

Eglinton Valley Lesser Short-tailed Bat Monitoring



2024-2025

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Cover: Prepping a bat for wing tracing. *Photo: Warren Simpson DOC*

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Summary

- 1 The Eglinton Valley southern lesser short-tailed bat population is continuing to recover with good adult female survival recorded in 2023/2024. Survival results from 2024/2025 will need to be confirmed in the next monitoring period. 1015 individually marked bats were recorded this season, with a record 364 new bats receiving tags this season. Roost emergence counts increased this year with the highest count being 3251 bats. The overall population trend is still increasing.

Introduction

The population of southern lesser short-tailed bats (*Mystacina tuberculata tuberculata*) in the Eglinton Valley is the largest known of this species on mainland South Island. It was thought to be the only population still viable until the discovery of another population in the Murchison Mountains, Fiordland, 40km away. However, this site has no effective rat control in place.

The Eglinton Valley is an ecologically important site as it is one of the few sites that is a stronghold for both long-tailed bats (*Chalinolobus tuberculatus*) and lesser short-tailed bats. It is also a stronghold for populations of mohua, robin, kaka and kakariki. Continuous stoat control and periodic rat and possum control is in place in the valley to protect these species.

The southern lesser short-tailed bat is ranked under the New Zealand Threat Classification System as at risk – recovering (O'Donnell et al, 2017), however this is due to most known populations having gone extinct and out of those remaining two of the three are under protection. Both species of bats in New Zealand are vulnerable to introduced predators (rats, stoats, feral cats and possums) throughout the year; in summer when they congregate in large colonies, and during winter when they may remain inactive (in torpor) within roosts.

The Bat Recovery Group recognises the lesser short-tailed bat (STB) population in the Eglinton Valley as a priority for management, with the aim of maintaining long term security of the population. The STB programme is a long-term project and compliments the suite of monitoring in the valley, resulting in a unique project with one of the longest histories and broadest scope in the country. Informal monitoring began in 1997 when the bats were first discovered in the valley. Initially bats were monitored in an ad hoc fashion by conducting roost counts using infra-red video cameras to gain roost emergence counts. Sampling effort varied considerably from year to year, but a focused video monitoring programme began in 2005. Roost emergence counts is a useful monitoring tool; however, it has limitations as it is almost certainly an underestimate of the population and varies considerably between years due to chance. Roost exit counts are therefore not thought to be as sensitive at detecting changes in populations as mark-recapture analysis.

Mark-recapture analysis requires animals to be individually identified to calculate estimates of populations size and survival. After an initial study to see if passive integrated transponders tags (PIT tags) were suitable for marking and monitoring populations trends in lesser short-tailed bats (Sedgely and O'Donnell 2007) the focus of the project is now long-term monitoring of the population trends. Because bats produce only one offspring annually, their population recovery is gradual and challenging to observe in the short term, necessitating a long-term management strategy. PIT tagging sessions are conducted at communal roost trees throughout the month of January to continually have a high proportion of the population marked. Recapture data is obtained using antennae and data loggers on roost trees throughout the season. At the same time the existing video monitoring programme is also being continued to evaluate the relative merits of each technique.

The size and scope of predator control has varied greatly over time. A 100x100m bait station grid has been in place for several years and has expanded over time to cover 4800ha of the valley. In recent years aerial 1080 operations have become the focus of predator control and have significantly increased the area under management. There have been six large scale 1080 operations since 2014 as part of the National Predator Control Programme (NPCP, formally Tiakina Nga Manu/Battle for our Birds) campaign in response to beech mast

events. These were carried out in 2014, 2016, 2019, 2020, 2023 and 2024. Bait station pindone operations have also been undertaken as a secondary measure in response to high rat numbers outside of the beech mast cycle in 2017 and 2018. Additionally, the valley has 433 stoat traps and approximately 20 cat traps which are checked 9 times a year.

2 Objectives

2.1 Aim

To estimate lesser short-tailed bat survival and population size in the Eglinton Valley from year to year, with a focus on the correlation with the current pest control regime.

