NORTHERN BETTONGS – RARE & SPECIAL

Bettongia tropica

bettong = Aboriginal word for 'small wallaby', ***tropica*** = 'occurs in the tropics'

By Robin Aiello

A Rare Little Marsupial

The Northern Bettong (*also known as the Northern Rat Kangaroo*) is about the size of a rabbit, with a grey back and cream belly. Probably the first thing that you will notice about these cute little marsupials is their extremely long tail that is as long as its entire body! When hopping quickly, they carry their head low, arch their back and hold their tail straight out behind.

This endearing marsupial is endemic to northeastern Australia and is one of the most endangered bettong species in Australia. Researchers fear that it faces a high risk of becoming extinct in the wild.

FAST FACTS

Body Length:	38cm
Tail Length:	36cm
Weight:	1.4kg
Lifespan:	6 years
Diet:	fungi
Est pop:	1500-2500

It is currently listed as 'Endangered' under the Queensland *Nature Conservation Act 1992*, the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, and the IUCN red list of threatened species.

Although it is believed that this species was once quite common, today there are only a few known populations of these small marsupials left in the wild – all of them located in far north Queensland within about 80 miles of each other. The total area that they occupy is less than 500 $km^{2.}$

Why Is Its Range so Limited?

Because…it has very specific nesting and food requirements.

The northern bettong will only nest under the base of grass trees or inside large clumps of grass, and their very preferred food is a type of fungus that only is found growing at the base of eucalyptus trees.

These two things combined, mean that they must live in a habitat that:

1. receives a lot of rain,
2. has a lot of open space, and
3. has a lot of grass growing on the forest floor.

In other words - a wet sclerophyll eucalypt forest!

In fact, that is the only place that they are found. These native marsupials live exclusively in a narrow strip of eucalypt forest that lies between the rainforest and the grassy woodlands of the western edge of the Wet Tropics Bioregion of north Queensland.

A Recent Discovery

The original distribution of these small marsupials is unknown. The species was first recorded in 1884. Between then and 1932 a further 5 specimens were collected – and then…nothing – they were presumed extinct. It wasn't until the late 1970's that there was another sighting.

As of 1996, they are known to be restricted to only a few small isolated populations in northern Queensland.

The northern bettong cannot live in the neighbouring rainforest because the fungus that they eat does not grow there. Similarly, it cannot range into the woodlands on the other side because not only is the fungus is less abundant, but they cannot outcompete the larger, more common Rufous Bettong that lives there.

Therefore, the northern bettong occupies a very special intermediate niche, where they have access to their preferred food all year round, which in turn, allows them to breed year round (although they only carry one joey/baby at a time, they may have up to 3 joeys in a year, if conditions are optimal)

The Northern Bettongs' Unique Lifestyle

The northern bettong is a solitary, nocturnal animal that spends their days tucked away safely, out of sight, in their well concealed nests.

Their nests, lined with materials that they carry with their prehensile tail, are dug out beneath either a grass tree (*Xanthorrea johnsonii*) or within a clump of grass.

Some individual bettongs may have as many as four nests scattered throughout their home range (a home can range from 50 – 70 hectares) that they use for refuge.

They venture out only at night to forage for food. In order to find enough food to sustain them, they wander great distance each night and can cover as much as 150m per hour. They are looking for their favourite food – sporocarps, otherwise known as truffles (see text box).

Sporo-WHAT???
SporoCARPS -

Sporocarps, commonly known as 'truffles', are the fruiting stage of some fungus. The native Australian species are closely related to mushrooms. They grow beneath the ground and are almost always found in association with tree roots. They rely on mammals to disperse the spores through their scat

These sporocarps are found at the bases of eucalypt trees, growing in association with the eucalypt roots. The bettong uses their strong sense of smell to locate the fungus and then digs them up using their long, sharp, powerful front claws.

The northern bettong is the only specialist fungus feeding mammal (mycophagist) in tropical Australia. The sporocarps, or truffles, make up over 67% of their diet. However, during the dry season when truffles are less abundant, the bettong will eat resort to eating less preferred foods such as cockatoo grass, tubers, lilies, herbs and small invertebrates to survive.

