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Report on the joint *eriss*/PAN cane toad risk assessment field trip to the Katherine/Mataranka and Borroloola regions

G Begg, D Walden & J Rovis-Hermann

1 Introduction

In May 2000, while cane toads (plate 1) were known to be rapidly approaching the borders of the Kakadu National Park (KNP), a joint Environmental Research Institute of the Supervising Scientist (*eriss*)/Parks Australia North (PAN) field trip was undertaken to obtain information about:

- how the presence of cane toads has affected the lives of Aboriginal communities;
- visitor perceptions about cane toads;
- the impact of cane toads in nature reserves such as the Elsey National Park; and
- the diet of cane toads (by obtaining a sample of cane toads from the Mataranka region).

The group consisted of Jacqui Rovis-Hermann, Dave Walden and George Begg (from *eriss*) and Kathy Wilson, Beryl Smith and Ryan Barrawei (both Jawoyn Traditional Owners (TOs) for southern Kakadu) from PAN.

2 Itinerary

- *Tuesday* 9th *May*: 14:00 hr depart Jabiru Katherine. Strategy meeting with PAN representatives.
- Wednesday 10th May: Charter Cessna 210, fly from Katherine Borroloola for meeting with Northern Land Council (NLC), Parks and Wildlife Commission of the Northern Territory (PWCNT) and representatives from Garawa, Mara, Yanguwa and Kurdaryi communities at Rrumburriya Council Offices. 15:00 hr return flight to Katherine. During the afternoon Dave Walden met with Mr Bill Daw (future CEO of the Katherine Region Tourist Association).
- *Thursday 11th May*: Drive to Barunga for meeting with NLC and local community representatives at Barunga Council Offices (plate 2). Unplanned meeting with community representatives at Beswick. Drive to Mataranka to collect cane toad specimens and stomach contents of cane toads present in Elsey National Park.
- *Friday 12th May*: Meeting in Mataranka with PWCNT. A meeting with TOs at Elsey Station was scheduled but had to be cancelled. Return to Jabiru (via Katherine Pine Creek) by 16:30 hr.

The places visited and referred to in the text are shown in figure 1 and a list of contacts made during the course of the trip appears in table 1.





3 Contacts made

District	Name	Organisation	Telephone number	
Borroloola	Andrew Ross	NLC	8975 8849	
	Keith Rory	Council member		
	Harry Lansen	Council member	8975 9946	
	David Harvey	Council member	8975 9908	
	Roy Hammer	Council member	8975 8858	
	Brendon Wilson	Borroloola Hotel		
Katherine	Bill Daw	Katherine Region Tourist Association	8972 2650	
Barunga	Phil Baxter	NLC	8972 2894	
Beswick	David Lane	Wugularr Community Government Council	8975 4514	
	Mike Popple			
Mataranka	John Papple	PWCNT	8975 4560	

 Table 1
 Contacts made during the course of the trip



Plate 1 Adult cane toad



Plate 2 Discussing the effects of cane toads with members of the Barunga community

4 Results

4.1 Information from Aboriginal communities

4.1.1 When did cane toads first appear in the area?

Cane toads first arrived in Borroloola in 1993/1994; at Barunga in January 2000 and in Beswick in March 2000 (fig 1). They were first sighted on the road to Bulman by David Lane in October 1999.

4.1.2 Have they become more numerous since then or have they declined in number?

In urban areas cane toads have steadily become more numerous. However, whether this is the case in rural areas is unknown.

4.1.3 Have any of their food resources (eg goannas) declined?

After the arrival of cane toads the numbers of goannas and certain types of snakes at Borroloola noticeably declined. However, they are gradually starting to reappear. A decline in numbers is also occurring at Barunga. Fish (such as barramundi) as well as long- and shortnecked turtles (which eat cane toad tadpoles) are vulnerable, but their numbers have not yet declined.

4.1.4 Have they noticed any other animals dying from eating cane toads?

There is evidence to suggest that small freshwater crocodiles; pelicans, herons, jabiru, snakes (king brown, black), turtles, fish (barramundi, black bream, catfish); freshwater crocodile; saltwater crocodile (found dead at Ngukurr on Roper River) and semi-domestic pigs have died as a result of ingesting cane toads.

There was also discussion about the animals that attempt to attack the toads and die from the venom exuded by the toads.

4.1.5 Have they noticed any animals eating cane toads without experiencing ill effects?

Several species (including certain snakes and fish) learn to eat cane toads without ill effects. Dingo; king brown; crows and kites (feeding on dead cane toads) were cited as examples.

