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# Waikato Regional Council dairy winter grazing survey 2011

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Te Kaunihera ā Rohe o Waikato

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# Executive summary

**Background and research objectives**

Waikato Regional Council (WRC) commissioned Versus Research to survey dairy farmers (farmers) in the Waikato region to investigate farmers' winter grazing practices and management decisions in order to better understand the impact these practices and decisions have on nutrient run off and leaching in the region. This study builds on the qualitative research of Davies and Topperwien (2011) which investigated (n=36) Waikato region farmers' winter grazing practices and which segmented farmers based on their stand off practices (wet soils management) and wintering off practices.

The key research objective of the current study was to quantify the proportion of farmers in each segment identified in the qualitative work by Davies and Topperwien (2011) and to identify any other segments. The current study sought to quantify the stand off infrastructure that farmers have and to quantify farmers' wintering off practices.

**Method**

A telephone survey of a random sample of farmers in the Waikato region was conducted between the 5th of September and the 14th of September 2011. The final sample consisted of n=401 dairy farmers. A sample of n=401 has a margin of error of plus or minus 4.89% at the 95% confidence level and when p =.5 (maximum population variability).

**Sample**

The Agribase™of dairy farmers was used for this project. This database was supplied to Versus Research by WRC and telephone numbers from this database were randomly selected for calling. Overall, the final sample achieved was largely representative of the region's spread of dairy farms. However, the average farm size and herd size were above that of the region indicating that slightly more large farming operations were included in the sample relative to that of the population.

# Key results

**Pasture damage and pugging**

Around two thirds of farmers (63%) said that their farm was prone to pugging (very prone 24% prone 39%); 35% said that their farm was not very prone (32%) or not at all prone (3%) to pugging; and, 2% said they were unsure.

Farmers who said that their farm was prone[1] to pugging were asked to specify the proportion of their farm that was pugged in a typical winter. The highest proportion, 47% said that between 5 and 10% of their farm was pugged in a typical winter; 37% said that less than 5% of their farm was pugged in a typical winter; 11% said that more than 10% of their farm was pugged in a typical winter; and 6% said that they were unsure.

[1] Very prone, prone and not very prone; those who said that their farm is not at all prone to pugging were excluded.

### Wintering off practices

Almost two thirds (65%) of farmers said that they did not winter off their herd, while just over a third (35%) said that they winter off some, or all, of their herd.

Of the 35% **who winter off** their herd:

- Around 80% said they do so to manage a feed deficit (42% said they winter off their herd to manage feed and to ease pressure on pasture; 27% said to build up pasture cover on the milking platform; 6% said to lengthen the season / milk through winter and 4% said due to cold climate conditions / lack of grass growth). Around a quarter mentioned managing wet soils as the reason for wintering off (14% said to prevent pugging and 9% mentioned soil wetness); 22% because they had a run-off block available; 4% because they have high stocking rate; and 3% gave another reason for wintering off their herd.
- 80% said they winter off less than half of their herd (56% winter off 30% or less; 25% winter off between 31 and 50%) and 20% said they winter off over half their herd.
- About 22% winter off their herd for one month, 43% for two months; 30% for three months and 5% winter off their herd for 4 or 5 months.
- June is the most common month for stock to be wintered off (87%). As few as 4% said they winter off their herd in April, 35% in May; 65% in July; 26% in August; and 2% said they winter off their herd in another month.
- 69% said they have a grazing arrangement where they lease or own land within an hour of their farm; 29% said they use contract graziers; 5% said they lease or own land more than an hour away from their farm; and, 2% said they have some other arrangement or were unsure about their arrangement.

Of the 65% who **do not winter off** their herd the highest proportion, 46% said they do not winter off their herd as they have enough feed / feeding infrastructure; 43% costs are prohibitive; 14% to control cow condition; 7% as grazing is too far away; 6% supplements are grown/imported; 4% free draining soil; 3% self contained policy; 1% winter milking so cows stay on-farm; 1% are an organic operation and there is no organic grazing available; and 5% gave another reason for not wintering off their herd.

## Infrastructure on-farm

### Proportion of farmers with various infrastructure

Farmers were asked to specify whether they had the following on their farm: a sacrifice paddock; a feedpad; a purpose built stand off or loafing pad; winter cropping areas; and, a wintering barn or herd home. Twenty-six% of farmers overall said that they had a sacrifice paddock; 24% said that they have a feedpad; 22% said that they had a purpose build stand off or loafing pad; 10% said that they had winter cropping areas; 5% said that they had a wintering barn or herd home; and, 39% said they had none of these.

### Sacrifice paddocks

Of the farmers (26%) who said they had a sacrifice paddock:

- 78% said that the contour of their sacrifice paddock was mainly flat; 20% mainly rolling; 1% mainly steep; and, 1% that the contour is mixed
- 80% said they do **not** sacrifice the same paddock each winter, 17% said they did and 3% said they were unsure
- 81% said that their sacrifice paddock did **not** border a waterway or drain, 17% said that their sacrifice paddock did, and 2% said they were unsure

- 6% used the same sacrifice paddock each winter and this sacrifice paddock also bordered a waterway or drain.

**Feedpads**

Of the farmers (24%) who said they had a feedpad:

- 87% said their feedpad was made from concrete, 6% said from gravel, and 6% said from something other than concrete or gravel.
    - Farmers **who said that their feedpad was made from a material other than concrete** (n=12) were asked to specify whether or not their feedpad was sealed. The highest proportion, 67% said that their feedpad was sealed, while 33% said that it was not.
- 93% said that their feedpad had a nib, while 7% said that their feedpad does not.
- 40 percent said they had a sump that pumps the effluent from the feedpad to the dairy's effluent pond / holding tank; 27% said they scraped or washed the effluent from the feedpad directly into the dairy's effluent pond or holding tank; 26% said they had a separate effluent pond or holding tank for the effluent from the feedpad; 1% said they leave the effluent on their feedpad; and 5% said they have another system for collecting the effluent from their feedpad.

**Stand off pads**

Of the farmers (22%) who said they had a feedpad:

- 50% said their stand off pad was made from soil with wood shavings / post peelings; 18% said from gravel or crushed rock and rubble; 17 percent % said from concrete; and 15% said from another material.
    - Farmers **who said they had a stand off pad made from any material other than concrete** (n=73) were asked whether their stand off pad was sealed. Just over half, 52% said that their stand off pad was sealed, 45% said their stand off pad was not and 3% said they were unsure.
- 53% said that their stand off pad had a nib, 45% said that their stand off pad did not have a nib, and 1% said they were unsure.
- 68% said they collected the effluent from their stand off pad, 31% said they did **not**, and 1% said they were unsure.
    - 44% **who said they collected the effluent from their stand off pad** said they had a sump or holding facility that pumps the effluent to the dairy's effluent pond or holding tank; 23% said they scraped or washed the effluent directly into the dairy effluent pond or holding tank; 12% had a separate effluent pond or holding tank for their stand off pad; 8% leave it on the stand off pad; 2% said they were unsure; and 15% said they did something else with the effluent collected.

**Wintering barns**

Of the farmers (5%) **who said they had a wintering barn**, 63% said that the flooring was made from concrete; 11% said soil with wood shavings or post peelings; 5% said gravel or crushed rock and rubble; 5% said they had a slotted floor; 11% said it was made from another material; and 5% said they were unsure.

**Winter cropping areas**

Of the farmers (10%) **who said they had winter cropping areas,** 70% said that the contour of their winter cropping area was mainly flat; 20% said that the contour of their winter cropping areas was mainly rolling; and, 10% said that the contour of their winter cropping area was something else.

**Standing-off practices to manage wet soils in winter**

All farmers were asked if they stand off some, or all of their herd, in winter to manage wet soils. Four fifths said that they did, while a fifth said that they did not.

Of the 80% of farmers that said that they stand off their herd in the winter to manage wet soils:

- Just over two-thirds (67%) said they stand off to protect their pasture / aid pasture recovery; 40% said to prevent pugging; 15% said to prevent soil damage; 6% said they only stand off in very poor weather conditions; 6% noted environmental reasons for standing off; 4% said they stand off to protect cow condition; and 1% gave another reason for standing off.
- Almost two thirds (65%) stand off all of their herd; 27% said they stand off between 50 and 99% of their herd; 7% said that they stand off less than half of their herd; and, 1% said they were unsure.
- In terms of frequency during winter; four-fifths stand off their herd for 30 days of less during a winter (55% said that they stand off for 10 to 29 days, 26% stand off for less than 10 days), 11% said that they stand off their herd for 30 to 59 days, 3% said they stand off their herd for 60 to 89 days, 2% said they stand off their herd everyday and 4% said that the numbers of days varies significantly each winter.
- In terms of duration off the paddock, almost 60% stand off their herd for periods of 12 hours or less (45% said between 9 and 12 hours and 14% said for periods less than 9 hours), while 40% said they stand off their herd for more than 12 hours each time they stand off their herd and 2% said they were unsure.
- 61% said they **mainly used** their cow shed yard to stand off their herd; 20% their stand-off pad; 19% their sacrifice paddock; 18% their feedpad; 8% their races; 3% their winter cropping areas; and, 3% said they mainly used their wintering barn / herd home.
- Farmers who did **not** stand off their herd in winter were asked to specify why this was the case[2]. The highest proportion, 60% said they did not stand off their herd in winter as their farm has “free draining” or “good” soils.

**Utilisation of infrastructure by farmers who stand off in winter to manage wet soils**

Farmers have more than one form of infrastructure available to them on which they can stand off (yard, races and a sacrifice paddock in addition to any other infrastructure). Comparing the proportion of farmers who **had** a particular type of infrastructure on-farm to the proportion who **mainly used** it, demonstrates utilisation of that infrastructure. Results indicate that purpose built stand off pads had the highest utilisation: 77% of farmers who had a purpose built stand off pad (and who stand off their herd to manage wet soils in winter) said that they mainly used their stand off pad. This was followed by feedpads (69%); cow shed yards (61%); sacrifice paddocks (59%); wintering barns (50%); winter cropping areas (30%) and races, which had the lowest utilisation of 8%.

## Segment analysis

Segmentation analysis was carried out in order to better understand farmers’ stand off practices in winter. Segments were identified based on grouping farmers who stand off their herd to manage wet soils in winter for a similar duration (hours per day) and for a similar frequency (number of days in winter). Seven segments were identified. These segments are summarised below, fuller descriptions are found in Section 9:

[2] Why is it that you don't stand off your cows in winter? Is it because...

- **Segment 1:** Farmers who do not need to stand off their herd in winter to manage wet soils; 21% of farmers were in Segment 1.
- **Segment 2:** Farmers who stand off their herd for less than 10 days in winter and for less than 12 hours each time; 7% of farmers were in Segment 2 .
- **Segment 3:** Farmers who stand off their herd for less than 10 days in winter and for **12 or more hours** each time; 15% of farmers were in Segment 3.
- **Segment 4:** Farmers who stand off their herd for 10 to 29 days in winter and for less than 12 hours each time; 9% of farmers were in Segment 4.
- **Segment 5:** Farmers who stand off their herd for 10 to 29 days in winter and for **12 hours or more** each time; 36% of farmers were in Segment 5.
- **Segment 6**: Farmers who stand off their herd for 30 days or more in winter and for less than 12 hours each time; 3% of farmers were in Segment 6.
- **Segment 7:** Farmers who stand off their herd for 30 days or more and for **12 hours or more** each time; 10% of farmers were in Segment 7.

Patterns can be seen across the segments and these are summarised below as some segments had too few members (less than 30) to be able to perform reliable statistical testing.

The proportions of those wintering off compared with those who didn't winter off some or all of their herd were very similar across all seven segments (35% winter off and 65% don't).

Farmers in Segment 1 were much more likely to have a well-drained farm, and not surprisingly were more like to report that they their farm was not very prone, or not prone at all to pugging. However, 21% of this segment had poorly drained properties.

Given farmers in Segment 1 did not need to stand their cows off to manage wet soils, none had a wintering barn (0% versus 5% for all) or a sacrifice paddock (0% versus 26% for all) and relatively few had a stand off pad (5% versus 22% for all) or a feedpad (14% versus 24% for all).

In contrast, the farmers in Segments 6 and 7 were much more likely to have, and use, a range of infrastructure, in addition to races and the yard, on farm. In terms of infrastructure, farmers in Segment 7 were **much more** likely, compared to the total, to say that they had a wintering barn (16% versus 5%), and they were **more** likely, compared to the total, to say that they had a feedpad (39% versus 24%) and a sacrifice paddock (42% versus 26% for all). Farmers in this segment were as likely to say they had a stand off pad (34% versus 22% for all). This segment was **much less** likely, compared to the total, to say they have no infrastructure for standing off other than their yard/races (8% versus 40% for all).

Nearly all farmers in Segment 7 were **much more** likely, compared to the total, to say that their farm was prone/very prone to pasture damage and pugging (89% versus 63% for all). Similarly many farmers in Segment 6 assessed their farm as prone or very prone to pasture damage and pugging.

Herd sizes were below the regional average in Segments 1, 2 and 3, and were higher or consistent with the regional average in other segments.

Most soils were represented in similar proportions in each segment as for the sample as a whole, with allophanic being the most common soil.

## Additional analysis – CHAID

Cross-tabulation analysis of the segments and the resulting segment profiles (see Section 9.3) indicated that a range of factors (for example soil, land contour, stocking rate, farm infrastructure available) influence stand-off practice.

In order to better understand the determinants of stand-off practice, and to identify the factors that best predict stand-off practice, additional statistical analysis was undertaken.

The statistical analysis used for this was Chi Square Automatic Identification Detection or CHAID (Wilkinson,1992). CHAID is an exploratory data method that examines the relationships between a dependent measure (in this case, stand off practice) and a series of possible predictor variables (such as soil, rainfall, contour) that may interact with each other.

Overall, the results from the CHAID analysis support the findings from the cross-tabulation analysis. That is, a range of factors influenced stand-off practice. Specifically, seven factors were placed in relatively close succession of each other as the best predictors for stand-off practice. These factors were (in order of importance):

- Proneness to pugging (farmers' perceptions of their farms propensity to pug)
- The presence of infrastructure on-farm in addition to a milking shed and races
- Location of farm (District)
- The proportion of the farm well drained / moderately well drained
- Stocking rate
- Farm contour
- Main soil type.

**Predictors:** Main soil type, district location, farm contour, average annual rainfall, farm drainage classification, stocking rate, farmers' perceptions of their farm's propensity to pugging, winter off practice, on-farm role, gender, stand-off infrastructure on-farm. **Top splitter:** Pugging: perceptions of farm propensity to pug, with a probability of 0.0, Six variables followed in close succession: infrastructure on-farm, location, proportion of the farm well drained and moderately well drained, stocking rate, farm contour, and main soil type.

**Discussion of results**

These findings illustrate the dominance of farm context as the key driver in farmer decision making on winter grazing practices. By understanding the range of factors that influence choice of wintering practices it is clear that there was no single practice or action currently undertaken by farmers that would result in a win-win in terms of a reduction in nutrient emissions and providing direct benefits to farmers.

Even for an action as widely practiced as standing off, it is likely that this is not practiced for long enough periods to greatly reduce nutrient emissions. Although 80% of dairy farmers stand off some, or all of their herd, the majority stand off for only 29 days or less during winter and for periods of 12 hours or less.

Wintering practices were driven by the size of the pasture management issue:

- The size of the winter feed deficit and/or
- The scale of water logging on farm.

Farmers' business imperatives as well as preferences for management options drive their choice of wintering practices. There is no one factor that determines which practice is chosen. A farm system is a complex system and that means practices are determined by the interplay of a combination of factors in the farm context.

The results for the practice of wintering off illustrates the points above. Around a third of Waikato dairy farmers in our sample used wintering off as a management practice and did so primarily to meet a pasture/feed deficit over the winter months. About a quarter also used wintering off as a management tool for prevention of pasture damage and pugging. On these results, there was no business imperative compelling the majority of farmers in the sample, 65% to undertake this practice.

In terms of nutrient emission reduction it should be noted that while 78% of these famers winter off for two or more months, only 20% winter off more than half their herd. Wintering off is not necessarily a desirable practice as it effectively results in a transfer of the nutrient pollution to another location. These results show that it is likely that the transfer of nutrients stays within the home farm catchment, as the majority of farmers who winter off do so by means of leasing or owning land within an hour of their home farm (69%), and for those who use a contract grazier, the majority locate their herd within the district of their home farm.

Overall, farmers who winter off their herd choose to do so in close proximity to the home farm; this means transport costs are lower and greater control can be exercised over the condition of the cows wintered off[3].

Consistent with the previous study, farmers who wintered their herd on the home farm (65%) were more likely to report having enough feed or the ability to supplement, having infrastructure to enable on/off grazing, lower stocking rates and a strong preference to personally manage cow condition and not incur the cost of wintering off. This implies that these farmers were unlikely to take up wintering off as a mitigation practice as they have no business imperative to do so – if anything, the opposite is the case.

The majority (80%) of farmers stand off their herd in winter to manage wet soils. The primary drivers for doing so were to protect pasture (the primary feed source) and prevent pugging. However relatively few farmers mentioned preventing soil damage. Overall, results indicate that protecting pasture was top of mind for most farmers who stand off. This may suggest lower awareness amongst farmers of the long term effects of soil compaction and the links to productivity.

In terms of how frequently farmers were standing off their herd through the winter, this study found that the majority (81%) of farmers who stand off their herd, do so for 29 days or less through winter. In terms of the duration that the cows were stood off the pasture, nearly 60% stand off their cows for 12 hours or less at a time. Both these results should be taken into account when considering if current stand off practices are mitigating nutrient emissions during the high risk winter period.

[3] This is consistent with the previous study, that is, cost and lack of control over cow condition were reported as key barriers to wintering off and close proximity of the winter off location helps to mitigate both factors.

The duration and frequency that farmers stand off their cows for was highly influenced by the context of the farm: the farm's soil type, contour and stocking rate amongst other factors.

In terms of infrastructure used for standing off, the majority (61%) of farmers who stand off their herd did so on their cow shed yard. Given that most farmers stand off their herd infrequently and for short periods of time, it is likely they would view investment in stand off infrastructure as unnecessary and costly.

However, where there had been investment in stand off infrastructure, utilisation was relatively high, particularly for stand off pads. It should be noted that stand off infrastructure was not fully utilised, that is, used for every occasion for standing off, as farmers tended to use their cow shed yard in addition to other stand off infrastructure, or may have a preference not to use certain infrastructure for standing off[4].

This seems to be the case with the small proportion of farmers that had invested in wintering barns, where only half of those with a wintering barn were using it for their main stand off infrastructure.

Overall, farm context appeared critical to influencing stand off practice. Farm context variables were inter-related and complex, as indicated through the CHAID analysis, and need to be accounted for in any policy aimed at influencing farmers' behaviour regarding nutrient management.

In conclusion, the results of the segmentation and CHAID analyses indicated that herd management practices in the winter months on dairy farms are heavily influenced by the severity of waterlogging and pugging experienced by farmers. However, the precise combination of practices employed by farmers depends on the soil type and terrain of their properties, the infrastructure they have available, their stocking rate and opportunities for wintering-off, as well as the severity and timing of waterlogging. Furthermore, these sets of factors are inter-related. Consequently, no single factor can be said to drive winter herd management on dairy farms. This means there is no single management solution to reducing nutrient emissions from dairy farms and this needs to be accounted for in any policy aimed at influencing farmers' behaviour regarding nutrient management.

[4] In the previous study some farmers stated that they would not use their feedpad for standing off as they had experienced stock losses or injuries.

# 1 Background and research objectives

**Background**

Nutrient management is a focus for Waikato Regional Council due to its role in managing the region's water quality. When pastoral farming is considered, nutrients from animal effluent and fertiliser leach past the root zone of plants and into groundwater, or flow into waterways, leading to reduced water quality. Monitoring shows that nutrient concentrations in waterways are increasing across many farmed areas in the region.

Related to the issue of increased nutrients in waterways, soil compaction and excessive fertility in the region's soils are common issues. Stocking pressure can lead to pugging of soils. Pugging results in compaction of the pore spaces in the soil so that water logging can occur leading to nutrients and bacteria running off into waterways. Excessive fertility results when more fertiliser is added to soils than plants can use. This extra fertiliser can leach into waterways or get washed off with soil particles when it rains (Environment Waikato, 2008). These processes mean that there is strong connection between farmers' grazing management practices and nutrient management.

In order to better understand the relationship between farm systems and nutrient management practices currently undertaken by the region's farmers Waikato Regional Council undertook a qualitative study of 36 dairy farmers. In depth interviews were conducted between March and December 2008, with 14 farmers in the Upper Waikato catchment, and 22 farmers around the Hauraki Plains area (Davies and Topperwien, 2011).

An earlier report (Ritchie, 2007) reviewed the range of nutrient management practices used in the Upper Waikato and noted that local climatic, soil and farm management variables influence the magnitude of environmental gain from implementing different practices. Ritchie also noted that the extent to which farmers were adopting these practices, and their decision-making on whether to adopt or reject a practice, was not known.

The purpose of this research was to quantify dairy farmers' practices concerning winter grazing management systems and their decisions. The focus of the research was on winter practices that help mitigate or exacerbate nutrient management.

Asking farmers why they choose certain practices over others, or why they may have made changes to their system, can provide insight into the likelihood of the adoption of practices. It can help identify areas of the farm system where farmers are already exercising recommended practices. It can also indicate potential barriers or obstacles associated with certain practices, which could impede the rate of adoption of new practices.

**Research objectives**

Given this background, the key research objectives for this project were to better understand farmers':

- Wintering off practices, including: the proportion of farmers who typically winter-off; reasons for wintering off; reasons for not wintering off; herd proportion

wintered off; duration of wintering off (months); and, wintering off arrangements including use of contract graziers.

- Stand off practices in winter to manage wet soils, including: the proportion of farmers who stand off their herd in winter to manage wet soils; reasons for standing off; reasons for not standing off; herd proportion stood off; duration (days) herd is stood off for; hours (per day) herd is stood off for; infrastructure available and mainly used for standing-off; and, effluent capture systems and sealing for stand off infrastructure.
- Use of pugging prevention strategies for when cows graze in paddocks and farmer's perceptions regarding how prone their farm is to pugging; and, the proportion of their farm pugged in a typical winter.
- To compare the results to the qualitative study by Davies and Topperwien (2011) where relevant.

# 2 Method

## Overview

A telephone survey[5] of a random sample of farmers in the Waikato region was conducted between the 5th of September and the 14th of September 2011. Surveying was conducted to correspond with non-milking times: between 10am and 2pm, and 6pm and 8.30pm. The final sample consisted of n=401 dairy farmers.

Previously, a pilot survey was completed on the 19th of July and 2nd of September 2011 to check questionnaire flow and to ensure any potential areas for confusion were eliminated and/or technical issues removed prior to „going live'. All interviewing was completed in-house at Versus Research on the Versus CATI (computer assisted telephone interviewing) system; all interviewers were supervised by a senior researcher at all times to handle any queries from dairy farmers. Survey data was checked, audited and „cleaned' on the completion of the survey process.

## Sample

Waikato Regional Council supplied Versus Research with the Agribase™[6] of dairy farmers; telephone numbers were randomly selected from this database to go into the pool of numbers to telephone. Up to six call backs were made to each telephone number before the telephone number was removed from the pool.

The person responsible for making the day-to-day decisions about winter stock management practices was asked for in the introduction of the survey. This was done to ensure that the relevant person was surveyed. Where multiple farms were owned by a farmer, they were asked to provide answers to the survey questions with one farm in mind, that is, the farm which was called. Farms with less than 100 cows were excluded from the survey.

## Calling statistics

A total of 2,258 phone numbers were called during the time frame. Of the 1,015 respondents who qualified and were able to be contacted during this time, 401 agreed to take part in the survey (40%), and 614 refused (60%).

The remaining phone numbers were not used because there was no answer, they number was engaged, there was an answer machine/fax, the number was disconnected, and/or the person was not available during the hours of calling.

[5] Please refer to Appendix 1 for the questionnaire used in the survey.

[6] AgriBase™ is maintained by AsureQuality New Zealand Ltd through routine contact with dairy farmers and through updates of property changes from Valuation Service Providers. In February 2008, Waikato Regional Council entered into a three-year licence for data supply with 6 monthly updates and for a further year in May 2011. The current version of the data is dated June 2011.

# 3 Analysis and reporting

## Subgroups

The results in this report are analysed at the sample level and by six subgroups:

- Farm size
- Herd size
- Stocking rate
- District council areas
- Soil type (dominant soil on farm by ha)
- Demographics

All subgroups were sorted on the basis of trying to achieve logical bands with a minimum of n=30 per sample group in order that reliable significance testing could be performed.

**Farm size**

Four groupings were used for farm size; the groupings and the sample sizes are given below:

**Table 1 Farm size**

| Farm size (hectares) | Sample size[7] |
|---|---|
| <50 | 30 |
| 51 - 100 | 179 |
| 101 - 200 | 154 |
| 201 or more | 37 |

**Herd size**

Five groupings were used for herd size; the groupings and the sample sizes are given below:

**Table 2 Herd size**

| Herd size (cows) | Sample size |
|---|---|
| 100 - 200 | 105 |
| 201 - 300 | 121 |
| 301 - 400 | 68 |
| 401 - 500 | 45 |
| 500 or more | 62 |

[7] Farm size and stocking rate count totals n=400 as one participant did not want to provide their farm size.

### Stocking rate[8]

Stocking rate was defined as the number of cows per effective hectare. Four groupings were used for stocking rate; the groupings and the sample sizes are given below:

**Table 3 Stocking rate**

| Stocking rate (cows per effective hectare) | Sample size |
|---|---|
| Less than 2.5 | 76 |
| 2.5 - 2.99 | 154 |
| 3.0 - 3.49 | 121 |
| 3.5 or more | 49 |

### Main soil type

For the analysis, WRC supplied the main soil type for each farm included in the survey data set. Overall, there were eight soil types. Results were analysed by sub-groups where n=30 or more farmers had a soil type. These sub-groups were: allophanic, gley, organic and pumice. Sample sizes for the following soil types were too small for statistically significant differences to be analysed: granular, podzol, brown and ultic. Please refer to Section 4 to see a chart of the results showing the proportion of farmers for each soil type.

## Additional Analysis - CHAID

In order to better understand the determinants of stand-off practice a CHAID analysis (Wilkinson, 1992) was undertaken in addition to the cross-tabulations using subgroups. Data from a range of variables in the survey were used in this analysis. In addition, data on two other variables were also included:

- Average annual rainfall for each farm, sourced from Waikato Regional Council
- Land drainage classification for each farm, sourced from Landcare Research New Zealand Limited[9] Landcare Research provided the proportion of the farm that is well drained, moderately well drained, poorly drained and very poorly drained. For example, one farm in the data set may have been 20% well drained, 40% moderately well drained and 40% poorly drained. To streamline the data for use in CHAID analysis, the drainage categories for well drained and moderately well drained for each farm were added together, to give a drainage range from 0 – 100%. This figure was then used in the CHAID analysis.

# Margin of error

The overall sample of n=401 has a margin of error of plus or minus 5.89% at the 95% confidence level and when p =.5 (maximum population variability).

# Significance testing

Significance testing was conducted between the subgroup results and the sample to determine whether differences shown are statistically significant. Differences are indicated by plus or minus signs as follows:

- Two plusses or minuses (++ or --) denote significance at the 95% confidence level. When discussed in the report, this is referred to as **more/less likely**.

[8] Stocking rate was calculated by dividing herd size by farm size for each case in the dataset.

[9] Data used with the permission of Landcare Research New Zealand Limited

- Three plusses or minuses (+++ or ---) denote significance at the 99% confidence level. When discussed in the report, this is referred to as **much more/less likely**.

# Display of data

For ease of interpretation, charts are used to display top level results in this report. Labels on charts for very small proportions (for example, 1%) may not show as these labels can extend beyond their segment and overlap with numbers from other segments making the labels unreadable.

The relevant question in the survey is footnoted on the same page as the chart and the base size, that is, the number of farmers that answered a question, is shown below the chart.

# Percentages

Please note that not all percentages shown add up to 100%. This is due to rounding and/or questions that allow multiple responses.

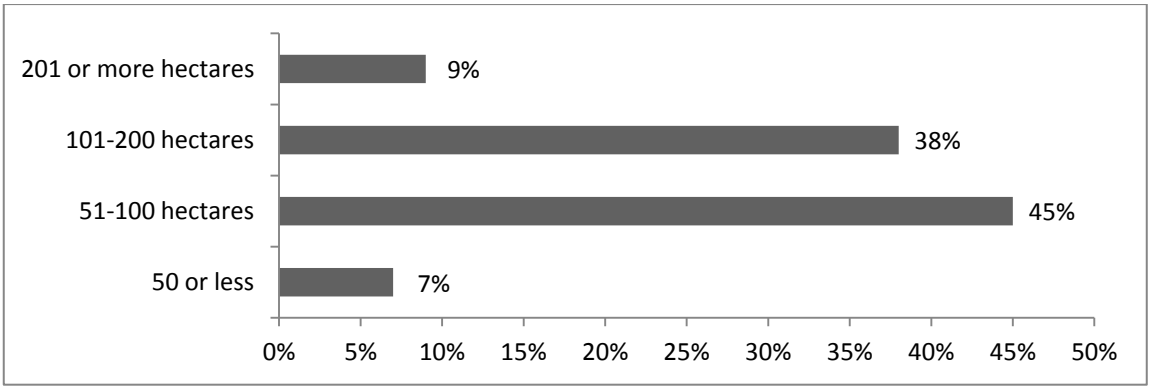
# 4 Sample profile

The following section gives an overview of the sample for this project and compares this to the region's population. Overall, the sample appears to be representative however, the sample's average farm size and herd size are above that of the region, which may mean a bias to larger farm sizes in this study.

### Farm size

The largest proportion of farmers surveyed, 45%, had a farm size between 51 to 100 effective hectares. The average (mean) farm size for the sample is 120 effective hectares which was above the region's average, 109 hectares[10].

