

Irrigation Water
Monitoring Programme
Annual Report
2020-2021

Technical Report 2021-95



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Taranaki Regional Council
Private Bag 713
Stratford

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Executive summary

This report for the period July 2020 to June 2021 describes the monitoring programme implemented by the Taranaki Regional Council (the Council) to assess the environmental and consent compliance performance of irrigation consent holders across the Taranaki region. The assessment covers resource consents held for pasture irrigation, horticultural and golf course irrigation. This is the 18th Annual Report issued by the Council to report on compliance monitoring programmes for consents authorising the abstraction of freshwater for irrigation purposes in Taranaki.

At 30 June 2021, a total of 66 resource consents to take and use freshwater for irrigation purposes were registered in the Council's database. Of these, 50 were for pasture irrigation, 7 for horticultural activities and 9 for recreational purposes (golf clubs). Fifty-four of these consents authorised abstraction of surface water (82%) and 12 from groundwater sources (18%).

The Council's monitoring of irrigation water permits comprises a range of various components including site inspections, the collection and assessment of abstraction data, residual flow monitoring, water quality analysis, data review and compliance assessments. The specific range of monitoring carried out for each consent is dictated by the water source, weather and flow conditions, and system design.

A total of 56 irrigation consents were exercised during the 2020-2021 monitoring year, with most commencing irrigation in mid-December and concluding late March. Rainfall recorded at the Council's monitoring locations over the summer irrigation period ranged between 97% and 155% of historical mean values. As a result of higher rainfall volumes, the total irrigation water usage during the 2020-2021 season of 5,567 ML was less than the 8,835 ML used during the preceding 2019-2020 monitoring year.

The Council carried out compliance monitoring inspections at all active irrigation sites during 2020-2021 period. Compliance with residual flow conditions for surface water abstractions was assessed by the Council on 30 separate occasions, across 25 waterways. Consent holder performance for the year was assessed on compliance with their authorised abstraction rates/volumes, maintenance of minimum residual flows, provision of abstraction records and all other general conditions of their consent(s).

Monitoring found the majority of takes being well managed and operating within relevant consent conditions during the 2020-2021 period. The Council was required to enter three incidents in relation to irrigation consents over this period, which resulted in two infringement notices being issued. The overall rate of non-compliance across all exercised consents was 5%, which was similar to that seen during the 2019-2020 period (4%).

During the 2020-2021 year, 84% of exercised irrigation consents in Taranaki achieved a high level of environmental performance and compliance with their consents, 11% achieved a good level of performance, while 5% are required to improve their compliance performance.

For reference, in the 2020-2021 year, consent holders were found to achieve a high level of environmental performance and compliance for 86% of the consents monitored through the Taranaki tailored monitoring programmes, while for another 11% of the consents, a good level of environmental performance and compliance was achieved.

In terms of overall environmental and compliance performance by the irrigation water consent holder's over the last several years, this report shows that the consent holder performance remains at a good to high level in the year under review.

This report includes recommendations for the 2021-2022 year.

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1 Introduction

1.1 Compliance monitoring programme reports and the Resource Management Act 1991

1.1.1 Introduction

This report is for the period July 2020 to June 2021 by the Taranaki Regional Council (the Council) describing the monitoring programmes for resource consents authorising the abstraction of freshwater for irrigation purposes in Taranaki. The report covers the data collected for compliance monitoring for resource consents for pasture irrigation, horticultural and golf courses.

One of the intents of the *Resource Management Act 1991* (RMA) is that environmental management should be integrated across all media, so that a consent holder's use of water, air, and land should be considered from a single comprehensive environmental perspective. Accordingly, the Council generally implements integrated environmental monitoring programmes and reports the results of the programmes jointly. This report discusses the environmental effects of the Consent holder's use of water, and is the 18th combined annual report by the Council for the Irrigation water.

1.1.2 Structure of this report

Section 1 of this report is a background section. It sets out general information about:

- consent compliance monitoring under the *Resource Management Act 1991* (RMA) and the Council's obligations;
- the Council's approach to monitoring sites through annual programmes;
- the resource consents held for water takes across various catchments;
- the nature of the monitoring programme in place for the period under review; and
- a description of the activities and operations conducted in the Company's site/catchment.

Section 2 presents the results of monitoring during the period under review, including scientific and technical data.

Section 3 discusses the results, their interpretations, and their significance for the environment.

Section 4 presents recommendations to be implemented in the 2021-2022 monitoring year.

A glossary of common abbreviations and scientific terms, and a bibliography, are presented at the end of the report.

1.1.3 The Resource Management Act 1991 and monitoring

The RMA primarily addresses environmental 'effects' which are defined as positive or adverse, temporary or permanent, past, present or future, or cumulative. Effects may arise in relation to:

- a. the neighbourhood or the wider community around an activity, and may include cultural and social-economic effects;
- b. physical effects on the locality, including landscape, amenity and visual effects;
- c. ecosystems, including effects on plants, animals, or habitats, whether aquatic or terrestrial;
- d. natural and physical resources having special significance (for example recreational, cultural, or aesthetic); and
- e. risks to the neighbourhood or environment.

In drafting and reviewing conditions on discharge permits, and in implementing monitoring programmes, the Council is recognising the comprehensive meaning of 'effects' in as much as is appropriate for each activity. Monitoring programmes are not only based on existing permit conditions, but also on the obligations of the RMA to assess the effects of the exercise of consents. In accordance with Section 35 of the RMA, the Council undertakes compliance monitoring for consents and rules in regional plans, and maintains an overview of the performance of resource users and consent holders. Compliance monitoring, including both activity and impact monitoring, enables the Council to continually re-evaluate its approach and that of consent holders to resource management and, ultimately, through the refinement of methods and considered responsible resource utilisation, to move closer to achieving sustainable development of the region's resources.

1.1.4 Evaluation of environmental and administrative performance

Besides discussing the various details of the performance and extent of compliance by the consent holders, this report also assigns a rating as to each Company's environmental and administrative performance during the period under review.

Environmental performance is concerned with actual or likely effects on the receiving environment from the activities during the monitoring year. Administrative performance is concerned with the Company's approach to demonstrating consent compliance in site operations and management including the timely provision of information to Council (such as contingency plans and water take data) in accordance with consent conditions.

Events that were beyond the control of the consent holder and unforeseeable (that is a defence under the provisions of the RMA can be established) may be excluded with regard to the performance rating applied. For example loss of data due to a flood destroying deployed field equipment.

The categories used by the Council for this monitoring period, and their interpretation, are as follows:

Environmental Performance

High: No or inconsequential (short-term duration, less than minor in severity) breaches of consent or regional plan parameters resulting from the activity; no adverse effects of significance noted or likely in the receiving environment. The Council did not record any verified unauthorised incidents involving environmental impacts and was not obliged to issue any abatement notices or infringement notices in relation to such impacts.

Good: Likely or actual adverse effects of activities on the receiving environment were negligible or minor at most. There were some such issues noted during monitoring, from self-reports, or during investigations of incidents reported to the Council by a third party but these items were not critical, and follow-up inspections showed they have been dealt with. These minor issues were resolved positively, co-operatively, and quickly. The Council was not obliged to issue any abatement notices or infringement notices in relation to the minor non-compliant effects; however abatement notices may have been issued to mitigate an identified potential for an environmental effect to occur.

For example:

- High suspended solid values recorded in discharge samples, however the discharge was to land or to receiving waters that were in high flow at the time;
- Strong odour beyond boundary but no residential properties or other recipient nearby.

Improvement required: Likely or actual adverse effects of activities on the receiving environment were more than minor, but not substantial. There were some issues noted during monitoring, from self-reports, or during investigations of incidents reported to the Council by a third party. Cumulative

adverse effects of a persistent minor non-compliant activity could elevate a minor issue to this level. Abatement notices and infringement notices may have been issued in respect of effects.

Poor: Likely or actual adverse effects of activities on the receiving environment were significant. There were some items noted during monitoring, from self-reports, or during investigations of incidents reported to the Council by a third party. Cumulative adverse effects of a persistent moderate non-compliant activity could elevate an 'improvement required' issue to this level. Typically there were grounds for either a prosecution or an infringement notice in respect of effects.

Administrative performance

High: The administrative requirements of the resource consents were met, or any failure to do this had trivial consequences and were addressed promptly and co-operatively.

Good: Perhaps some administrative requirements of the resource consents were not met at a particular time, however this was addressed without repeated interventions from the Council staff. Alternatively adequate reason was provided for matters such as the no or late provision of information, interpretation of 'best practical option' for avoiding potential effects, etc.

Improvement required: Repeated interventions to meet the administrative requirements of the resource consents were made by Council staff. These matters took some time to resolve, or remained unresolved at the end of the period under review. The Council may have issued an abatement notice to attain compliance.

Poor: Material failings to meet the administrative requirements of the resource consents. Significant intervention by the Council was required. Typically there were grounds for an infringement notice.

For reference, in the 2020-2021 year, consent holders were found to achieve a high level of environmental performance and compliance for 86% of the consents monitored through the Taranaki tailored monitoring programmes, while for another 11% of the consents, a good level of environmental performance and compliance was achieved.¹

1.1.5 Regional freshwater allocation

At 30 June 2021, there were a total of 66 resource consents to take and use freshwater for irrigation purposes. Fifty consents were for pasture irrigation, seven for irrigation associated with horticultural activities and nine for recreational purposes (e.g. golf course watering) (Figure 1).

Surface water is the predominant source of water for irrigation, accounting for 54 of the 66 consented water abstractions (82%). The remaining 12 consents (18%) authorise abstractions from groundwater (Figure 2).

The relatively low yields from Taranaki's aquifers are rarely sufficient to supply an entire irrigation system, and hence groundwater usage as a primary source of irrigation water is uncommon across the region. Typically, groundwater abstractions are used to supplement surface water irrigation supply.

The breakdown of freshwater allocation in the region indicates that pasture irrigation represents 26% of the total consented water abstraction in Taranaki. Other types of irrigation (horticultural and recreational)

¹ The Council has used these compliance grading criteria for more than 17 years. They align closely with the 4 compliance grades in the MfE Best Practice Guidelines for Compliance, Monitoring and Enforcement, 2018

account for approximately 8%, with other uses² accounting for the majority (66%) of the total water allocation across the region (Figure 3).

