Nathan Dam

Fitzroy River Turtle Distribution, Reproductive Condition and Nesting Survey, 2010.

Prepared for:

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1 Introduction and Survey Description

In October 2010, SunWater commissioned frc environmental to survey the distribution of the Fitzroy River turtle (*Rheodytes leukops*) in the Dawson River across the proposed Nathan Dam study area.

Surveys were conducted over 11 days commencing the 29th October. Dawson River sites were surveyed from downstream of the proposed dam site, beginning at Theodore Weir, through the proposed inundation area and upstream of the proposed inundation area. Sites were also surveyed on the Cockatoo Creek tributary within and upstream of the inundation area. Figure 1.1 shows the survey sites, whilst Appendix A provides a description of each site.

Conditions throughout the survey area were generally fine, however water clarity was extremely poor because of un-seasonally early heavy rainfall and consequent high flow events within the catchment. High flows reduced in-water visibility and some sites suitable for survey in low flow conditions were considered unsafe to survey. These conditions restricted the survey methods able to be used: emphasis was placed on netting and muddling. Temperatures (air) ranged from 8.6°C over night, to 32°C during most days, whilst daily rainfall ranged between 0 and 5 mm at Taroom. Flows recorded at gauging stations within the study area ranged between 0.8 m and 2.8 m, with water levels classified as steady or rising during the survey.

A total of 13 sites were visited (Table 1.1). All sites were surveyed during the day; Theodore Weir was also surveyed at night. At each site, surveys consisted of a combination of: muddling, dip-netting, evening spotlighting, net blockades using fyke and seine nets, and ad-hoc observation, with the suite of methods employed dependent on the conditions encountered at each site. A summary of the sampling methods and effort employed at each site is presented in Table 1.1.

With the focus of this survey being to assess the presence, distribution and reproductive / nesting status of the Fitzroy River turtle in the Nathan Dam study area, the sampling effort afforded at each site was generally less than would be required to determine, for example, total abundance. The absence of Fitzroy River turtles at sites cannot be considered definitive for the area as sampling techniques were limited and it was not possible to use the preferred survey techniques for Fitzroy River turtles (spotlighting and snorkelling). Poor visibility restricted night surveys, and poor visibility and flow conditions restricted snorkelling.

Where turtles were captured they were palpated and examined using ultrasound for the presence of eggs and mature follicles (which become eggs). Observational searches for nests and eggshells and the use of ultrasound are effective, but not infallible methods and it is possible that reproductive activity is both more widespread and 'numerous' than was observed during the survey.

