2018 WINTER CROP SURVEY

Gisborne District Council

ABSTRACT

The 2018 Winter Crop Survey reports details the fourth consecutive survey of the winter crops grown throughout the Gisborne District.

Olivia Steven

Water and Coastal Resource Officer

Contents

Executive Summary

The 2018 Winter Crop Survey is the fourth consecutive survey to detail the type, location and total areas of different winter crops in the Gisborne Region. A total of 10,302 hectares was surveyed, 1,756.9 hectares was recorded as winter crops (pasture, tilled land and maize stalks were excluded from this). Eighteen main winter crop types were identified throughout the region and varied in abundance.

The Tairāwhiti Resource Management Plan ('the Plan') has new rules for protecting freshwater that relate directly to intensively farmed stock, winter intensive grazing and commercial vegetable growing. Rules around break-feeding came into effect 1 July 2017, the remaining rules around cropping and intensive farming will come into effect by 1 May 2021. Areas posing a threat to water quality were identified across the region and were classified under each rule in the Freshwater chapter of the TRMP.

Dominant crops

- Plantain and Chicory were the most dominant crop (628.7 ha), followed by Unidentifiable Crops, Lettuce/Cabbage (157.9 ha), Cauliflower/Broccoli (153.9 ha), Kale/Chou Moellier (147.8 ha) and Forage rape (134.3 ha).

Crops by location

- Poverty Bay Flats had the largest area of cropped land (862.1 ha) with the greatest diversity of winter crop types. East Cape/Ruatoria had the second largest area with 315.8 hectares, followed by East/Tolaga/Tokomaru Bay (284.2 ha), Motu/Matawai (242.0 ha), Tiniroto (132.4 ha) and lastly Te Karaka/Whatutu with 71.9 hectares.

Break-feeding

- 108.9 hectares of the total area was identified as being break-fed, greater than the 2017 survey (73.8 ha). Approximately half of the area (53.4 ha) was identified as not complying with the Permitted Activity standards under the Tairāwhiti Resource Management Plan.

Water Threat

- Crops were identified as having a threat to water if they triggered any of the relevant rules for cropping in the Tairāwhiti Resource Management Plan.
- 2,815.3 hectares of the total area was identified as having a water threat. This accounts for 27% of the total area surveyed.
- Water threats identified as not meeting the Permitted Activity standards were found to cover 53.4 hectares of the total area, amounting to only 0.6% of the total land surveyed.

1.0 Introduction

The Environmental Services Team from the Gisborne District Council has completed a survey of the winter crops grown throughout the Gisborne District for the 2018 winter season. This is the fourth consecutive year that the winter crop survey has been completed. The purpose of the survey is to identify the different types of winter crops that are being grown throughout the region that are intended for human and animal consumption, the area that they cover and their proximity to waterbodies; as part of a proactive approach to sustainable management of Gisborne's freshwater resources.

The data from the survey is used to assist in the management of the region's physical resources with determining both water quality and water quantity parameters. This information will then be used to monitor waterways, help develop farm environment plans, and inform the farming community and general public on crop types and trends.

The Environmental Services Section hopes to gain a better understanding of the adherence of intensive farming operations to the setback rules in the Freshwater Chapter (C6) of the Tairāwhiti Resource Management Plan. This is of particular interest as there are new rules that relate directly to intensively farmed stock, winter intensive grazing and commercial vegetable growing.

1.1 Relationship to the Tairāwhiti Resource Management Plan (TRMP)

The Tairāwhiti Resource Management Plan ('the Plan') has new rules for protecting freshwater that relate directly to intensively farmed stock, winter intensive grazing and commercial vegetable growing. The Plan also contains rules regarding setbacks for waterways, crossings for winter intensive grazing and commercial vegetable growing. These new rules come under Section C6.2.9 of the plan which relate to water quality and discharges to water and land. The rules have been implemented to ensure that any permanently flowing stream, lake, wetland or Outstanding Waterbody identified in G18 or Regionally Significant Wetland identified in G17 of the Plan are protected for their values.

Rules regarding winter intensive grazing came into effect from the 1st July 2017 and rules regarding commercial vegetable growing will come into effect from the 1st May 2021. The 2018 Winter Crop Survey had an additional focus from the previous year's surveys. The survey identified areas that are not compliant with the new winter intensive grazing rules and may in the future be not complying with the rules regulating commercial vegetable growing that come into effect 1st May 2021. There is a requirement for commercial vegetable growers and annual croppers to lodge a Farm Environment Plan with Gisborne District Council by the 1st of May 2021. The rules are included in Appendix One.

Definitions Part E: Definitions of the TRMP

Intensively Farmed Stock is defined as:

1. Cattle or deer grazed on irrigated land or contained for break feeding of feed crops;
2. Dairy farming; and
3. Farming of more than 9 pigs per hectare of land

Intensive farming is defined as 'intensively farmed stock, commercial vegetable growing or cropping activities'.

2.0 Methods

The 2017 winter crop survey was conducted from late May to early July. The survey began on 29th May and took 33 days to complete, finishing on the 12th July (was not completed on consecutive days due to weather events and staff members being busy or away). The Poverty Bay flats were surveyed first followed by the Te Karaka and Whatatutu area than out west to Motu/ Matawai, than down south to Tiniroto. The coast was than surveyed around Tolaga Bay, Tokomaru Bay than up North to Ruatoria and Tikitiki, going as far North as Whakaangiangi Road near Te Araroa.

This survey began around the same time as the previous winter crop survey due to past identification that much of the crops had been eaten down to stubs and therefore hard to identify from June/July onwards. It is recommended by PGG Wrightson's that future winter crop surveys are carried out early June as that is the best time to record winter crops before being eaten out. This year's survey was spread out over a longer time than previous years due to staff commitments. It was found that the winter crops were still able to be identified and were not eaten out by July as suggested in previous reports. This may have been a result of the particularly wet weather experienced throughout June.

The data was gathered on a hand held tablet using Arc Collector software. This was collected by systematically driving throughout the region and manually recording crop type and the activity (e.g tilled or planted), stock type, whether stock were being break-fed or grazed on the crop, crossings, the proximity of the crop to waterways, and if this proximity was a threat to the water quality.

Very few of the crops were hard to identify by either being far away or have been eaten out. Photos were taken of these crops to help amplify and identify the image back in the office. The crops that could simply not be identified were classified as 'other'. Some of the crops categorised as 'other' could be identified back in the office by seeing which crop grew in that particular location in the summer.

This particular method using Arc Collector software in the field is the second time it has been used for the winter crop survey. The previous surveys were conducted by recording the crop types onto printed aerial maps and then being digitised back in the office using ArcMap.

2.1 Survey Area

The area surveyed is the same as the previous winter crop surveys. The same areas were surveyed to ensure accuracy when comparing results; this practice should be continued through future winter crop surveys. The surveyed area is shown in figure 1; divided into different localities in order to compare data between locations. These locations are:

1. Motu/ Matawai
2. East/ Tolaga/ Tokomaru
3. East Cape/ Ruatoria
4. Tiniroto
5. Te Karaka/ Whatatutu
6. Poverty Bay Flats

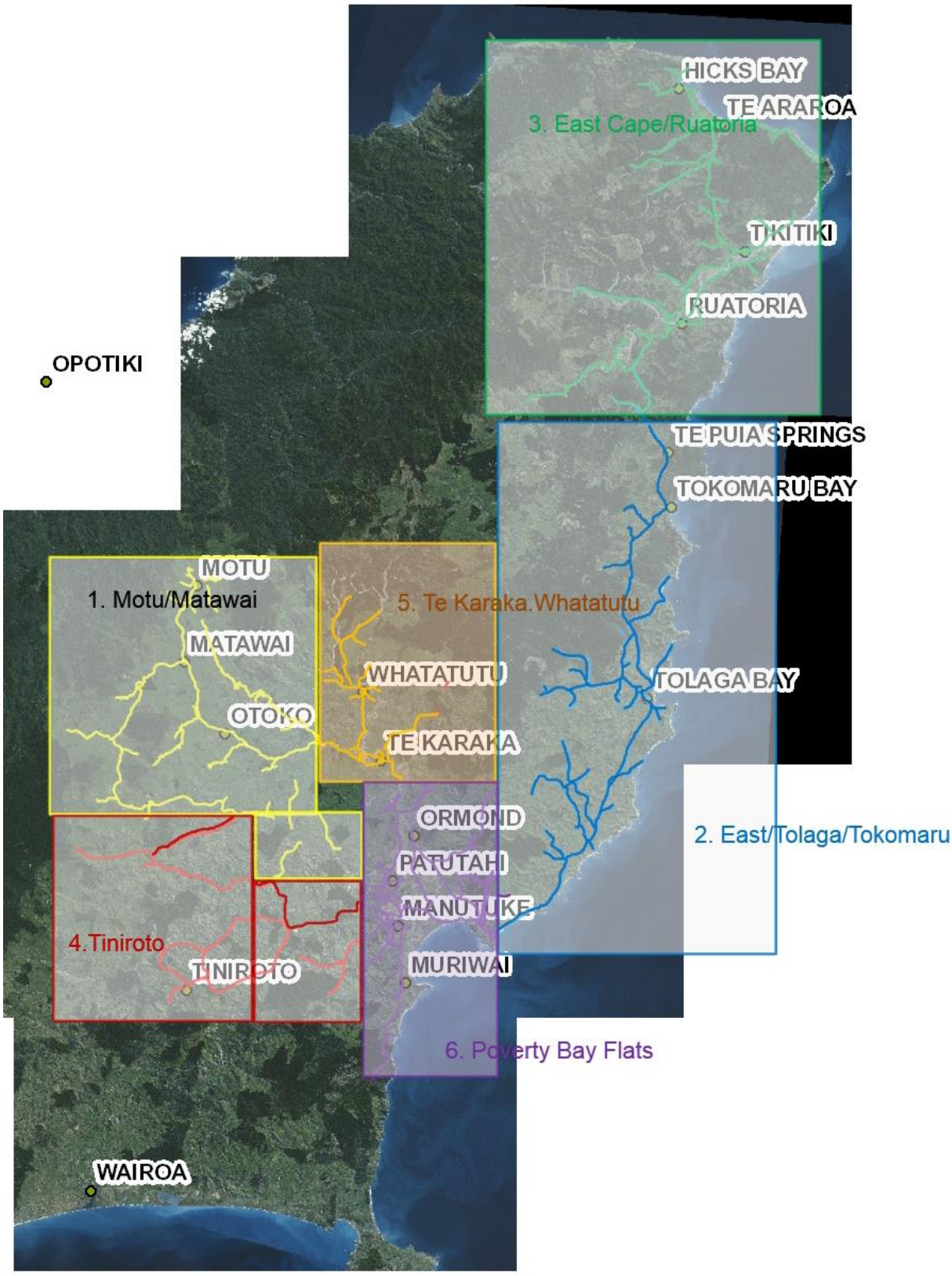


Figure 1. *Areas surveyed in winter crop survey, divided into different areas of the District.*

2.2 Crop Types

This survey used a similar format for crop types as previous years. Fodder crops identified were brassicas, lucerne, plantain, oats, and fodder beet. Brassica crops included Cauliflower/Broccoli, Kale, swedes, and turnips. A full list of crop types that were recorded can be seen in figure 2.

