Grampians National Park - Fox Adaptive Experimental Management

2006 ANNUAL SPRING TRAPPING REPORT: Special post fire AEM review

FOREWORD

This report details the Fox AEM prey response monitoring in the Grampians National Park carried out in accordance with Victorian Research Permit 10002528. The report aims to provide a review of the last four years of mammal trapping, fox bait take and sand pad monitoring data in context with the affect of the recent January 2006 fires in the Grampians National Park.

Comments provided in this report are a combination of field anecdotal information, initial analysis of monitoring data at a local level and a local understanding of the Grampians National Park. These results are not to be considered as the definitive final scientific report. Parks Victoria will be producing the formal scientific findings of the AEM program in conjunction with Arthur Rylah Research Institute for Environmental Research (ARIR) at the conclusion of the five year research program in 2008.

EXECUTIVE SUMMARY

1. Fox Prey indicator species for the Grampians National Park have possibly been discovered. The Swamp Rat, Stumpy Tailed Lizard and Southern Brown Bandicoot. These animals have shown a significant response since the commencement of the fox baiting program and are potentially part of the staple fauna diet for foxes in the Grampians.

2. Initial analysis indicates between a 58% reduction in the fire affected area and a 47% reduction overall in the total amount of individual animals captured (all species). The impact of the January 2006 wildfire resulted in zero captures of the target fox prey species Southern Brown Bandicoot, Heath Mouse, Long Nosed Potoroo and non target Pygmy Possum and Agile Antechinus.

3. Stumpy Tailed lizard numbers have been the only species to show an increase since the fire, possibly benefiting as a result of increased insect resources. Further research is needed to determine how this species survives wildfire and benefits to it's habitat in the post fire landscape.

4. The area of Matthews Track was subject to lower fire intensity than other trapping areas and as a result Brush Tailed Possums have survived and are persisting with evidence of recruitment into the population only 9 months after the fire with a new season female being captured.

Mike Stevens
Biodiversity Team Leader, Grampians National Park
Phone: (03) 5361 4004 or 0438 513 269 Email: mstevens@parks.vic.gov.au

INTRODUCTION

The Grampians National Park Fox Adaptive Experimental Management Program commenced in January 2003 in the Grampians National Park. The program is part of a 5 year research partnership between Parks Victoria and ARI. The project is looking strategically at the effectiveness of fox control at five Parks Victoria managed sites across Victoria with the aim of determining the cost effectiveness of various fox baiting programs and their benefit to the protection of native wildlife.

The monitoring is conducted through three programs in the Grampians National Park

- Input monitoring (calculation of fox bait take information),
- Output monitoring (measuring decline in fox activity through sand pad monitoring), and
- Response monitoring (spring mammal trapping to monitor the response of native animal populations to the fox baiting effort).

Fox Baiting currently occurs across 73,000 Ha of the Grampians National Park along approximately 450km of the existing road and track network. Fox baits are spaced every kilometre to minimise the possibility of non-target species poisoning and the program is conducted 9 weeks at a time, followed by a 4 week break, 4 times per year. A four week break is scheduled into the program to reduce the affects of bait caching, shyness and avoidance by foxes.

In January 2006 a large wildfire impacted on significant biodiversity areas of the Grampians national Park along the Mt William and Serra Ranges. These areas contain significant habitat for the nationally endangered Smoky Mouse (Pseudomys fumeus) and large tracts of endemic vegetation types to the Grampians region. In addition, a state-wide endangered species recovery team is working to re-introduce Brush tailed Rock Wallabies back into the Grampians NP in Spring 2008 with animals being held in a 'soft release' holding pen at Dunkeld in co-operation with corporate sponsors the Dunkeld Pastoral Company.

The Grampians Fox AEM baiting program has now undertaken an extremely important role since the 2006 fire as it helps to protect surviving native fauna populations and assist their recovery back into the landscape.

MAMMAL TRAPPING

The prey response (Mammal Trapping) program began in spring 2003 and is conducted in the Victoria Valley region of the park (Note: The initial pilot trapping program was conducted in summer 2003).

The Victoria Valley is renowned for its large area, connectivity and abundance of varied Heathland vegetation and is currently the main target area (along with the Victoria Range) of the Grampians National Park Fox 1080 baiting program.

The mammal trapping program is targeting the following fox prey species:

- Heath Mouse (Pseudomys shortridgei)
- Swamp Rat (Rattus lutreolus)
- Long Nosed Potoroo (Potorous tridactylus),
- Southern Brown Bandicoot (Isoodon obesulus), and
- Brush Tailed Possums (Trichosurus vulpecula).

Non-target species also captured include:

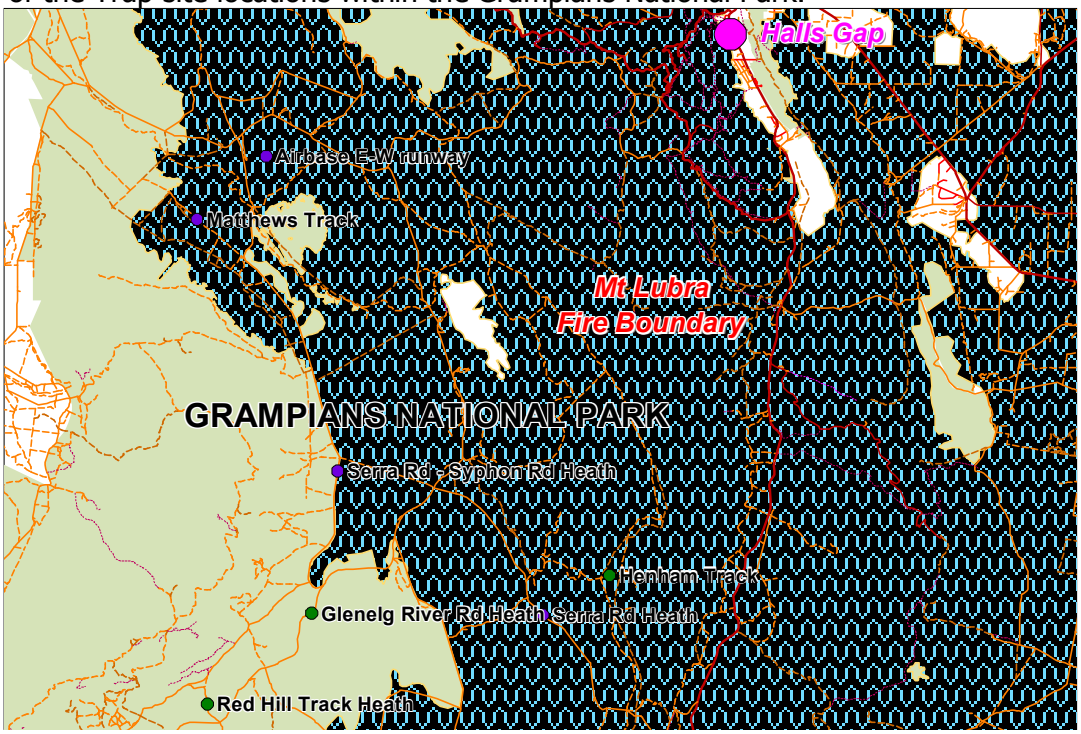
- Shingle-Backed or Stumpy-Tailed Lizard (Tiliqua rugosa)
- Blue Tongue Lizard (Tiliqua scincoides)
- Agile Antechinus (Antechinus agilis)
- Pygmy Possum (Cercartetus nanus)

