

# Kauri Dieback Recreation Project



## Mark II Prototype Cleaning Station – compliance research report

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# CONTENTS

<b>1</b>	<b>EXECUTIVE SUMMARY</b>	<b>3</b>
<b>2</b>	<b>INTRODUCTION</b>	<b>3</b>
<b>2.1</b>	<b>BACKGROUND</b>	<b>3</b>
<b>2.2</b>	<b>MARK II PROTOTYPE CLEANING STATION</b>	<b>3</b>
<b>3</b>	<b>METHODOLOGY</b>	<b>5</b>
<b>3.1</b>	<b>LOCATIONS</b>	<b>5</b>
<b>3.2</b>	<b>OBSERVATIONAL SURVEY</b>	<b>5</b>
<b>3.3</b>	<b>COMPLIANCE</b>	<b>6</b>
<b>3.4</b>	<b>TIMEFRAME AND HOURS</b>	<b>7</b>
<b>3.5</b>	<b>ENGAGEMENT</b>	<b>7</b>
<b>3.6</b>	<b>ANALYSIS</b>	<b>8</b>
<b>4</b>	<b>RESULTS</b>	<b>8</b>
<b>4.1</b>	<b>ENTRY AND EXIT BEHAVIOURS: COMBINED</b>	<b>8</b>
<b>4.2</b>	<b>ENTRY AND EXIT BEHAVIOURS: SEPARATED</b>	<b>9</b>
<b>4.3</b>	<b>TROUNSON KAURI PARK: COMPARISON OF BARREL AND GRATE VS MARK II PROTOTYPE CLEANING STATION</b>	<b>10</b>
<b>5</b>	<b>DISCUSSION</b>	<b>11</b>
<b>6</b>	<b>REFERENCES</b>	<b>14</b>
<b>7</b>	<b>APPENDIX 1</b>	<b>15</b>
<b>7.1</b>	<b>TROUNSON KAURI PARK, WAIPOUA FOREST, CAMPGROUND ENTRANCE</b>	<b>15</b>
<b>7.2</b>	<b>AH REED KAURI PARK, WHANGAREI</b>	<b>16</b>
<b>7.3</b>	<b>MT MANAIA, WHANGAREI</b>	<b>17</b>
<b>7.4</b>	<b>DOMES VALLEY, AUCKLAND</b>	<b>18</b>
<b>7.5</b>	<b>HAKIRAMATA TRACK, PARKER ROAD, WAIKATO</b>	<b>19</b>
<b>7.6</b>	<b>TUAHU TRACK, TAURANGA</b>	<b>20</b>
<b>7.7</b>	<b>WAIU KAURI GOVE WALK, WHITIANGA</b>	<b>21</b>
<b>8</b>	<b>APPENDIX 2</b>	<b>22</b>
<b>9</b>	<b>APPENDIX 3</b>	<b>23</b>

# 1 Executive Summary

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*Phytophthora agathidicia*, the cause of Kauri Dieback disease, continues to be a major biosecurity and conservation threat for New Zealand. In response to this threat the Department of Conservation has committed to four areas of focus to minimise the risk of the diseases spread by track users; track upgrades, track closures, designed improved cleaning stations, and behaviour change research. As a result, a Mark II prototype cleaning station has been designed to increase compliance behaviours of track users to clean their footwear, and to minimise ongoing maintenance requirements. Observational surveys were undertaken at seven locations to determine track user compliance at the new cleaning station. Over 90% of track users used the cleaning station instead of walking through or around it without using any equipment. Differences in correct compliance compared to partial compliance was apparent. Between 3% to 64% of track users undertook correct compliance. This increased to between 72% to 95% when added with partial compliance behaviours. The behaviour absent from partial compliance was the track user's failure to inspect their footwear after brushing them and before disinfecting them. Results suggest that the increased equipment options available at the Mark II prototype may require further shaping of track user's behaviour in order to achieve the correct behaviours required.

## 2 Introduction

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### 2.1 Background

Kauri Dieback (KD) continues to be a major biosecurity and conservation issue for New Zealand. The Department of Conservation (DOC) established the Kauri Dieback Recreation Project (The Project) in 2015. The Project is tasked with minimising the spread of KD via people using tracks on public conservation land within the Kauri lands.