Pasture was recorded if it was in an area that had been cropped in the past, however this land will not be counted as a crop but will be used in analysis of water threat. In the past 'tilled land' and 'maize stalk' has been recorded but not used for analysis; however, this year it is included for analysis in section 3.4 water threat, as it can have a large impact on waterways.

Crops that were difficult to identify due to them being too far away or eaten out were recorded as unknown, see figure 3 for an example of a crop that was classified as 'unknown'. Paddocks where only stalks and hoof prints remained as evidence of being a fodder crop, were also recorded as unknown crops. Plantain, chicory, and clover were often planted with a variety of grasses or together, so they were recorded as a mix: chicory mix, chicory/plantain, plantain mix, and clover mix.

Figure 2. *Crop Types Surveyed*

Barley	Leafy Turnip
Cauliflower/Broccoli	Lettuce/
Lucerne Mix	Cabbage
Chicory	Lucerne
Chicory Mix	Oats
Chicory/Plantain	Plantain
Fodder Beat	Plantain Mix
Forage Rape	Swede
Kale/Chou Moellier	Turnip
Lupin	Other
Unknown	Clover
Clover Mix	

Figure 3. *Fodder Crop Stalks – can be difficult to identify if the leaf is not visible.*

3.0 Results

The results and discussion section compares trends and observations of major crop types. The same areas have been surveyed throughout all past winter crop surveys, therefore we can draw accurate conclusions when discussing any changes or trends in crop types throughout the Region.

The area of winter crops, excluding pasture, tilled land and maize stalk was **1,756.9 hectares**. The total area surveyed and recorded was **10,302.0 hectares.** The areas of pasture (5,540.1 ha), tilled land (1,514.3 ha) and maize stalk (1,490.7 ha) was excluded to calculate the total area of winter crops as pasture is not cropped for winter fodder. Pasture, tilled land and maize stalk is discussed and analysed further on in the report in section 3.4 and 3.5, as these crops pose potential threats to water.

A greater area was surveyed in the 2018 survey than the previous year (8,211.6 ha). However, the 2017 survey had a greater total area of winter crops 2,077.3 ha than the 2018 survey of winter crops 1,756.9 ha. Maize stalk was not recorded in the previous year's survey which may explain the difference in total land surveyed. Maize stalk was recorded in this year's survey as it was recognised as having a potential water threat and is included within the Tairāwhiti Resource Management Plan Freshwater Rules. The area of pasture was similar in the 2018 survey (5,540.1 ha) to the 2017 survey (5,298.51 ha). However, the area of tilled land had almost doubled from 835.9 ha in 2017 to 1,514.3 in 2018. The total area (ha) and total number of sites of winter crops in the Gisborne Region can be seen in Table 1 and figure 4 and 5 below.

Table 1. Total area (ha) of crop types identified in the 2018 Winter Crop Survey.

Crop Type	Total area (ha)	Number of sites	Crop Type	Total area (ha)	Number of sites
Barley	0	0	Lucerne Mix	6.1	1
Cauliflower/Broccoli	153.9	8	Lupin	0	0
Chicory	42.4	17	Maize Stalk*	1,490.7	129
Chicory Mix	36.7	7	Oats	6.4	3
Chicory/Plantain	163.6	31	Other	26.9	10
Clover	22.9	3	Pasture*	5,540.0	823
Clover Mix	0	0	Plantain	233.9	35
Fodder Beet	21.1	4	Plantain Mix	61.4	8
Forage Rape	134.2	17	Swede	0	0
Kale/Chou Moellier	147.7	20	Tilled land*	1514.3	147
Leafy Turnip	90.7	14	Turnip	3.34	1
Lettuce/Cabbage	1,57.9	11	Unknown	387.2	30
Lucerne	59.8	11	**TOTAL**	**10,302**	**1,330**

**excluded from the area of winter crops but used in analysis of water threat (section 3.4)*

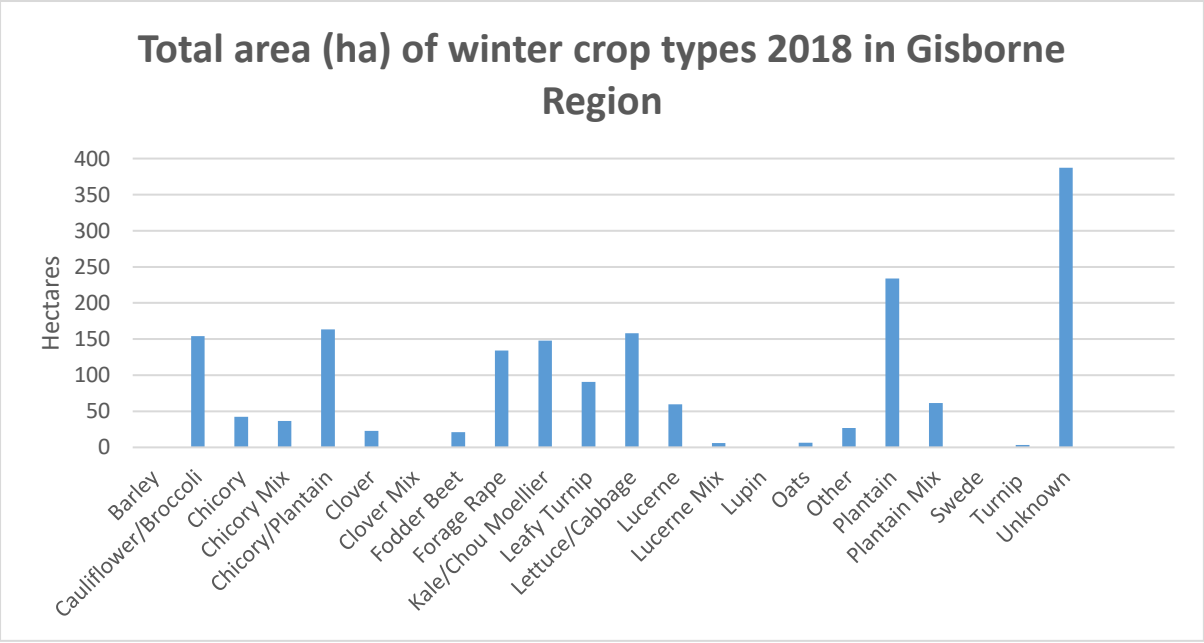


Figure 4. Total area (ha) of crop types identified in the 2017 Winter Crop Survey.

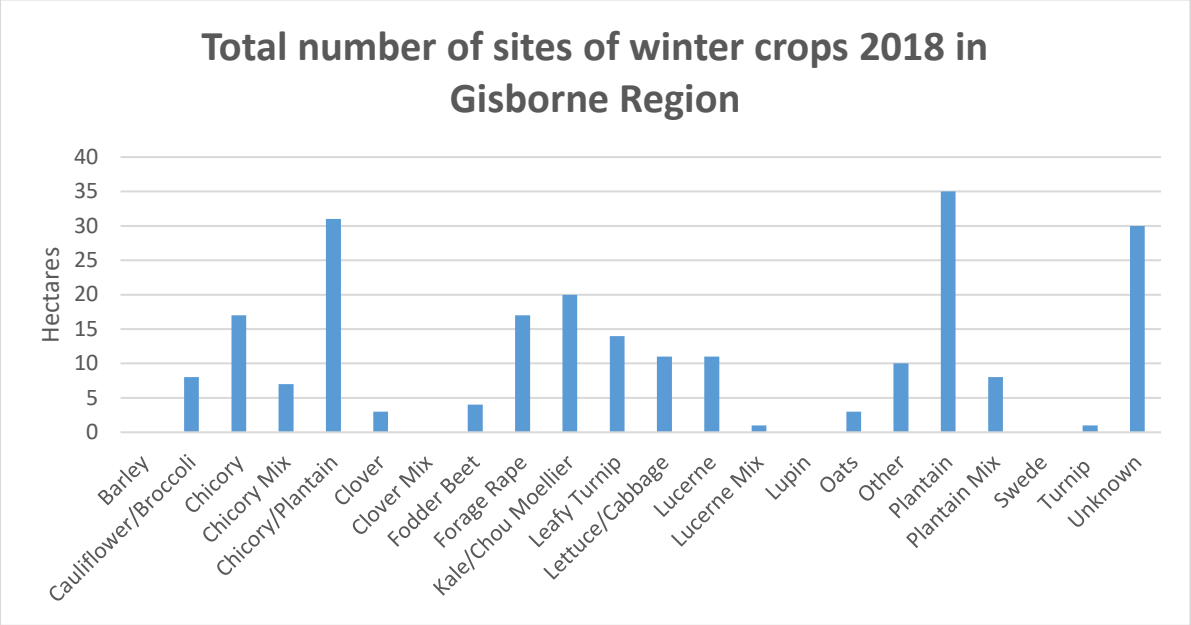


Figure 5. Total number of sites of winter crops identified in the 2017 Winter Crop Survey.