**Figure 1 What is the effective area of your farm? (hectares)**

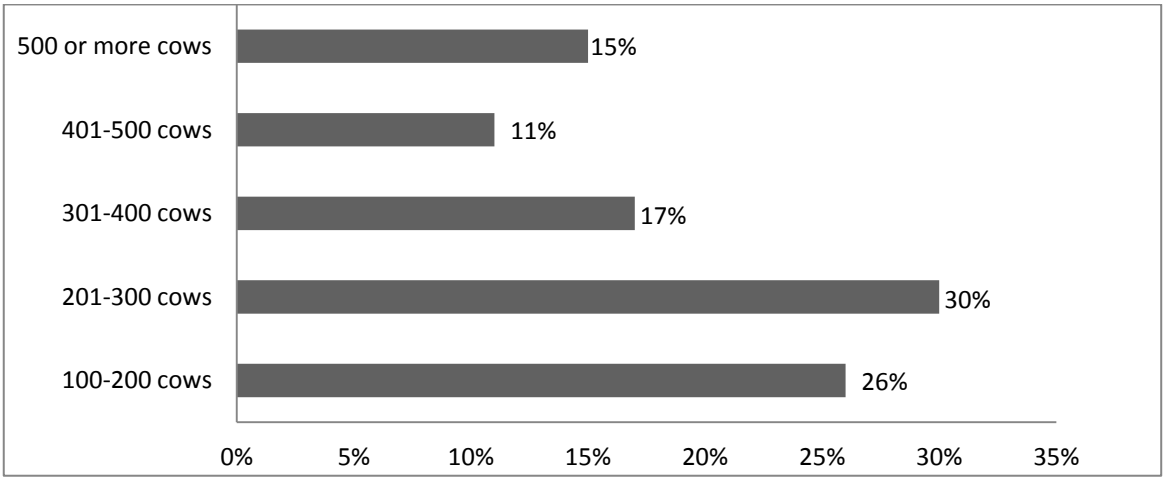



Base: All farmers surveyed, n=400[11]

### Herd size

The largest proportion of farmers surveyed, 30% had a herd size of 201 to 300 cows. The average herd size for farmers surveyed was 343 cows; this was above the region's average of 318 cows.

**Figure 2 What is your herd size?**



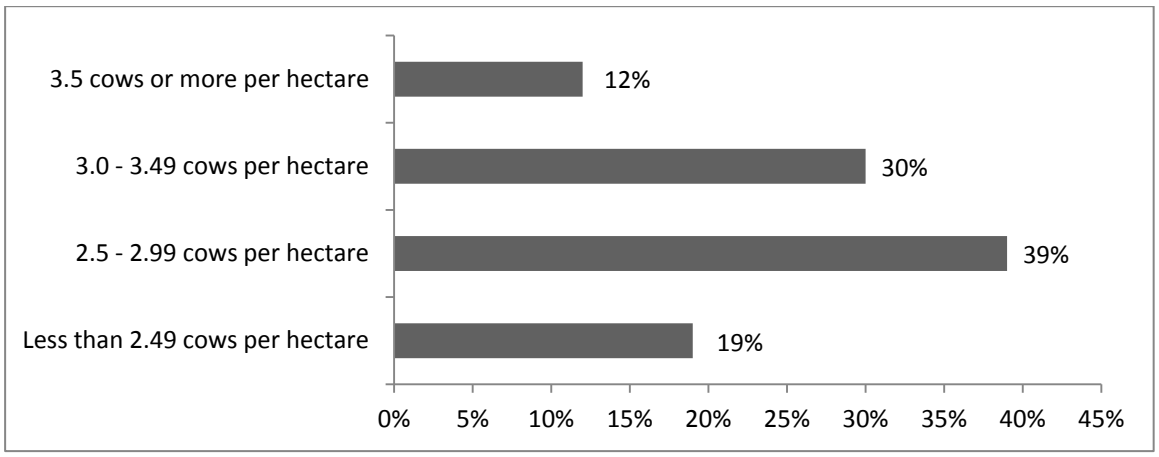

Base: All farmers surveyed, n=401

### Stocking rate

The highest proportion of farmers sampled, 39% had a stocking rate of 2.5 to 2.99 cows per hectare. The average stocking rate for the sample is 2.91 cows per hectare and this is comparable to the region's average of 2.93 cows per hectare.

[10] Dairy NZ: New Zealand Dairy Statistics, 2010-2011 used for the region's dairy population statistics throughout this section.
[11] One respondent refused to answer this question

**Figure 3 Stocking rate [calculated after data collection]**

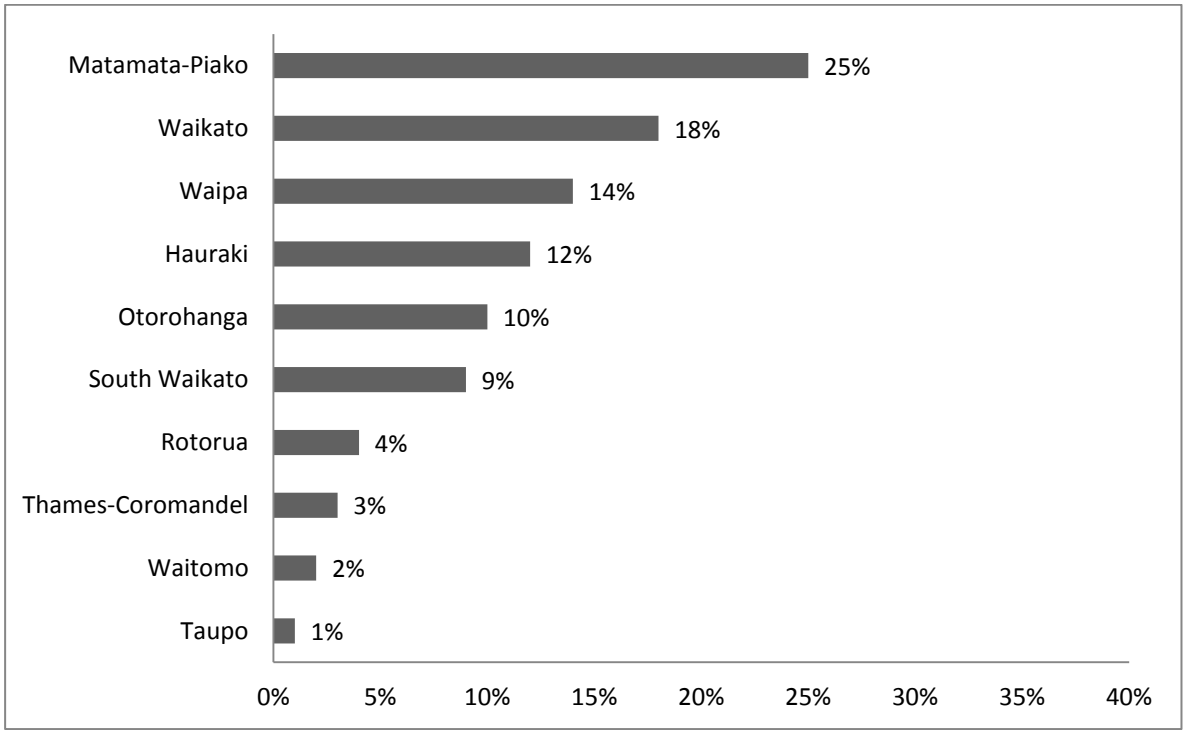



Base: All farmers surveyed, n=400

### District council area

Just over half (57%) of farmers surveyed were from Matamata-Piako (25%), Waikato (18%) and Waipa (14%); overall the sample spread is largely consistent with the population spread in the region.

**Figure 4 Sample by district council area**



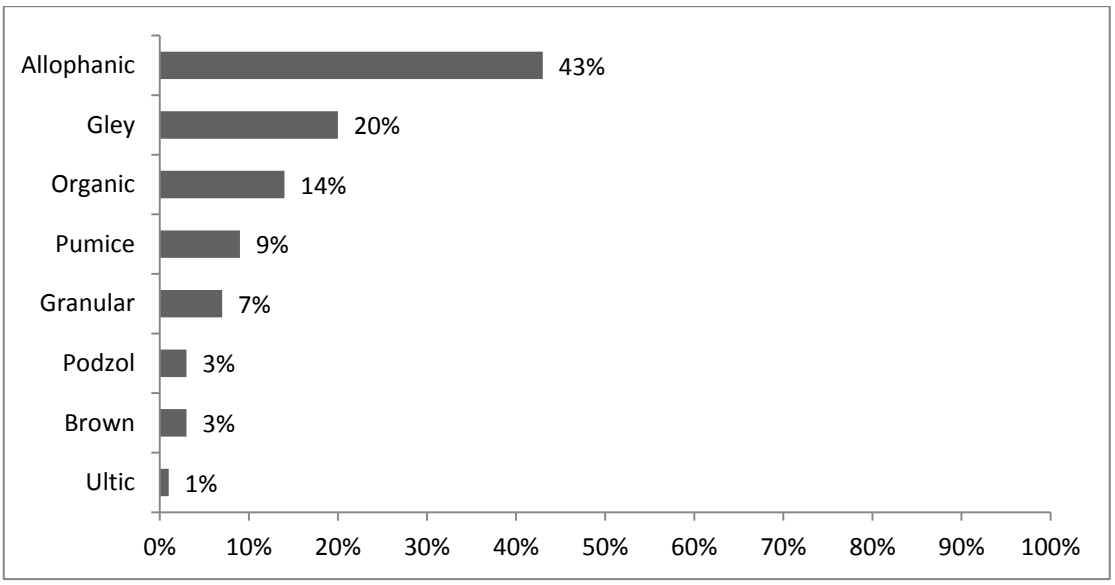

*Base: All farmers surveyed, n=401*

### Main soil type[12]

Just under half (43%) of farmers surveyed have an allophanic soil as their main soil type; 20% gley; 14% organic; 9% pumice; 7% granular; 3% podzol; 3% brown; and 1% ultic.

[12] Farmers were asked in the survey to specify their main soil type on-farm. However, for the analysis soils data pertaining to each property was Waikato Regional Council.

**Figure 5 Main soil type on-farm**

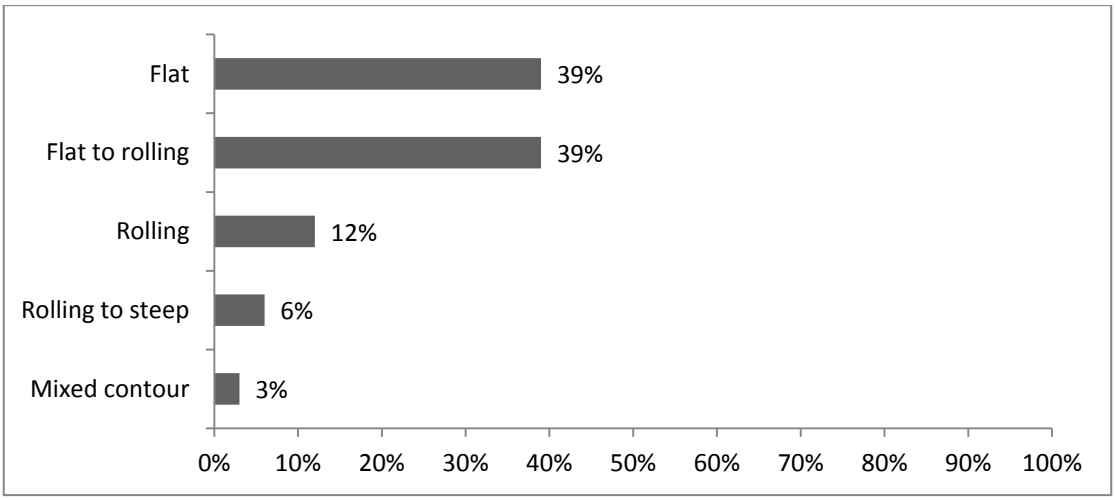



*Base: All farmers surveyed, n=401*

**Farm contour**

Just over three quarters (78%) of farmers surveyed said that the contour of their farm was flat (39%) or flat to rolling (39%); 12% rolling; 6% rolling to steep; and, 3% said that the contour of their farm is a mix of flat, rolling and steep.

**Figure 6 Overall, what is the contour of your farm? Is it...**

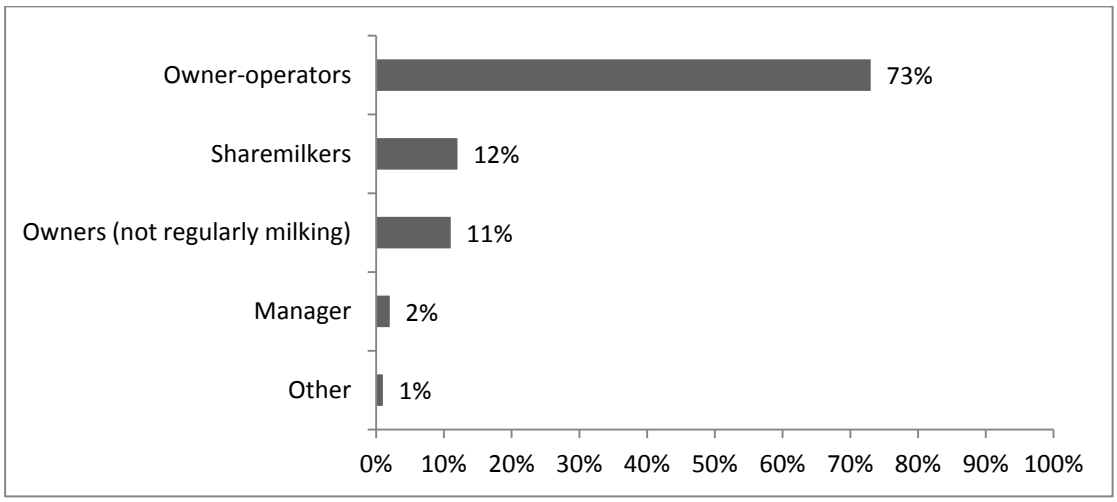



*Base: All farmers surveyed, n=401*

**Role on farm**

The highest proportion (73%) of survey respondents said that they are owner-operators; 12% sharemilkers; 11% owners who do not regularly milk the herd; 2% farm managers; and 1% said that they had another role on-farm.

**Figure 7 Role on farm: are you a....**



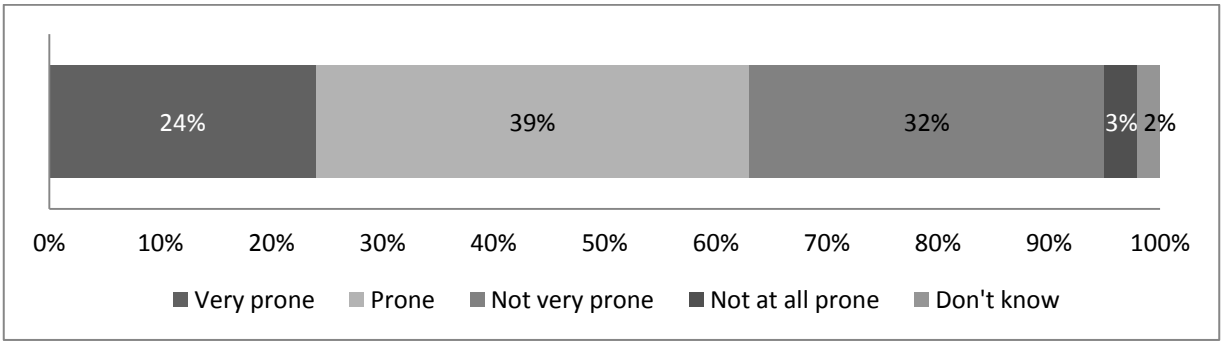

Base: All farmers surveyed, n=401

# 5 Pasture damage and pugging

## 5.1 Farm propensity to pug

Farmers were asked how prone they feel their farm is to pasture damage or pugging. Overall, 63% said that their farm was very prone (24%) or prone (39%) to pugging, 35% said that their farm was not prone (32%) or not at all prone (3%) and 2% said they didn't know.

**Figure 8 Farm propensity to pug**[13]




Base: All farmers surveyed, n=401

**Herd size, farm size, and stocking rate variation**

- Farmers with a stocking rate of less than 2.5 cows per hectare were **less** likely to say that their farm was very prone to pasture damage or pugging (14% compared to 24% for all).
- Farmers with a stocking rate of 3.0-3.49 were **more** likely to say that their farm was very prone to pasture damage or pugging (31% compared to 24% for all).

**Geographic and soil type variation**

- Farmers in South Waikato District were **much less** likely to say that their farm was very prone to pasture damage or pugging (3% compared to 24% for all).
- Farmers in the South Waikato District were **more** likely to say that their farm was not very prone to pasture damage or pugging (49% compared to 32% for all).
- Farmers in the Waikato were **much more** likely to say that their farm was very prone to pasture damage or pugging (38% compared to 24% for all).
- Farmers in the Waikato were much **less** likely to say that their farm was not very prone to pasture damage or pugging (16% compared to 32% for all).
- Farmers in the Waikato were **more** likely to say that their farm was not at all prone to pasture damage or pugging (8% compared to 3% for all).
- Farmers who had allophanic soil as their main soil type were **more** likely to say that their farm was prone to pasture damage or pugging (46% compared to 39% for all).
- Farmers who had gley soil as their main soil type were **much more** likely to say that their farm was very prone to pasture damage or pugging (44% compared to 24% for all).
- Farmers who had gley soil as their main soil type were **much less** likely to say that their farm was not very prone to pasture damage or pugging (11% compared to 32% for all).

[13] To help us analyse your answers, overall how prone would you say your farm is to pasture damage or pugging in winter? Is it…

- Farmers who had pumice soil as their main soil type were **much more** likely to say that their farm was not very prone to pasture damage or pugging (62% compared to 32%).
- Farmers who had pumice soil as their main soil type were **more** likely to say that their farm was not at all prone to pasture damage or pugging (11% compared to 3% for all).

**Demographic variation**

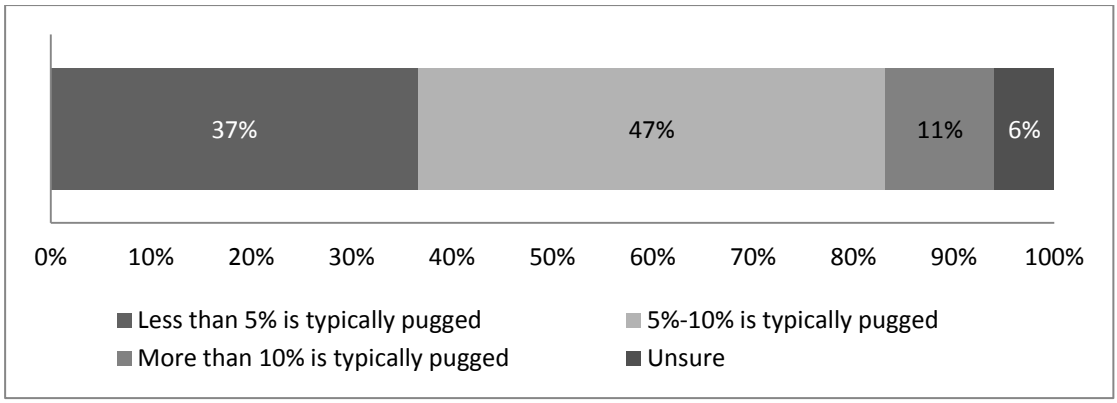
- There were no notable differences across the demographic groupings.

# 5.2 Proportion of farm pugged

Farmers who said that their farm was prone to pugging were asked to specify the proportion of their farm that was pugged in a typical winter.

Overall, 37% of farmers who said that their farm was prone to pugging said that less than 5% of their farm was pugged in a typical winter; 47% said that between 5% and 10% was pugged; 11% said that more than 10% was pugged; and, 6% said they were unsure as to the proportion pugged in a typical winter.

**Figure 9 What proportion of your farm would you say is pugged in a typical winter?**




Base: Farmers who said their farm was very prone, prone or not very prone to pugging, n=380.

**Herd size, farm size, and stocking rate variation**

- Farmers with a herd size of 500 or more cows were **more** likely to say that less than 5% of their farm was typically pugged (49% compared to 37% for all)
- Farmers with a farm size of 201 or more hectares were **more** likely to say that less than 5% of their farm was typically pugged (56% compared to 37% for all).

**Geographic and soil type variation**

- Farmers with gley as their main soil type were **more** likely to say that more than 10% of their farm was typically pugged (18% compared to 11% for all).
- Farmers with pumice as their main soil type wer **much more** likely to say that less than 5% of their farm was typically pugged (59% compared to 37% for all).

**Demographic variation**

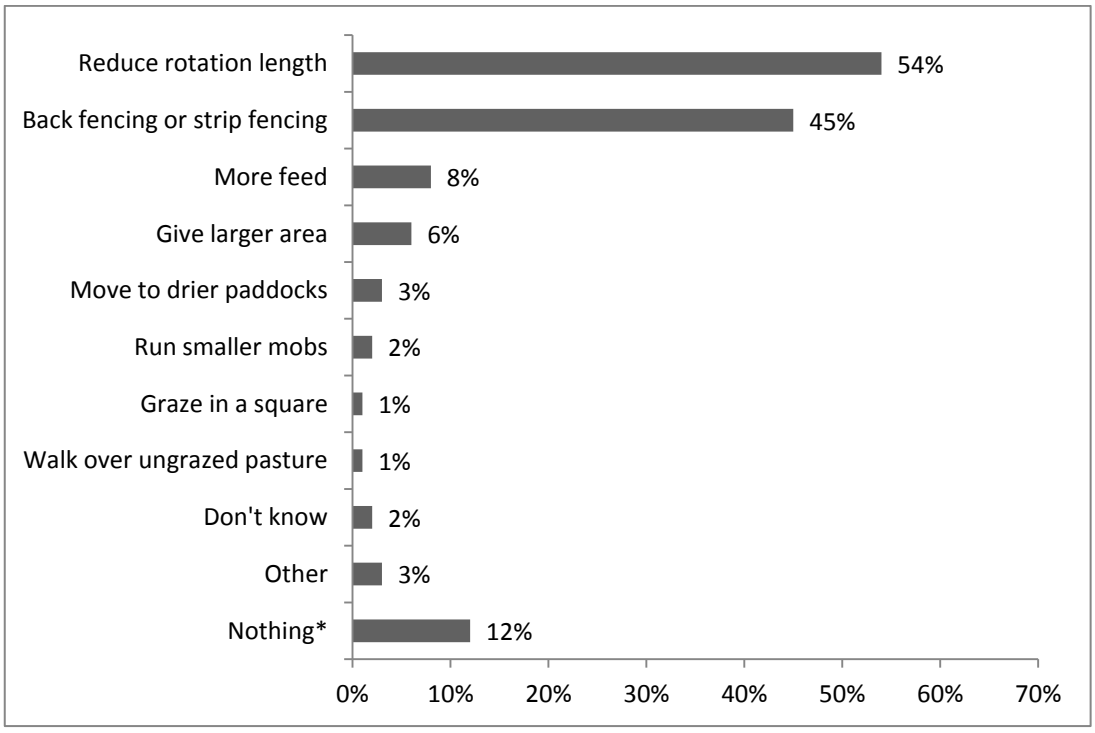
- Females were **more** likely to say they were unsure as to what proportion of their farm was typically pugged (13% compared to 6% for all).

## 5.3 Prevention strategies used in-paddock

Farmers were asked what they did to prevent pasture damage or pugging during winter when cows were **grazing in paddocks**.

The most popular strategies to prevent pasture damage / pugging while cows were grazing in paddocks were: reducing rotation length (54%) and back fencing / strip fencing (45%).

**Figure 10 Pugging prevention strategies used in-paddock**[14]




Base: Farmers who said that their farm is was very prone, prone, or not prone to pugging (excludes farmers who said not at all prone to pugging), n=380

**Herd size, farm size, and stocking rate variation**

- Farmers with a herd size of 301-400 cows were **less** likely to say they feed out more to prevent pasture damage or pugging (2% compared to 8% for all).
- Farmers with a farm size of 51-100 hectares were **more** likely to say they back or strip fence to prevent pasture damage or pugging (51% compared to 45% for all).
- Farmers with a farm size of 201 or more hectares were **more** likely to say they give their herd a larger area to prevent pasture damage or pugging (14% compared to 6% for all).
- Farmers with a stocking rate of 3.5 or more cows per hectare were **more** likely to say they feed out more to prevent pasture damage or pugging (15% compared to 8% for all).

**Geographic and soil type variation**

[14] For the part of the milking herd that you don't stand off in winter or for when you do graze on paddocks in winter, what do you typically do to prevent pasture damage or pugging, do you...?
* Of the 12% (n=47) of farmers who said that they do nothing to prevent pugging while cows graze in paddocks, 96% (n=45) stand off to prevent pugging and pasture damage. This suggests they may be removing cows from paddocks as a means to prevent pugging thereby obviating the need for back fencing for example.

- There were no notable differences across the geographic and soil type groupings.

**Demographic variation**

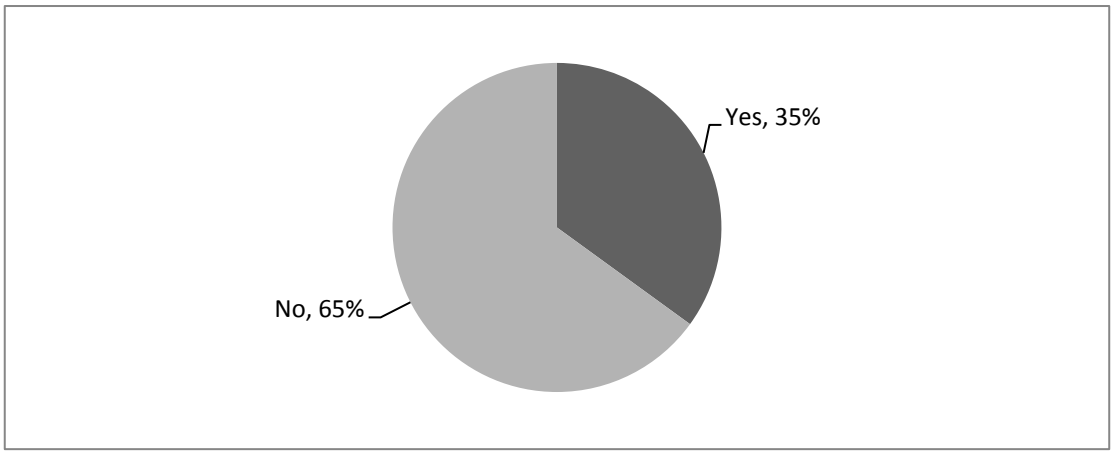
- Owners (with sharemilkers or managers) were **more** likely to say they don't know what is done to prevent pasture damage or pugging (7% compared to 2% for all).
- Sharemilkers were **more** likely to say they do something else („other') to prevent pasture damage or pugging (8% compared to 3% for all).

# 6 Wintering off

## 6.1 Proportion of farmers who winter off

Farmers were asked whether they winter off some, or all, of their herd over the winter months. Overall, just over a third (35%) winter off some, or all, of their herd, while under two thirds (65%) did not winter off their herd.

**Figure 11 Proportion of farmers who winter off their cows15**




Base: All farmers surveyed, n=401

**Herd size, farm size, and stocking rate variation**

- Farmers with small dairy farms (<50 hectares) were **more** likely to say they did **not** winter off their herd (87% compared to 65% for all).
- Farmers with a herd size of 100-200 cows were **much more** likely to say they that did **not** winter off their herd (81% compared to 65% for all).
- Farmers with a stocking rate of less than 2.49 cows per hectare were **more** likely to say they did **not** winter off their herd (75% compared to 65% for all).
- Farmers with very large dairy farms (201 or more hectares) were **more** likely to say they did winter off their herd (54% compared to 35% for all).
- Farmers with a herd size of 501 or more cows were **much more** likely to say they did winter off their herd (56% compared to 35% for all).
- Farmers with a stocking rate of 3.0-3.49 cows per hectare were **more** likely to say they did winter off their herd (44% compared to 35% for all).

**Geographic and soil type variation**

- Farmers in the Matamata-Piako District were **much more** likely to say they did not winter off their herd (76% compared to 65% for all).

**Demographic variation**

- Owner-operators were **more** likely to say they winter off their herd (52% compared to 35%) for all.

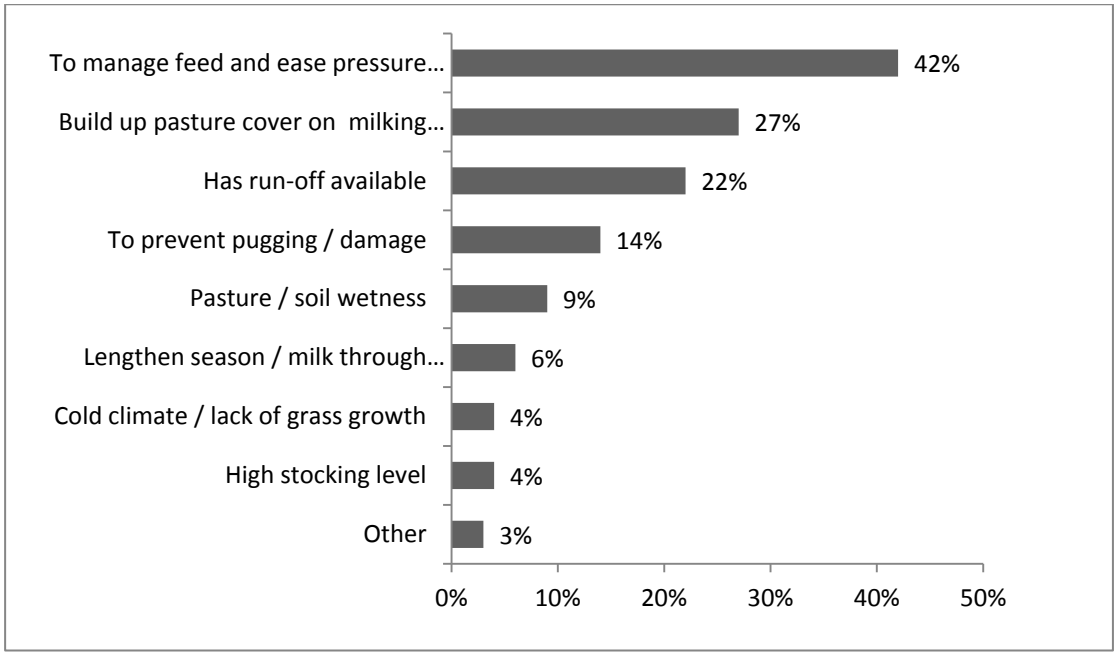
## 6.2 Reasons for wintering off

Farmers who said they winter off some or all of their herd (35%) were asked to specify why this was the case.

[15] Thinking about your usual practice, do you typically WINTER off or GRAZE off some or all of your MILKING herd from the milking platform in winter? That is, do you move a proportion of your milking herd to a grazing block, whether owned or leased, or to a contract grazer over the winter months?

The highest proportion of farmers, 42% said they winter off in order to manage feed and ease pressure of the home farm pasture. Some 27% said they winter off to build up pasture cover on the milking platform; 22% said they had a run-off available and this made wintering off easier; 14% said they winter off to prevent pugging / pasture damage; 9% said they winter off due to pasture / soil wetness; 6% said they winter off so they can winter-milk the cows remaining (that is, enough pasture for remaining herd); 4% said they winter off as the climate is too cold for sufficient pasture growth; 4% said they winter off as they have a high stocking rate; and, 3% gave other reasons as to why they winter off their herd.

