



**AQUATIC FAUNA SURVEY OF PROPOSED ROAD PAVEMENT
QUARRY RG3
SECTION 4497, S94/158A
VICTORIA RIVER, NORTHERN TERRITORY.**

28TH OF NOVEMBER - 3RD OF DECEMBER 2005

**Prepared by
Paul de Lestang (Senior Research Scientist, DPIFM)
and
Dion Wedd (Curator, Territory Wildlife Park. NRETA)**

Executive Summary

An aquatic faunal biodiversity survey was conducted to ascertain the presence of threatened or endangered species of freshwater elasmobranchs in the Victoria River at a proposed gravel excavation site between 15°37.201S, 131°07.956E and 15°37.635S, 131°08.195E, from the 29th of November to the 2nd of December 2005. This survey was conducted to satisfy the requirement of a Public Environmental Report for the proposed road works to increase the flood immunity of the Victoria Highway. The recommendations in this report are based on the understanding that the site of river gravel extraction is located in an elevated seasonally dry channel bed deposit of the Victoria River. It is also understood that no gravel will be extracted from the adjacent permanent baseline flow channel within the greater Victoria River channel.

In total, 27 species of fish, 4 species of reptile and one elasmobranch were recorded. The elasmobranch, *Himantura chaophrya*, was the only species recorded in the pools adjacent to the proposed excavation site that is listed ('data deficient') in the SCHEDULE 1, Conservation Status of Animals of the Northern Territory 2003. However previous research (Thornburn et al. 2002) and anecdotal evidence from the local community and traditional owners suggest the presence of the listed species, *Pristis microdon* and *Pristis clavata*, in the pools adjacent to the proposed gravel excavation site.

This report suggests that the proposed extraction of material from the Victoria river site RG3 would have little or no impact if:

The area is rehabilitated to allow existing river flows to be maintained; and
Any depressions are graded to allow water to drain freely to the river channel.

1. INTRODUCTION

The flood immunity of the Victoria Highway is to be increased from a 1 in 5 year flood event to a 1 in 20 year flood event. Works on this upgrade are to commence in the dry season of 2006. The river bed at 15° 32'48"S, 130° 58'25"E (RG3) is a proposed site of alluvial deposits intended for use as pavement material for the upgrade of the road surface. Thornburn et al. (2002) describe Freshwater sawfish (*Pristis microdon*) and Dwarf sawfish (*Pristis clavata*) from this region. These

species are listed as vulnerable in Schedule 1, Conservation Status of Animals of the Northern Territory with *Pristis microdon* listed as vulnerable by the Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act 1999). A Public Environmental Report (PER) discussing the impact of material extraction is required before any excavation can occur. Following recommendations of a preliminary site investigation in early November, a further intensive aquatic survey was carried out to determine:

- The presence of aquatic fauna classified in Schedule 1 of the Conservation Status of Animals of The Northern Territory and the EPBC Act, including the freshwater sawfishes *Pristis microdon* and *Pristis clavata*, freshwater whip ray *Himantura chaophrya* and spear-toothed sharks of the genus *Glyphis*.
- Potential impacts of material extraction
- Recommendation to the PER regarding the effects of stream bed disturbance on the aquatic fauna present.

This report details the species composition and relative abundance of the aquatic fauna surveyed in the base line flow channel adjacent to the extraction site and offers a comparison with a control site some 20km upstream of the extraction area where no disturbance is intended.

2. SITE DETAILS

2.1. Site access

Proposed Excavation Site RG3

Access to RG3 was via a maintained dirt thoroughfare, through Coolibah Station about 18km past the Victoria Highway Inn on the Victoria highway. A recently formed track allowed access direct to the site. Four wheel drive vehicles were required to gain access to the river frontage. The formed dirt track was composed of low grade clay loam. Slight wetting by periodical rain during the course of the survey rendered the track almost impassable.

Control Site

Access to the control site was via the Victoria River boat ramp, located behind the Victoria Highway Inn. On the northern side of the boat ramp, a seasonally exposed gravel and sand bank provided access to an exposed bank approximately 2 km north of the boat ramp where the research vessel was launched.

Sampling location.

Proposed Excavation Site RG3

The sampling area was determined by visual observation and commenced at 15° 32.135' S, 130° 58.383' E and continued downstream to 15° 32.522' S, 130° 58.267' E.