3.1 Major Crop Types

The results section shows observations and trends of major crop types. The major crop types were determined by the total area they covered and the number of sites they were found at, major crops can be seen in Table 2. Major crop types were determined by the total hectares and the total number of sites.

Table 2. Top five most common crops identified in Gisborne Region

Crop Type	Total hectares	Number of sites
Chicory/Plantain	628.7	98
Unknown	387.2	30
Lettuce/Cabbage	157.9	11
Cauliflower/Broccoli	153.9	8
Kale/Chou Moellier	147.8	20
Forage Rape	134.3	17

3.1.1 Plantain & Chicory

Plantain and chicory continue to be the most abundant crop type present in the Gisborne Region. Plantain and chicory accounts for 35.8% of all crops recorded in the Gisborne Region, covering 628.7 ha. Plantain, chicory and plantain/chicory mix were grouped together for the purpose of analysis as they were difficult to identify separately in some instances and pose very similar environmental impacts. For a further breakdown refer to table 1 above.

Observations and trends:

The area of Plantain and Plantain Mix have been compared to the previous year's surveys and trends have been observed. The trend for the area of Chicory and Plantain is that it has decreased from

1,143.2 ha in 2015 to 1,139.7 ha in 2016 to 853.2 ha in 2017 to 628.7 ha in 2018, a total decrease of 55% since 2015, as seen in figure 6.

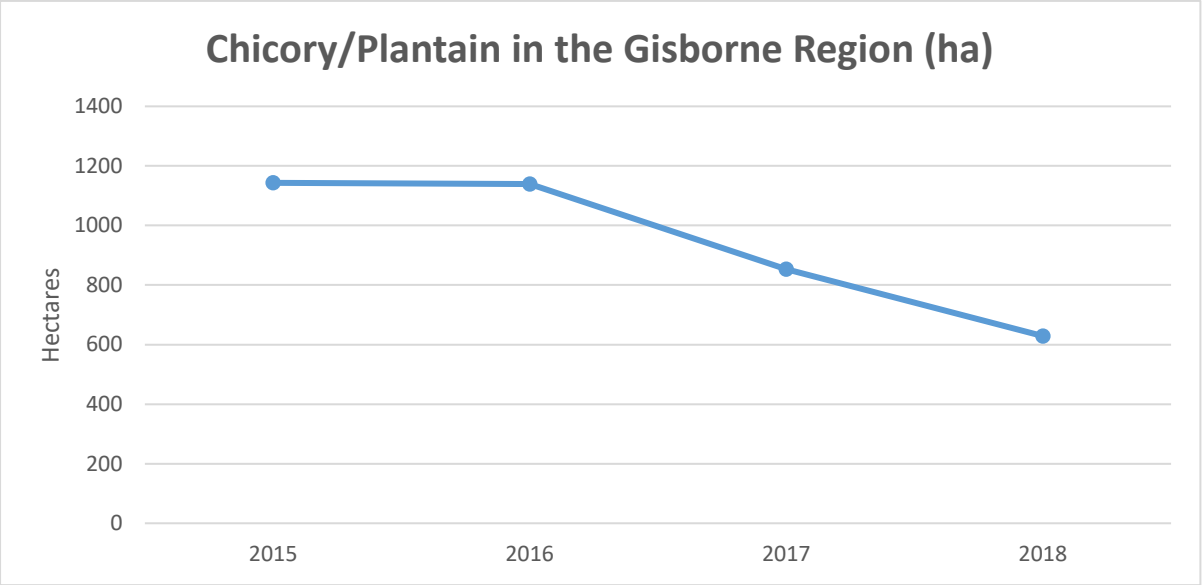


Figure 6. Total area of Chicory and Plantain in the Gisborne Region (ha)

3.1.2 Unknown Crops

Unknown crops was the second most abundant crop type identified in the Gisborne Region, covering an area of 387.2 hectares. Unknown crops are crops that were too difficult to identify due to either the crop being too far away or have been eaten out and only stalks present. The category covers a wide range of different crops.

Observations and trends:

The area of unknown crops have been compared to the previous winter crop surveys and trends have been observed. Unknown crops recorded have increased in area from 2017 (231.1 ha) to 387.2 ha in 2018, as seen in figure 7**.** This increase in area could be due to the greater area surveyed in 2018 and that the survey was carried out over a longer length of time, as crops are eaten out later in the season therefore harder to identify.

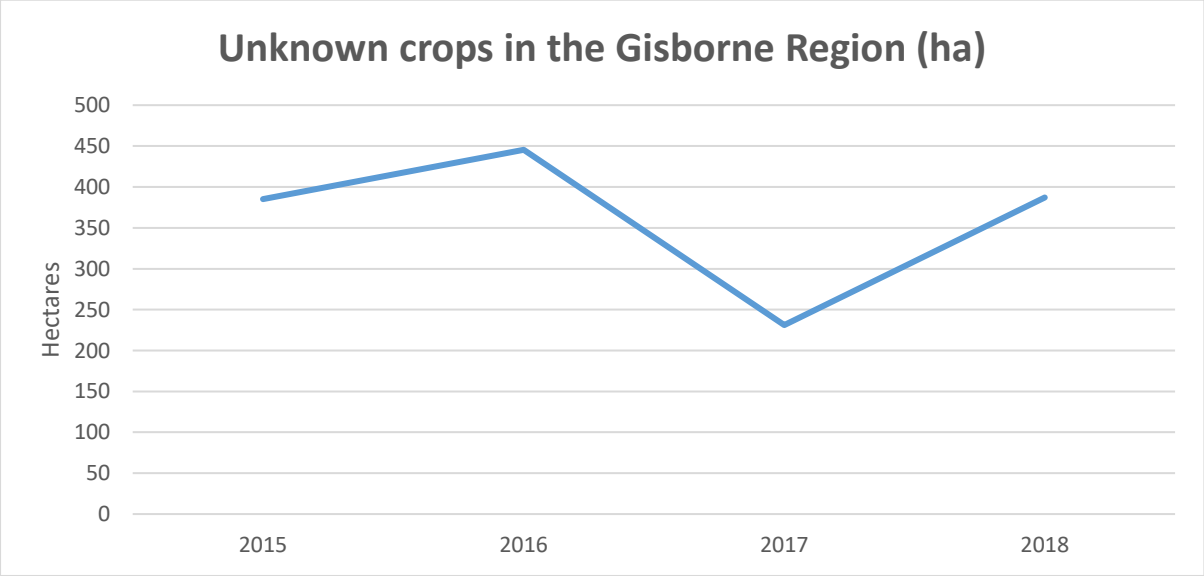


Figure 7. Total area of unknown crops in the Gisborne region

3.1.3 Commercial Winter Vegetables

There are a number of commercial crops grown in the winter months of the Gisborne Region. These commercial crops include cauliflower and broccoli and lettuce and cabbage. These crops have been categorised into two different groups with Broccoli and Cauliflower categorised together and Lettuce and Cabbage categorised together.

The total area of crops observed at the time of the survey was very similar, with Lettuce and Cabbage as the third most abundant crop (157.9 ha), and Cauliflower and Broccoli was the fourth (153.9 ha). These crop categories combined contribute to 17.7% of the total winter crops recorded in the Region with 311.8 ha.

Observations and trends:

Both of these commercial crop categories have grown significantly with 0 ha of lettuce and Cabbage recorded in 2015, to 52.78 ha in 2016, 140.54 ha in 2017 and 157.9 ha in 2018. Cauliflower and broccoli has increased from 0 ha being recorded in 2015, 6.8 ha in 2016, 138.9 ha in 2017 to 153.9 ha in 2018. The total area for these winter commercial vegetables in all three of the winter crop surveys can be seen in figure 8 and 9.

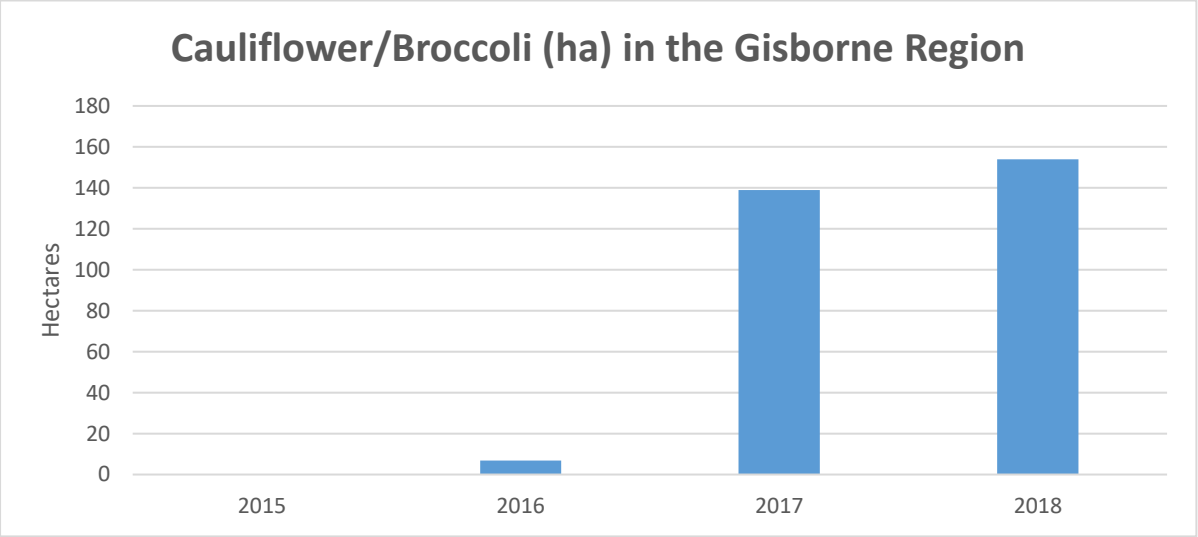
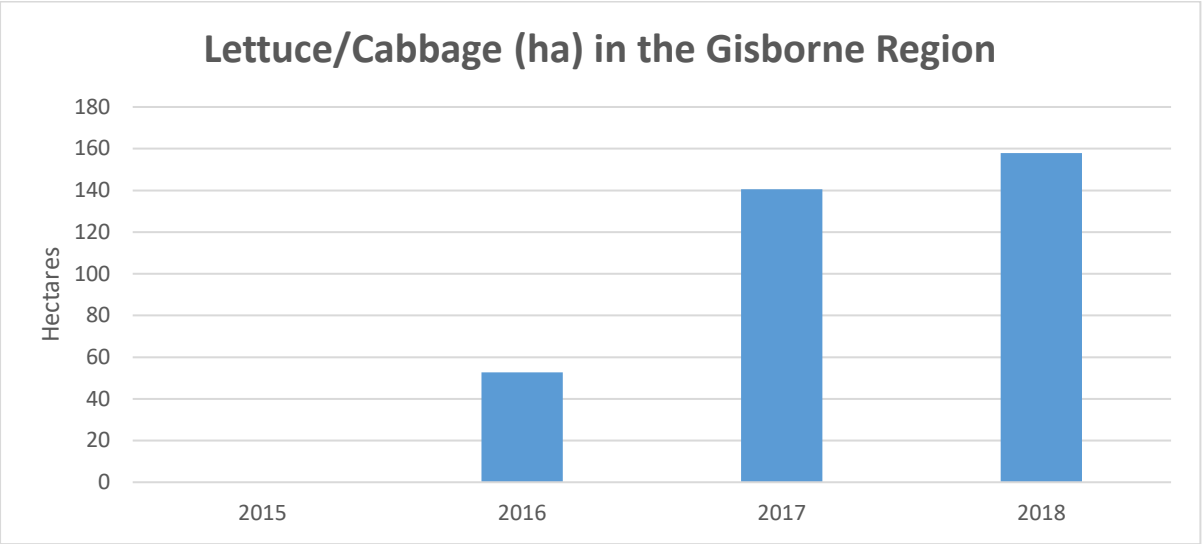