In addition to the Fox AEM prey response trapping, this seasons monitoring program provided valuable information regarding post fire survival / ability of fauna to persist post fire as five of the seven trap sites were in fire affected areas.

Table 1: Trapping site details

Location	Traps Used	Fire History	Vegetation
Henham Track	Cage x 30	2006, 1994 (9 month old)	Heathy Woodland and Heathy Dry Forest Complex, Heathy Woodland
Serra Road	Cage x 30 + Elliot x 30	1958 / 1967 / 1983 / 1994 / 2006 (9 month old)	Sand Heath, Heathy Woodland, Damp Heath Scrub
Glenelg River Road	Cage x 30	1963/80/99 (7 yo)	Heathy Woodland, Wet Heathland, Heathy Woodland and Wet Heathland Complex
Red Hill Track	Cage x 30	1966/81/88 (18 yo)	Heathy Woodland, Heathy Dry Forest and Sand Heath
Syphon Road	Cage x 30 + Elliot x 30	1994, 2006 (9 month old)	Heathy Woodland, Sand Heath, Wet Heathland
Matthews Track	Cage x 30 + Elliot x 30	1978 / 1988 / 2006 (9 month)	Sand Heath, Heathy Woodland, Damp Heath Scrub
Victoria Valley Airbase	Cage x 30 + Elliot x 30	1963 / 1985 / 2006 (9 month old)	Sand Heath
	Total 330 traps (210 Cage + 120 Elliot)		

Map 1: Map of the Trap site locations within the Grampians National Park.



Serra Rd - SPRING 2005 (Pre Fire)

Serra Rd - SPRING 2006 (Post Fire)

The 1st trapping session setup took place on Thursday 12th October with the dropping off of traps to each site followed by the placement and baiting of traps on Saturday 14th. An additional day set up was required this year as trap transects had to be re-established as trap marker flags were destroyed in the fire.

Teams were briefed prior to the checking of traps at the Parks Victoria works depot in Halls Gap each morning at 0600 hrs and had left the depot by approximately 0615. All traps were checked on a 24 hour rotation cycle.

Session Dates, Timing, Weather Conditions and Trap Locations

Session A (5 nights)

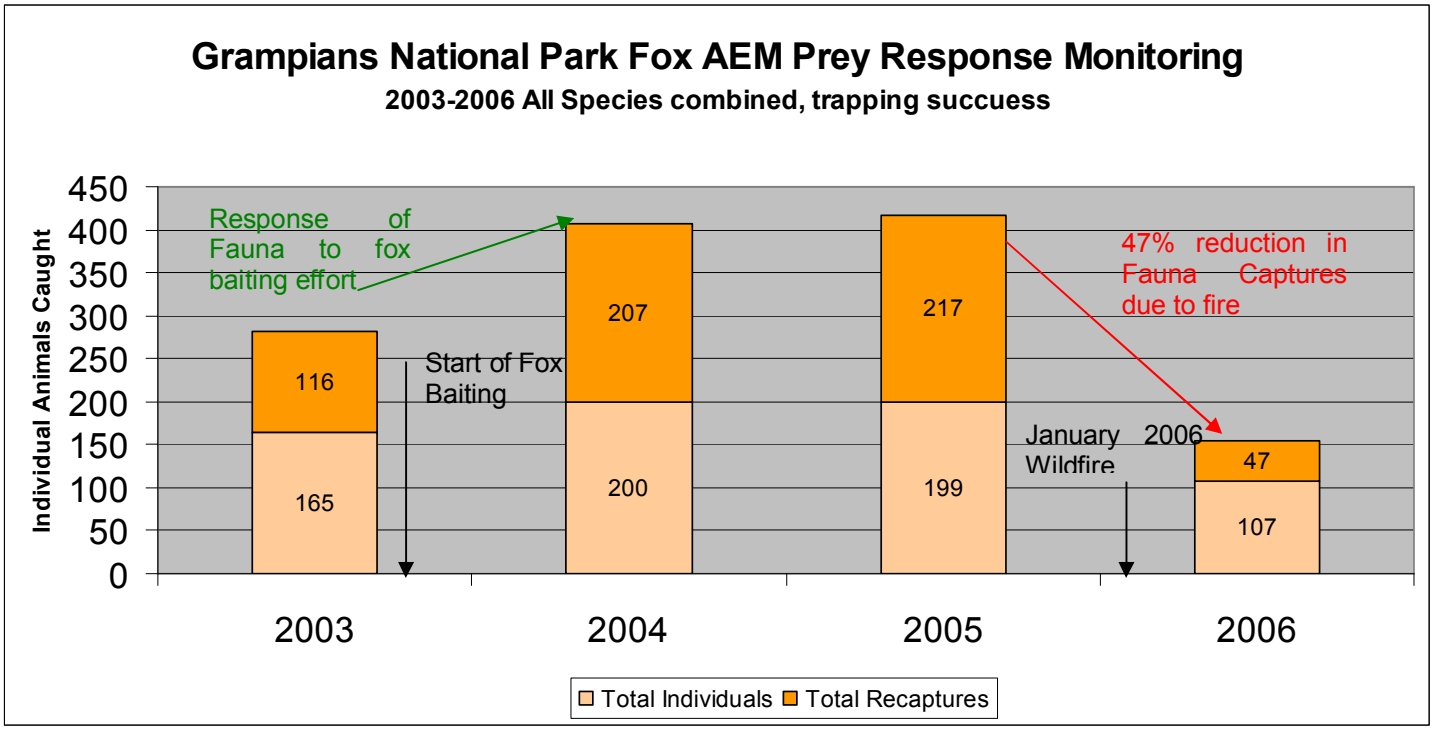
- Saturday 14th October Traps Set
- Sunday 15 to Thursday 19 October, 2006
- Days: Warm to hot. Nights: warm to cool