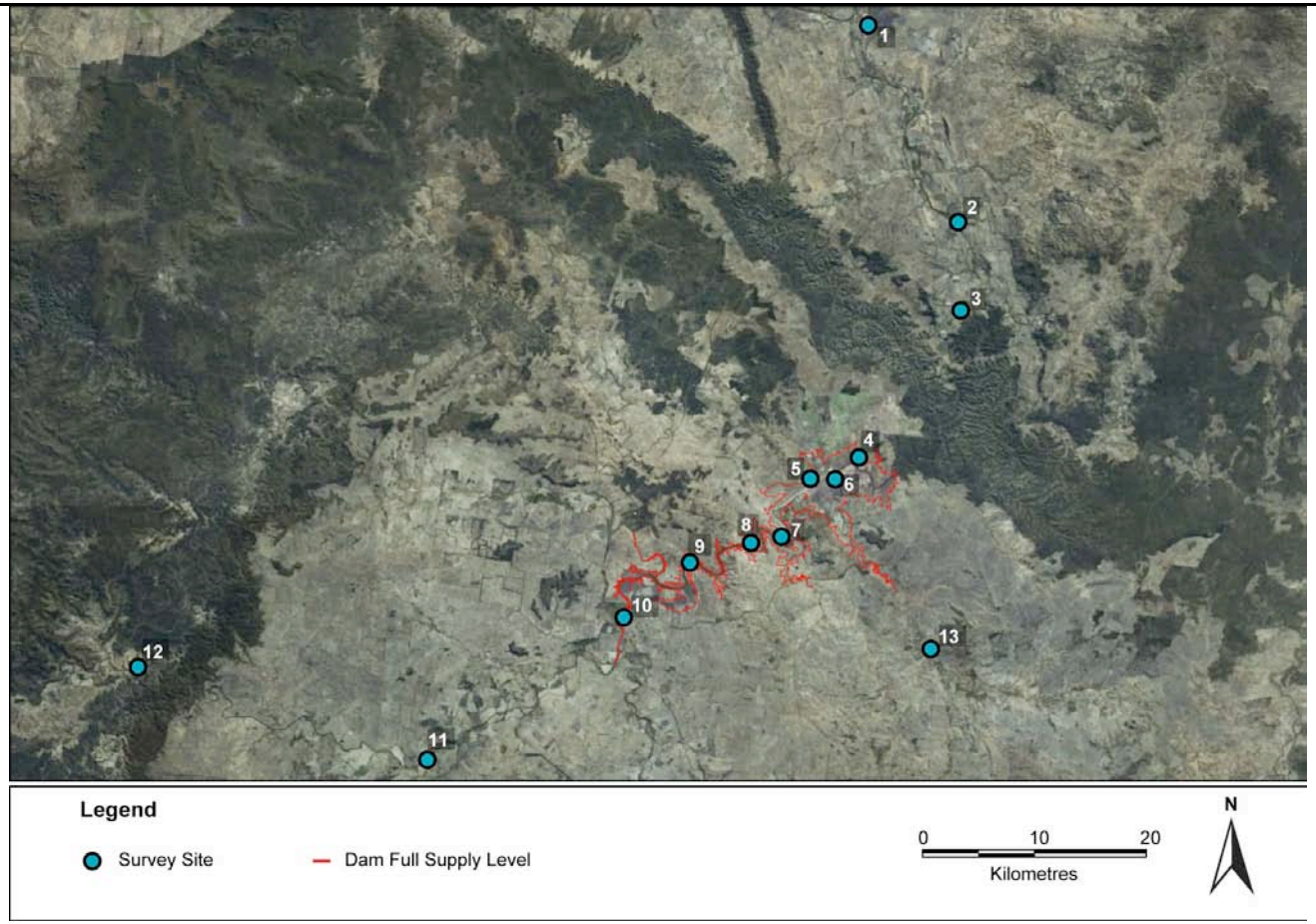

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	Figure 1.1 Map of site locations.	
	Source: Google Earth 2010, Sunwater Pty. Ltd.	November 2010

Table 1.1 Summary of sampling effort, October / November 2010[1]

Site	Waterway	Night Sampling	Day Sampling	Effort (person hours)
1	Dawson River	Spotlight	Muddle, Observation, Fyke & Seine Nets, Dipnet	12.5
2	Dawson River	-	Observation	1.5
3	Dawson River	-	Observation, Fyke & Seine Nets, Dipnet	4.5
4	Dawson River	-	Muddle, Observation, Fyke & Seine Nets, Dipnet	4.0
5	Dawson River	-	Muddle, Observation, Fyke & Seine Nets, Dipnet	4.5
6	Cockatoo Creek	-	Muddle, Observation, Fyke & Seine Nets, Dipnet	6.0
7	Dawson River	-	Muddle, Observation, Fyke & Seine Nets, Dipnet	3.0
8	Dawson River	-	Muddle, Observation, Fyke & Seine Nets, Dipnet	3.0
9	Dawson River	-	Observation	3.0
10	Dawson River	-	Muddle, Observation, Fyke & Seine Nets, Dipnet	4.5
11	Dawson River	-	Muddle, Observation, Dipnet	1.0
12	Dawson River	-	Muddle, Observation, Fyke & Seine Nets, Dipnet	3.0
13	Cockatoo Creek	-	Muddle, Observation, Dipnet	1.0

[1] Does not include egg and nest search.

Figure 1.2

Net blockade of flowing main channel at site 4.

Figure 1.3

Disturbing habitat and moving towards net blockade at site 10.