**Figure 12 Reasons for wintering off[16]**




Base: Farmers who winter off some or all of their herd, n=140

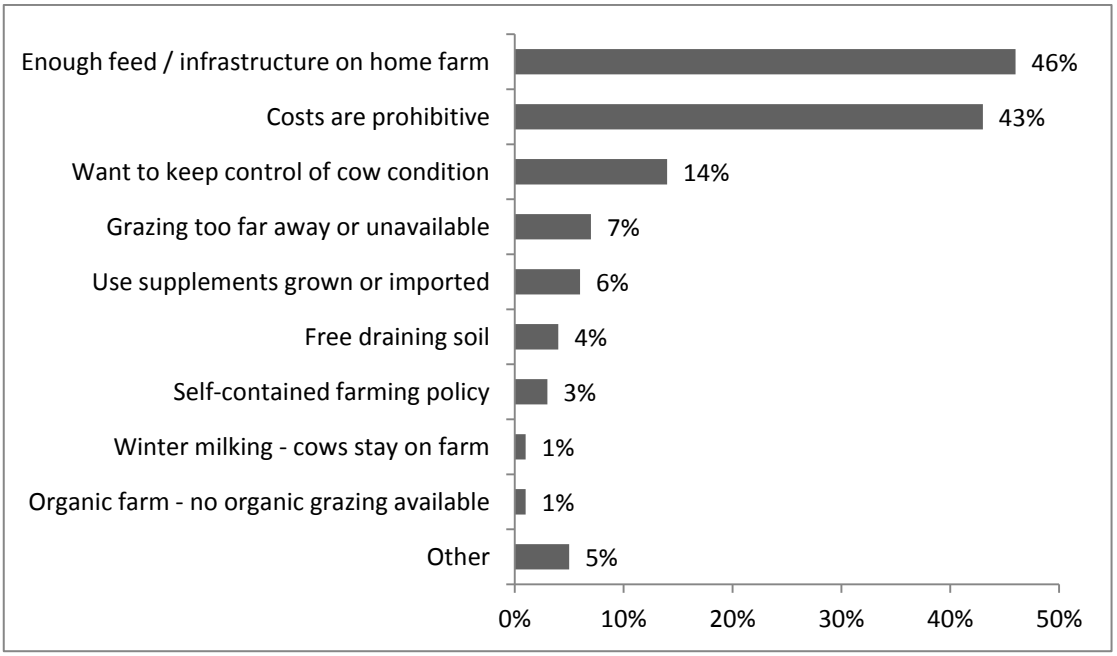
[16] Why do you winter off your milking herd? Please be as specific as you can and provide examples where possible.

## 6.3 Reasons for not wintering off

Farmers who said they did **not** winter off their herd (65%) were asked why they did not winter off their herd.

The highest proportion of farmers, 46% said they had enough feed or had infrastructure on their home farm to carry their herd over winter. Some 43% said that the costs of wintering off made it prohibitive; 14% said they preferred to keep control of cow condition; 7% said that grazing was not available nearby; 6% said they used supplements rather than winter off; 4% said they had free draining soil; 3% said that they had a self-contained farm policy; 1% said they keep the herd on the farm as they winter-milk; 1% were organic farmers needing organic grazing options which were not easily available; and 5% gave other reasons for not wintering off.

**Figure 13 Reasons for *not* wintering off**[17]




Base: Farmers who do not winter off their herd, n=261

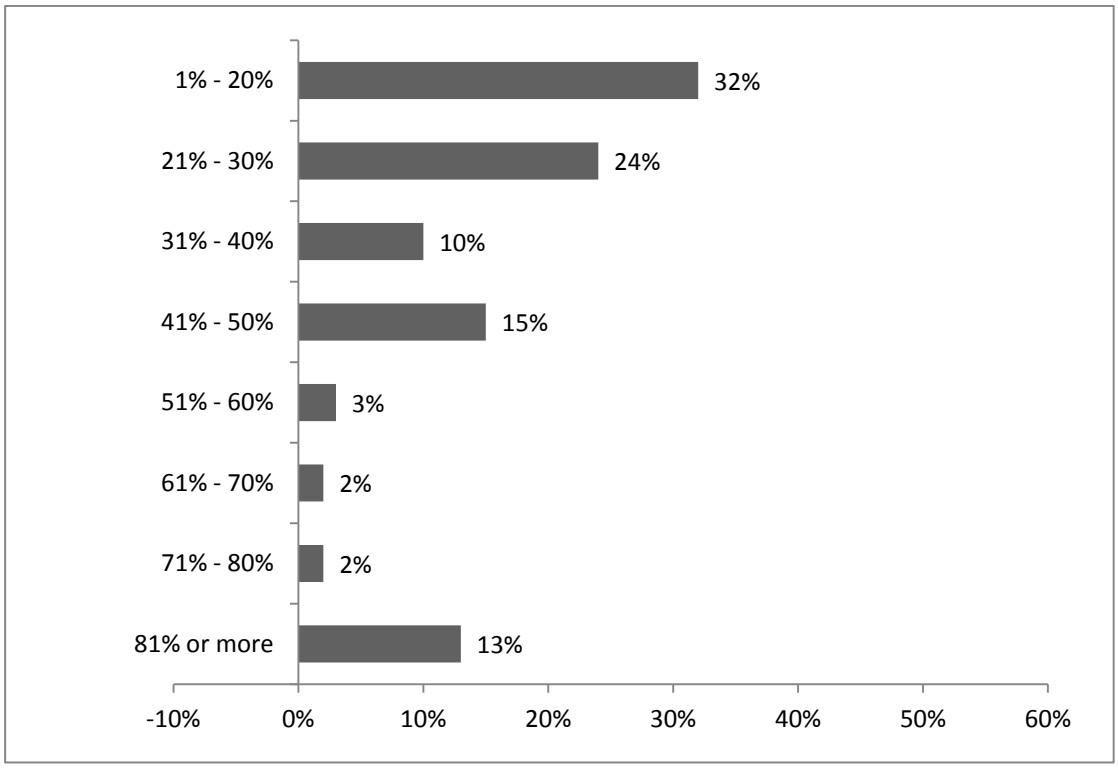
[17] Why do you not winter off your milking herd? Please be as specific as possible and provide examples.

# 6.4 Proportion of herd wintered off

Farmers who indicated they winter off their herd were asked what proportion of their herd they typically winter off[18].

Just over half (56%) of farmers who winter off their herd, winter off 30% or less of their herd; a further quarter (25%) winter off between 31 and 50% of their herd; and, 20% winter off more than half of their herd.

**Figure 14 Proportion of milking herd wintered off**




Base: Farmers who winter off their herd, n= 140

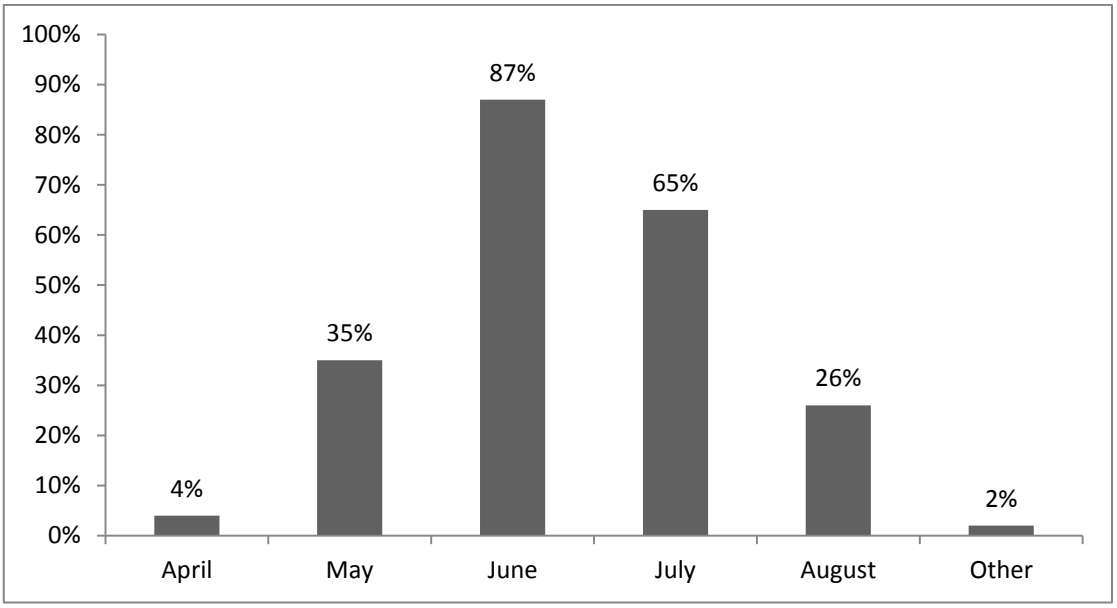
[18] What proportion of your milking herd do you typically winter off?

# 6.5 Months wintered off

Farmers who winter off some, or all, of their herd were asked to specify the months they winter off their herd.

The highest proportion of farmers, 87% winter off their herd in June; this was followed by 65% who winter off in July; 35 percent who winter off in May; 26% who winter off in August; 4% who winter off in April; and 2% who winter off in another month.

**Figure 15 Months wintered off**[19]




Base: Farmers who winter off their herd, n= 140

**Herd size, farm size, and stocking rate variation**

- Farmers with a farm size of 101 to 200 hectares were **much more** likely to say they winter off their herd in May (47% compared to 35% for all).
- Farmers with a stocking rate of 2.5-2.99 cows per hectare were **less** likely to say they winter off their herd in July (51% compared to 65% for all).

**Geographic and soil type variation**

- There were no notable differences across the geographic and soil type groupings.

**Demographic variation**

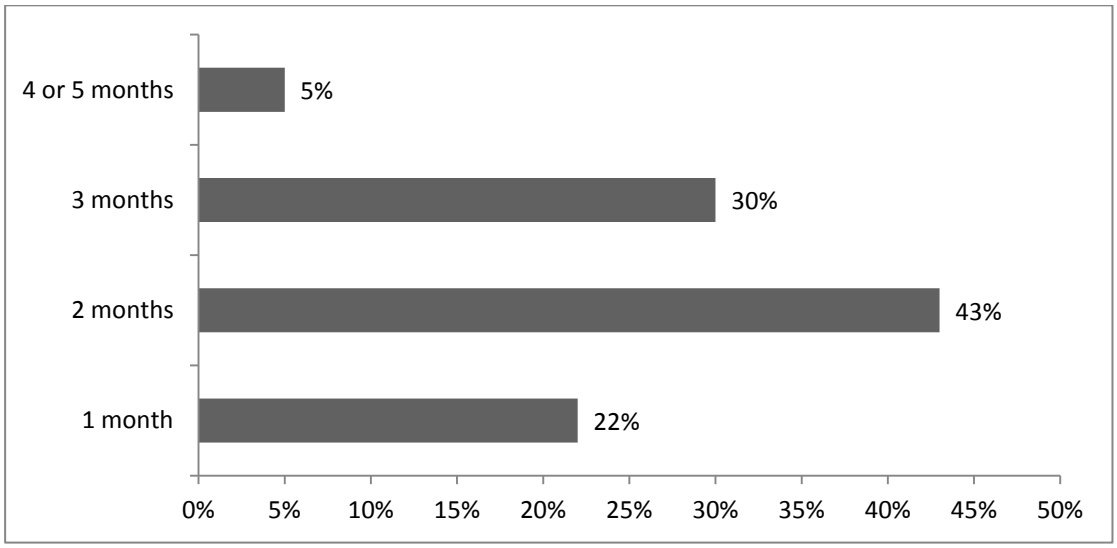
- There were no notable differences across the demographic groupings.

[19] Which months over winter do you send your cows away when you winter them off?

# 6.6 Number of months wintered off

Just under half (43%) who winter off their herd do so for two months; just under a third (30%) winter off their herd for three months; just under one quarter (22%) winter off their herd for one month; and, a small proportion (5%) winter off their herd for four or five months.

**Figure 16 Number of months wintered off**[20]




Base: Farmers who winter off their herd, n= 140

**Herd size, farm size, and stocking rate variation**

- There were no notable differences across farm size, herd size and stocking rate groupings.

**Geographic and soil type variation**

- Farmers with gley as their main soil type were **less** likely to say they winter off their herd for two months (27% compared to 43% for all).

**Demographic variation**

- There were no notable differences across the demographic groupings.

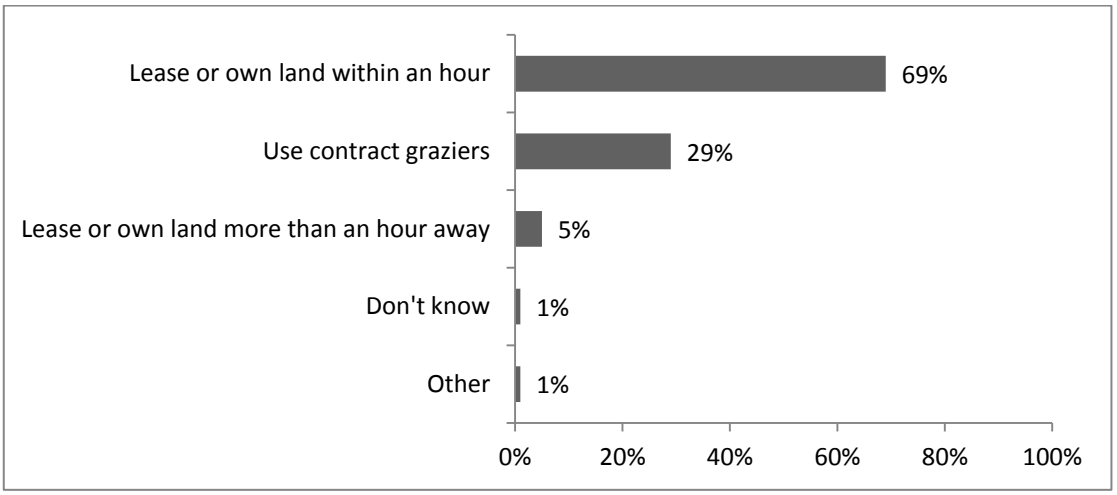
[20] Which months over winter do you send your cows away when you winter them off?

# 6.7 Typical arrangement for wintering off cows

Farmers who winter off some, or all, of their herd were asked to specify the typical arrangement they have for wintering off their herd.

The highest proportion, 69% leased or owned land within an hour of their farm; 29% used contract graziers; 5% leased or owned land more than an hour away from their farm[21]; and a small proportion (2%) had some other arrangement or were not sure as to what their arrangement was.

**Figure 17 Arrangement for wintering off cows[22]**




Base: Farmers who winter off their herd, n= 140

**Herd size, farm size, and stocking rate variation**

- There were no notable differences across the farm size, herd size and stocking rate groupings.

**Geographic and soil type variation**

- There were no notable differences across the geographic and soil type groupings.

**Demographic variation**

- There were no notable differences across the demographic groupings.

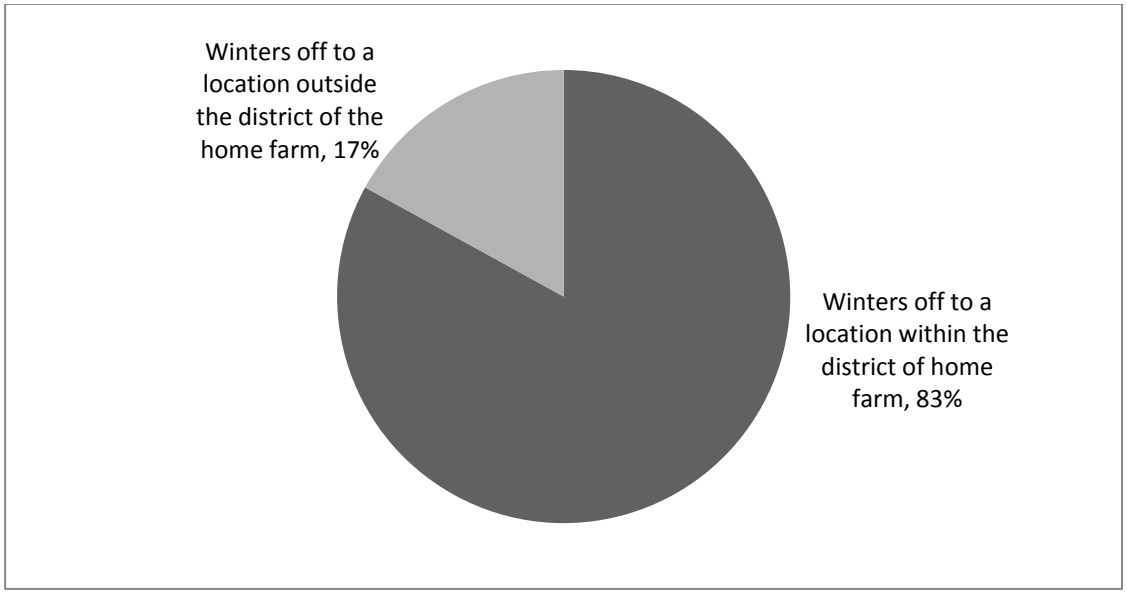
[21] Refer to Appendix 4 to see the locations of land leased / owned
[22] What arrangement do you typically have to winter off your cows, do you...

# 6.8 Location of contract grazier used for wintering off

Farmers who said they winter off some, or all, of their herd in winter and who said that their typical arrangement for wintering off their herd was the use of a contract grazier, were asked to specify the name of the town closest to where they send their herd for the contract grazier[23].

Some 83% of farmers who winter off their herd and who used a contract grazier have their herd sent to a contract grazier that is in the same district as the home farm.

**Figure 18 Wintering off location within district of home farm**




Base: Farmers who winter off some, or all, of their herd and who typically used a contract grazier, n=40.

[23] What is the closest town to where you send your cows for the contract grazier?

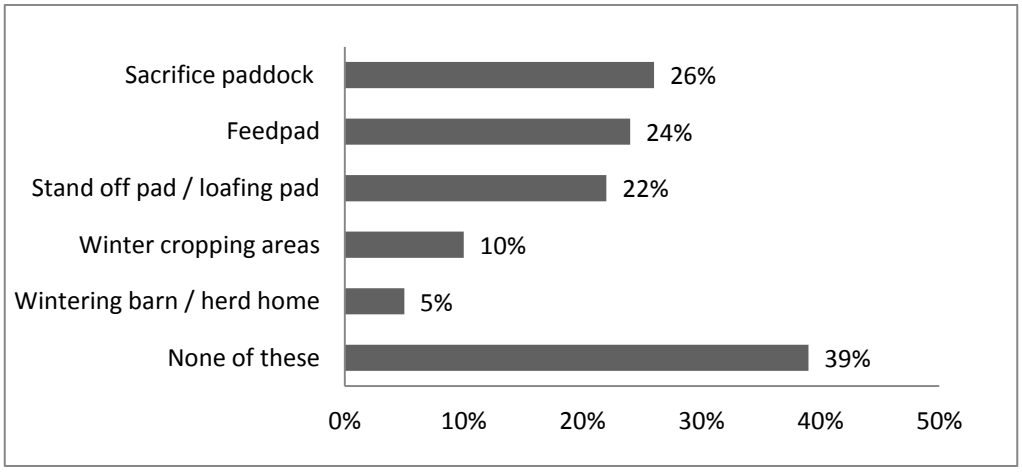
# 7 Infrastructure on-farm

## 7.1 Proportion of farmers with different types of infrastructure

Farmers were asked to specify whether they had the following on their farm:
a feedpad, a stand off or loafing pad, a sacrifice paddock, a wintering barn or herd home, or winter cropping areas.

Overall, 26% of farmers had a sacrifice paddock; 24% had a feedpad[24]; 22% had a stand off pad; 10% had winter cropping areas; 5% had a wintering barn / herd home; and 39% had none of these.

**Figure 19 Which of the following do you currently have on your farm?**




Base: All farmers surveyed, n=401

### 7.1.1 Notable differences: Sacrifice paddock

**Herd size, farm size and stocking rate variation**

- There were no notable differences for the herd size, farm size and stocking rate groupings.

**Geographic and soil type variation**

- Farmers in the South Waikato District were **less** likely to say they had a sacrifice paddock for standing off their herd (11% compared to 26% for all).
- Farmers in the Waikato District were **much more** likely to say they had a sacrifice paddock for standing off their herd (38% compared to 26% for all).

**Demographic variation**

- There were no notable differences for the demographic groupings.

### 7.1.2 Notable differences: Feedpad

**Herd size, farm size, and stocking rate variation**

- Farmers with a herd size of 100-200 cows were **less** likely to say they had a feedpad (15% compared to 24% for all).
- Farmers with a herd size of 200-300 cows were **less** likely to say they had a feedpad (16% compared to 24% for all).

[24] A DairyNZ survey in 2009 found 19% of dairy farmers in the region had feedpads (Tarbotton, pers.comm 2009 in DOCS 1505953).

- Farmers with a herd size of 500 or more cows were **much more** likely to say they had a feedpad (47% compared to 24% for all).
- Farmers with a farm size of 51-100 hectares were **much less** likely to say they had a feedpad (17% compared to 24% for all).
- Farmers with a farm size of 101-200 hectares were **more** likely to say they had a feedpad (29% compared to 24% for all).
- Farmers with a farm size of 201 or more hectares were **more** likely to say they had a feedpad (38% compared to 24% for all).
- Farmers with a stocking rate 2.5 cows or less per hectare were **much less** likely to say they had a feedpad (12% compared to 24% for all).
- Farmers with a stocking rate of 2.5-2.99 cows per hectare were **less** likely to say they had a feedpad (17% compared to 24% for all).
- Farmers with a stocking rate of 3.5 or more cows per hectare were **much more** likely to say they had a feedpad (53% compared to 24% for all).

**Geographic and soil type variation**

- There were no notable differences across the geographic, soil type and annual rainfall groupings.

**Demographic variation**

- There were no notable differences across the demographic groupings.

### 7.1.3 Notable differences: Stand off pad / loafing pad

**Herd size, farm size, and stocking rate variation**

- Farmers with a farm size of less than 50 hectares were **less** likely to say they had a purpose built stand off pad (3% compared to 22% for all).

**Geographic and soil type variation**

- Farmers in the Hauraki District were **much more** likely to say they had a purpose built stand off pad (43% compared to 22% for all).
- Farmers who had gley soil as their main soil type were **much more** likely to say they had a purpose built stand off pad (48% compared to 22% for all).
- Farmers who had organic soil as their main soil type were **less** likely to say they had a purpose built stand off pad (9% compared to 22% for all).
- Farmers who had pumice soil as their main soil type were **less** likely to say they had a purpose built stand off pad (5% compared to 22% for all).

**Demographic variation**

- There were no notable differences across the demographic groupings.

### 7.1.4 Notable differences: Winter cropping areas

**Herd size, farm size, and stocking rate variation**

- Farmers with a herd size of 201-300 cows were **less** likely to say they had winter cropping areas (4% compared to 10% for all).
- Farmers with a herd size of more than 500 cows were **much more** likely to say they had winter cropping areas (19% compared to 10% for all).
- Farmers with a farm size of 51-100 hectares were **less likely** to say that they had winter cropping areas (7% compared to 10% for all).
- Farmers with a farm size of 201 or more hectares were **much more** likely to say that they had winter cropping areas (24% compared to 10% for all).

**Geographic and soil type variation**

- Farmers who had organic soil as their main soil type were **more** likely to say they had winter cropping areas (18% compared to 10% for all).
- Farmers who had pumice soil as their main soil type were **much more** likely to say they had winter cropping areas (27% compared to 10% for all).

**Demographic variation**

- There were no notable differences across the demographic groupings.

### 7.1.5 Notable differences: Wintering barn / herd home

**Herd size, farm size, and stocking rate variation**

- There were no notable differences across the herd size, farm size and stocking rate groupings.

**Geographic and soil type variation**

- There were no notable differences across the geographic and soil type groupings.

**Demographic variation**

- There were no notable differences across the demographic groupings.

### 7.1.6 Notable differences: 'None of these'

**Herd size, farm size, and stocking rate variation**

- Farmers with a stocking rate of 2.5-2.99 cows per hectare were **more** likely to say they had „none of these' (47% compared to 39% for all).
- Farmers with a stocking rate of 3.5 cows or more per hectare were **much less** likely to say they had „none of these' (20% compared to 39% for all).

**Geographic and soil type variation**

- Farmers who had gley soil as their main soil type were **much less** likely to say they had „none of these' (27% compared to 39% for all).

**Demographic variation**

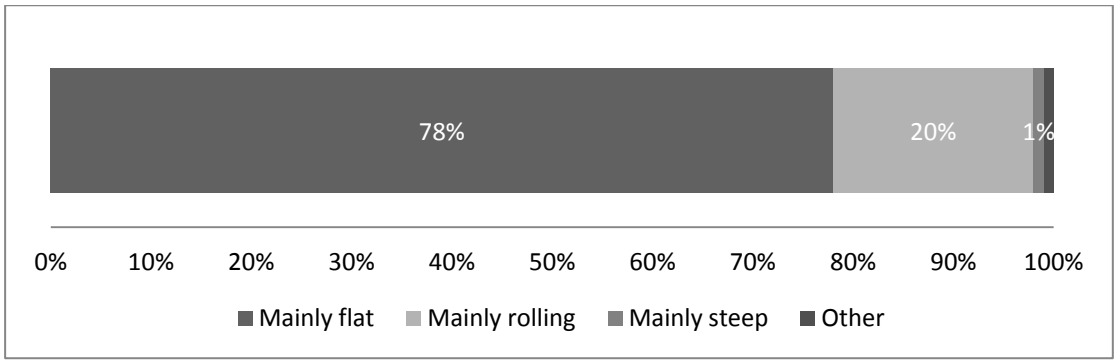
- There were no notable differences across the demographic groupings

# 7.2 Sacrifice paddocks

## 7.2.1 Sacrifice paddock contour

Farmers who said that they had a sacrifice paddock (26% of farmers overall) were asked to specify the contour of their sacrifice paddock. The highest proportion, 78% said that the contour was mainly flat; 20% said mainly rolling; 1% said mainly steep; and, 1% said that the contour was mixed.

**Figure 20 Contour of sacrifice paddock[25]**




Base: Farmers who had a sacrifice paddock, n=103

**Herd size, farm size, and stocking rate variation**

- There were no notable differences across the farm size, herd size and stocking rate groupings.

**Geographic and soil type variation**

- There were no notable differences across the geographic and soil type groupings.

**Demographic variation**

- There were no notable differences across the demographic groupings.

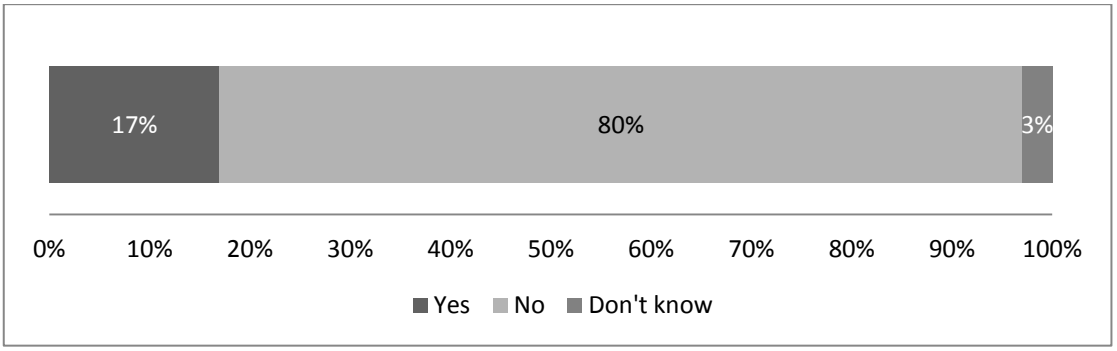
[25] Thinking about your sacrifice paddock, is its contour...

### 7.2.2 Sacrifice paddocks used each winter

Farmers who had a sacrifice paddock were asked whether or not they used the same sacrifice paddock(s) each winter[26].

The majority, 80% said they did **not** sacrifice the same paddock(s) each winter, 17% said they did and 3% said they were unsure.

**Figure 21 Same paddocks sacrificed each winter**




Base: Farmers who had a sacrifice paddock, n=103

**Herd size, farm size, and stocking rate variation**

- Farmers with a farm size of 51-100 hectares were **more** likely to say they used the same sacrifice paddock each year (26% compared to 17% for all).

**Geographic and soil type variation**

- Farmers who had allophanic soil as their main soil type were **more** likely to say they used the same sacrifice paddock each winter (27% compared to 17% for all).

**Demographic variation**

- There were no notable differences across the demographic groupings.

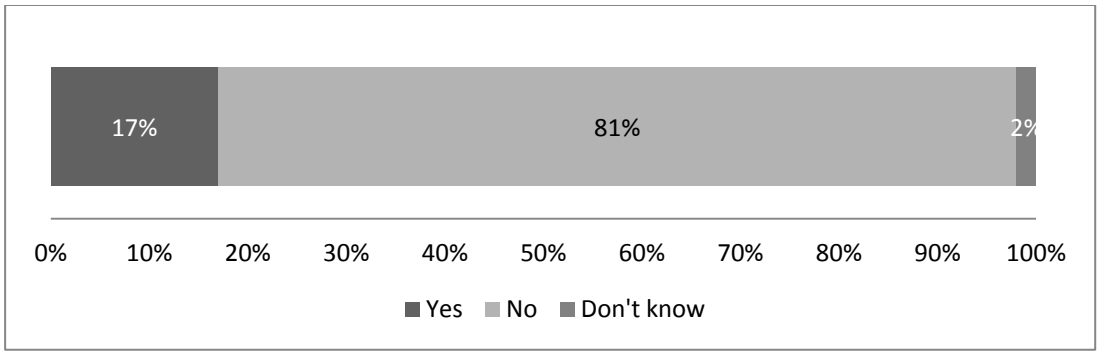
[26] Do you sacrifice the same paddocks each winter?

### 7.2.3 Sacrifice paddock bordering a waterway or drain

Farmers who had a sacrifice paddock were asked whether or not their sacrifice paddock typically bordered a waterway or drain[27].

The majority, 81% said that their sacrifice paddock did **not** typically border a waterway or drain, 17% said that their sacrifice paddock typically did and 2% said they were unsure.

**Figure 22 Sacrifice paddock bordering a waterway or drain[28]**



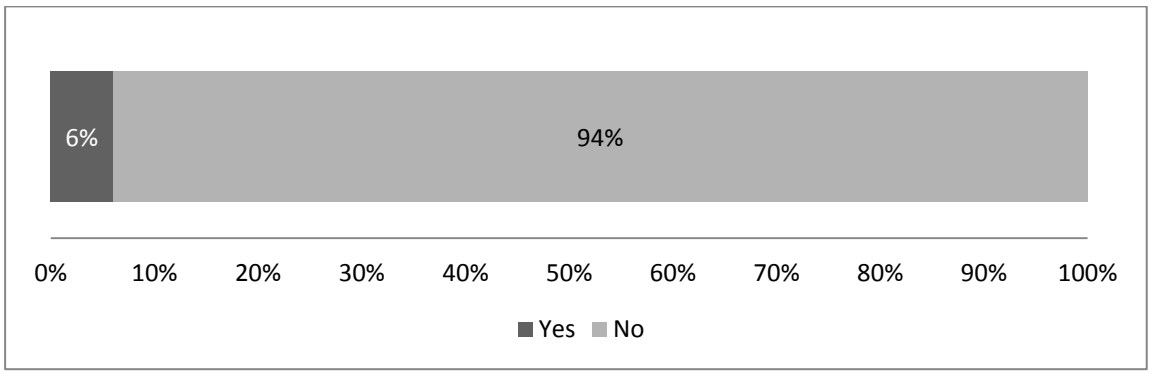

Base: Farmers who had a sacrifice paddock, n=103

### 7.2.4 Same sacrifice paddock used each year and bordering a waterway or drain

Further analysis was conducted to identify the proportion of farmers who used the same sacrifice paddock(s) each winter **and** where the sacrifice paddock(s) bordered a waterway or drain.