Session B (5 nights)

- Friday 10th November Traps Set
- Sunday 11 November to Wednesday 15 November, 2006
- Day: overcast, cold, wet. Night: Cool. Raining, Total of 17.7mm of rainfall

MAMMAL TRAPPING RESULTS

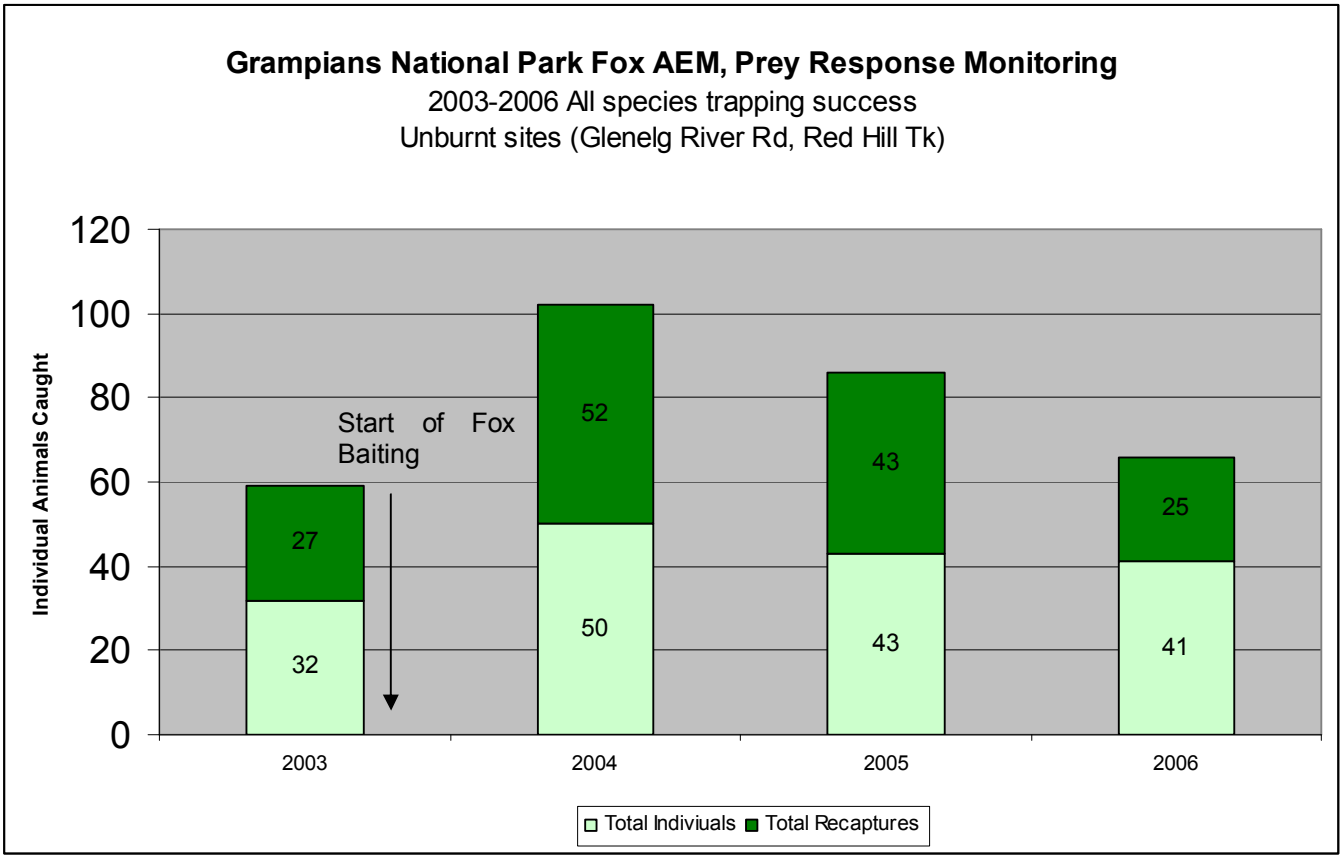
Graph 1: Prey Response – total captures of all species per year



The 2006 Spring mammal trapping results (data includes all 7 sites – 5 burnt and 2 unburnt) indicate that there has been approximately a 47% reduction in the small fauna population in the prey response study area of the Grampians National Park since the January 2006 wildfire.

With an unknown degree of confidence we can say that the fire has widely affected small fauna populations in the study area by around 47% with unburnt areas more or less being unaffected by the fire.

Graph 2: Prey Response at study sites not affected by the January 2006 Fire



Graph 2 has combined the trapping data for Glenelg River Road and Red Hill Track, the two monitoring sites that have remained unburnt. A sub-analysis of data specific for these two sites has been completed. Of interest is the increase in captures from 2003 to 2004 possibly affected by the commencement of the fox baiting program yet a gradual decline over the past three years a potential result of the impact of a prolonged drought although this data is limited to only 600 trap nights at two sites.