Figure 8. Total area (ha) of Cauliflower/Broccoli crops identified in the 2015, 2016, 2017 & 2018 Winter Crop Survey.



3.1.4 Kale/Chou Moellier

Figure 9. Total area (ha) of Lettuce/Cabbage crops identified in the 2015, 2016, 2017 & 2018 Winter Crop Survey.

Kale/chou moellier is another common crop identified in the Gisborne Region. The area of kale/chou moellier recorded covered 147.8 ha at a total of 20 sites, making it the fifth most abundant crop in the region.

Observations and trends:

The area of Kale/Chou Moellier has been compared to the previous winter crop surveys and trends have been observed. Kale/Chou Moellier again has no obvious trend with decreasing in area from 252.16 ha in 2015 to 15.37 ha in 2016, than increasing to 189.72 ha this survey in 2017, as seen in figure 10.

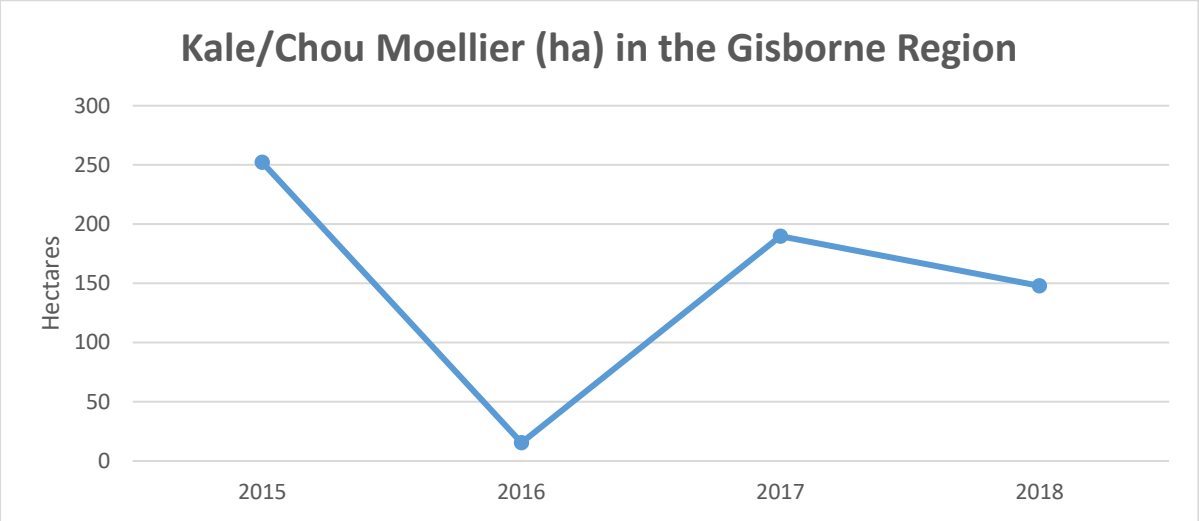


Figure 10. Total area of kale and Chou Moellier in the Gisborne Region

3.1.4 Forage rape

Forage rape is another common crop identified in the Gisborne Region. The area of forage rape recorded covered 134.3 ha at a total of 17 sites, making it the sixth most abundant crop in the region.

Observations and trends:

The area of forage rape has been compared to the previous winter crop surveys and an increasing trend has been observed. Forage rape is increasing in area from 0 ha in 2015 and 2016 to 65.0 ha in 2017 to 134.3 ha in 2018, as seen in figure 11.

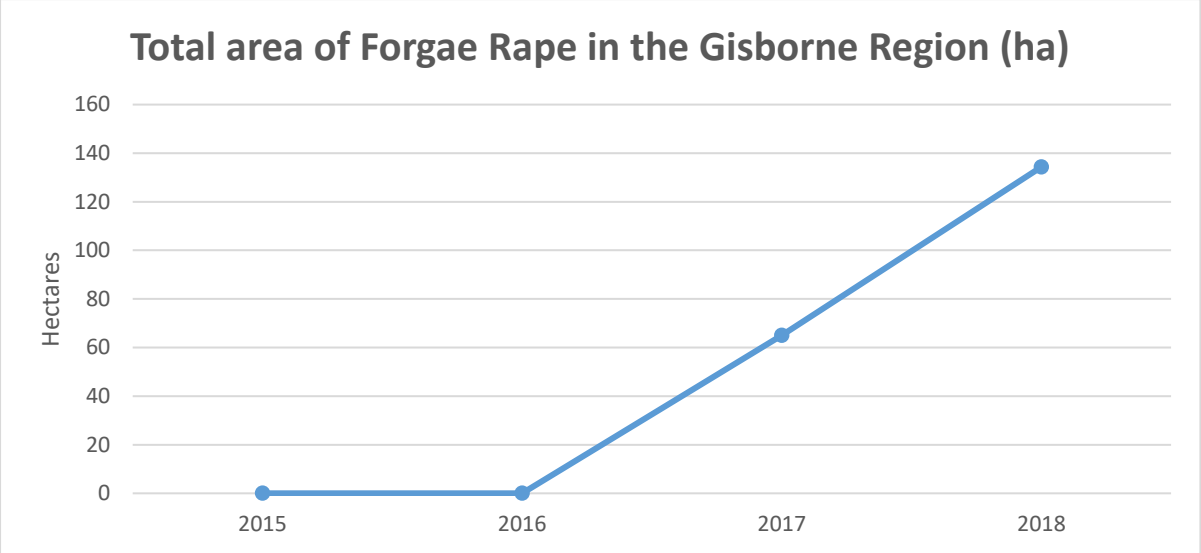


Figure 11. Total area of forage rape in the Gisborne Region

3.2 Minor Crop Types

Minor crops were identified as crops that have a low area (ha) and number of sites. The site and area information can be seen table 3. Leafy turnip**,** lucerne, other, clover, forage beet, oats, lucerne mix and turnip were all at the time of the survey to be under a 100 hectares.

Table 3. Area and number of sites of Minor Crop Types (ha)

Crop Type	Hectares	Number of sites
Leafy Turnip	90.7	14
Lucerne	59.9	11
Other	26.9	10
Clover	23.0	3
Forage Beet	21.2	4
Oats	6.4	3
Lucerne mix	6.2	1
Turnip	3.3	1

3.3 Location

3.3.1 Poverty Bay Flats

The total surveyed area for the Poverty Bay Flats area was 4,499.2 hectares. The total area of pasture (1,542.5 ha), maize stalks (641.7 ha) and land area that was tilled (1,452.9 ha) were excluded to calculate the total area of winter crops, which is 862.1 hectares, making this the area with the largest amount of crops in the District. The total area of crops was similar to the 2017 survey which found a total of 850.9 hectares of winter crops. The crop types found in this area can be seen in figure 12. The

major crop type found in this region was unknown with 212.9 hectares. Chicory and Plantain was the second most abundant crop in this area with 189.4 hectares followed by lettuce and cabbage with 158.0 hectares, and cauliflower/broccoli with 153.9 hectares. Minor crops found in this area included forage rape, lucerne, lucerne mix, clover, kale, 'other', oats, and clover.

