

# 2020/21 SUMMER CROP SURVEY

**Gisborne District Council** 



# ABSTRACT

The 2020/21 Summer Crop Survey report details the sixth survey of the summer crops grown throughout the Gisborne District.

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# **Executive Summary**

The 2020/21 Summer Crop Survey is the sixth survey to detail the type, location and total area of different summer crops in the Gisborne district. A total of 24,068.4 hectares was surveyed, of which 15,432.6 hectares was recorded as summer crops (pasture and tilled land were excluded from this value).

The Tairāwhiti Resource Management Plan (TRMP) rules for protecting freshwater that relate directly to intensively farmed stock, winter intensive grazing and commercial vegetable growing. 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 6 of the TRMP.

# **Dominant crops**

• Maize and Sweetcorn were the most dominant crop types (6,485.5 ha), followed by Squash (1,595.1 ha), Citrus (1,534.4 ha), Grapes (1,382.5 ha), Chicory (888 ha), and kiwifruit (688.5 ha).

# **Crops by location**

- Poverty Bay Flats had the largest area of cropped land (10,225.8 ha) with the most diverse summer crop varieties.
- East Coast/Tolaga/Tokomaru had the second largest area (2,094.5 ha), followed by Te Karaka/Whatatutu (1,915.7 ha), East Cape/Ruatoria (1,014.5 ha), and Motu/Matawai (182.2 ha).

# **Taruheru Catchment**

- Recent reports by the council such as the State of Environment and Freshwater Accounting reports have identified the Taruheru River as having the poorest freshwater quality.
- As a follow up from the Winter Crop Surveys, the Summer Crop Survey 2020/2021 looks at long term trends in commercial cropping in the Taruheru Catchment over the past 13 years.
- Trends found that the total area of cropping (excluding pasture and tilled land) had increased by approximately 297.5 ha over the 13 years, Maize and Sweetcorn was the most abundant crop in both 2008 and 2021, Kiwifruit had doubled from 136.7 ha in 2008 to 314.5 ha in 2021 and Grapes had decreased the most from 574.7 ha in 2008 to 387 ha in 2021.

# Water Threat

- Crops surveyed were categorised as having a water threat if they triggered any of the applicable rules for cropping in the Freshwater Chapter 6 of the TRMP.
- Water threatened areas accounted for approximately 437.8 hectares of the total area, amounting to only 1.8% of the total land surveyed.

# **1.0 Introduction**

The Environmental Science Team from Gisborne District Council has completed a survey of the summer crops grown throughout the Gisborne district for the 2020/21 summer seasons. This is the sixth consecutive year that the summer crop survey has been completed. The purpose of the survey is to identify the different types of summer crops being grown throughout the region that are intended for human and animal consumption. The survey outlines the area that the crops cover, and proximity to waterbodies.

The data from the survey is utilised in the management of the region's physical resources, as it helps to determine both water quality and 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 Science Team aims 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, and commercial vegetable growing.

# 1.1 Relationship to the Tairāwhiti Resource Management Plan (TRMP)

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

Rules regarding commercial vegetable growing will come into effect from 1 May 2021. There is a requirement for commercial vegetable growers and annual croppers to lodge a Farm Environment Plan with Gisborne District Council by 1 May 2021. The rules are included in *Appendix 3*.

# **Definitions Part E: Definitions of the TRMP**

Intensive farming is defined as:

1. 'Intensively farmed stock, commercial vegetable growing or cropping activities'.

**Cropping** is further defined as:

 'Using an area of land in excess of 1 hectare to grow annual crops other than commercial vegetable crops. This definition does not include crops grazed on by animals from the same property'.

#### Commercial Vegetable growing is defined as:

- 1. 'Using an area of land greater than 1 ha for producing **vegetable crops** for human consumption'
- 2. 'This may be undertaken on a rotational basis, but managed as a single operation'.
- 3. 'It does not include perennial crops'

#### Farming is defined as:

- 1. 'A land-based activity for the production of livestock or plants and includes':
  - c) 'Plantation forestry, horticultural produce and cropping'.

# 2.0 Methods

The 2020/21 summer crop survey began on 23<sup>rd</sup> of December 2020 and finished on the 20<sup>th</sup> of January 2021. The survey took 12 working days to complete over 28 days. Consequently, the survey was not conducted on consecutive days due to holidays, weekends and staff members being away/having a high workload.

The survey order included that the Poverty Bay flats and Tiniroto were surveyed first, followed by the Te Karaka and Whatatutu areas, Tolaga Bay, Tokomaru Bay were surveyed next, followed by Motu/Matawai. The more northern coastal areas that were surveyed included the area around Ruatoria and Tikitiki, with the furthest point being Rangitukia. This is shown in figure 1.