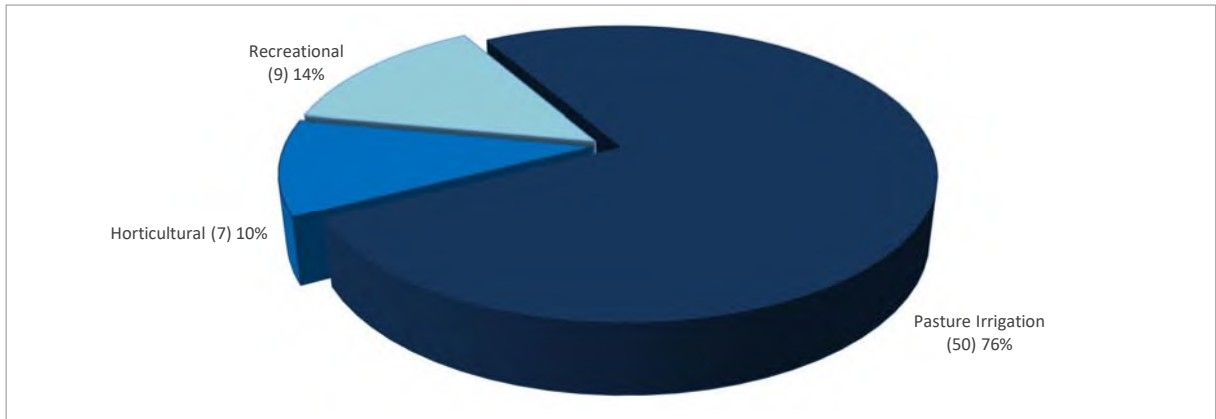


Figure 1 Percentage of water irrigation allocation per activity in the Taranaki region

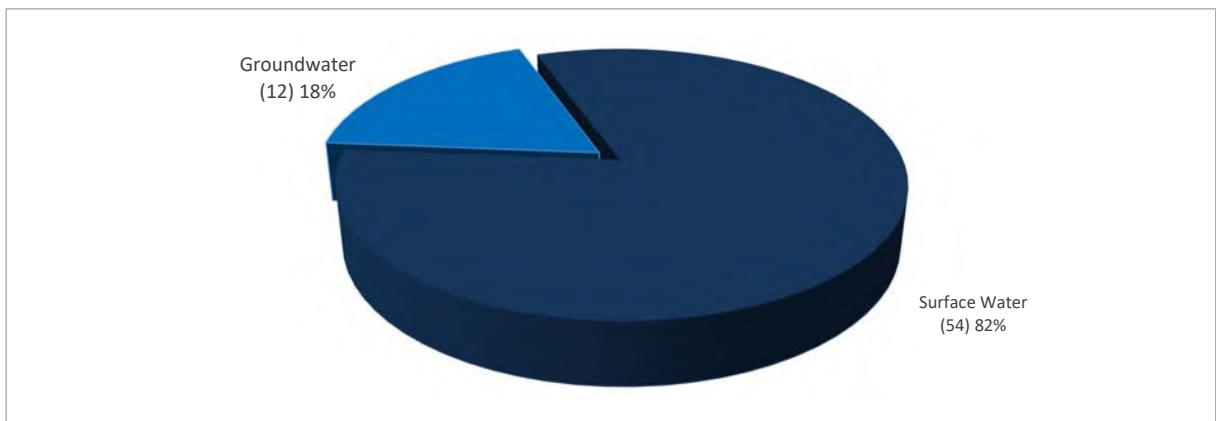


Figure 2 Source of water for irrigation in Taranaki during the 2020-2021 period

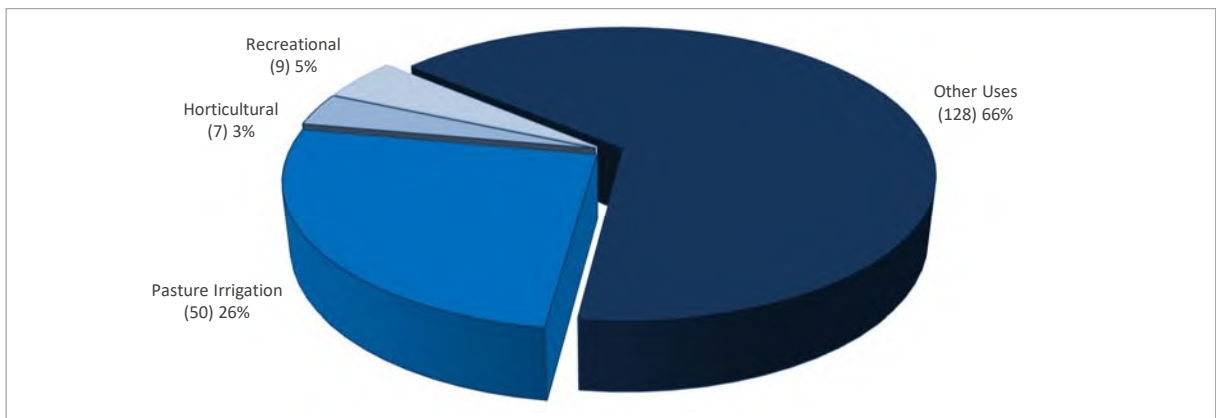


Figure 3 Total consented water abstractions – distributed by activity 2020-2021

² Includes: Aquaculture, Building Construction/Drainage/Flood Control, Chemical Processing/Manufacturing, Dairy Farm, Dairy Processing/Manufacturing, Dry Stock Farm, Hydrocarbon Exploration/Service Facilities, Landfills, Local Authorities, Meat and By-Product Processing, Petrochemical Processing, Piggery Farms, Poultry Farms, Power Generation – HydroPower Generation & Thermal, Quarries, Recreation/Tourism/Cultural, Road/Bridge Construction or Maintenance, Sewage Treatment, Swimming Pools, Timber Treatment or Sawmills, Water Supply or Treatment.

1.1.6 Irrigation zones

A regional study commissioned for the Council in 2002 (Rout, 2003) identified eight irrigation zones based mainly on climate. The developed potential in each zone was assessed as was the potential cost/benefit of irrigation development in each. Each zone, and the location of all current irrigation consents are illustrated in Figure 4.

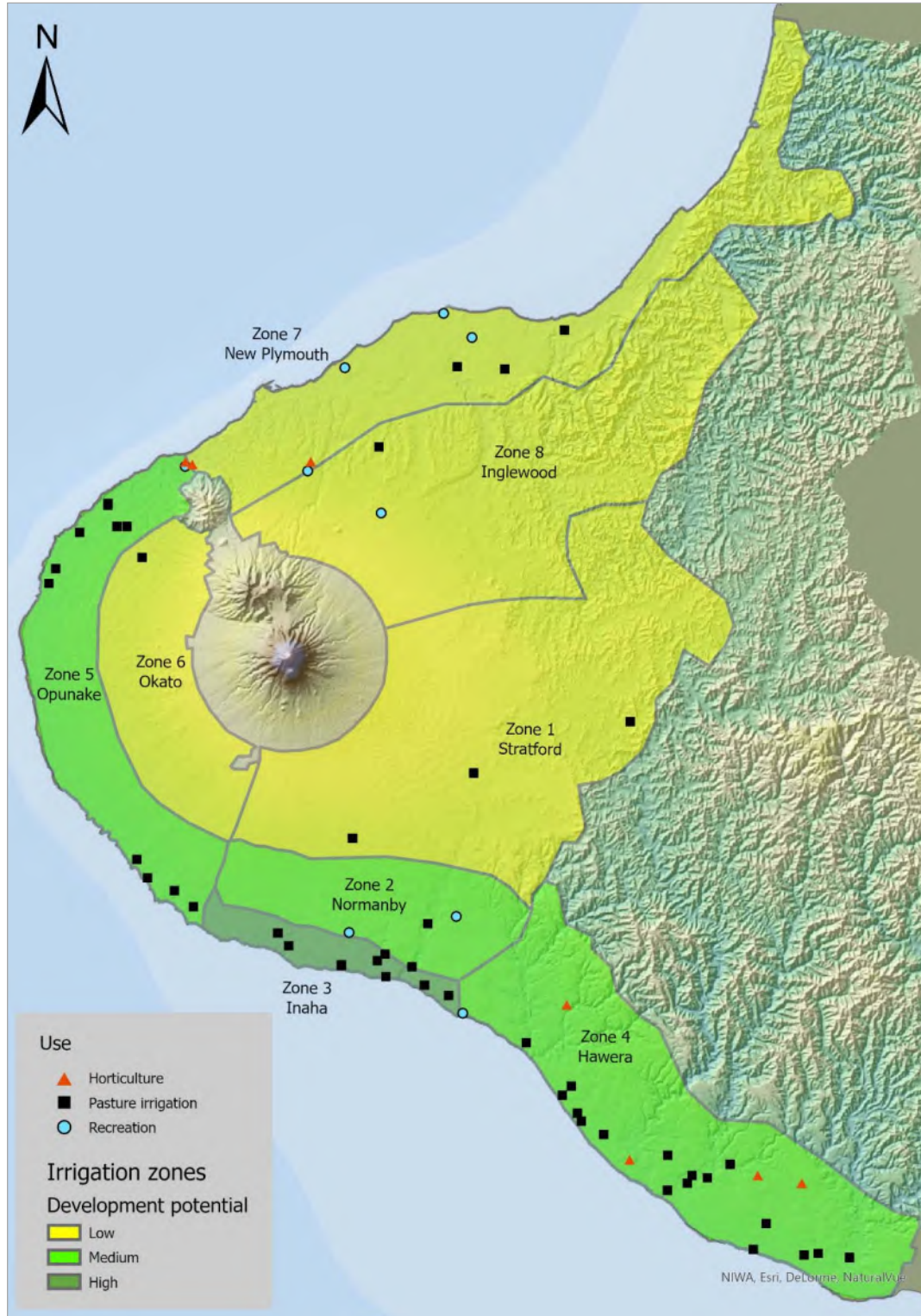


Figure 4 Pasture irrigation zones and locations of consented irrigation in Taranaki

The modelling exercise identified zones with the most potential for pasture irrigation requirements were Normanby (*Zone 2*), Inaha (*Zone 3*), Hawera (*Zone 4*) and Opunake (*Zone 5*). As illustrated in Figure 4, the vast majority of pasture irrigation in Taranaki does take place within Zones 2, 3, 4 and 5, which represents a 10 km wide belt of coastal land stretching from Oakura to Waitotara. The remainder of irrigators are generally located inland, between Inglewood and Eltham.

1.1.7 Irrigation systems

In general there are two types of irrigation methods; surface and pressurised. The majority of irrigation systems currently in operation in the province fall in to the pressurised category. Pressurised systems can be further differentiated based on the method of operation and equipment used. A summary of the systems encountered in the region is given below.

K-line and long-lateral types – Impact sprinklers mounted on moveable laterals (Photo 1)

These are the most common systems found in the region, as they are a low cost option and are relatively easy to operate. They can easily be adapted to fit in with existing farm layouts and are especially suitable for windy conditions. However, these systems are labour intensive, as they need to be moved manually on a regular basis.



Photo 1 Mosaic of pictures depicting k-line long lateral type irrigation

Centre pivot type – spray mounted on a movable lateral (Photo 2)

Centre pivot type systems are automatically controlled, so have a low labour input. They are low maintenance and have versatility in application rates and are desirable on steep, rocky or uneven soils. However, they are a high capital cost option and can be expensive to run due to electricity costs.



Photo 2 Picture depicting centre pivot

Travelling irrigators-spray nozzles mounted on fixed or rotating boom (*rotary boom, fixed boom, gun irrigator, effluent irrigator*) (Photo 3)

Travelling irrigators are a low capital cost option, and are simple to operate. They can cover a large irrigation area and there is some control over the application rate. However, these systems do not perform well in windy conditions, and tend to apply uneven amounts of water, especially at the end of a run.