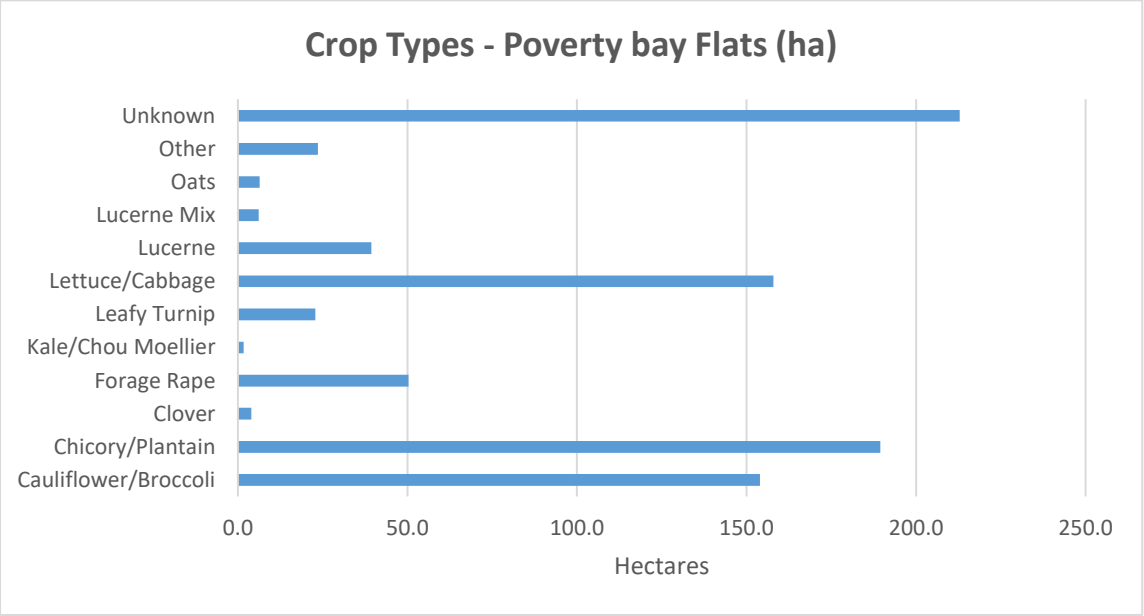


Figure 12. *Crop Types recorded on the Poverty Bay Flats in ha.*

3.3.2 East Cape/Ruatoria

The total surveyed area for the East Cape/Ruatoria region was 1,573.1 hectares. The area of pasture (1,148.3 ha), maize stalks (40.5 ha) and land area that was tilled (68.5 ha) were excluded to calculate the total area of winter crops, which was 315.8 hectares, making this the second largest area of crops in the District. The total area of crop types found in this area can be seen in figure 13. The most abundant crop in this area is chicory and plantain with 113.6 hectares, followed by unknown crops with 72.24 ha. Fodder beet is the third most abundant crop with 49.01 ha. The remaining crops of forage rape, leafy turnip, plantain mix, and chicory were found in much lower quantities.

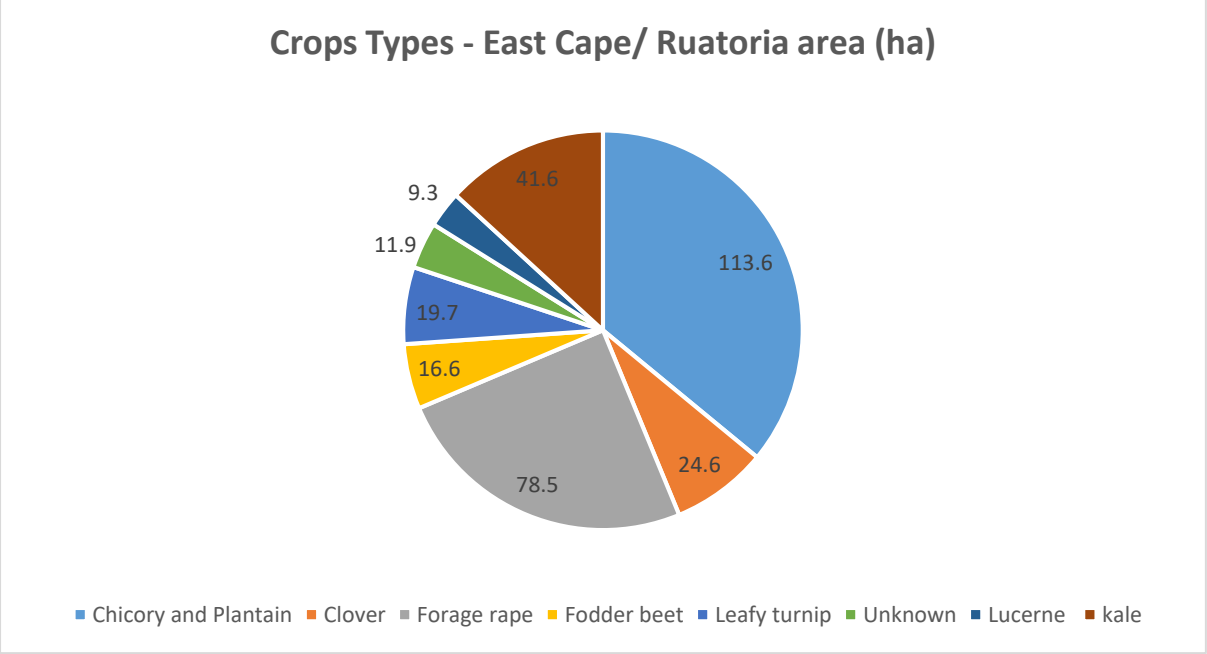


Figure 13. *Crop Types recorded in the East Cape/ Ruatoria area in hectares.*

3.3.3 East/Tolaga/Tokomaru

The total area surveyed for the East/Tolaga/Tokomaru area was 2,506.1 hectares. The area of pasture (1,780.7 ha), maize stalks (409.5 ha) and land area that was tilled (31.7 ha) were excluded to calculate the total area of winter crops, which was 284.2 hectares, making this the second largest area of crops in the District. The total area of crop types found in this area can be seen in figure 14. The major crop type found in this region was plantain and chicory with a total area of 138.7 hectares. Unknown crops were the second most abundant crop type in this region with a total area of 92.9 hectares. The remaining crops of forage rape, clover, Lucerne and 'other' were found in much lower quantities.

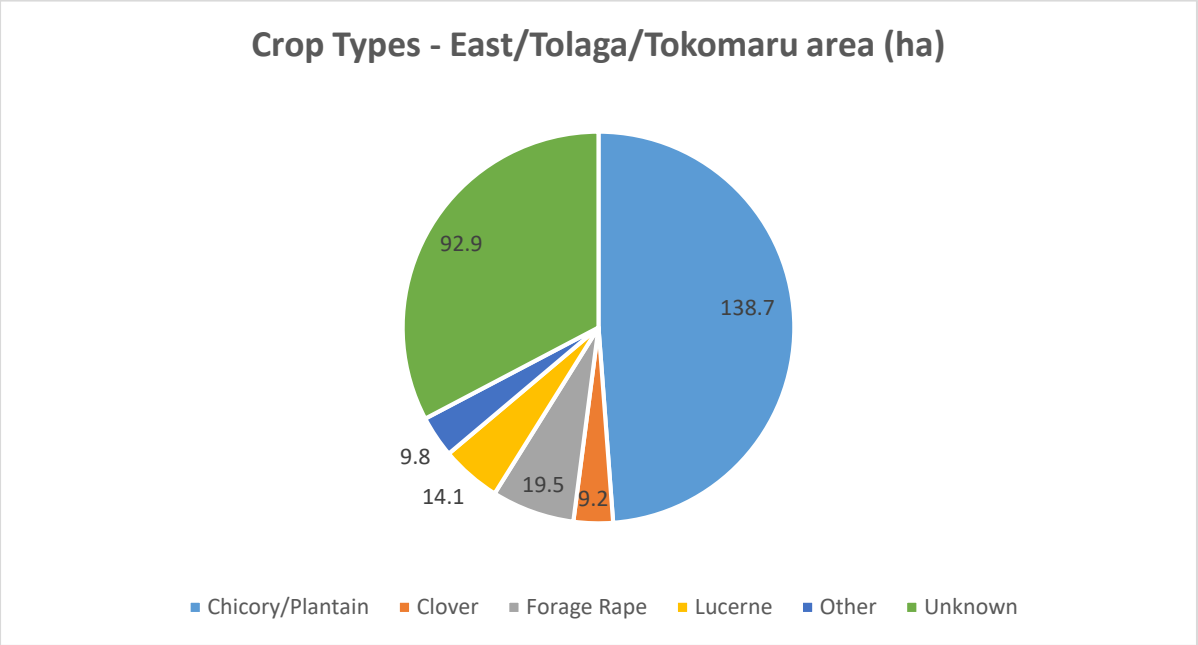


Figure 14. *Crop Types recorded in the East/Tolaga/Tokomaru area in ha.*

3.3.4 Motu/Matawai

The total area surveyed for the Motu/Matawai area was 570.5 hectares. The area of pasture (324.5 ha) and the area of tilled land (3.9 ha) was excluded to calculate the total area of winter crops, which was 242.0 hectares, making this the fourth largest area of crops in the District. The total area of crop types found in this area can be seen in figure 15. The major crop type found in this region was Kale/Chou Moellier, which was 103.7 hectares. The second most abundant crop type was chicory and plantain with a total of 61.1 hectares. Other crop types found in the region were forage rape with 29.7 hectares, leafy turnip with 25.9 hectares, unknown with 18.2 hectares and turnip with 3.3 hectares.