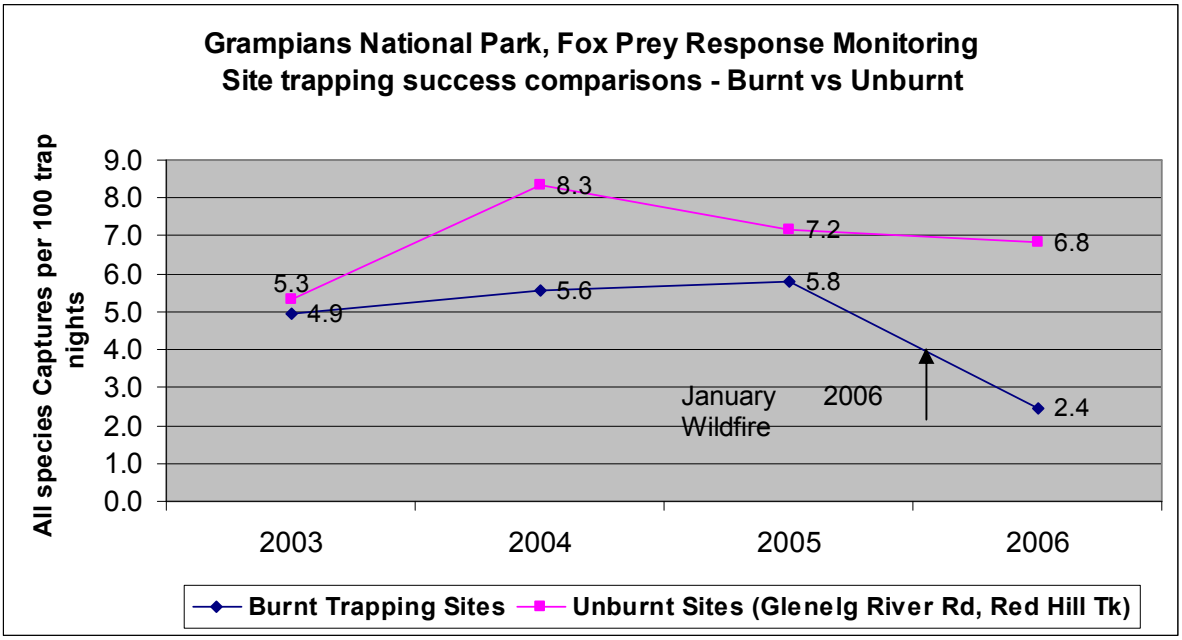
In graph 3 an attempt has been made to standardise the results presented in graph 1 and 2 so that they can be directly compared. Trap success = all species captures / 100 trap nights. The data has been further separated by calculating the 2 unburnt sites, compared to the 5 burnt sites.

Without a complete statistically rigorous analysis the author can not be certain of the confidence in the data but this initial analysis in graph 3 suggests that there has been a 58% reduction in the captures of fauna across the burnt sites, compared to the unburnt sites as a direct result of the fire.

Although this analysis in one instance is "common sense", it provides further support to the importance of continuing fox baiting efforts for the following:

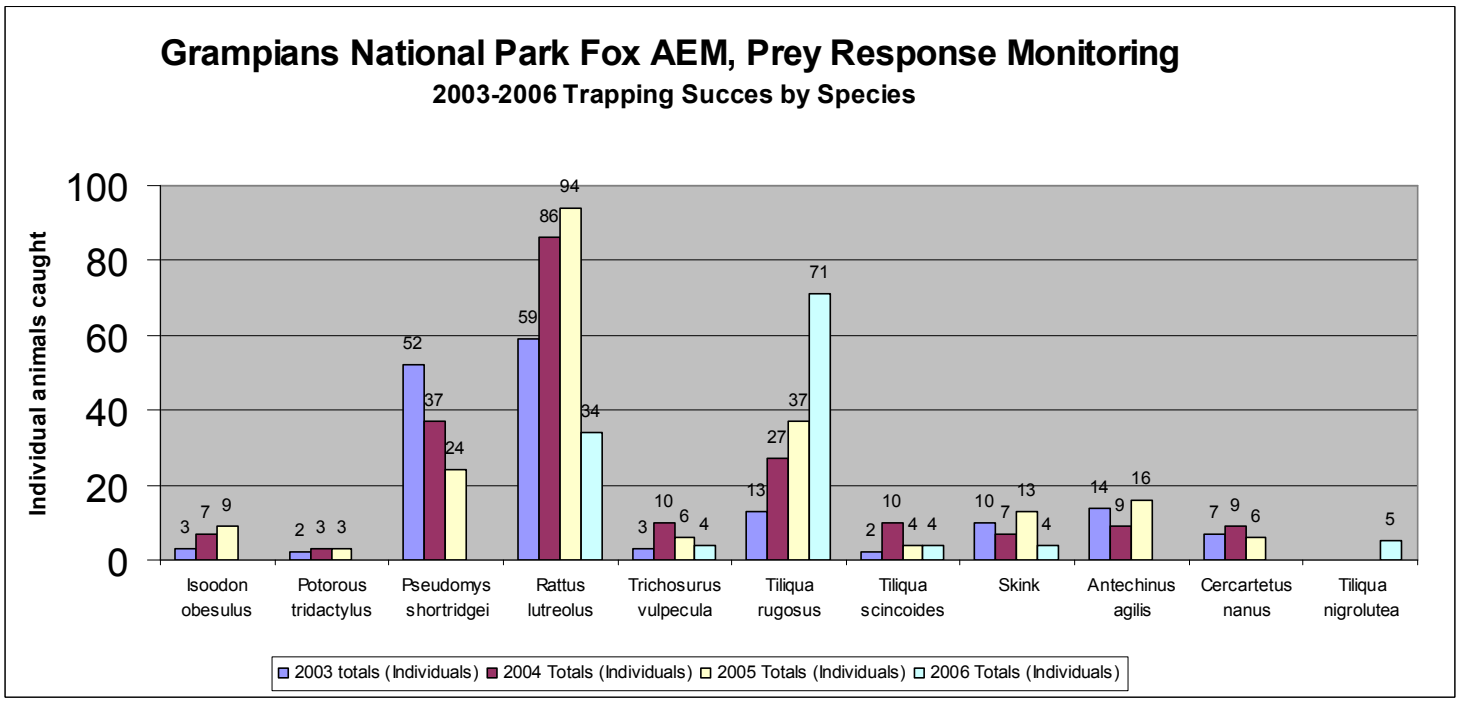
1. In the fire affected area to reduce the impact of foxes on surviving wildlife
2. In adjoining unburnt areas to protect outlying populations from increased predation due to a shortage of fox food resources in the fire affected area
3. To create fox baited links/corridors between burnt and unburnt sites to assist recolonising wildlife.

