

STOP THE TOAD

KEEP WA CANE TOAD FREE

Stop the Toad Foundation Emma Gorge toad fence report



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Executive Summary

Cane toads are listed in the World Conservation Union's world's 100 worst invasive species and they are about to invade Australia's last wilderness area; The Kimberley.

Using a newly developed control method, this project is the first ever attempt in Australia at creating a 'toad-free sanctuary'.

The aim of the project is to keep toads out of the iconic Emma Gorge on El Questro Station using a toad-proof fence and to study the biodiversity of the surrounding area before and after toads.

The project is a joint venture between The Stop the Toad Foundation (STTF), Dr. Sean Doody from Monash University, El Questro Wilderness Park and The Australian Geographic Society. It will run for a minimum of three years, and depending on its success, continue for years after that.

This report will outline Stop the Toad's contribution to the project; the construction of the fence. It will cover the background of the idea, the total costs, materials required and how it was constructed. It should be used as a guide for land managers considering toad control in The Kimberley.



An adult cane toad is blocked by an exclusion fence.

Why Emma Gorge?

Emma Gorge is one of the most spectacular and breath taking gorges in The Kimberley. It is home to a suite of wildlife, including ten species of goannas- a high number in biological terms. Some of these animals are rapidly disappearing in Queensland and the Northern Territory where toads have been for years. The Emma Gorge fence will protect some of the same animals in Western Australia and buy some time for them to prepare for the arrival of toads.

Emma Gorge is also one of the most well known tourist destinations in The Kimberley. Tens of thousands of local, national and international tourists flock to this oasis to experience the natural beauty and peaceful surroundings offered by Emma Gorge. They also come to stay in the Emma Gorge Resort, one of the top end resorts found along the Gibb River Road. It offers safari style cabins, a fully licensed bar and restaurant and pool area. The Emma Gorge fence will aim to stop toads from infiltrating this serene haven.

Emma Gorge represents The Kimberley. Australia's last remaining wilderness. The Emma Gorge fence aims to keep it that way.



A Mertens' Water Monitor (Varanus mertensi), one of the goanna species impacted by the cane toad.

Background

Cane toads (*Bufo marinus*, revised to *Rhinella marina*) were introduced into Australia in 1935 in an attempt to control pest beetles in the sugar cane industry. They were unsuccessful in their control efforts, but very successful at invading the ecosystems of Australia's north. Cane toads were originally released in Gordonvale in Queensland, but have spread west and south to now cover 1/3 of Australia.

As cane toads have spread across Australia, they have left a trail of ecological destruction in their path. They affect native wildlife in complex and numerous ways including lethal toxic ingestion for predators, predation on native species and competition for food and habitat. Key species that have been shown to be directly negatively affected by cane toads in Queensland and the NT include goannas, freshwater crocodiles, snakes, quolls and native frogs.

In 2009, cane toads reached the Kimberley region of Western Australia and have the potential to damage the biodiversity of this unique region in the immediate future. Research results reveal that the impact of cane toads on native species is more severe in areas with a more arid climate and longer, harsher dry seasons. This will mean bad news for the Kimberley- an area that has harsher dry seasons than the NT. Unless areas are protected from the toads they will have a significant impact on a range of species, some which are only found in the Kimberley.

Over the past 25 years, there has been a lot of effort and both Federal and State Government's funding poured into research for a biological solution to control the cane toad. Some ideas have included using a virus to interfere with the metamorphosis process, the introduction of sterile males into the population, using sex pheromones to attract toads and lure them into a trap, and using a lung parasite to weaken the population. Despite scientists' best efforts, an answer has not been found.

Community groups across Australia have also put a huge amount of effort into controlling toads using manual methods such as hand collection, trapping and fencing. Whilst this effort has played an important educative role in the community, it also hasn't managed to eradicate toads in Australia. The effort of two community groups has, however, been responsible for a breakthrough in the manual control of toads.