The data was gathered on a hand held tablet which utilised an ArcGIS (Geographic Information System) software called Arc Collector. The data was entered systematically while driving throughout the region, and the crop type, activity (e.g tilled or planted), and proximity of the crop to a waterway was recorded. It was also noted whether or not the crop proximity (to a waterway) was a threat to the water quality.

In previous years, the summer crop survey has begun between the first two weeks of January and has been completed within the last week of that month. This year's survey began with one day of surveying in late December, then continued within the first two weeks of January and was completed within the second to last week of that month. Therefore, the crop survey was fulfilled within the same cropping period to enable crop identification to be maximised. Only a small proportion of the crops were hard to identify as they were either out of viewing range, or a hybrid/unidentifiable species. Photos were taken of these crops to help identify the image and crop type back in the office. The crops that could not be identified were categorised as 'other'.

This specific method (where data was collected using Arc Collector software) is the third time it has been used for the summer crop survey, and was also utilised during the 2018 winter crop survey. Prior to this, previous surveys were carried out by recording the crop types onto printed aerial maps and then digitizing this data onto an interactive map available online using ArcMap software. Previous reports include a water threat section relating to the relevant TRMP rules for commercial cropping which has also been included into this year's report. There was a more specific focus on the Taruheru Catchment specifically focusing on long term cropping trends.

# 2.1 Survey Area

The same areas as the 2019/20 survey were surveyed to ensure accuracy when comparing results between years; this practice should remain consistent for future summer crop surveys. The surveyed area is shown in figure 1; divided into five different localities in order to compare data between locations. These locations are:

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

# **Crop Survey Area**



# 2.2 Crop Types

This survey used a similar format for crop types as previous years. A full list of summer crop types that were recorded are shown in Figure 2.

Pasture was recorded if it was in an area that had been cropped in the past, however this land was not categorised as a crop, it was categorised as 'pasture/unused'. This data was further used in an analysis relating to water threat, as pasture can have a significant impact towards waterway quality. In previous reports 'tilled land' has been recorded but not used for analysis; however this year it has been included as part of the analysis in section 4.0 water threats.

Crops that were difficult to identify due to them being too far away or a hybrid/unidentifiable species were recorded as 'other', see Figure 2. Crops that were not recorded in the 2019/20 Summer Crop Survey were recorded as a new area. 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							
Apples and Pears	Persimmon						
Avocados	Pine Nursery						
Baleage	Pinenuts						
Cauliflower/Broccoli	Plantain						
Chicory	Plantain/Chicory						
Citrus	Plantain/Clover						
Clover	Pomegranate						
Feijoa	Poplar/WillowNursery						
Flowers	Potatoes						
Forage rape	Squash						
Grape Nursery	Stock Feed/Baleage						
Grapes	Stonefruit						
Kiwifruit	Tamarillo						
Leafy Turnip	To Be Planted						
Lettuce/Cabbage	Tomatoes						
Lucerne							
Maize/Sweetcorn							
Melons							
Olives							
Other							
Pasture/Unused							

Figure 2. Crop types surveyed in the Gisborne District

# 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 summer crop surveys allowing accurate conclusions to be able to be drawn when discussing any changes or trends in crop types throughout the region.

For the entire Gisborne region, the area of summer crops excluding pasture and tilled land was 15,432.6 hectares. The total area surveyed and recorded was 24,068.4 hectares. The areas of pasture (7,888.4 ha) and tilled land (747.4 ha) were excluded to calculate the total area of summer crops. This is because pasture land use types generally have a lower impact on soil and waterways, as pasture is generally not as intensely irrigated or fertilised as commercial crops. Tilled land has a risk of the bare soil eroding into waterways with seeds/seedlings still being intensively irrigated and fertilized. However, tilled land is generally pretty short term, and the crop to be planted is unknown so the impact the potential species has is unknown.

A greater area was surveyed in the 2020/21 survey than the previous 2019/2020 survey (24,003.9 ha). This survey also had a higher total area of summer crops (15,432.6 ha) compared to the 2019/2020 survey of summer crops (15,221.7 ha). This may explain the increase of total surveyed land.

The total area (ha) of the main 25 summer crops in the Gisborne region can be seen in Table 1 and Figure 4 below.

