

WINDY HILL - ROSALIE BAY CATCHMENT TRUST

Windy Hill Sanctuary

Goodnature A24 Trap Project



Final Report #10 September 2018

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Executive Summary

The A24 Goodnature Trap project was undertaken between February 2016 and August 2018 in a 100 hectare area within the Windy Hill Sanctuary on Aotea Great Barrier Island.

The Goodnature Trap was required to cull both ship rats and kiore in an area with already reduced rat densities. They failed to bring rat tracking tunnels below 20% over two and a half years except for the July 2018 run when these reached 12.5 %. However, the management regime of traps and diphacenone bait in adjacent pest managed areas for that month were 7.5% and 0% - a pattern that was consistent throughout the project timeframe.

Traps were initially spaced 50 metres apart and were reduced to 25 metres apart in August 2017 – this improved the tracking tunnel rates from an average of 32% to 25% - still well above adjacent areas managed with traps and diphacenone.

The traps were reliable and generally had good functionality. The main issues identified were the glugging up of bait around the trigger which resulted in some devices off-gassing and a lack of consistent bait release from the automatic Lure Pumps (ALPs). There was consensus that the attractiveness of the lure is optimum for up to four months not six.

The failure of the Goodnature A24 trap to reduce rat densities sufficiently resulted in the devices being removed from the Sanctuary in August 2018 and returned to Auckland Council.

Project Background

The Goodnature A24 Trap project was a collaboration between the Great Barrier Local Board, Auckland Council, DOC, Goodnature Ltd, and the Windy Hill Sanctuary. Its purpose was to establish how effectively the non-toxic, self-setting, multi-kill Goodnature A24 trap was at reducing both ship rat and kiore densities within a pest managed Sanctuary on Aotea Great Barrier Island. This objective supported the local community aspirations to find ways to manage these pests with non-toxic methods.

Two hundred and ninety-three A24 Goodnature traps were established in the Big Windy Hill Pest Managed Area in the Sanctuary between February 22 and 24, 2016 by a team made up of personnel from Auckland Council, DOC, Goodnature, and the Windy Hill Sanctuary.

Gas canisters and lures were replaced at 6 monthly intervals.

Traps were checked monthly for the first six months to test functionality and enable identification of rat species. From then, every 3-6 months following the replacement of the manual lure with the chocolate flavoured auto-lure pump (ALP) in August 2016.

Rat tracking tunnels to DoC standard were undertaken 5 times a year to assess efficacy of A24s at reducing rat densities and the results compared with neighbouring pest managed areas using a mix of traps and diphacenone.

Eleven motion triggered cameras were established for the first three months to record activity.

The project was originally planned for a two-year period but was extended by six months to August 2018 to allow more time to assess the efficacy of the A24 at reduced spacing.

Key Points from Reports

Nine reports were completed between April 2016 and April 2018 and shared with the organisational participants, the community, other interested conservation groups, and posted on the Sanctuary website.

The following summarise the key points from each report and track the progress of the project.

1 April 2016

First check showed all traps were operational. Body count of 17 ship rats and 1 kiore. First camera check showed 4 interactions, 2 being kiore. No kills.

2 July 2016

Traps functioning at 91-100%. 43 ship rats, 2 kiore, and 3 unidentified rats counted. Camera checks showed 2 kills and a pig and morepork scavenging carcasses.

#3 September 2016

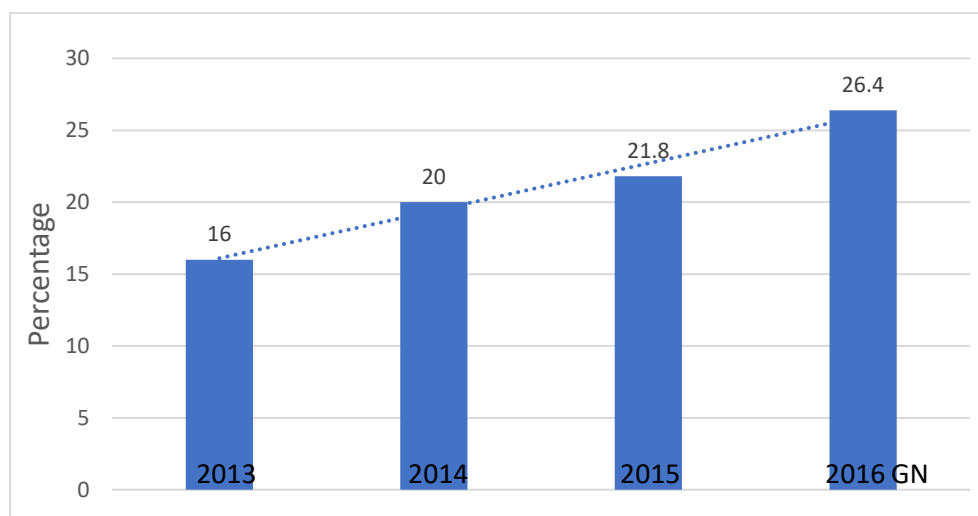
ALPs (automatic lure pump) replaced manual lures in August. Chew card monitoring undertaken but low results did not correspond with higher rat tracking tunnel results. Bulk of rats identified under traps are ship rats.