The Project involves four inter-dependent approaches:

1. Track upgrades – eliminate muddy areas and protect kauri roots by installing boardwalks or geoweb on tracks, or rerouting tracks to avoid kauri.
2. Track closures – close tracks permanently.
3. Cleaning stations – develop a more effective and efficient cleaning station.
4. Behaviour change – conduct research focusing barriers and benefits of cleaning stations for track users, and to investigate behaviour change strategies which have been successful in other contexts.

This report is the later approach, focusing on track user behaviour specifically at cleaning stations. Compliance behaviour results aim to inform of any required future modifications to cleaning stations and identify focus areas of future behaviour change strategy focus.

### 2.2 Mark II Prototype Cleaning Station

Despite reports indicating an increase in KD awareness, compliance behaviour of track users has not improved (Ough Dealy & MacDonald, 2016; Colmar Brunton, 2016; Heggie-Grace & Robertson, 2015; Wegner, 2014). In response to this DOC has commissioned a new cleaning station, the Mark II Prototype (Figure 1).

The Mark II prototype design is based on research of track users' behaviour at earlier designs of cleaning stations, and barriers of those earlier cleaning stations to full compliance (Beauchamp, Ough Dealy, Williams, 2016; Ough Dealy & MacDonald 2017a; Ough Dealy & MacDonald, 2017b).

Operational barriers of earlier cleaning stations have also been considered in the design, with a minimal maintenance standalone prototype targeted. Figure 2 outlines the equipment available to track users to clean their footwear and gear.



Figure 1: Mark II prototype cleaning station at Hakiramata Track, Waikato (Aley, 2018)



Figure 2: Equipment available to assist in track users cleaning their footwear (station located at AH Reed Memorial Park, Whangarei) (Aley, 2018)

# 3 Methodology

## 3.1 Locations

A sub-set of seven locations (Figure 3) were chosen from a possible 20 sites where the first Mark II prototypes had been installed at the time of the study. Factors influencing the research locations were:

- If the tracks were open
- Availability of research staff
- Seeking a variety of local versus visitor tracks
- Seeking a variety of urban versus rural tracks

Appendix 1 provides before and after installation photos of each location.

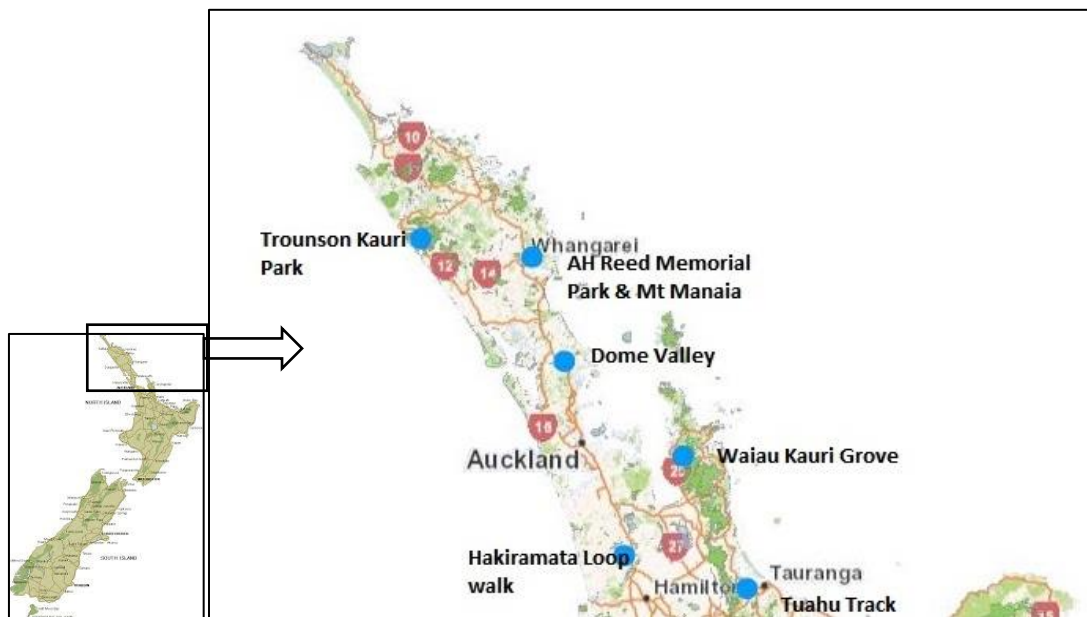


Figure 3: Location map of the seven locations where observational surveys were conducted.