Figure 1.4

Dip-netting on foot in deep water at site 11.

Figure 1.5

Muddling at site 11.

Figure 1.6

Net blockade of connected backwater at site 8.

Figure 1.7

Net blockade at edge of weir pool at site 6.

2 Results

2.1 Habitat

Habitat assessments were completed during the survey. The habitat values of each site surveyed are described in Appendix A. Habitat surveyed included shallow pools, deep pools and runs, and rapids. Riparian vegetation was intact at all sites, with most dominated by mature forests. Banks varied from gentle to steeply sloping earth; grasses and weeds were generally sparse, with bare earth and evidence of stock access. Bed substrates were predominantly fine silts and sand with some pebbles and cobbles at upstream sites and downstream of Theodore Weir. Most sites had elements of large woody debris. The river ranged between wide and deep upstream of weir pools, to comparatively narrow elsewhere. Sites unaffected by weir pools showed some braiding, with banks damaged by earlier flooding.

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

2.2 Fitzroy River Turtle (*Rheodytes leukops*)

Fitzroy River turtle were not sighted[2] or captured in the survey area.

Anecdotal information from local landholders indicated that Fitzroy River turtles have not been sighted in the region recently and that sightings have declined since major flooding in the Dawson River in March 2010.

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

2.3 Carapace, Eggs and Eggshell

Eggshells were photographed and collected at sites 6 and 8 (Table 2.1). Based on the size of the eggshells it is considered possible that some of the collected shells are from Fitzroy River turtles or Krefft's River turtles[3]. A single nest was observed at site 6.

A single Krefft's River turtle carapace was collected at site 6.

Figure 2.1

Eggshells and nest on right bank at site 6.

Figure 2.2

Eggshells on left bank at site 6.

[3] Eggshells are being provided to Dr Colin Limpus, DERM for species confirmation.

Table 2.1 Eggs, eggshell and nests observed at survey sites, October / November 2010.

Site	Total Egg Clusters	No. of Shells	Total Nests Observed	Habitat	Predation	Notes
6	5	~12	0	Fine earth - silt	Unknown	Shells only, approximately 3 m from water, leaf litter present
6	5	~5	0	Fine earth - silt	Unknown	Shells only, approximately 1.5 m from water, leaf litter present
6	5	1	0	Fine earth - silt	Unknown	Shells only, approximately 2 m from water, leaf litter present
6	5	>2	1	Fine earth - silt	Unknown	Nest shallow, approximately 3.5 m from water, leaf litter present
6	5	~10	0	Fine earth – sand/silt	Unknown	Shells only, 2-3 m from water
8	2	1	0	Open sand	Unknown	Sandy bank, some grasses present, approximately 2 m from the water. Both eggs may be from same nest, but were widely scattered.
8	2	1	0	Open sand	Unknown	Sandy bank, some grasses present, approximately 2 m from the water. Both eggs may be from same nest, but were widely scattered.

2.4 Other Turtles

The white-throated snapping turtle (*Elseya albagula*), Krefft's River turtle (*Emydura macquarii krefftii*), eastern snake-necked turtle (*Chelodina longicollis*) and broad-shelled turtle (*Chelodina expansa*[4]) were recorded in the survey area. Details of their abundance at each site are set out in Table 2.2. Six unidentified basking turtles were observed at site 6 and three unidentified basking turtles were observed at site 7.

[4] Identification confirmed by B. Chessman.

Table 2.2 Summary of other turtle species observed at the survey sites, October / November 2010.

Site	*Elseya albagula*			*Emydura m. krefftii*			*Chelodina longicollis*			*Chelodina expansa*			Sampling Method
	Sex	Size (cm)[5]	Weight (kg)	Sex	Size (cm)[6]	Weight (kg)	Sex	Size (cm)	Weight (kg)	Sex	Size (cm)	Weight (kg)	
3				Unknown	Medium	--							Observation
3				Unknown	Medium	--							Observation
3				Unknown	Medium	--							Observation
3				Unknown	Medium	--							Observation
3				Unknown	Medium	--							Observation
3				Unknown	Medium	--							Observation
3				Unknown	Medium	--							Observation
4										Unknown	33.1	4.35	Net blockade
5	Unknown	Medium	--										Observation
5	Unknown	Medium	--										Observation
8							Unknown	25.4	2.0				Net blockade
9				Unknown	--	--							Observation