#4 November 2016

Reliability of traps continues to be high – any issues have been related to cylinders gassing out, one trap breaking (replaced by GN), 3 traps incorrectly set up, bait clogging around trigger. Since March 149 rat bodies counted – 13% kiore. Goodnature undertook an Operational Review of the field layout and recommended that a pre-feed (additional lure placed beneath the traps) may assist in reducing tracking tunnel percentages and that some units be repositioned onto more robust trees.

#5 March 2017

During this first year, ship rats were the predominant animal culled by the traps with just 17 of the 169 carcasses identified as kiore. The pre-feed recommended by Goodnature resulted in tracking tunnels reducing by 4%. The Big Windy/Goodnature pest managed area has historically been a challenging area to manage with annual average tracking tunnel indices remaining comparatively high. Graph 1 shows the progression over the last 4 years with the 2016 Goodnature A24 trap results being the highest to date. However, rat densities in 2016 were higher throughout the Sanctuary due to the abundant food availability driven by a wet summer and the same average may have resulted irrespective of the current methodology.



A comparison of annual tracking tunnel averages for the (Big Windy) GN project area (Graph 1)

The change to the ALP in August 2016 resulted in considerable savings of time and labour. Rather than the previous monthly checks, between August and the replacement of the ALP in February 2017, the traps were checked only in October, and in passing in September and November when the tracking tunnels were done. Each trap was also checked in December when the pre-feed was undertaken. There were some observed issues with a few of the pumps – the bait congealed around the trigger pin and resulted in uneven or low bait flow, some appeared to run out before the six months, and a few didn't work at all. This was reported to Goodnature. Overall, the ALP appeared to operate effectively.

During the pre-feed run in November, several traps that had been established on less stable trees such as ponga or on trees that had since fallen over, were re-sited. Around 100 traps had the access for rats made easier by placing sticks and rocks underneath the entry to the trap. Initially traps had been set higher than normal because of the potential risk to rails, however no rails were culled or seen in this area.

It was identified that Kiore present a challenge in terms of catching and it may be that the rise in tracking tunnel indices in the Goodnature project area is related to the reduction in ship rats and the corresponding increase in kiore. Camera footage indicates that kiore are less likely to enter a trap and this is supported by kiore catches representing just 10% of the total catches.

#6 July 2017

Rat tracking indices have been higher than any other pest managed area in the Sanctuary since the Goodnature project commenced. For the latest tunnel run in July 2017, the rat tracking tunnels in the Goodnature project area stood at 36% compared to neighbouring pest managed areas Windy Hill at 0% and Benthorn Bush at 5%.

Between April 19th and July 5th, 2017, two trap lines baited with peanut butter (Trap line I-3 -with 14 traps and I-6 with 21 traps) within the Goodnature trap area were re-opened to assess the abundance of kiore present in the area. Over that time 31 animals were trapped - 15 kiore, 11 ship rats, and 5 unidentifiable. This confirmed the suspected level of kiore.

The Trust undertook a spot check of 20 ALPs in early June - 1 was empty, 3 had not dispensed bait at all, 1 had bait build up on the trigger and had outgassed. Out of just 20 units, this added up to a concerning number of devices potentially not functioning in the field. Goodnature replaced lures, and one trap that had trigger failure, and responded that they felt that mice were probably taking the Auto-Lure bait without triggering the device. However, in our experience, it would be unusual to have mice in an area with so many rats.

#7 Sept 2017

Over the 18 months of the trial the following issues of have been identified:

- Consistently higher rat tracking tunnel indices in the Goodnature area than other areas in the Sanctuary using standard rat traps and diphacenone bait
- Only 10% of animals identified beneath A24 traps have been kiore with the greater Sanctuary area catch rate for these animals standing at 57% as had been assessed previously.
- Some of the Auto-Lure Pumps (ALP) emptied at 4 months, short of the 6 months expiry date
- Bait clogging round the trigger appears to result in some units gassing out.