Graph 3: Trapping success comparisons – Burnt Sites v Unburnt sites



Note: Burnt sites = 2700 Trap Nights, Unburnt Sites = 600 Trap Nights

Graph 5: Fox Prey Species Trapping Results



E. Muelman discovered that Swamp Rats in the Grampians when in sufficient abundance have the ability to restrict or exclude Heath Mouse from areas of preferred habitat (The ecology of the Heath Mouse Pseudomys shortridgei in the Grampians National Park, Victoria, 1997). Graph 5 indicates a relationship between Swamp Rat population increase and Heath Mouse population decrease. Since the commencement of fox poison baiting the Heath Mouse population has suffered a 54% reduction at the expense of a 59% increase in the Swamp Rat population. This affect could be summarised by:

1. Heath mouse may not be a key fox prey species (although they may be subject to a degree of predation) due to their small weight range (30-80gm) and nocturnal activity pattern

2. Swamp Rats are a key fox fauna prey species due their (100-220gm) weight range and crepuscular activity pattern coinciding with fox hunting patterns
3. The successful fox poison baiting program in the Grampians National Park has caused a reduction in predation pressure on Swamp Rats having a positive affect on the Swamp Rat population survival.
4. As previously studied in the Grampians by Eddie Muellman, an abundance of Swamp Rats will successfully out compete Heath Mouse for preferred habitat, as a result Heath Mouse are being out competed from the study site.
5. This affect on the Nationally Vulnerable Heath Mouse population although of concern, may not be completely negative as it does not mean the Heath Mouse population is declining in the Grampians National Park, only being pushed into areas outside of the current study site and potentially sub-optimum habitats
6. As the fox baiting program continues in the Grampians National Park we may be seeing natural population levels / relationship between Swamp Rats and Heath Mice returning although the affect of natural predators (Quolls, Dingos) that have been removed from the Grampians landscape is unknown. The removal of the 'replacement predator' through the fox baiting program may be potentially deleterious to the Heath Mouse population in the Grampians National Park but this will require further study.

An abundance of Swamp Rats may in turn reduce fox predation on rarer fauna species. Foxes may require less hunting effort to capture the abundant Swamp Rat as compared to the rarer, more elusive species where a reduced food return for hunting effort could be obtained.

Graph 5 has also shown trends in relation to individual species to the fox baiting program. Swamp Rats Stumpy-Tailed Lizards, and to a lesser degree Southern Brown Bandicoots have responded well in terms of capture success to the fox baiting efforts.

This finding could potentially impact on future fox prey monitoring programs by reducing the monitoring effort required to target a diverse range of species, monitoring can be targeted at the specific indicator species. Swamp Rat and Stumpy Tailed Lizards appear to show significant initial reaction to fox baiting effort and are in large abundance increasing confidence in the data, whilst Southern Brown Bandicoot may be a species that could be tracked over long term monitoring periods requiring large amounts of trapping effort to achieve similar confidence levels.

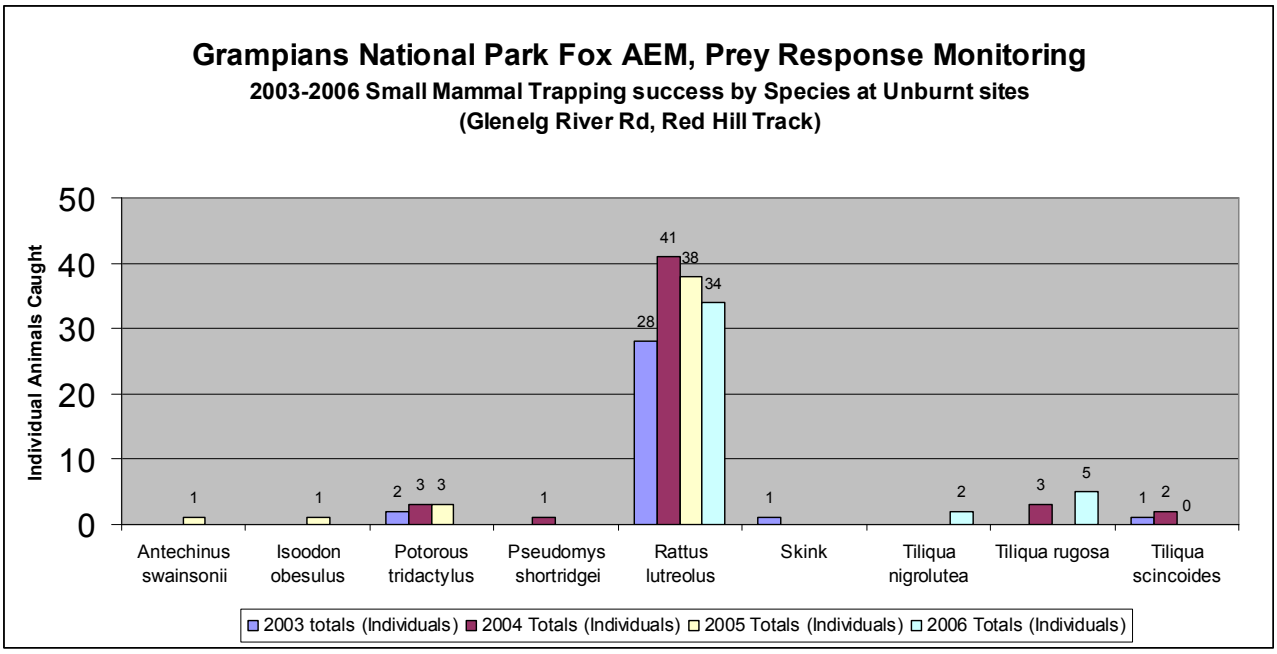
Rarer species such as the Long Nosed Potoroo and have been more difficult to trap and appear to be rarer in the Grampians landscape.