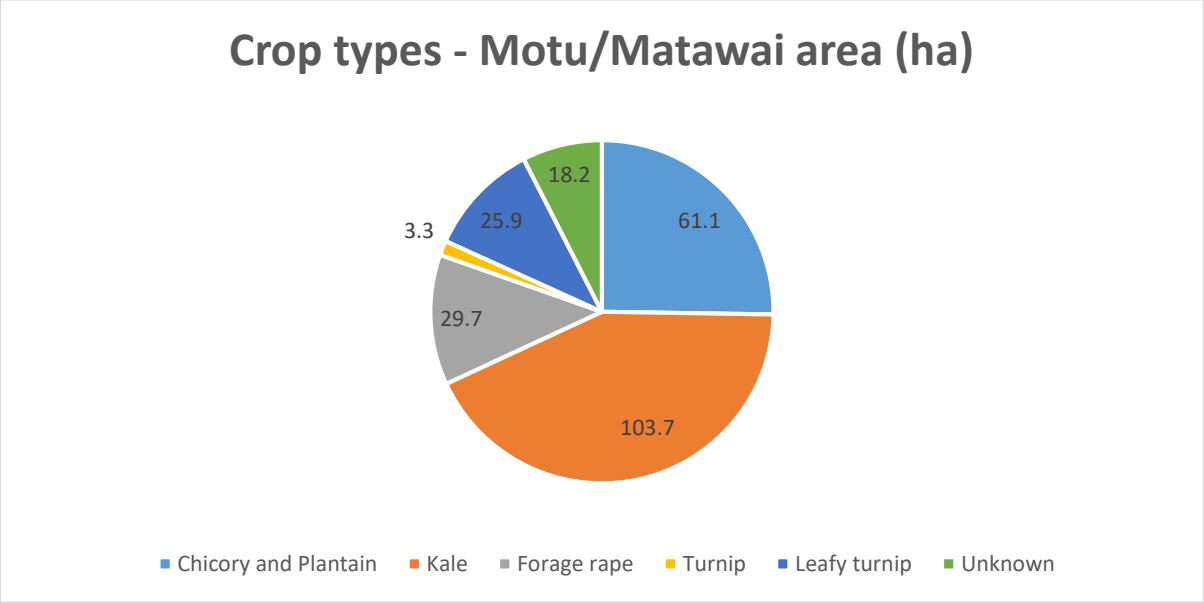


Figure 15. *Crop Types recorded in the Motu/Matawai area in ha.*

3.3.5 Tiniroto

The total area surveyed for the Tiniroto area was 336.9 hectares, which was relatively similar to the 2017 survey of 325.3 hectares. The areas of pasture (204.5 ha) were excluded to calculate the total area of winter crops, which was 132.4 hectares in total, making this the second smallest area of crops in the District. The 2018 survey found less than half of the total area of crops as the 2017 survey (282.90 ha). The total area of crop types found in this area can be seen in figure 16. The major crop type found in this region was unknown with 56.8 hectares. The second most abundant crop in the region was chicory and plantain with a total area of 40.8 hectares, closely followed by the third most abundant crop of forage rape with a total of 25.2 hectares. Lastly followed by kale/chou moellier (9.6ha).

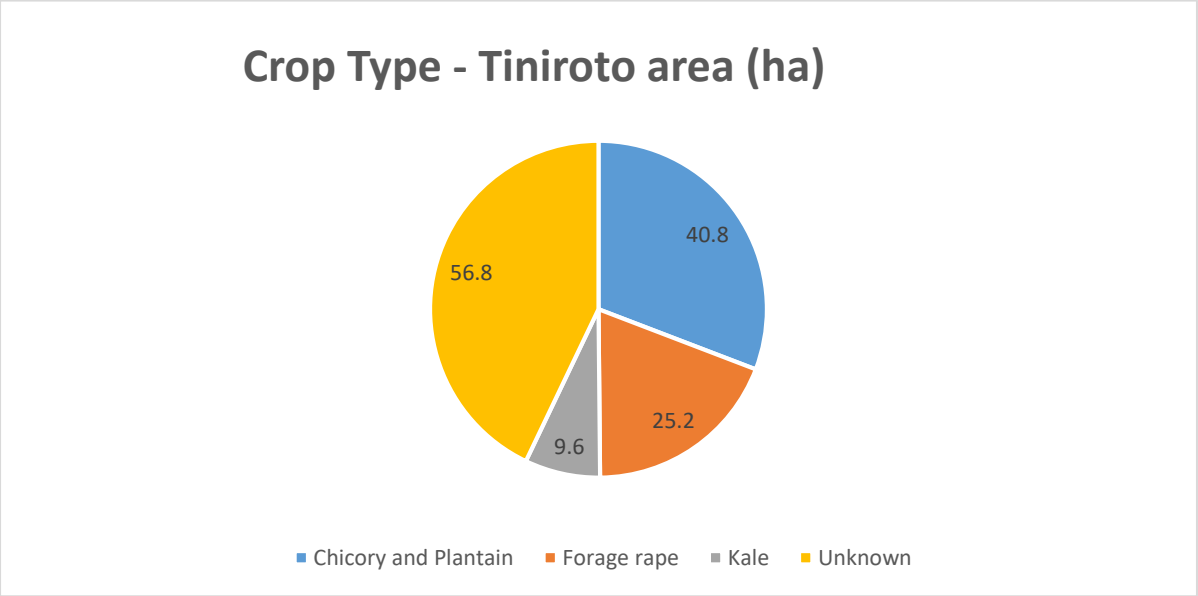


Figure 16. *Crop Types recorded in the Tiniroto area in hectares.*

3.3.6 Te Karaka/Whatatutu

The total area surveyed for the Te Karaka/Whatatutu area was 817.4 hectares. The area of pasture (288.4 ha), maize stalks (431.3 ha) and tilled land (25.7 ha) were excluded to calculate the total area of winter crops, which was 71.9 hectares, making this the area with the least amount of crops in the District. The total area of crop types found in this area can be seen in figure 17. The major crop type found in this region was chicory and plantain with a total area of 40.6 hectares. The second most abundant crop type was leafy turnip with a total of 8.2 hectares, closely followed by forage beet being the third most abundant crop at 8.1 hectares. Lucerne, unknown and forage rape were also identified in this region.

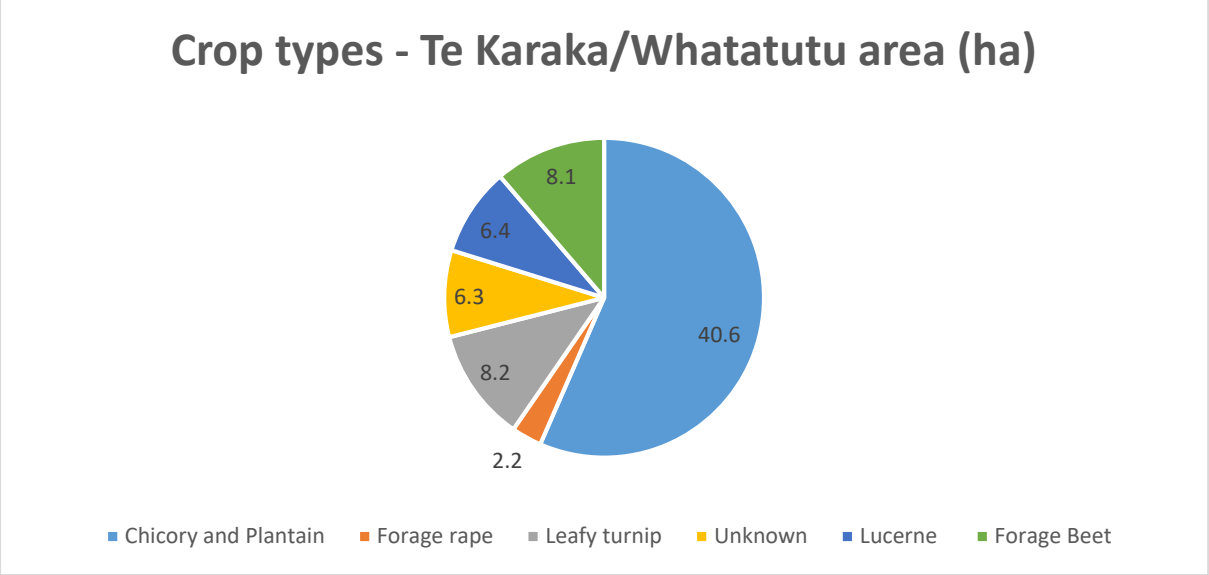


Figure 17. *Crop Types recorded in the Te Karaka/ Whatatutu area in hectares.*

3.4 Break-fed

The total area being break-fed was 108.94 ha. This is a greater area than the previous year's survey which recorded the total area being break-fed as 73.79 ha. Break-feeding is defined as a system of controlling the feeding of grazing by dividing their paddock with movable fences, as seen in figure 18 and figure 19.

It is important that break-fed crops are identified as there are rules in the Freshwater Chapter of the TRMP surrounding the activity as it can have an effect on water quality if managed incorrectly, this is discussed further in section 3.6.

Figure 18. *An example of cattle being break-fed in the Gisborne Region.*

Figure 19. *An example of cattle being break-fed in the Gisborne Region.*

Crop types that were being break-fed were Pasture with 38.5 ha, Kale with 32.7 ha, Fodder Beet with 17.7 ha, Unknown Crops with 3.9 ha and Leafy Turnip with 3.5 ha, as shown in figure 20. It is possible that some of the unknown crops identified were break-fed which could have potentially increased the total area. It is also possible that some areas were going to be break-fed but had not been set up at the time of the survey so it was difficult to know.

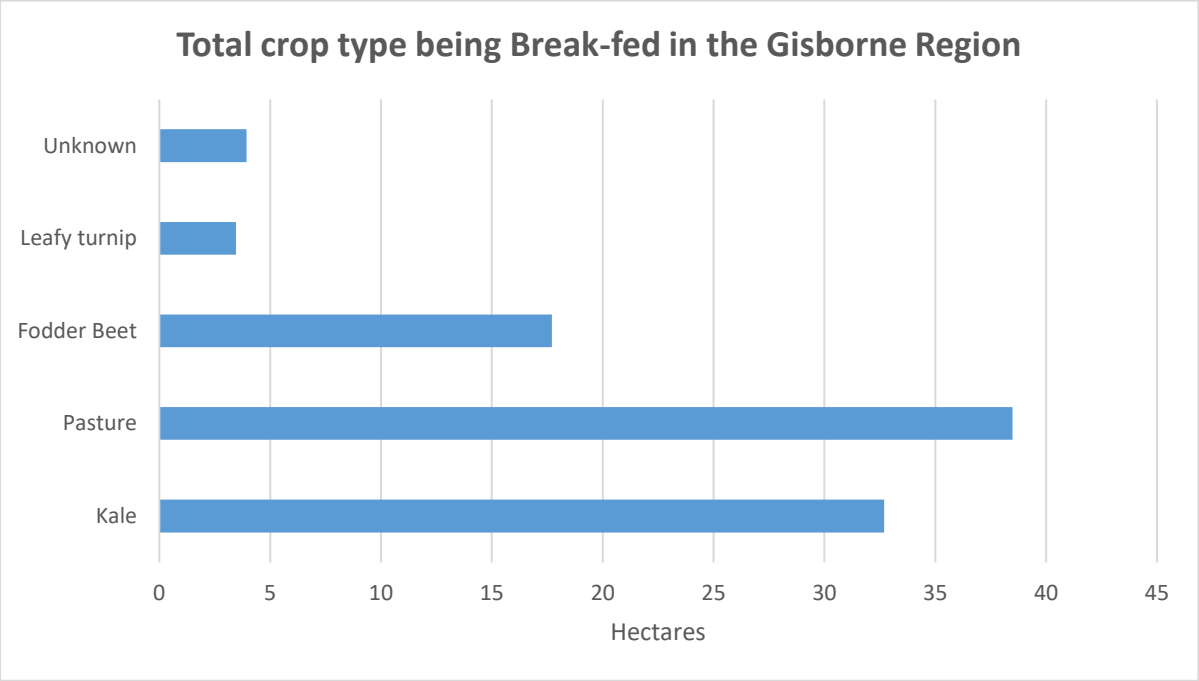


Figure 20. Total area (ha) of crop type being break-fed in the Gisborne Region 2018.