The predominant irrigation system used in Taranaki is the K-line, accounting for 51% of all systems in use. A further 16% of irrigation consent holders operate solely with centre pivots, 7% operate travelling irrigators, while 20% utilise more than one type of system. The remaining 6% of consent holders are yet to install irrigation infrastructure.



Photo 3 Picture depicting travelling irrigator system

Appendix II lists the type of system operated by each consent holder.

1.1.8 Environmental effects of exercising water permits

Environmental effects of water abstraction can include a loss of aquatic habitat and biodiversity, and impacts on cultural, recreational and aesthetic values of waterbodies. In an effort to reduce such impacts, the Council encourages the efficient use of water through technical irrigation system design, and maintenance and management practices that help with the achievement of high irrigation efficiencies.

Surface water bodies

Expected periods of peak irrigation water demand normally coincide with periods of low flows in rivers and streams. During these periods, the Council closely monitors river flows and the exercising of water permits.

The majority of surface water permits for irrigation require the abstraction to cease when the flow in the river providing water for irrigation reaches, or falls below, a specified level (minimum/residual flow). Policy 6.1.5 of the Regional Freshwater Plan for Taranaki states that at least two-thirds of habitat within a river or stream is to be retained at mean annual low flow (MALF) levels. This figure has been derived for protection of habitat requirements for brown trout, and is considered conservative for native species.

For many smaller waterways, two-thirds habitat roughly equates to two-thirds MALF, however, the cut-off flow level on many irrigation abstraction consents is in practice generally set at MALF. It is the responsibility of the consent holder to ensure compliance with consent conditions at all times.

In certain coastal streams, and under certain flow conditions, tidal movements can result in the migration of saline water upstream from the coastal margin. The abstraction and application of saline or brackish water to land can have adverse effects on pumping and irrigation equipment, crops and soils.

Groundwater abstractions

The abstraction of groundwater for use in irrigation supply has the potential to lower groundwater levels in the vicinity of the pumping bore. The potential effects of any groundwater abstraction are assessed by the Council during the processing of a resource consent application for a groundwater take. The potential

impact of any new take on existing groundwater users and ecological receptors form a major component of this assessment.

Groundwater levels in coastal bores should generally be maintained above mean sea level to avoid the risk of sea water intrusion into the freshwater aquifers. Increased salinity in previously fresh groundwater can result in significant ecological effects, adversely impact existing users of groundwater and limit its potential future use.

Fortunately in Taranaki, the risk of saltwater intrusion is low due to the limited number of high yielding coastal bores. As part of irrigation monitoring programmes, the Council monitors water quality indicators at five coastal sites in order to assess any changes in groundwater composition as a result of abstraction.

Nutrient loading

Irrigated pasture typically supports higher stock numbers compared with non-irrigated pasture and consequently a higher nutrient (nitrate) loading per hectare. This is particularly the case in areas where the underlying soils are free-draining. Irrigation schemes in Zones 2, 3 and 4 occur in areas where groundwater is known to be at risk of nitrate contamination given the drainage characteristics of soils in those zones (TRC 1998, 2005). Careful management of irrigation water and fertiliser application regimes is therefore required to minimise the risk of groundwater and surface water contamination under irrigated conditions.

1.2 Climatological data and irrigation requirements

The Council provides live on-site data on soil moisture, rainfall and temperature via its website. Eight sites along the coastline provide climatological information about the most intensively developed irrigation zones.

Irrigation in Taranaki dairy farms usually occurs over a three to six month period depending on location and climatic conditions. For the majority of consent holders irrigation for the 2020-2021 season commenced in mid-December, which is a lot later than normal due to significant rainfall in the preceding months. However, strong coastal winds throughout summer quickly dried soils, meaning coastal consent holders needed to irrigate to keep soil moisture levels up. Rainfall from Te Maunga was 97-118% of normal for the period. The irrigation season was over for most of the consent holders by the end of March. As shown in Table 1, the rainfall sites along the southern and coastal belt received between 103% and 147% of normal for the period 1 December 2020 to 31 March 2021, with plentiful rainfall falling at the start of December and then again in late March, making the rainfall totals higher than normal. Rainfall gradients across the region are illustrated in Figure 5.

Rainfall has a direct impact not only on river and stream flows but also on the amount of water recharging the region's aquifers, which also contribute baseflow to surface water systems. Rainfall recharge is critical to maintain groundwater levels and thus the potential to supply water in the zones where there is more pressure on surface water resources.

Accurate interpretation of climatological data is important for the planning, scheduling and operation of efficient irrigation systems. Precipitation and evapotranspiration data are fundamental to carrying out reliable water budget calculations and calculations of crop (pasture) water requirements. Crop water requirements can be defined as the depth of water need to offset the loss of water through evapotranspiration. In other words, for any period of time, the net irrigation requirement is the amount of water which is not effectively provided for by rainfall.

The calculated amounts of irrigation water to be efficiently applied to pasture, should also account for the water that is lost while transporting it from its source to the pasture root zone. Some of the losses that need to be estimated are those which occur due to leakage from pipelines and evaporation from droplets sprayed through the air. To compensate for these losses, additional water must be pumped than is required

to be stored in the pasture root zone. Therefore, the gross irrigation requirement is the total amount that must be pumped which takes into consideration the irrigation efficiency.

Table 1 Total rainfall from 1 December 2020 to 31 March 2021 versus historical values

Site	Total rainfall 1 December 2020 to 31 March 2021 (mm)	Mean rainfall December to March (mm)	December 2020 to March 2021 rainfall as a proportion of mean values
North Egmont	1,741	1,796	97%
Dawson Falls	1,673	1449	115%
Kahui Hut	1,478	1,253	118%
Hillsborough	543	444	122%
Brooklands Zoo	509	434	118%
Mangati	503	368	137%
Motunui	618	400	155%
Egmont Village	816	645	127%
Everett Park	729	560	130%
Inglewood	687	615	112%
Stratford	541	489	111%
Mangaehu	478	403	119%
Kotare	688	572	120%
Kaka Rd (Uruti)	725	617	117%
Pohokura Saddle	620	526	118%
Stony (Okato)	651	536	122%
Kapoiaia (Cape Egmont)	546	379	144%
Taungatara (Te Kiri)	471	367	128%
Kaupokonui (Manaia)	376	288	130%
Duffys (Whareroa)	418	285	147%
Patea	424	295	144%
Charlies	565	439	129%
Moana Trig	511	423	121%
Rimunui Stn (Waitotara)	386	346	111%
Ngutuwera	354	344	103%
Waitotara Coast	364	312	117%

The third variable that should be accounted for when planning and operating irrigation systems is soil moisture. Some of the water that is required by the pasture may already be held in the soil, so it is critical to quantify it. There is no extra value in applying more water than the soil can hold, this only results in unnecessary costs and wastage. The only reliable way of knowing how much irrigated water can be stored in the soil at the time of irrigation is by measuring soil moisture.

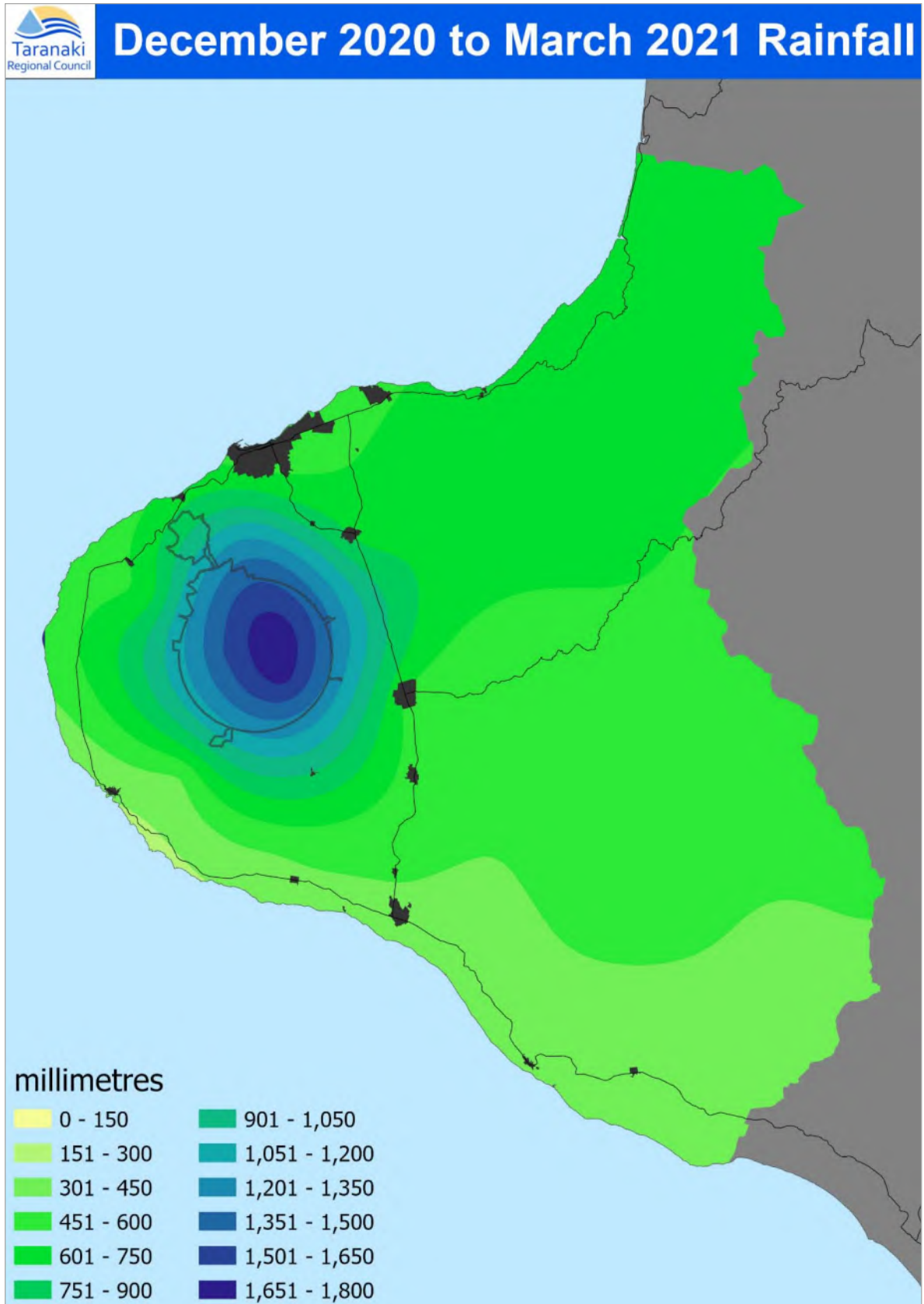


Figure 5 Distribution map of the total rainfall recorded from 1 December 2020 to 31 March 2021

By measuring the soil moisture the irrigator can be more certain that:

- only the amount of water required by the plant is applied;
- leaching of nutrients is minimised;
- pasture growth and quality is maximised;
- the environmental impacts of irrigation are minimised; and
- costs are reduced.

