



# Aquatic Reptile Survey of the Finniss River

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# Executive Summary

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In 2012, Hydrobiology (2013a) consulted with the Traditional Owners of various parts of the Finnis River. During these consultations Traditional Owners identified a number of aquatic reptiles as culturally significant. There is a large number of records of aquatic reptiles downstream of the Rum Jungle Mine; however we are not aware of any studies looking at the distribution and abundance.

This report summarises results of an aquatic reptile survey conducted within the vicinity of eight historical water sampling sites downstream and upstream of the former Rum Jungle Mine site during May 2014. Seventy-four aquatic reptiles were recorded during the survey.

Of particular interest, Merten's Water Monitors (*Varanus mertensi*) were found to be abundant along the Finnis River, but not present within the lower East Branch. Mitchell's Water Monitor (*Varanus mitchelli*) was also present in the lower Finnis River. Both of these species are listed as Vulnerable in the Northern Territory due to population declines associated with the introduced Cane Toad.

Freshwater turtles were recorded in the upper parts of the Finnis River. However despite a large survey effort only six individual turtles of two species were found.

Saltwater (*Crocodylus porosus*) and Freshwater Crocodiles (*Crocodylus johnstoni*) were recorded along both the upper and lower parts of the Finnis River. Saltwater Crocodiles (*C. porosus*) were not recorded from the East Branch.

The Finnis River is home to some populations of aquatic reptiles that are listed threatened species and/or culturally significant. It is recommended that some of these species be monitored during any works that could affect the water and habitat quality of the Finnis River.

Merten's and Mitchell's Water Monitors are listed Threatened Species in the Northern Territory and are considered culturally significant. Freshwater and Saltwater Crocodiles are also considered culturally significant. It is recommended that a monitoring program be undertaken during any works that could affect water and habitat quality of the Finnis River.

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# 1 Introduction

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A previous desktop review highlighted 165 known terrestrial vertebrate species from the Upper Finnis River (Hydrobiology 2013a). Despite a large number of database records we are unaware of any studies of the distribution and abundance of aquatic reptiles downstream of the former mine.

Historically the Finnis River was known to be well stocked with fish and freshwater crocodiles (Davy 1975). In addition to the freshwater crocodiles, the river is well known for being the original home to “Sweetheart”, a large saltwater crocodile (*Crocodylus porosus*) responsible for attacking boats in the 1970s (Stringer 2003). Unfortunately, “Sweetheart” was deemed a menace and was accidentally killed during his capture and subsequently became the most popular exhibit at the Northern Territory Museum and Art Gallery in Darwin.

While numerous surveys and monitoring have been conducted on the former Rum Jungle Mine site, mining began there before any formal requirement for environmental impact assessment (Low 2001). Despite a substantial amount of literature on fishes in the Finnis River system since mine closure (Hydrobiology 2013a), there does not appear to have been any other vertebrate work apart from crocodile monitoring (Manolis et al. 2002a; 2002b), a few incidental freshwater turtle captures (Jeffree & Twining 1992), a desktop fauna and flora survey of Browns Oxide (Low, 2001), and a fauna survey of the Area 55 Oxide project (Coffey Environments 2009).

In 2012, Hydrobiology (2013a) consulted with the Traditional Owners of various parts of the Finnis River. These consultations identified a number of aquatic reptiles as culturally significant. In particular Traditional Owners made frequent mention of the use of “turtle” or “freshwater tortoise”, primarily for food, but also as a totem animal and in ceremony. The use of both Freshwater (*Crocodylus johnstoni*) and Saltwater Crocodiles (*Crocodylus porosus*) was inferred from discussion as infrequent and opportunistically based. Both species were not actively sought by the groups in discussion, but were identified as important totem items and for use in ceremony. Importantly, Traditional Owners mentioned a lack of big goannas, inferred to be Yellow Spotted Monitors (*Varanus panoptes*), but also stated that the smaller Water Goanna, presumably Merten’s Water Monitor (*Varanus mertensi*), could still occasionally be seen at creek crossings.

Hydrobiology (2013b) recommended “a detailed survey of all the culturally significant aquatic reptiles downstream of the former Rum Jungle Mine to gain an understanding of species abundance and secondly to determine distribution in relation to the former Rum Jungle Mine should be conducted”. This report has been commissioned by Hydrobiology to address this recommendation.

