the right bank. Riparian vegetation was a combination of eucalypts, melaleuca, casuarina and callistemon and greater than 10 m tall. Instream habitat included large and small woody debris, some undercut banks, overhanging and trailing bank vegetation and detritus. The substrate was dominated by sand, silt/clay, cobble, pebble and gravel.



View downstream



View upstream

Site 13

Easting: 726816

Northing: 7559922

The river at this site was divided into two branches. The southern branch was wide (40 m) and deep (>4 m). The northern branch was narrow (8 m) and shallow (1 m). The riparian zone was 50 m wide and 40 m wide on the left and right banks respectively. The riparian vegetation consisted of eucalypts, melaleuca, casuarina and callistemon. Instream habitat was dominated by large woody debris, overhanging and trailing bank vegetation. Some small woody debris and undercut banks were also present. The substrate in the southern branch was dominated by sand, with silt/clay, cobble, pebble and gravel. The substrate in the northern branch was dominated by silt/clay with some sand, cobble, pebble and gravel.



View upstream in southern branch



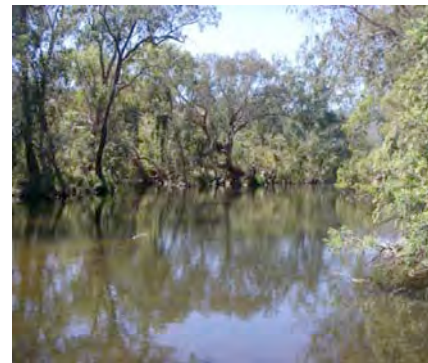
View upstream in northern branch

Site 14

Easting: 730897

Northing: 7560767

This site was moderately wide (15 m) and shallow (0.8 m). The banks were stepped with a riparian zone wider than 200 m on both the left and right banks. The riparian vegetation included eucalypts, melaleuca, casuarina and callistemon. Instream habitat was dominated by large woody debris, with small woody debris, trailing bank vegetation, some undercut banks and detritus. The substrate consisted of cobble, pebble, gravel and sand, with some boulder and silt/clay.



View upstream



View across top of riffle

Site 15

Easting: 729937

Northing: 7555464

This site was relatively wide (20 m) and deep (>4 m). The banks were stepped and stable. The riparian zone width was 40 m and 60 m on the left and right banks respectively. The riparian vegetation included eucalypts, melaleuca, casuarina and callistemon. Instream habitat included large woody debris, detritus, trailing bank vegetation and some undercut banks. The substrate was dominated by sand, with some silt/clay, cobble, pebble and gravel.



View upstream



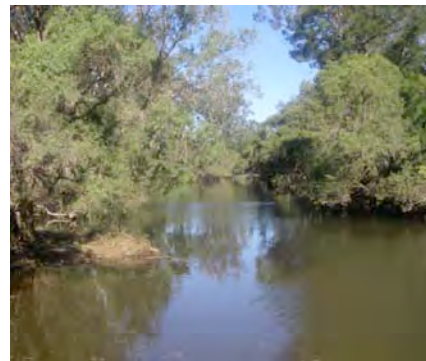
View of log tangle

Site 16

Easting: 726917

Northing: 7551517

This site was relatively wide (20m) and deep (3 m). It had stable, stepped banks. The riparian zone was wide, 80 m and 60 m on the left and right banks respectively. Eucalypts and callistemon dominated the riparian vegetation. Instream habitat was dominated by large woody debris with small woody debris, trailing bank vegetation, detritus and some undercut banks. The substrate was dominated by silt/clay with cobble, pebble, gravel and sand present.



View upstream



View downstream

Site 17

Easting: 727750

Northing: 7547731

This site was relatively wide (20 m) and deep (>4 m). The riparian zone was wide, 60 m and 40 m on the left and right banks respectively. Eucalypts, melaleuca and callistemon dominated the riparian vegetation. Large woody debris dominated the instream habitat, with small woody debris, undercut banks, trailingbank vegetation and detritus also present. The substrate was dominated by silt/clay with some sand and gravel.



View downstream



View upstream

Site 18

Easting: 728333

Northing: 7545960

This site was relatively narrow (10 m) and shallow (0.8 m). The banks were stable and the right bank was stepped. The riparian zone was wide: 50 m on the left bank and 80 m on the right bank. Eucalypts, callistemon and casuarina dominated the riparian vegetation. Instream habitat included large and small woody debris, some undercut banks and trailing bank vegetation. The substrate included cobble, pebble, gravel, sand and silt/clay.



View upstream



View downstream

Site 19

Easting: 729542

Northing: 7544590

This site was moderately wide (18 m) and deep (1.5 m). The banks had low stability, with evidence of scouring and cattle damage. The riparian zone was relatively wide on both the left (50 m) and right (30 m) banks. Riparian vegetation was dominated by eucalypts, casuarina and callistemon. Instream habitat was limited with small amounts of woody debris and trailing bank vegetation. The substrate was predominantly sand with some silt/clay, bedrock, cobble, gravel and pebble.



View upstream



View of log tangles