Control Site

The control site was also determined by visual observation and started approximately 1 km upstream of the Victoria River bridge (15° 37.201' S, 131° 07.956' E), extending approximately 4 km upstream (15° 37.635' S, 131° 08.195'). This area is not intended to be disturbed and was selected on its geographic similarities with RG3 and access availability.

2.2. Site description.

Proposed Excavation Site RG3

The survey site consisted of a section of the Victoria River dominated by deeper pools interspersed with shallow rocky margins and small rapids. The site was divided into five sampling areas ranging in length from 120-250m and width ranging from 45-55m. The northern bank was almost vertical and bordered deep water. The southern banks were mostly shallow and rocky. The depth varied between treatment sites from 3m to 3.8m and shallow margins less than 1m were extensive along the southern banks.

The bottom was composed of rounded river gravel and sand varying in size from fine sand particles to large boulders (1000 mm in diameter) with the average size being about 150mm in diameter. The gravel substrate was covered in fine filamentous algae and detritus that floated to the surface upon being disturbed.

Streamside vegetation of the northern bank consisted of weeping paperbark, (*Melaleuca luecadendra*), freshwater mangrove (*Barringtonia acutangula*) and river pandanus (*Pandanus aquaticus*) with an understorey dominated by noogoora burr (*Xanthium pungens*). The soil type was a deep clay loam interspersed with eroded areas where animals gain access to the river's edge. The southern banks were sparsely vegetated by small sedges and grasses with intermittent patches of *Barringtonia* and *Melaleuca*. The soil type was mostly sand and washed river pebbles of various sizes and composition.

Control Site

The control site consisted of a four kilometre section of the Victoria River with shallow rapids at the upstream and downstream boundaries. The site was divided into three sampling areas, varying in length from 100 m – 150 m, width from 10 m – 45 m and in depth from less than 0.2 m – 5 m.

The river banks were generally almost vertical and bordered deep water and the substrate was predominantly sand and mud partly covered in fine filamentous algae. The streamside vegetation and soil type was very similar to the northern bank of Site RG3, with both banks consisting of weeping paperbark (*Melaleuca luecadendra*), freshwater mangrove (*Barringtonia acutangula*) and river pandanus (*Pandanus aquaticus*) with an understorey dominated by noogoora burr (*Xanthium pungens*).

3. METHODOLOGY

Each night, from 29/11 to 01/12 one area at each site was sampled. On the fourth night of sampling, (02/12) a further two areas adjacent to RG3 were sampled. Typically, sampling began at 17:30 and ceased at 00:00. However due to inclement weather conditions on 02/12, sampling times were reduced to 1730-2230.

In each area, sampling consisted of a combination of methods, as described below. However, due to adverse weather conditions experienced on 02/12, spotlighting was not used. Individuals of each species were collected and fixed in formalin for later identification and inclusion into the Northern Territory Museum and Art Gallery fish data base.

An indication of the relative abundance of each species recorded has been defined as: Abundant (A) > 0.5 individual's caught/20m net/hr (gillnet) or > 10 fish seen (spotlight) ; Common (C) 0.1-0.5 individual's caught/20m net/hr or between 5-9 fish seen (spotlight) and Rare (R) < .1 individual's caught/20m net/hr or < 2 fish seen (spotlight).

3.1. Gill netting

Two gillnets, 20m long by 2m deep consisting of 76.2 mm (3') monofilament mesh were set at each sampling site. Where possible the nets were set so the lead-line was in contact with the bottom. The nets were set perpendicular to the bank with each net covering one side of the pool to ensure the full width of the pool was adequately fished. The nets were set between 50 and 80m apart. Fishing time for the nets varied from 5 hrs to 7hrs and 30 minutes. The nets were checked at intervals of 30mins to 1 hr depending on the numbers of fish that needed removal per check.

3.2. Long lines

Two 50m long monofilament long lines with a 10/0 Suicide hook placed every 5 meters were set on the bottom between the gill nets at each sampling location. Baits included whole mullet, mullet fillets and bony bream fillets. The lines were checked at the same time as the gill nets with checking times varying as above. The hooks were rebaited as required.