From a project management perspective although the affect of the fire has been frustrating the monitoring program now has an excellent opportunity to track the long term response of these species to both fire and the fox baiting effort as we have sufficient pre-fire trapping information.

Graph 6 shows individual species trapping results for the unburnt sites only. Although this data is limited to only 600 trap nights from 2 sites there is positive signs of fauna response to the fox baiting program at the unburnt sites. The initial trapping program in 2003 resulted in neither Southern Brown Bandicoots or Heath Mice being recorded at the sites, when in 2004 Heath Mouse were recorded and in 2005 Southern Brown Bandicoot was recorded. Swamp Rates saw an initial increase but have gradually declined (still being above 2003 levels) between 2004 to 2006.

Although this data may not be statistically valid it provides an opportunity to track long term change at sites that were unaffected by the fires.

Graph 6: Individual Species Captures, Unburnt sites



Trap Deaths

- 2006 Trap Deaths = 3 (1 Blue Wren, 2 Swamp Rats)
- 2005 Trap Deaths = 2 (2 Swamp Rat Adults, plus 7 overnight new born Swamp Rats)
- 2004 Trap Deaths = 4 (3 Swamp Rats, 1 Southern Brown Bandicoot)
- 2003 Trap Deaths = 10 (5 Swamp Rats, 2 Heath Mice, 2 Southern Brown Bandicoot, 1 Agile Antechinus)
- Traps were checked within the constraints of the research permit with animals not exposed to lengthy trapping time.
- All Elliot traps were covered shade cloth due to dry hot drought conditions being experienced (open at both ends for ventilation) and well placed in shaded / sheltered locations where possible in the Fire Affected Area
- All cage traps are covered with canvas wraps and placed in shaded / sheltered locations.

Further Research / Analysis possibilities

- Species specific analysis of post fire abundance and long term study of post fire response
- Affect of fox baiting program to the distribution and abundance of Heath Mouse in competition with Swamp Rats (historical comparison with E. Muelmann PhD)

Conservation Volunteers Participation

CVA assist Parks Victoria staff to deliver the Grampians mammal trapping program by sourcing volunteers through its Nature wise program.

The aim of the partnership is to provide a "pure" Ecotourism experience (as differentiated from nature based tourism) where participants can contribute to an existing research program that contributes to biodiversity protection in the Grampians National Park. A key focus of the partnership is to return any profits from the program back into conservation works in the Grampians which has previously occurred in the form of environmental weeding work.

CVA provided logistical support (vehicles, food, and accommodation), participant's pre departure information, management and supervision of volunteers, insurance, volunteer registration, marketing, bookings and administration.

Parks Victoria provided a unique wildlife eco tourism or eco-conservation experience with Park staff that is linked to a developed and on going state-wide research project, and public liability insurance.

CVA is a national not for profit conservation organisation whose core business is to attract and manage volunteers on practical conservation projects. They offer a range of conservation holiday packages and involve over 10,000 volunteers in hands-on conservation projects annually.

This year 25 people participated in four Ecotours contributing 50 labour days of around 400 volunteer hours to the program.

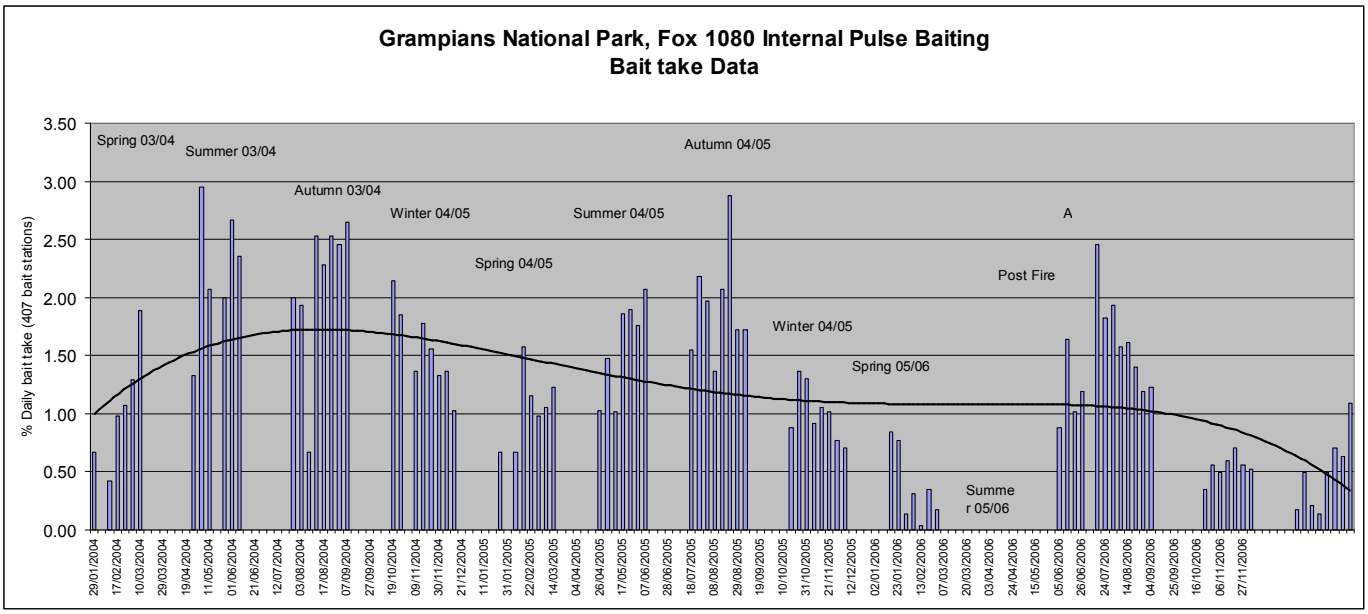
Spring 2006 CVA Group	Number of Participants	Total number of labour days
1	3	6
2	6	12
3	8	16
4	8	16
TOTAL	25	50

The use of Conservation Volunteers Australia has greatly assisted Parks Victoria to conduct the annual mammal monitoring component of the Fox AEM program. The program appears to be a great success with the further delivery of Ecotour product planned for the spring 2007 mammal monitoring program in the Grampians. Over the past 2 years CVA participants have contributed over 640 volunteer hours to the program.