4.1.6 Have their camp dogs been affected?

Camp dogs often attack cane toads and grow sick (or hallucinate) after mouthing toads, but none have been known to die. After washing out the mouths of the camp dogs with water using a garden hose they recover within a few hours.

4.1.7 In what way (if any) have cane toads affected their lifestyles?

The primary impacts upon the cultural values of Aboriginal people arise from the loss of bush tucker (see 4.1.3 above); the mortality of species of religious or cultural significance (totem species such a saltwater crocodiles, catfish and snakes) and the despoilation of waterholes and springs that are regarded as sacred sites. However, there is no necessity for the introduction of control measures. The toads occasionally enter people's houses but do no harm.

In Borroloola the decline in the number of certain bushfood and totem species has led to a change in some of their ceremonies and dances. The changes concerned have been specifically made to ask the spirits to return the bushfoods that they have lost due to cane toads. Some people said that certain of these foods were on the rise again and, under these circumstances, the ceremonies and dances would revert back to their original form.

4.1.8 Are there any places that cane toads avoid?

Not to their knowledge.

4.1.9 Where do they tend to find the largest number of cane toads?

Around swampy areas, billabongs and waterholes.

4.1.10 When do they appear in the evenings?

As soon as it is dark.

4.1.11 Are they more numerous at any particular time of the year?

In the Wet season.

4.1.12 Where do the cane toads go in the dry season or during the heat of the day?

The toads remain hidden away in thick grass or in moist sites (near leaking taps, under garden plants, beneath wheelie-bins, woodpiles etc).

4.1.13 What do cane toads eat?

The cane toads feed on insects that are attracted to lights and feed on cockroaches in people's houses. They have been seen to eat baby snakes (ie 'emu killers' — a legless lizard) and small mammals. They eat scraps, bones, dead animals — even cigarette butts.

4.1.14 Where do they breed?

The cane toads breed in waterholes, pools and, when filled with rainwater, the footprints of cattle. Goannas feed on the cane toad eggs and die.

4.1.15 What happens to other forms of aquatic life at the breeding sites?

Fish (barramundi, catfish); turtles; small crocodiles and certain waterbirds have been known to die.

4.1.16 What happened to the cane toad skin industry that is said to have been established at Borroloola?

They recall once seeing products such as wallets, shoes and waistcoats made from cane toad skins by balanda, but feel that products of this nature have created little interest in the marketplace.

4.1.17 What else can they tell us about cane toads?

- Cane toads can be killed by spraying Dettol or pouring salt on them.
- Cane toads have been seen swimming in salty water (eg McArthur estuary) and, as a result, have gained access to Kangaroo Island at mouth of Carrington and McArthur Rivers.
- Knowing that cane toads are poisonous, the children in Beswick walk around the streets at night killing them with sticks and stones.
- Cane toads are present in the sewage treatment ponds at Barunga (plate 3).
- Cane toads are present at Bulman.
- When calling cane toads sound like a motorbike.
- Adult cane toads do not hop, but run. Small cane toads hop.
- Cane toads get spread by vehicles.
- The potability of water supplies occupied by cane toads is not adversely affected.



Plate 3 The Barunga sewage treatment pond

4.2 Information from Roper River Land Care Group (RRLCG)

(Notes from a meeting with Mr Bill Daw, Katherine, Wednesday 10 May, 15:00 hr).

Bill lived in Borroloola from 1992 until recently (May 2000). His position in Borroloola was the coordinator for the RRLCG and travelled extensively throughout the area, had many local contacts and was present in Borroloola before and after the arrival of cane toads. He is about to take up a CEO position with the Katherine Region Tourist Association in Katherine.