Overall, 6% of farmers who had a sacrifice paddock used the same sacrifice paddock each year and the sacrifice paddock bordered a waterway or drain.

**Figure 23 Uses the same sacrifice paddock each year and it borders a waterway or drain**




Base: Farmers who had a sacrifice paddock, n=103

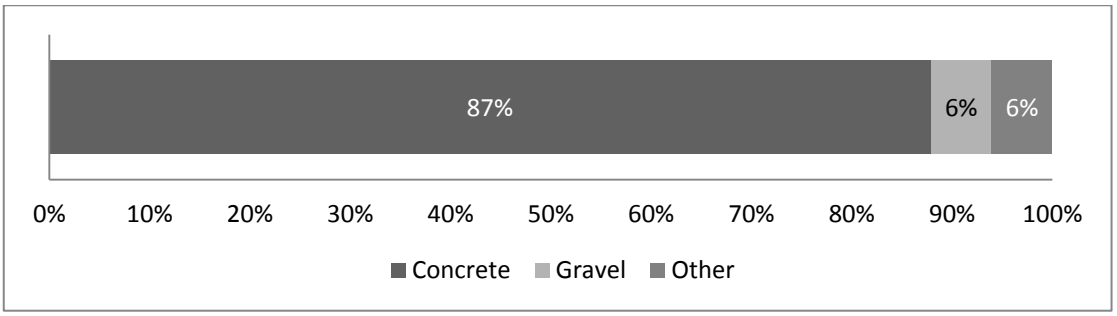
[27] Does the sacrifice paddock typically boarder a waterway or drain?
[28] Base sizes for the various sub-groups are too small (n=<30) to reliably test for significant differences.

# 7.3 Feedpads

## 7.3.1 Feedpad construction

Farmers who said that they had a feedpad (24% of farmers overall) were asked to specify what their feedpad was made from. The highest proportion, 87% said their feedpad was made from concrete, 6% said from gravel, and 6% said from something other than concrete and gravel.

**Figure 24 Feedpad constructed from**




Base: Farmers who had a feedpad, n=95

**Other (recorded verbatim):**

- *Brown rock*
- *Clay*
- *Metal based, like a stone*
- *Metal with a lime base rock over it*
- *Lime rock*
- *Saw dust*

**Herd size, farm size, and stocking rate variation**

- There were no notable differences across the farm size, herd size and stocking rate groupings.

**Geographic and soil type variation**

- There were no notable differences across the geographic and soil type groupings.

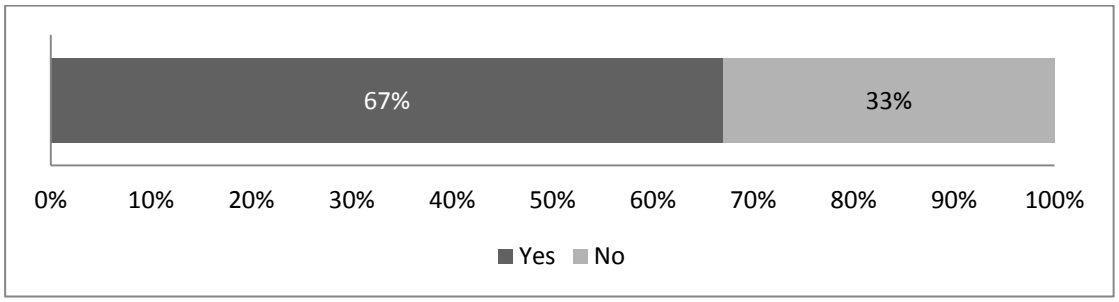
**Demographic variation**

- There were no notable differences across the demographic groupings.

### 7.3.2 Non-concrete feedpad sealed

The 12 farmers who said their feedpad was made from a material other than concrete were asked to specify whether or not their feedpad was sealed[29]. The highest proportion, 67% said their feedpad was sealed, while 33% said that it was not.

**Figure 25 Feedpad sealed**

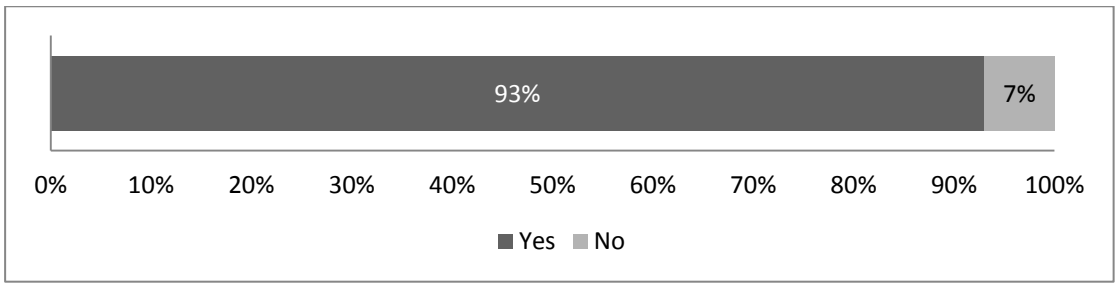



Base: Farmers who had a non-concrete feedpad, n=12

### 7.3.3 Feedpad nib

Farmers who said they had a feedpad were asked whether their feedpad had a nib for containing effluent. Nearly all (93%) said that their feedpad had a nib, while 7% said that it did not.

**Figure 26 Feedpad nib**




Base: Farmers who had a feedpad, n=95

**Herd size, farm size, and stocking rate variation**

- Farmers with a farm size of 51-100 hectares were **more** likely say that their feedpad did not have a nib (17% compared to 7% for all).

**Geographic and soil type variation**

- There were no notable differences across the geographic and soil type groupings.

**Demographic variation**

- There were no notable differences across the demographic groupings.

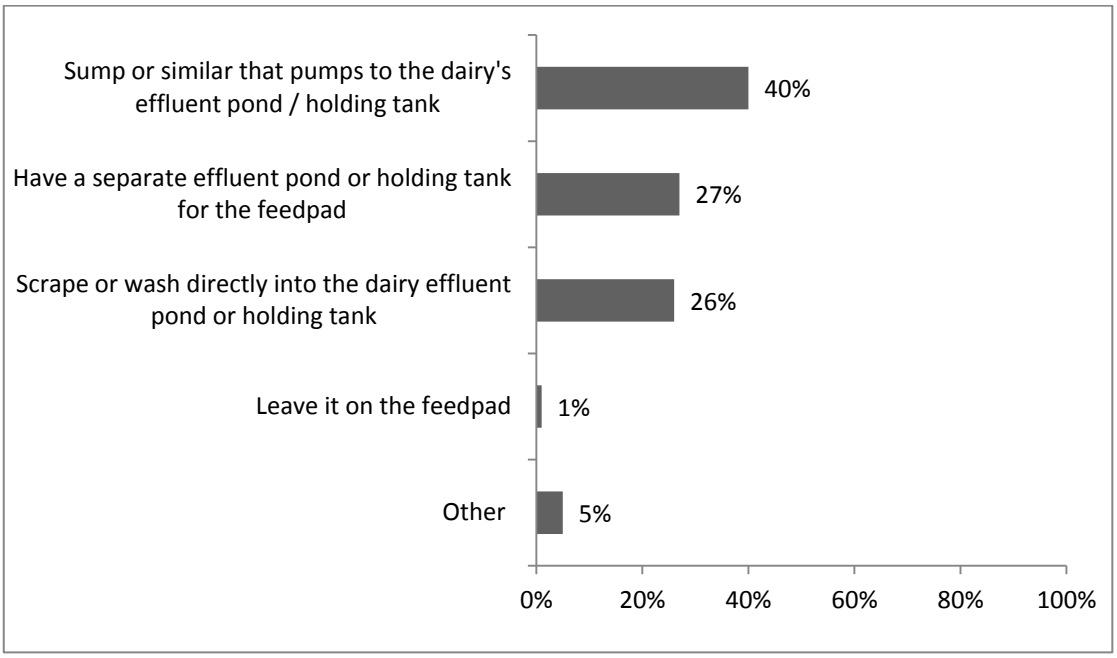
29 Is your feedpad sealed? Farmers who have a feedpad made from a material other than concrete and who use their feedpad for standing off their herd in winter to manage wet soils, n=12.

### 7.3.4 Feedpad effluent disposal

Farmers who said they had a feedpad were asked to specify how the effluent from their feedpad was captured[30].

The highest proportion, 40% said they had a sump that pumped to the dairy's effluent pond / holding tank; 27% said they scraped or washed it directly into the dairy's effluent pond or holding tank; 26% said they had a separate effluent pond or holding tank for the feedpad; 1% said they leave it on their feedpad; and, 5% said they had another system.

**Figure 27 Feedpad effluent capture[31]**




Base: Farmers who had a feedpad, n=95

**Other (recorded verbatim):**

- *Effluent is loaded into a muck spreader and spread onto the paddocks.*
- *Runs into a pump then irrigated over paddocks.*
- *Solids are separated and stored in a concrete bunker. The liquid is held in a lined pond.*
- *Spread onto paddocks eventually.*
- *The owners did not comply with the rules before they built the feedpad, so we do not use it.*

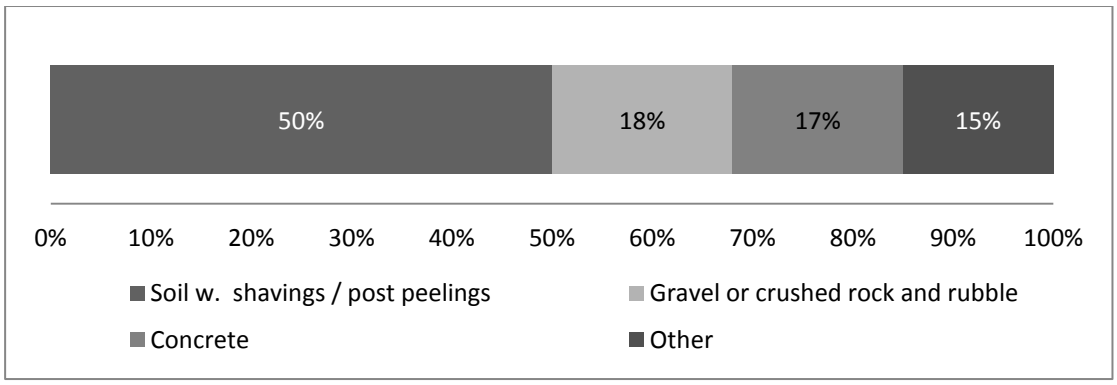
[30] What do you typically do with the effluent from your feedpad? Base: All farmers who said that they have a feedpad, n=95.
[31] Base sizes for the various sub-groups are too small (n=<30) to reliably test for significant differences.

# 7.4 Stand off pads

## 7.4.1 Stand off pad construction

Farmers who said that they had a stand off pad (22% of farmers overall) were asked to specify what their stand off pad was made from[32]. Some 50% said their stand off pad was made from soil with wood shavings / post peelings; 18% gravel or crushed rock and rubble; 17% concrete; and 15% from another material.

**Figure 28 Stand off pad construction[33]**




Base: Farmers who had a purpose built stand off pad, n=88

**Other (recorded verbatim):**

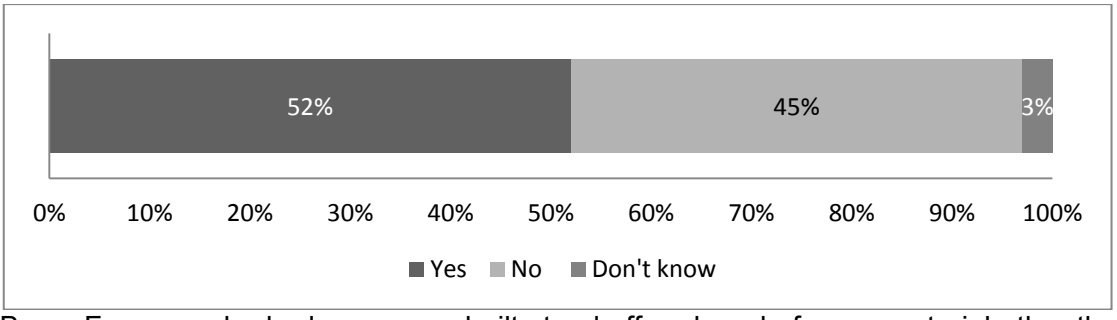
- *Clay base with natural wood chips. Very deep base: 500mm deep.*
- *Clay, then thick layer of gravel metal and sand on top.*
- *Post peel, no flow underneath, metal on top.*
- *Pumice x 3.*
- *Sand.*
- *Shavings out of the calf shed, it slowly builds up.*
- *Soil stripped back and put in drainage system of gravel and piping, post peel wood product as a surface at the top -300-400 mm thick.*
- *Soil and sand.*
- *Ryholite base with lime rock over the top.*
- *Woodchips.*

[32] Thinking about your stand off pad or loafing pad, what is your stand off of pad constructed from?
[33] Base sizes for the various sub-groups are too small (n=<30) to reliably test for significant differences.

## 7.4.2 Stand off pad sealed

Farmers who said they had a stand off pad made from any material **other** than concrete were asked whether their stand off pad was sealed. Just over half, 52% said that their stand off pad was sealed, 45% said their stand off pad was not sealed and 3% said they were unsure.

**Figure 29 Stand off pad sealed[34]**

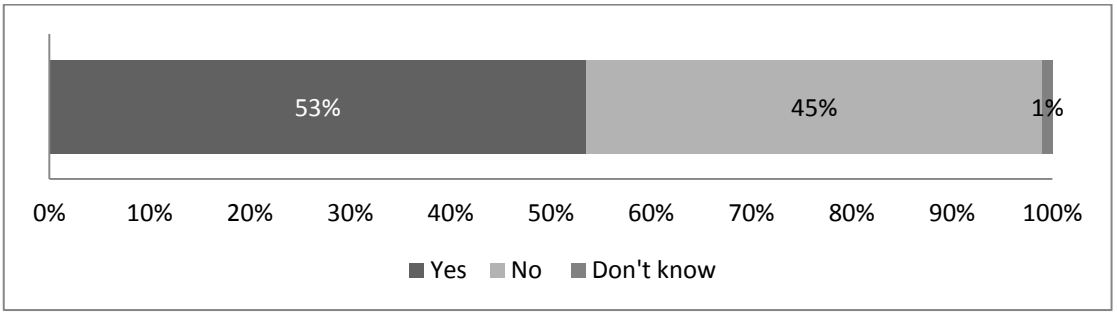



Base: Farmers who had a purpose built stand off pad made from a material other than concrete, n=73

## 7.4.3 Stand off pad nib

Farmers who said they had a stand off pad (22% of farmers overall) were asked whether their stand off pad had a nib for containing effluent. Just over half, 53% said that their stand off pad had a nib, 45% said that their stand off pad did not and 1% said they were unsure.

**Figure 30 Stand off pad nib[35]**

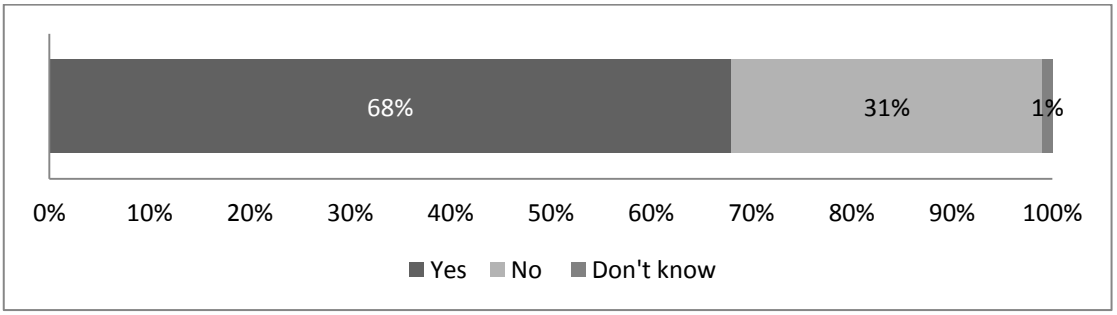



Base: Farmers who had a purpose built stand off pad, n=88

## 7.4.4 Stand off pad effluent captured

Farmers who said they had a stand off pad were asked whether they collected the effluent from it. Sixty-eight% said they collected the effluent, 31% said they did not and 1% said they were unsure.

**Figure 31 Stand off pad: effluent collected[36]**




Base: Farmers who had a purpose built stand off pad, n=88

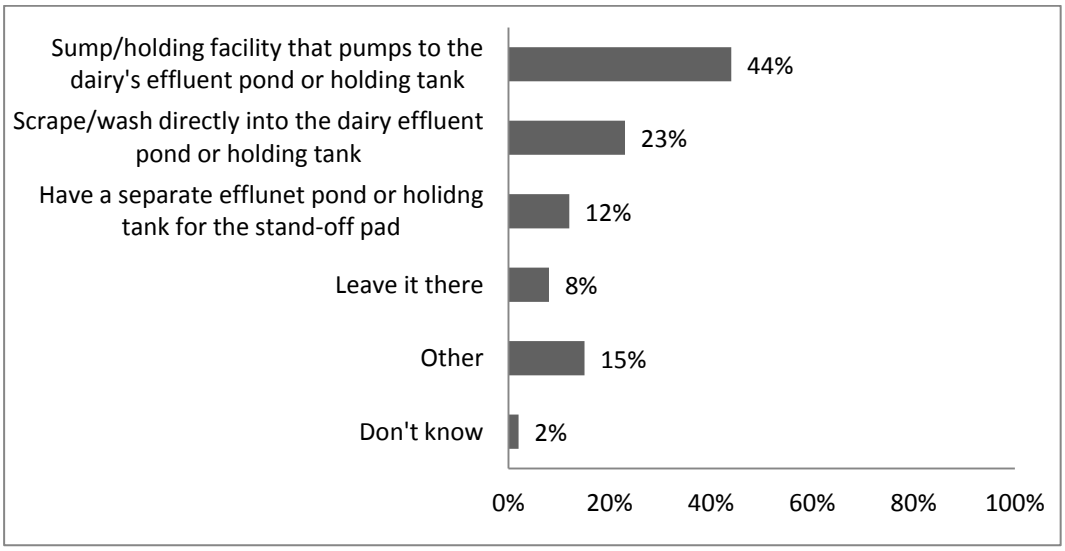
[34] Is your stand off pad sealed?
[35] Base sizes for the various sub-groups are too small (n=<30) to reliably test for significant differences.
[36] Base sizes for the various sub-groups are too small (n=<30) to reliably test for significant differences.

### 7.4.5 Stand off pad effluent disposal

Those farmers who collected effluent from the stand off pad were asked what they typically did with the effluent37.

Some 44% used a sump/holding facility that pumped to the dairy's effluent pond or holding tank; 23% scraped or washed the effluent directly into the effluent pond or holding tank; 12% had a separate effluent pond or holding tank; 8% leave it there; 15% do something else; and 2% said they were unsure.

**Figure 32 Stand off pad: effluent disposal[38]**




Base: Farmers who had a stand off pad from which effluent is collected, n=60

**Other (recorded verbatim)**

- *Soaked into ground, the cows aren't in the stand off pad long enough to do damage.*
- *Gets taken into a clay bunker, and gets pumped.*
- *Scraped each year and distributed around the farm.*
- *Leave on there, as soon as weather allows usually Oct/Nov, scrape up it up and mix with sand to fill paddock holes. 35 or so truck loads a year.*
- *Apply the post peeling directly onto maize paddocks.*
- *The wood chips topping is changed once a year and is spread on our maize paddock. The only crop we plough.*
- *Goes into a muck tank to be spread onto the paddocks.*
- *Reuse it.*
- *We leave it until it's dry then cart it off in summer; we then use it to spread out across the pastures.*

[37] What do you typically do with the effluent collected?
[38] Base sizes for the various sub-groups are too small (n=<30) to reliably test for significant differences.

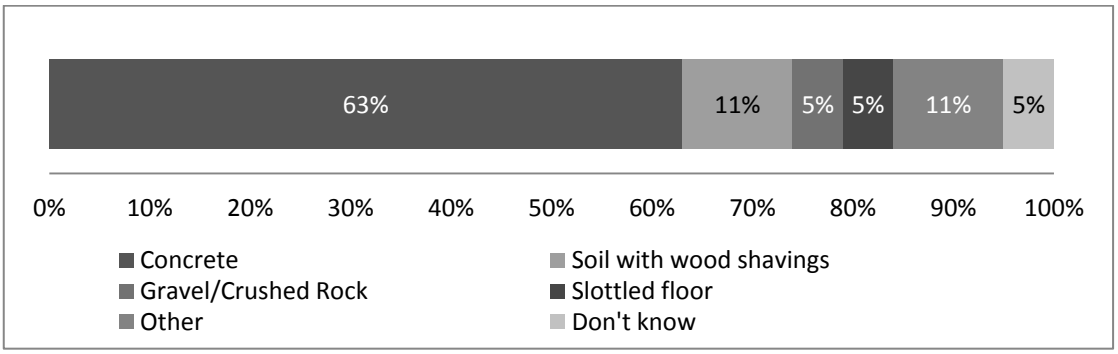
# 7.5 Wintering-barns

## 7.5.1 Wintering barn construction

Farmers who said they had a wintering barn (5% of farmers overall) were asked what the flooring of their wintering barn was made from39.

The highest proportion, 63% said that the flooring was made from concrete; 11% said soil with wood shavings or post peelings; 5% said gravel or crushed rock and rubble; 5% said they had a slotted floor; 11% said it was made from another material; and 5% said they were unsure.

**Figure 33 Wintering barn flooring construction[40]**




Base: Farmers who had a wintering barn or herd home, n=19

## 7.5.2 Wintering-barn flooring sealed

Farmers who said that the flooring of their wintering barn was made from something other than concrete (n=6) were asked whether the flooring of their wintering barn was sealed. All (100%) said that the flooring of their wintering barn was sealed.

[39] Thinking about your wintering barn or herd home, what is the flooring of your wintering barn or herd home made from? Is it...

[40] Base sizes for the various sub-groups are too small (n=<30) to reliably test for significant differences.

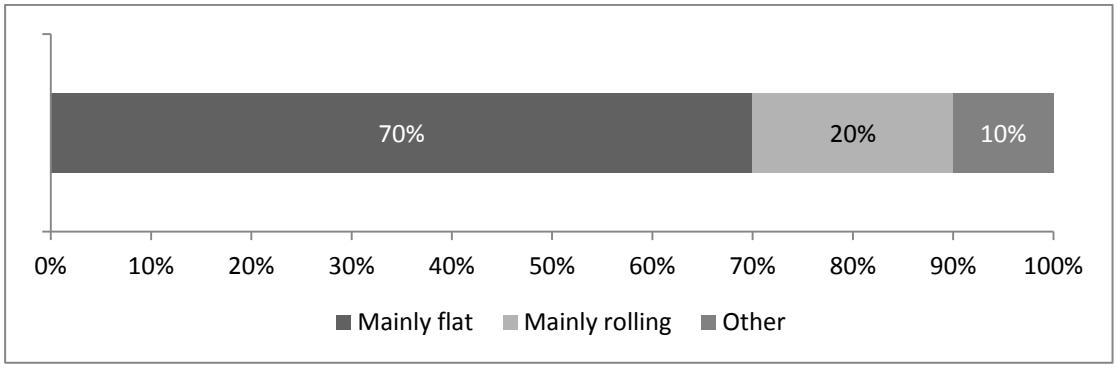
# 7.6 Winter cropping areas

## 7.6.1 Contour of winter cropping areas

Farmers who said they had a winter cropping area on their farm (10% of farmers overall) were asked to specify the contour of their winter cropping areas.

The highest proportion, 70% said that the contour of their winter cropping area was mainly flat; 20% said that the contour of their winter cropping areas was mainly rolling; and, 10% said that the contour of their winter cropping area was something else.

**Figure 34 Contour of winter cropping area**[41]




Base: Farmers who had winter cropping areas, n=40

**Other (recorded verbatim)**

- *Mixed.*
- *Flat to rolling*
- *Mixture.*
- *Half flat, half rolling*

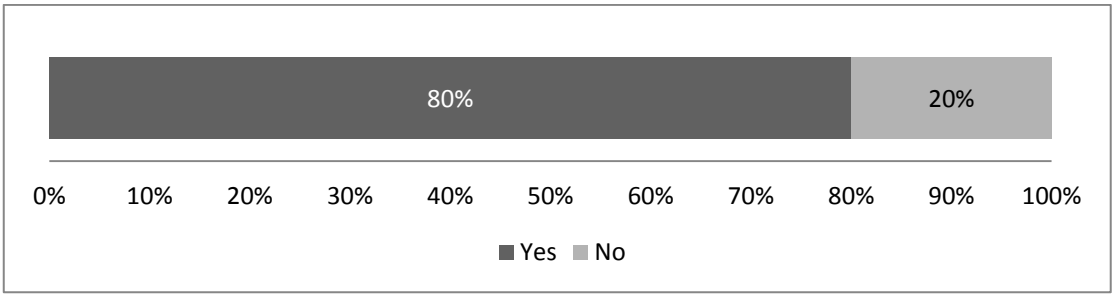
[41] Thinking about your winter cropping area, is its contour...

# 8 Standing off

## 8.1 Proportion of farmers who stand off to manage wet soils in winter

Farmers were asked whether or not they stand off some, or all, of their herd in winter to manage wet soils and pasture damage. The majority of farmers (80%) stand off their herd in winter to manage wet soils, while 20% did not.

**Figure 35 Proportion of farmers who stand off their herd over winter to manage wet soils[42]**




Base: All farmers surveyed, n=401

**Herd size, farm size, and stocking rate variation**

- Farmers with a herd size of 100-200 cows were **more** likely to say they did not stand off their herd during winter to manage wet soils or pasture damage (29% compared to 20% for all).
- Farmers with a stocking rate of less than 2.5 cows per hectare were **more** likely to say they did not stand off their herd during winter to manage wet soils or pasture damage (25% compared to 20% overall).

**Geographic and soil type variation**

- Farmers with gley soil as their main soil type were **much more** likely to say they stand off their herd during winter to manage wet soils or pasture damage (92% compared to 80% for all).
- Farmers with pumice soil as their main soil type were **much more** likely to say they did not stand off their herd during winter to manage wet soils or pasture damage (54% compared to 20% for all).
- Farmers in the Matamata-Piako District were **more** likely to say they stand off their herd during winter to manage wet soils or pasture damage (88% compared to 80% for all).
- Farmers in the South Waikato District were **much more** likely to say they did **not** stand off their herd during winter to manage wet soils or pasture damage (46% compared to 20% for all).

**Demographic variation**

- There were no notable differences across the demographic groupings.

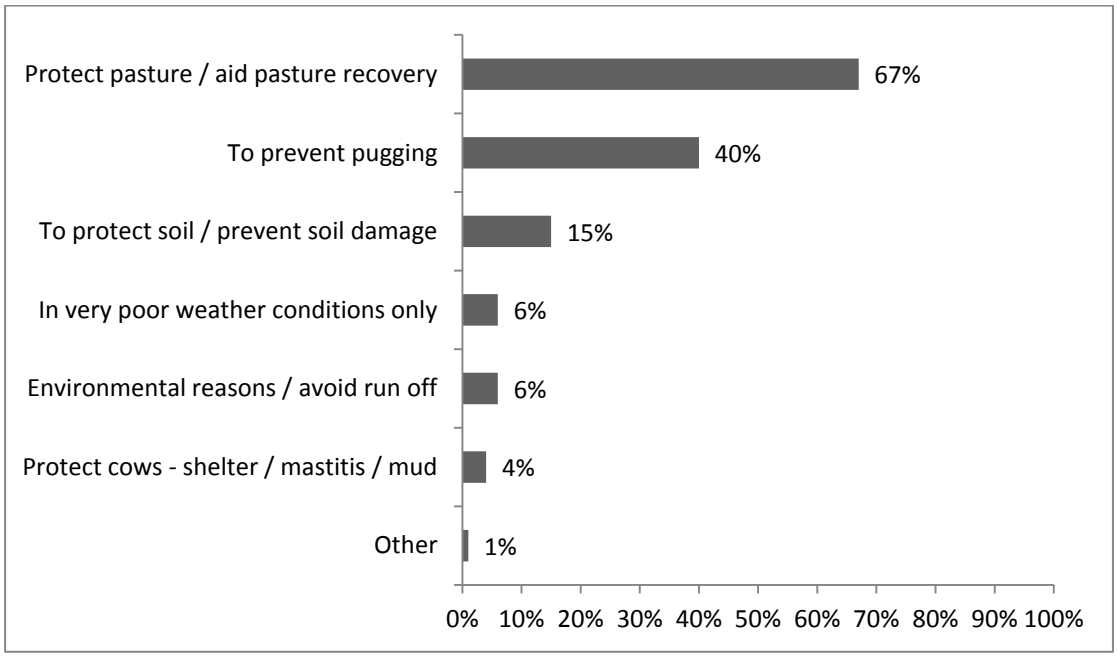
[42] Thinking about the cows left on the farm, do you typically stand off some, or all, of the herd from paddocks during winter to manage wet soils or pasture damage?

# 8.2 Reasons for standing off

Farmers who stand off some, or all, of their herd to manage wet soils in winter were asked to give further detail as to why they stand off their herd.

The highest proportion, 67% said they stand off to protect their pasture / aid pasture recovery. Some 40% said they stand off to prevent pugging; 15% said they stand off to prevent soil damage; 6% said they only stand off in very poor weather conditions; 6% noted environmental reasons for standing off; 4% said they stand off to protect cow condition; and 1% gave another reason for standing off.