## 2 Methods

### 2.1 Sampling Regime

The aquatic reptile survey was conducted within the vicinity of eight historical water sampling sites downstream and upstream of the former Rum Jungle Mine site (Figure 1 & Figure 2). Based on a site visit to each area, the following trapping regime was formulated based on suitability for conducting turtle trapping and/or crocodile counts (Table 1).

**Table 1. Sampling Regime for Finnis River Aquatic Reptile Survey**

Site	Goanna Searches	Turtle Trapping	Crocodile Spotlight Count
FC&LB	✓		
EB&LB	✓		
FRDSMB	✓	✓	✓
FRUSMB	✓	✓	✓
EBUSFR	✓	✓	✓
FR@GS204	✓	✓	✓
FR1	✓	✓	✓
FR2	✓	✓	✓

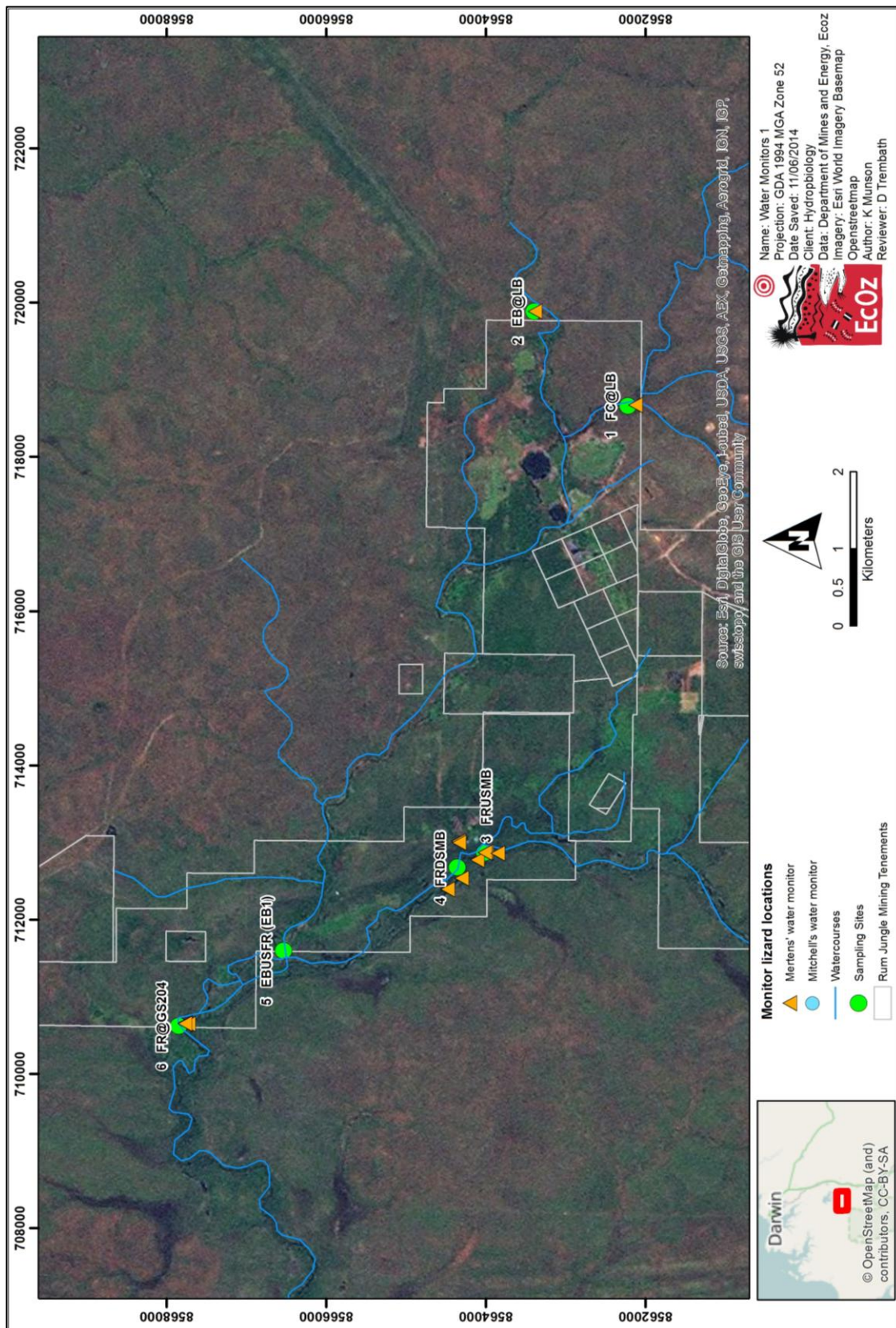
### 2.2 Goanna, Turtle and Crocodile Sampling