Over the past five years, The Stop the Toad Foundation (STTF) and Frogwatch NT have designed and tested a tool for the manual control of cane toads; exclusion fences. These fences are designed to keep cane toads out of an area, but allow other native animals to pass through. They are also cost effective, easy to erect and offer a practical solution to keeping toads out of specific areas.

The potential of the exclusion fencing strategy to control toads is supported by scientists Dr. Mike Letnic (from the University of Western Sydney) and Dr. Sean Doody. Dr. Doody has been researching the affects of cane toads on our native reptile species in the NT for the past 8 years. He has also been conducting pre-toad biodiversity surveys in the eastern Kimberley, based at El Questro Wilderness Park, 70kms west of Kununurra.

El Questro Wilderness Park is one of the most iconic places along the Gibb River road and one of the most visited by tourists from all over Australia and the world. It hosts many of the unique animals found only in the eastern Kimberley and is largely visited due to its spectacular scenery. El Questro management, Delaware North, is very keen to sustain their wilderness image and is the first privately owned company to be proactive in terms of toad control.

One of El Questro's more famous gorges, Emma Gorge, is situated in the NE of the Wilderness Park and is surrounded by 200m high sandstone cliffs of the Cockburn Ranges. This site should be relatively impenetrable to toads as they are not the most enthusiastic climbers. A 1.4km pre-existing cattle fence at the entrance to the gorge was an added bonus for the project as these fences are easily converted into toad proof fences and save time in the erection of a completely new fence (an additional 600m of fence, however, was erected from scratch).



The pre-existing cattle fence around the base of Emma gorge before it was converted to a toad proof fence. The outside has been cleared using a whipper snipper.

Project Aims

1. To create a 2km fence around the mouth of Emma Gorge to ensure it is relatively protected from the imminent invasion of cane toads. This will involve converting an existing 1.4km cattle fence into a toad proof fence, and then extending the fence 300m up the escarpment on either side by creating a completely new fence.
2. To create a fence line that can be used as a study site for a biodiversity survey pre and post toad. This will be in conjunction with Monash University and the Australian Geographic Society.
3. To create a fence line that can be used as the basis for a new wildlife and toad busting tour in conjunction with El Questro Wilderness Park.

Timeline

The distance toads travel each year has varied since their introduction. They only managed to travel up to 10km per year in the first few decades after they were released in Queensland. This distance increased to around 55km each year since reaching the wet-dry tropics of the Northern Territory. The 2010/11 northern wet season was one of the wettest seasons recorded for a few decades. Toads moved up to 80kms in some areas on the western frontline.

The aim for the Emma Gorge fence line was to have it erected before toads reached the area. During the planning stages of the project (early 2011), the western frontline of toads was 30kms west of Kununurra, only 40kms away from Emma Gorge. It was assumed they would move at a rate of at least 55km a year and that toads would reach Emma Gorge by the end of 2011. It was therefore essential to have the toad fence at Emma Gorge erected during the 2011 northern dry season. The construction of the fence was carried out in two parts; the existing 1.4km cattle fence was converted into a toad proof fence in May 2011, and the extension of the fence 300m up either side of the escarpment took place in September 2011.



Construction of the fence begins. One of the first steps was to remove any large rocks along the base of the fence to create a flat surface.

Fence construction; materials and relevant cost

The following table represents the materials required to convert the existing cattle fence into a toad proof fence and their relative cost.

Material	Amount	Cost	Total Cost
Shade cloth	2kms	\$2 per metre	\$4,000
25mm square plastic mesh	100m	\$3.9 per metre	\$390
6mm Black Insulation Rubber	4m	\$72 per metre	\$288
1.5mm PVC pond liner	5m	\$4 per metre	\$20
C clips	26 boxes	\$21 per box	\$546
Tie Wire	1 roll	\$25 each	\$25
Fencing Wire 3.15mm	8 rolls (80m each)	\$33 each	\$264
Droppers 107cm	2 bundles (45 in bundle)	\$158 each	\$316
Star pickets 1800mm	60	\$12 each	\$720
Screws, nuts and bolts	20 of each	\$70 total	\$70
TOTAL COST			\$6,639

The total cost of the Emma Gorge fence was essentially \$6,639. There was, however, in-kind support that kept the total cost to a bare minimum.