In order to maximise the efficient use of water taken, the Council strongly urges irrigators to monitor and plan irrigation with the factors outlined above in mind. Precision irrigation will also assist irrigators in achieving greater economic benefits from water taken.

1.3 Monitoring Programme

1.3.1 Introduction

Section 35 of the RMA sets obligations upon the Council to gather information, monitor and conduct research on the exercise of resource consents within the Taranaki region. The Council is also required to assess the effects arising from the exercising of these consents and report upon them.

The Council may therefore make and record measurements of physical and chemical parameters, take samples for analysis, carry out surveys and inspections, conduct investigations and seek information from consent holders.

Every year the Council undertakes monitoring programmes for all pasture irrigation water permits. The programmes list all of the work that the Council could undertake during the forthcoming monitoring period and the cost of the activities to the consent holder. Because irrigation is climate dependent, the level of monitoring varies from year to year, as do associated costs. Increased monitoring is generally required during drier years. Automated monitoring systems can reduce ongoing monitoring costs for consent holders.

The 2020-2021 monitoring programmes for irrigation water permits comprised a range of various components, including liaison with consent holders, site inspections, water take data collection, residual flow monitoring, water quality analysis, data review and compliance assessments. The specific range of monitoring carried out in relation to each consent is dictated by the water source, weather and flow conditions and system design. Irrigation began in mid-December for the majority of farmers, due to high rainfall in the preceding months. Systems were generally turned on in mid-December, due to strong coastal winds, drying out the soil quicker than normal. Rainfall started to fall at regular intervals in late-March 2021.

A summary of the various monitoring programme components are set out in Sections 1.3.2 to 1.3.6.

1.3.2 Programme liaison and management

There is generally a significant investment of time and resources by the Council in:

- ongoing liaison with resource consent holders over consent conditions and their interpretation and application;
- discussion over monitoring requirements;
- preparation for any consent reviews, renewals or new consent applications;
- advice on the Council's environmental management strategies and content of regional plans; and
- consultation on associated matters.

1.3.3 Site inspections

The 2020-2021 pasture irrigation monitoring programme provided for an annual inspection of each pasture irrigation abstraction site to assess/evaluate compliance with consent conditions. Council staff were able to visit 100% of the active consents during the 2020-2021 monitoring period. Additionally, activities comprising of golf clubs, horticultural irrigation schemes and stock and dairy shed takes were also subject to a planned inspection visit.

Site inspections are focused on assessing the overall set-up of the intake structures, a visual inspection and assessment of screenings, fences, staff gauges, flowmeters, datalogger devices and planting of riparian vegetation, in line with consent conditions.

The annual inspections occur between May and July each year, once the irrigation season has ended. The timing of inspections means that a full seasons irrigation records can be downloaded from the datalogging devices during inspections, resulting in time and cost efficiencies. It also means however that most irrigation systems have been decommissioned for the season or undergoing maintenance, so it is sometimes difficult for staff to assess compliance with all consent conditions, particularly those relating to application efficiency and water loss across the operable system. Consent holders that breached their consent conditions in the previous monitoring period also receive an additional mid-season inspection to ensure compliance is continuing.

Monitoring of surface water abstractions also include checking compliance with the residual flow conditions of the consent. Residual flow conditions set minimum environmental flows to be maintained during pumping in the waterways downstream from the abstraction point. Compliance with the residual flow conditions is assessed through hydrological flow gauging's which are carried out during low flow conditions in summer. The results of residual flow monitoring are summarised in Section 2.2.

1.3.4 Measuring and reporting of water takes

A special condition of all irrigation water abstractions is the requirement for the consent holder to measure and record abstraction data. The information collected contributes to the sustainable management of the resource and allows for assessment of compliance with consent conditions. The information is also useful for consent holders in managing inputs to their operations, identifying potential energy savings, operational issues and making water use efficiency gains³.

The Resource Management (Measurement and Reporting of Water Takes) Regulations 2010 (the Regulations) place further legislative requirement on holders of consents for water abstraction greater than 5 L/s, unless the taking of water is for non-consumptive purposes.

The regulations require:

- all water permits allowing the taking of 5L/s or more to collect and report records to a set minimum requirement⁴;
- measurement at the point of where the water is taken from the river, lake or groundwater system (unless otherwise approved by the Council to be in another location);
- continuous records of daily volumes to be collected using an appropriate flowmeter with the data transferred to the Council on at least an annual basis;
- the flowmeter to meet an accuracy standard (\pm 5%), and should be properly installed and calibrated independently every five years; and
- the consent holder is to be responsible for recording and transferring the data to the Council.

³ Sustainable Water Programme of Action, Ministry for the Environment.

⁴ Refer to the document Resource Management (Measuring and reporting of Water Takes) Regulations 2010. REF 2010/267.

All abstractions captured under the Regulations were required to be complaint by 10 November 2016. The Council retains the authority to apply more stringent requirements on consent holders over and above those set out in the Regulations through the setting of consent conditions.

The rates and volumes of water abstraction are measured using a flowmeter. If a flowmeter is installed outside of the manufacturer's specifications, large errors may occur. The error produced by a valve installed immediately upstream of the flowmeter can be as much as 50%. Errors produced by sharp bends upstream of the flowmeter can amount to 20% of the measured flow. Photo 4 shows an example of a good installation of a flowmeter, with appropriate lengths of straight pipe either side of the meter. Photo 5 shows an example of a poor installation, with an elbow in the pipework immediately downstream of the flowmeter.

Poorly installed flowmeters are unlikely to pass the verification test required by a resource consent and/or the Regulations. In these instances the consent holder will be required to undertake works to allow for the successful verification of the flowmeter.

Presently the Council receives a mixture of manual and electronic records of water use data each year. The majority of consent holders use a datalogger to electronically store all take data being measured by the flowmeter. Data stored on a datalogger is downloaded in the field by Council staff during end of year inspection visits, or earlier if deemed necessary. Some datalogging systems also utilise telemetry to transmit data to the Council in near real-time. Telemetered systems have clear benefits for both consent compliance and water use assessment by consent holders. Records are required to cover the entire water year (1 July to 30 June) and must be provided to the Council by 31 July of each year.

On the 3 August 2020, the government gazetted the Resource Management (Measurement and Reporting of Water Takes) Amendment Regulations 2020⁵. The amended Regulations came in to force on the 3 September 2020. Most significantly, the amended Regulations require consent holders to record measurements of the water taken under a water permit in each 15-minute period, instead of each day. The permit holder must also provide the Council with daily records of the measurements by the end of the next day (or later in certain circumstances) electronically. In effect, the amended Regulations mandate the use of telemetry systems for all takes exceeding 5 L/s.

The new requirements start applying to a water permit only a number of years after these regulations commence, depending on the rate at which water may be taken under the permit, as follows:

- 2 years after if the rate is ≥ 20 litres/second (i.e. September 2022);
- 4 years after if the rate is ≥ 10 but < 20 litres/second (i.e. September 2024);
- 6 years after if the rate is ≥ 5 but < 10 litres/second (i.e. September 2026).

The Council will work closely with the consent holders to ensure compliance by the set date based on their abstraction rates. Information has already been sent out to all water permit holders and service providers regarding the new requirements and provide general information on telemetry systems and operation.

⁵ Refer to the document Resource Management (Measuring and reporting of Water Takes) Amendment Regulations 2020. REF 2020/176.

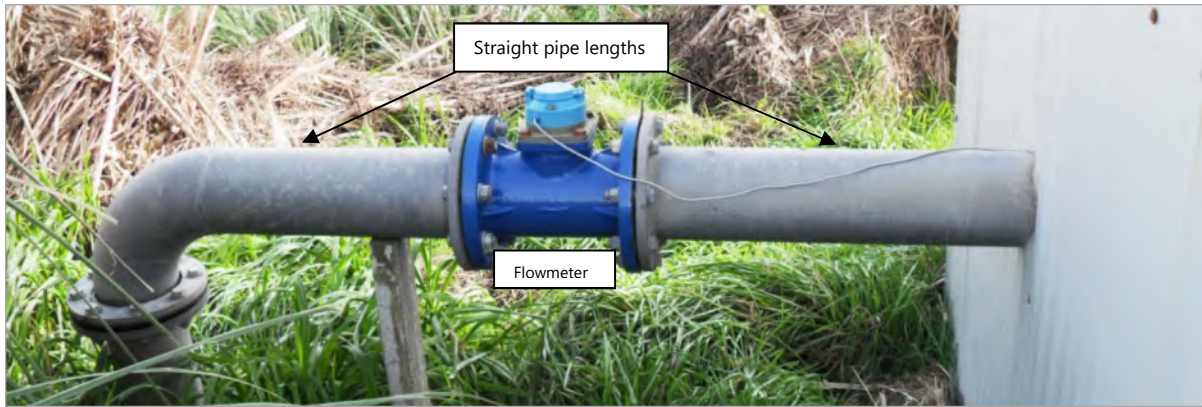


Photo 4 An example of a good flowmeter installation

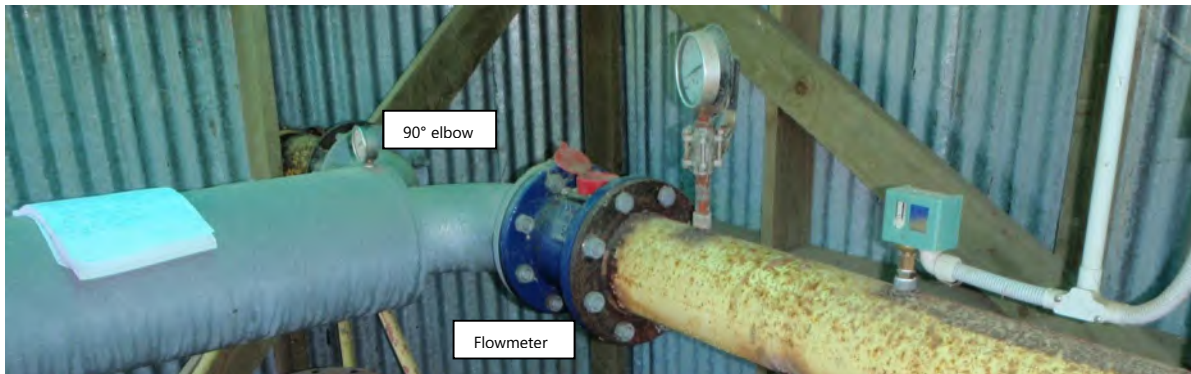


Photo 5 An example of a poor flowmeter installation

1.3.5 Residual flow monitoring

Compliance with consent conditions requires water to only be taken when there is water available above the minimum flow limit set out in the consent. If flows drop below this level, then irrigation is to cease until such a time that flows increase above the minimum flow limit. To determine compliance with these consent conditions the Council undertakes stream flow measurements by indirect and direct methods at control points usually upstream and/or downstream of abstraction points. These methods involve the measurements of velocity and cross-sectional areas which are used together to determine the flow rate at the time of the assessment.