**Figure 36 Reasons for standing off**[43]



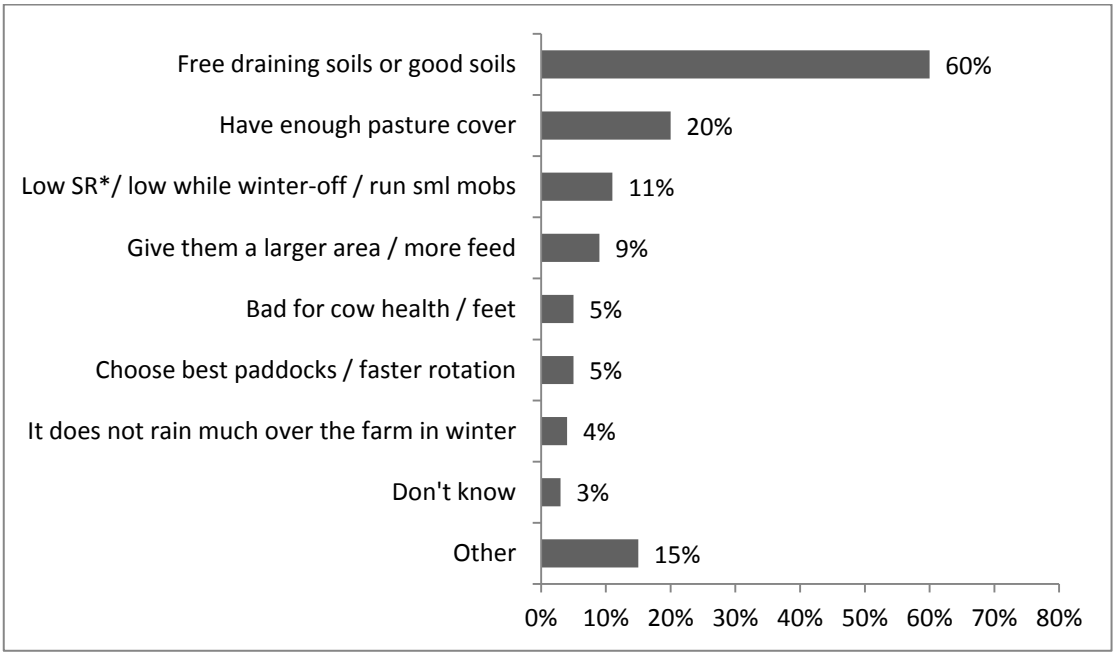

Base: Farmers who stand off their herd in winter to manage wet soils or pasture damage, n=319

[43] Can you please tell me why you stand off your cows? Please be as specific as you can and provide examples.

# 8.3 Reasons for not standing off

Farmers who did **not** stand off their herd in winter were asked to specify why this was the case[44]. The highest proportion, 60% said they did not stand off their herd in winter as their farm had free draining soils or „good' soils.

**Figure 37 Reasons for *not* standing off herd in winter[45]**




Base: Farmers who did NOT stand off their herd in winter to manage wet soils or pasture damage, n=80

**Other (recorded verbatim)**

- *Hill farm.*
- *I am on a hill farm. If it rains continually for a period I may shift stock twice a day.*
- *It's the contour of the farm. I make a bigger mess moving them on and off the paddocks than if I leave them there.*
- *Haven't found anywhere suitable to do that.*
- *Have a raised area where they don't cause much damage.*
- *At the wettest time they are down the run-off so no need to stand off.*
- *They need to eat because we are milking them, that's why we don't stand them off.*
- *I manage them appropriately so we don't have pasture or soil damage.*
- *I sow grass seed so I can re-coup the loss if there is any pasture damage.*
- *More a milking reason, because we milk during the winter.*
- *Don't like putting them in the yard and don't have a feedpad.*
- *Unsure*

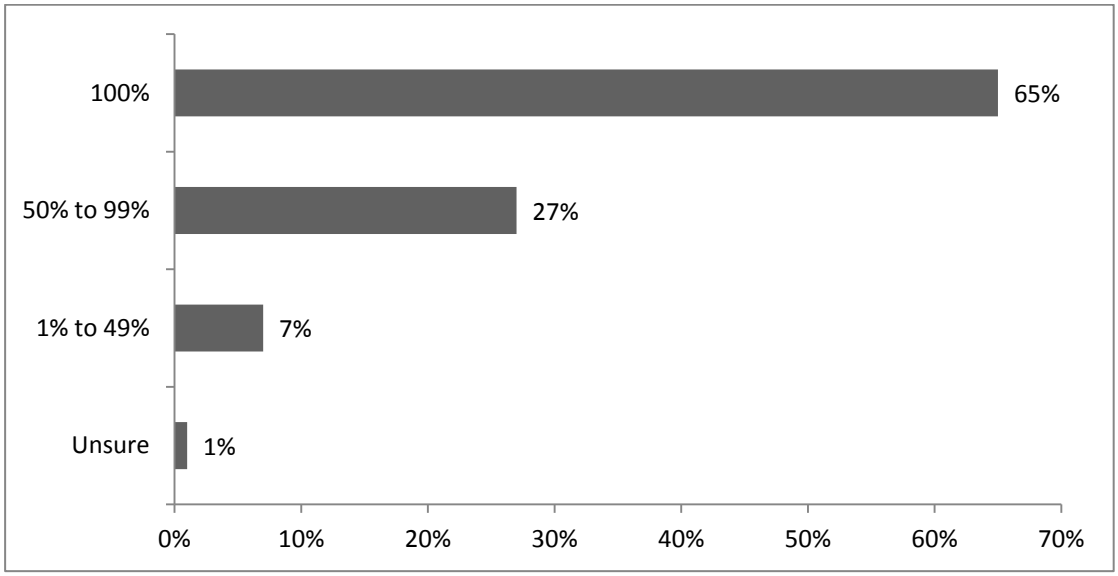
[44] Why is it that you don't stand off your cows in winter? Is it because...
[45] Base sizes for the various sub-groups are too small (n=<30) to reliably test for significant differences.* SR = stocking rate.

# 8.4 Proportion of herd stood off

Farmers who stand off their herd in winter to manage wet soils were asked to specify the proportion of their herd they typically stand off.

Almost two thirds (65%) who stand off their herd in winter to manage wet soils stand off all (100%) of their herd. Just over one quarter (27%) stand off 50 to 99% of their herd; a small proportion (7%) stand off less than half of their herd; and, 1% were unsure as to the proportion typically stood off.

**Figure 38 Proportion of herd typically stood off[46]**




Base: Farmers who stand off their herd in winter to manage wet soils or pasture damage, n=319

**Herd size, farm size, and stocking rate variation**

- Farmers with a stocking rate of 3.5 cows or more per hectare were **more** likely to say they stand off 100% of their herd (81% compared to 65% for all).

**Geographic and soil type variation**

- Farmers in the Waipa District were **more** likely to say they stand off between 1 and 49% of their herd (16% compared to 7% for all).
- Farmers who had allophanic soil as their main soil type were **more** likely to say that that stand off 1 to 49% of their herd (11% compared to 7% for all).

**Demographic variation**

- There were no notable differences across the demographic groupings.

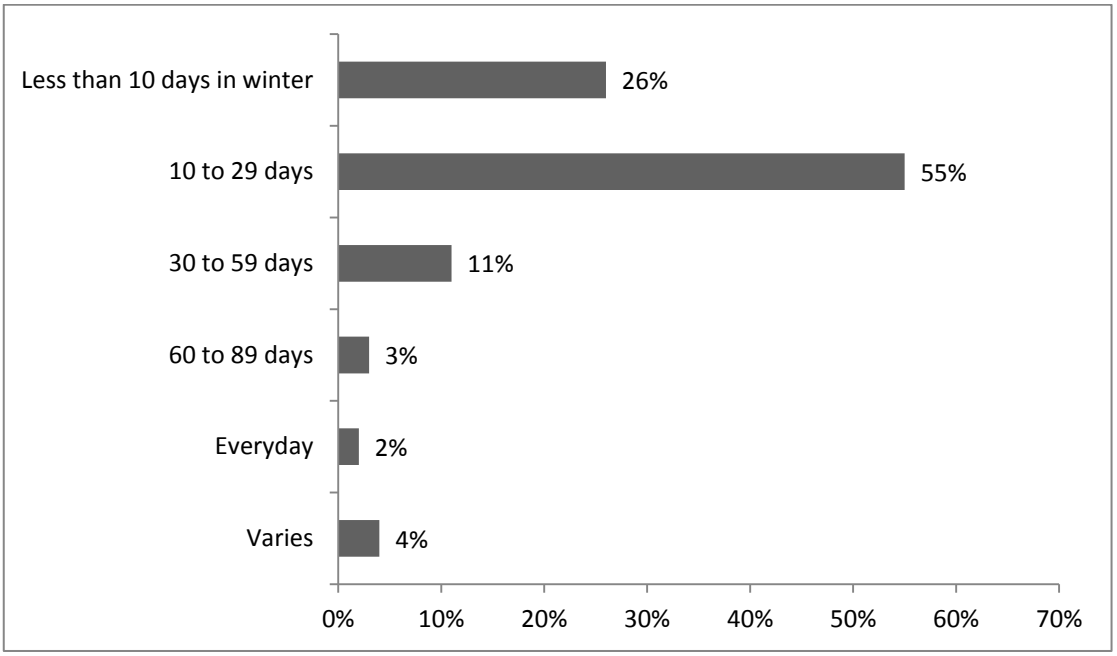
[46] When standing off your herd in winter, what proportion would you typically stand off to manage wet soils?

# 8.5 Frequency of standing off

Farmers who stand off their herd in winter to manage wet soils were asked to specify the number of days in winter they typically stand off their herd for.

The highest proportion, 55% stand off their herd for 10 to 29 days; 26% stand off their herd for less than 10 days; 11% for 30 to 59 days, 3% for 60 to 89 days; 2% stand off their herd everyday; and, 4% said that the numbers of days varies significantly each winter.

**Figure 39 Number of days over winter that herd is stood off for[47]**




Base: Farmers who stand off their herd in winter to manage wet soils or pasture damage, n=319

**Herd size, farm size, and stocking rate variation**

- Farmers with a farm size of 51-100 hectares were **much more** likely to say they stand off their herd less than 10 days (34% compared to 26% for all).
- Farmers with a farm size of 51-100 hectares were **more** likely to say they stand off their herd 60-89 days (5% compared to 3% for all).
- Farmers with a farm size of 101-200 hectares were **more** likely to say they stand off their herd for 10-29 days (63% compared to 55% for all).
- Farmers with a herd size of 100-200 cows per hectare were slightly more likely to say they stand off their herd for less than 10 days (33% compared to 26% for all).
- Farmers with a herd size of 201-300 cows were **more** likely to say they stand off their herd for less than 10 days (35% compared to 26% for all).
- Farmers with a stocking rate of less than 2.5 cows per hectare were **more** likely to say they stand off their herd for less than 10 days (37% compared to 26% for all).

**Geographic and soil type variation**

- Farmers with gley soil as their main soil type were **much more** likely to say they stand off their herd for 10-29 days in winter (70% compared to 55% for all).

[47] In a normal winter, would you say you stand off your cows...

- Farmers with organic soil as their main soil type were **much more** likely to say they stand off their herd everyday in winter (9% compared to 2% for all).
- Farmers in the Hauraki District were **much more** likely to say that the number of days they stand off their herd varied (12% compared to 4% for all).
- Farmers in the Matamata-Piako District were **more** likely to say they stand off their herd for 10-29 days in winter (64% compared to 55% for all).
- Farmers in the Waikato District were **more** likely to say they stand off their herd for 30-59 days in winter (18% compared to 11% for all).

**Demographic variation**

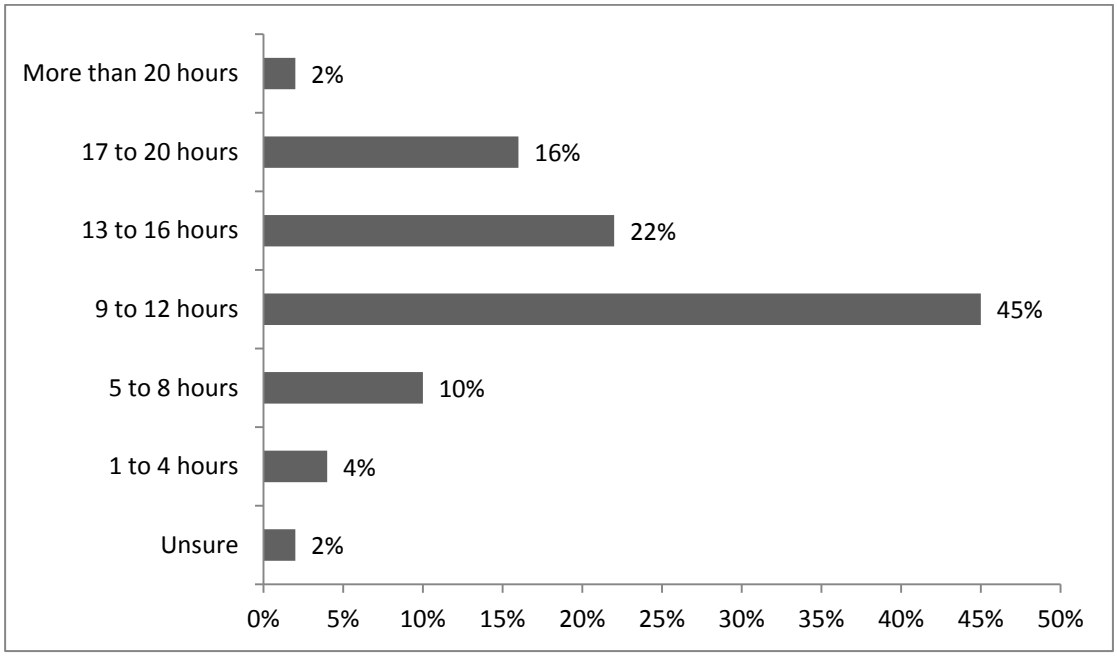
- There were no notable differences across the demographic groupings.

# 8.6 Duration of standing off

Farmers who stand off their herd in winter to manage wet soils were asked how many hours they typically stand off their herd for in a 24 hour period.

The highest proportion (45%) stand off their herd between 9 and 12 hours; 40% stand off their herd for more than 12 hours; 14% stand off their herd for less than 9 hours; and 2% were unsure as to how many hours the herd is typically stood off for.

**Figure 40 Hours herd is typically stood off for per day**[48]




Base: Farmers who stand off their herd in winter to manage wet soils or pasture damage, n=319

**Herd size, farm size, and stocking rate variation**

- Farmers with a herd size of 100-200 cows were **more** likely to say they stand off their herd for 17 to 20 hours (24% compared to 16% for all).
- Farmers with a stocking rate of 2.5-2.99 cows per hectare were **more** likely to say they stand off their herd for 17 to 20 hours (22% compared to 16% for all).
- Farmers with a stocking rate of 3.0-3.49 cows per hectare were **much more** likely to say they stand off their herd for 9 to 12 hours (55% compared to 45% for all).

[48] When you stand off your milking herd, how many hours would you typically stand them off for in a day, that is, in a 24 hour period?

**Geographic and soil type variation**

- Farmers in the Hauraki District were **much more** likely to say they were unsure as to how many hours their herd was stood off for (7% compared to 2% for all).
- Farmers who had allophanic soil as their main soil type were **much more** likely to say they stand off their herd for 13 to 16 hours (29% compared to 22% for all).
- Farmers who had gley soil as their main soil type were **much more** likely to say they stand off their herd for 20 hours or more (5% compared to 2% for all).

**Demographic variation**

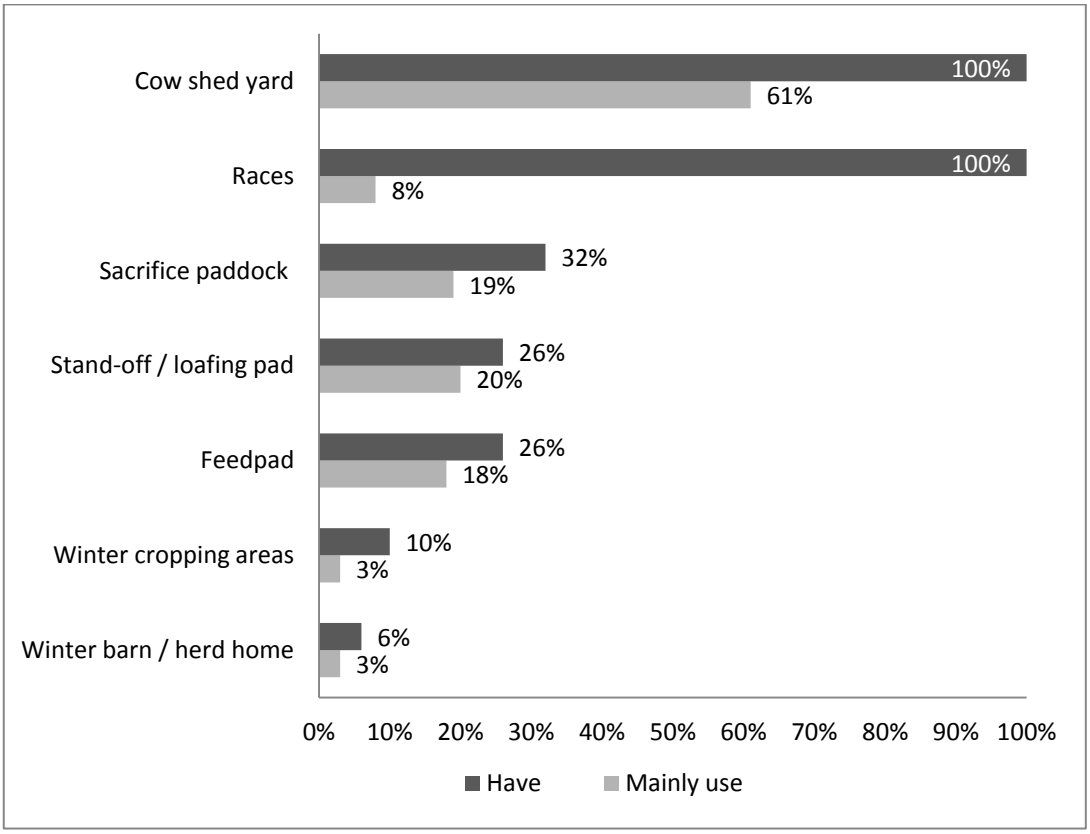
- There were no notable differences between the demographic groupings.

# 8.7 Stand off infrastructure used

**Of farmers who stand off their herd in winter to manage wet soils**[49], 32% said that they had a sacrifice paddock; 26% a purpose build stand off pad; 26% a feedpad; 10% winter cropping areas; and, 6% a wintering barn / herd home.

Farmers who stand off their herd in winter to manage wet soils were asked to specify the infrastructure that they **mainly used** for standing off. Some 61% said they mainly used their cow shed yard; 20% a stand off pad; 19% a sacrifice paddock; 18% a feedpad; 8% races; 3% winter cropping areas; and, 3% a wintering barn / herd home.

**Figure 41 Infrastructure mainly used for standing off**[50]




Base: Farmers who stand off their herd in winter to manage wet soils or pasture damage, n=319

[49] Note: Results reported for „have' differs to page 26 as these results are for farmers who stand off their herd to manage wet soils and NOT all farmers (as per page 26).
[50] Which of the following do you mainly use for standing-off your herd in winter to manage wet soils?

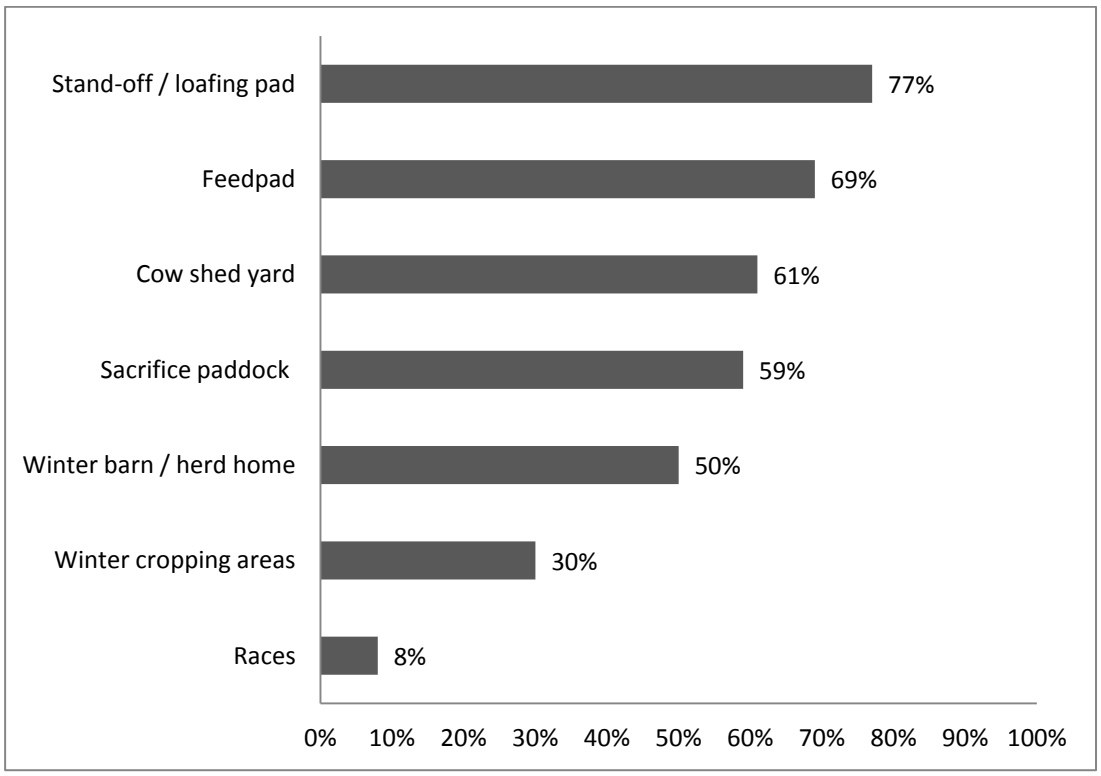
# 8.8 Utilisation of stand off infrastructure

Comparing the proportion of farmers who **had** a particular type of infrastructure to the proportion who **mainly used** it[51] demonstrates the utilisation of that infrastructure by those who have invested in it.

It should be noted that a particular stand off infrastructure need not necessarily be fully utilised, that is, used for every occasion for standing off, as farmers often had more than one infrastructure option available to them (for example, yards, races and a sacrifice paddock in addition to other infrastructure).

Results indicated that purpose built stand off pads had the highest utilisation: 77% of farmers who had a purpose built stand off pad (and who stand off their herd to manage wet soils in winter) said that they **mainly used** their stand off pad. This was followed by feedpads: 69% of farmers who had a feedpad (and who stand off their herd to manage wet soils in winter) said that they **mainly used** their feedpad for standing off. Cow shed yards (61%) and sacrifice paddocks (59%) followed in close succession. Wintering barns (50%) and winter cropping areas (30%) were next, while races had relatively low utilisation (8%).

**Figure 42 Utilisation of stand off infrastructure**




Base: Farmers who stand off their herd in winter to manage wet soils or pasture damage, n=319

[51] Refer to chart on pg. 50 „infrastructure mainly used for standing off'.

# 9 Segments

## 9.1 Overview

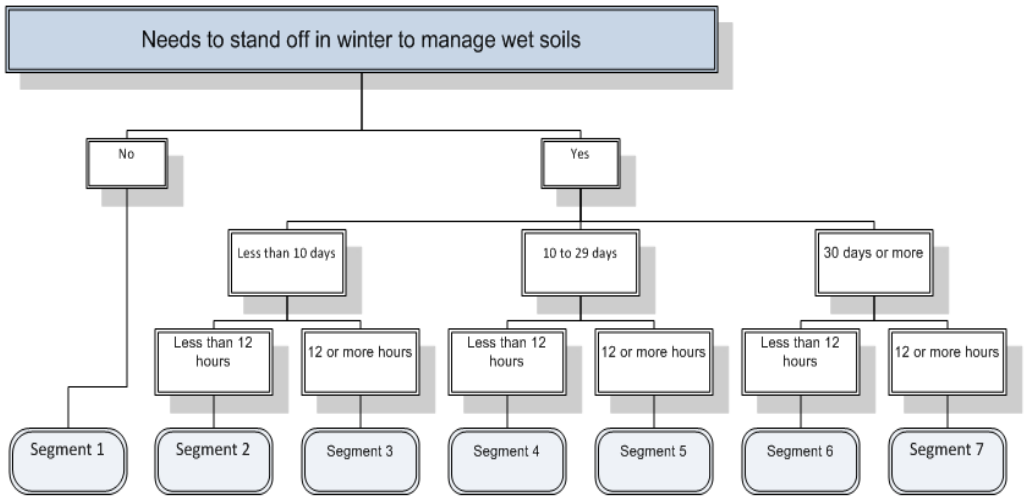
Using standoff areas (standoff pads, feed pads, yards or herd homes) is recommended to reduce the time spent on paddocks, alleviating soil compaction during the wetter months of winter when nitrogen leaching risk is highest (Davies and Topperwien, 2011). Given this, identifying farmers' stand off practises is important.

Segmentation analysis[52] was conducted in order to categorise farmers into groups based on their stand off practices/behaviour. Similar to the Davies and Topperwien study (2011), the sample of farmers in this study were segmented by:

- how frequently they stand off their herd (number of days in winter)
- the duration they stand off their herd for (hours per day).

Analysis of the data identified that farmers' could be classified into three groups in terms of how frequently they stand off their herd: (1) less than 10 days; (2) 10 to 29 days; (3) 30 days or more. Analysis of the data also identified that the highest proportion of farmers stand off their herd for approximately 9 to 12 hours each time. Consequently, the farmers in the sample were classified into two groups based on the number of hours they stand off their herd: (1) less than 12 hours; (2) 12 hours or more. Combining these two analyses resulted in seven segments describing different patterns of stand off practices. A decision tree summarising the segments is shown in Figure 1[53].

**Figure 43 Decision tree for standing off herd in winter to manage wet soils**




[52] Segmentation analysis categorises people into groups based on similar behaviour and/or needs.

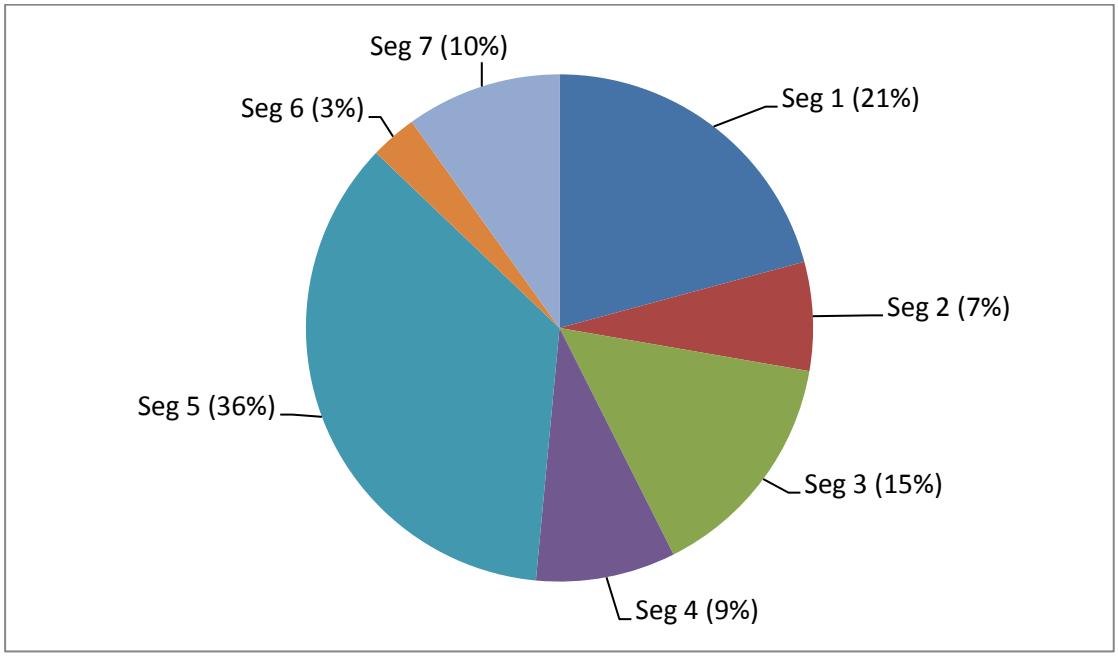
[53] The segmentation reported in this study differs from that of Davies and Topperwien (2011). While Davies and Topperwien (2011) also segment on frequency and duration of standing-off, the categories used for frequency and duration differed, for frequency the categorisation was: (1) everyday in winter or (2) less than everyday in winter. For duration, the categorisation was: (1) less than 20 hours and (2) 20 hours and more.

## 9.2 Proportion of farmers in each segment

Of the n=383 farmers who were able to specify the frequency and duration that they stand off their herd for in a typical winter for the purpose of managing wet soils and pasture damage:

- 21% (n=80) were in Segment 1 as they did not need to stand off their herd in winter to manage wet soils
- 7% (n=25) were in Segment 2 as they stand off their herd for less than 10 days in winter and for less than 12 hours each time
- 15% (n=57) were in Segment 3 as they stand of their herd for less than 10 days in winter and for 12 or more hours
- 9% (n=35) were in Segment 4 as they stand off their herd for 10 to 29 days in winter and for less than 12 hours each time
- 36% (n=136) were in Segment 5 as they stand off their herd for 10 to 29 days in winter and for 12 hours or more each time
- 3% (n=12) were in Segment 6 as they stand off their herd for 30 days or more in winter and for less than 12 hours each time
- 10% (n=38) were in Segment 7 as they stand off their herd for 30 days or more and for 12 hours or more each time.

**Figure 44 Proportion of farmers in each segment**




Base: Farmers who did not stand off and farmers who stand off and were able to specify the frequency and duration that they stand off their herd for n=383

## 9.3 Segment profiles

Below is a summary of the profile of each segment; included for each is summary analysis for: farm drainage[54], soil type, farm contour, location, herd size, stocking rate, infrastructure on-farm, proneness to pugging, pugging prevention strategies used and winter-off practice (winter off or not).

**Segment 1: does not need to stand off to manage wet soils**

In total, 21% (n=80) of farmers surveyed and who qualified for segment analysis were categorised into Segment 1 as they did not need to stand off their herd from paddocks in winter in order to manage wet soils.

*Soil type, drainage, contour, pugging*

For farmers in Segment 1:

- 43% had allophanic soils as their main soil type
- 25% pumice soils (**much higher** than the overall result, 9%)
- 14% organic soils
- 8% gley soils (**much lower** than the overall result, 20%)
- 5% granular soils
- 3% brown soils
- 3% podzol soils
- 1% ultic soils

Nearly two thirds (64%) of farmers in Segment 1 had a well drained farm (**much** higher than the result overall of 48% having a well drained farm). In total 15 % of farmers in Segment 1 had a poorly drained farm, and the drainage categorisation for 21% of farmers in Segment 1 was uncertain (consistent with the overall result, 29%).

The farmers in this segment were **much less** likely to have a flat farm contour compared to the total (23% versus 39% for all) and were **much more** likely to have some form of sloped (flat to rolling, rolling, rolling to steep) farm contour (78% vs. 61% for all).

Farmers in this segment were **much more** likely to say that their farm was not very prone/not at all prone to pasture damage or pugging (68% versus 35% for all).