## 3.2 Observational Survey

An observational survey was conducted to record the behaviours of track users when entering and exiting the cleaning station (Appendix 2).

Due to timing constraints, pre-installation observational surveys were done at one location only, Trounson Park. For all the other locations the Mark II prototype had already been installed before the research project was undertaken. This resulted in the absence of baseline compliance data to enable comparison between the new cleaning station against the old cleaning station at each site (i.e. barrel and grate system, Figure 4).

Surveys were conducted by DOC staff or contract DOC staff hired specifically to undertake the research. While the researchers attempted to be as inconspicuous as possible, in most circumstances they would have been visible to the track user, without engaging directly with the track users.





Figure 4: Barrel and grate cleaning station at Trounson Park entrance (Aley, 2018)

### 3.3 Compliance

For this study, compliance is considered to constitute the first three instructions listed on the instruction panel on site. That being brush, inspect and disinfect (Figure 5). Any behaviour combinations that included these three behaviours plus any other equipment used at the same time was considered correct compliance.



Figure 5: Instruction panel on Mark II prototype cleaning station (Aley, 2018)

As there was an expectation, inferred from pre-study onsite observations, that a large proportion of track users might not undertake the 'inspect' step of the instructions, a partial compliance option was included in the observation sheet; behaviours that constituted brushing and disinfecting footwear (Foot brush & treadle, Figure 2). Therefore, the only behaviour not observed for this group was inspecting their footwear after brushing and before disinfecting.

Non-compliance was measured as doing ‘nothing’ by either walking through the cleaning station without using any equipment, walking around the cleaning station, or walking away from the cleaning station and not entering the track at all.

Any other stand alone or combination of behaviours, while noted in the results, are not considered to be correct or partial compliance, but are neither considered to be non-compliance.

### 3.4 Timeframe and hours

Research was conducted between June and September 2018. Table 1 summarises the dates for each site. Table 2 summarises the schedule for data collection. Due to conducting the research during winter, hours of observation were restricted for health and safety reasons. Furthermore, if the weather on the scheduled day was heavy rain, reducing the likelihood of track users, the researcher amended their data collection to the next suitable fine day.

Table 1: Location and dates of observational surveys

Location	Date Commenced	Date Completed	Sample size n =
Trounson Kauri Park			
▪ Barrel and grate observations (carpark)	▪ 26 Jul 2018	▪ 4 Aug 2018	n = 128
▪ Mark II prototype cleaning station (campground)	▪ 28 Aug 2018	▪ 2 Sep 2018	n = 42
Mt Manaia Track	3 Jul 2018	8 Jul 2018	n = 564
AH Reed Memorial Park Track	3 Jul 2018	9 Jul 2018	n = 284
Dome Valley Track	18 Sep 2018	23 Sep 2018	n = 116
Waiiau Kauri Grove Track	3 Jul 2018	8 Jul 2018	n = 211
Tuahu Track	17 Jul 2018	28 Jul 2018	n = 170
Hakiramata Track	19 June 2018	24 June 2018	n = 318

Table 2: Observational survey days and hours

Day	Hours
Tuesday	08.00 – 12.00
Wednesday	12.00 – 16.00
Thursday	08.00 – 12.00
Friday	12.00 – 16.00
Saturday	08.00 – 16.00
Sunday	08.00 – 16.00

Note: some hours were adjusted for weather events, but total hours did not change.

### 3.5 Engagement

In the first instance, contact was made with each DOC Office (or where applicable local Council) Operations Manager of chosen locations. This was to provide not only notification to DOC staff about the research, but also ensure that applicable iwi/hapu, concessionaires, and community

groups were informed. No notification of the research was put at the track entrance during the study.