All fencing equipment such as fencing pliers, mattocks, shovels and cordless drills were supplied by STTF. The fence was erected in 18 days with the assistance of STTF volunteers. So essentially, the labor was free of charge, although the project was coordinated by a STTF staff member. El Questro Wilderness Park provided the STTF team with food and accommodation.



Shade cloth is attached to the existing cattle fence to block the toad's movement into Emma Gorge.

Fence construction; activities undertaken, the number of people and time they each took.

The fence line was cleared from vegetation by the El Questro staff using a whipper snipper. Ideally a fence line should be graded so that a good fire break is inserted before the fence is constructed. At the time of erection, this was impossible due to the ground being wet from the late wet season at the beginning of 2011. El Questro maintenance staff have since inserted a fire break on either side of the fence using a grader.

The following table represents the activities undertaken to construct the fence and the time each activity took. The two parts of fence construction, in May and September, have been joined together for the purpose of this activity.

Day	Activity	No. working hrs	No. people	No. people hours
1	Dug 250m trench on western side.	5.5	8	44
	Attached shade cloth, filled in trench.			
2	Raked ground, removed rocks from western side. Attached 150m shade cloth.	5.5	7	38.5
3	Removed rocks from western side.	4.5	8	36
	Attached 100m shade cloth. Lay wire along bottom of fence line. Placed rocks back along base of shade cloth.			
4	Rolled out shade cloth, attached 100m. Placed rocks on bottom of fence.	5.5	6	33
5	Attached final 100m shade cloth on west side. Lay rocks along remaining fence line.	5.5	8	44
	Attached black insulation rubber to first access gate. Started digging trench on east side of fence line. Attached 135m shade cloth on east side.			
6	Continued digging trench. Attached 100m shade cloth and filled in trench. Cleaned out river bed to make even ground. Lay wire along bottom of fence line.	4	9	36

Table continued

Day	Activity	No. working hrs	No. people	No. people hours
7	Attached 250m shade cloth to fence. Placed rocks along fence line. Tightened fence wire where it was too slack.	6	8	48
8	Attached black rubber to eastern access gate. Built 100m fence up eastern escarpment by attaching fencing wire to trees.	5.5	8	44
9	Shaped shade cloth on cattle grid to ensure toads are directed to fall into grid. Removable fence erected across one creek crossing. Built 70m of fence up western escarpment.	4	8	32
10	Moved rocks along eastern side of fence. 50m of temporary fence erected along creek line. Snake ladders were made and attached to fence line near cattle grid.	6	6	36
11	Permanent water crossing covered with PVC material; made to be removable and so that the creek flow can continue. 2 x cane toad traps made for either side of cattle fence.	4	7	28
12	Second permanent water crossing covered with PVC material. Fence checked for rubbish and final walk of complete fence line.	4	7	28
13	Path cleared on east side of escarpment using rakes, matics and hammers. Star pickets inserted and wire strung through star pickets and around trees.	4	9	36

Table continued

Day	Activity	No. working hrs	No. people	No. people hours
14	Shade cloth erected on east escarpment and rocks placed along bottom of fence. East side complete. Started to clear path on west side.	4	9	36
15	300m path cleared on west side. Some star pickets inserted and 50m wire strung up.	4	9	36
16	250m wire strung up, west side complete. More shade cloth was placed around cattle grid to ensure toads can't climb along edge.	4	9	36
17	Attached 300m shade cloth to wire. Attached droppers to section of fence that required extra support. Started placing rocks along bottom of fence.	4	9	36
18	Finished placing rocks along bottom of fence. West side complete.	4	6	24
	TOTAL	84	141	651.5

Challenges and potential weaknesses of the fence

The Emma Gorge toad fence represents the first-ever attempt at keeping toads out of a specific area. It is largely a trial and the weaker sections of the fence line will most likely need to be modified throughout the course of the project. There are three parts of the fence that are the weakest and could potentially allow toads to enter Emma Gorge; the cattle grid, the permanent water crossings and the escarpment. These were all secured to the best of our abilities, but will need to be managed in the future.