Ongoing Threats Facing the Northern Bettongs

The northern bettong and its habitat is under considerable threat from a range of activities, including many that are associated with man's recent activities in the area.

Some of the most damaging impacts include the following:

- **Long term cattle grazing** – this reduces the native grass coverage that not only reduces nesting sites but also increases exposure to predation by feral animals and foxes.
- **Land clearing** – In recent years these areas have become prime land for residential building and are being cleared for development, completely destroying the area for the bettong.
- **Increased predation** – by foxes and domestic dogs and cats.
- **Competition for food** – feral pigs also hunt fungus, particularly sporocarps and can out-compete the northern bettong for this limited food source.
- **Habitat loss caused by reduced fire burn-offs** – historically, these eucalypt forests experienced regular fire burn-offs over thousands of years. Many of the plants and

One Potential Impact:
Some climate change models predict less rainfall and more, longer dry periods in northern Queensland.
Since fungi abundance is positively related to rainfall (more rainfall, more fungus), less rain, therefore, would result in less fungus, which would result in less food for the bettong, which could result in relocation and starvation.

animals in this habitat are actually fire-adapted. However, today fire burn-off are rare. As a result, the vegetation grows uninterrupted and the rainforests invade the fringe habitats, and the increase in shade kills the grass and eucalypts, which results in the reduced number of nesting sites and reduced number of sporocarps (remember, they are grow in close association with eucalypt tree roots). This shift in vegetation and loss of food forces the bettong to relocate.

Potential Future Climate Change Threats

So…how will climate change affect the northern bettong? We just don't know yet!

Mostly, because very little is actually known about this very rare species. But, researchers agree that northern bettong is one of many Wet Tropics animals that they fear could suffer extinction due to an expected complete loss of habitat by 2050. The Eucalypt forests where they live are particularly susceptible to the predicted rising temperatures and increased periods of drought.

If, in fact, these environments ***do*** get less rainfall in the future, then the northern bettong will be in severe danger. ***Why?*** Because truffles, their main food source, require lots of rain and are far less abundant during dry periods.

But more information is needed. That is why researchers at James Cook University, partially funded by MTSRF, are taking a closer look at these little marsupials - their distribution, habitat requirements and population dynamics.

Generally, animal species with broad geographical ranges are better able to adapt to climate changes because they are already adapted to diverse environment factors. But species like the Northern Bettong, that have a very limited distribution and are restricted to one specific habitat, are far less able to adapt to changes, and are therefore far more likely to suffer severe die offs.

With this information they can identify factors limiting the current distribution of the northern bettong and build models to predict the populations response to climate change. The information that they collect will be used to develop an integrated model aimed at identifying environmental and climatic factors that limit and control the patterns of species distribution and abundance. This, in turn, allows researchers to better predict the consequences of climate change on tropical biodiversity, which in turn will help guide conservation and management plans in these regions.

This MTSRF Project

This northern bettong project lies within Theme 2 of the MTSRF research themes:

Theme 2 - Risks & Threats to the Ecosystems

Program 5ii - Climate Change: Rainforest and Catchments

Project 2.5ii.4 - Impacts of climate change on biodiversity

Project 2.5ii.4s1 - Conservation of the northern bettong, a rare and threatened endemic macropod species of the Wet Tropics: limits to current distribution and a mechanistic model for predicting effects of climate change

For more info see:
http://www.rrrc.org.au/mtsrf/theme_2/project_2_5ii_4.html

Relevant MTSRF Research

The Marine and Tropical Sciences Research Facility (MTSRF) is part of an Australian Government initiative to “develop collaborative, public benefit research between Australia's best tropical environmental researchers to support the conservation and sustainable use of North Queensland's environmental assets - the Wet Tropics rainforests, the Great Barrier Reef and the connecting coastal regions”.

The Reef and Rainforest Research Centre (RRRC) is contracted to administer the MTSRF Research Programme in North Queensland.

There are 5 main themes of study:

Theme 1	Status of ecosystems
Theme 2	Risks and Threats to the Ecosystems
Theme 3	Halting & Reversing decline in water quality
Theme 4	Sustainable use and management of natural resources
Theme 5	Enhancing Delivery