Crop Type	Area (ha)	Сгор Туре	Area (ha)					
Apples and Pears	392.6	Olives	10.3					
Avocados	74.5	Other	430.4					
Baleage	341.1	Pasture/Unused	7,888.4					
Cauliflower/Broccoli	99.3	Persimmon	109.5					
Chicory	888	Pine Nursery	52					
Citrus	1,534.4	Pinenuts	1.5					
Clover	244.6	Plantain	82.7					
Feijoa	59	Plantain/Chicory	22.6					
Flowers	1.4	Plantain/Clover	23.9					
Forage rape	122.1	Pomegranate	2.2					
Grape Nursery	20.3	Poplar/Willow Nursery	11.4					
Grapes	1,382.5	Potatoes	0.9					
Kiwifruit	688.5	Squash	1,595.1					
Leafy Turnip	138	Stock Feed/Baleage	51.4					
Lettuce/Cabbage	47.7	Stonefruit	23.5					
Lucerne	331.2	Tamarillo	8.4					
Maize/Sweetcorn	6,485.5	To Be Planted	747.4					
Melons	31.3	Tomatoes	134.9					

 Table 1. Total area (ha) of main 25 crop types identified in the 2020/21 Summer Crop Survey.



Figure 4. Total area (ha) of crop types identified in the 2020/21 Summer 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 (hectares) they covered, and major crops can be seen in Table 2. The major crop types were analysed to test if there were any long term trends over the past four summers, these trends can be seen in Figure 5.

Сгор Туре	Total hectares
Maize/Sweetcorn	6,485.5
Squash	1,595.1
Citrus	1,534.4
Grapes	1,382.5
Chicory	888
Kiwifruit	688.5

Table 2. Top six most common crops identified in Gisborne region



**Figure 5.** Six year trend of the major crops in the Gisborne region (2014/15 – 2020/21)

### 3.1.1 Maize/Sweetcorn

Maize and Sweetcorn were the most abundant crop types present in the Gisborne region. Maize and Sweetcorn account for 42.02% of all crops recorded in the Gisborne region (excluding pasture and tilled land), covering 6,485.5 hectares of land. Maize and Sweetcorn were grouped together for the purpose of analysis as they were difficult to identify separately in juvenile form and pose very similar impacts on the environment and waterways.

#### **Observations and trends:**

Overall the trend for Maize and Sweetcorn is decreasing as seen in Figure 6, with a major drop from 2015 to 2016, then the trend appears to be plateauing around approximately 6,500 hectares. These trends could be attributed to a large proportion of crop land transitioning to Citrus and Kiwifruit orchards and other crops particularly around the Poverty Bay Flats.



**Figure 6.** Six year trend of the total area (ha) of Maize/Sweetcorn in the Gisborne region (2014/15 – 2020/21)

# 3.1.2 Squash

Squash was the second most abundant crop type identified in the Gisborne region, covering an area of 1,595.1 hectares. The Squash category covers a range of various Buttercup Squash and Pumpkin crops which account for 10.34% of the summer crops recorded in the Gisborne region (excluding pasture and tilled land).

# **Observations and trends**:

The area of Squash crops have been compared to the previous summer crop surveys and trends have been observed. Squash area peaked in 2015/16 with 2,299 hectares and has since been on the decline and appeared to be flattening around 1,800 hectares in 2018/19 and 2019/20, then another decline in 2020/21. This long term decline may be attributed to similar reasons as Maize and Sweetcorn, which is the diversification of what is grown in the region. This is confirmed by the total area being surveyed actually increasing throughout the years.



Figure 7. Six year trend of the total area (ha) of Squash in the Gisborne region (2014/15 – 2020/21)

# 3.1.3 Citrus

The total area of citrus crops observed at the time of the survey was 1,534.4 hectares. There are a number of citrus crops grown in the summer months of the Gisborne region. These commercial crops include Orange, Lemon, Mandarin, Lime and Grapefruit. These citrus varieties were grouped together as they were difficult to distinguish, mainly due to similarity in appearance between species and dense shelter belts that prevented a clear view of the citrus types. These crop categories combined contribute to 9.94% of the total summer crops recorded in the region.

# **Observations and trends:**

This commercial crop category trend has remained very similar in the past with very little variation and over the past year area identified has increased. This may be due to the conversion of other crops into citrus, such as grapes which is declining in area.



Figure 8. Six year trend of the total area (ha) of Citrus in the Gisborne region (2014/15 – 2020/21)

# 3.1.4 Grape

Grape is another common crop identified in the Gisborne region. The area of Grapes recorded covered 1,382.5 hectares making it the fourth most abundant summer crop in the region, accounting for 8.96% of the total summer crops surveyed in the region.