### 3.6 Analysis

Data sheets were manually entered to an Excel summary sheet for each site. Calculations of the percentage for each behaviour was undertaken. Due to the large variance in the combination of behaviours, some groupings were made to reveal broader behaviour trends. These include:

- Did something versus did nothing
- Full compliance (brush, inspect, disinfect) plus other behaviours (e.g. hand brush, water spray) combined

## 4 Results

### 4.1 Entry and exit behaviours: combined

90% or more of track users did something to clean their footwear at the cleaning station (Figure 6).

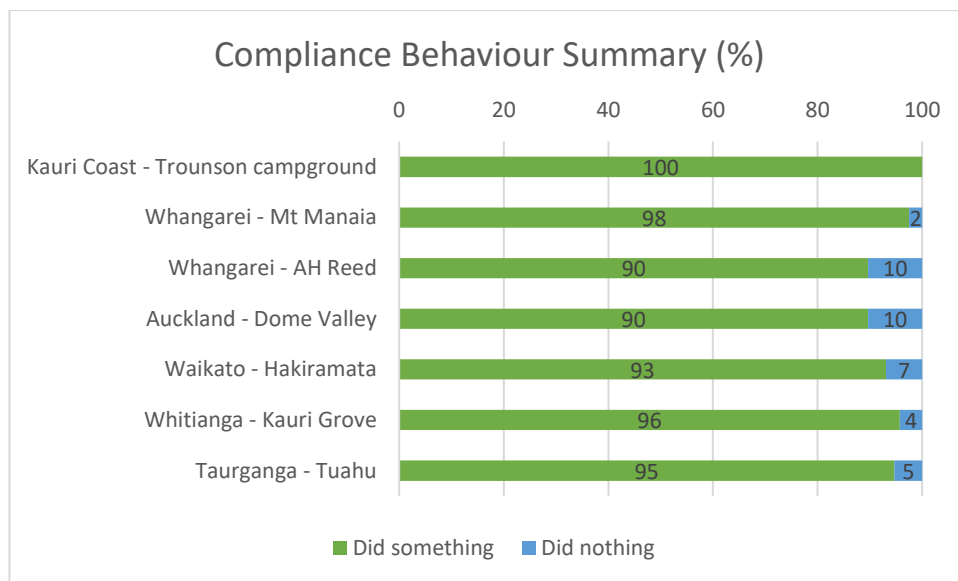


Figure 6: Compliance behaviour summary (did something versus did nothing). Note Hakiramata track has a malfunctioning treadle on the entry to the track side. Entry and exit behaviours combined.

Correct compliance (i.e. brush, inspect, disinfect plus other behaviours by one track user) ranged from 3% to 64% (Figure 7). However, when correct compliance was combined with partial compliance behaviours (i.e. foot brush + treadle) results increased to 72% to 95%.

While only a small portion of track users had walking poles, none were cleaned while entering or exiting the cleaning station.