3.3. Cast netting, dip-netting and spotlighting

Cast nets and dip nets were employed to sample species that could not be identified by visual observation. Species were sighted by spotlight and caught using a hand held dip net or cast net. Once identified the fish were either released unharmed or maintained as museum specimens. Spotlighting commenced at 2030 when all residual daylight had ceased.

4. RESULTS

4.1. Fish species

A total of 18 families and 27 species were caught or sighted in the base line flow channel adjacent to the proposed excavation site (RG3) over four days of sampling (Tables 1a-1c). This consisted of 15 families and 22 species of fish, 2 families and four species of reptiles and one species of elasmobranch. Only three species of fish, *Nematalosa erebi*, *Amniataba percoides* and *Arius leptaspis* were considered abundant, with the majority of species described as either common (13 species) or rare (11 species). The elasmobranch, *Himantura chaophrya*, was the only species recorded that is listed as 'data deficient' in the SCHEDULE 1, Conservation Status of Animals of the Northern Territory 2003.

In total, 11 families and 14 species of fish and one species of reptile were recorded at the control site over the three days of sampling (Appendix B), with all of these species also having been recorded at the proposed excavation site. Of these species, only *N. erebi* and *A. leptaspis* were considered abundant, with a further five species considered common and remaining eight species considered rare. No elasmobranch species or other species of significance, as described in the SCHEDULE 1, Conservation Status of Animals of the Northern Territory 2003 or the EPBC Act 1999 were recorded at the control site.

Family	Genus and species	Common Name	Length Range (mm)	Relative abundance
Clupeidae	⁺ <i>Nematalosa erebi</i>	Bony Bream	170 - 365	A
Megalopidae	⁺ <i>Megalops cyprinoides</i>	Tarpon	345 - 430	C
Terapontidae	[#] <i>Amniataba percoides</i>	Banded Grunter	-	A
	⁺ <i>Hephaestus jenkinsi</i>	Jenkins's Grunter	246 - 280	C
	[#] <i>Leiopotherapon unicolour</i>	Spangled Grunter	-	C
	⁺ <i>Syncomistes butleri</i>	Sharpnose Grunter	230	R
Ariidae	⁺ <i>Arius midgleyi</i>	Silver Cobbler	320 - 700	C
	⁺ <i>Arius leptaspis</i>	Salmon Catfish	210 - 360	A
Plotosidae	⁺ <i>Neosilurus ater</i>	Black catfish	335 - 400	R
	[#] <i>Neosilurus pseudospinosus</i>	Falsespine Catfish	355 - 400	R
Belonidae	[#] <i>Strongylurakrefftii</i>	Freshwater Longtom	-	C
Apogonidae	[#] <i>Glossamia aprion</i>	Mouth Almighty	-	C
Toxotidae	⁺ <i>Toxotes chatareus</i>	Sevenspot Archerfish	200 - 260	R
Atherinidae	[#] <i>Craterocephalus stramineus</i>	Blackmast	-	C
	^{#*} <i>Craterocephalus stercusmuscarum</i>	Flyspecked Hardyhead	-	R
Latidae	⁺ <i>Lates calcarifer</i>	Barramundi	450-700	C
Mugilidae	⁺ <i>Liza alata</i>	Diamond Mullet	317 - 430	C
Ambassidae	[#] <i>Ambassis sp.</i>	NW Glassfish	-	C
	⁺ <i>Parambassis gulliveri</i>	Giant Glassfish	182 - 221	C
Melanotaeniidae	[#] <i>Melanotaenia australis</i>	Western Rainbowfish	-	C
Eleotridae	[#] <i>Oxyeleotris selheimi</i>	Blackbanded Gudgeon	-	R
Gobiidae	[#] <i>Glossogobius sp.</i>	Goby	-	R

Table 1a. Length range and relative abundance for fish caught in the base line flow channel adjacent to the Victoria River proposed impact site RG3. ⁺ Relative abundance determined using Gillnet data; [#] Relative abundance determined using spotlight data. * denotes those species caught only during the preliminary survey (see Appendix 2).

4.2. Elasmobranch species

Family	Genus and species	Common Name	Length Range (mm)	Relative abundance
Dasyatidae	⁺ <i>Himantura chaophraya</i>	Freshwater Whipray	-	R

Table 1b. Length range and relative abundance for elasmobranchs caught in the base line flow channel adjacent to the Victoria River proposed impact site RG3. ⁺ Relative abundance determined using Gillnet data; [#] Relative abundance determined using spotlight data.

