

Irrigation Water
Compliance Monitoring Programme
Annual Report
2016-2017

Technical Report 2017-94

ISSN: 1178-1467 (Online)

Document: 1959057 (Word)

Document: 1967901 (Pdf)

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January 2018

Executive summary

This is the 14th Annual Report issued by the Taranaki Regional Council (the Council) to report on compliance monitoring programmes for resource consents authorising the abstraction of freshwater for irrigation purposes in Taranaki. This report for the period July 2016 to June 2017 encompasses the data collected for compliance monitoring for resource consents for pasture irrigation, horticultural and golf course irrigation; as per the recommendations for the previous report.

Water is a public resource and the authorisation to take it is granted through resource consent. Associated with that permission is a public expectation that the water will be used efficiently, an expectation that can be better met if the actual amounts of water taken are accurately measured and recorded. Maintaining environmentally appropriate residual flows in streams and rivers to protect aquatic habitat is of primary concern to the Council when assessing water take applications. Monitoring of compliance with consent conditions is then required to ensure that any significant adverse effects as a result of authorised water takes are avoided.

At 30 June 2017, a total of 75 resource consents to take and use freshwater for irrigation purposes were registered in the Council's database. Of that number, 55 were for pasture irrigation, 9 for horticultural activities and 11 for recreational purposes (golf clubs). Sixty-two consents authorised abstraction for surface water (83%) while 13 (17%) utilised groundwater sources. A total of 46 irrigation consents were exercised during the 2016-2017 monitoring year.

The 2016-2017 monitoring programmes for irrigation water permits comprised a range of various components, including liaison with consent holders, site inspection, 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.

It was a reasonably quiet season for the Council's hydrological monitoring team, as the weather conditions meant the demand for irrigation was not high, with irrigation starting in November or December for many. The Council carried out compliance monitoring inspections at 67 sites during the 2016-2017 irrigation season, with 100% of all of the active consents being visited. The inspections included visual checks of the intake structures, screens, staff gauges, fencing around the pump sheds, downloading of data and stream gaugings.

For the summer irrigation period, the rainfall recorded at the Council's monitoring locations ranged between 100 % and 158% of historical mean values. This meant that many rivers and streams were running above mean annual low flow conditions for the period. The higher than normal stream flows meant that there was only a small amount of monitoring required to ensure ecological flows were maintained in those waterways being used to supply water for irrigation. During the period under review, compliance with residual flow conditions for surface water abstractions was assessed by the Council on 17 separate occasions, across 13 waterways. Irrigation had stopped for all water users by the end of March 2017.

Consent holder performance was assessed based 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).

The Council was required to enter a total of seven incidents over the course of the 2016-2017 period in relation to irrigation consents. These incidents were reported to Council and staff implemented appropriate responses as they were identified. This included the issuing of four abatement notices and one infringement notice.

During the 2016-2017 year, 80% of exercised irrigation consents in Taranaki achieved a high level of environmental performance and compliance with their consents, 5% achieved a good level of performance, while 15% require an improvement in their compliance performance.

For reference, in the 2016-2017 year, consent holders were found to achieve a high level of environmental performance and compliance for 74% of the consents monitored through the Taranaki tailored monitoring programmes, while for another 21% 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 holders over the last several years, this report shows that the consent holder's performance remains at a good to high level in the year under review. This is an improvement on the 2015-2016 monitoring year, as only 47 % of all exercised consents achieved a high level of environmental and compliance performance.

This report includes recommendations for the 2017-2018 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 2016 to June 2017 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.

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 RMA and the Council's obligations;
- the Council's approach to monitoring water takes 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 irrigation activities conducted in each 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 2017-2018 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 *Resource Management Act 1991 (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' inasmuch 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 significant 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 in response to unauthorised incident reports, 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 in response to unauthorised incident reports. 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 in response to unauthorised incident reports. 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 2016-2017 year, consent holders were found to achieve a high level of environmental performance and compliance for 74% of the consents monitored through the Taranaki tailored monitoring programmes, while for another 21% of the consents, a good level of environmental performance and compliance was achieved.

1.1.5 Regional freshwater allocation

At 30 June 2017, there were a total of 75 resource consents to take and use freshwater for irrigation purposes. Fifty-five consents were for pasture irrigation, nine for irrigation associated with horticultural activities and eleven for recreational purposes (e.g. golf course watering) (Figure 1).