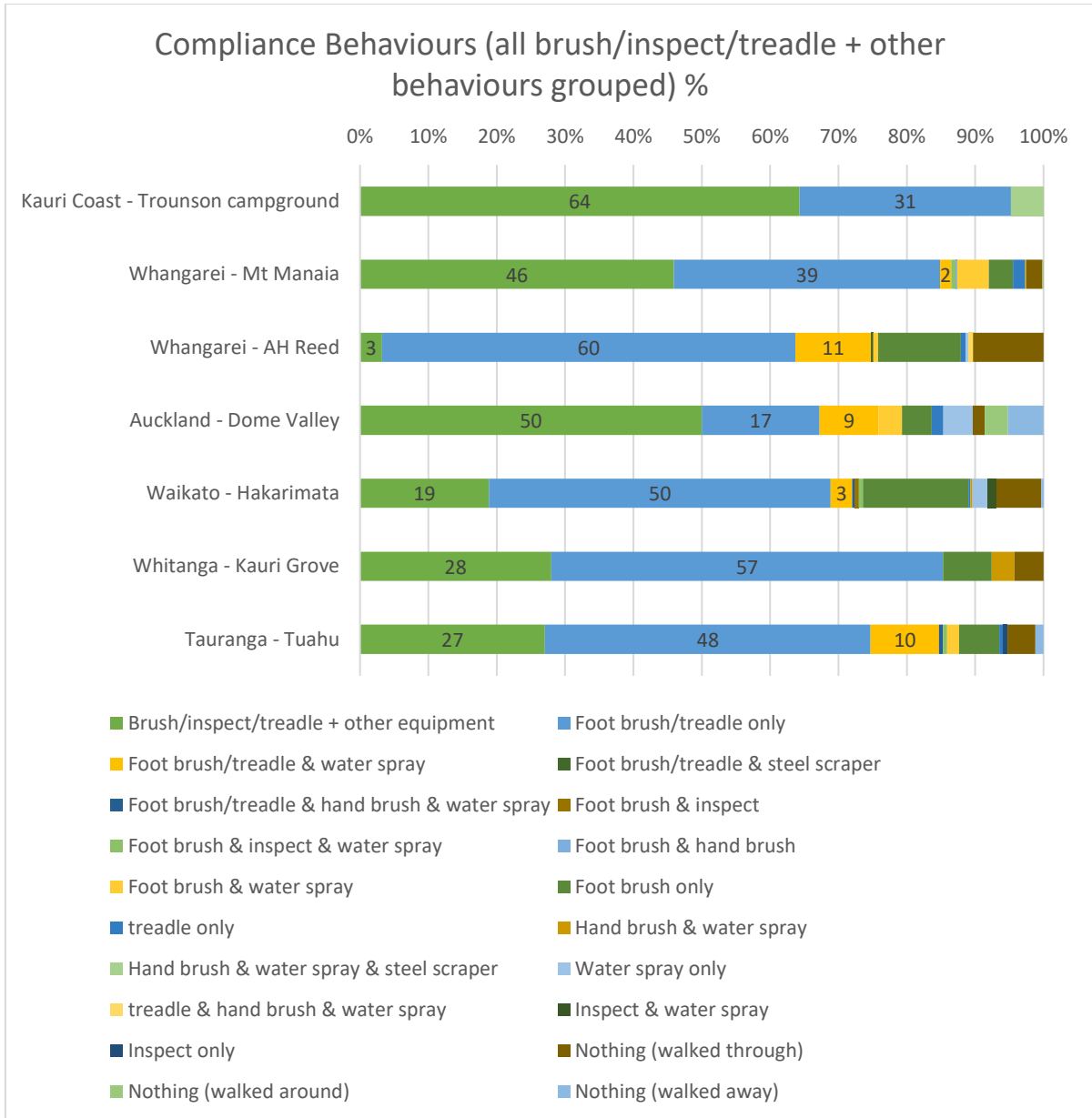


Figure 7: Full compliance behaviours grouped, other behaviours kept individual. Note that Hakarimata Track had a malfunctioning treadle on the track entry side. Entry and exit behaviours combined.

#### 4.2 Entry and exit behaviours: separated

When entry and exit behaviours were compared separately, 95% of track users did something on entry and 94% did something on exit (Figure 8). Results varied at different locations (Appendix 3), however no noticeable trends highlighted any pattern.