The location that had the most break-fed crops was East Cape/Ruatoria area which had a total of 65.7 ha of break-fed crops, this was followed by East/Tolaga/Tokomaru with 19.1 ha, Te Karaka/Whatatutu with 9.8 ha, Motu/Matawai with 8.1 ha, Poverty Bay Flats with 5.3 ha and Tiniroto with 0.9 ha, as seen in figure 21.

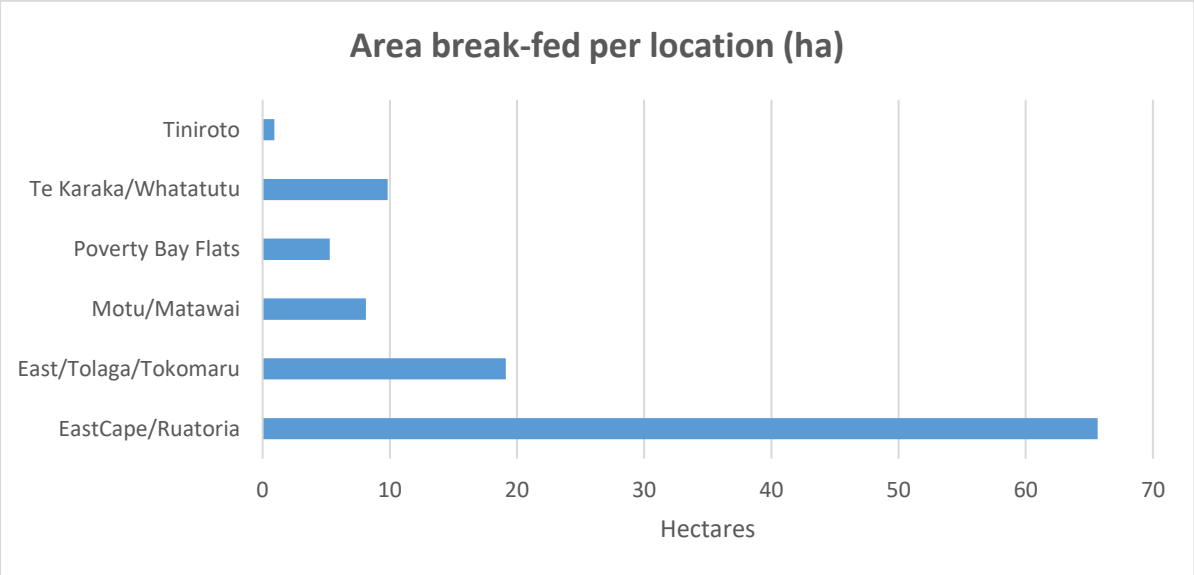


Figure 21. Total area (ha) of crop type being break-fed per location in the Gisborne Region 2018

3.5 Threat to water

Crops were identified as having a threat to water if they triggered any of the relevant rules for cropping in the Freshwater Chapter C6 of the TRMP. The rules that relate to winter crops are outlined in the introduction of this report. In summary, water threat relates to rules 6.2.9(2), 6.2.9(3), 6.2.9(4) and 6.2.9(5). Crops categorised with no water threat did not trigger any of the rules of the TRMP.

The total area that was categorised with having water threat was 2,815.3 ha, this accounts for 27% of the total area surveyed.

Water threats identified as not complying are those that do not meet the Permitted Activity Standards break rules regarding break-feeding, rule 6.2.9(5) which came into effect 1 July 2017. Break-feeding can have a significant impact on water bodies if managed incorrectly. Of the total area being break-fed (108.9 ha), 65.1 ha (12 sites) were identified as posing a degree of water threat and 53.4 hectares were identified as not compliant with rule 6.2.9(5) in the freshwater chapter of the Tairāwhiti Resource Management Plan. This area covers 8 sites and accounts for 0.6% of the total land surveyed.

For the majority of areas identified as having water threat (2,761.9 ha), the rules will not come into effect till 1 July 2021 which allows farmers time to adjust their practises to comply with the new rules.

It is to be noted that the total area of water threat does not reflect the area of the setback required but instead reflects the total area of cropped land that is adjacent to the water body. Comparison with the previous year's surveys cannot be made as water threat was previously defined on a set of values, not based on the rules of the Freshwater chapter of the Tairāwhiti Resource Management Plan (TRMP).

Table 4. Areas and number of sites identified as water threats including break-feeding*

Rule	Water threat	Hectares	Number of sites	Break-fed (ha)
6.2.9(2)	Slope >25 stock/feed crops	18.4	4	4.5
6.2.9(2)	Slope <15 <5m PFS, lake, wetland	7.1	2	7.1
6.2.9(4)	<5m PFS, lake, wetland		0	
6.2.9(4)	<10m OWB, RSW, AEWB		0	
6.2.9(4)	Cultivation <10m PFS, RSW, AEWB	254.2	21	
6.2.9(4) /6.2.9(3)	Cultivation <5m edge of a modified watercourse or stream	2,482.4	240	
6.2.9(5)	Intensive stock <5m watercourse		5	36.4
6.2.9(5)	Intensive stock <10m OWB, RSW		3	17.0

PFS = Permanently Flowing Stream
OWB = Outstanding Waterbody
RSW = Regionally Significant Wetland
AEWB = Aquatic Ecosystem Waterbody
*If several rules were relevant, the most stringent rule was chosen to be displayed in table 4 above.

The most common water threat rules triggered, Rule 6.2.9(4) and 6.2.9(3) 'Cultivation <5m edge of a modified watercourse or stream' accounted for 89.3% of the total area identified as a water threat. The second most common rule triggered, Rule 6.2.9(4) 'Cultivation <10m Permanently Flowing Stream, Regionally Significant Wetland and Aquatic Ecosystem Waterbody' accounted for 9.1% of the total

area identified as water threat. Cultivation practises accounts for 98.4% of the water threat identified in the 2018 Winter Crop Survey, the remaining was attributed to management of stock.

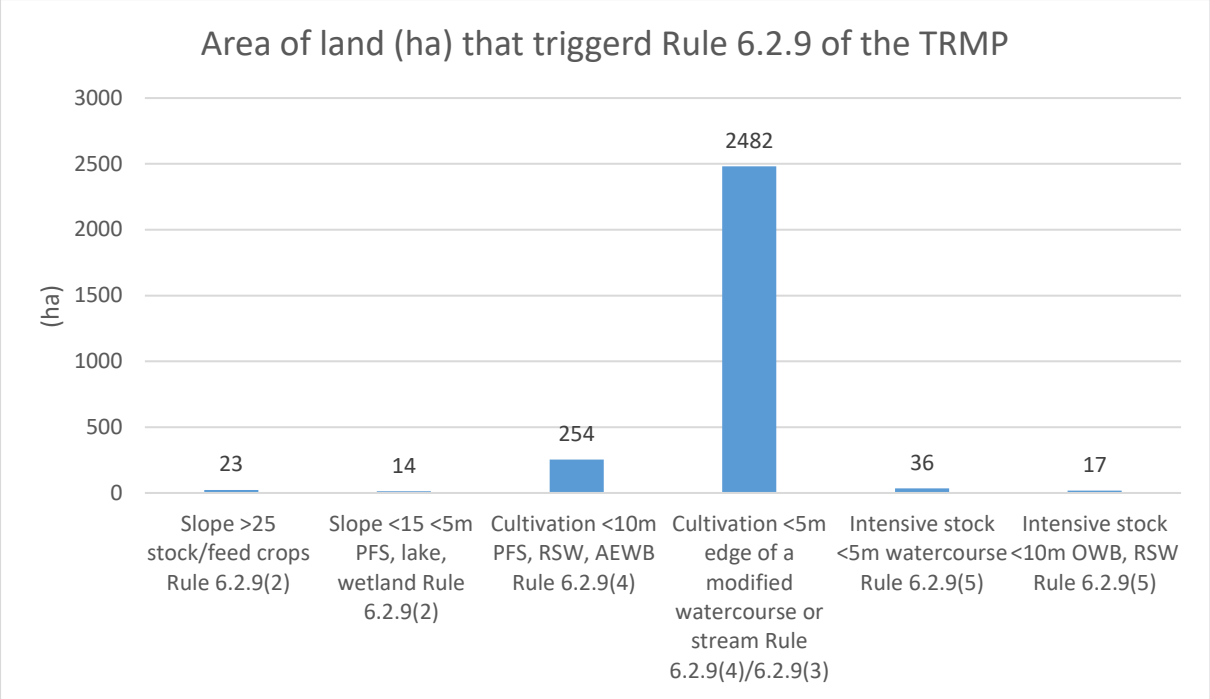


Figure 22. Total land area triggering rules within the Freshwater Chapter of the Tairāwhiti Resource Management Plan

4.0 Limitations

4.1 Survey Area

As previously stated in **section 2.0** this 2018 winter crop survey is the fourth survey to be conducted in the Gisborne Region. The survey area is outlined in figure 1 in section 2.2. These areas cover all visible cropping areas that can be seen by the road throughout the Region. Although the localities are delineated in section 2.2, it was sometimes difficult to distinguish which location the crop belonged to, especially at the boundary between two locations. The survey area was also limited by public road access, therefore the survey does not cover the entire Gisborne region as it only surveys crops visible from the road. Using the Councils drone, or any other variation of remote sensing could be used to overcome this limitation however this would be much more expensive and potentially more time consuming. It is recommended that the same areas should be surveyed each winter, to keep trends as accurate as possible. The recent aerial photography will be useful to identify any new cropped areas.