- With such high numbers of rats left in the area, it raises the question of whether the chocolate based lure is the most effective when a peanut butter based lure works more effectively elsewhere in the Sanctuary
- The A24 spacing of 50m between units is twice that of the stations in the other Sanctuary pest managed areas and that this may also result in elevated rat numbers.

On 29th and 30th August the Windy Hill field team worked alongside Nick Graham and Chris Dwan from Goodnature to move 124 of the A24 units from the coastal side of the project area and interspersed these with the units on the inland area of the project at 25 metre spacing.

During the changeover operation, it was found that 9 of the units had no gas left and that 43 of the ALPs had not dispensed any bait and were still full. The latter is a significant percentage of units and raises some concern about the consistency of the ALPs. 5 of the 9 gassed out A24s were units where the bait had congealed around the trigger indicating this may have been the cause.

#8 January 2018

To get a comparative picture of the efficacy of the ALPs in other areas contact has been made with Mt Bruce, Boundary Stream, Ark in the Park, DOC Te Anau (Lyndsay Wilson), and the Hollyford Community Trust. A spot check protocol was shared. A general consensus shared by these A24 projects is that 4 months is the most effective life for the lure in the ALPs.

A further spot check of 70 units was carried out in December 2017, 4 months after gas and ALP renewal. It was found that all traps fired when manually triggered, 2 of the ALPs appeared not to have dispensed bait – judged by the fullness and the softness of the ALP, and in 12 of the devices lure was blocked around the trigger(picture below) – the lure thickens and hardens forming a ‘skin’ which appears to prevent any additional lure dropping down to below the unit. No kills were observed under traps.



#9 April 2018

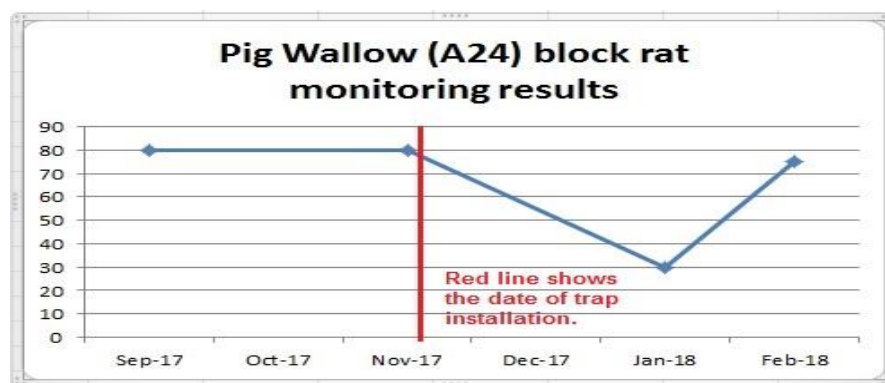
In February 2018, another gas and ALP changeover was undertaken with the Windy Hill team joined by Goodnature personnel – Sean O’Brien and Christine Stockum. 10 ALPs had failed to drop bait and 3 had out-gassed. This was a real improvement on the last run in August 2017 and was not considered significant to the integrity of the network. Some of the failed units were taken by to Goodnature to be further assessed. A summary of ALP assessment follows. After spending two days

in the Goodnature project area the team from Goodnature had no changes to the field layout to recommend.

| | Aug 2017 | Dec 2017 Spot check of 70 | Feb 2018 |
|---------------------|-----------|------------------------------|----------|
| ALP fail to release | 43 | 2 | 10 |
| Off gassed | 9 | 0 | 3 |
| Trigger Blocked | 5/9 above | 12 | 0 |

