Manaaki Whenua
Landcare Research

An evaluation of welfare performance of chain-spring modifications of No. 1 leg-hold traps for capturing possums

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Summary

Project and client

- Manaaki Whenua – Landcare Research was asked by the New Zealand Fur Council to assess the welfare performance of unmodified No. 1 double-coil spring traps and No. 1 double-coil spring traps with two chain spring modifications when used for capturing possums.

Objective

- To assess the effectiveness of two chain spring modifications of No. 1 double-coil spring leg-hold traps on trap welfare performance.

Methods

- Possums were trapped using unmodified and two modifications of chain-spring No. 1 leg-hold traps (labelled 0-spring, 1-spring, and 2-spring). Traps were deployed in the field near Little River, Canterbury.
- Trapped possums were euthanised and the limbs that had been caught in the trap removed, and trauma was independently assessed by a veterinary pathologist using the NAWAC guidelines (Appendix A in NAWAC 2019).

Results

- Seventy-five possum limbs were assessed and scored for trauma (25 for each trap type).
- All possums with observed trauma (69 of 75 total possums trapped) had at least one individual observation in the mild trauma category, with only two possums having individual observations in the moderate trauma category (one each from the 0-spring and 1-spring traps).
- Only one possum had an individual observation above moderate trauma, which was in the severe trauma category (from a 0-spring trap).

Conclusions

- In this study, all three trap types qualified for the NAWAC specifications of a Class B restraining trap, and the 1-spring modification trap qualified for Class A.

Recommendations

- NAWAC should accept the recommendation that No. 1 double-coil spring leg-hold traps with a 1-spring chain modification be classified as Class A restraining traps for possums.

1 Introduction

Manaaki Whenua – Landcare Research assessed the welfare performance of unmodified No. 1 double-coil spring traps and No. 1 double-coil spring traps with two chain spring modifications for trapping possums. The trial was undertaken for the New Zealand Fur Council and was run in May 2019.

2 Background

Since the 1920s possums have been trapped in New Zealand, initially just for their fur, but more recently both for their fur and as a pest. Until the 1980s the most commonly used trap was the Lanes-Ace gin trap, which is a relatively large, serrated-jawed, long-spring trap. In the 1980s several models of No. 1 double-coil spring leg-hold traps were introduced to the New Zealand market, with the Victor No. 1 double-coil spring leg-hold trap (Woodstream Corp., Lititz, Pennsylvania, USA) dominating the market.

Because of a continuing concern about the frequency and extent of the injuries caused to possums by the larger gin traps, and a belief that the smaller No. 1-sized traps caused fewer injuries, trials were undertaken to compare the injuries (trauma) caused by the various-sized traps available (Warburton 1992). The results of these trials showed that the smaller traps caused less severe traumas than the gin trap, without a significant decrease in capture efficiency. These results eventually led to a public consultation process, led by the Ministry for Primary Industries (MPI), then called the Ministry of Agriculture and Forestry, aimed at prohibiting No. 1½ and larger traps, which included the Lanes-Ace type of gin traps. This consultation process raised the possibility of using springs on the chains of traps to reduce injuries, and consequently further trials were carried out to test this possibility (Warburton & Poutu 2008).

By the time the chain spring trials were carried out, the National Animal Welfare Advisory Committee (NAWAC) had developed a trap-testing guideline (NAWAC 2019, updated verson), which categorised the welfare performance of restraining traps as Class A or Class B depending on the frequency and extent of trauma caused to the captured animal (see NAWAC 2019, p. 4). Although Warburton and Poutu's (2008) results showed that the addition of springs did decrease injuries, the decrease was not sufficient to enable the gin trap or No. 1½ traps to meet the Class B classification. However, the No. 1-sized traps did meet the Class B criteria (although it was incorrectly stated in Warburton & Poutu 2008 that they did not). As a result, the larger leg-hold traps were prohibited from use in New Zealand (The Animal Welfare (Leg-hold traps) Order 2007).

The No. 1-sized traps were classified as Class B traps, which left some potential to further improve the welfare of these traps to see if they could meet the Class A criteria. The New Zealand fur industry expressed an interest in being proactive in improving the welfare performance of leg-hold traps and sought to have the No. 1-sized traps further assessed with the addition of chain springs.