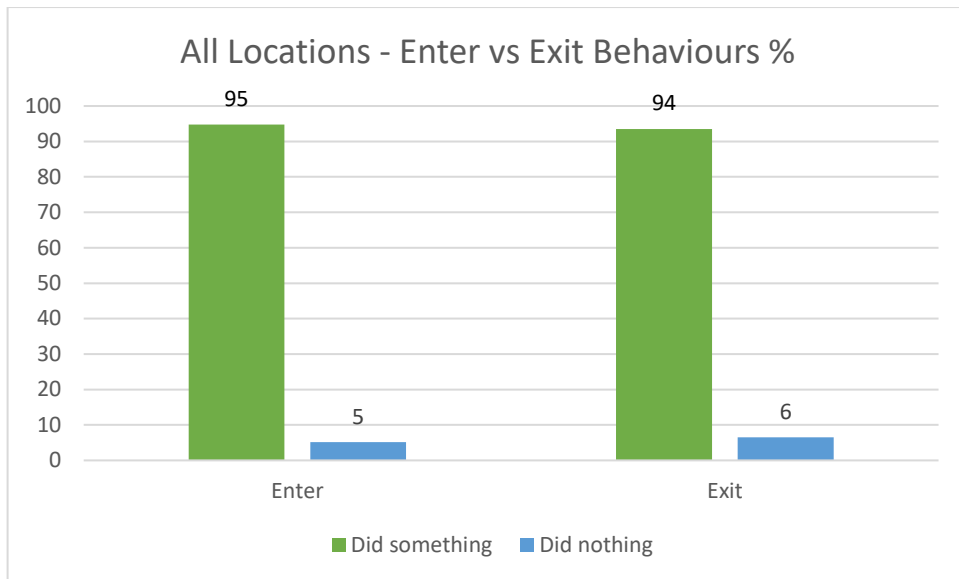


Figure 8: Entry and exit compliance behaviours. Entry n =982, exit n = 678. Note sum of n is greater than those listed in Table 1 due to some track users undertaking multiple behaviours.

#### 4.3 Trounson Kauri Park: Comparison of barrel and grate vs Mark II prototype cleaning station

While compliance was high for both cleaning station methods, the Mark II prototype saw 100% of track users do something to clean their shoes (Figure 9).

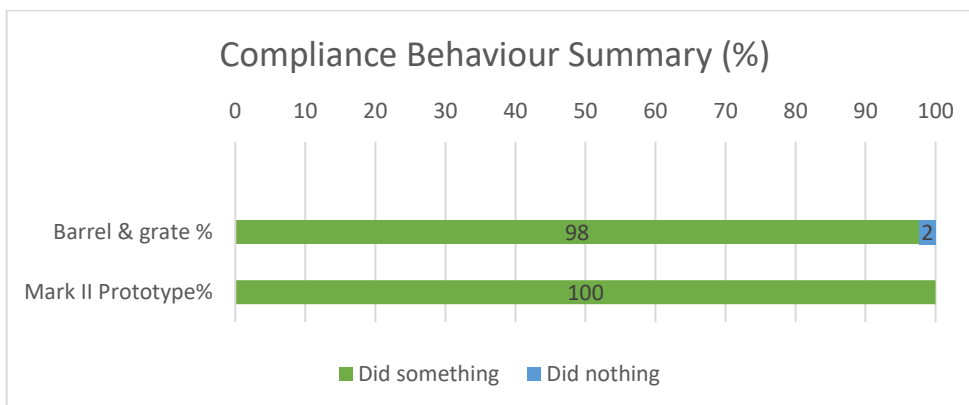


Figure 9: Compliance behaviour summary (did something versus did nothing) at Trounson Kauri Park. Note that the Barrel & grate data was from the carpark entrance and the Mark II prototype data was from the campground entrance. The same location was not possible due to a malfunctioning cleaning station installed at the carpark entrance

Figure 10 illustrates that the 100% compliance at the Mark II prototype includes the behaviour of using the hand brush and hand water spray equipment (which reflects the equipment used to achieve the correct compliance at barrel and grate stations).