# **Observations and trends:**

The area of Grapes has been compared to the previous summer crop surveys and trends have been observed. Grapes have shown a decreasing trend in area covered, 1,851.1 hectares in 2015 to 1,382.5 hectares in 2020, as seen in Figure 9. This could be due to a conversion of grapes into other crops such as kiwifruit or citrus.



**Figure 9.** Six year trend of the total area (ha) of Grapes in the Gisborne region (2014/15 – 2020/21)

# 3.1.4 Kiwifruit

Kiwifruit is another common crop identified in the Gisborne region. The area of Kiwifruit recorded was 688.5 hectares, making it the sixth most abundant crop in the region contributing to 4.46% of the summer crops recorded in the Gisborne region (excluding pasture and tilled land).

# **Observations and trends:**

The area of Kiwifruit has been compared to the previous summer crop surveys and as seen in Figure 10, Kiwifruit appears to be increasing in recent years. This trend is expected to continue as installation of Kiwifruit infrastructure was observed during the survey but as the Kiwifruit had not yet been planted it was not included in the Kiwifruit crop total area.



**Figure 10.** Six year trend of the total area (ha) of Kiwifruit in the Gisborne region (2014/15 – 2020/21)

# 3.2 Location

# 3.2.1 The Poverty Bay Flats

The total surveyed area for the Poverty Bay Flats region was 14,600.4 hectares. The total area of pasture (3,736.3 ha) and tilled land (638.3 ha) was excluded to calculate the total area of summer crops, which is 10,225.8 hectares. This area had the largest amount of crops in the district. The crop types found in this area can be seen in Figure 11.

The major crop type found in this region was Maize and Sweetcorn with 3,935.1 hectares. Citrus was the second most abundant crop in this area with 1,481.8 hectares followed by Grapes with 1,331.6 hectares then Squash with 1,070.7 hectares. Kiwifruit was found to be the fifth most common crop in the region covering 635 hectares of land.



Figure 11. Crop Types recorded on the Poverty Bay Flats in ha

In this example 'Various crops' were identified as crops with low hectares that contributed to less than 1% of the total crop area in the 2020/21 Summer Crop Survey. Various crop types for the Poverty Bay Flats region are included in Figure 12.



Figure 12. Various crop types in the Poverty Bay Flats breakdown.

# 3.2.2 East Cape/Ruatoria

The total surveyed area for the East Cape/Ruatoria region was 2,495.9 hectares. The area of pasture (1,481.4 ha) and land area that was tilled (0 ha) were excluded to calculate the total area of summer crops, which was 1,014.5 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 13. The most abundant crop in this area is Chicory with 437.7 hectares, followed by Maize and Sweetcorn with 199.7 hectares, and Lucerne, the third most abundant crop with 152.4 hectares. The remaining crops including Baleage, Citrus, Clover, Leafy Turnip, Forage rape, Olives, Plantain, Plantain/Clover, Poplar/Willow Nurseries, Other, and Potatoes were found in much lower quantities.



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

# 3.2.3 East/Tolaga/Tokomaru

The total area surveyed for the East/Tolaga/Tokomaru area was 2,871.1 hectares. The area of pasture (735.6 ha) and land area that was tilled (41.0 ha) was excluded to calculate the total area of summer crops, which was 2,094.5 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 Maize and Sweetcorn with a total area of 1,453.8 hectares. Unidentifiable/other crops was the second most abundant crop type in this region with a total area 142.7 hectares. The remaining crops including Squash, Baleage, Chicory, Citrus, Clover, Feijoa, Forage Rape, Grapes, Kiwifruit, Lucerne, Plantain, Plantain/Clover, and Plantain/Chicory were found in much lower quantities.



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



#### 3.2.4 Motu/Matawai

The total area surveyed for the Motu/Matawai area was 778.1 hectares. The area of pasture (595.9 ha) and the area of tilled land (0 ha) was excluded to calculate the total area of summer crops, which was 182.2 hectares, making this the smallest 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 Leafy Turnip, which had 83.8 hectares of the crop. Other crop types found in the region were Stock feed/Baleage with 18.5 hectares, Baleage with 45.3 hectares, and Forage Rape with 34.6 hectares.



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

# 3.2.5 Te Karaka/Whatatutu

The total area surveyed for the Te Karaka/Whatatutu area was 3,323 hectares. The area of pasture (1,339.2 ha) and tilled land (68.1 ha) were excluded to calculate the total area of summer crops, which was 1,915.7 hectares, making this the area the third largest area of crops in the district. 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 Maize and Sweetcorn with a total area of 896.8 hectares. The second most abundant crop type was Squash with a total of 442.7 hectares, followed by 'Other/unknown' being the third most abundant crop at 69.1 hectares. Clover, Apples and Pears, Chicory, Grapes, Pine Nursery, Leafy Turnip, Kiwifruit, Forage rape, Grape Nursery, Melons and Various crop types were also found in the region in lower abundance.