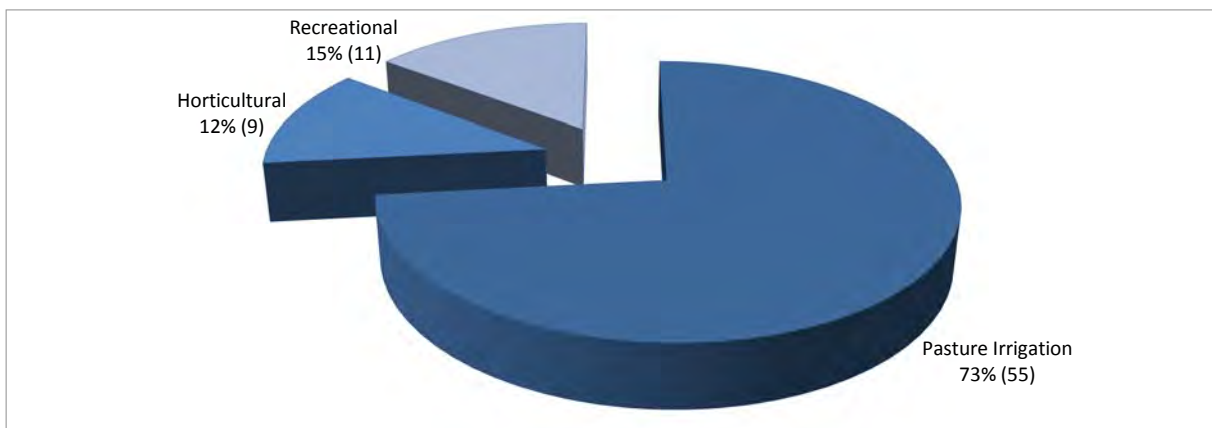


Figure 1 Percentage of water irrigation allocation per activity in the Taranaki region

Surface water is the predominant source of water for irrigation, accounting for 62 of the 75 consented water abstractions (83%). The remaining 13 consents (17%) 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 28% of the total consented water abstraction in Taranaki. Other types of irrigation (horticultural and recreational)

account for approximately 11%, with other uses¹ accounting for the majority (61%) of the total water allocation across the region (Figure 3).