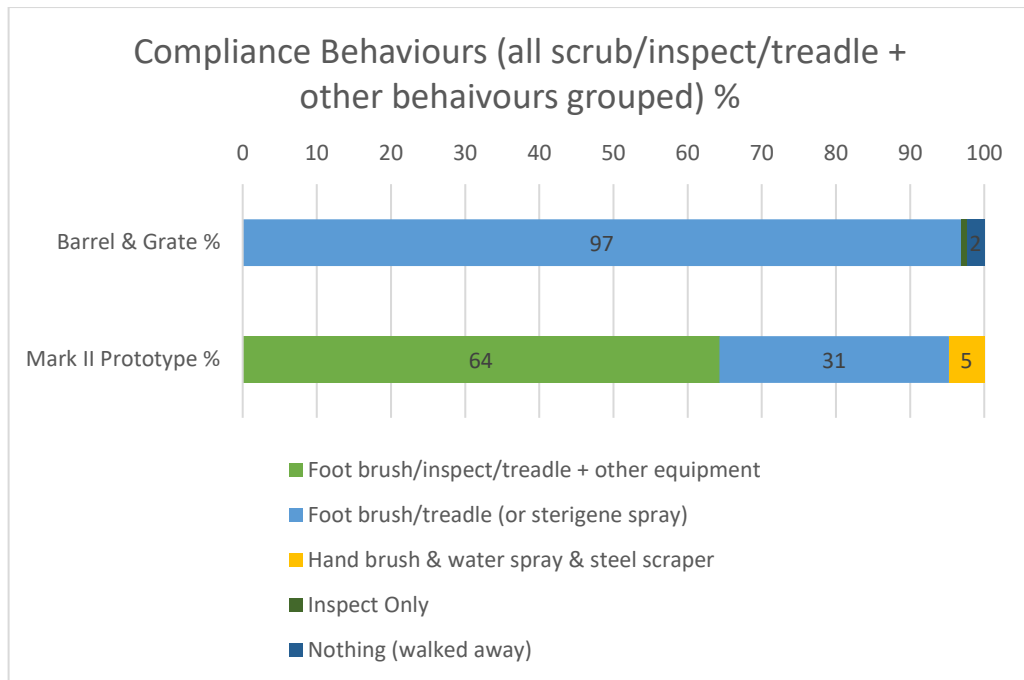


Figure 10: Full compliance behaviours grouped, others kept separate. Note that the barrel and grate location was Trounson carpark and the Mark II location was the Trounson campground (see Figure 4).

## 5 Discussion

Between 90% to 100% of track users did something (i.e. used one or more pieces of equipment) at the Mark II prototype cleaning station to clean their footwear. While correct compliance proved to be low, when partial compliance results were totalled with correct compliance behaviours, results ranged between 72% to 95%.

These results suggest that while there is high overall amenability of track users to use the cleaning station, their behaviours need to be shaped in order to reflect the correct compliance instructions identified in Figure 5. Shaping is a method used where behaviours observed may be similar to one that is desired, but through reinforcing a behaviour that is closer to what you want (McLeod, 2015; Skinner, 1965) the desired behaviour is achieved. Consideration should be given to the instruction and icon of 'inspect', and how it is communicated at the cleaning station, as this is the main behaviour missing from partial compliance.

This is reinforced by Figure 10, where the separate behaviour of hand brush and hand water spray was observed. This equipment looks the same as the hand brush and sterigene spray on the barrel and grate station.

Associated with this is the use of the same type of the hand water spray applicator (Figure 2) as the sterigene applicator used in previous cleaning station models (i.e. the barrel and grate model, Figure 4). As the treadle is a new method to apply the disinfectant spray, but the old spray applicator is now being used for water application, there could be an influence of some track users using the hand water spray to apply what they consider is the sterigene spray. This has already been identified as a possible influence, with the hand water spray applicator being upgraded to have a sign saying 'water' on this device in the near future (Figure 11). However, the consensus is that the main goal is to have shoes clean of all soil, rather than rely in sterigene disinfectant.



Figure 11: Water label added post installation at Mt Manaia Track (Aley, 2018)

The difference in behaviours from two geographically close locations, Mt Manaia and AH Reed Memorial Park in Whangarei, suggests that there is another influence, aside from geographic proximity, guiding compliance behaviours. This is also indicated by AH Reed Memorial Park having a higher incidence of non-compliance (10%) when compared to the other locations ( $\leq 7\%$ ). AH Reed Memorial Park is located on Whangarei District Council land, and not public conservation land, and is also a more urban location compared to all the other tracks. Research into factors which may be influencing this variation is recommended.

Similarly, research into the considerably higher correct compliance rate of Mt Manaia is also recommended. A possible contributing factor of high correct compliance at this location may be associated with engaged community and conservation groups in the area (Bream Head Conservation Trust, n.d; Backyard Kiwi, n.d).

Any influence of one treadle not working does not appear to impact negatively on correct compliance. Although Hakiramata Track had one malfunctioning treadle (on the entry side when starting the track), most track users were observed to use the other working treadle to disinfect their footwear. During peak flow times this may have a negative impact on compliance due to a contributing factor to delays.