1.3.6 Data review and compliance assessment

A major component of the monitoring programme is the assessment of water take data for consent compliance purposes. Compliance with abstraction rate and volume is assessed for all consent holders that exercised their consent. Compliance with abstraction rate and/or volume limits stipulated in the applicable resource consent was determined by assessment of remotely recorded data, or by calculating from records submitted by the consent holder. Data transferred to the Council by telemetered systems is electronically assessed on receipt, with pre-set automated alarms activated in the event of any consent limit exceedances.

2 Results

2.1 Site inspections

The Council carried out annual compliance monitoring inspections at all sites where irrigation consents were exercised during 2020-2021 irrigation season.

Inspections found the majority of takes being well managed and operated within relevant consent conditions. Three non-compliances were identified during inspection visits, which are discussed further in Section 2.5.

2.2 Residual flow compliance

During the period under review, compliance with residual flow conditions for surface water abstraction sites was assessed 30 times in 25 waterways.

Stream gaugings were generally targeted to coincide with the periods of low surface water flows. Of the 30 gaugings carried out, flows were measured below residual flow limits on one occasion. However, in this instance, the irrigator had already ceased taking water, as they had been using the Council's website to monitor the river flows via the environmental data page.

2.3 Water usage and compliance assessment

A total of 56 irrigation consents were exercised during the 2020-2021 monitoring year, with most commencing irrigation in mid-December and concluding for most by end of March. Total water use across all exercised irrigation consents of 5,567 ML. This was more than that used during the preceding 2018-2019 monitoring year, when 55 irrigation consents were exercised, and a total usage of 8,835 ML.

The highest water usage for the season was by W & S Morrison, abstracting 755,215 m³. This consent took an average of 88 L/s, with irrigation occurring from mid-December to late March. The second highest water user was Spenceview Farms with 641,535 m³. Both W & S Morrison and Spenceview Farms use large volumes of water, as they operate centre pivots to irrigate large areas of their farmland. Both consent holders operated within the conditions of their respective consents for the duration of the monitoring period. The average usage across all irrigation takes for the 2020-2021 year was 89,825 m³.

The majority of the consent holders who exercised their consents during the 2020-2021 period and were required to submit records, either by their consent conditions or the Regulations, did so within the required timeframe. Written notifications and telephone calls received advising the non-exercising of consents were also taken as provision of records.

Appendix III lists each consent holder's 2020-2021 water usage for comparison against their maximum authorised take volume over the monitoring period. The average annual consented take volume across all irrigation consents is 1,051 ML. In contrast to this figure, the actual average annual usage for the 2020-2021 season was 90 ML, which is only 9% of the total allowable take volume. Actual usage figures are significantly less than the volume allocated through consents given that consents are only exercised for a small portion of the year, as demand only spikes during dry periods. Also, the majority of the consent holders tend to not irrigate on a continual basis, but generally irrigate at night to minimise evaporation losses and capitalise on reduced electricity supply costs. Peak irrigation demand does generally coincide with periods of reduced flow in the region's rivers and streams, which means there is a reduced volume of water available for abstraction.

All data collected is assessed for compliance against respective consent conditions. Following the assessment of the 2020-2021 data, three incidents were lodged in relation to irrigation consent non-compliances. Details relating to each non-compliance and the follow-up actions undertaken by the Council are presented in Section 2.5.

2.4 Groundwater quality results

During the period under review, groundwater samples were obtained from a total of seven coastal sites to assess salinity levels in aquifers being pumped. The results indicate groundwater salinities in the range

expected in coastal areas. The measured values during the 2020-2021 monitoring period show little deviation from historical mean values at each site.

The results of the sampling carried out are presented below in Table 2. Historical means for each analyte are presented in brackets for comparison.

Table 2 Groundwater quality results

Consent	Site code	Sample date	Chloride (g/m ³)	Conductivity (mS/m)	pH	Sodium (g/m ³)	Number of samples on record
5950-2	GND1203	03/03/2021	31.0 (34.0)	36.9 (33.2)	8.4 (8.5)	62.0 (59.8)	10
	GND1711	03/03/2021	37.0 (n/a)	34.1 (n/a)	8.7 (n/a)	60.0 (n/a)	2
6026-1	GND1233	03/03/2021	25.0 (47.6)	37.8 (47.7)	7.7 (7.8)	41.0 (40.6)	9
9561-1	GND2108	03/03/2021	47.0 (44.8)	44.2 (41.4)	8.2 (8.1)	27.0 (25.9)	5
	GND2109	03/03/2021	34.0 (37.1)	36.9 (36.4)	8.0 (8.1)	27.0 (26.0)	5
9608-1	GND2354	03/03/2021	72.0 (87.2)	75.4 (75.3)	8.9 (8.7)	182.0 (186.5)	6
10767-1	GND3015	03/03/2021	33.0 (n/a)	43.6 (n/a)	8.1 (n/a)	42.0 (n/a)	1

2.5 Incidents, investigations, and interventions

The monitoring programme for the year was based on what was considered to be an appropriate level of monitoring, review of data, and liaison with the consent holders. During the year matters may arise which require additional activity by the Council, for example provision of advice and information, or investigation of potential or actual causes of non-compliance or failure to maintain good practices. A pro-active approach, that in the first instance avoids issues occurring, is favoured.

For all significant compliance issues, as well as complaints from the public, the Council maintains a database record. The record includes events where the individual/organisation concerned has itself notified the Council. Details of any investigation and corrective action taken are recorded for non-compliant events.

Complaints may be alleged to be associated with a particular site. If there is potentially an issue of legal liability, the Council must be able to prove by investigation that the identified individual/organisation is indeed the source of the incident (or that the allegation cannot be proven).

Table 3 below sets out details of any incidents recorded, additional investigations, or interventions required by the Council in relation to the consent holder's activities during the 2020-2021 period. This table presents details of all events that required further investigation or intervention regardless of whether these were found to be compliant or not.

Following investigation of all registered incidents, one non-compliance was deemed sufficiently minor not to warrant further action from the Council, over and above a formal warning regarding their future conduct. The other two incidents resulted in infringement notices being issued. Overall, the non-compliance rate across all active irrigation consents in 2020-2021 was 5%. This is similar to the 2019-2020 monitoring year, in which 4% of exercised consents were subject to some form of enforcement action.

Table 3 Incidents, investigations, and interventions summary table

Date	Consent Holder (Consent number)	Details	Compliant (Y/N)	Enforcement Action Taken?	Outcome
15/07/2021	The Tom Lance Trust (3312-3.1)	Abstraction volume had been breached on several occasions between 7 October 2020 to 17 February 2021	N	Infringement notice	An infringement notice was issued requiring them to comply with their consent conditions at all times
15/07/2021	Kohi Investments Limited (5896-2)	Abstraction rate breaches on a number of occasions during the monitoring year	N	Infringement notice	An infringement notice was issued requiring them to comply with their consent conditions at all times
15/07/2021	Alexander Farms Limited (10767-1)	Measuring and recording equipment for the groundwater level and abstraction were not installed	N	14 day letter	Recording equipment installed. Letter of explanation received and Council accepted

3 Discussion

3.1 Discussion of site performance

Given that this report jointly covers 66 different irrigation water take consents at numerous locations across the region, a discussion of system performance at each location is impractical. However overall, the examination of the data supplied to the Council for the 2020-2021 monitoring year revealed that three of the 56 consent holders (5%) who exercised their consents breached one or more conditions of their resource consent. Two of these breaches related to exceedances of consented abstraction rate and/or volume, while one was required to install equipment to record abstraction and groundwater level.

Discussed below are some of the key points and issues arising from the monitoring of irrigation water takes during the 2020-2021 monitoring year. Also discussed are some components of irrigation system monitoring, data collection and transfer that could assist consent holders in improving compliance performance and optimisation of their water usage.

The primary means of measuring water abstraction data is the flowmeter. In order to comply with monitoring requirements set out in consent conditions, and the requirements set out in relation to meter accuracy in the Regulations, it is critical that flowmeters are installed as per manufacturer's specifications. Consent holders must ensure the meter is operable at all times, even when no water is being taken. Consent holders should not tamper with the operation of the meter, or attempt to access internals of the meter, without advising the Council and engaging a suitably qualified technician. Further information regarding preferred meter specification and operation can be obtained by contacting the Council.

To accuracy of a flowmeter is needs to be confirmed by a verification test. A meter is deemed to be recording accurately (verified) when reading within $\pm 5\%$ of a calibrated reference meter. The Regulations required all takes over 5 L/s to be verified by 10 November 2016. Resource consents being issued by the Council generally require flowmeters to be verified before the consent is first exercised. The correct installation of a good quality flowmeter will typically ensure a meter is able to pass a verification test. While 100% of active consents that required their meters to be verified in Taranaki have been verified, the Council has had to pursue enforcement action in a small number of instances to ensure compliance. Re-verification of a meter is required every five years, and plans should be put in place well in advance of re-verification dates to avoid any compliance issues.

The Council received a small number of calls from consent holders at the conclusion of the monitoring period advising of operational issues with measurement and recording equipment that had occurred during the year. Consent holders are reminded that they need to contact the Council as soon as they discover any operational issues with any monitoring equipment or operational issues that impact their ability to comply with their consent (e.g. burst pipework). The majority of irrigation consents stipulate a requirement to notify the Council of such issues in any case, and failure to do so may result in enforcement action being taken.

As discussed previously in this report, the majority of irrigation consent holder's record water take data on dataloggers, which is automatically transmitted to the Council and is viewed real time by Council staff. Automated alarms are set up to notify staff and the consent holder of any breaches of authorised rate or volume. However, there are still a small number which are downloaded by Council staff at the conclusion of the monitoring year, at which point it is assessed for compliance. During the investigation and follow-up of non-compliances identified at the conclusion of the 2020-2021 monitoring year, consent holders identified as non-compliant installed equipment to transmit the data directly to Council. The amended Regulations, which came in to force on 3rd September 2020, require consent holder's that take above 20 L/s to record and transmit their data in real time by September 2022. This will improve consent compliance and allow water users to better monitor their water usage and improve water use efficiency.

Irrigation consent holders are also urged to investigate the use of soil moisture monitoring equipment to assist in the efficient planning and scheduling of irrigation. By monitoring soil moisture conditions, irrigators can optimise the usage of their irrigation systems to only apply water to pasture when it is required and to cease irrigation when the optimum volume of water has been applied. This has obvious benefits in terms of both maximising pasture production and the efficiency of water usage. These benefits can also result in cost savings by avoiding water being applied when it is not required. Soil moisture monitoring can be undertaken with handheld sensors, or with dedicated in-situ systems. The complexity and cost of each available system vary and consent holders can contact the Council for further information.

3.2 Evaluation of performance

A tabular summary of the consent holder's compliance record for the year under review is set out in Table 4.