- Bill used to travel the road from Borroloola to Roper Bar (approx. 180 km) on a regular basis. He used to see many snakes and snake tracks on the road prior to the toad's arrival. Since toads have arrived he has seen relatively few snakes and snake tracks.
- He has observed crows and raptors eating dead toads from the ventral surface, without apparent ill effects.
- Some time after the toads' arrival he noticed, on several occasions, dead freshwater crocodiles in the river. These crocodiles had no external signs of injury. He had not observed this prior the toads' arrival.
- He generally saw a lot more toads on and around the roads and near water in relatively open areas such as drainage ditches, creek overflows and backwater areas. His impression was that there were relatively few toads around the riverbanks.
- Whenever he saw toads moving on or along the roads (plate 4) they were nearly always heading in a northerly or westerly direction. They hardly ever moved in other directions.
- Public attitude in Borroloola about the progress of the toads and imminent arrival was one of apathy and little concern. Once the toads arrived there was a sense of 'panic' expressed by many and in particular those people who previously had shown little concern. Some of these people were on the committee of the RRLCG and local council. Catchment management priorities and public information awareness campaigns were soon given much higher priority than before.
- Bill says that he is kept well informed by locals about the whereabouts of toads. At present they are in the headwaters of the Wilton River (fig 1) and, in his opinion, they will be in Kakadu National Park before they reach Katherine.
- The managers of Nutwood Downs station reported that the toads arrived suddenly in large numbers during a Wet season. He suggests that they 'fast tracked' down the upper Hodgson River to Nutwood Downs and continued 'fast tracking' down the Hodgson River to the Roper River, similarly down the Waterhouse River to Beswick and the Mataranka region including Elsey National Park (fig 1).
- The Aboriginal people Bill has spoken to do not complain much about the toads and seem to accept them as a part of their surroundings. They have mentioned that there are less goannas since the toads' arrival. There have been no reports of increases in goanna numbers since the arrival of toads in the area.



Plate 4 Ryan and Beryl observing a cane toad on the road near Mataranka

Table 2	Other	contacts	in t	he	reaion	suggested	as	beina	useful
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Name	Telephone number
Max & Mabel Gorringe of Elsey Station	89754515
Brian Pascal, Manager, Territory Manor	89754516
Stuart Frith, keen fisherman, Territory Manor	C/- above
Bruce Ross, local resident, Mataranka	89754838
Rod Dunbar, Manager, Nutwood Downs	89759954
Ted Hart, Hodgson River station	89759889

4.3 Information from the Borroloola Hotel

(Mr Brendon Wilson)

In spite of the swimming pool at the hotel being unlit at night, they have to remove 20–30 toads from the pool each morning (plate 5). Providing this is done early enough, users of the pool are not inconvenienced. The toads removed from the pool are killed by throwing them against the fence!

4.4 Information from PWCNT (Mataranka)

(Mr John Papple)

4.4.1 When did cane toads first appear in the Elsey National Park?

Cane toads were first noticed at the end of December 1999. They are also present at Larrimah and, judging from toads found squashed on the Stuart Highway, they are about 70 km away from Katherine (fig 1). They can be expected to get into the King River catchment shortly and, from there, find their way into the Katherine – Daly Rivers and further north.



Plate 5 Removing cane toads from the Borroloola Hotel swimming pool

4.4.2 Is there a record of the rate of spread up the Roper River?

No.

4.4.3 How far have they spread up the Waterhouse River?

Cannot be certain, but expect to find them throughout the catchment by now. The next watershed is that of the Katherine River. Hence, one way or another, cane toads are likely to get into the Katherine and Daly basin long before reaching Kakadu.

4.4.4 Is the upper reaches of the Waterhouse River in "stone country"?

Yes.

4.4.5 What impacts (if any) have been noticed in the Elsey National Park?

None as yet.

4.4.6 Is there a habitat map for the Elsey National Park and, if so, do the cane toads been noticed in any preferred habitat?

Apart from the delineation of land units, there is no habitat map for the park. Cane toads appear to be found in most of the habitats representative of the area. The toads move successfully out of the grass in the wake of fires. However, much depends on the speed of the fire.

4.4.7 Do they have species / relative abundance data for the fauna of Elsey National Park?

Much of the staff's routine survey and observations has been set back by flood clean up work. However, since 1997 the PWCNT staff have been conducting transects twice yearly (before and after the Wet) at three sites (riparian, woodland and grassland situations) along the Waterhouse River. Following CSIRO methodology, transects involve using sand tracks, setting pitfall traps, Elliot and cage traps for vertebrates. They also conduct crocodile surveys

and since the beginning of 2000 have started recording (monthly) the sighting of potential cane toad predators.

These include **reptiles** such as frill necked lizard, sand monitor, water monitor, green tree snake, blue-tongue, children's python, and king brown; and **birds** such as crows, butcher birds, wedgetail eagle, white bellied sea eagle, whistling kite, black kite, blue-winged kookaburra, tawny frogmouth, sparrow hawks, brown falcon, barn owl, pheasant coucal, cuckoo shrikes, kingfishers (forest and azure), mudlark, spotted nightjar, ibis, little egret, herons (pacific, great-billed, night).