*District area*

For farmers in Segment 1:

- 21% were located in South Waikato District (**much higher** than the total, 9%)
- 16% Waikato District
- 15% Matamata-Piako District (**lower** than the total result, 25%)
- 14% Waipa District
- 11% Rotorua District (**much higher** than the total result, 4%)
- 9% Hauraki District
- 8% Otorohanga District

[54] Land drainage data was supplied and reproduced with the permission of Landcare Research New Zealand Limited. The drainage categories are: well drained n=194 (66% or more of the farm is classified as well drained or moderately well drained); poorly drained n=94 (66% or more of the farm is classified as poorly drained or very poorly drained) and „unsure' (for farms with a mixture of drainage categories where a single drainage category could not be applied, that is, predominate drainage category is less than 66% of farm) n=115. The cut off point of 66% was used as where a farm's drainage category was lower than this figure, the impact on farm management could not be certain. The cut off point of 66% was set by WRC.

- 5% Taupo (**much higher** than the total result, 1%)
- 1% Thames-Coromandel District

*Herd size, stocking rate*
In terms of herd size and stocking rate, farmers in this segment were **more** likely, compared to the total, to have a small herd size, that is, 100-200 cows (38% versus 26% for all) along with a lower stocking rate (less than 2.5 cows per hectare, 28% versus 19% for all). The average stocking rate for Segment 1 was 2.72 cows per hectare, lower than the region's average (2.93 cows per hectare).

*Infrastructure on-farm*[55]
Given farmers in Segment 1 did not need to stand their cows off to manage wet soils, none had a wintering barn (0% versus 5% for all) or a sacrifice paddock (0% versus 26% for all) and relatively few had a stand off pad (5% versus 22% for all) or a feedpad (14% versus 24% for all).

*Strategies to prevent pugging in-paddock*
To prevent pugging in paddocks, these farmers were slightly more likely, compared to the total, to *reduce their rotation length,* that is, to speed up herd movement around the farm so that the herd spent less time in each paddock (64% versus 54% for all) and were **much more** likely to *feed out more in order that the herd was full and was less likely to walk paddocks grazing* (17% versus 8% for all).

*Winter-off practices*
Some 29% of farmers in Segment 1 said that they winter off some, or all, of their herd while 71% of farmers in Segment 1 said that they did not winter off their herd. These results were consistent with the overall results (35% of farmers overall winter-off some, or all, of their herd, while 65% do not).

**Segment 2: stands-off less than 10 days in winter, for less than 12 hours each time**
In total, 7% of farmers (n=25) surveyed and who qualified for segment analysis were categorised in Segment 2 as they stand off their herd for less than 10 days in winter and when standing off their herd they did so for less than 12 hours.
Note: the minimum sample size required to produce reliable results for significance testing was n=30 and as the sample size for Segment 2 was only n=25, the profile that follows for Segment 2 is indicative only[56]

*Soil type, drainage categorisation, contour, pugging*
For farmers in Segment 2:
- 60% had allophanic soils as their main soil type
- 12% organic soils
- 8% gley soils
- 8% granular soils
- 8% pumice soils
- 4% podzol

Some 68% of farmers in Segment 2 had a well drained farm, 12% had a poorly drained farm, and the drainage categorisation for 20% of farmers in Segment 2 was uncertain.

[55] Data collected from the survey question: "Which of the following [stand-off infrastructure] do you currently have on-farm...?"
[56] Results not tested for statistical significance as sample size was too small

Just over three quarters (76%) had some form of sloped farm contour (versus 61% for all) and the majority (68%) said that their farm was not prone/not all prone to pasture damage or pugging (versus 35% for all).

*District area*
For farmers in Segment 2:

- 20% were located in the Matamata-Piako District
- 20% Hauraki District
- 16% Waikato District
- 12% Otorohanga District
- 12% South Waikato District
- 8% Waipa District
- 4% Rotorua District
- 4% Thames-Coromandel District
- 4% Waitomo District.

*Herd size, stocking rate*
Most (84%) in Segment 2 had a herd size between 100 and 300 cows (versus 56% for all) and Segment 2 had a smaller average herd size (258 cows) than the region's average (318 cows). The average stocking rate for this segment, 2.82 cows per hectare, was lower than the region's average (2.93 cows per hectare).

*Infrastructure on-farm*
In terms of stand off infrastructure, 40% had a sacrifice paddock (versus 26% for all), 16% had winter cropping areas (versus 10% for all), 12% had a feedpad (versus 24% for all), 12% had a stand off pad (versus 22% for all), and none had a wintering barn (versus 5% for all).

*Strategies to prevent pugging in-paddock*
To prevent pugging, farmers in Segment 2, like others, mainly *reduce rotation length* (65% versus 54% for all) and *back fenced* (57% versus 45%), but they seemed more inclined, compared to the total, to *provide a larger area* (17% versus 6% for all) and to *use drier/more free draining paddocks* on their farm (13% versus 3% for all).

*Winter-off practices*
Just over a third (36%) of farmers in Segment 2 said that they winter off some, or all, of their herd while 64% of farmers in Segment 2 said that they did not winter off their herd. These results were consistent with the overall results (35% of farmers overall winter-off some or all of their herd, while 65% do not).

**Segment 3: stands-off less than 10 days in winter, for more than 12 hours each time**
In total, 15% (n=57) of farmers surveyed and who qualified for segment analysis were categorised in Segment 3 as they stand off their herd for less than 10 days in winter and when standing off their herd they did so for 12 hours or more.

*Soil type, drainage categorisation, contour, pugging*
For farmers in Segment 3:

- 44% had allophanic soils as their main soil type
- 14% pumice soils

- 12% gley soils
- 11% organic soils
- 9% granular soils
- 5% brown soils
- 4% ultic soils
- 2% podzol soils

Just over half (53%) of farmers in Segment 3 had a well drained farm, 18% had a poorly drained farm, and the drainage categorisation for 30% of farmers in Segment 3 was uncertain.

In total, 70% of farmers in this segment reported having a farm contour with some form of slope (flat to rolling, rolling, rolling to steep) while 30% said that their farm contour is flat.

Just under half (49%) of farmers in this segment said that their farm was not very prone/not at all prone to pugging and this was higher than the total (35%), but lower than both Segment 1 (68%) and Segment 2 (also 68%).

*District area*
For farmers in Segment 3:

- 26% were located in the Matamata-Piako District
- 16% Waipa District
- 14% Otorohanga District
- 14% Waikato District
- 12% South Waikato District
- 5% Rotorua District
- 5% Thames-Coromandel District
- 4% Hauraki District (**lower** than the total result, 12%)
- 4% Waitomo District.

*Herd size, stocking rate*
Farmers in Segment 3 were **more** likely to have smaller herd sizes, with 68% having a herd size of 300 or fewer cows (versus 56% for all). Farmers in this segment were **less** likely to have a high stocking rate, that is, 3 or more cows per hectare (28% versus 43% for all). The average stocking rate for this segment was 2.74 cows per hectare, lower than the region's average (2.93 cows per hectare).

*Infrastructure on-farm*
In terms of infrastructure, farmers in Segment 3 were **less** likely, compared to the total, to have a feedpad (11% versus 24% for all) or a stand off pad (7% versus 22% for all). However, they were **much more** likely to have a sacrifice paddock (40% versus 26% for all).

*Strategies to prevent pugging in-paddock*
For prevention of pugging in paddocks, farmers in Segment 3 were **more** likely, compared to the total, to say they *reduce rotation length* (69% versus to 54% for all).

*Winter-off practices*
Some 39% of farmers in Segment 3 said that they winter off some, or all, of their herd while 61% of farmers in Segment 3 said that they did not winter off their herd. These results were consistent with the overall results (35% of farmers overall winter-off some, or all, of their herd, while 65% do not).

**Segment 4: stands-off for 10 to 29 days in winter, for less than 12 hours each time**
In total, 9% (n=35) of farmers surveyed and who qualified for segment analysis were categorised in Segment 4 as they stand off their herd for 10 to 29 days in winter and when standing off their herd they did so for less than 12 hours.

*Soil type, drainage categorisation, contour, pugging*
For farmers in Segment 4:

- 40% had allophanic soils as their main soil type
- 31% gley soils
- 11% organic soils
- 6% granular soils
- 6% ultic soils
- 3% brown soils
- 3% podzol soils

Some 40% of farmers in Segment 4 had a well drained farm, 23% had a poorly drained farm, and the drainage categorisation for 37% of farmers in Segment 4 was uncertain.

Just under two thirds (63%) of farmers in this segment reported having a farm contour with some form of slope (flat to rolling, rolling, rolling to steep) while 37% said that their farm was flat.

Farmers in this segment were **more** likely, compared to the total, to say their farm is prone/very prone to pasture damage and pugging (80% versus 63% for all).

*District area*
For farmers in Segment 4:

- 29% were located in the Matamata-Piako District
- 23% Waipa District
- 20% Otorohanga District (**higher** than the total result, 10%)
- 17% Waikato District
- 9% Hauraki District
- 3% Waitomo District.

*Herd size, stocking rate*
Farmers in this segment were **much more** likely to have a stocking rate of 4 or more cows per hectare (17% versus 4% for all). Accordingly, the average stocking rate for Segment 4 was relatively high, 3.25 cows per hectare, higher than segments 1-3 and higher than the region's average (2.93 cows per hectare).

*Infrastructure on-farm*
In terms of infrastructure, farmers in Segment 4 were **more** likely, compared with the total, to have a feedpad (40% versus 24%).

*Strategies to prevent pugging in-paddock*
For prevention of pugging in paddocks, farmers in Segment 4 were **more** likely to say, compared to the total, that they *back fenced* (62% versus 45% for all).

*Winter-off practices*
Just under half (46%) of farmers in Segment 4 said that they winter off some, or all, of their herd while 54% of farmers in Segment 4 said that they did not winter off their herd. These results were consistent with the overall results (35% of farmers overall winter-off some, or all, of their herd, while 65% do not).

**Segment 5: stands-off for 10 to 29 days in winter, for 12 hours or more**
In total, 36% of farmers (n=136) surveyed and who qualified for segment analysis were categorised in Segment 5 as they stand off their herd for 10 to 29 days in winter and for 12 or more hours each time.

*Soil type, drainage categorisation, contour, pugging*
For farmers in Segment 5:
- 46% had allophanic soils as their main soil type
- 28% gley soils (**much higher** than the total result, 20%)
- 12% organic soils
- 8% granular soils
- 2% podzol soils
- 2% pumice soils (**much lower** than the total result, 9%)
- 1% brown soils
- 1% recent soils

Nearly half (45%) of farmers in Segment 5 had a well drained farm, 25% had a poorly drained farm, and the drainage categorisation for 37% of farmers in Segment 5 was uncertain.

Just under half (49%) of farmers in this segment reported having a flat farm and this is **much** higher than the total (39%). Farmers in this segment were **much more** likely to say that their farm was prone/very prone to pasture damage and pugging (81% versus 63% for all).

*District area*

For farmers in Segment 5:

- 35% were located in the Matamata-Piako District (**much higher** than the total result, 25%)
- 20% Waikato District
- 14% Waipa District
- 13% Hauraki District
- 8% Otorohanga District
- 5% South Waikato District (**lower** than the total result, 9%)
- 3% Thames-Coromandel District
- 1% Rotorua District (**lower** than the total result, 4%)
- 1% Waitomo District

*Herd size, stocking rate*

The spread of herd sizes for farmers in Segment 5 appeared consistent with the overall spread of herd sizes. While herd sizes were comparable, farmers in this segment were **more** likely, compared to the total, to have a stocking rate of 3 or more cows per hectare (50% versus 43% for all) however, the average stocking rate for this segment is 2.94 cows per hectare, essentially consistent with the region's average stocking rate (2.93 cows per hectare).

*Infrastructure on-farm*

In terms of infrastructure, farmers in Segment 5 were **much more** likely, compared to the total, to have a stand off pad (30% versus 22%) and were l**ess** likely to say that they did not have any infrastructure besides yard/races for standing off (31% versus 39% for all).

*Strategies to prevent pugging in-paddock*

For prevention of pugging in paddocks farmers in Segment 5, like farmers in Segments 1-4, mainly reduced rotation length (55% versus 54% for all) and *back fenced* (45% versus 45% for all). However, they were l**ess** likely to *feed out more in order that the herd was full* (4% versus 8% for all) and were **more** likely, compared to the total, to say that they did nothing to prevent pugging in paddocks **when cows were grazing** (17% versus 12% for all)[57].

[57] Some of these farmers said that they will simply stand off their herd rather than implementing in-paddock strategies to reduce pugging.

*Winter-off practices*
A third (33)% of farmers in Segment 5 said that they winter off some, or all, of their herd while 67% of farmers in Segment 5 said that they did not winter off their herd. These results were consistent with the overall results (35% of farmers overall winter-off some, or all, of their herd, while 65% did not).

**Segment 6: stands-off for 30 days or more in winter, for less than 12 hours**
In total, 3% (n=12) of farmers surveyed and who qualified for segment analysis were categorised in Segment 6 as they stand off their herd for 30 days or more in winter and when standing off their herd they did so for less than 12 hours.

Note: the minimum sample size required to produce reliable results for significance testing was n=30 and as the sample size for Segment 6 was n=12, the profile that follows for Segment 6 is indicative only[58].

*Soil type, drainage categorisation, contour, pugging*
For farmers in Segment 6:

- 33% had allophanic soils as their main soil type
- 33% organic soils
- 17% brown soils
- 17% gley soils

A third (33%) of farmers in Segment 6 had a well drained farm, 42% had a poorly drained farm, and the drainage categorisation for 25% of farmers in Segment 6 was uncertain.

Half (50%) reported having a farm with a flat contour and 75% reported having a farm that was prone/very pone to pasture damage and pugging (versus 63% for all)

*District area*
For farmers in Segment 6:

- 42% were located in the Waikato District
- 25% Matamata-Piako District
- 17% Hauraki District
- 8% South Waikato District
- 8% Waipa District

*Herd size, stocking rate*
None of the farmers in Segment 6 had a low stocking rate of less than 2.5 cows per hectare (0% versus 19% for all) and results indicated that farmers in this segment were more likely to have higher stocking rates, with 42% having a stocking rate of 3.0 to 3.49 cows per hectare (versus 30% for all) and 25% having a stocking rate of 4 cows or more per hectare (versus 4% for all). The average stocking rate for this segment was 3.44 cows per hectare, higher than the region's average stocking rate (2.93 cows per hectare).

*Infrastructure on-farm*
In terms of infrastructure, 50% of farmers in Segment 6 had a feedpad (versus 24% for all); 33% had a stand off pad (versus 22% for all); 25% had a wintering barn (versus 5% for all); 25% had a sacrifice paddock (versus 26% for all); 17% had winter cropping

[58] Results not tested for statistical significance as sample size is too small

areas; and, 8% said that they did not have any infrastructure besides a yard/races for standing off (versus 39% for all).

*Strategies to prevent pugging in-paddock*
For prevention of pugging in paddocks, farmers in Segment 6 mainly *reduced rotation length* (40% versus 54% for all) and *back fenced* (30% versus 45% for all).

*Winter-off practices*
Some 42% of farmers in Segment 6 said that they winter off some, or all, of their herd while 58% of farmers in Segment 6 said that they did not winter off their herd. These results were consistent with the overall results (35% of farmers overall winter-off some, or all, of their herd, while 65% do not).

**Segment 7: stands-off for 30 days or more in winter, for 12 hours or more**
In total, 10% (n=38) of farmers surveyed and who qualified for segment analysis were categorised in Segment 7 as they stand off their herd for 30 days or more in winter and when standing off their herd they did so **12 hours or more**.

*Soil type, drainage categorisation, contour, pugging*
For farmers in Segment 7:

- 34% had allophanic soils as their main soil type
- 18% gley soils
- 18% organic soils
- 8% granular soils
- 8% podzol soils (**higher** than the total result, 3%)
- 8% pumice soils
- 5% brown soils

Some 29% of farmers in Segment 7 had a well drained farm and this result was **lower** than the overall result (48% of farmers overall have a well drained farm). A further 29% had a poorly drained farm, and the drainage categorisation for 42% of farmers in Segment 7 was uncertain.

Nearly all, 90% reported having a flat (45%) or flat-to-rolling farm contour (45%) and farmers in this segment were **much more** likely, compared to the total, to say that their farm was prone/very prone to pasture damage and pugging (89% versus 63% for all).

*District area*
For farmers in Segment 7:

- 24% were located in the Waikato District
- 13% Matamata-Piako District
- 13% Hauraki District
- 13% Otorohanga District
- 11% Thames-Coromandel District (**higher** than the total result, 3%)
- 11% Rotorua District
- 3% Waitomo District.

*Herd size, stocking rate*
There was a spread of herd sizes in this segment, with just under half (45%) of farmers in this segment saying that they had a herd size of 300 or fewer cows and just over half (55%) saying that they had a herd size of more than 300 cows. The average stocking

rate for this segment was 2.94 cows per hectare, comparable to the region's average (2.93 cows per hectare).

*Infrastructure on-farm*
In terms of infrastructure, farmers in Segment 7 were **much more** likely, compared to the total, to say that they had a wintering barn (16% versus 5%), and they were **more** likely, compared to the total, to say that they had a feedpad (39% versus 24%) and a sacrifice paddock (42% versus 26% for all). Farmers in this segment were as likely to say they have say they had a stand off pad (34% versus 22% for all). The farmers in this segment were **much less** likely, compared to the total, to say they had no infrastructure for standing off other than their yard/races (8% versus 40% for all).

*Strategies to prevent pugging in-paddock*
For prevention of pugging in paddocks, farmers in Segment 7 were essentially as likely to *back fence* as other farmers (35% versus 45%), but were **less** likely, compared to the total, to say that they reduced rotation length (35% versus 54% for all) and were **more** likely, compared to the total, to say that they did nothing to prevent pugging of paddocks **when cows are grazing** (24% versus 12% for all).

*Winter-off practices*
Just over a third (34%) of farmers in Segment 7 said that they winter off some, or all, of their herd while 66% of farmers in Segment 7 said that they did not winter off their herd. These results were consistent with the overall results (35% of farmers overall winter-off some, or all, of their herd, while 65% do not).

In conclusion, the results of the segmentation analysis indicate that herd management practices in the winter months are heavily influenced by the severity of waterlogging and pugging experienced by farmers. However, the precise combination of practices employed by farmers depends on the soil type and terrain of their properties, the infrastructure they have available, their stocking rate and opportunities for wintering-off, as well as the severity and timing of waterlogging. Furthermore, these sets of factors are inter-related. Consequently, no single factor can be said to drive winter herd management on dairy farms. This means there is no single management solution to reducing nutrient emissions from dairy farms and this needs to be accounted for in any policy aimed at influencing farmers' behaviour regarding nutrient management.

# 10 Additional analysis

Cross-tabulation analysis of the segments and the resulting segment profiles (see Section 9.3) indicated that a range of factors (for example soil, land contour, stocking rate, farm infrastructure available) influenced stand-off practice.

To better understand the determinants of stand-off practice, and to identify the factors that best predict stand-off practice, an additional statistical analysis was undertaken.

The statistical tool used for this additional analysis was Chi Square Automatic Identification Detection or CHAID (Wilkinson, 1992). CHAID is an exploratory data method that examines the relationships between a dependent measure (in this case, stand off practice) and a series of possible predictor variables (such as soil type, rainfall, contour) that themselves may interact. Essentially, CHAID identifies which of the predictor variables is strongest in determining the variations in the dependent variable. CHAID can analyse a range of types of data[59]. This was an important consideration as the data to be analysed included various ordinal and categorical scales. Furthermore, CHAID can analyse many variables simultaneously, unlike cross tabulations.

Data from a number of variables collected in the survey were used in the analysis. In addition, data on two other factors were also included in the analysis:

- Average annual rainfall for each farm, sourced from Waikato Regional Council
- Soil drainage classification for each farm, sourced from Landcare Research New Zealand Limited[60]

Overall, the results from the CHAID analysis confirmed the findings from the cross tabulations reported previously. That is, a range of factors influenced stand-off practice. Specifically, seven factors were placed in relatively close succession to each other as the best predictors for stand-off practice. These factors were (in order of importance):

- Proneness to pugging (farmers' perceptions of their farms propensity to pug)
- The presence of farm infrastructure in addition to a milking shed and races
- Location of farm (District)
- The proportion of the farm well drained / moderately well drained[61]
- Stocking rate
- Farm contour
- Main soil type

For a more detailed review of the CHAID analysis results, please refer to Appendix 7

[59] Including: ordinal scales, nominal scales, and continuous values.
[60] Data reproduced with the permission of Landcare Research New Zealand Limited
[61] For each farm included in the survey data, Landcare Research provided the proportion of the farm that is well drained, moderately well drained, poorly drained and very poorly drained. For example, one farm in the data set may have been 20% well drained, 40% moderately well drained and 40% poorly drained. To streamline the data for use in CHAID analysis, the drainage categories for well drained and moderately well drained for each farm were added together, to give a drainage ranging from 0 – 100%. This figure was then used in the CHAID analysis. Using our example above, the drainage figure used for the CHAID analysis would have been 60%.

# 11 References

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Tarbotton, I 2009, email, 21 September 2009, Ian.Tarbotton@dairynz.co.nz.

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# Appendix 1: questionnaire

**Q.1 Hello, it's _____ calling <u>ON BEHALF</u> of Waikato Regional Council. We are doing a survey about dairy farm wintering practices which will take about 12 minutes. Can I please speak to the person who makes the DAY TO DAY decisions about winter stock management practices on your farm?**
IF YES - CONTINUE
IF NO – RESCHEDULE / END SURVEY

*IF NEEDED – ABOUT VERSUS*
***We're calling from Versus Research, an independent research company, hired by Waikato Regional Council. We're doing a short survey to help us find out more about how people manage their winter grazing.***

*IF NEEDED - CONFIDENTIALITY*
***All answers provided are held in complete confidentiality. We report summary results about groups of farmers (for example, 50% of farmers said...) and we do not identify which individuals have said what. No names are recorded.***

*IF NEEDED - WHERE WE GOT PHONE NUMBER*
***Phone numbers have been randomly selected from the AsureQuality database.***

*COMPLAINTS*
***Angela Davies, Senior Policy Advisor, Environment Waikato, 07-859-0732***

**So firstly, what is your herd size? If you have more than one farm, please answer in regard to the farm that you are on for all the questions in the survey.**
ENTER HERD SIZE _____
[S - IF THE ANSWER IS 0-99, THEN SKIP TO QUESTION 60]

**Q.2 Which District Council area are you in?**

| | |
|---|---|
| Hauraki | 1 |
| Hamilton | 2 |
| Matamata-Piako | 3 |
| Otorohanga | 4 |
| South Waikato | 5 |
| Taupo | 6 |
| Thames-Coromandel | 7 |
| Waipa | 8 |
| Waikato | 9 |
| Waitomo | 10 |
| Rotorua | 12 |
| Other | 11 |

[A - IF THE ANSWER TO QUESTION 2 IS NOT 11, THEN SKIP TO QUESTION 4]
**Q.3 OTHER: District Council:**
_____

**Q.4 Thinking about your usual practice, do you typically WINTER off or GRAZE off some or all of your cows from the milking platform in winter? That is, do you move a proportion of your cows to a grazing block, whether owned or leased, or to a contract grazer over the winter months? This does not include calves.**

Yes ..... 1
No ..... 2
Don't know ..... 3

[S - IF THE ANSWER IS 2, THEN SKIP TO QUESTION 13]
[S - IF THE ANSWER IS 3, THEN SKIP TO QUESTION 14]

**Q.5 What proportion of your herd do you typically winter off?**
ENTER PERCENT _____

**Q.6 Do you winter off all throughout all winter?**

Yes ..... 1
No ..... 2

**Q.7 Which months over winter do you send your cows away when you winter them off?**

April ..... 1
May ..... 2
June ..... 3
July ..... 4
August ..... 5
Other ..... 6

**Q.8 Why do you winter off your cows? Please be as specific as you can and provide examples where possible.**

_____

**Q.9 What arrangement do you typically have to winter off your cows, do you...**
READ OUT, ALLOWED MORE THAN 1 ANSWER

Lease or own land on neighbouring properties or properties within an hour 1
Lease or own land on properties more than an hour from your farm ..... 2
Use contract graziers ..... 3
DO NOT READ OUT Other - specify ..... 4
DO NOT READ OUT Don't know ..... 5
[EXCLUSIVE ANSWER: "DO NOT READ OUT Don't know"]
[S - IF THE ANSWER IS 5, THEN SKIP TO QUESTION 14]

[A - IF THE ANSWER TO QUESTION 9 IS NOT 4, THEN SKIP TO QUESTION 11]
**Q.10 OTHER: arrangement for wintering off cows:**

_____

[A - IF THE ANSWER TO QUESTION 9 IS NOT 3, THEN SKIP TO QUESTION 12]
**Q.11 What is the closest town to where you send your cows for the contract grazier?**

_____

[A - IF THE ANSWER TO QUESTION 9 IS NOT 2, THEN SKIP TO QUESTION 14]
**Q.12 What is the closest town to where you own or lease your run-off block?**

_____

[A - IF THE ANSWER TO QUESTION 4 IS NOT 2, THEN SKIP TO QUESTION 14]
[A - IF THE ANSWER TO QUESTION 5 IS 100, AND...]

[A - IF THE ANSWER TO QUESTION 6 IS 1, THEN SKIP TO QUESTION 21]

**Q.13 Why do you not winter off your cows? Please be as specific as possible and provide examples.**

_____

**Q.14 Thinking about the cows left on the farm, do you typically STAND OFF some or all of your cows during winter to manage wet soils or pasture damage?**

Yes ..... 1
No ..... 2
Don't know ..... 3

[S - IF THE ANSWER IS 3, THEN SKIP TO QUESTION 21]
[S - IF THE ANSWER IS 2, THEN SKIP TO QUESTION 19]

**Q.15 When standing off your cows in winter, what proportion would you typically stand off to manage wet soils?**

ENTER PERCENT _____

**Q.16 Can you please tell me why you stand off your cows? Please be as specific as you can and provide examples.**

_____

**Q.17 In a normal winter, would you say you stand off your herd...**

READ OUT, SINGLE ANSWER ONLY

Less than 10 days in winter ..... 1
10 to 29 days ..... 2
30 to 59 days ..... 3
60 to 89 days ..... 4
or Everyday ..... 5
DO NOT READ OUT - Don't know ..... 6
DO NOT READ OUT - It depends / It varies ..... 7

**Q.18 When you stand off your cows, how many hours would you typically stand them off for in a day, that is, in a 24 hour period?**

NUMBER OF HOURS _____

[A - IF THE ANSWER TO QUESTION 14 IS NOT 2, THEN SKIP TO QUESTION 21]
**Q.19 Why is it that you don't stand off your cows in winter? Is it because...**
READ OUT, ALLOWED MORE THAN 1 ANSWER
[READ ANSWERS IN RANDOM ORDER, EXCEPT THE LAST 2]

| | |
|---|---|
| You have enough pasture cover | 1 |
| You have free draining soils or good soils | 2 |
| It does not rain much over your farm in winter | 3 |
| [62]*Low stocking rate / low stocking rate while wintering off / run small mobs* | *6* |
| *Give them a larger area / more feed* | *7* |
| *Choose best paddocks / faster rotation* | *8* |
| Bad for cow health / feet | 9 |
| DO NOT READ OUT: Other | 4 |
| DO NOT READ OUT: Don't know | 5 |

[EXCLUSIVE ANSWER: "DO NOT READ OUT: Don't know"]

[A - IF THE ANSWER TO QUESTION 19 IS NOT 4, THEN SKIP TO QUESTION 21]
**Q.20 OTHER: Reasons for not standing cows off in winter:**
_____

**Q.21 Which of the following do you currently have on your farm?**
READ OUT, ALLOWED MORE THAN 1 ANSWER
[READ ANSWERS IN RANDOM ORDER, EXCEPT THE LAST 3]

| | |
|---|---|
| Feedpad | 1 |
| A purpose built stand off or loafing pad | 2 |
| Wintering barn or herd home | 3 |
| Winter cropping areas | 4 |
| Sacrifice paddock for standing off cows | 5 |
| DO NOT READ OUT, SELECT EVERY TIME Cow shed yard | 6 |
| DO NOT READ OUT, SELECT EVERY TIME Races | 7 |
| None of these | 8 |

[A - IF THE ANSWER TO QUESTION 14 IS NOT 1, THEN SKIP TO QUESTION 24]
**Q.22 Which of the following do you use for standing off your cows in winter? Please tell us all that apply.**
READ OUT, ALLOWED MORE THAN 1 ANSWER
[READ ONLY ANSWERS PICKED IN QUESTION 21, BUT ALWAYS SHOW THE LAST 4]

| | |
|---|---|
| Feedpad | 1 |
| Purpose built stand off or loafing pad | 2 |
| Wintering barn or herd home | 3 |
| Winter cropping areas | 4 |
| Sacrifice paddock for standing off cows | 5 |
| Cow shed yard | 6 |
| Races | 7 |
| DO NOT READ OUT: Other | 8 |
| DO NOT READ OUT: Don't know | 9 |

[EXCLUSIVE ANSWER: "DO NOT READ OUT: Don't know"]

[62] ** Note: answer choices in italic were coded from answers recorded under 'other'.*

**Q.23 And which of these do you MAINLY use for standing off your cows in winter?**
READ OUT, ALLOWED MORE THAN 1 ANSWER
[READ ONLY ANSWERS PICKED IN QUESTION 22, BUT ALWAYS SHOW THE LAST 2]

Feedpad ..... 1
Stand off or loafing pad ..... 2
Wintering barn or herd home ..... 3
Winter cropping areas ..... 4
Sacrifice paddock for standing off cows ..... 5
Cow shed yard ..... 6
Races ..... 7
DO NOT READ OUT: Other ..... 8
DO NOT READ OUT: Don't know ..... 9

[EXCLUSIVE ANSWER: "DO NOT READ OUT: Don't know"]

[A - IF THE ANSWER TO QUESTION 21 IS NOT 1, THEN SKIP TO QUESTION 30]
**Q.24 What is your feedpad made from?**
READ OUT, SINGLE ANSWER
Concrete ..... 1
Gravel ..... 2
Bark ..... 3
DO NOT READ OUT: Other - specify ..... 4

[A - IF THE ANSWER TO QUESTION 24 IS NOT 4, THEN SKIP TO QUESTION 26]
**Q.25 OTHER: Feedpad made from:**
_____

[A - IF THE ANSWER TO QUESTION 24 IS 1, THEN SKIP TO QUESTION 27]
**Q.26 Is your feedpad sealed?**
Yes ..... 1
No ..... 2
Don't know ..... 3

**Q.27 Does your feedpad have a nib, that is an edging or similar, to contain effluent?**
Yes ..... 1
No ..... 2
Don't know ..... 3

**Q.28 What do you do typically do with the effluent from your feedpad?**
READ OUT, SINGLE ANSWER

Have a sump or holding facility that pumps to the dairy's effluent pond or holding tank.....
... 1
Scrape or wash directly into the dairy effluent pond or holding tank ..... 2
Have a separate effluent pond or holding tank for the feedpad ..... 3
Leave it on the feedpad ..... 4
DO NOT READ OUT - Other specify ..... 5
DO NOT READ OUT - Don't know..... 6