4.3. Reptile species

Family	Genus and species	Common Name	Length Range (mm)	Relative abundance
Crocodylidae	[#] <i>Crocodylus johnstoni</i>	Freshwater Crocodile	900	C
	[*] <i>Crocodylus porosus</i>	Saltwater Crocodile	-	R
Chelidae	⁺ <i>Elseya dentata</i>	Northern Snapping turtle	-	R
	[*] <i>Emydura victoriae</i>	Red-faced Turtle	-	R

Table 1c. Length range and relative abundance for reptiles caught in the base line flow channel adjacent to the Victoria River proposed impact site RG3. ⁺ Relative abundance determined using Gillnet data; [#] Relative abundance determined using spotlight data. * denotes those species caught only during the preliminary survey (see Appendix 2).

4.4. Invertebrates

Invertebrates were not deliberately sampled. The only species collected during the surveys were *Macrobrachium spp.*

5.0 SPECIES OF INDIGENOUS SIGNIFICANCE

Species of indigenous significance were discussed with Loraine Jones, the daughter of Jerry Jones, a traditional owner of the portion of the Victoria River that encompasses the proposed excavation site (RG3). She indicated that only two fish, the catfish (*A. leptaspis* and *Arius midgleyi*), and the bream (*Hephaestus jenkinsi*, and *Syncomistes butleri*) were targeted by the indigenous community as a food source.

6.0 DISCUSSION

A total of 18 families containing 27 species were recorded in the base line flow channel adjacent to the proposed excavation site (RG3) using the methods described in Section 3. Of the 22 species of fish and four species of reptile none were considered unusual for this area and no new species were recorded. Only one species of elasmobranch, *H. chaophrya*, was recorded. This species is considered as 'data deficient' in the SCHEDULE 1, Conservation Status of Animals of the Northern Territory 2003, 'Vulnerable' by the IUCN (Larson, et al, 2004) and not listed in the EPBC Act 1999.

H. chaophrya is only one of two rays that are found in areas of low salinity including the upper reaches of rivers, and there is very limited information on population distributions (Larson et al., 2004). This species is vulnerable to exploitation and habitat degradation given its limited distribution (Larson et al., 2004).

Although no other elasmobranchs were recorded, anecdotal information from the local community and traditional owners suggest the presence of sawfish in the upper Victoria River, including the base line flow channel adjacent to the proposed excavation site RG3. Furthermore, site investigation by the authors revealed that the base line river channel adjacent to RG3 is suitable habitat for sawfish and it is the opinion of the authors that they would either be in the area or frequent the area at certain times of the year. The presence of sawfish in the upper Victoria River appears to be seasonal, with the majority of sightings in the late wet and early dry season. A further aquatic faunal survey conducted immediately after the wet season may confirm the presence and species of sawfish.

The presence of *Glyphis* spp A or *Glyphis* spp C (listed as critically endangered and endangered respectively by the EPBC Act 1999) at the survey site is considered highly unlikely (Larson. H pers comm). No records exist for either species in the Victoria River. Records from other river systems where these sharks have been collected indicate that they require salinity levels of 4ppt or higher. The area surveyed adjacent to RG3 is a permanent fresh water

stretch of the Victoria River totally isolated from any tidal influence and hence intrusion by brackish water.

The section of the Victoria River encompassing the excavation site RG3 experiences a significant annual variation in river flow but does appear to maintain a base line flow for the whole year. It is understood that no barriers to the flow of water adjacent to the excavation site RG3 are proposed or anticipated to occur. However, any barrier that significantly reduces or completely blocks the river flow could have a deleterious impact on the environment including reduced biodiversity of the area through decreased water quality and reduced access for the many migratory species such as *Lates calcarifer*, and the listed species, *P. microdon* and *P. clavata*.

It is possible that extraction or other major disturbances close to the edge of the existing base line flow channel may disturb the sediment thus causing an increase in suspended load. An increase in suspended load may have a variety of effects that may be deleterious to water quality and biological communities in the immediate and downstream areas. However, it is the considered opinion of the authors that, if the integrity of the existing stream flows are maintained, and the sediment loading is not excessive, the possible impacts will be short term and would cause only minor impact to the current aquatic biodiversity of the area.