Goannas or monitor lizards (family Varanidae) were actively searched for on foot at each site (Table 1). Surveys were also conducted by boat along each bank of the entire stretch of each site and consisted of visual searches for basking monitors (Figure 3) as described in Doody et al. (2006).

Freshwater turtles were surveyed with cathedral traps of the design by Kuchling (2003). Eight traps baited with chicken frames were set during daylight hours for two days at each site (Table 1) (Figure 3). After the first day of trapping the traps were moved to a second area within the site. Traps were checked throughout the day.

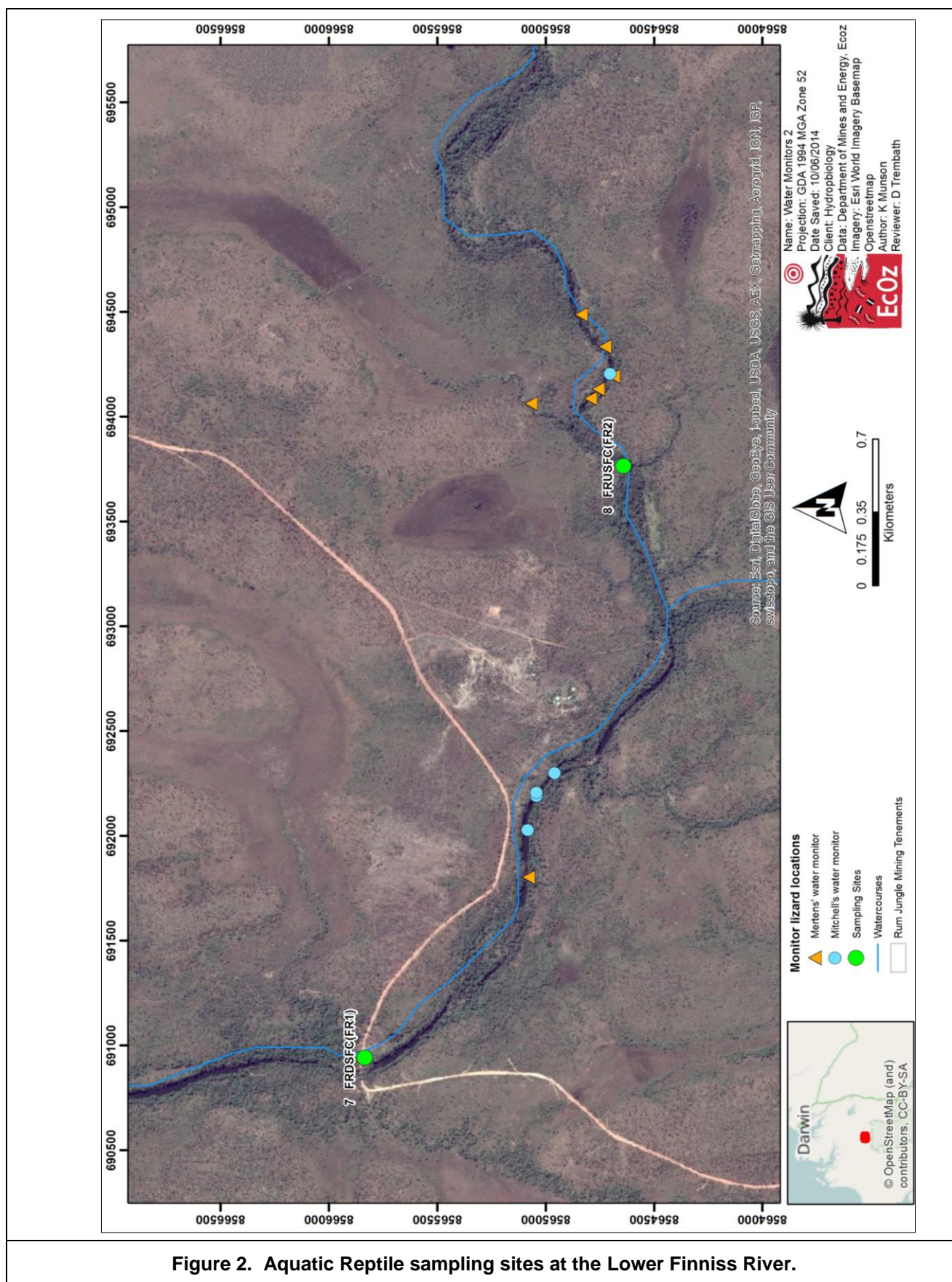
Freshwater and Saltwater Crocodiles were surveyed at each site at night (Table 1). Over two consecutive nights, a fifteen minute timed spotlight count was made of each site, where all the crocodiles present were counted and identified to species.