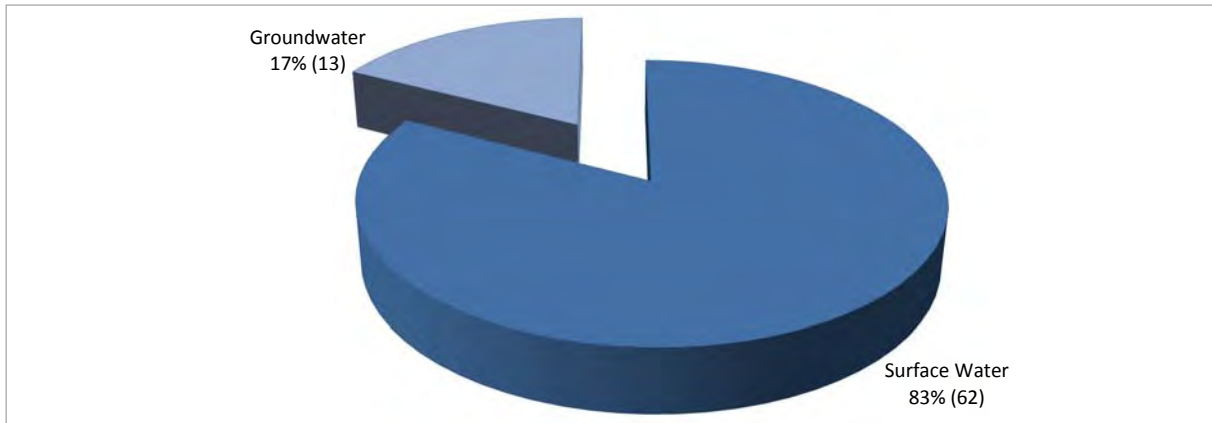


Figure 2 Source of water for irrigation in Taranaki during the 2016-2017 period

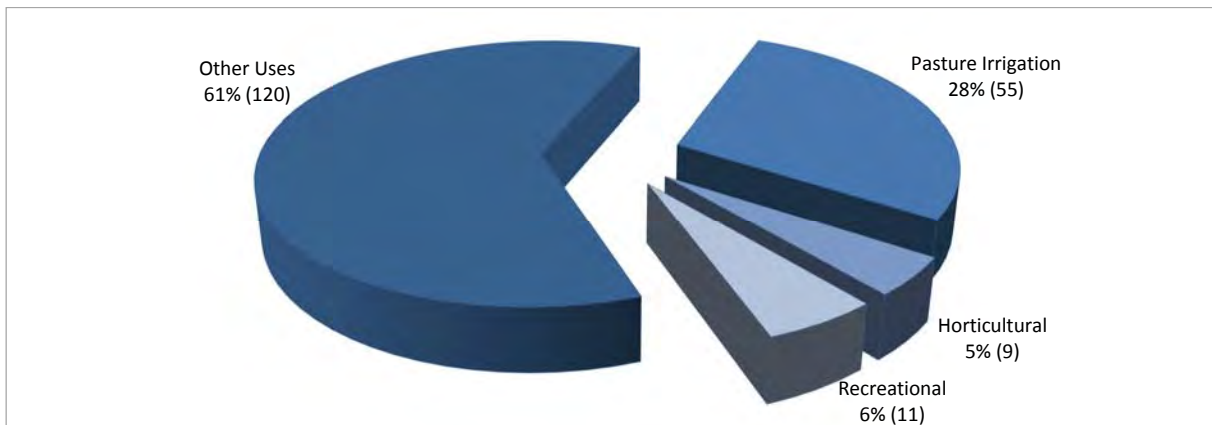


Figure 3 Total consented water abstractions – distributed by activity 2016-2017

1.1.6 Irrigation zones

A regional study commissioned for the Council in 2002 (Rout, 2003) identified eight irrigation zones based mainly based on climate. The zones were characterised by different parameters in terms of system management and financial return. Each zone, and the location of all current irrigation consents are illustrated in Figure 4.

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 or irrigators are generally located inland, between Inglewood and Eltham.

¹ 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, Piggy 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.