While not included on the observation sheet, all research assistants commented on the high (almost total) incidence of track users failing to push open the instruction barrier and keep to the left on completion of using the cleaning station. Instead track users stepped around the instruction sign to exit on the right side of the cleaning station. This is despite signs indicating keep to the left. During peak flow this may negatively impact on the time it takes to move through the cleaning station and is not the correct behaviour the cleaning station was designed for. It is recommended to review signage modifications to include a 'push' icon, or a nudge behaviour change strategy (Ashraf et al., 2017) to rectify this undesirable behaviour. If amended signage is not effective, then it is recommended the option of a barrier is considered in consultation with the designer.

Limitations of the research include that the cleaning stations had already been installed before the research had started, except for Trounson Kauri Park. Therefore, comparison of compliance behaviours pre-installation against post-installation were unable to be undertaken. Another was the unknown influence of the cleanliness of the cleaning stations on compliance behaviours. It has been observed that the cleaning stations tend to rapidly become covered in mud, including the brush and treadle (Figure 12). This may have an influence on track user behaviours, therefore is recommended this is tested by comparing compliance at clean stations versus dirty stations.

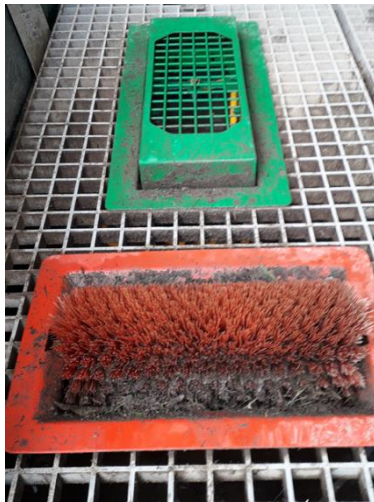


Figure 12: Evidence of dirt accumulation at a recently installed cleaning station (Aley, 2018)

Furthermore, the efficacy of the cleaning station to clean boots has not been field tested. This is a recommendation for further research, as while compliance may be high, if the cleaning station is not cleaning footwear effectively it poses an ongoing risk to the spread of KD in the future.

Evidence suggests most track users will clean their footwear. Overall the increased equipment options available to track users at the cleaning station, while intended to provide easier pathways to achieving clean footwear, have likely influenced the compliance results through such a wide combination of behaviours being observed. Therefore, future focus should be how track users' behaviour can be shaped to achieve the correct compliance behaviours.



## 6 References

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# 7 Appendix 1

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Note: All photos in Appendix 1 are sourced from members of the Kauri Dieback Recreational Project or hired contractors to the project.

## 7.1 Trounson Kauri Park, Waipoua Forest, campground entrance

Before



After





## 7.2 AH Reed Kauri Park, Whangarei

Before



After



7.3 Mt Manaia, Whangarei

Before



After





7.4 Dome Valley, Auckland

Before



After





## 7.5 Hakiramata Track, Parker Road, Waikato

Before



After





**7.6 Tuahu Track, Tauranga**

Before



After



**7.7 Waiau Kauri Gove Walk, Whitianga**

Before



After



# 8 Appendix 2

## DOC Kauri Dieback Recreation Project

### Compliance Observational Data – Prototype II Cleaning Station

Insert single line for each behaviour observed for each track walker

For equipment cleaned note type of equipment and Y/N if cleaned or not

If walked away and not entered track ask person why (if you feel comfortable doing this)

**ENTERING / EXITING TRACK (circle one)**

**Date** \_\_\_\_\_

**Location/Times** \_\_\_\_\_

**Researcher name** \_\_\_\_\_

Time	Foot Brush + Inspect + Treadle	Foot Brush + Treadle	Foot Brush Only	Treadle Only	Inspect Only	Hand Brush	Hand Water Spray	Steel Footwear Scraper	Nothing (walked through)	Nothing (walked around)	Nothing (walked away and not used track)	Equipment cleaned – Y/N
8.00-9.00												
9.00-10.00												
10.00-11.00												
11.00-12.00												
12.00-1.00												
1.00-2.00												
2.00-3.00												
3.00-4.00												

# 9 Appendix 3