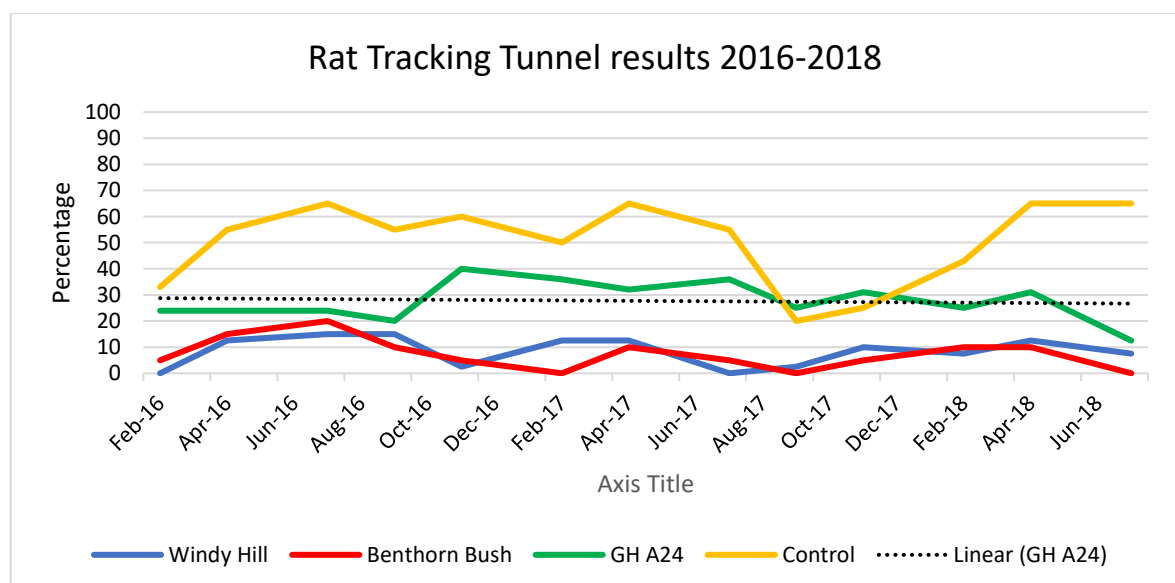
Further discussions have been held with other groups using the A24s but in all but two cases they are used in a mixed array with DoC 200s, cyanide or 1080 and not comparable to our situation where the A24s are the sole tool.

Ark in the Park (Pigs Wallow area) in the Waitakeres has a 50 HA area with just A24s and no kiore. The following graph supplied by them shows that the early tracking tunnel results for this area. The A24s at Pigs Wallow are set at 100 x 50 while Windy Hills are now at 100 x 25.



Rat Tracking Tunnel Results

Twenty-five tracking tunnels were established in two lines of 10 and one of 5 on random compass bearings through the A24 area prior to the project commencing. Sanctuary wide tracking tunnel runs were carried out in Jan/Feb, April, July, September, and November each year.



For all but the final tracking tunnel run in July 2018, tracking tunnels remained between 20% and 40% in the A24 area compared to 0% to 15% in Windy Hill (40 tracking tunnels) and 0% to 20% in Benthorn Bush (20 tracking tunnels).

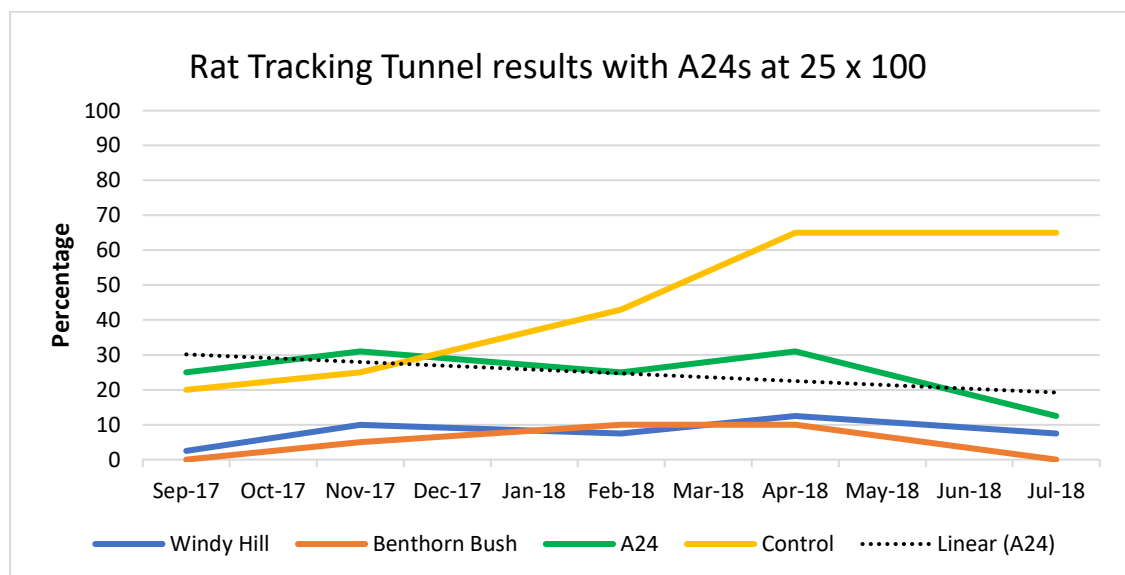
Discussion

Over the two and a half years the Goodnature A24 traps failed to bring rat tracking tunnel rates down as indicated by the trend line in the graph Rat Tracking Tunnels 2016-2018. The A24s were less effective than standard rat traps alternated with 100-150 grams of diphacenone paste as deployed in two adjoining pest managed areas. With stations at 25 metre spacing tracking tunnels in these areas varied between 0 -20%.