Currently the slightly higher gradient of the proposed excavation site allows the floodwaters to run off into the base line river channel as water levels decrease during the dry season. At the completion of gravel excavation, and prior to the on-coming wet season, it is recommended that the excavated area should be rehabilitated to ensure the area links freely with the base line river channel thus preventing the pooling or holding of water and the subsequent likelihood of trapping fish as water levels decrease after the wet season.

Several reptile species, including the crocodiles *Crocodylus johnstoni* and *Crocodylus porosus* and turtles *Elseya dentata* and *Emydura victoriae* were recorded in the base line flow channel adjacent to site RG3. It is probable that disturbance of the river bank within 25 m of the existing base line river channel may cause short term localised emigration of nesting freshwater crocodiles and negatively impact on the short term reproductive success of both species of turtle. To minimise this impact, visual surveys identifying crocodile and turtle nests should be conducted in proposed disturbed areas that are within 25 m of the existing river channel. Areas containing nests should be avoided if possible.

This survey was conducted towards the end of the dry season, after a below average wet season. The faunal biodiversity described in this report may vary considerably after a significant flood period. To describe the complete aquatic faunal community (as indicated in the draft Victoria Highway PER Guidelines), this area requires further sampling using the described sampling methodology (Section 3.0) immediately after flood waters recede to a level that allows access. Sampling at this time may also confirm the existence and

species of the freshwater sawfish (*Pristis spp.*) in the area adjacent to the proposed excavation site.

7.0 RECOMMENDATIONS

- 7.1 To maintain, where possible, a buffer zone of 25 m (or greater) from the existing river channel. Alternatively, gravel disturbance within 25 m of the existing river channel can be carried out, provided that a visual survey to identify (and thus avoid) turtle and crocodile nests occurs.
- 7.2 Maintain existing river inflow.
- 7.3 Rehabilitate excavated area to ensure a hydraulic linkage with the existing channel so as to prevent isolated water bodies forming in the disturbed area as water levels recede after the wet season.
- 7.4 Conduct a further aquatic faunal survey immediately after the flood waters recede (May - June 2006), using the described sampling methodology (Section 3.0), to describe the seasonal change in aquatic fauna, specifically the presence (or otherwise) of the freshwater sawfish (*Pristis spp.*).

8.0 REFERENCES

- Larson H., Gribble, N., Salini, J., Pillans, R. and Peverell, S. (2004). Sharks and Rays. In: National Oceans Office. Description of key species groups in the Northern Planning Area. National Oceans Office, Hobart Australia.
- D.C Thornburn, S.Peverell, J.d. Stevens , P.R. Last and A.J. Rowland. 2002 *Status of Freshwater and Estuarine Elasmobranchs in Northern Australia.*
- Department of Environment and Heritage, *Environmental Protection and Biodiversity Conservation Act 1999*. LIST OF THREATENED FAUNA.
- Northern Territory of Australia, *Territory Parks and Wildlife Conservation Act* Schedule 1, CONSERVATION STATUS OF ANIMALS OF THE NORTHERN TERRITORY, 2003.

Appendix 1.



PRILIMINARY SITE AND AQUATIC FAUNA SURVEY OF
PROPOSED ROAD PAVEMENT QUARRY RG3
SECTION 4497, S94/158A
VICTORIA RIVER, NORTHERN TERRITORY.
12TH AND 13TH OF NOVEMBER 2005

Prepared by Dion Wedd

1.0 INTRODUCTION

The flood immunity of the Victoria Highway is to be increased from a 1 in 5 year flood event (Q5) to a 1 in 20 year flood event (Q20). Works on this upgrade are to commence in the Dry season of 2006. The river bed at 15° 32'48"S, 130° 58'25"E (RG3) is a proposed site of alluvial deposits intended to be used as pavement material for the upgrade of the road surface.

A Preliminary Environmental Report (PER) discussing the impact of material extraction is required before work can commence on this project. As part of this process a preliminary site investigation was carried out to determine:

- Access to the site
- The likelihood of the presence of aquatic fauna classified in Schedule 1 of the Conservation Status of Animals of The Northern Territory.
- The ability to conduct further investigation
- Potential impacts of material extraction

2.0 BACKGROUND

The initial site assessment was planned to coincide with the arrival of Department of Primary Industry and Fisheries staff from Queensland with electro-fishing equipment. These field officers will be conducting aquatic surveys in Lake Argyle in Western Australia over the next 2 weeks.