The cattle grid has shade cloth angled towards the inside of the grid, directing toads to fall into the grid and not pass over it. The grid will have cane toad traps on either side of the inside of the fence as another form of toad control once toads are in the area. Toads may figure out that they can walk across the beams in the cattle grid, so these will need to be monitored carefully.



Shade cloth was used to direct toads into the cattle grid. Cane toad traps will be placed on the inside of the fence as another form of toad control.

There are two permanent streams that cross the fence line, both only a couple of metres wide. The challenge was to secure these sections, but allow the water to flow all year. To do this, we attached a removable section of 1.5mm PVC pond liner material across the stream with the idea that it will move up and down freely with the water. Obviously, toads can still pass under the material, but the flow will most likely discourage them.



STTF volunteer attaches PVC pond liner material across one of the permanent water crossings.

Toads have managed to infiltrate escarpment areas across QLD and the NT, so will most likely do the same in WA. They are not, however, biologically designed to climb, so the steep Cockburn ranges surrounding Emma Gorge will hopefully prove too much for them. Nonetheless, the fence line was extended 300m up either side of the escarpment to the first rocky outcrop. This was the most difficult part of building the fence as spinifex and large boulders had to be removed, and a whole new fence line created. Ideally, the fence will be extended even further up the escarpment in the future.



The fence was extended 300m up the rocky escarpment either side by attaching fencing wire to trees.

Fire is also a potential risk to the fence due to its location, the fact that it is a natural part of the environment and the material that the fence is made out of (shade cloth). A fire break has been placed on either side of the 1.4km section of fence which is at ground level. The remaining 600m of the fence runs up the escarpment surrounding Emma gorge and it is impossible to get a grader along this section of the fence. This part of the fence will be most prone to fire and most likely lost in the event of a fire in the area.

Potential future costs

The fence will need to be maintained once a year after each wet season. It might need to be checked mid-year as well. Costs will include possible re-straining, clearing of debris and re-attaching parts of the fence that have come unstuck. In the case of a fire along the escarpment, the 600m of fence will need to be replaced. As the Emma Gorge fence is a trial, there may be unforeseen costs in the future, but they will most likely be minimal.

It is important that the fence is monitored for native wildlife impacts, presence of toads and any required maintenance. The fence line is conveniently located 1km away from the Emma Gorge resort, where El Questro staff are stationed all year round. This makes it very easy to include monitoring the fence as a weekly, or even daily, routine at no cost. El Questro hopes to create a new wildlife tour along the fence line which will also help to monitor the fence and its success.

Conclusion

Never before has an attempt to control toads on a landscape scale been carried out. We believe that Emma Gorge on El Questro Station presents an excellent opportunity geographically and environmentally to trial the fencing strategy and to control toads in a natural, confined area. The project also presents a good opportunity for scientists to determine the local biodiversity before toads reach the area, the impact of toads on this biodiversity and the impact of the fence on both toads and native wildlife. The project will allow tourists to be involved with the monitoring of the fence line, to view native animals at night time and to carry out toad control. It will increase community awareness of the impact that toads have on our native wildlife.

The Keep Emma Gorge Cane Toad Free Project is an exciting project. It has huge potential that if successful may set an example for other areas in Australia to follow. The total cost - \$6639- is not that much to invest to keep toads out of one of the most iconic gorges in The Kimberley. A biological or genetic solution to cane toads may still be 10-20 years away. Until that time, this project represents a pro-active solution to keeping unique wildlife areas cane toad free.