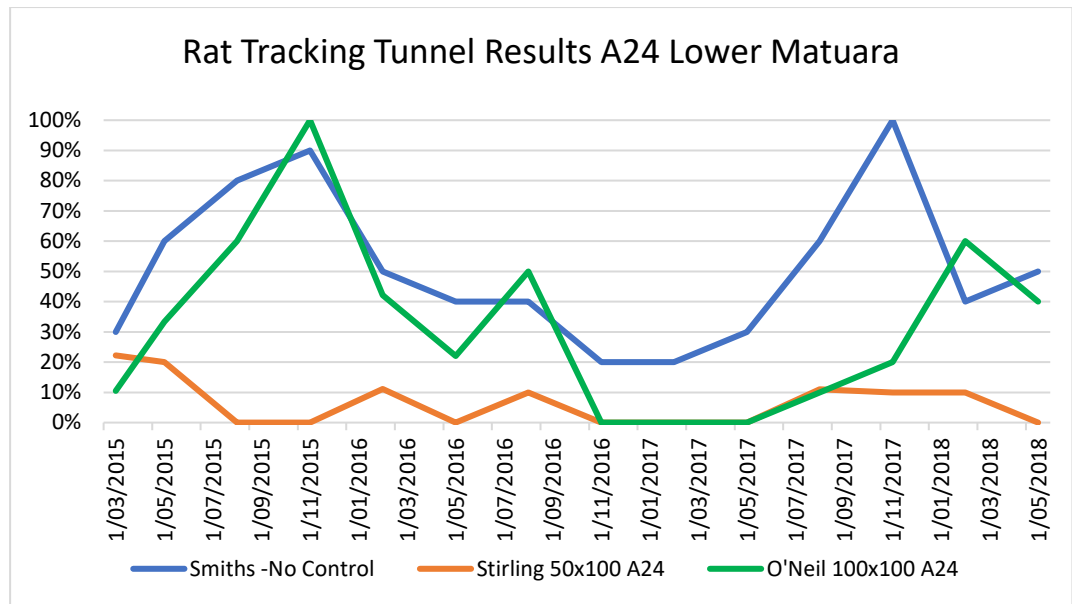
There are a range of variables to consider as to why the A24s failed to reduce rat densities to acceptably low levels – for example: the distance between traps, the significance of kiore, the attractiveness of the lure; the already reduced levels of rats when the project commenced; and the design of the device itself.

- Trap distance – for first 18 months of this project the A24 were at 50 metre spacing compared to 25 metres for stations in the adjoining areas which, in the presence of kiore with smaller home ranges, is considered good practice.

Tracking tunnel results taken from the time the A24s were moved to 25 metre spacing is shown below and indicates a more significant downward trend than that taken over the whole period of the project. This trend may have continued to decline had the project been continued but overall results indicated to the Great Barrier Local Board that extending the funding for the project that was considered too expensive for the risk.



Tracking tunnel results from two A24 only projects in Lower Matura in Southland also showed improved tracking tunnel percentages when the distance between traps was reduced as shown on the following graph. The A24 traps at 50x100 were introduced into the Stirling area in March 2015 and O'Neil at 100x100 in January 2106. (Data supplied by Environment Southland – thank you).