The intent was to utilise this equipment and expertise to conduct an initial aquatic fauna survey to determine the presence of freshwater elasmobranchs including:

- *Pristis microdon*, Freshwater Sawfish (listed as vulnerable*)
- *Pristis clavata*, Dwarf Sawfish (listed as vulnerable*)
- *Himantura chaophrya*, Freshwater Whip-ray (listed as data deficient*)

- *Glyphis sp A and C*, Spear-toothed sharks (listed as endangered*)

* Indicates species listed in SCHEDULE 1, CONSERVATION STATUS OF ANIMALS OF THE NORTHERN TERRITORY 2003.

The ability to use electro-fishing equipment allowed a large area to be relatively thoroughly sampled for other fish and invertebrate species.

3.0 PRELIMINARY FINDINGS

3.1 Determining site access

Prior to the commencement of this survey, permission to gain access to the site (RG3) was needed. Staff from the Northern Land Council (NLC) were contacted to determine the identity of the traditional owners. Once identified, permission was sought and granted from the traditional owners at Timber Creek on Saturday the 12th of November 2005.

Access to RG3 was via a maintained dirt thoroughfare, through Coolibah Station to a recently formed track which allowed access direct to the site. Four wheel drive vehicles were required to gain access to the river frontage to launch the electro-fishing boat.

3.2 Presence threatened aquatic species

The purpose behind the aquatic survey of RG3 was to determine the presence or the likely presence of threatened species (listed in section 2.0) that may be affected by the removal of alluvial material at the site. The use of electro-fishing equipment allowed a large portion of the site to be sampled relatively quickly to determine the presence of such animals.

Approximately 5.4 km of river upstream of RG3 was sampled with electro-fishing equipment and no listed species were collected. (See section 5.0 for further information).

3.3 Ability to conduct further investigation

RG3 was further inspected during daylight hours on Sunday the 13th of November. This was done to determine the suitability of the site for further intensive specific sampling. Various sampling sites and suitable techniques were assessed.

It is envisaged that several sites adjacent to and downstream of the proposed extraction site will need to be sampled.

4.0 SITE DETAILS

4.1 Sampling location.

The sampling commenced at 15° 32.130'S, 130° 58.843' E to approximately 5.51km upstream of RG3 at 15° 32.723'S, 131° 00.178'E.

4.1.1 Site description.

The survey site comprises steep sided banks dominated by *Melaleuca* sp with an understorey dominated by Ngurra Burr. The banks are composed of rich brown loamy soil with moderate clay content.

The depth of the sampled section of river varied considerably with a maximum depth recorded of 8m. The river bed is composed of sand and regolith. Regular rocky protrusions occurred along the length of the sampled area indicating significant rocky habitat below water level. Frequent large stands of fallen timber along the bank edges provide habitat and bank-side stabilization.

5.0 METHODOLOGY

5.1 Electro-fishing

Electro-fishing involves the use of an electrical current passing through the water between a cathode (boat) and 2 anodes placed in the water in front of the boat. Fish situated within this electrical field are affected by the electrical impulse causing involuntary muscle contraction. The effect on fish differs according to their overall size. Larger fish have a greater potential and are more affected by the electrical charge, smaller fish can often swim through electrical field unaffected. The electrical charge causes fish to rise to the surface within the vicinity of the anode. There they can be collected, identified and released.

The electrical current is activated by a foot pedal and is at the discretion of the operator. The boat is manoeuvred into areas of likely habitat, the electrical current is applied.

A total of 2715 seconds of current was applied during the sampling of 5.4 km of the river upstream of RG3.

5.2 Cast netting, dip-netting and spotlighting

Cast nets were employed to sample specific species that could not be identified by visual observation. Species were selected in the spotlight and the net cast over them. Once species were identified the fish were released unharmed.

Dip netting involved a similar technique but was used for small fish that could not be caught in the cast net. Species were sighted by spotlight and caught using a hand held dip net.

6.0 RESULTS

The following list of species was collected utilising the methodology above between the hours of 1930-0230 Saturday and Sunday the 12th and 13th of November 2005.

6.1 Water quality.

The following water quality parameters were measured at 0130 on Sunday 13th November 2005 at the beginning of the sample site. Operators of the electro-fishing equipment stated that high levels of general hardness reduced the efficiency of the electro-fishing equipment.