[5] Size for observed turtles is a visual estimate only. Size classes are: small - <15 cm, medium - 15-30 cm, large - >30 cm

[6] Size for observed turtles is a visual estimate only. Size classes are: small - <15 cm, medium - 15-30 cm, large - >30 cm

Figure 2.3

An eastern snake-necked turtle (*Chelodina longicollis*) caught using fyke nets at site 8.

Figure 2.4

A white throated snapping turtle (*Elseya albagula*) basking at site 5.

Figure 2.5

A Krefft's River turtle basking at site 3.

Figure 2.6

A broad-shelled turtle (*Chelodina expansa*) caught using nets at site 4.

Appendix A Habitat Description for Individual Survey Sites.

Site	Description	Photograph
Site 1 Easting: 204540 Northing: 7236581 Zone: 56J	This site was broad upstream of the weir (50 m), comparatively narrow downstream of the weir (20 m) and deep (>2 m). The banks were moderately sloped and stable. The riparian zone ranged between 20 m on the left and 30 m on the left banks respectively. The vegetation was dominated by melaleuca and eucalypt trees greater than 10 m high. Instream habitat included moderate amounts of woody debris, and traces of trailing bank vegetation, instream vegetation and roots. The substrate on the margins of the weir pool was dominated by silt and sand. Downstream of the weir it was dominated by cobble and gravel.	 View upstream – right bank  View downstream of weir
Site 2 Easting: 216152 Northing: 7212069 Zone: 56J	This site was affected by high and fast flowing water. The river was wide (30 m) with moderately stable banks. There was evidence of large areas of the banks being washed awat in earlier floods. The riparian zone ranged between 10-30 m on the left bank and 20 m on the right bank. Eucalypt and palm trees greater than 10 m high dominated the vegetation. Instream habitat was included some large woody debris and traces of overhanging vegetation, small woody debris, trailing bank vegetation and detritus. The substrate could not be determined because of the flow.	 View upstream  View downstream

Site 3

Easting: 216331

Northing: 7200589

Zone: 56J

This site comprised a long (>500 m), wide (250 m), deep (>2 m) pool. The banks were moderately stable with riparian vegetation between 15 m and 20 m wide on the left and right banks respectively. The dominant vegetation was melaleuca and palm trees greater than 10 m tall. Instream habitat included small and large woody debris, some instream vegetation and roots, and detritus. The substrate along the edges was dominated by silt/clay with some sand present.

View across weir pool

View downstream

Site 4

Easting: 204842

Northing: 7181554

Zone: 56J

This site was moderately wide (25 m) and deep (1 – 1.5 m). The banks were moderately stable. Riparian vegetation was between 50 m wide on the left bank and 20 m wide on the right bank and dominated by eucalypts. Instream habitat was dominated by large woody debris, with overhanging and vegetation and detritus also present. Evidence of cattle access was present on the banks. The substrate was dominated by silt/clay and sand.

View downstream

View upstream

Site 5

Easting: 199053

Northing: 7178603

Zone: 56J

This site was wide (>100 m) and deep (>2 m). The banks were stable. Riparian vegetation ranged between 10 m and 15 m wide on the left and right banks respectively. It was dominated by eucalypts and melaleuca greater than 10 m tall. Instream habitat included some large woody debris, with traces of small woody debris, overhanging vegetation, detritus, and undercut banks. The substrate along the margins was dominated by silt/clay and sand.

View upstream

View along right bank

Site 6

Easting: 201855

Northing: 7179047

Zone: 56J

This site was wide (50 m) and deep (~2 m). The banks were stable with riparian vegetation consisting of eucalypt and melaleuca. Understorey vegetation was sparse and banks consisted of silty earth covered by leaf litter. Instream habitat comprised small and large woody debris, with traces of overhanging vegetation, instream vegetation including roots and detritus. The substrate along the margins consisted of sand and silt/clay.