- The significance of kiore – early camera footage showed that kiore were much less likely than ship rats to engage with the A24 trap. Ship rats repeatedly climbed all over the device and generally explored whereas kiore either ignored the trap or often just sniffed the gas cannister and ran off. Literature describes kiore as a more cautious animal and this may have been a factor in the limited engagement with the A24. In the Sanctuary well over 50% of the rats culled are kiore and in the trapping run undertaken in the A24 project area the high level of kiore was confirmed. Their presence in significant numbers, coupled with their more cautious nature may well have contributed to the higher tracking tunnel rates.
- Lure Attractiveness – throughout the Sanctuary peanut butter is used as the lure in rat traps and is the base lure in diphacenone paste. The chocolate base in the ALPs does not appear to be as attractive and this may be another reason that the A24s failed to reduce rats significantly. It would have been useful to have been able to trial a more nut based lure in the A24s, however this was not available from Goodnature.
- Rat densities – the area for the A24 project had been under management since 2006. Prior to management, tracking tunnels reached 86%. Post management between 2007 and 2013 tracking tunnel annual averages ranged between 7.4% and 16%. From 2014 on, potentially because of reducing the bait weight and changing bait to cholecalciferol, the tracking tunnel averages started to rise and peaked in 2015 at 21.8%. Following the introduction of the A24s it rose further to an annual average of 26.4% in 2016 and reached 32% in 2017. In 2018, the result for Jan/Feb was 25%, for April 31%, and dropped to 12.5% in July. Judging by these results, perhaps the A24 is more effective as a knock down tool when rat densities are high, and more animals interact with the traps. They appear to be less effective in an area where rats are already reduced and when the traps are at 50 metre spacing.
- The A24 design – an opinion – Station design for the Sanctuary is based on DoC research which established a preference for wood coupled with a ‘see through’ run, ie; mesh both ends. The A24 trap lures animals to put their heads up and into a dark space. With so few kills recorded from 11 cameras over three months perhaps the trap design is not optimum for rats. The design of the A24 would have to be a consideration for the failure of the A24s to reduce rat abundance when wooden stations with either a rat trap or bag bait in adjacent pest managed areas outperformed it in terms of tracking tunnel results.

Appendix 1, Cost Comparison Goodnature A24 with Windy Hill Sanctuary Station, as attached, details the costs of the project and a comparison with the Sanctuary standard methodology. This shows that the standard of monthly checking of trap and bait stations is cheaper than using A24s.

While the outcome of this Goodnature A24 project has been disappointing, the reports documenting the project progress will provide a point of reference for Councils and other conservation projects.

We wish Goodnature well in addressing the issues identified which will hopefully assist in further trap refinement.

A24 Project Collaborative Contribution

The team from **Goodnature** were fully involved with this project guiding the installation of the A24s in February 2016; promptly replacing failed units, gas, and ALPs over the two and a half years; assisted with the replacement of manual lures with ALP's in August 2016; undertook a Field audit in October 2016 coming up with recommendations; and assisted with the relocation of units in February 2017. Their onsite presence and evaluation were invaluable and added credibility to this community-based project. The Sanctuary provided the Goodnature team with tracking tunnel results from 2016-2017 to assist their enquiry as to the reason for the continued high A24 tracking tunnel results over the project timeframe.

Great Barrier Local Board/Auckland Council approved the project and provided \$60,000 to cover the cost of traps and two years of gas cannisters and lure pumps. Officers from Council and the Local Board members assisted with the installation phase and have had a keen interest in the outcomes of the project.

Darren Peters from **Department of Conservation** collaborated with the Windy Hill Sanctuary to provide the project concept, design, and presentation to the Great Barrier Local Board and Auckland Council team. Darren also assisted with the installation of the A24s and consulted throughout the project.

Windy Hill Sanctuary provided a pre-managed site with formed tracks, established stations and 25 tracking tunnels. Historical data was available to use in the analysis of the A24 performance against other methodology. The value of the Sanctuary input for trap establishment and maintenance, tracking tunnels undertaken five times a year, spot checks, data analysis, reporting, and presentations is \$25,000.

Thank you to all the people involved in this very worthwhile project, particularly Kevin Parsons, Abby Naismith, and Henry Cookson for their diligent work as the Windy Hill Sanctuary field team.

Judy Gilbert

Sanctuary Manager

Appendix 1

Cost Comparison Goodnature A24 with Windy Hill Sanctuary Station



Costs were compared over an 18 month period for the establishment and maintenance of 300 A24 Traps and 600 wooden stations used for rat traps/bait set on a 100 x 50m grid in a 100 hectare area in the Windy Hill Sanctuary.

Stations in the Sanctuary are established at 25 metres apart – In the first 18 months in the project area of 100 hectares 300 A24s at 50 metres apart were compared with 600 wooden stations at 25metres apart to establish an equal baseline of coverage.

Costs were further compared for 12 months for the maintenance of 300 A24 Traps and 300 WH stations at 100 x 25m grid in a 50 hectare area following the relocation of A24s to reduce the distance between traps.

All costs are based on records kept throughout the project.

Costs for rat tracking tunnel monitoring have not been included as they would be the same for both the A24 and WH station.

Costs for removing the A24s and cleaning them have not been included.

The spreadsheet attached details costings and provides the information for this report.