Figure 16. Crop Types recorded in the Te Karaka/ Whatatutu area in hectares.



Figure 16.1 Various crop types breakdown for the Te Karaka and Whatatutu area

#### 3.3 Taruheru Catchment

The Taruheru Catchment covers the area between Waihirere and Gisborne City, from the Hills to the Waipaoa River. The Taruheru River runs from the Waihirere Stream to the Turanganui River and is surrounded by fertile land and thus has been intensively cropped for many years. Recent reports looking into the water quality has highlighted several worrying trends. The ammonia, Nitrate and E.Coli levels are all above national bands and do not meet the freshwater objectives set in the Tairawhiti Resource Management plan. The Taruheru River at Tuckers Road also typically has very low levels of dissolved oxygen, causing stress on the fish living in the river. It is likely that the source of these nutrients is due to the land use surrounding the Taruheru River, hence this section looks at long term trends in commercial cropping in the Taruheru Catchment to see if it may be contributing to the river's poor health.

Data from the Summer Crop surveys from 2008 to 2021 (excluding 2013-2015 as Summer Crop surveys were not conducted in these years) has been compiled to help identify trends in land use in the Taruheru Catchment. The full table of the data can be found in Appendix 2 of this report and is summarised below in figure. 17.

Trends show that over the past 13 years, the area of cropped land (excluding Pasture and tilled land) has increased by 197.5 hectares from 2,625 hectares in 2007/08 to 2,822.5 hectares in 2020/21. Maize and Sweetcorn remains as the most abundant crop with an area of 657.4 hectares in 2020/21, an increase of 18 hectares from 2007/08. Kiwifruit has shown a large increase over the 13 years effectively increasing from 136.7 hectares in 2008 to 314.5 hectares in 2021. Lettuce and Cabbage has increased a small amount from 42.8 hectares in 2008 to 47.7 hectares in 2021. Citrus has increased by 169.4 hectares to 596.9 hectares in 2021 while Apples and Pears, have effectively remained the same over the 13 years decreasing marginally from 2008 (99.5 ha) to 2021 (97.7 ha). Tomatoes have shown the largest decrease in area from 257.1 hectares in 2008 to 387 hectares in 2021. Squash has shown a slight decline from 306.6 hectares in 2008 to 331.8 hectares in 2021.

These trends show a move towards leafy greens such as lettuce and cabbage which tend to require larger amounts of fertilizers to grow. Grapes, which generally do not require large amounts of water, have been replaced by Kiwifruit which not only require more water but also usually require field tile drainage. While these trends alone do not explain the poor water quality trends observed in the Taruheru River, they help to understand some factors that influence the river's health and may help the council manage the freshwater values of the Taruheru through Farm Environment Plans and possibly what land use water consents will be allowed for.

![](_page_19_Figure_0.jpeg)

Figure 17. Long term Crop Trends in the Taruheru Catchment, summer periods from 2008 to 2020/21

# 4.0 Water Threats

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 water threat relates to rules 6.2.9(2), 6.2.9(3), 6.2.9(4) and 6.2.9(5) of the TRMP, see Appendix 3. Crops that were listed with no water threat did not trigger any of the rules of the TRMP.

Paddock drains were considered a water threat in this survey as they come under the category of being a modified watercourse under the TRMP definitions, see Appendix 4. Modified watercourses will be influenced by the setback requirements under rule 6.2.9(3) which comes into place from 1 July 2021 where no cultivation is to be undertaken within 5 metres of the edge of any modified watercourse, permanent or intermittent stream. Therefore future non-compliant sites have been identified in this survey to input into management actions and Farm Environment Plans leading up to 2021.

The total area that was classed as having a water threat was 437.8 hectares. This comprises 1.8% of the total area surveyed. Each of the categories are shown in Figures 18, 19 and 20 below. These included cultivation <5m edge of a modified watercourse or stream (Rule 6.2.9(3)/6.2.9(4), cultivation <10m, Rule 6.2.9(2), and paddock drains.

For the majority of areas identified as having water threat (437.8 ha), the rules will not come into effect until 1 July 2021, which allows farmers time to adjust their practices 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 shows the total area of cropped land that is adjacent to the water body.