View across creek

View of typical bank structure

Site 7

Easting: 798661

Northing: 7171427

Zone: 55J

This site was wide (125 m) and moderately deep (>1.5 m). Riparian vegetation was 15 m wide on the left bank and 25 m wide on the right bank. It comprised eucalypt and melaleuca greater than 10 m tall. The understorey vegetation was sparse, with lots of bare ground and evidence of cattle access present. Instream habitat included large and small woody debris with traces of overhanging and instream vegetation, including roots. The substrate was dominated by sand and silt/clay.

View upstream

View downstream

Site 8

Easting: 795281

Northing: 7170868

Zone: 55J

This site was moderately wide (25 m) and deep (~1.5 m). Banks were moderately stable, with some evidence of erosion during earlier flooding. Riparian vegetation width was 15 m and 30 m on the left and right banks respectively. The vegetation was dominated by eucalypt and melaleuca greater than 10 m. Instream habitat included small and large woody debris, with traces of overhanging and trailing bank vegetation and detritus. The substrate was silt/clay and sand dominant with some cobble, pebble and gravel.

View of nesting bank

View downstream

Site 9

Easting: 787795

Northing: 7168568

Zone: 55J

This site was moderately wide (30 m) and deep (1.5 m). Banks were moderately stable and consisted of silt/clay soil. Riparian vegetation was 50 wide on the left bank and 20 m wide on the right bank. It consisted of eucalypt and melaleuca trees generally greater than 10 m. Instream habitat included large and small woody debris, with overhanging and trailing bank vegetation and detritus. The substrate along the river edges was dominated by silt/clay and sand and historic photos (2008) indicate the presence of boulders, cobble, pebble and gravel.

View upstream

View downstream

Site 10

Easting: 780013

Northing: 7161482

Zone: 55J

This site was moderately wide (25 m) and deep (>1 m) with braided channels. The banks were sloping and moderately stable. Riparian zone width was 35 m on the left bank and 30 m on the right bank. Eucalypts dominated the riparian vegetation. Instream habitat consisted of large and small woody debris, some trailing bank and overhanging vegetation and detritus. The substrate was dominated by silt/clay and sand with some cobble, pebble and gravel.

View upstream – right braid

View downstream

Site 11

Easting: 756625

Northing: 7144245

Zone: 55J

This site was relatively narrow (15 m) and deep (1.5 m). Tha banks ranged between sloping and vertical, with areas of erosion present. Instream habitat had traces of large and small woody debris with some overhanging and trailing bank vegetation and detritus. The riparian zone was narrow, 5 m and 10 m on the left and right banks respectively. The riparian vegetation consisted of eucalypts, lomandra and castor oil plants. The substrate was dominated by silt/clay and sand with some cobble, pebble and gravel.

View upstream

View downstream

Site 12

Easting: 722285

Northing: 7156515

Zone: 55J

This site was relatively narrow (12 m) with deep (>1 m) and shallow (<0.5) areas. Rapid, run and pool habitats were present. The banks were moderately stable and ranged between sloping and vertical. There was evidence of recent bank erosion from previous high flow events. The riparian zone was narrow, 10 m on the left bank and 15 m on the right bank. Riparian vegetation was a combination of melaleuca, casuarina and callistemon and generally greater than 10 m tall. Instream habitat included large and small woody debris, with overhanging vegetation and some undercut banks, trailing bank vegetation and detritus. The substrate was dominated by sand, with cobble, pebble, gravel and silt/clay.

View downstream

View upstream

Site 13

Easting: 213926

Northing: 7157386

Zone: 56J

The creek at this site was very narrow (1.5 m) and shallow (0.5 m). The riparian zone was 15 m wide on both the left and right banks. The riparian vegetation consisted of eucalypts and melaleuca, with lomandra, grasses and exotic weeds Instream habitat included traces of large and small woody debris, overhanging and trailing bank vegetation and detritus. The substrate in the northern branch was dominated by silt/clay with some sand and gravel.

View upstream