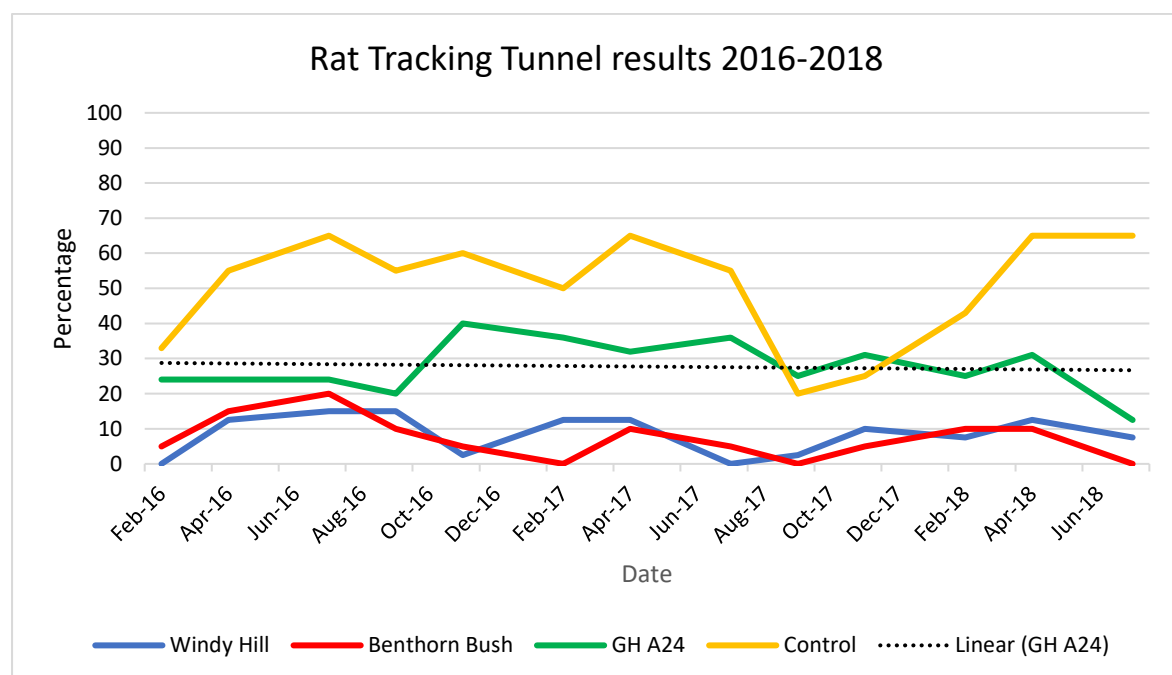
Cost Summary from spreadsheet as attached

| | A24 300 Units | WH Station 600/300 units |
|---------------------------|----------------------|---------------------------------|
| Capital | \$42,771 | \$10,812 |
| Service for 2.5 years | \$6468 | \$18,348 |
| Consumables for 2.5 years | \$15084 | \$6360 |
| Total | \$64,323 | \$35,520 |

While the cost of servicing the AA 24s is considerably lower than the cost of servicing the standard units (\$6,468 compared to \$18,348) this was offset by the higher capital and consumables costs of the A24 making the standard WH unit more cost effective even with monthly checks compared to six monthly checks.

The overall cost of running an A24 grid was c. 1.8 to 1.9 times that of an equivalent grid of snap-trap stations and bait. As the poisoned rat number is unknown, as is the actual number killed by the A24s, it is not possible to say which method killed the most rats, but the tracking tunnel results clearly indicate that the WH stations were much more effective in keeping rat numbers at low levels (TT averages for study period: 8.5 for Windy Hill, 27.7 for the GN study area).

In summary, not only was the standard Sanctuary methodology more cost effective, it was also more successful at keeping rat abundance at lower levels as shown in the graph below.



Note that Windy Hill and Benthorn Bush are adjacent areas managed in the same way as the WH stations in this study. The control area is also adjacent but has no rodent management.

Projected On-going Annual Costs for 50 HA Area

A cost comparison of the A24 versus the WH standard station with both units at the same spacing – 100 x 25metres also reveals the cost effectiveness of monthly checking over a year. The savings are gained through cheaper consumables.

| A24 | 300 units 100x25 | WH Standard | 300 units 100x25 |
|--------------------|------------------|----------------|------------------|
| ALP - 3 per annum* | 7164 | PB lure | 72 |
| Gas- 2x per annum | 2766 | Bait (150grms) | 1200 |
| Service | 1100 | Service | 4488 |
| Total | 11,030 | | 5760 |