The addition of springs between the links of the trap chain to provide a cushioning effect did reduce the severity of injuries in other trap models, but it had not been assessed for

No. 1-sized traps (Warburton & Poutu 2008). An improvement in leg-hold trap welfare performance would contribute to maintaining the social licence to keep using leg-hold traps for possum trapping in New Zealand, not only within the fur industry, but also by other agencies and programmes, as leg-hold traps are used throughout New Zealand as control and monitoring tools for a variety of conservation and agricultural programmes, including tuberculosis (TB) vector control.

3 Objective

To assess the effectiveness of two chain spring modifications of No. 1 double-coil spring leg-hold traps on trap welfare performance.

4 Methods

Trap welfare performance was compared across three treatments or trap types (modifications of a Chinese-manufactured No. 1 size trap, provided by the New Zealand Fur Council; see Figure 1):

1 standard – No. 1 trap with no springs

2 modification 1 – No. 1 trap with one spring

3 modification 2 – No. 1 trap with two springs.

For the trap types with springs, the overall trap modification also included a modification to the swivel on the end of the chain, with some swivel variation (Figure 2).

Figure 1. The three trap types used in this study; from top to bottom: standard No. 1 trap (0-spring), 1-spring modification, and 2-spring modification.

Figure 2. The swivel on the end of the chain of the 2-spring, 1-spring, and 0-spring traps, respectively.

The study was conducted on private land near Little River, Banks Peninsula. Traps were set for three nights, checked daily, and reset if required. Trap treatments were allocated to sites along transects using a randomised block procedure (i.e. the three different trap types were set along a transect in blocks of three, with the order of the traps randomised within blocks). Transects consisted of traps being set at best sites at a spacing of approximately 30–50 m, following current best management practices.[1] Flour and icing sugar lure (5:1) was applied to the tree trunk immediately behind the trap, and surrounding vegetation or other obstacles were removed to prevent entanglement (Figure 3). A total of 72 traps were set at one time (24 of each trap type), with trapping within each treatment ceasing once 25 possums were captured. All possums and non-target captures were recorded and possums were weighed.

[1] Bionet; https://www.bionet.nz/assets/Uploads/Publications/A4.1-Leghold-Traps-2015-Nov-HR.pdf (accessed April 2019).

Figure 3. Placement of a No. 1 leg-hold trap with a 1-spring modification.

Trapped possums were euthanised via blunt-force trauma to the head. Target legs (i.e. the leg caught in the trap) were removed and the remaining carcass was discarded away from (>20 m) the site of capture. Limbs were individually bagged and labelled, and sent to an independent veterinary pathologist (Gribbles Veterinary) to be assessed and scored. Following the NAWAC guidelines, individual trauma observations for each possum were used to determine the total trauma class for each possum sampled (NAWAC 2019). Using these assigned total trauma classes, each trap type was assessed to identify whether it met the criteria of one or both of the welfare performance classes (Class A and Class B restraining traps; see Tables 1 and 2). This work was carried out with Manaaki Whenua – Landcare Research Animal Ethics Committee approval (AEC No. 19/02/02).

Table 1. NAWAC guidelines for acceptable trauma of Class A restraining traps for 25 animals (NAWAC 2019). Note that the maximum of 2 in the '> Moderate' category is part of the 8 in the '> Mild category'

	Maximum allowable number of animals with trauma above mild and moderate levels	
Number of animals in test	> Mild	> Moderate
25	8	2

Table 2. NAWAC guidelines for acceptable trauma of Class B restraining traps for 25 animals (NAWAC 2019). Note the maximum of 2 in the '> Moderately severe' category is part of the 8 in the '> Moderate' category

	Maximum allowable number of animals with trauma above moderate and moderately severe levels	
Number of animals in test	> Moderate	> Moderately severe
25	8	2

5 Results

5.1 Capture results

In total, 88 possums were caught over three nights, in addition to six escapes (identified by fresh fur in a sprung trap) and four non-target animals (Table 3). While outside of the focus of this study, a declining trend in possum escape rates with the addition of each spring modification was observed, although these trends were not significant (Fisher's exact test, $P > 0.05$).