![](_page_20_Figure_5.jpeg)

**Figure 18.** Proportion of land area triggering rules within the Freshwater Chapter of the Tairāwhiti Resource Management Plan – identified as a water threat.

![](_page_21_Figure_0.jpeg)

**Figure 19.** Proportion of land area triggering rules within the Freshwater Chapter of the Tairāwhiti Resource Management Plan – identified as a water threat.

![](_page_21_Figure_2.jpeg)

**Te 20.** Proportion of fand area triggering fales within the freshwater endpter of

Tairāwhiti Resource Management Plan – identified as a water threat.

The most common water threat rules triggered, Rule 6.2.9(4) 'Cultivation <10m Permanently Flowing Stream, Regionally Significant Wetland and Aquatic Ecosystem Waterbody'. The second and third most common rule triggered, Rule 6.2.9(4) and 6.2.9(3) 'Cultivation <5m edge of a modified watercourse or stream', whereas 'Paddock drains' were the least common water threat.

The water threats within the 2018/19 Summer Crop Survey can be compared to this report as it is also based on the rules of the Freshwater chapter (C6) of the Tairāwhiti Resource Management Plan (TRMP). However, the 2018/19 results differ due to fluctuations in variation of crop types as crop species are converted over time and the implementation of Farm Environment Plans as farmers move towards meeting the rules of the Tairāwhiti Resource Management Plan.

The 2020/21 Summer Crop Survey showed the most common water threat rules triggered was Rule 6.2.9(4) and 6.2.9(3); 'Cultivation <5m edge of a modified watercourse or stream'. The second most common rule triggered; Rule 6.2.9(4) 'Cultivation <10m Permanently Flowing Stream, Regionally Significant Wetland and Aquatic Ecosystem Waterbody', whereas 'Paddock drains' made up the smallest water threat. This differs from the 2018/19 Summer survey, as the total areas identified as water threats in 2020/21 were lower compared to the 2018/19 results. This may be attributed to either improved management practices, or variation in crop type which may have influenced the distance between the crop and water body.

A conservative approach was taken when identifying potential water threats, as the rules these threats breach will not come into effect until 1<sup>st</sup> of July 2021. The guidelines and definitions for water threats can be quite general or vague; therefore improvements to watercourse definitions and threat identification may lead to a better estimate of the total land that is non-compliant. The purpose of recording these breaches is to gain a rough scale of non-compliance in the region so that a plan can be created for future management of these water threats. It was also noted there was a slight trend in non-compliance water threats in the rural regions. Frequency of water threats seemed to increase with distance from the town areas, which is possibly simply due to these areas being less exposed and monitored.

![](_page_22_Picture_4.jpeg)

Figure 21. Possible non-compliant cropping area.

# **5.0 Limitations**

# 5.1 Survey Area

As previously stated in section 2.0 the 2018/19 summer crop survey is the third survey to be conducted in the Gisborne region following this method, however the Poverty Bay Flats region has been surveyed individually since the 2007/08 summers. The survey area is outlined in Figure 1 in section 2.1. These cover all visible cropping areas that can be seen by the road throughout the region.

Another limitation was the possibility of hidden watercourses on properties that had a limited view of the entire area. This was usually due to land ridges or the distance from the road or tall crops. Another limitation of this is being able to see the distance of a crop from the edge of a waterway. This effecting the water threat data as all water threats weren't able to be identified. Communication with land owners prior to surveying may assist with these issues, and further strengthen survey accuracy. Also, surveying roadside drains and paddock drains as water threat may not be accurate as drains only have seasonal flows, are artificial structures and support limited ecological values.

The survey area was 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 Council's drone, or any other variation of remote sensing could be used to overcome this limitation however this would be much more expensive, potentially more time consuming and you would need permission from land owners. It is recommended that the same areas should be surveyed each summer, to keep trends as accurate as possible.

Recent aerial photography will be useful to identify any new cropped areas, which can be analysed and added to the survey using GIS Software.

# 5.2 Survey Method

As stated in section 2.0, this was the third year that the summer crop survey was done by using a hand held tablet rather than recording on aerial maps. The crop survey was easier with two people, driving a distance and pulling over when identifying and recording an area of cropped land in the Poverty Bay Flats region, as it was a densely cropped area with a relatively small size. Two people were necessary in the rural areas which required longer periods of driving between distanced crops. A second person in the vehicle reduced the amount of stops during the trip and increased survey efficiency. An additional person also acted as a safety measure as driving long distances in rural areas could be potentially hazardous.