Table 4 Individual performance for all irrigation consent holders

Consent	Consent Holder	Environmental compliance achieved?	Administration compliance achieved?
0017-3.1	Manaia Golf Club	High	High
0124-5	Kaitake Golf Club Inc	Good	High
0132-3	Hawera Golf Club Inc	High	High
0189-4	Al & KJ Williams	n/a	n/a
0270-3	Westown Golf Club Incorporated	High	High
0278-4	Oceanview Trust	n/a	n/a
0464-3	Oakura Farms Limited	n/a	n/a
0714-2	GD & HM McCallum	High	High
0721-3	Go 2 Milk Limited	High	High
0880-3	IHC New Zealand Inc	Good	Good
1223-3	EO & CP Lander	High	High
1721-3.1	Manukorihi Golf Club Inc	Good	High
1877-3	Te Ngutu Golf Club Incorporated	High	High
2138-3	Riverside Farms Taranaki Limited	Good	Good
3171-3	Taranaki Greenhouses Limited	High	High
3312-3.1	The Tom Lance Trust	Improvement required	High
4450-2.1	Waitara Golf Club Inc	Good	High
4494-3	Friesianroots Limited	High	High
4783-3	Larsen Trusts Partnership	n/a	n/a
4993-2	J & EG Sanderson	Good	Good
4994-2	J & EG Sanderson	High	High
5128-3	Coastal Country Farms Limited	High	High
5568-1	Cornwall Park Farms Limited	n/a	n/a
5570-3	Kaihihi Trust	High	High

Consent	Consent Holder	Environmental compliance achieved?	Administration compliance achieved?
5571-2	Jimian Limited	n/a	n/a
5623-2.1	WD & SC Morrison	High	High
5636-2	Waiwira Trust	High	High
5773-2	Goodin FJ & Sons Limited	High	High
5778-2	Mara Trust	High	High
5781-2.1	Waikaikai Farms Limited	High	High
5791-2	AL & LA Campbell	High	High
5797-2	Pihama Farms Limited	High	High
5807-2	Roger Dickie Family Trust	High	High
5827-2	Walker & McLean Partnership	High	High
5829-2	RM & MC Julian Family Trust	High	High
5840-2	Gibbs G Trust	High	High
5863-2.1	AR Geary Trust	High	High
5876-2	GA & RJ Dorn	High	High
5878-2.1	Woollaston Family Trust Partnership	High	High
5879-2	BR & RG Harvey Family Trust	High	High
5887-2	BLL Farm Trust	High	High
5896-2	Kohi Investments Limited	Improvement required	High
5898-2	David Pease Family Trust	High	High
5950-2.1	WD & SC Morrison	High	High
6026-1	JR & DM Baker	High	High
6159-1	Waireka Trust	n/a	n/a
6292-2	New Plymouth Golf Club Inc	High	High
6429-1	Leatherleaf Limited	High	High
6430-1	Fonic Farms Limited	High	High
6628-1.1	JW & MT Hamblyn Family Trusts	High	High
7346-1.1	Spenceview Farms	High	High
7372-1	Pukeone Partnership	High	High
7527-1.1	Pukeone Partnership	High	High
7528-1.1	Kereone Farms Limited	High	High
7626-1	NW & DM King	n/a	n/a
7768-1	Carter AJ Limited	n/a	n/a
7781-1	D Krumm	High	High
7895-1	Ohawe Farms Limited	High	High

Consent	Consent Holder	Environmental compliance achieved?	Administration compliance achieved?
9561-1	Kereone Farms Limited	High	High
9577-1.1	Bucman Trust	High	High
9597-1	Nilock & Camole Trusts	High	High
9608-1.2	DR Wilson	High	High
10135-1.1	Luttrell Trust Partnership	High	High
10369-1	Inglewood Golf Club Inc	High	High
10767-1	Alexander Farms Limited	Improvement required	Improvement required
10916-1	Waitotara Kiwifruit Limited Partnership	n/a	n/a

n/a = not applicable, as consent was not exercised during the period under review, so no rating assigned.

During the year, 84% of exercised irrigation water consents demonstrated a high level of environmental and 95% administrative performance with the resource consents as defined in Section 1.1.4. A further 5% are required to show improvement.

3.3 Recommendations from the 2019-2020 Annual Report

In the 2019-2020 Annual Report, it was recommended:

1. THAT in the first instance, monitoring and reporting of consented irrigation activities for the 2020-2021 year continue at the same level as in 2019-2020.
2. THAT should there be issues with environmental or administrative performance in 2020-2021, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.
3. THAT the monitoring and the downloading of abstraction data occurs mid-season for those that had water takes breaches during the 2018-2019 and 2019-2020 seasons.
4. THAT the Council will support and provide advice to consent holders to ensure that telemetry is in place by the dates set out by the Resource Management (Measuring and Reporting Water Takes) Amendment Regulations 2020.

Recommendation 1, 2 and 3 were implemented during the period under review. With the amendment to the Regulations 2020, Council will continue to work with consent holders in regards to recommendation 4 which has now mandated the installation of telemetry systems for specified takes.

3.4 Alterations to monitoring programmes for 2021-2022

In designing and implementing the monitoring programmes for air/water discharges in the region, the Council has taken into account:

- the extent of information already made available through monitoring or other means to date;
- its relevance under the RMA;
- the Council's obligations to monitor consented activities and their effects under the RMA;
- the record of administrative and environmental performances of the consent holder; and
- reporting to the regional community.

The Council also takes into account the scope of assessments required at the time of renewal of permits, and the need to maintain a sound understanding of industrial processes within Taranaki exercising resource consents.

It is proposed that for 2021-2022 that monitoring of irrigation consents continues at the same levels as during the 2020-2021 year.

It should be noted that the proposed programme represents a reasonable and risk-based level of monitoring for the site(s) in question. The Council reserves the right to subsequently adjust the programme from that initially prepared, should the need arise if potential or actual non-compliance is determined at any time during 2021-2022.

4 Recommendations

1. THAT in the first instance, monitoring and reporting of consented irrigation activities for the 2021-2022 year continue at the same level as in 2020-2021.
2. THAT should there be issues with environmental or administrative performance in 2021-2022, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.
3. THAT the monitoring and the downloading of abstraction data occurs mid-season for those that had water takes breaches during the 2019-2020 and 2020-2021 seasons.
4. THAT the Council will support and provide advice to consent holders to ensure that telemetry is in place by the dates set out by the Resource Management (Measuring and Reporting Water Takes) Amendment Regulations 2020.

Glossary of common terms and abbreviations

The following abbreviations and terms may be used within this report:

Conductivity	Conductivity, an indication of the level of dissolved salts in a sample, usually measured at 25°C and expressed in $\mu\text{S}/\text{cm}$.
Cumec	A volumetric measure of flow- 1 cubic metre per second ($1 \text{ m}^3\text{s}^{-1}$).
g/m^3	Grams per cubic metre, and equivalent to milligrams per litre (mg/L). In water, this is also equivalent to parts per million (ppm), but the same does not apply to gaseous mixtures.
Incident	An event that is alleged or is found to have occurred that may have actual or potential environmental consequences or may involve non-compliance with a consent or rule in a regional plan. Registration of an incident by the Council does not automatically mean such an outcome had actually occurred.
Intervention	Action/s taken by Council to instruct or direct actions be taken to avoid or reduce the likelihood of an incident occurring.
Investigation	Action taken by Council to establish what were the circumstances/events surrounding an incident including any allegations of an incident.
Incident register	The incident register contains a list of events recorded by the Council on the basis that they may have the potential or actual environmental consequences that may represent a breach of a consent or provision in a Regional Plan.
L/s	Litres per second.
$\mu\text{S}/\text{cm}$	Microsiemens per centimetre.
pH	A numerical system for measuring acidity in solutions, with 7 as neutral. Numbers lower than 7 are increasingly acidic and higher than 7 are increasingly alkaline. The scale is logarithmic i.e. a change of 1 represents a ten-fold change in strength. For example, a pH of 4 is ten times more acidic than a pH of 5.
Resource consent	Refer Section 87 of the RMA. Resource consents include land use consents (refer Sections 9 and 13 of the RMA), coastal permits (Sections 12, 14 and 15), water permits (Section 14) and discharge permits (Section 15).
RMA	<i>Resource Management Act 1991</i> and including all subsequent amendments.

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Appendix I

Example surface water abstraction permit for irrigation

Water Permit
Pursuant to the Resource Management Act 1991
a resource consent is hereby granted by the
Taranaki Regional Council

Name of Consent Holder:	Luttrell Trust Partnership (Trustees: Sean Prionseas Luttrell, Marianne Flora Luttrell & David Grant Cambie) 78A Nopera Road RD 32 Opunake 4682
Decision Date (Change):	14 December 2017
Commencement Date (Change):	14 December 2017 (Granted Date: 25 August 2015)

Conditions of Consent

Consent Granted:	To take and use water from the Warea River for pasture irrigation purposes
Expiry Date:	1 June 2031
Review Date(s):	June annually
Site Location:	288 Bayly Road, Warea
Grid Reference (NZTM)	1667764E-5656861N
Catchment:	Teikaparua (Warea)

*For General, Standard and Special conditions
pertaining to this consent please see reverse side of this document*

General condition

- a. The consent holder shall pay to the Taranaki Regional Council all the administration, monitoring and supervision costs of this consent, fixed in accordance with section 36 of the Resource Management Act 1991.

Special conditions

1. The rate of taking shall not exceed 64.8 litres per second.
2. At least 5 working days before this consent is first exercised the consent holder shall notify the Taranaki Regional Council. Notification shall include the consent number and the date that water will be first taken, and shall be emailed to worknotification@trc.govt.nz.
3. Before exercising this consent the consent holder shall install, and thereafter maintain a water meter and a datalogger at the site of taking (or a nearby site in accordance with Regulation 10 of the *Resource Management (Measurement and Reporting of Water Takes) Regulations 2010*. The water meter and datalogger shall be tamper-proof and shall measure and record the rate and volume of water taken to an accuracy of $\pm 5\%$. Records of the date, the time and the rate and volume of water taken at intervals not exceeding 15 minutes, shall be made available to the Chief Executive, Taranaki Regional Council at all reasonable times.

Note: Water meters and dataloggers must be installed, and regularly maintained, in accordance with manufacturer's specifications in order to ensure that they meet the required accuracy. Even with proper maintenance water meters and dataloggers have a limited lifespan.

4. The consent holder shall provide the Chief Executive, Taranaki Regional Council with a document from a suitably qualified person certifying that water measuring and recording equipment required by the conditions of this consent ('the equipment'):
 - (a) has been installed and/or maintained in accordance with the manufacturer's specifications; and/or
 - (b) has been tested and shown to be operating to an accuracy of $\pm 5\%$.

The documentation shall be provided:

- (i) within 30 days of the installation of a water meter or datalogger;
 - (ii) at other times when reasonable notice is given and the Chief Executive, Taranaki Regional Council has reasonable evidence that the equipment may not be functioning as required by this consent; and
 - (iii) no less frequently than once every five years.
5. If any measuring or recording equipment breaks down, or for any reason is not operational, the consent holder shall advise the Chief Executive, Taranaki Regional Council immediately. Any repairs or maintenance to this equipment must be undertaken by a suitably qualified person and a maintenance report given to Taranaki Regional Council within 30 days of any such work occurring.