2.2 Outcome measures

1. Record PIT tagged bats via dataloggers at communal roosts
2. Insert new PIT tags into at least 300 bats
3. Analyse population data to gain survival estimates between years
4. Film and count roost emergence as a secondary monitoring method

3 Methods

3.1 Estimate annual survival

- a) Mist net bats and attach radio transmitters
- b) Follow radio tagged bats to roost trees, set up antennae and data loggers
- c) Monitor for a minimum of three weeks throughout January
- d) Calculate survival using mark recapture

3.2 Insert new Passive Integrated Transponder (PIT) tags

- a) Catch bats at active communal roosts and insert PIT tags into new unmarked bats as per the Best Practice Manual for Conservation Techniques for Bats (Sedgeley et al, 2012)
- b) Record the age and sex for all bats caught and reproductive status for all females caught
- c) Aim to tag 300 unmarked bats each year

3.3 Undertake roost emergence counts as a secondary monitoring method

- a) Follow radio tagged bats to roost trees, set up cameras and recorders to film for 2 hours during emergence
- b) Count recorded emergent bats from videos
- c) Compare and graph results with previous counts

4 Results

4.1 Estimated annual survival

Recapture rate for this season was low probably due to the bats being in the same roost for an extended period.

Table 1. Captures of short-tailed bats in the Eglinton Valley 2006-2025

Year	Total Recorded	Recaptures	New	Adult Female	Adult Male	Juv Female	Juv Male	Unknown
2025	1015	651	364	83	67	93	121	0
2024	1151	917	234	100	68	28	38	0
2023	1379	1148	231	46	36	66	83	0
2022	1589	1295	294	63	32	101	98	0
2021	1387	1074	313	122	83	47	61	0
2020	1358	1021	338	143	110	38	47	0
2019	1264	956	308	49	43	91	125	0
2018	1170	946	224	69	49	36	69	1
2017	699	540	159	66	28	24	39	1
2016	1030	788	242	52	15	85	91	0
2015	1009	781	228	42	21	78	87	0
2014	892	645	247	79	71	45	52	0
2013	756	551	205	123	30	25	27	0
2012	831	607	224	71	37	45	71	0
2011	663	437	226	89	42	50	45	0
2010	559	315	244	87	45	54	59	0
2009	375	230	145	25	38	48	32	2
2008	238	90	148	47	48	22	26	5
2007	283	3	280	131	61	48	40	0
2006	15	0	15	5	2	4	2	2
Total PIT tagged			4305	1409	859	935	1092	11

Annual adult female survival from the 23/24 season continued to be above 79%. This year's survival data will need to be confirmed next year.