Temperature	32°C
Alkalinity	170ppm
General Hardness	130ppm
pH	8.62
Dissolved O2	75%
Conductivity	525ms

6.2 Fish species

Family	Species	Common name
Clupeidae	<i>Nematalosa erebi</i>	Bony bream
Megalopidae	<i>Megalops cyprinoids</i>	Tarpon
Terapontidae	<i>Amniataba percoids</i>	Banded grunter
	<i>Hephaestus jenkinsi</i>	Jenkins's grunter
	<i>Leiopotherapon unicolour</i>	Spangled grunter
	<i>Syncomistes butleri</i>	Butler's grunter
Ariidae	<i>Arius midgleyi</i>	Midgley's catfish
	<i>Arius leptaspis</i>	Salmon catfish
Plotosidae	<i>Neosilurus ater</i>	Black catfish
Belonidae	<i>Stongylura krefftii</i>	Longtom
Apogonidae	<i>Glossamia aprion</i>	Mouth almighty
Toxotidae	<i>Toxotes chatareus</i>	Archerfish
Atherinidae	<i>Craterocephalus stercusmuscarum</i>	Hardy-head
Centropomidae	<i>Lates calcarifer</i>	Barramundi
Mugilidae	<i>Liza alata</i>	Diamond mullet
Ambassidae	<i>Ambassis sp.</i>	NW glassfish
	<i>Ambassis macleayi</i>	Reticulated glassfish
	<i>Ambassis agrammus</i>	Sailfin glassfish
	<i>Parambassis gulliveri</i>	Giant glassfish
Melanotaeniidae	<i>Melanotaenia australis</i>	Western rainbowfish
Eleotridae	<i>Oxyeleotris selheimi</i>	Giant gudgeon

6.3 Reptile species

Family	Species	Common name
Crocodylidae	<i>Crocodylus porosus</i>	Salt water Crocodile
	<i>Crocodylus johnstoni</i>	Freshwater Crocodile
Chelidae	<i>Elseya dentata</i>	Northern Snapping turtle
	<i>Emydura victoriae</i>	Red-faced Turtle

6.4 Invertebrates

Invertebrates were not deliberately sampled. The only species collected during electro-fishing were *Macrobrachium spp.*

A total of 14 fish families containing 19 genera and 21 species were collected using the various methodologies discussed above. Of the 21 species of fish none were considered unusual for this area and no new records were recorded. No freshwater elasmobranchs were recorded in this survey.

A total of 2 reptile families containing 3 genera and 4 species were sighted or sampled during this survey.

Electro-fishing, dip-netting and visual observation were used to sample the main pool upstream of the proposed extraction site.

7.0 DISCUSSION

The main purpose behind this preliminary survey was to determine the main aspects of the site including ownership, access, suitability for survey techniques and preliminary impact assessment on possible populations of freshwater elasmobranchs. The traditional owners of the RG3 site were located and they gave permission to work on the site. Further discussion with the traditional owners is required before further survey work is carried out. Contact numbers can be obtained through the author of this report.

The site is considered suitable for extensive surveying using other techniques not used in the preliminary survey and the impact of excavation was deemed by the author as minimal. Initially extraction close to the river edge may cause existing deep water refuges to fill with silt and other debris. However if the integrity of the existing stream flows are maintained this impact will be short term. RG3 appears to be an area of high load deposition during Wet Season flooding. The nature of the existing water flow around the point bar would likely remove sediment deposited after initial the extraction with the impact reducing over successive years.

Although no listed species were collected, anecdotal evidence from the local community and traditional owners suggest that sawfish are often seen or captured in the local area. Site investigation revealed that the area is suitable habitat for sawfish and it is the opinion of the author that they would either be in the area or frequent the area at certain times of the year.

Anecdotal evidence suggests that Freshwater Whip-rays also frequent the area although none were sighted during the survey.

The list of fish species collected is limited to what was seen or caught in the field of the electro-fisher. It is suspected that further sampling using different techniques will reveal a more extensive species list.

8.0 RECOMMENDATIONS

8.1 Traditional owner permission

It is a recommendation of this report that Project Leaders conduct further consultation with traditional owners prior to the commencement of the main faunal survey at the end of November. Contact details can be provided upon request to the author of this report.