The software used to collect the crop data was Arc Collector. Using Arc Collector the team was able to edit the GIS layer from the previous crop survey. Editing the previous layer allowed the survey to be completed a lot more efficiently as most crops remained the same as the previous year. If the crop type had changed but the paddock shape remained the same, the crop type could be easily changed 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 was needed to be completed after the survey. The 2018 Winter Crop Survey will also follow this data collection method.

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

The survey time could also be reduced by excluding non-summer crops, such as pasture and tilled land which covered a large portion of the land surveyed (8,635.8 ha). Pasture was only recorded if the land area had previously been documented as having summer crops present. Pasture and tilled land are important to record due to their potential threat to water quality. Tilled land exposes bare land, increasing the likelihood of sediment running off the paddocks into nearby waterways. If survey time needed to be decreased, it is recommended that only recording pasture and tilled land that has a water threat is a suitable option.

The 2020/21 summer crop survey began on December 23<sup>rd</sup> and was finished on January 20<sup>th</sup>, around the same dates as the previous surveys. In previous years, the summer crop survey has always begun on a date between the first two weeks of January and has been completed within the last week of that month. The timing of the summer crop survey significantly impacts the results, as the survey only supplies a 'snapshot' of what crops are present during the time of the survey. This is an important factor to note because some crops such as fodder crops are planted and eaten out at different times of the year due to either weather or economic factors.

# 6.0 Conclusion

In summary, the 2020/21 Summer Crop Survey can conclude that out of the total 24,068.4 hectares of land that was surveyed, 15,432.6 hectares was recorded as summer crops (pasture and tilled land were excluded from this value). Maize and Sweetcorn were the most dominant crop types (6,485.5 ha), followed by Squash (1,595.1 ha), Citrus (1,534.4 ha), Grapes (1,382.5 ha), Chicory (888 ha), and Kiwifruit (688.5 ha).

These values showed that a large area of land is being utilised during the summer period for cropping practices. A focus on the Taruheru Catchment showed long term trends in commercial cropping which may be partially responsible for the deteriorating trends in water quality observed in the Taruheru River. These Trends include increases in leafy green crops and a movement from grapes to kiwifruit.

Water threatened areas were identified that did not comply with the Freshwater Rules that are due to come into effect on the 1<sup>st</sup> of July 2021. The area identified as a water threat had reduced from approximately 1,473 hectares in 2018/19 to 437.8 hectares in 2020/21, amounting to only 1.8% of the total land surveyed. These areas need to be targeted in the lead up towards the implementation of the 2021 Freshwater rules coming into practice, and will assist in the development of Farm Environment Plans.

The purpose of this survey has been to outline the land use patterns within the Gisborne district and to promote sustainable land use practices. This can be achieved through the identification of water threatened areas, as well as the location of cropping activities, which will enable the Environmental Science team to promote water and land quality management actions in the coming years.

# Appendix 1 – Full results from the Summer Crop Survey 2020/2021

Sum of Area (ha)	Locality					
Crop	East Cape/Ruatoria	East/Tolaga/Tokomaru	Motu/Matawai	Poverty Bay Flats	Te Karaka/Whatatutu	Grand Total (ha)
Apples and Pears				337.6	55	392.6
Avocados				74	0.4	74.5
Baleage	143.6	73.4	45.3	66.1	12.7	341.1
Cauliflower/Broccoli				99.3		99.3
Chicory	437.7	141.2		255.7	53.4	888
Citrus	1.8	35.8		1481.8	15.1	1534.4
Clover	6.5	79.5		96.6	62	244.6
Feijoa		10.1		48.9		59
Flowers				1.4		1.4
Forage rape	13.1	17.7	34.6	17.5	29.3	112.1
Grape Nursery					20.3	20.3
Grapes		0.6		1331.6	50.3	1382.5
Kiwifruit		16.4		635	37	688.5
Leafy Turnip	7.6		83.8	0.7	45.9	138
Lettuce/Cabbage				47.7		47.7
Lucerne	152.4	11.3		149.3	18.2	331.2
Maize/Sweetcorn	199.7	1453.8		3935.1	896.8	6485.5
Melons				12	19.2	31.3
Olives	2.3			8		10.3
Other	20.4	142.7		198.2	69.1	430.4
Pasture/Unused	1481.4	735.6	595.9	3736.3	1339.2	7888.4
Persimmon				103.4	6.1	109.5
Pine Nursery				4.2	47.8	52
Pinenuts				1.5		1.5
Plantain	20.6	12.8		38.7	10.6	82.7
Plantain/Chicory		5.4		4.8	12.4	22.6
Plantain/Clover	7.2	12.1		0.7	4	23.9
Pomegranate				1	1.1	2.2
Poplar/Willow Nursery	0.6			10.8		11.4
Potatoes	0.9					0.9
Squash		81.7		1070.7	442.7	1595.1
Stock Feed/Baleage			18.5	31.9	1	51.4
Stonefruit				18.1	5.4	23.5
Tamarillo				8.4		8.4
To Be Planted		41		638.3	68.1	747.4
Tomatoes				134.9		134.9
Grand Total (ha)	2495.9	2871.1	778.1	14600.4	3323	24068.4
Crops Total (ha)	1014.5	2094.5	182.2	10225.8	1915.7	15432.6