[A - IF THE ANSWER TO QUESTION 28 IS NOT 5, THEN SKIP TO QUESTION 30]
**Q.29 OTHER: Effluent from feedpad: _____**

[A - IF THE ANSWER TO QUESTION 21 IS NOT 2, THEN SKIP TO QUESTION 37]
**Q.30 Thinking about your stand off or loafing pad, what is your stand off or loafing pad constructed from?**
READ OUT, SINGLE ANSWER
Soil with wood shavings or post peelings (sawdust, woodchip) ..... 1
Gravel or crushed rock and rubble ..... 2
Concrete ..... 3
DO NOT READ OUT - Other specify ..... 4

[A - IF THE ANSWER TO QUESTION 30 IS NOT 4, THEN SKIP TO QUESTION 32]
**Q.31 OTHER: Stand off pad or loafing pad made from:**

_____

[A - IF THE ANSWER TO QUESTION 30 IS 3, THEN SKIP TO QUESTION 33]
**Q.32 Is your stand off pad sealed?**

Yes ..... 1
No ..... 2
Don't know ..... 3

**Q.33 Does your stand off pad have a nib, that is an edging or similar, to contain effluent?**

Yes ..... 1
No ..... 2
Don't know ..... 3

**Q.34 Do you typically collect the effluent from your stand off pad?**

Yes ..... 1
No ..... 2
Don't know ..... 3

[S - IF THE ANSWER IS 2 OR 3, THEN SKIP TO QUESTION 37]

**Q.35 What do you typically do with the effluent from your stand off pad?**
READ OUT, SINGLE ANSWER

Have a sump or holding facility that pumps to the dairy's effluent pond or holding tank . 1
Scrape or wash directly into the dairy effluent pond or holding tank ..... 2
Have a separate effluent pond or holding tank for the stand off pad ..... 3
Leave it there ..... 4
DO NOT READ OUT - Other - specify ..... 5
DO NOT READ OUT - Don't know ..... 6

[A - IF THE ANSWER TO QUESTION 35 IS NOT 5, THEN SKIP TO QUESTION 37]
**Q.36 OTHER: Effluent from stand off pad: _____**

[A - IF THE ANSWER TO QUESTION 21 IS NOT 3, THEN SKIP TO QUESTION 41]
**Q.37 Thinking about your wintering barn or herd home, what is the FLOORING of your wintering barn or herd home made from. Is it...**
READ OUT, SINGLE ANSWER

Soil with wood shavings or post peelings (sawdust, woodchip) ..... 1
Gravel or crushed rock and rubble ..... 2
Concrete ..... 3
Has a slotted floor, for example, concrete or wood ..... 4
DO NOT READ OUT: Other specify ..... 5
DO NOT READ OUT: Don't know ..... 6

[A - IF THE ANSWER TO QUESTION 37 IS NOT 5, THEN SKIP TO QUESTION 39]
**Q.38 OTHER: Flooring wintering barn / herd home:**

_____
[A - IF THE ANSWER TO QUESTION 37 IS 3, THEN SKIP TO QUESTION 40]
**Q.39 Is the floor or the effluent storage of your wintering barn or herd home sealed?**

Yes ..... 1
No ..... 2
Don't know ..... 3

**Q.40 How is the effluent collected from your wintering barn or herd home?**

_____

[A - IF THE ANSWER TO QUESTION 21 IS NOT 4, THEN SKIP TO QUESTION 43]

**Q.41 Thinking about your winter cropping area, is its contour...**
READ OUT, SINGLE ANSWER

Mainly flat ..... 1
Mainly rolling ..... 2
Mainly steep ..... 3
DO NOT READ OUT: Other specify ..... 4

[A - IF THE ANSWER TO QUESTION 41 IS NOT 4, THEN SKIP TO QUESTION 43]
**Q.42 OTHER: Contour of winter cropping areas:**
_____

[A - IF THE ANSWER TO QUESTION 21 IS NOT 5, THEN SKIP TO QUESTION 47]
**Q.43 Thinking about your sacrifice paddock, is its contour...**
READ OUT, SINGLE ANSWER

Mainly flat ..... 1
Mainly rolling ..... 2
Mainly steep ..... 3
DO NOT READ OUT: Other specify ..... 4

[A - IF THE ANSWER TO QUESTION 43 IS NOT 4, THEN SKIP TO QUESTION 45]
**Q.44 OTHER: Contour of sacrifice paddock:**
_____

**Q.45 Do you sacrifice the same paddocks each winter?**
Yes ..... 1
No ..... 2
Don't know ..... 3

**Q.46 Does the sacrifice paddock typically boarder a waterway or drain?**
Yes ..... 1
No ..... 2
Don't know ..... 3

**Q.47 Thinking about the main soil type on your farm, would you say it is...**
READ OUT, ALLOWED MORE THAN 1 ANSWER

Ash ..... 1
Clay ..... 2
Loam ..... 3
Marine Clay ..... 4
Peat ..... 5
Pumice ..... 6
DO NOT READ OUT: Other, specify ..... 7
DO NOT READ OUT: Don't know ..... 8
[EXCLUSIVE ANSWER: "DO NOT READ OUT: Don't know"]

[A - IF THE ANSWER TO QUESTION 47 IS NOT 7, THEN SKIP TO QUESTION 49]
**Q.48 OTHER: Main soil type on farm:**
_____

**Q.49 To help us analyse your answers, overall how prone would you say your farm is to pasture damage or pugging in winter? Is it…**
Very prone ..... 1
Prone ..... 2
Not very prone ..... 3
Not at all prone ..... 4
DO NOT READ OUT - Don't know ..... 5

[A - IF THE ANSWER TO QUESTION 49 IS 4 OR 5, THEN SKIP TO QUESTION 53]

[A - IF THE ANSWER TO QUESTION 5 IS 100, AND...]
[A - IF THE ANSWER TO QUESTION 6 IS 1, THEN SKIP TO QUESTION 53]

**Q.50 Thinking about pugging on your farm, what proportion of your farm would you say is pugged in a normal winter? This includes taking into consideration your prevention management, including standing off. Please also take into consideration trough areas and gateways.**

ENTER PROPORTION ..... _____

**Q.51 For the part of the herd that you don't stand off in winter or for when you do graze on paddocks in winter, what do you typically do to prevent pasture damage or pugging?**
READ OUT, ALLOWED MORE THAN 1 ANSWER

Reduce rotation length, that is, speed up cow movement around the farm 1
Back fencing or strip fencing ..... 2
Nothing ..... 3
*More feed / feed out ..... 6*
*Give larger area / paddock ..... 7*
*Move to drier paddocks / use better paddocks ..... 8*
*Run smaller mobs ..... 9*
*Move to next break ..... 10*
*Walk over ungrazed pasture ..... 11*
*Graze in square rather than rectangle ..... 12*
DO NOT READ OUT - Other ..... 4
DO NOT READ OUT - Don't know ..... 5
[EXCLUSIVE ANSWER: "Nothing"]
[EXCLUSIVE ANSWER: "DO NOT READ OUT - Don't know"]

[A - IF THE ANSWER TO QUESTION 51 IS NOT 4, THEN SKIP TO QUESTION 53]
**Q.52 OTHER: Method to prevent pasture damage / pugging:**
_____

**Q.53 How many effective hectares or acres is your farm?**
Hectares _____
Acres _____

**Q.54 And are you a...**
Owner-operator (that is, owner who milks regularly) .... 1
Owner (not milking regularly, e.g., has sharemilker) ..... 2
Sharemilker ..... 3
Farm manager ..... 4
DO NOT READ OUT - Other ..... 5

[A - IF THE ANSWER TO QUESTION 54 IS NOT 5, THEN SKIP TO QUESTION 56]
**Q.55 OTHER: Farm role:**
_____

**Q.56 Overall, what is the contour of your farm? Is it...**
Flat ..... 1
Flat to rolling ..... 2
Rolling - that is you can use a quad bike on it ..... 3
Rolling to steep ..... 4
Steep - that is, you CAN'T use a tractor on it ..... 5
DO NOT READ OUT: Other - specify ..... 6

[A - IF THE ANSWER TO QUESTION 56 IS NOT 6, THEN SKIP TO QUESTION 58]
**Q.57 OTHER: Contour of farm:**
_____

**Q.58 Do you have any comments about what we have been discussing tonight that you would like to pass on to Waikato Regional Council?**
_____

**Q.59 That's the end of the survey. Thank you very much for your time. Just to confirm, you have been speaking with NAME from Versus Research on behalf of Waikato Regional Council.**

Male ..... 1
Female ..... 2

**Q.60 Thank you for being willing to participate, but at this stage we are only interested in surveying farmers who have a herd size of 100 or more cows. Thanks again, have a nice day/evening.**

# Appendix 2: reasons for wintering off

**Build up pasture cover on the milking platform**

- To ease the pressure on the pastures and to boost grass growth.
- To preserve the grass platform from damage to ensure good pasture cover for the flush.
- Takes the pressure off the milking platform and sets it up for spring. It enables us to carry more cows per hectare.
- More grass for milking when they go home.
- Platform, store grass for the winter.
- Just to mainly build up seed around the property.
- Lightens up the platform here so we can save up pasture for the spring.
- To try and build up pasture cover and for better feeding for the cows.
- We have the run-off available and helps us build up more feed on the home farm for when calving starts.
- To take pressure off the home farm and to build up feed for the cows when they calf so can calf a touch earlier.
- Just so we can grow more grass.
- To build up some grass.
- To conserve grass on the dairy block.
- So that I can build pasture cover and to avoid damaging pasture. Also so that I can feed the cows better.
- Improve pasture cover.
- So that we let the farm grow more grass for the calving, plus we have a run-off.
- To give the farm a break and to grow some more grass.
- Build up a bit more grass, also have a run-off, gives the milking platform a bit of a break.
- To build up feed on the dairy farm. Saves on supplementary feed.
- So you get more grass and so they don't pug the paddocks.
- To build up surface feed on the milking platform.
- So I can grow a bit more grass on my dairy farm.
- To help ensure we have enough pasture for the coming season. You cannot be certain what the weather will do.
- Management tool helps us to grow a bit more grass.
- Better management for what we're trying to achieve on the farm, just gives a bit more grass coming into spring.
- The land gets very wet on flats and we need to look after grass. Keep pasture ready for when they're moved back.
- To build up pasture reserves in the paddocks.
- Transfers more grass to the milking platform for calving down on.
- To give the milking platform a breather to preserve grass for when the cows start calving again.

**To manage feed and ease pressure on pasture**

- To take the pressure off the farm so that there is more grass available for the rest of the herd especially the calving cows.
- Just to not over-stock the milking platform.
- Because the farm gets too wet. Gives us the ability to grow grass for spring/summer.
- Just to keep the pressure off the home block.
- Just gives the farm a rest, decreases the stocking rate when its wetter.
- Means I don't have to buy a whole lot of feed to feed them on the farm.
- So we can keep the cover up at an optimal level.

- To ease the load on the home farm and we have a run-off on another farm that we use, in order to ease the load.
- Usually because of a lack of feed.
- Take pressure off the farm.
- So I can get more feed on the farm.
- We have a second farm and it frees up the home farm dairy platform.
- Just enables us to take a bit of pressure of try to increase production.
- It is easier for us. It protects pasture and allows us to get grass at home. Differs season to season. Best utilisation of resources I have.
- To preserve grass basically.
- Because we want to save grass and have best practice so we have things under control.
- My rising 2 year olds stay off for 2 months over winter. Lightens the load. So instead of 320 cows there are only 250.
- Basically to make things easier on us; usually when I've wintered off it's been cheap grazing handy rather than bring in supplements.
- It's for a grazier; it helps grow the heifers out and takes the pressure of the pasture.
- Just eases the pressure.
- Colder climate and to make sure we have enough grass for calving.
- Just availability of our grass.
- Just to ease up numbers on the home farm.
- Because it's easier, the grass doesn't grow in the winter so I would rather use someone else's.
- Ease the pressure off, so can feed others better, not much grows in the winter sometimes.

- I normally just winter off my late calving cows, then I don't have to get them back until August, end of August. Takes pressure of the pasture, cows that are here and me as well.
- To save grass and lighten my load.
- To take the pressure off the home farm. They would need to feed them and look after them during wet weather. Wintering off allows me to milk for longer at the end of the season.
- To preserve feed for the rest of them.
- Take pressure off the home farm.
- Not enough grass.
- Relieves the milking platform a bit.
- It's basically to get the feed stock up on the farm for milking otherwise we have no feed.
- To feed them properly; if we leave them on the farm all of the animals on the farm will be less well fed.
- Feed demand basically.
- Because it is easier on the farm.
- Just to relieve the paddocks. We take the late „calvers' away to relieve the pressure.
- Feed shortages at home primarily.
- It is easy management and conserves feed.
- Usually six weeks only, all of June and first half of July. To make feed budget work. If not at home, will not eat home's grass. Nothing to do with pugging, just saving grass.
- To take pressure off milking area and onto my own block where I grow maize over summer which helps to fertilise it too.
- To reduce feed demand.
- I do not have enough supplements to feed them at home. It makes life easier on the home farm that you do not need to worry so much about the weather and less mess in the paddock.

- It is quite cost effective. It saves the pasture.
- To feed them properly.
- To ease pressure on the home farm (milking platform).
- Because we just don't grow enough grass to feed them all and if we didn't graze off we would pug our soils up.
- To ease the stocking rate because we won't have enough feed to feed them.
- We winter off the heifers coming in which we take to another grazing block.
- I have a block up the road to help support the main dairy farm in terms of the nutrients, I take them up the road just to graze and feed when things here on the farm are a bit stressed.
- Make it easier to maintain grass through winter. Less pressure on pastures and feed for cows.

**Has a run-off block available**

- Because I have a run-off block and want to graze it. Helps grow the grass. Destocks the dairy farm.
- Because we have that opportunity owning another farm on the boundary of this one. We also send them away because we winter milk.
- Because I own another farm which produces maize. When the maize is cut, we grow Italian rye grass and cows go there.
- I have a block that we grow maize on, it is an environmental thing to take the pressure off the land.
- Have own run-off and they stay there for a year and come back when they calf.
- We own the small run-off just thirty hectares and there is some grass available so we bundle them away so that they aren't in the way.
- I have a run-off up the road so half can go up there. I use it in winter so that the platform can be free for the milking cows.
- Because we have a grazing property up the road (run-off) so it works well.
- Lease a run-off nearby so this makes it a bit easier to do it.
- Because we have a run-off.
- Because we've got a small run-off down the road.
- We have a run off and when I was a bit short of grass in late Autumn I moved a few of them off so I'd be able to feed the others a bit better.
- Because we have a run-off available.
- I have a place that I can place them, to save my pasture during winter.
- We have run off that we do [raise] our young stock on and we always have surplus left for wintering off cows. Just to try make less mess on the home farm and feed our cows better.
- We have a run-off down the road that grows grass well.
- I have a run-off so I can take advantage of that.
- Owner's own other land that they grow maize on in summer and that they use to winter off in winter.
- We have a run-off block. Use it to build up grass on the home farm.
- He has a run-off and makes use of this by wintering off animals.
- Because we've got a run-off and our farm is a bit wet.
- Because we have a maize block that is a run-off.  It's a commercial maize block used in winter as a run-off.

**High stocking level**

- Because we milk more cows than we have land for, and it gives the grass some time to regenerate after the summer months of damage.
- We're fairly highly stocked.

- We're very highly stocked on the farm and it relives a bit of pressure on the home farm and we utilise the run-off from down the road.

- I winter them off as it enables me to run a higher stocking rate and keep a higher number of cows. I do a mixture of my own supplements and buy in some. Silage I make 60% and buy 40%.
- To allow a higher stocking rate for the rest of the year.

**To prevent pugging / damage**

- I winter them off so I do less damage to my pasture; we have a quite wet pasture so it's easily damaged.
- It is too wet, save the damage they make to the paddocks.
- I have a flat farm and it makes it easier as it minimises pugging and I can feed the ones left here better.
- Make more grass available and to stop pugging on the farm.
- Because I have a wet farm and it's to prevent pugging.
- To look after my own pasture to prevent pugging.
- To give relief to the home farm, do less pugging on the home farm and to boost feed levels on the farm.
- Less damage to the soil as less weight in mobs.
- Controls pasture damage.
- To save pugging.
- To minimize pasture damage at the home farm and to better feed the cows that remain. We produce our own supplement and buy in as needed.
- To conserve the feed and look after our soils.

**Cold climate / lack of grass growth**

- It is cold and wet, and we need to maintain the grass. It is also cheaper in the long run as there is more grass on the farm when calving occurs.
- So we can grow a bit more grass in the winter months because we are in a cold area.
- We can't grow enough grass as our temperature is too cold where we live.

**Wetness**

- Because it's too wet to have all of them on the farm.
- Ground gets really wet as we are on peat, eases the pressure on the farm.
- We are a very low river flat farm, get very wet. Takes pressure off the land.
- Because we are on a very wet farm and it works very well for us.
- We are on heavy clay soil so when it gets wet we have to stand them off for too long so it is better to have them off the farm to prevent pugging.

- We have quite a wet farm and we can't carry them effectively. It causes pasture damage.

**Lengthen season / milk through winter**

- Milk more cows through the winter period.
- I can milk cows into May as it frees up pasture.
- Last year I milked some cows through so for every cow I milk through I winter off too, to protect the grass.
- Every milking cow eats double the amount of the dry cows, therefore we need to take 50% off.
- We winter milk (milk all winter). We graze off cows so we have enough grass for the winter milk cows.
- I need to have as many cows off the farms as possible so that I can milk the other cows (winter milking).

**Other**

- We don't winter off the main milking herd only the heifers.
- They can get feed better and gain more weight at grazing farms.
- I winter off my herd because I need to.

# Appendix 3: reasons for not wintering off

**Costs are prohibitive**

- We couldn't afford to winter them off so we don't; we manage it as best as we can.
- Cost associated with grazing.
- Because it costs too much bloody money.
- We don't like to spend the money; we can do it ourselves here.
- The cost is too expensive.
- It costs too much money, I am only a small farm. There is no grazing land nearby. Would be prepared to travel 10km if possible.
- It costs too much money.  It's always been done that way here.
- The finances needed for it.
- It costs too much.
- Cost far too much. Can manage at home very easily.
- It is too expensive.
- Costs associated with it.
- The cost is too expensive.
- It’s too costly. We can feed them as we want.
- Costs are far too high.
- It costs too much.
- We have a run-off but not big enough to take the additional stock. It is not profitable for us to send the cows away during winter.
- Because I can't afford it.
- Money. It costs too much to winter, the cost of grazing and transport.
- It is too expensive.
- The cost doesn't stack up economically.
- Cost.
- To keep costs down.
- Financial reasons.
- Don't need to.  It is cheaper to keep them here and our farm has the resources to cope with them.
- Young stock, never done it, costs a lot.
- The cost. Our stocking rate doesn't warrant having to graze any off.
- Costs are high. No need generally. We can just do it on the farm. We are self-contained.
- Cost, it is more efficient to have them at home. I can keep an eye on them myself. It is expensive to buy winter grazing.
- Financial reasons, it costs so much.
- Economics. Grazing on, there isn't much cost.
- The cost is far too expensive for us.
- It's too expensive.
- Cost money and it’s easy, expensive to graze out.
- Too expensive.
- It's too expensive to send them onto neighbouring properties or graziers.
- It's too expensive.
- The cost.
- The cost.
- Because of the expense and I can feed them myself rather than pay someone else to do it badly. I make a bit of grass silage on the farm and buy any other supplements as needed.
- Cost too much.
- Because of the cost. You either pay for off feeding or pay for food.

- Because economically does not suit us, we can keep a better eye on them here.
- It's too expensive and too hard to find land that's close enough to truck the cows to.
- It's very expensive, it's over $20 a head this year.
- It's a cost thing and we're on fairly free draining soil here. It's recently been developed and we're just trying to get the grass to grow properly.
- Don't really need to. It's cheaper not to.
- Mainly because the cost is unsustainable due to the way I farm because I don't think I've got a high stocking rate. If I did winter off I would have an abundance of grass here that won't get utilised.
- It still costs more money and freight is a killer because you're only away 6-5 weeks and freight both ways to take them away and bring them back which brings the price up highly.
- Because we can normally feed them here, graze everything on the farm, cuts cost.
- The cost and availability.
- We have enough feed. Too expensive. Poor availability of good winter grazing at a reasonable price.
- Can't afford to do it.
- Because it is too expensive and I don't really need to.
- The cost for me is quite excessive for a cow to graze and transport. And then the animal may not be up to the conditions that I would like to be at. My animals might not be looked after as well.
- The owner wouldn't be willing to pay half the grazing. We normally grow enough grass to have everything on anyway.
- We have done in the past [but] the economics couldn't add up for us.
- Cost. Ease of management. Control, what they eat.
- It's more cost effective to keep them at home and look after them better.
- Too expensive.
- Not economic - availability and price of grazing is expensive.
- Because it's too expensive.
- Generally because of economics.
- Cost of wintering off. Can't afford it.
- Cost money, have our own pad as well as supplements.
- Cost is too high.
- Cost.
- Too expensive.
- The cost. We have a grass based system, and keep the cows at home.
- Have enough grass here.
- Too expensive.
- Can't afford it and we have a big enough area so as to do better with them.
- Cost effective to have them at home.
- The economics of it; it's too expensive and we have relatively good soil so we don't need to as much as some other farmers might.
- Cost.
- Cause we can do it at home and it's cheaper
- Because can't afford it, we have good grass growth so we don't need to winter off.
- Don't need to have the extra cost we just don't need to graze off really.
- Because of the price of doing it.
- No need to, it is quite expensive. I am able to look after the herd better on the farm.
- Because of the cost.
- Cost.
- Because it costs money.
- Because the cost of it.

- Cost. We can cope with them on the property.
- Because too expensive.
- It is too expensive. I have a self-contained unit.
- Cost.
- Cost.
- It costs too much. I can starve them cheaper at home.
- The cost behind it and cows put a lot of fertility back on the farm.
- We do not need to, we have good soils here plus off farm grazing is too expensive in this area and we buy in a lot of supplements to carry over.
- It costs too much and we can't afford it.
- Because we haven't got our own run-off or anything. To have them off, it is too expensive.
- The expense of it and it is not very practical or good for the cows.
- Because it's an unnecessary expense, we are able to graze them here as we have good soil.
- Too expensive.
- Cost. It is too expensive.
- We're under stocked and it costs too much. It is too expensive.
- We run an average stocking rate so it is more economical to keep them here over winter. Most supplements are made on farm so we have enough feed with the low stocking rate.
- It's too expensive. We're a sustainable system so we don't need to.
- It is too expensive.
- Mainly I do not. It depends on the cost. We have a feedpad so if I can get the feed cheaper than grazing costs then I will buy in the feed. It also depends on payout from Fonterra. If it is large then will try to extend milking season and then will need to replace feed by grazing or buying in supplements. The extra we get for milk would need to more than what we pay for grazing or extra feed. It needs to be overall beneficial financially.
- It's too expensive and it's not good for the farm fertility and animal health to winter off.
- Because it is too expensive.
- Costs too much, and we like to control their diet.
- I do not graze off because it’s cheaper for me to not graze off and also I have control over the feeding levels of the herd.
- Because it is too expensive to pay for grazing that is, contract graziers and leasing.

**Wants to keep control of cow condition**

- Often I find it is an issue of availability and quality of areas available to send my herd. I have wintered off my cows before, a couple of seasons ago actually, and they came back skinnier than when they left. If I am paying to winter off my cows, I want to be ensured that they will be fed and cared for properly and that the place where I am sending them too is not already over filled or that there is enough pasture to feed them.
- I just feel that we're better to keep them at home and keep an eye on our stock. The cost factor as well.
- I want to have control of how the cows are fed and what conditions they are in.
- I do not have a grazing block. And if you truck stock around the country they quite often come back worse than when they left. I prefer to buy in supplements and manage my own stock on this farm.
- I can look after them better at home.
- Not wanting to take them off the farm.
- The people don't look after the animals and they send them back skinny.
- I've never really liked grazing off my cows, I like to look after them.
- Like to have all of the stock on the farm so I can control what happens to them.

- I like to have control of their intake over winter and I haven't found good grazing at the right price.
- Have more control with them on the farm and can look after them better.
- The wintering that is available is all been allocated in the area, meaning that there isn't anything left available. Ideally when you send them away you would like them to come back better than how you sent them, but often that doesn't happen.
- Nobody feeds them otherwise.
- Because we care for them better, don't get fed properly when off the farm.
- We can safely monitor them at home.
- Bad experience with grazing off. Cows return on a lower condition compared to when they leave the farm, thus defeating the purpose of wintering off.
- Just want them on the farm, can watch over them.
- I think it is upsetting to the cows. It takes them a while to settle to cows and it is difficult to get grazing close. Also, worried about TB.
- It is too hard on the animals, animal health issues.
- I prefer to control their diet.

**Has enough feed / infrastructure on home farm**

- Mainly because I don't need to. I seem to try grow as much grass as I can so I have a full round during winter and then it is back again when I am calving.
- We don't need to.
- Stock rates are too low at the moment, we are slowly building them up.
- Cause I have a feedpad.
- We've got hills so they 'winter off' up there.
- We have enough space on the farm to keep them here rather than having to send them off.
- Have got heard homes.
- I'm not that heavily stocked that I don't need to.
- Everything is done on our own farm.  Do not need to send them away anywhere else.
- Because plenty of grass available for the herd.
- Grow a lot of grass in the winter.
- Don’t need too, low enough stock.
- I don't need to because we have enough feed on the farm.
- Low stocking rate.
- I only milk part of the farm. Low stock rate.
- We don't need too.  We are able to accommodate the cows on our own farm, enough pasture and land.  Not necessary to send the cows away.
- We don't need to as we have enough feed and we are on hill country so we don't get very wet.
- Don't need to.
- Nothing grazed off at all.
- No need to send away - have resources to look after here.
- We grow enough grass on the farm to feed them all over the winter. I only need to buy a little bit of silage and palm kernel.
- Because I don't have to, enough pasture.
- Because I don't need to, I have enough land.
- Because I have a run-off. Don't need to.
- Because we get by with what we have.
- It just suits to keep them at home.
- I am satisfied that I can feed them well enough at home. I buy in some supplement feed that is mainly used in autumn but some will be left for the short fall in winter.
- Don't need to.  There is also a cost to grazing off and also better to keep cows here to graze.
- I don't need to as I have enough feed.

- No reason to; we have reasonably good systems in place to make it unnecessary.
- Because we do it more efficiently here; we have a feedpad and stand off areas and other various areas to help manage.
- I have a self-contained unit and everything (all stock) is here always. I make all supplements myself that is hay etc.
- Basically I think my stocking rate is sustainable for the complete year. Buy in minimal supplements if needed.
- Don't need to we have a low stocking rate anyway.
- It's just the way we do it. Small herd, enough feed.
- Because I have enough grass for them.
- We never have, have enough grazing.
- There is basically no need. We have good wintering country with good contour that eases good winter management. We grow our own supplements for winter. We buy very little supplements. We are organic.
- No need to because we can feed them here.
- We used to but we've lowered our stocking rates.
- Don't need to, farm can support the cows over winter without losing much grass if I'm careful.
- Because we can leave them on, we've got an attached dry stock farm, we have enough grass.
- We have enough feed on farm.
- Because we are able to feed them on the farm for the winter.
- We've got a very low stocking rate and we don't have to.
- Used to, don't do it now, enough grass.
- The stocking rate is reasonable and they can get through winter on their own.
- Because we deal with them at home.
- We cull as many as we can and bring in as many heifers as we can. We cut back on grazing needs this way.
- Because we don't need too, good soil and low stocking rate.
- We can carry them at home.
- Don't need too. Lower stock, so I can cater for feed during the winter.
- Just easier to winter them on.
- Not overstocked so no need to winter off.
- Got a feeding pad, therefore no need to winter off.
- Costs a lot of money and it is not always that easy to find good grazing. You also run the risk of other people not looking after them properly for example too skinny then it screws up your season.
- We are graziers rather than sending off our mobs to graze.
- No need.
- Don't need to. We can sustain the stocking rate, and we are not driving for maximum production. Self sufficiency. We carry what we can carry.
- We're over in the Coromandel ranges so we have bigger rougher land than some areas; they're not always on the milking platform though so you can say that some of the farm might as well be a run-off.
- Don't need to, I can feed them on the farm.
- Don't need to have appropriate management here.
- Because we keep the cows on the farm, fairly good soils and enough grass.
- We generally grow enough grass. Grazing can be hard to find. We've got facilities to keep them here.
- We don't need to winter them off as we have the land capabilities to keep them here, especially seeing as we milk all through winter. We feed the milkers from the feedpad when necessary so we can still get a good yield.
- Because work out don't have to. Yearlings are not here calf's are grazed away and end of season I get rid of some cows.
- Small herd size.
- We winter them all on the farm, have the facilities.

- No reason to, good cover. I'm a more old-fashioned, traditional farmer.
- Don't need to, fairly low stocking rate.
- We can house them on farm.
- I have a slightly lower stocking rate so I am able to keep them on in winter.
- There's no need to.
- Because we have a large farm with a beef unit on it as well so we don't need to.
- We don't need to.
- We have enough grass and supplements on the farm.
- We have got pasture, a good wintering country. It is not a problem.
- Because we don't need to really.
- We have enough grass on the farm.
- We don't have to, we are able to graze them here.
- If we have enough feed, we do not need to. If we have to we will, but general practice is that we keep them at home.
- We have enough room on our own property.
- Has sufficient grass and winter feed to feed the herd.
- Because I feel I can carry them on the farm's pasture quite well.
- Because I can grow enough feed to keep them on my farm.
- We don't have too, we can feed them all at home.
- Farm is large enough to graze at home.
- There is enough space to graze on, low stock number.
- There is enough room on my farm and relatively low stocking rate.
- Because I have enough feed on the farm for them.
- We haven't got a lot of stock on our farm so we have enough feed.
- Don't need to, we have enough feed and quite a low stocking rate.
- We are not that highly stocked so doesn't really worry me, fairly good growing farm and fairly dry so we don't need to.
- Because I don't need to and it's too expensive and limited opportunities in Waikato.
- Because I run a low stocking low import system.

**Distance - grazing too far away / availability**

- There typically isn't grazing area easily available, like to keep cows at home.
- We haven't found anywhere suitable. We did last year, first time in six years, but it's not a common thing.
- Lack of availability of suitable grazing land, nothing close by. I would be prepared to travel 30-40km.
- Because there is nowhere for me to winter them off. The costs is also a factor as it is unsustainable as I have to cart all the cows off the property.
- There is a lack of availability for grazing off in reasonable locations. There are ones miles away in different districts but none too close. If you're looking after your cows yourself then you know what's going on and that they're cared for.
- Because there is no good grazing available close by.
- Because we have nowhere to winter them off.
- Just getting good grazing, that's the problem.
- Nowhere to put them, all are contained on rotational grazing system.
- Difficult to find the right place to put them.
- No place to send them.