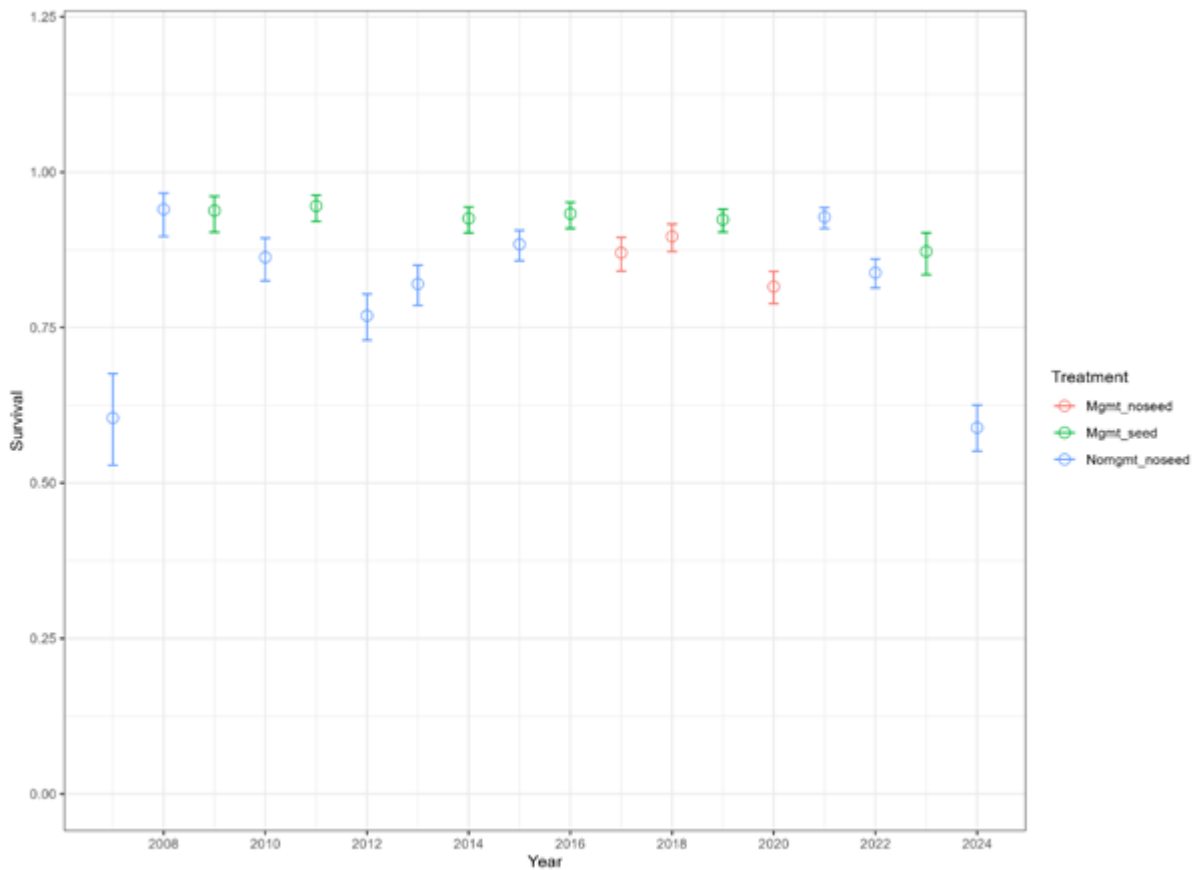


Figure 1. Annual survival of adult females with 95% confidence intervals. Note “Year” is referring to survival throughout that year. I.e. monitoring data from Jan 2022 correlates with survival in 20/21.

4.2 PIT tags

364 new bats were tagged this year. We are still using mini PIT-tags by Faread. The RFID scanners and apps developed for smart phones by the DOC electronics team in 2021 are still in use. These continue to work well as a time efficient method to input records for captured bats directly into the database.

4.3 Roost emergence counts

Roost counts were higher than last season, with the highest emergence count at M72 with 2449. The highest roost count for one night was 3251 from 2 roost trees; M109 and M72.

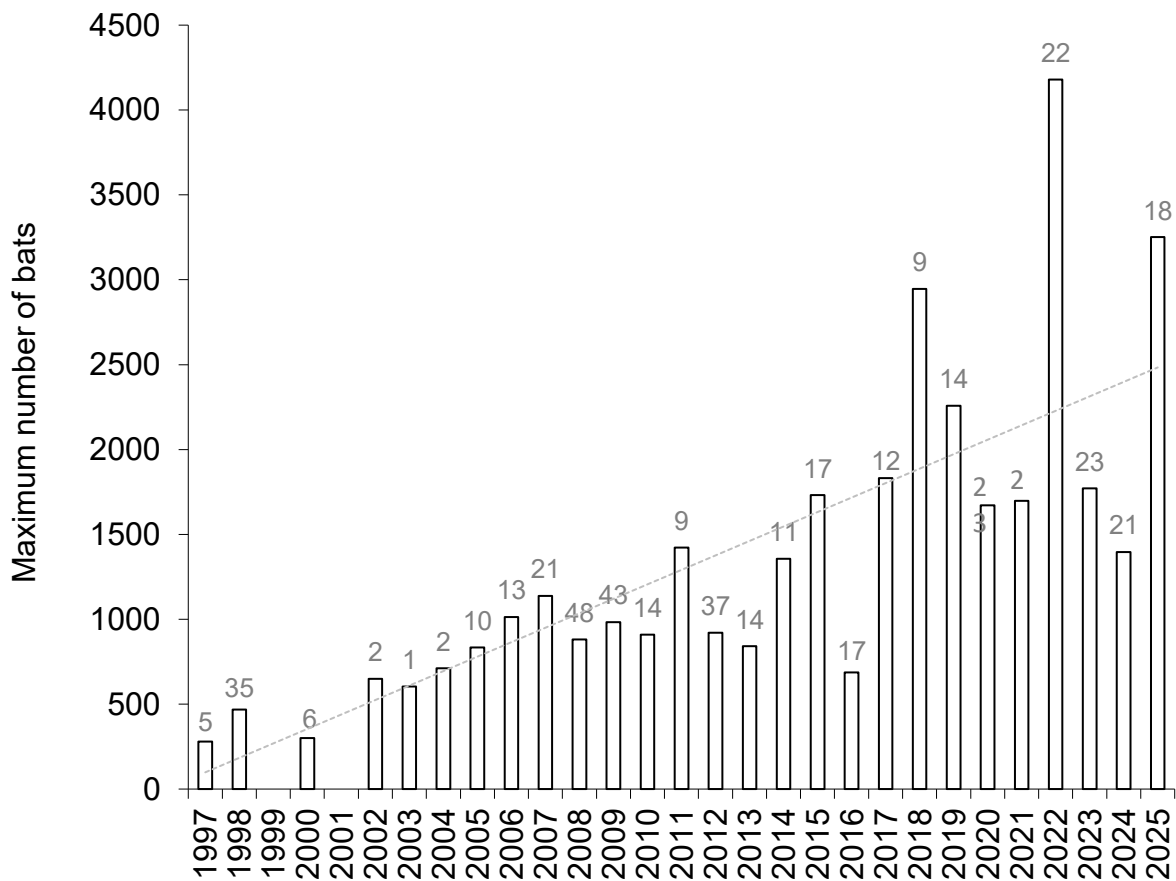


Figure 2. Highest annual roost emergence counts with trend line. Note this method is an index only, it is not a true representation of the population