Table 3. Summary of results of possums caught using three different leg-hold trap modifications

Trap type	Total traps set	Possums	Still set	Escapes	Sprung (empty)	NT: hedgehog	NT: rat
0-spring	72	26	33	4	7	0	2
1-spring	72	33	34	2	3	0	0
2-spring	72	29	35	0	6	2	0
TOTAL	**216**	**88**	**102**	**6**	**16**	**2**	**2**

Note: NT = non-target animal

5.2 Welfare performance

In total, 75 possum limbs were analysed for trap-related injuries and used in this welfare assessment. The mean body mass of possums assessed in this study was 2.65 kg. All possums with observed trauma (69/75) had at least one individual observation in the mild trauma category, with only two possums having individual observations in the moderate trauma category (Table 4). Only one possum had a trauma classified as worse than moderate, which was in the severe trauma category (Table 5). See Appendix 1 for a list of the traumas within each trauma category.

Table 4. Summary of possums with at least one individual observation in each trauma category

Trap type	Mild	Moderate	Moderate/ severe	Severe
0-spring	24	1	0	1
1-spring	22	1	0	0
2-spring	23	0	0	0
TOTAL	**69**	**2**	**0**	**1**

Table 5. Summary of the total trauma class determinations (categories) of possums caught by each treatment (No. 1 leg-hold traps, with zero, one, and two-spring modifications)

Trap type	*n*	Mild Category*	Moderate Category	Moderate/ Severe Category	Severe Category
0-spring	25	16	7	1	1
1-spring	25	19	5	1	0
2-spring	25	12	13	0	0
TOTAL	75	47	25	2	1

*According to the NAWAC guidelines, the mild trauma category includes individuals with no identifiable trauma.

6 Conclusions

In this study all three trap types qualified for the NAWAC specifications of a Class B restraining trap, which supports the results reported by Warburton and Poutu (2008). One trap type (1-spring modification) met the Class A criteria. The only individual observation of severe trauma occurred from the 0-spring trap, with the 2-spring trap the only type with no trauma observations seen above moderate. It is unclear why the 2-spring modification caused more moderate injuries than the 1-spring modification, but it could either be a sample size issue (i.e. chance) or the additional spring caused more chain entanglement. Nevertheless, as reported by Warburton and Poutu (2008), addition of 1-spring chain modification does reduce injuries, and such a modification should be routinely used to improve the welfare performance of No. 1 leg-hold traps.

7 Recommendations

- NAWAC should accept the recommendation that No. 1 leg-hold traps with a 1-spring chain modification be classified as Class A restraining traps for possums.
- The New Zealand Fur Council should encourage their trappers to use the 1-spring chain modification on No. 1 leg-hold traps. (Note: the style of spring modifications referred to in this recommendation is specific to that used in this study.)
- While only the 1-spring modification passed the Class A criteria in this study, we did observe a declining trend in possum escape rates with the addition of each spring modification. While these declines were not statistically significant, possibly due to low sample size, they may be worth exploring in the future.
- Research should continue into the use of spring modifications on leg-hold traps, including data points from different sites and habitats, to increase overall welfare performance for possum trapping in New Zealand in general.

8 Acknowledgements

We thank Joe Powers, Kinloch Farm, for land access and permission to set traps; R. Fairley, Gribbles Veterinary, for providing pathological observations; and G. Morriss, M. Coleman, and O. Pollard for assistance in the field.

9 References

NAWAC (National Animal Welfare Advisory Committee) 2019 (updated version). NAWAC Guideline 09: Assessing the welfare performance of restraining and kill traps. Wellington, Ministry for Primary Industries.

Warburton B 1992. Victor foot-hold traps for catching Australian brushtail possums in New Zealand: capture efficiency and injuries. Wildlife Society Bulletin 20: 67–73.

Warburton B, Poutu N 2008. Effectiveness of chain-springs on leghold traps for reducing injuries to captured brushtail possums (Trichosurus vulpecula). New Zealand Journal of Ecology 35: 147–150.

Appendix 1

The criteria for determining the total trauma class when an animal receives more than one trauma observation (from Appendix B in NAWAC 2019).

Mild = 1 mild trauma

Moderate = 1 moderate trauma

or 3 mild traumas

Moderately severe = 1 moderately severe trauma

or 2 moderate traumas

or 1 moderate + 2 mild traumas

or 5 mild traumas

Severe = 1 severe trauma

or 2 moderately severe traumas

or 1 moderately severe + 1 moderate + 2 mild traumas

or 1 moderately severe + 2 moderate traumas

or 1 moderately severe + 5 mild traumas

or 3 moderate traumas

or 2 moderate + 4 mild traumas

or 10 mild traumas