**Organic - no organic grazing**

- Cause we are organic and it is very hard to find grazing on organic farms.
- We are organic farmers so it is not practical as there is not fully certified organic grazing anywhere handy. We have our own winter grazing over at Whangamata hill block however cannot use it for this herd as it is not organic certified so we take in other farmers stock there.
- We are an organic farm and the rules for grazing off mean that finding organic grazing is difficult.

**Uses supplements grown / imported**

- We like to look after the herd on the farm and use supplements. I am also just a share milker and I need to do what the farmer wants. I do not have full control. Am only 50/50. The owner wants them on-farm. We have free draining soil that can handle the wet weather. Trucking the cows is hard on the farm animals, especially when they come back and are heavily pregnant. You need someone else to look after your herd. They never look after them as well as yourself. Like they need magnesium and to get the weight on to prepare them for the new milking season. For example, when my father's ones are away, they tend to lose some stock- normally winter grazing is rougher hilly country. Different factors make the difference.
- Because we can purchase feed to make sure we can feed them at home.
- I make silage.

**Winter milk so cows are on farm anyway**

- We winter milk all of our cows usually.

**Self-contained farming policy**

- Because I believe I should be able to do the whole thing on my farm.
- We try to be self-contained.
- Keep them at home, farming practice.
- Not our policy, self-contained policy.
- Farming practice is self-sufficient.
- Because my management plan is we can survive within the farm boundary.
- We're a self-contained unit, we just winter everything on.

**Other**

- We bring all our cows home on the first of June.
- Because it's farm policy and we have the area.
- Because we just choose not to.
- Just would rather keep them at home.
- Because we just got here (sharemilkers) and didn't realise that not grazing off was the usual practice.
- I just don't.
- Too much grass, and because of the economics - it costs money.
- Most people don't, it is normal practice to have them on the farm.
- Never used graziers before.
- It's just a practice we've got here on this farm.
- I hadn't really thought about it.
- It is just my practice to winter them at home where I can manage them.
- Traditional farming, graze on the farm.

# Appendix 4: further comments

Please note:

- Comments recorded verbatim may have been assigned to more than one theme.
- Not every comment appears listed under the theme to which it is assigned. If a comment is coded under multiple themes, the comment will show under the first theme selected and not all themes selected.
- Comments recorded verbatim are largely left unedited.

**Request for more information / support / advice**

- Education is needed to minimise pugging on farms so information available on how to reduce pugging on farms is useful.
- We try our hardest to look after the pastures and damage, but sometimes you can't prevent the damage from mother nature. The run off of effluent etc means that when mother nature comes in to effect, there is only so much we can do. Communication and allowing farmers to put across their views is very important. Also understanding and patience is huge and if they want us to look after our environment they need to be tolerant with the way we run things.
- When I built my feedpad I was surprised that the council took very little interest in whether I was doing it right or not. I did contact the council and was given a list of people to get in touch with; however no one visited to see what I was doing or help out. I was only sent a small information pack which didn't help very much. It would be helpful if in future it was possible to have someone visit the farm to see whether it is up to standard or more in-depth information.
- What are you going to hit us with next? Now you have effluent under control are you next doing stand off pads etc?
- If they would be a bit more helpful with what pads to use, instead of getting a pad and then them coming back and saying no that is not right. They won't put themselves in the firing line.
- Be consistent with the rules, don't keep changing the rules every five minutes. And have good guidelines. Can't keep changing everything all the time. More Environment Waikato.
- They could be more educational and helpful in what they are doing. The participant had an experience a few years ago where he was putting in a new effluent system (costing $60000), he contacted the council for advice and was told that they do not give out advice, however he would be prosecuted if he got it wrong. If he had had more information and help he would have completed it differently and saved a lot of money as he is now redoing this. He was not from a dairy farming background and sought advice from the council and was let down. Now they would be far better to take a more educational stance when dealing with farmers. Farmers want to comply and do their best, however they need the educational and informative advice from the council.
- If we all know what we're doing we can minimise the effluent into drains etc. They were very good questions and it is a problem in the Waikato. It is going to become more necessary for containment of animals because of effluent.
- A little more clarity as to advice for designing effluent systems and guidelines to this. Marine clay farms may need 90 days storage, whilst other soils may not need as long. Farmers are given confusing and conflicting information. I would like more advice which is scientific, based on actual farm trials with different systems. I am reluctant to spend when it may not be compliant in 5 years time.
- Some of the ideas regarding feedpad and stand off area design are poor; you can't just make a stand off pad without drainage into effluent ponds. For small farms, I think it's just not economically viable sometimes unless you keep it simple. You want to make improvements, but it will cost an arm and a leg to do it. I don't really know what they require of me in order to begin construction of feedpad/stand off pad etc.

- Any information that could be passed on to farmers as a result of this survey would be really great for helping to better educate us and also give us an idea of whether or not farming practices have improved for the better or worse.

**General solutions and suggestions**

- Why don't they subsidise infrastructure and systems to help with better effluent collection?
- I am hanging out to get a composting barn in time for next winter.
- This winter has shown that having a wintering barn had definite advantages.
- Work with us, not against us.
- Hungry cows are the ones that keep moving around - keeping cows full reduces pasture damage.
- I believe with good farming practices and common sense, the problems of pugging and pasture damage can be kept to a minimum in this area.
- We feed maize silage to our cows to reduce the nitrogen content being returned to the soil. We graze off on our maize paddock throughout winter, which is grows grass throughout winter. And all surplus effluent on the feedpad are collected and distributed regularly to the lowest fertility areas of the farm where the irrigator does not reach.
- Rule by encouragement rather than dictating. Showcase people and/or farms that are doing things right.
- We have got some pine trees that we stand the cows off on, because it is a good dry area when it is cold or wet.
- Make informed decisions, preferably by people who do farm.
- Their management of the Taupo lake. I would like to suggest that they grow Chicory and Lucerne on the properties which boarder the lake. I would like them to test the sediment that is in the lake (not in Taupo but in the power dams), because there's been years of sediment build up. I would like them to take samples. Might learn a lot from taking those core samples.
- Leaching determined by feed type. Maize has low nitrate; grass farmers waste a lot of protein therefore nitrate comes through excretion.
- We will probably be applying for consent to put up a barn for 800 cows in the next year.
- Stop using urea to make the grass grow; it's poison and it probably does more harm to the soils than anything else.
- Bringing in additional feed onto farms can cause more nutrient loading and hoof damage.
- I don't expect to have invest in expensive capital structures, that is herd homes.
- Stand off pads may help farmers, but not cows.
- To reduce pugging we alter duration in paddocks.  Stand off stock when wet. We do not back fence when wet, this is only done when dry. We give them more space to move when wet, let them spread out. When wet we increase their feed so when so they waste less. So if hungry they will mill around and move more so damaging grass. So feed more when wet to get contented cows that stand/sit around only.
- Lower my rates. Unlike some farmers, we are a lower stocking rate and lower input. The big farms that put in a lot of feed are the ones that are doing damage. If we could afford to go organic we would.

**Positive WRC comments**

- They are a bit picky but they are doing a good job.

**Negative WRC comments**

- I know they are doing their job and that but the storm water drains in town are full of poison but they are not doing anything about that. Instead they are just picking on the poor dairy farmer.

- They need to follow up with the drainage near the river. Waitoa River in particular. I believe that farmers are generally doing what they can but EW is not doing what our rates are paying for.
- Clearly WRC are not happy with how we are grazing our cows. WRC are far too judgemental given most of them are not farmers. It is very hard to manage wet pastures. Farmers are working hard to protect their pasture as that effects their bottom line. We would like lower rates.
- Sometimes they just criticize us farmers and we do our god damn best but we still get critised.
- We got a letter a couple of years ago from a fly over on a helicopter, presumably EW in conjunction with District Council. We felt the letter was very rude. It said that we had viewed our farm during their inspection and they said that you seem to be complying but we will be monitoring further. This, in my view, is anti-farmer. We felt that it would have been better to say something more encouraging to us.
- They're wasting our lives and wasting our money. I'm currently in the process of upgrading my effluent system - $150,000 on top of $100,000 five years ago.
- Did they really spend $462,000 on lunches in 2010?
- It's time they mind their own business. Too much red tape; picking on people that have real reasons for what they are doing. Making mountains out of molehills.
- Stop giving us so much paper work.

**Comments regarding the environment**

- I don't disagree with what you're trying to do in terms of controlling the damage to the environment. I have had a few recent graduates around to have a talk to me and they were very rude. We are more responsive to being treated like people than school children being punished for doing our work. I do try, and spend a lot of money, to prevent leaching and I am accused of just moving the problem from one place to another when I've tried very hard to eliminate some of the problems. We don't even receive any help about what we need to do, they just tell us the law and don't suggest what can be done or where, how to build things; they just point out even more issues with what we do to try improve our farms.
- Wintering off dairy platforms can just transfer our problem and often the problem can be worse as the management is not as effective.
- We're very concerned about keeping the waterways clean.
- I believe that leaching of nutrients into rivers is caused largely by growing crops, maize, too close to the river. Chemical fertiliser and other chemicals enter the river. Dangerous practices like releasing chemicals over rivers from the helicopters mean chemicals get into waterways. This practise is from WRC too. Also, this is an organic farm where the soils are free draining.

**Can't control weather**

- The winter we have just had has probably been the worst we have had and I have had the most damage this year than any other year.
- I think it is too important for the council to remember extreme weather events are challenging and it is during these times that cause the major effluent problems.
- We can't control the weather, some years are better than others.
- This year was an extreme year and we had to do things we normally do not do. I believe all farmers try to minimise farm damage-pasture damage.
- It was a very wet winter this year and it seemed to be for a longer time. Normally we get wet now but it started very early this year. We're pretty good with the effluent we try to keep it out of the waterways and do the best we can. We also don't graze near waterways when it's wet.

- It is very difficult when it rains everyday for six weeks. We do our best. Someone needs to design something to help farmers - an economical way of covering their yards. It would be a huge help in controlling effluent.
- The weather is getting more extreme.

**Differing farm context / soil / contour**

- When it comes to the questions, farmers sometimes have to stand off next to waterways. We get a lot of back up as the council will not clean out the drains. They seem to be taking a backwards step on it every year. They are not cleaning, it's even backing up to the neighbours. They came in winter once when it is a summer job. We do all we can to protect waterways, fenced them off etc. We were promised flaxes to hold the banks etc, but we haven't seen a thing. We take out on average 10m off paddocks to protect the banks. Areas on the farm are eroding and caving in. We only have a little gauze holding it up.
- This type of ash, on rolling country, is probably the driest soil you can come up with. It's so free-draining and quick drying that it can rain buckets today and be dry tomorrow which is something some people don't understand about this soil. The Waihi ash soil has an advantage over Hauraki plains where they can stay wet for weeks and stand off for long term. We just need to stand them off literally when it's raining so badly that it's necessary to give the soil a day to dry again.
- I think they need to look at the Hauraki Plains separate to the other areas in country and separate to other areas in the Waikato too. Also the Hauraki Plains have several different soil types and different contours. It can't all be treated as exactly the same.
- Because of the soil (hard pan) there is no leeching into the soil, because it is so hard the water sits on the soil. We have hump and hollow contour which prevents from it leaching into the soil. At the bottom of each hump and hollow there is a surface drain that we spin out, so that when it rains the water goes out quicker.
- I have a covered feedpad, just built to manage pugging events. The new feedpad manages effluent with a new 90 day storage pond.
- It all depends on how much feed, and how many cows you have per hectare. I run close to three cows to the hectare. I do realise councils are trying to have stand off pads but it's not relevant for everyone.

**Farmers are doing good practice**

- Most farmers try to take care of their environment to the best of their ability, and it's a little bit difficult with the Council pestering them about it.
- As farmers we do our best to reduce pugging as, in addition to environmental factors, it works out cheaper for us in the long run as we have more feed for the cows in the following season if less is pugged.
- We are very conscious about what we are doing.
- I think that farmers are getting better at looking after pastures and not pugging.
- As a farmer it is something I work very hard at, it is self centred as I have an economic reason as if I damage it, it is months before it recovers. You are interested environmentally for it. I am known to jump out of bed at 3 or 4 am if I hear bad rain to move my stock if that rain was not predicted.
- There is a lot of farmers doing a good job so don't put us all in the same box. There are a lot of farmers who are aware they can be doing better but some people are constrained by finances.
- We try and do the best not to pug, and we always re-grass, it's always small patches and we reseed those patches. Stop any run off into creeks and that kind of thing.
- We generally endeavour to do our best in terms of our land and animals but sometimes keeping everyone happy is rather difficult.

- We do the best we can under the circumstances we are faced with. We certainly don't want our farms pugged as it ruins our soil so we do the best that we can.
- The Waikato Regional Council should not target particular farmers as we all do our best to protect the environment.
- I am very sensitive to pugging and we have a program if anything gets damaged. Pastures is still evolving and we have to keep replacing them and we work through our cropping programme to achieve this.
- Hopes that they don't get heavy handed on the farmers as they are doing their best and doing quite well.
- My observation is that farmers are generally doing everything they can to protect the soil. Farmers in general are employing both faster rotations and back fencing to achieve this.
- Most farmers are caretakers of their land and we try to do the best we can.
- I think the bulk of farmers are trying best practice. People are more aware of pasture damage and just don't want it on their farms so it would be helpful if the council (Waikato Regional Council) provided some sort of feed back to farmers after this so that we can understand how to fix issues that we might have.

**Other**

- They should be fully aware it is a particularly difficult part of the year, not to pug and not to damage. At the end of the day it is good facilities that allow us to manage it that way.
- I think we are lucky in Tokoroa that we have free draining soil. In time, I think we will have to stand off cows if there are changes in weather patterns.
- Standing cows off and pugging damage has been a serious issue, thinking about investing money in better facilities for wintering practices.
- Believes that the council wants to bring in a legislation that has the view point of: farmers will need to stop wintering off their herd as this only causes pollution in other areas, they (W.R.C) want farmers to keep the pollution on their own farm and stand off their herd. The new legislation that they want to bring in will limit the amount of stock that you can run and it will force farmers to build more areas (Herd home, stand off pad, feedpad, etc.) for standing off. This will in turn force farmers to spend more money to meet the new requirements.
- The weather conditions at the moment seem to be very extreme so that is influencing my answers quite a bit just because of the weather.

# Appendix 5: run-off block location

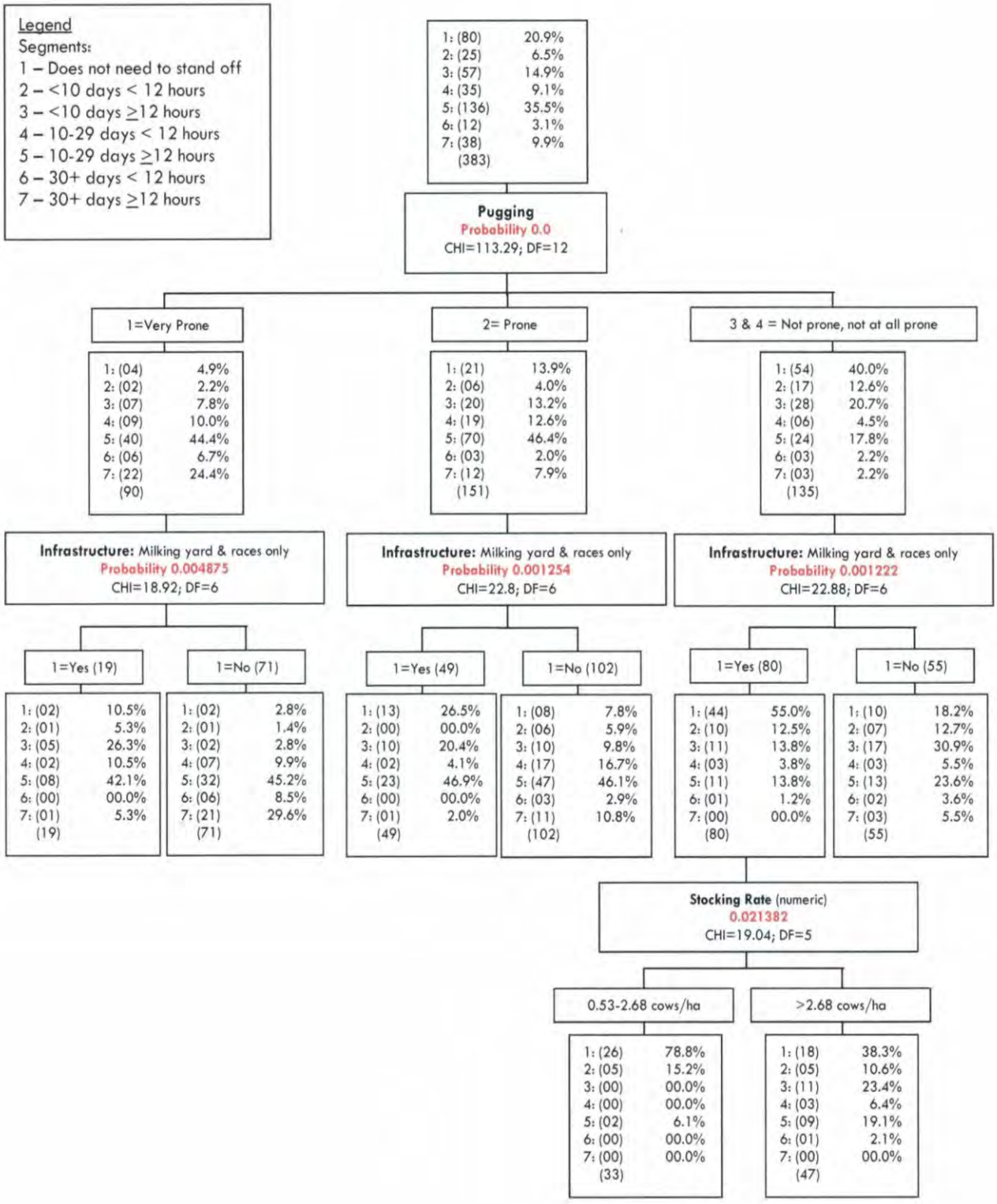
| Farm in: | Run off block location: |
|---|---|
| Hauraki District | Paeroa |
| South Waikato District | Raglan |
| Taupo District | Napier<br>Taupo |
| Thames-Coromandel District | Tairua and Paeroa |
| Waitomo District | Hawkes Bay |
| Rotorua District | Rotorua |

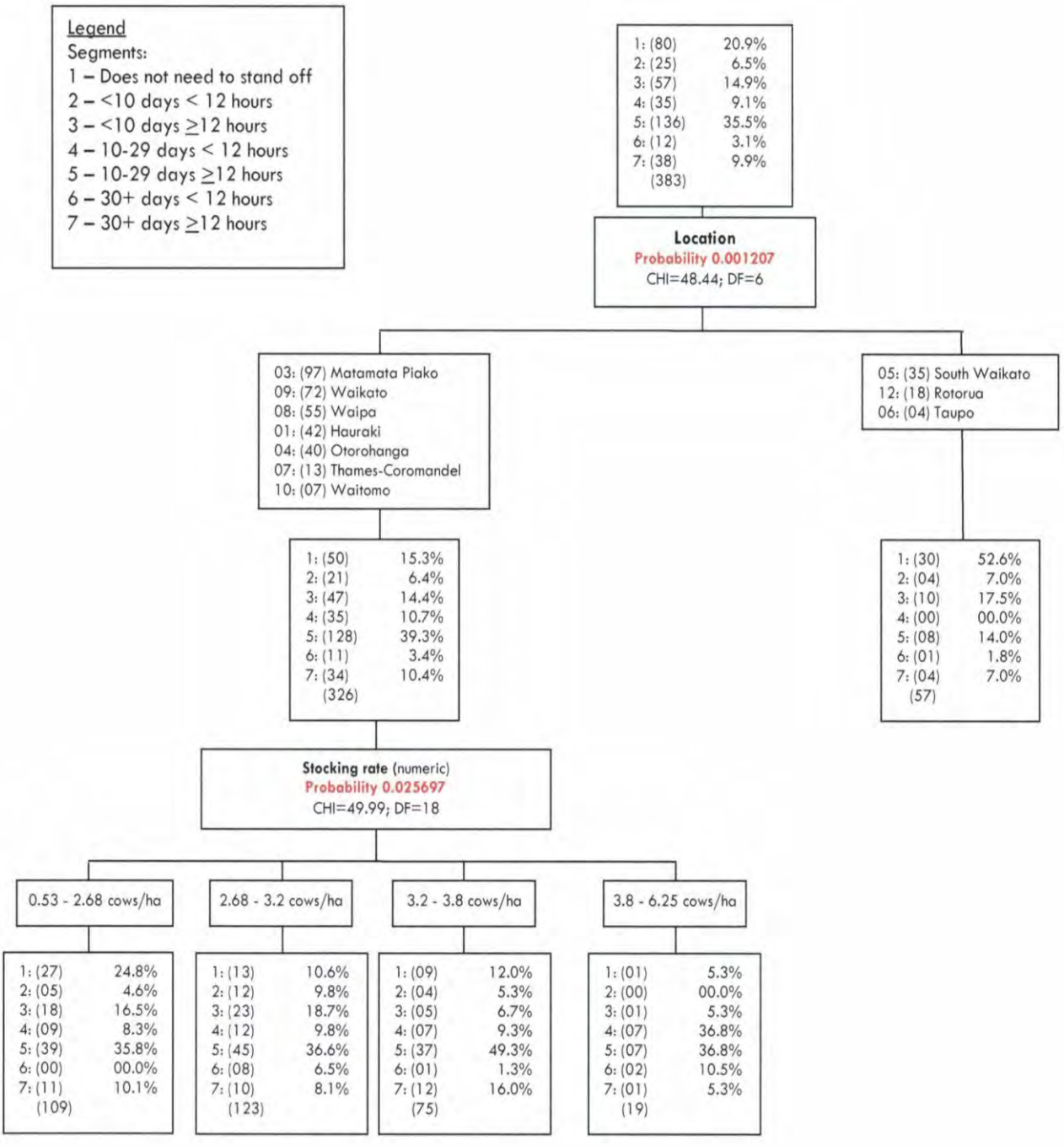
# Appendix 6: location of contract grazier

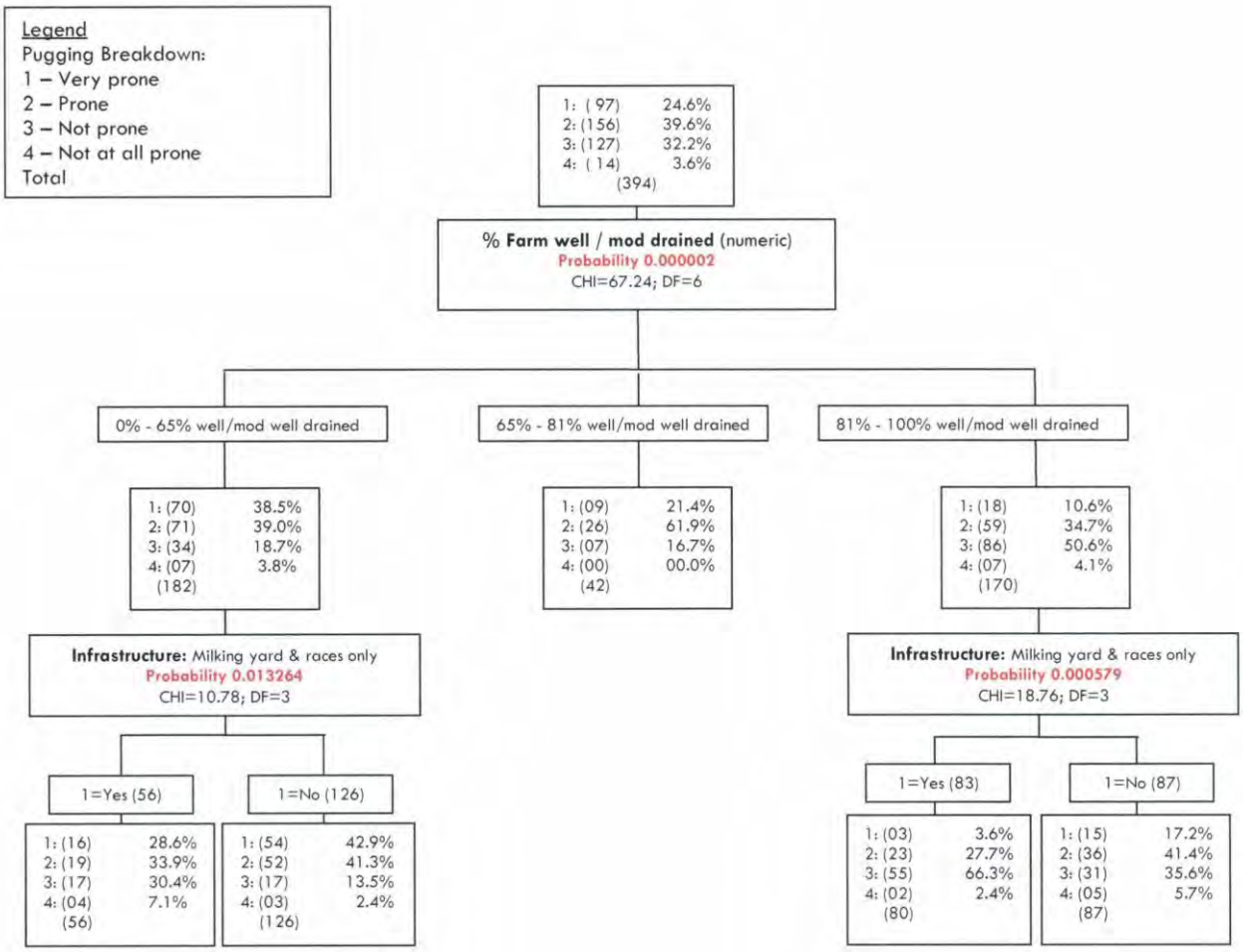
| Farm in: | Location of contract grazier: |
|---|---|
| Hauraki District | Morrinsville<br>Maramarua<br>Waihi<br>Mangatarata (on state highway 27) |
| Matamata-Piako District | Matamata x2<br>Matamata and Te Kuiti<br>Morrinsville x2<br>Tauranga<br>Te Awamutu |
| Otorohanga District | Otorohanga x3<br>Te Awamutu |
| Rotorua | Rotorua |
| South Waikato District | Hastings<br>Cambridge<br>Rotorua<br>Putaruru x2<br>Raglan<br>Taupo |
| Waikato District | Raglan x2<br>Piopio<br>Huntly x2<br>Auckland Airport area<br>Maramarua |
| Waipa District | Te Awamutu x4<br>Pirongia<br>Huntly<br>Napier<br>Anywhere in the North Island |
| Waitomo District | Taumaranui<br>Aria |

# Appendix 7: CHAID analysis trees

**Dependent Variable:** Stand-off segments.
**Predictor variables:** Physical context (soil, location, contour, rainfall, drainage) and others (winteroff practices, stocking rate, pugging, role, gender, infrastructure)
**Top splitter:** Pugging: perceptions of farm propensity to pugg, with a probability of 0.0, Six variables followed in close succession: infrastructure on-farm, location, proportion of the farm well drained & moderately well drained, stocking rate, farm contour, and main soil type.




Legend
Segments:
1 – Does not need to stand off
2 – <10 days < 12 hours
3 – <10 days ≥12 hours
4 – 10-29 days < 12 hours
5 – 10-29 days ≥12 hours
6 – 30+ days < 12 hours
7 – 30+ days ≥12 hours
1: (80) 20.9%
2: (25) 6.5%
3: (57) 14.9%
4: (35) 9.1%
5: (136) 35.5%
6: (12) 3.1%
7: (38) 9.9%
(383)
Location
Probability 0.001207
CHI=48.44; DF=6
03: (97) Matamata Piako
09: (72) Waikato
08: (55) Waipa
01: (42) Hauraki
04: (40) Otorohanga
07: (13) Thames-Coromandel
10: (07) Waitomo
05: (35) South Waikato
12: (18) Rotorua
06: (04) Taupo
1: (50) 15.3%
2: (21) 6.4%
3: (47) 14.4%
4: (35) 10.7%
5: (128) 39.3%
6: (11) 3.4%
7: (34) 10.4%
(326)
1: (30) 52.6%
2: (04) 7.0%
3: (10) 17.5%
4: (00) 00.0%
5: (08) 14.0%
6: (01) 1.8%
7: (04) 7.0%
(57)
Stocking rate (numeric)
Probability 0.025697
CHI=49.99; DF=18
0.53 - 2.68 cows/ha
2.68 - 3.2 cows/ha
3.2 - 3.8 cows/ha
3.8 - 6.25 cows/ha
1: (27) 24.8%
2: (05) 4.6%
3: (18) 16.5%
4: (09) 8.3%
5: (39) 35.8%
6: (00) 00.0%
7: (11) 10.1%
(109)
1: (13) 10.6%
2: (12) 9.8%
3: (23) 18.7%
4: (12) 9.8%
5: (45) 36.6%
6: (08) 6.5%
7: (10) 8.1%
(123)
1: (09) 12.0%
2: (04) 5.3%
3: (05) 6.7%
4: (07) 9.3%
5: (37) 49.3%
6: (01) 1.3%
7: (12) 16.0%
(75)
1: (01) 5.3%
2: (00) 00.0%
3: (01) 5.3%
4: (07) 36.8%
5: (07) 36.8%
6: (02) 10.5%
7: (01) 5.3%
(19)


Legend
Pugging Breakdown:
1 – Very prone
2 – Prone
3 – Not prone
4 – Not at all prone
Total
1: ( 97) 24.6%
2: (156) 39.6%
3: (127) 32.2%
4: ( 14) 3.6%
(394)
% Farm well / mod drained (numeric)
Probability 0.000002
CHI=67.24; DF=6
0% - 65% well/mod well drained
65% - 81% well/mod well drained
81% - 100% well/mod well drained
1: (70) 38.5%
2: (71) 39.0%
3: (34) 18.7%
4: (07) 3.8%
(182)
1: (09) 21.4%
2: (26) 61.9%
3: (07) 16.7%
4: (00) 00.0%
(42)
1: (18) 10.6%
2: (59) 34.7%
3: (86) 50.6%
4: (07) 4.1%
(170)
Infrastructure: Milking yard & races only
Probability 0.013264
CHI=10.78; DF=3
Infrastructure: Milking yard & races only
Probability 0.000579
CHI=18.76; DF=3
1=Yes (56)
1=No (126)
1=Yes (83)
1=No (87)
1: (16) 28.6%
2: (19) 33.9%
3: (17) 30.4%
4: (04) 7.1%
(56)
1: (54) 42.9%
2: (52) 41.3%
3: (17) 13.5%
4: (03) 2.4%
(126)
1: (03) 3.6%
2: (23) 27.7%
3: (55) 66.3%
4: (02) 2.4%
(80)
1: (15) 17.2%
2: (36) 41.4%
3: (31) 35.6%
4: (05) 5.7%
(87)