4.2 Survey Method

As stated in section 2.0, this was the second year that the winter crop survey was done by using a hand held tablet rather than recording on aerial maps. This year it was found easier for just one person to drive and pull over when identifying and recording an area of cropped land. In the past, two people were required, however, with the additional information included in this year's survey and staff commitments, it was more time efficient for one person to complete the task.

The software used to collect the crop data was Arc Collector. Using Arc Collector we were able to edit the GIS layer from the previous crop survey. Editing the previous layer allowed the survey to be completed a lot faster as most crops remained the same as the previous year. If the crop type had

changed but the paddock shape remained the same, we could easily change the crop type without drawing in a new paddock every time. This method also reduced the time of the survey as the digitising was done in the field so no further work needed to be completed after the survey. The summer crop Survey 2017/2018 also followed this data collection method.

Digitising the data not only reduced the time of the survey, it also increases the accuracy of the results. That is because of the ability to use a smaller scale, allowing a detailed description of crop boundaries, by increasing the view of the paddocks and removing features such as patches of bush, houses, sheds, shelter belts, river edges, and other obstructions.

The survey time could also be reduced by excluding non-winter crops, such as pasture, maize stalks and tilled land which covered the majority of the land surveyed (8555.1 ha). Pasture was only recorded if the land area had previously been documented as having winter crops present. Pasture, maize stalks and tilled land are important to record due to their potential threat to water quality. Tilled lad and maize stalks exposes bare land, increasing the likelihood of sediment running of the paddocks into nearby waterways. Going forward, if survey time needed to be decreased, it is recommended only recording pasture, maize stalk, and tilled land that has a water threat.

The 2018 winter crop survey began on the same date as the 2017 survey. In previous years, the winter crop survey had begun at different times. The 2015 Survey was conducted in August and September, while the 2016 survey was conducted in July and August. The time of the winter crop survey significantly impacts the results, as the survey only supplies a 'snapshot' of what crops are present during the time of the survey. Fodder crops are planted and eaten out at different times of the year due to either weather or money factors. Best practice going forward would be to have consistency of when the survey is conducted to get a more conclusive result. PGG Wrightson advised Council staff that the best time of the year to carry out the winter crop survey is early June, prior to the crops being eaten out and therefore difficult to identify. This should be carried on in future Winter Crop Surveys.

Appendix 1

Rule 6.2.9(2)

Diffuse discharges from dairy farming and intensively farmed stock activities lawfully established prior to 14 October 2015.

Classification: Permitted Activity

a) *From **1 May 2021**, intensively farmed stock activities shall have prepared and submitted to the Consent Authority a Farm Environment Plan which has been certified by the Consent Authority as meeting the requirements outlined in Appendix H20. All dairy farming and intensively farmed stock activities shall be carried out in accordance with the actions and timeframes specified in the certified Farm Environment Plan. An annual report will be provided to the Consent Authority on the implementation of the Farm Environment Plan; except that*

b) *Where the area of dairy farming or intensively farmed stock is less than 5 hectares, a Farm Environment Plan is not required provided that the activity complies with the following standards:*

   i. *Where the land slope is less than 15 degrees, no establishment of feed crops or irrigation of pasture is undertaken within 5 metres of the top of the bank of any permanently flowing stream, lake or wetland and within 10 metres of the top of the bank or edge of any Outstanding Waterbody identified in Schedule G18 or Regionally Significant Wetland identified in Schedule G17 A smaller setback of at least 1 metre can only occur where a Farm Environment Plan is prepared that demonstrates that this smaller setback will not adversely impact on the quality of receiving waterbody and this is certified by the Consent Authority*

   ii. *Where the land slope is between 15 and 25 degrees, no establishment of feed crops or irrigation of pasture is undertaken within 10m of any permanently flowing stream, lake or wetland. A smaller setback of at least 1 metre can only occur where a Farm Environment Plan is prepared that demonstrates that this smaller setback will not adversely impact on the quality of receiving waterbody and this is certified by the Consent Authority;*

   iii. *No feed crops are established on land with a slope greater than 25 degrees;*

   iv. *No cultivation occurs within 1 metre of open surface water drains.*

c) *From **1 July 2017**, where dairy farming or intensively farmed stock activities are within a paddock adjoining a waterbody, all livestock shall be excluded from 5 metres from the top of the bank or edge of any permanently flowing stream, lake or wetland, and within 10 metres of the top of the bank or edge of any Aquatic Ecosystem Waterbody identified in Schedule G15, any Outstanding Waterbody identified in Schedule G18 or any Regionally Significant Wetland identified in Schedule G17;*

d) *From **1 July 2019**, all permanent and intermittent streams and rivers that are crossed by formed stock crossings as part of the intensively farmed stock activity shall be bridged or culverted. However, cattle, deer and pigs are able to enter waterbodies for the purpose of crossing from one side to the other provided:*

   i. *They are being supervised and are actively driven across the water body in one continuous movement; and*

   ii. *This occurs less frequently than once per week.*

***Advisory Note:** The discharge of dairy farm effluent to land is a discretionary activity in accordance with Rule C6.2.3(14) .*

*Farm Environment Plans will be assessed by the Consent Authority for compliance with the information requirements in Appendix H20. If a Farm Environment Plan which meets the Appendix H20 requirements is not produced by the **1 May 2021** then existing intensively farmed stock activities will require a resource consent to continue.*

Stock access to the beds of rivers and lakes including stock crossings are also subject to Rules C6.3.7(1) and C6.3.7(2).

Rule 6.2.9(5)

Diffuse discharges from stock access or grazing when winter intensive grazing is being undertaken.

Classification: Permitted Activity

a) *From **1 July 2017,** stock are excluded from within 5 metres of the top of the bank or edge of any permanently flowing or intermittent stream, lake or wetland and within 10 metres of the top of the bank or edge of any Aquatic Ecosystem Waterbody identified in Schedule G15, Outstanding Waterbody identified in Schedule G18 or Regionally Significant Wetland identified in Schedule G17 for the period 1 May to 30 September on all winter intensive grazing land of less than a 15 degree slope;*

*b) From **1 July 2017,** stock are excluded from 10 metres from the wetted bed of all permanent and intermittent streams and rivers, all lakes and the edge of all wetlands for the period 1 May to 30 September on all winter intensive grazing land of a 15 degree slope or greater*

Rule 6.2.9(3)

Diffuse discharges from commercial vegetable growing and cropping activities lawfully established prior to the 14 October 2015.

Classification: Permitted Activity

*From **1 May 2021** onwards all commercial vegetable growing and cropping activities shall have prepared and submitted to the Consent Authority a Farm Environment Plan which has been certified by the Consent Authority as meeting the requirements outlined in Appendix H20. All commercial vegetable growing and cropping activities shall be carried out in accordance with the actions and timeframes specified in the certified Farm Environment Plan. An annual report shall be provided to the Consent Authority on the implementation of the Farm Environment Plan;*

b) *From **1 July 2021,** no cultivation is undertaken within 5 metres of the edge of any modified watercourse, permanent or intermittent stream, expect where the Farm Environment Plan can demonstrate that a smaller setback of at least 1 metre can occur without adversely impacting on the quality of receiving waterbody and this is certified by the Consent Authority.*

***Advisory Note:** Farm Environment Plans will be assessed by the Consent Authority for compliance with the information requirements in Appendix H20. If a Farm Environment Plan which meets the Appendix H20 requirements is not produced by the **1 May 2021** then existing commercial vegetable growing and cropping activities will require a resource consent to continue.*

***Advisory Note:** Refer to the definitions of Intermittent Stream and Modified Watercourse as many "drains" are likely to meet these definitions and the requirements of the rule.*

Rule 6.2.9(4)

Diffuse discharges from new commercial vegetable growing, cropping, dairy farming and intensively farmed stock activities established after 14 October 2015 except where they are within 20 metres of an Outstanding Waterbody identified in Schedule G18.

Classification: Permitted Activity

a) A Farm Environment Plan which has been certified by the Consent Authority as meeting the requirements outlined in Appendix H20 must be prepared and submitted to the Consent Authority prior to the commencement of the activity. All commercial vegetable growing, cropping, dairy farming and intensively farmed stock activities must be carried out in accordance with the actions and timeframes specified in the certified. An annual report shall be provided to the Consent Authority on the implementation of the Farm Environment Plan;

b) Where dairy farming or intensively farmed stock activities are within a paddock adjoining a waterbody, all livestock shall be excluded from 5 metres from the top of the bank or edge of any permanently flowing stream, or the edge of any lake or wetland, or within 10 metres of the top of the bank or edge of any Aquatic Ecosystem Waterbody identified in Schedule G15, or any Regionally Significant Wetland identified in Schedule G17, or within 20 metres of any Outstanding Waterbody identified in Schedule G18. ;

c) All permanent and intermittent streams and rivers that are crossed by formed stock crossings as part of the intensively farmed stock unit shall be bridged or culverted. This must be done by 1 July 2019 or when the activity is established if after this date. However, cattle, deer and pigs are able to enter waterbodies for the purpose of crossing from one side to the other provided:

i. They are being supervised and are actively driven across the water body in one continuous movement; and

ii. This occurs less frequently than once per week;

d) No cultivation is undertaken within 5 metres of the edge of any modified watercourse, permanent or intermittent stream, unless the Farm Environment Plan can demonstrate that a smaller setback of at least 1 metre can occur without adversely impacting on the quality of receiving waterbody and this is certified by the Consent Authority.

Rule 6.2.9(4)

Classification: Discretionary

Diffuse discharges that do not meet the permitted activity standards for the rules in section C6.2 or is not provided for by another rule in this Plan.