# Appendix 2 – Long Term Trends – Taruheru Catchment Results

Crop (ha)	2007/08	2008/09	2009/10	2010/11	2011/12	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21
Apples and Pears	99.5	64.8	58.2	49.3	52	48.3	32	64	110.3	105.9	97.7
Avocados	18.4	11.4	13.7	29.2	35.2	13.6	16.5	16	20.2	20	33.6
Baleage									1.8	1.8	7.6
Cauliflower/Broccoli	10.4	60.9	6.9	12.2	41.3	19.2	33.3	14.2	15.5	16.7	49
Chicory									2.1	56.6	31.5
Citrus	427.6	538.2	537	533	556.4	548.5	541.7	539.1	518.8	507.2	596.9
Clover									13.6	10.6	25.6
Courgettes							1.3	1.4			
Feijoa						9.7	21.7	24.2	24.8	25.4	27.9
Flowers								0.6	0.6	0.6	0.6
Fodder Beet									7.8		
Forage rape									19.7		
Grapes	574.7	591.3	569.8	583.7	641.4	446.3	444.6	444.5	397.4	399.4	387
Kiwifruit	136.7	191.8	219.2	220.8	219.3	216.6	254.1	201.3	202.9	269.9	314.5
Leafy Turnip							36.9	20.1	39	23	0.7
Lettuce/Cabbage	42.8	60.6	15.2	9.5	42.1	55.9	73.6	94.1	79.4	129.7	47.7
Lucerne			7.9	27.3		4.6	12.9	7.2	2.9		23
Maize/Sweetcorn	639.3	879	935.5	853.8	848.9	1035.1	919.5	788.8	739.7	724.1	657.4
Melons	54.4	4.9	17.8	30.9	18.2	3.1	1.5	31.6	3	0.1	0.8
Olives						0.4	0.7	1.7	1.3	1.3	1.2
Onions			1.7								
Other								30.8	15.8	39.1	70.5
Peas/Beans	1.3				51.1						
Persimmon	40.7		4.9	30.7	30.7	44.7	13.9	59.1	59.5	59.5	66
Pine Nursery								0.1	0.5	0.5	1.4
Plantain						27.9	10.8	5.9	5.2		
Plantain/Chicory									0.9	4.8	4.8
Plantain/Clover								49.5	5.6		
Pomegranate							1.2	1.5	1.6	0.6	0.2
Squash	306.6	243.9	274.9	347.3	439.5	340.6	403	190.4	269.2	284.8	331.8
Stock Feed/Baleage							0.3				
Stonefruit	8.6	35.8	35.2	36.1	40	21	44.3	33.8	18.6	23.1	12.2
Strawberries			5.5	0.8	1.5		0.3	0.3	0.1		
Tamarillo	6.4		29.5	11.8	11.8	0.7	3	5.1	7	7.3	8.4
Tomatoes	257.1	141.3	211.2	208.2	111.6			22.3	36.3	4.3	24.6
Grand Total	2624.5	2823.9	2944.1	2984.6	3141	2836.2	2867.1	2647.6	2621.1	2716.3	2822.6

# Appendix 3 - Tairāwhiti Resource Management Plan

## Rule 6.2.9(2)

- 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;
  - 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.

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

#### Classification: Permitted Activity

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(3)

Diffuse discharges from commercial vegetable growing and cropping activities lawfully established prior to 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.

# Definitions

#### Modified watercourse -

- 1. A watercourse that meets any of following criteria:
  - *is a river or stream that has been channelled or diverted.*
  - is a drain (as defined in this Plan) constructed through a wetland or swamp, that generally follows the path of a historic natural watercourse or reasonably defined natural drainage channel.
  - is a watercourse that has a natural headwater of either a channel or spring, and generally follows the path of a historic natural watercourse or reasonably defined natural drainage channel is the oxbow of a diverted river.

**Drain** – Any natural channel which has been modified to lower the water table or divert water.