8.2 Further surveying prior to and after extraction

Initial surveys should indicate what species are in the area at the time of the survey, but may fail to indicate compositional change over the course of a full year. Further surveys conducted after the Wet Season will assist in determining the nature of the animal movements and species composition. Initial base line data will provide a snapshot of the inhabitants and will allow a determination of species dynamics pre and post extraction.

8.3 Recommended survey method

Considering the size and structure of the main pool, it would be of no advantage to sample using gill nets. The water is simply too deep and snaggy. Pools and riffles downstream of RG3 would be appropriate for sampling with various mesh size gill nets set in areas likely to contain sawfish.

Population dynamics in the area will be hard to determine using these methods and such data would require a more extensive study designed to achieve this outcome.

Another appropriate method to sample for sawfish would be spotlighting and visual observation in the shallow runs below RG3. If specimens are required cast netting can be used to collect sighted animals.

Another method is to set baited lines at various points along the sample site. Sawfish and rays will take baits and can be captured relatively unharmed.

It is the recommendation of the author that an intensive 5-7 day survey be conducted on the pools and riffles adjacent to and downstream of RG3. This may determine the likely presence of freshwater sawfish in the local area. Recent rains in the Katherine region have caused significant stream rises at the time of the survey. A further study of RG3 would need to be carried out before rain renders the site inoperable.

9.0 SUMMARY

The initial aquatic survey of the water bodies associated with the gravel extraction site RG3 failed to reveal the presence of freshwater elasmobranchs. Anecdotal evidence from the local community indicates the presence of these animals at certain times of the year. Sampling of the main pool using electro-fishing equipment revealed 21 species of fish, 4 reptiles and 1 invertebrate specimen. Further sampling with gill nets of various mesh sizes, dip netting and spotlighting may reveal a more diverse aquatic fauna.

Pools and riffles downstream and adjacent to RG3 are more suitable habitat for freshwater sawfish and lend themselves to more intensive sampling methodologies. Population studies on freshwater elasmobranchs are not the focus of this study. The results will only reveal the presence of animals in the area at the time of the survey. No conclusions can be drawn as to their likely abundance or residence time in the area.

Report prepared by

Dion Wedd
Curator, Territory Wildlife Park
Bio Parks, NRETA.

Appendix 2.

Fish Species

Family	Genus and species	Common Name	Length Range (mm)	Status
Clupeidae	⁺ <i>Nematalosa erebi</i>	Bony Bream	180 - 310	A
Megalopidae	⁺ <i>Megalops cyprinoides</i>	Tarpon	300 - 370	C
Terapontidae	[#] <i>Amniataba percooides</i>	Banded Grunter	-	R
	[#] <i>Syncomistes butleri</i>	Sharpnose Grunter	230 - 258	R
Ariidae	⁺ <i>Arius midgleyi</i>	Silver Cobbler	140 - 600	A
	⁺ <i>Arius leptaspis</i>	Salmon Catfish	240 - 300	C
Plotosidae	[#] <i>Neosilurus ater</i>	Black catfish	-	R
Belonidae	[#] <i>Strongylura krefftii</i>	Freshwater Longtom	-	C
Toxotidae	[#] <i>Toxotes chatareus</i>	Sevenspot Archerfish	215 - 225	C
Latidae	⁺ <i>Lates calcarifer</i>	Barramundi	420 - 440	R
Mugilidae	[#] <i>Liza alata</i>	Diamond Mullet	340 - 370	R
Ambassidae	[#] <i>Ambassis sp.</i>	NW Glassfish	-	R
	[#] <i>Parambassis gulliveri</i>	Giant Glassfish	182 - 221	R
Melanotaeniidae	[#] <i>Melanotaenia australis</i>	Western Rainbowfish	-	R

Table a. Length range and status for fish recorded at the Victoria River Control site.

⁺ Relative abundance determined using Gillnet data; [#] Relative abundance determined using spotlight data.

Reptile species

Family	Genus and species	Common Name	Length Range (mm)	Status
Crocodylidae	[#] <i>Crocodylus johnstoni</i>	Freshwater Crocodile	900	C

Table a. Length range and status for reptiles recorded on the Victoria River Control site. ⁺ Relative abundance determined using Gillnet data; [#] Relative abundance determined using spotlight data.