Fox Baiting Program

Fox Bait take indicates we are experiencing a seasonal variability in bate take that can be associated with fox life cycle (See Graph 7). Local management assume the higher bait take during summer / autumn is associated with the peak dispersal and territory establishment of young foxes thus a higher probability of bait incursion by foxes and less prey food species available. The lower bait take during winter / spring occurs during fox mating and breeding time when food resources become more available and mothers / young cubs are feeding on prey species.

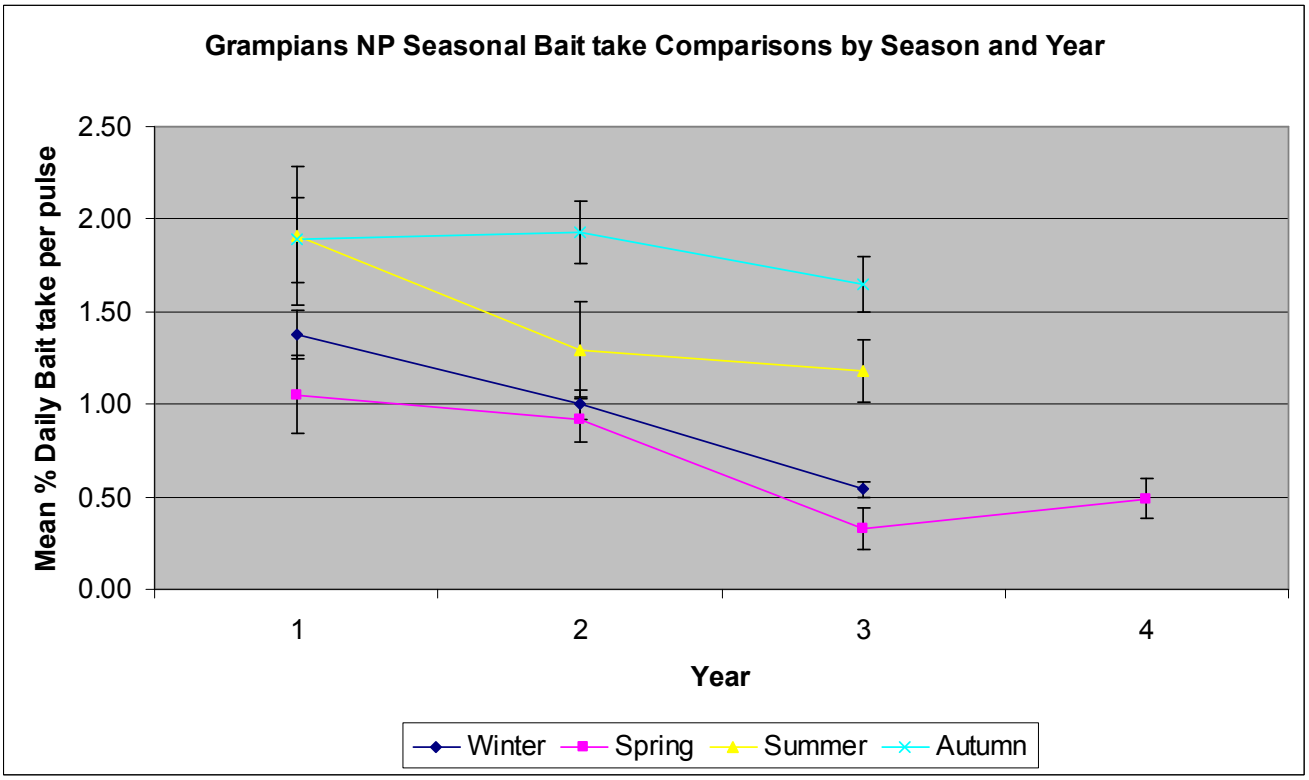
Graph 7: Fox bait take data analysis



Line is a computer generated trend line of the data, indicating bait take is gradually decreasing.

Graph 8 indicates that each season (apart from autumn) has experienced a significant decline in bait take since the commencement of the pulse baiting program. It is assumed that the park experiences an influx or "flush" of young foxes external to the park in summer and autumn as the residual population in the park is gradually killed off. It is also assumed that as winter and spring bait take are gradually reducing each season, less foxes are surviving to reach the mating and breeding season, with only the "bait wise" persisting to the next generation / breeding season.