**Figure 1. Aquatic Reptile sampling sites at the Upper Finniss River.**





**Figure 2. Aquatic Reptile sampling sites at the Lower Finnis River.**





**Figure 3. Cathedral turtle trap and basking Mertens Water Monitor (*Varanus mertensi*) at the Finnis River.**

### 3 Results

Seventy-four aquatic reptiles were recorded during the survey (Table 2). Two species of monitor lizard were present at most sites along the Finniss River, with 22 Merten's Water Monitors (*Varanus mertensi*) (Figure 3) and five Mitchell's Water Monitors (*Varanus mitchelli*) recorded (Table 2; Figure 1 & Figure 2). No Monitor species were seen within the East Branch downstream of the former mine site. Two species of freshwater turtle were recorded across four sites (Table 2; Figure 4). Freshwater Crocodiles (*Crocodylus johnstoni*) were present at all sites surveyed except for the shallow intermittent sites in the headwaters of the East Branch, with the largest counts in the larger pools (FRDSMB, FR1 & FR2). Saltwater Crocodiles (*Crocodylus porosus*) were only present within sites that had larger pools (FRDSMB, FR1 & FR2).

**Table 2. Total number of records of Aquatic Reptile species observed and or captured during the survey.**

Site	Species							
	<i>Varanus mertensi</i>	<i>Varanus mitchelli</i>	<i>Emydura tanybaraga</i>	<i>Chelodina oblonga</i>	<i>Crocodylus johnstoni</i>		<i>Crocodylus porosus</i>	
					Night 1	Night 2	Night 1	Night 2
FC@LB	1							
EB@LB	1							
FRUSMB	6			1	2	2		
FRDSMB	4		1		4	3	2	2
EBUSFR				1	1	1		
FR@GS204	3		3		1			
FR1	1	1			3	3	1	2
FR2	6	4			4	6	2	2
Totals	22	5	4	2	30		11	





**Figure 4. Northern Long-necked Turtle (*Chelodina oblonga*) and Northern Yellow Faced Turtle (*Emydura tanybaraga*) captured during the survey.**

# Discussion

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As expected the Finniss River is home to populations of aquatic reptiles, with Merten's Water Monitors (*Varanus mertensi*) found to be abundant along the Finniss River, but not present within the lower East Branch. Mitchell's Water Monitor (*Varanus mitchelli*) was also present at sites within the lower Finniss River. Mertens Water Monitor tracks and individuals were observed in the headwaters of the East Branch, but not at the lower East Branch, despite this species being previously recorded there during a post wet season survey (March 2014, EcOz Survey). As this species forages along the edge of water bodies for aquatic prey (i.e. freshwater crabs & crayfish) (Christian 2004), its tracks are unmistakable and when present this species is easily detected, thus the reason for its absence within the lower East Branch at this time is unknown.

Both monitor species are listed as Vulnerable in the Northern Territory due to population declines associated with the introduced Cane Toad (*Rhinella marina*) (Doody et al. 2006; 2009; Griffiths & McKay 2007). Consultations with Traditional Owners suggested that all species suffered an initial decline but are still present; however other species such as the Floodplain Goanna (*Varanus panoptes*) have not been seen since the arrival of Cane Toads (Hydrobiology 2013a). This apparent decline of the Floodplain Goanna is in accordance with the study by Doody et al. (2006; 2009) at the Daly River.