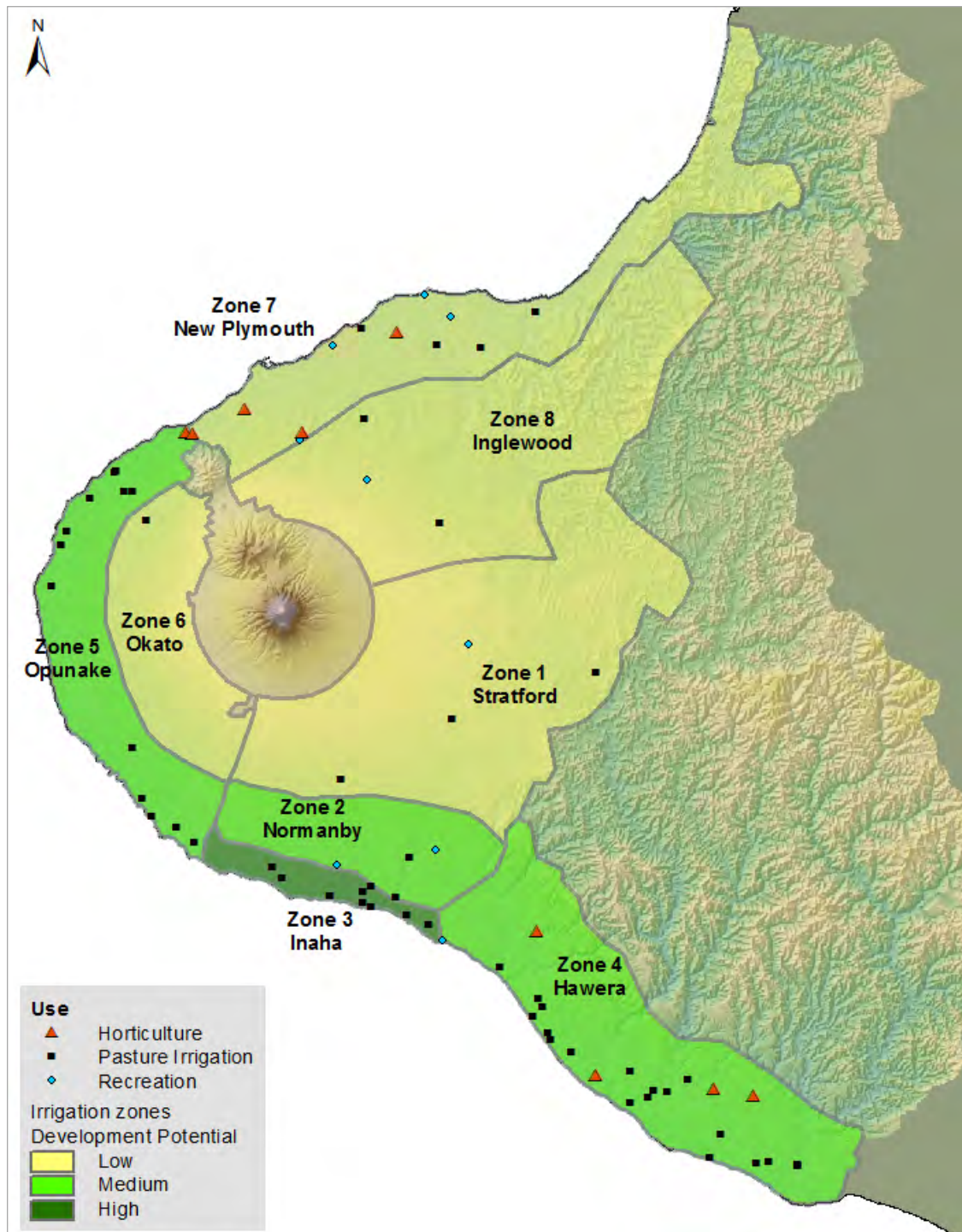


Figure 4 Pasture irrigation zones and locations of consented irrigation in Taranaki

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 long-lateral type and k-line 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 Mosaic of pictures depicting centre pivots

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.



Photo 3 Picture depicting travelling irrigator system

The predominant irrigation system used in Taranaki is the K-line, accounting for 48% of all systems in use. Thirteen percent of irrigation consent holders operate solely with centre pivots, 8% operate travelling irrigators, while 17% operate more than one type of system on their farm. The remaining 13% of consent holders are yet to install irrigation infrastructure.

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 RFWP 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 adverse ecological effects, adversely impact on existing groundwater users and potential future use.

Fortunately in Taranaki, the risk of saltwater intrusion is low due to the limited number of high yielding coastal bores. The Council does however monitor water indicators at five coastal sites as part of irrigation monitoring programmes, 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.

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 southern 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. Irrigation for the 2016-2017 season commenced for many in November, but some did not exercise until as late as January. Irrigation was not a necessity for many, as there were generally no long periods without rain. The irrigation season ended in March. The rainfall sites along the southern and coastal belt received between 106% to 158% of normal for the period 1 November 2016 to 31 March 2017, as shown in Table 1. Rainfall gradients across the region are illustrated in Figure 5.

Table 1 Total rainfall from 1 November 2016 to 31 March 2017 versus historical mean values

Site	Total rainfall 1 November 2016 to 31 March 2017 (mm)	Mean rainfall November to March (mm)	November to March 2016- 2017 rainfall as a proportion of mean values
North Egmont	2,807	2,311	121%
Dawson Falls	2,506	1,866	134%
Kahui Hut	2,540	1,606	158%
Hillsborough	770	582	132%
Brooklands Zoo	561	545	103%
NP Wastewater	473	475	100%
Mangati	582	467	125%
Motunui	491	450	131%
Egmont Village	1,198	848	141%
Everett Park	988	723	137%
Inglewood	1,154	864	134%
Stratford	743	606	123%
Mangaehu	723	513	141%

Site	Total rainfall 1 November 2016 to 31 March 2017 (mm)	Mean rainfall November to March (mm)	November to March 2016- 2017 rainfall as a proportion of mean values
Kotare	1,125	755	149%
Kaka Rd (Uruti)	1,041	816	128%
Pohokura Saddle	814	690	118%
Stony (Okato)	943	655	144%
Kapoaiaia (Cape Egmont)	586	474	124%
Taungatara (Te Kiri)	636	488	130%
Kaupokonui (Manaia)	396	372	106%
Duffys (Whareroa)	471	365	129%
Patea	555	352	158%
Charlies	778	512	152%
Moana Trig	643	534	121%
Rimunui Stn (Waitotara)	519	459	113%
Ngutuwera	490	448	109%

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 that 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.

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.

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.