Graph 8: Fox Bait Take Analysis, Seasonal Bait Take comparisons



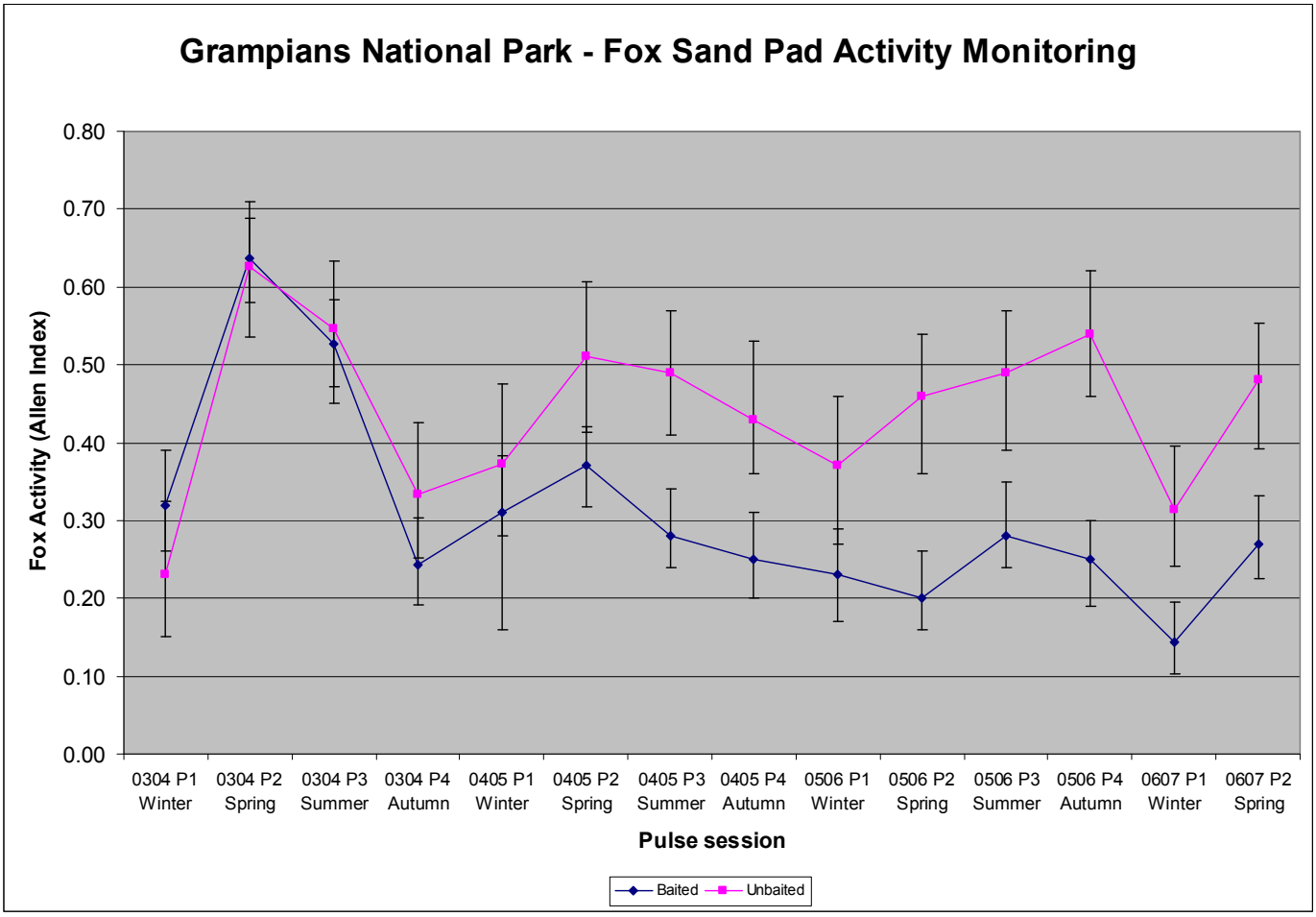
Bars represent Standard Error

As the program continues, sand pad data is indicating a strong correlation between the affects of fox baiting on fox activity in the baited area as compared to the unbaited area.

Sand pad data was initially converse to bait take data in being higher activity in winter and spring as compared to bait take data which experiences higher activity in summer and autumn. This could be associated with the need for fox mothers to feed young and young to increase condition rapidly before the onset of summer, thus foraging wider in winter. As the monitoring continues summer / autumn sand pad activity is now higher then winter / spring.

It is assumed that this change of fox sand pad activity in the baited area can be associated with less foxes surviving to reach the mating and breeding season as a direct result of the fox poison baiting program, with only the "bait wise" persisting to the next generation / breeding season (confirming bait take data)

Graph 9: Fox Activity Monitoring Program (Sand Pads)



The bars represent 95% confidence limits

Autumn is the only season that has not experienced any significant decline in bait take over the 3 years of the revised internal pulsed baiting program. It is assumed that this in conjunction with an understanding of the fox life cycle provides further evidence that the Grampians experiences an influx or "flush" of young foxes external to the park in predominantly autumn (April / May / June).

Conclusion:

The reduction in bait take and sand pad activity coupled with the increase in Swamp Rat and Stumpy Tailed Lizards provides the team with a degree of confidence that the fox baiting effort is effective and the time, labour, expense and commitment is warranted to protect the Grampians fauna population and continue to the Fox AEM project into the future for the Grampians National Park.

Post fire an excellent opportunity exists to obtain long term monitoring data of fauna species and their response to wildfire.

Acknowledgements

Thankyou to all the Conservation Volunteers Australia participants who helped contribute to the mammal trapping program. Your efforts greatly helped the program and assisted Parks Victoria Rangers during the busy spring monitoring period.

CVA participants:

Andrew Grieve	Sue Flere	Leith Barker
Daniela Garland	Sean Lumb	Blair Grossman
Elizabeth Sarrailae	Karen Elliot	Robert Kerton
Leonie Dukes	Liz Headland	Yariet Peers
Gail Davies	Anne Paterson	Juliet Jones
Jessica Morris	Barbara Annison	Amanda Rusiniak
Yukari Hijioka	Marion Jeppenlatz	Jo Davies
Inger VanDyke	Greg Cranston	

A special award is needed for Marion Jeppenlatz who travelled the furthest distance to attend coming from Queensland just to participate. Runners up were Yukari and Blair from South Australia and Inger from NSW.

A special thankyou to Jo Davies for her continuing support and hard work in developing the ecotourism partnership between Parks Victoria and Conservation Volunteers Australia. Without her and the CVA team efforts the program would not be as successful as it is.

To the Parks Victoria, Grampians National Park Biodiversity team – Andrew Dennis, Jake Goodes, Sylvia Van der Peet, Tony Corrigan, Geoff Pitt, thankyou for continuing the endless task in conducting fox baiting, mammal trapping and sand pad monitoring each year.

Thankyou to Dr John Wright (Parks Victoria) and Dr Alan Robley (ARIER) for your annual project review, guidance and support with the Fox AEM program in the Grampians National Park.