*ALPs would have been changed every 4 months

| Cost Benefit Analysis A24 & WH wooden station for trap/bait | | | | | | | | |
|--|---------------------|------------------|-----------------|-------------------|---------------|---------------|--|--|
| Costs are Ex GST | | | | | | | | |
| | | | | | | | | |
| Actual Cost Two and a half year period at 100 x 50 & 25m spacing | | | | | | | | |
| | | | | | | | | |
| | A24 | | | | | | | |
| | per unit | 300 units | Renew x4 | Total | | | | |
| Unit | 130 | 39,000 | | 39,000 | | | | |
| ALP | 7.96 | 2388 | 9552 | 11940 | | | | |
| Gas | 4.61 | 1383 | 5532 | 6915 | | | | |
| | | 42,771 | 15084 | 57,855 | 57,855 | | | |
| | | | | | | | | |
| Service time over 2.5 years | Area Covered | Per check | | | | | | |
| | 100 | hours | hourly rate | cost | area/ha | | | |
| 2016 March check | 100 | 32 | 22# | 704 | | | | |
| April check | 100 | 24 | 22 | 528 | | | | |
| May check | 100 | 24 | 22 | 528 | | | | |
| June check | 100 | 24 | 22 | 528 | | | | |
| July check | 100 | 24 | 22 | 528 | | | | |
| Aug regas/ALP rebait | 100 | 42 | 22 | 924 | | | | |
| Oct check | 100 | 24 | 22 | 528 | | | | |
| 2017 Feb regas/rebait (+2 GN staff) | 100 | 25 | 22 | 550 | | | | |
| Aug relocate/regas&ALP rebait(+2 GN staff) | 50 | 48 | 22 | 1056 | | | | |
| 2018 Feb regas/rebait (+2 GN staff) | 50 | 25 | 22 | 550 | | 6424 | | |
| August - removed | | 292 | | | | | | |
| | | | | Total cost | | 64,323 | | |

| Cost Benefit Analysis A24 & WH wooden station for trap/bait | | | | | | | | |
|--|--------------|---------------|---------------|-------|-----------|-----------|-------------------|----------------------|
| | | | | | | | | |
| Station/trap/bait | | | | | | | | |
| | per unit | per 600 units | service x 30* | x 10* | | | Total | |
| Wooden Station | 11.5 | 6900 | | | | | 6900 | |
| Trap | 5.5 | 3300 | | | | | 3300 | |
| Trap - PB lure | 0.02 | 12 | 360 | | | | 372 | |
| Bagged bait | 1 | 600 | | 6000 | | | 6600 | |
| | | 10812 | 360 | 6000 | | | 17172 | 17,172 |
| | | | | | | | | |
| | | | | | | | | |
| Service time over 2.5 years | Area Covered | Per check | | | 18 months | 12 months | Total | |
| | | hours | hourly rate | cost | | | | |
| Monthly Check | | | | | | | | |
| 2016 Feb - 2017 July Trap/Rebait | 100 | 35 | 22 | 770 | 13,860 | | 13860 | |
| 2017 Aug - 2018 August | 50 | 17 | 22 | 374 | | 4488 | 4,488 | |
| | | | | | | | 18,348 | 18,348 |
| | | | | | | | | |
| Spreadsheet Notes | | | | | | | | |
| * Peanut butter lure is replaced monthly, 150 gram bags of rat bait replaced 3 monthly. | | | | | | | | |
| # For the purposes of this analysis Windy Hill Field team wages have been averaged at \$22/hour. | | | | | | | | |
| | | | | | | | | |
| | | | | | | | Total Cost | <u>35,520</u> |

| Cost Benefit Analysis A24 & WH wooden station for trap/bait | | | | | | | | |
|---|--|----------------------------|-----------|-----------------|-------------------------------------|--|--|--|
| | | | | | | | | |
| Cost summary | | A24 | | Standard | | | | |
| Capital - establishment 300 units | | 42,771 | 600 units | 10812 | | | | |
| Service for 2.5 years | | 6468 | | 18,348 | | | | |
| Consummables for 2.5 years | | 15,084 | | 6360 | | | | |
| | | | | | | | | |
| | | 64,323 | | 35,520 | | | | |
| | | | | | | | | |
| | | | | | | | | |
| Projected Ongoing Annual Costs (50ha) | | 300 xA24 100x25 | | | 300x Standard 100x25 | | | |
| ALP - replaced 3x per annum | | 7164 | | PB lure | 72 | | | |
| Gas | | 2766 | | Bait | 1200 | | | |
| Service | | 1100 | | Service | 4488 | | | |
| | | | | | | | | |
| | | 11030 | | | 5760 | | | |
| | | | | | | | | |