Consent 10135-1.1

6. Any water meter or datalogger shall be accessible to Taranaki Regional Council officers' at all reasonable times for inspection and/or data retrieval. In addition the data logger shall be designed and installed so that Taranaki Regional Council officers can readily verify that it is accurately recording the required information.
7. The records of water taken shall:
 - (a) be in a format that, in the opinion of the Chief Executive, Taranaki Regional Council, is suitable for auditing; and
 - (b) specifically record the water taken as 'zero' when no water is taken.
8. The taking of water authorised by this consent shall be managed to ensure that the flow in the Warea River immediately downstream of the intake point is not less than 323 litres per second. No taking shall occur when the flow is less than 323 litres per second.
9. A staff gauge shall be installed and a low flow rating curve established and maintained that determines the flow in the Warea River immediately downstream of the take site.
10. From 1 December 2015, for flows less than 1500 litres per second, the consent holder shall determine the flow in the Warea River immediately downstream of the take site at intervals not exceeding 15 minutes to an accuracy of $\pm 10\%$.

Note: The installations required by conditions 9 & 10 will be installed by the Taranaki Regional Council and costs charged to the consent holder.

11. Before 1 September 2017 the consent holder shall complete, and subsequently maintain, all of the riparian fencing and planting indicated in the Riparian Management Plan for the property.
12. At all times the consent holder shall take all practicable steps to take and use water efficiently and generally prevent or minimise any adverse effects on the environment including as minimum, by ensuring that:
 - (a) the minimum amount of water necessary for the purpose is taken;
 - (b) as far as practicable, soil water does not exceed field capacity;
 - (c) there is no surface ponding or runoff; and
 - (d) equipment does not leak.
13. Water shall be taken and used in accordance with an *Irrigation Management Plan* ('IMP') prepared by the consent holder and approved by the Chief Executive, Taranaki Regional Council, acting in a certification capacity. The IMP shall detail methods and techniques that will be used to ensure compliance with condition 12 including, as a minimum, details of:
 - (a) The specific area(s) to be irrigated and the method of irrigation;
 - (b) Crop water requirements, evapotranspiration and available water holding capacity of the soil(s) over the irrigated area;
 - (c) How irrigation will be scheduled to maximise the benefits of rainfall and minimise subsurface drainage;
 - (d) How available soil water will be determined;
 - (e) How water is to be applied as uniformly as practicable over the irrigated area, and the uniformity of application demonstrated;
 - (f) A leak detection programme; and
 - (g) Information to be provided to the Taranaki Regional Council to enable compliance to be checked.

Consent 10135-1.1

14. The Irrigation Management Plan ('IMP') prepared and submitted to the Chief Executive, Taranaki Regional Council in accordance condition 13 shall also be provided to Fish and Game New Zealand at the same time. Any comments made by Fish and Game New Zealand within 15 working days of receiving a plan will be taken into account by the Chief Executive, Taranaki Regional Council when determining if the plan meets the requirements of this consent.
15. The consent holder shall ensure that the intake is screened to avoid fish (in all stages of their life-cycle) entering the intake or being trapped against the screen.
16. This consent shall lapse on 30 September 2020, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.
17. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review annually during June for the purposes of:
 - (a) ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time; and/or
 - (b) to require any data collected in accordance with the conditions of this consent to be transmitted directly to the Taranaki Regional Council's computer system, in a format suitable for providing a 'real time' record over the internet; and/or
 - (c) increasing the minimum flow specified in condition 8 to account for additional hydrological information that becomes available, recognising that the specified flow is intended to be a reasonable estimate of mean annual low flow.

Signed at Stratford on 14 December 2017

For and on behalf of
Taranaki Regional Council

A D McLay
Director - Resource Management

Appendix II

Active irrigation consents in Taranaki
July 2020 to June 2021

Irrigation Water Takes

Surface water takes

Consent	Consent Holder	Usage	Irrigation system
0017-3.1	Manaia Golf Club	Recreational	K – line
0124-5	Kaitake Golf Club Inc	Recreational	K – line
0132-3	Hawera Golf Club Inc	Recreational	K – line
0189-4	AI & KJ Williams	Pasture Irrigation	Travelling irrigator
0270-3	Westown Golf Club Inc	Recreational	K – line
0278-4	Oceanview Trust	Pasture Irrigation	K – line and flood irrigation
0464-3	Oakura Farms Limited	Horticultural	n/a
0880-3	IHC New Zealand Inc (NORTH TARANAKI)	Horticultural	K – line
1223-3	EO & CP Lander	Horticultural	K – line
1721-3.1	Manukorihi Golf Club Inc	Recreational	K – line
1877-3	Te Ngutu Golf Club Incorporated	Recreational	K – line
2138-3	Riverside Farms Taranaki Ltd	Pasture Irrigation	K – line
4450-2.1	Waitara Golf Club Inc	Recreational	K – line
4494-3	CT & JM McDonald	Pasture Irrigation	K – line
4783-3	Larsen Trusts Partnership	Pasture Irrigation	K – line and travelling irrigator
4993-2	J & EG Sanderson	Pasture Irrigation	K – line
4994-2	J & EG Sanderson	Pasture Irrigation	K – line
5128-3	Coastal Country Farms Limited	Pasture Irrigation	K – line and travelling irrigator
5568-2	Cornwall Park Farms Limited	Pasture Irrigation	Travelling irrigator
5570-3	Kaihihi Trust	Pasture Irrigation	K – line
5571-2	Jimian Limited	Pasture Irrigation	K – line
5623-2.1	WD & SC Morrison	Pasture Irrigation	Centre pivot and K - line
5636-2	Waiwira Trust	Pasture Irrigation	Centre pivot and K - line
5773-2	Goodin FJ & Sons Limited	Pasture Irrigation	K – line
5778-2	Mara Trust	Pasture Irrigation	K – line
5781-2.1	Waikaikai Farms Limited	Pasture Irrigation	K – line
5791-2	AL & LA Campbell	Pasture Irrigation	K – line
5797-2	Pihama Farms Limited	Pasture Irrigation	K – line
5807-2	Dickie Roger Family Trust	Pasture Irrigation	Centre pivot and K – line
5827-2	Walker & McLean Partnership	Pasture Irrigation	Centre pivot
5829-2	Julian RM & MC Family Trust	Pasture Irrigation	K – line and travelling irrigator
5840-2	Gibbs G Trust	Pasture Irrigation	Centre pivot
5863-2.1	Geary AR Trust (A R Geary)	Pasture Irrigation	Centre pivot and K – line

Consent	Consent Holder	Usage	Irrigation system
5876-2	GA & RJ Dorn	Pasture Irrigation	K – line
5878-2.1	Woollaston Family Trust Partnership	Pasture Irrigation	Travelling irrigator
5887-2	Croftwest Trust	Pasture Irrigation	K – line
5896-2	Kohi Investments Limited	Pasture Irrigation	K – line
5898-2	David Pease Family Trust	Pasture Irrigation	K – line
6159-1	Waireka Trust	Pasture Irrigation	K – line & travelling irrigator
6292-2	New Plymouth Golf Club Inc	Recreational	K – line
6429-1	Leatherleaf Limited	Pasture Irrigation	Centre pivot
6430-1	Fonic Farms Limited	Pasture Irrigation	Centre pivot and K – line
6628-1.1	Hamblyn Family Trusts	Pasture Irrigation	K – line
7346-1.1	Spenceview Farms	Pasture Irrigation	Centre pivot
7372-1	Pukeone Partnership	Pasture Irrigation	Centre pivot
7527-1.1	Pukeone Partnership	Pasture Irrigation	Centre pivot
7528-1.1	Kereone Farms Limited	Pasture Irrigation	Centre pivot
7626-1	NW & DM King	Pasture Irrigation	K – line
7768-1	Carter AJ Limited	Pasture Irrigation	Travelling irrigator
7781-1	D Krumm	Pasture Irrigation	Travelling irrigator
7895-1	Ohawe Farm Limited	Pasture Irrigation	K – line
9577-1.1	MJ Washer Trusts Partnership	Pasture Irrigation	K – line and travelling irrigator
9597-1	Nilock & Camole Trusts	Pasture Irrigation	Centre pivot
10135-1.1	Luttrell Trust Partnership	Pasture Irrigation	K – line

Groundwater takes

Consent	Consent Holder	Usage	Irrigation system
0714-2	GD & HM McCallum	Pasture Irrigation	K – line and travelling irrigator
0721-3	Go 2 Milk Limited	Horticultural	n/a
3171-3	Taranaki Greenhouses Limited	Horticultural	K – line
3312-3.1	The Tom Lance Trust	Horticultural	K – line
5879-2	BR & RG Harvey Family Trust	Pasture Irrigation	n/a
5950-2.1	WD & SC Morrison	Pasture Irrigation	Centre pivot and K - line
6026-1	JR & DM Baker	Pasture Irrigation	K – line
9561-1	Kereone Farms Limited	Pasture Irrigation	Centre pivot
9608-1.2	D Wilson	Pasture Irrigation	Centre pivot
10369-1	Inglewood Golf Club Inc	Recreational	K – line
10767-1	Alexander Farms Limited	Pasture Irrigation	Centre pivot
10916-1	Waitotara Kiwifruit Limited Partnership	Horticultural	K – line

n/a - consent holder does not have any system in place.

Appendix III

Water take consent usage for 2020-2021

Water take consent usage for 2020-2021

Consent	Consent holder	Consented allowable annual usage (m ³ /annum)	Actual water usage from 1 July 2020 to 30 June 2021 (m ³ /annum)	Percentage of consented volume used
0017-3.1	Manaia Golf Club	36,500	4,464	12%
0124-5	Kaitake Golf Club Inc	47,450	9,754	21%
0132-3	Hawera Golf Club Inc	91,250	n/a ¹	0%
0189-4	AI & KJ Williams	365,000	0	0%
0270-3	Westown Golf Club Inc	131,400	2,275	2%
0278-4	Oceanview Trust	4,320,432	0	0%
0464-3	Oakura Farms Limited	36,500	0	0%
0714-2	GD & HM McCallum	182,500	0	0%
0721-3	Go 2 Milk Limited	30,660	8,330	27%
0880-3	IHC New Zealand Inc (NORTH TARANAKI)	32,120	1,165	4%
1223-3	EO & CP Lander	108,405	5,331	5%
1721-3.1	Manukorihi Golf Club Inc	69,350	1,620	2%
1877-3	Te Ngutu Golf Club Incorporated	73,000	5,455	7%
2138-3	Riverside Farms Taranaki Ltd	756,864	0	0%
3171-3	Taranaki Greenhouses Limited	22,630	14,518	64%
3312-3.1	The Tom Lance Trust	29,200	9,910	34%
4450-2.1	Waitara Golf Club Inc	18,250	5,543	30%
4494-3	Fresianroots Limited	788,400	105,840	13%
4783-3	Larsen Trusts Partnership	1,169,825	0	0%
4993-2	J & EG Sanderson	1,022,000	0	0%
4994-2	J & EG Sanderson	1,186,250	84,033	7%
5128-3	Coastal Country Farms Limited	851,545	0	0%
5568-2	Cornwall Park Farms Limited	286,525	0	0%
5570-3	Kaihihi Trust	547,500	82	0.01%
5571-2	Jimian Limited	1,261,440	0	0%
5623-2.1	WD & SC Morrison	4,730,400	755,215	16%
5636-2	Waiwira Trust	2,584,930	434,712	17%
5773-2	Goodin FJ & Sons Limited	630,720	36,262	6%