Table 2. Summary of communal roost tree occupancy 2025

Roost tree	Known dates occupied	Minimum days occupied	Highest emergence count
M72	06/01/25 – 23/01/25	18	2449
M128	09/01/25 – 10/01/25	1	99
M109	15/01/25 – 19/01/25	5	1191 (2 nd night with no footage)

5 Discussion

Survival data shows the population is recovering well and indicates that the current pest management regime is working for lesser short-tailed bats.

Finding all roost trees during the monitoring period continues to be difficult due to a likely combination of malfunctioning transmitters, difficulties picking up transmitter signals and

tricky bat behaviour. Five transmitters were fitted throughout the season, and we had far less issues with them this year.

This year's behavioural patterns have reverted to those observed in previous years, with bats remaining in their roost trees for extended periods. We also found the main maternity roost tree but still had trouble finding the other trees the bats were using at the same time. As a result, the roost emergence counts will be underestimating the overall population.

The juveniles fledged early this year compared to last year, juveniles started to be PIT-tagged in the first week, then poured out in the second week resulting in a high number of juveniles tagged this year – a record 214! While the exact factors influencing the timing of female implantation and birth are not fully understood, it is believed that environmental factors such as weather conditions and food availability may contribute to these variations.

This year the highest emergent count data was 3251 bats on the night of the 15/01/25 in trees M109 (1191) and M72 (2060). M72 is in the South Plato Creek cluster, whereas M109 is located over at the Murcott Burn. The distance between these two roost sites is 4km. There could have been any number of other roosts in this vicinity as well.

Technology was mostly good this year. We had one camera recording failure – most likely user error. The data loggers were mostly good, with 2 single loggers playing up. The antennae on M72 needs to be replaced. We continued to use Fared mini PIT-tags this year, with good results. The tags do take longer to be rescanned by the antennae though, but after a series of conversations and data wrangling between myself and Moira we found that this can be remedied by leaving the dataloggers out for longer (minimum of 5 days).

We continued to use thermal imaging for checking potential roost trees and for detecting escapees at harp trap sites. It still has its limitations but overall proved to be helpful.

There was a noticeable lack of batflies *Mystacinobia zelandica* this year which led to concern from the team. We informed the Bat Recovery Group and were then put in touch with Tara Murray (Senior Science Advisor, Fauna Science Team). There is not much on monitoring batflies currently, but counting presence/absence, or each batfly on each bat handled would create a good baseline if monitoring started in the 2026 season.

During this season, the wings of 42 bats were traced as part of a dataset analysing flight speed and manoeuvrability in relation to key morphological parameters, such as aspect ratio and wing loading. When combined with body mass and sex, this dataset will assist in refining predictions of flight performance and categorising New Zealand's native bats within a broader global framework of bat flight strategies. By comparing their wing morphologies with those of other bat species worldwide, the objective is to classify them based on manoeuvrability. This information may further inform assessments of their likelihood to avoid wind turbine rotor blades, as well as provide insights into their habitat utilisation and behavioural adaptations.

Having a team of trained handlers and PIT taggers that supplements the core team is crucial for the success of the project and being able to train up new handlers is beneficial. Additionally, we were joined by Bryony Hitchcock for 2 weeks (of the Kakapo Team on staff development) and Elicia Milne (Supervisor for the Te Anau Bio team) for just over a week. We also utilised the long-tailed bat team when they were not catching bats.

6 Recommendations

1. Continue sexing all captured bats and recording reproductive status for females
2. Allow four weeks for the work to be completed
3. Continue with the target of PIT tagging 300 new bats per year
4. Continue gaining long term data through the monitoring of this population
5. Count individual batflies on handled bats and record

7 Acknowledgements

Thank you to all who were involved in this season's fieldwork: the lesser short-tailed bat monitoring team of Warren Simpson, David Sagar and Elicia Milne, as well as our lovely helper for two weeks Bryony Hitchcock. Thank you to our extra PIT taggers Hannah Edmonds, Linda Kilduff, Jane Tansell and Bex Jackson, our extra handlers Monique van Rensburg, Jo Filmer, and Jenny Rickett and to all the others who came out to help in the evenings, too many to name.

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