Freshwater turtles were found to be present in the upper parts of the Finniss River, with one species being found in the East Branch of the Finniss River. Surprisingly despite a large survey effort only six individual turtles of two species were caught. The biology of the Northern-Yellow Faced Turtle (*Emydura tanybaraga*) is relatively unknown, with no published ecological studies. Earlier studies within the Northern Territory on *Emydura* sp., probably *E. subglobosa worrelli* noted that this species was sparse to almost non-existent in sandy and/or rocky streams, but may have been more common within billabong systems (Legler 1982). These earlier studies also noted that diving for freshwater turtles seemed to be more successful than trapping (Legler 1982; Cann 1997), however with the subsequent recovery of Saltwater Crocodile (*Crocodylus porosus*) populations (Letnic & Connors 2006; Fukuda et al. 2011), this technique is no longer safe to use. The survey method used here may therefore underestimate abundance; however fyke nets set at a larger number of sites during the fish survey following this survey (Hydrobiology unpublished) collected only a single Northern-Yellow Faced Turtle, therefore supporting our low trapping results. The Northern Long-necked Turtle (*Chelodina oblonga*) was also found, but in low densities. This species is able to persist in riverine areas with a heavy sediment layer and deep holes (Legler 1982), but occurs in higher densities within floodplain billabongs and swamps (Legler 1982; Kennett 1999; Fordham 2007). This species is probably present in all the floodplain billabongs systems that occur within the Finniss River drainage. The Northern Snapping Turtle (*Elseya dentata*), was not found, although there are earlier records from the Finniss River (Hydrobiology 2013a). This is surprising as this species is known to enter baited traps (Kennett 1999).

As expected the Saltwater (*Crocodylus porosus*) and Freshwater Crocodiles (*Crocodylus johnstoni*) were found to be present along the upper and lower parts of the Finniss River. Adults and juveniles of both species were seen during night time eye shine counts and both species were observed in or near gill nets set for a fish survey (R. Smith pers. comm.). As the survey advanced downstream larger individuals of both species were encountered in the deeper longer stretches such as FR1 and FR2. Saltwater Crocodiles were not seen within the East Branch of the Finniss River. This may be related to a lack of larger pools, but as Freshwater Crocodiles (*C. johnstoni*) were present in the lower East Branch and at other sites (Hydrobiology unpublished), the absence of Saltwater Crocodiles (*C. porosus*) is unknown at this time.

Historical counts of Saltwater Crocodiles are only available for the tidal reaches of the Finniss which found a density of 5.3 sightings per km of river in 1995 (Fukuda et al. 2007). It is possible that Saltwater Crocodiles numbers will continue to rise in the Finniss River, as reported for other river systems, such as in the Daly and Roper Rivers, with increases since the cessation of hunting in 1971 (Letnic & Connors 2006). However one study has documented a population decrease in Freshwater Crocodiles attributed to Cane Toads (Letnic et al. 2008). As the Finniss River Freshwater Crocodile population has never been studied, it could be possible that the Freshwater Crocodile numbers observed were low due to this factor, however anecdotal evidence

suggests an increase in both Freshwater and Saltwater Crocodiles since extensive monitoring began in the 1970's (R. Jeffree pers com).

### ***Summary and Recommendations***

The Finniss River is home to populations of aquatic reptiles that are listed threatened species and/or culturally significant. Of particular note, was that Merten's Water Monitors were present in an earlier survey of the East Branch, but were not found recently. It is recommended that this species is monitored during any works that could affect the water and habitat quality of the Finniss River.

Given the presence of Merten's and Mitchell's Water Monitors recorded during this survey and that they are listed Threatened Species in the Northern Territory and are culturally significant, it is recommended that they are a particular focus of any monitoring program. Freshwater and Saltwater Crocodiles are considered culturally significant as both a food source and totem. As they are both present in the Finniss River and easy to survey using eye shine spotlight counts, it is recommended that both of these species are monitored.

Freshwater turtles are considered culturally significant but appear to be at a low density and/or are difficult to trap in this region. This makes them not ideal candidates for on-going monitoring, however there is potential to revisit the monitoring program in future years in an attempt to monitor potentially recovering populations.



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