4.4.8 Does the northern quoll occur that far south?

No.

4.4.9 What impression does the presence of cane toads make on visitors to the park?

This depends on the origins of the visitors concerned. Queenslanders do not turn a hair but those from the southern States express alarm about the continued spread of toads and the apparent lack of control methods. There has been no evidence of cane toads entering the thermal pool at Mataranka. Phone calls were received from locals asking why they had not been forewarned about the arrival of cane toads and asking what they (PWCNT) were going to do about the problem.

4.4.10 Can PWCNT supply any further details about the research being conducted in the area that is apparently based on sound recordings of frog populations as an indirect measure of cane toad impact?

The PWCNT has not been consulted by the researchers. However, as in the case of Kakadu, the program is being conducted by Professor Gordon Grigg (University of Queensland).

5 Stomach contents analysis

Analysis of the stomach contents of 12 toads (three from Borroloola taken during the day on 10 May and nine taken in the Elsey National Park on night of 11 May taken under Permit No: CKM 575 issued by Director of National Parks & Wildlife on 27 April 2000) yielded the following results:

- The stomach contents varied considerably. Five of the cane toads had been feeding almost exclusively on Coleoptera (~13 species involved, both large and small). Others had been feeding almost exclusively on Isoptera (~176 termites); Formicidae (~ 137 ants) and Hemiptera. With the aid of an entomologist (at the NT Museum?), identification to species level may be possible.
- In every case vegetative material (speargrass seeds, leaves, stems) small pebbles and sand formed a surprisingly large proportion of the stomach contents. In two cases ~ 60% of the stomach contents comprised roughage of this nature.
- Other invertebrates being eaten included Orthoptera; Lepidoptera (larvae); spiders; centipedes and isopods (slaters).

The stomach contents of the toads collected in Borroloola were too well digested to identify.

6 Conclusions

• In spite of a decline in a number of some traditional bushfoods, the lifestyles of Aboriginal communities do not appear to be seriously disadvantaged by the presence of

cane toads. Nevertheless, the negative effects of cane toads can be sufficient for cultural and religious ceremonies of Aboriginal communities to be changed. As proved to be the case in Queensland, Aboriginal people eventually grow accustomed to the presence of cane toads and, in the realisation that little can be done to control or eliminate them, come to accept the need to co-exist.

- For a period of 4–5 years certain species of goannas and snakes are likely to be adversely affected. Their decline will negatively affect Aboriginal communities that are semi-dependent on their availability as a food supply.
- The mowed lawns, sprinkler systems, shaded gardens, swimming pools, playing fields, sewage treatment ponds and street lighting in the township of Jabiru will offer ideal conditions for cane toads. The lifestyles of people resident in the township can be expected to be significantly affected and there will be a high risk of household pets (dogs) becoming poisoned.
- Disturbed areas in the KNP such as caravan parks and camping grounds will be similarly affected.

7 Recommendations

It is recommended that once the cane toad risk assessment is complete:

- PAN/*eriss* finalise a communication strategy to inform interested and affected parties about the potential impact of the cane toads in the KNP. This would avoid misinformation, unnecessary concern and be in keeping with the '*early invasion response strategy*' currently being established by EA (Greg Miles, Jabiru Rag 18.5.00).
- immediate attention is given to designing a cane toad monitoring program aimed at key species (eg *Varanus* spp) and key habitats (eg riparian zones).

8 Outcomes

In the latter part of 2000, cane toad identification and information sessions were conducted jointly by KNP and *eriss* staff. Target audiences included KNP staff, Energy Resources of Australia staff, tourist operators (including hotel/caravan park/tourist village staff) and Aboriginal communities. People were briefed on all aspects of cane toad impacts and the identification of cane toads, including the eggs and tadpoles. Park managers have continued to inform these groups and the general public of the locations of cane toads, their impacts and what action to take if cane toads are sighted outside of their present distribution ie as part of the '*early invasion response strategy*'. Posters, bulletins and items in the local media and tourism newsletters all contribute to this education and awareness program. A cane toad 'flipbook' has also been prepared for Aboriginal communities. By the time of this report, cane toads were well established in some southern areas of the Park such as Kambolgie Creek, the Gunlom area and the upper Mary River catchment.

An autopsy on a freshwater crocodile found dead in Kambolgie Creek during February 2002, revealed that gastric haemorrhages consistent with violent stomach contractions were probably caused by ingestion of a cane toad (Northern Territory News 19 March 2002).