¹ Consent was exercised, but not required to submit records by the consent or the Regulations

Consent	Consent holder	Consented allowable annual usage (m ³ /annum)	Actual water usage from 1 July 2020 to 30 June 2021 (m ³ /annum)	Percentage of consented volume used
5778-2	Mara Trust	630,720	41,967	7%
5781-2.1	Waikaikai Farms Limited	2,269,205	73,381	3%
5791-2	AL & LA Campbell	958,125	22,953	2%
5797-2	Pihama Farms Limited	1,314,000	0	0%
5807-2	Dickie Roger Family Trust	6,679,500	349,509	5%
5827-2	Walker & McLean Partnership	821,250	117,813	14%
5829-2	RM & MC Julian Family Trust	1,533,000	49,635	3%
5840-2	Gibbs G Trust	821,250	84,513	10%
5863-2.1	Geary AR Trust (A R Geary)	1,144,640	197,189	17%
5876-2	GA & RJ Dorn	1,350,500	35,740	3%
5878-2.1	Woollaston Family Trust Partnership	474,500	0	0%
5879-2	BR & RG Harvey Family Trust	630,720	7,638	1%
5887-2	BLL Farm Trust	547,500	28,205	5%
5896-2	Kohi Investments Limited	1,460,000	134,886	9%
5898-2	David Pease Family Trust	946,080	93,355	10%
5950-2.1	WD & SC Morrison	313,900	63,680	20%
6026-1	JR & DM Baker	189,070	19,625	10%
6159-1	Waireka Trust	237,250	0	0%
6292-2	New Plymouth Golf Club Inc	292,000	36,547	13%
6429-1	Leatherleaf Limited	912,500	90,627	10%
6430-1	Fonic Farms Limited	1,741,050	78,672	5%
6628-1.1	Hamblyn Family Trusts	765,770	60,726	8%
7346-1.1	Spenceview Farms	3,815,856	641,535	17%
7372-1	Pukeone Partnership	1,261,440	196,344	16%
7527-1.1	Pukeone Partnership	5,545,080	392,493	7%
7528-1.1	Kereone Farms Limited	3,416,400	487,200	14%
7626-1	NW & DM King	725,328	0	0%
7768-1	Carter AJ Limited	126,144	0	0%
7781-1	D Krumm	105,120	n/a ¹	0%
7895-1	Ohawe Farm Limited	1,259,250	45,864	4%
9561-1	Kereone Farms Limited	682,550	134,335	20%

Consent	Consent holder	Consented allowable annual usage (m ³ /annum)	Actual water usage from 1 July 2020 to 30 June 2021 (m ³ /annum)	Percentage of consented volume used
9577-1	Bucman Trust	127,750	4,319	3%
9597-1	Nilock & Camole Trusts	647,875	115,737	18%
9608-1.2	D Wilson	946,080	121,848	13%
10135-1.1	Luttrell Trust Partnership	2,043,533	236,796	12%
10369-1	Inglewood Golf Club Inc	36,500	1,979	5%
10767-1	Alexander Farms Limited	788,400	117,871	15%
10916-1	Waitotara Kiwifruit Limited Partnership	394,200	0	0%

Appendix IV

Report on consented water permits for farm
and general water supply purposes 2020-2021

Report on water permits for farm and general water supply

Introduction

This report is for water takes for general farm and water supply purposes that have been granted by the Council [water takes in excess of the permitted 1.5 litres per second or 50 cubic metres per day entitlement per property according to the Regional Fresh Water Plan for Taranaki, Rule 15]. This report discusses the consents active to 30 June 2021 and any compliance issues related to them.

These water takes are different to that for water irrigation, as these are used for general farm use and water supply and are used throughout the year unlike irrigation consents that are used for a small portion of the year. These consents generally have different consent conditions attached to them, compared to those for irrigation water, as the takes are generally of a minor nature and generally fall outside the Measurement and Reporting of Water Takes Regulations 2020.

Current water take consents

At 30 June 2021, there were a total of 37 current water take consents for general farm and water supply purposes. Of these seven were from surface water and 30 were from groundwater sources (Table 1).

Table 1 Total consents granted for dairy farm and water supply purposes to 30 June 2021

Consent	Consent holder	Source
0865-3	Kathdan Trust Limited	Surface Water
1190-3.2	Pungarehu Farmers Group Water Scheme	Surface Water
5413-2	MJ Fahy	Groundwater
5990-2	ID & JA Armstrong	Surface Water
6133-1	DJ & ME McKenzie	Groundwater
6372-1	Naplin Trust	Groundwater
6380-1.1	Caiseal Trust Partnership	Groundwater
6451-2	Nukumaru Water Scheme Society Inc	Groundwater
6903-1	Awatea Hawkes Bay Trust	Groundwater
7132-1	Aorere Farms Partnership	Groundwater
7272-1	Belmont Dairies Limited	Groundwater
7304-1.2	Gwerder Brothers	Groundwater
7497-1	Te Rua O te Moko 2B Ahuwhenua Trust	Surface Water
7540-1	AJ & DI Dravitzki Trusts Partnership	Groundwater
7569-2	Stoney River Dairy Limited	Groundwater
7608-1	Go 2 Milk Limited	Groundwater
7711-1	Pariroa Marae (The Trustees)	Groundwater
7783-1	Norwood Farm Partnership	Groundwater
7969-1	AB Middleton	Surface Water
9747-1.1	DP & JH Roper Family Trust Partnership	Groundwater
9900-1.1	Kaipi Holdings Limited	Groundwater

Consent	Consent holder	Source
9910-1	PKW Farms LP	Groundwater
9947-1	Ngatoro Poultry Limited	Groundwater
10029-1	Hernly Farms Limited	Groundwater
10112-1	Construction Mechanics (1993) Limited	Groundwater
10113-1.2	Lupton Trust	Groundwater
10120-1.1	SC & MJ O'Neill Family Trust	Groundwater
10199-1	R Oldfield	Groundwater
10421-1	Medley Partnership	Surface Water
10449-1	Joblin Partners Limited	Groundwater
10484-1	PKW Farms LP	Groundwater
10542-1	Zenith Farms Family Trust	Surface Water
10728-1	Turangareere Trust	Groundwater
10746-1	Hernly Farm Limited	Groundwater
10877-1	Moorelands Trust Partnership	Groundwater
10903-1	Summerset Villages (Bell Block) Limited	Groundwater
10907-1	K Lupton & D Alexander	Groundwater

Results and discussion

During the year under review, the Council inspected all water take consents that have a compliance monitoring programme. This meant that some consents were not monitored due to the small nature of the takes, as it was deemed unnecessary, and/or there were no enforceable consent conditions to monitor on the systems.

Of the consents that were inspected, they were checked to ensure that they were compliant with their resource consent conditions, which may include the presence of a flowmeter, a tamperproof flowmeter, adequately screened intakes, bores labelled and cased, pump sheds fenced off, water bodies fenced off, riparian margins planted.

If the consents were required to keep records, the records were either downloaded at the time of the annual inspection, if a data logger was present, or the records were to be sent to the Council by 31 July. **Error! Reference source not found.** lists the consents annual allowable usage and actual water usage for 2020-2021 season.

Table 2 Consents allowable annual water take and 2020-2021 actual annual usage

Consent	Consent holder	Consented allowable annual usage (m ³ /annum)	Actual water usage from 1 July 2020 to 30 June 2021 (m ³ /annum)
0865-3	Kathdan Trust Limited	394,200	53,213
1190-3.2	Pungarehu Farmers Group Water Scheme	125,143	59,699
5413-2	MJ Fahy	71,540	879
5990-2	ID & JA Armstrong	43,800	8,450
6133-1	DJ & ME McKenzie	1,825	n/a

6372-1	Naplin Trust	18,250	n/a
6380-1.1	Caiseal Trust Partnership	36,500	8,225
6451-2	Nukumaru Water Scheme Society Inc	62,050	0
6903-1	Awatea Hawkes Bay Trust	91,250	8,433
7132-1	Aorere Farms Partnership	65,700	22,183
7272-1	Belmont Dairies Limited	94,535	38,137
7304-1.2	Gwerder Brothers	78,214	60,780
7497-1	Te Rua O te Moko 2B Ahuwhenua Trust	28,470	27,157
7540-1	AJ & DI Dravitzki Trusts Partnership	18,250	n/a
7569-1	Stoney River Dairy Limited	78,840	Not setup
7608-1	Go 2 Milk Limited	9,125	n/a
7711-1	Pairoa Marae (The Trustees)	18,250	353
7783-1	Norwood Farm Partnership	51,100	31,207
7969-1	AB Middleton	51,100	n/a
9747-1.1	DP & JH Roper Family Trust Partnership	36,500	23,783
9900-1.1	Kaipī Holdings Limited	220,752	67,277
9910-1	PKW Farms LP	40,150	20,998
9947-1	Ngatoro Poultry Limited	127,020	29,481
10029-1	Hernly Farms Limited	126,144	Not operational
10112-1	Construction Mechanics (1993) Limited	47,450	6,916
10113-1.2	Lupton Trust	45,625	10,313
10120-1.1	SC & MJ O'Neill Family Trust	43,800	n/a
10199-1	ClearAz Taranaki Spring Water	2,008	1,020
10421-1	Medley Partnership	78,840	Not setup
10449-1	Joblin Partners Limited	54,750	74,888
10484-1	PKW Farms LP	50,057	26,780
10542-1.1	Zenith Farms Family Trust	58,400	n/a
10728-1	Turangareere Trust	49,275	6,721
10746-1	Hernly Farm Limited	60,955	48,994
10877-1	Moorelands Trust Partnership	18,250	n/a
10903-1	Summerset Villages (Bell Block) Limited	45,333	0
10907-1	K Lupton & D Alexander	87,600	0

n/a – not applicable (no requirement to provided records)

Thirty-three of the consents had an end of year site inspection, with one consent holder being found to be non-compliant with their consent conditions, which resulted in an incident being lodged. A summary of this incident identified during the 2020-2021 year, and the Council's response, is presented in Table 3.

Table 3 Consent non-compliance found during 2020-2021

Date	Consent Holder (Consent number)	Details	Compliant (Y/N)	Enforcement Action Taken?	Outcome
29/07/2021	Joblin Partners Limited (10449-1)	Abstraction volume breaches throughout the monitoring year	N	14 day letter	Letter of explanation received and Council accepted.

Summary

Of the 33 sites inspected, one was found to be non-compliant with their consent conditions. Council will continue to work with all consent holders to ensure they comply their consent conditions in future seasons.

The biggest water user for the 2020-2021 season was Joblin Partners Limited with 74,888 m³. The average annual water use across all consents was 18,168 m³.

The Council will continue to monitor these water takes and any new consents that may be granted in the future, as although they are relatively minor in size, it is still important to manage the resources and assess if there are any adverse environmental effects arising from the exercising of these consents.