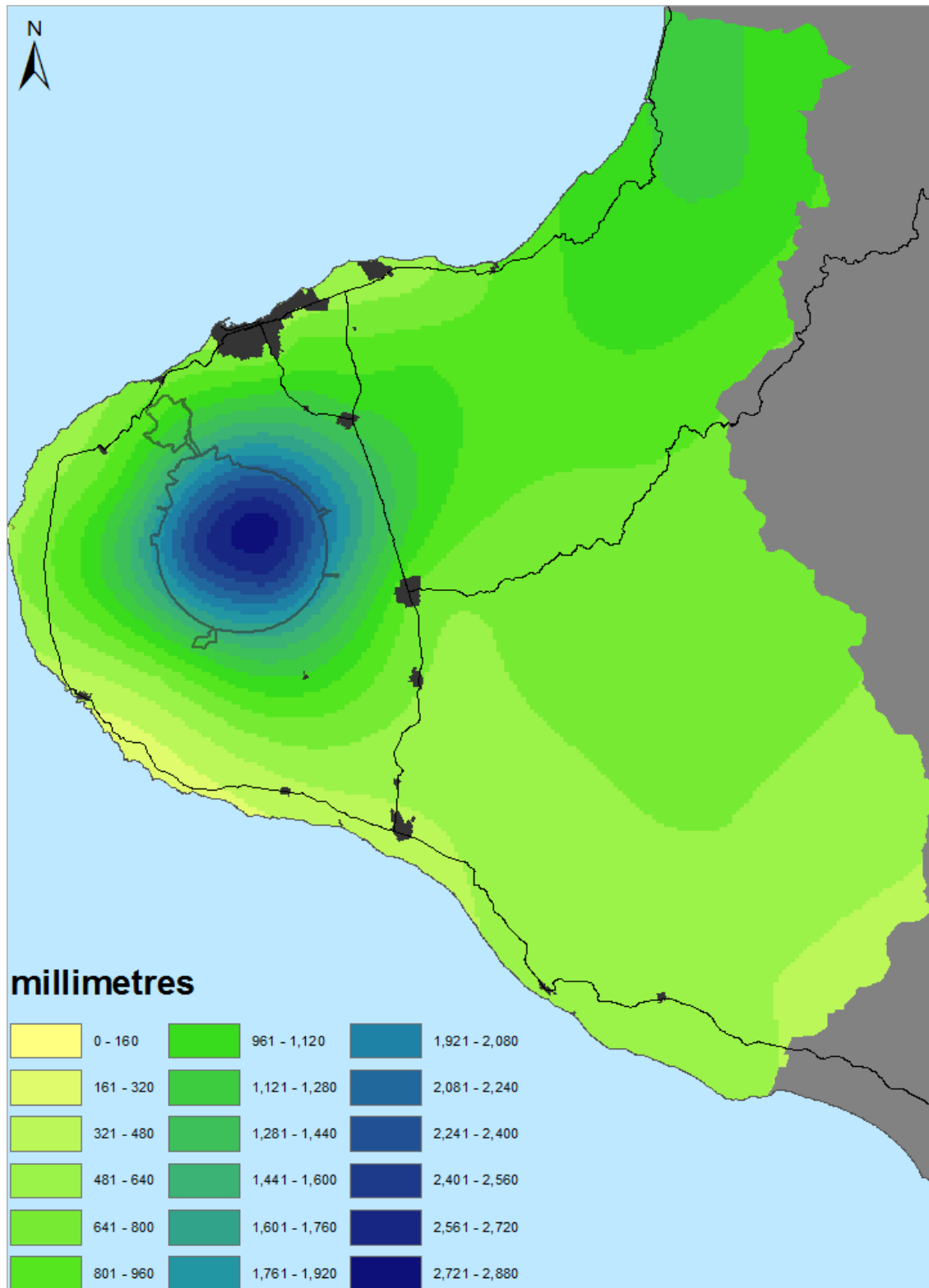


Figure 5 Distribution map of the total rainfall recorded from 1 November 2016 to 31 March 2017

1.2.1 Droughts in Taranaki

Droughts are a normal, recurrent feature of climate. This phenomenon occurs almost everywhere though it features vary from region to region. Defining drought is difficult as it depends on need, physical differences in regions, and varying disciplinary perspectives. In the most general sense, drought originates from a deficiency of precipitation over an extended period of time, resulting in damage to crops and resultant loss of yields.

Climate change scenarios suggest that Taranaki may experience more severe weather extremes in the form of dry spells, as well as heavy rainfall events. The most severe droughts in Taranaki have been in 1969-1970, 1977-1978 and 2007-2008. Changes in drought risk for the Taranaki region indicate a slight increase in the southern coast of the region. Developing climatology assessments of drought for a region provides a greater understanding of its characteristics and the probability of recurrence at various levels of severity. Information of this type is extremely beneficial in the development of response and mitigation strategies and preparedness plans.

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 2016-2017 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. Rainfall occurred regularly over the 2016-2017 summer, which meant irrigation was not required for many consent holders. The ones that did exercise their consent only doing so for a short period of time, with irrigation starting in November for some, but as late as January for others, and everyone having stopped irrigating by the end of March.

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;
- in 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 2016-2017 pasture irrigation monitoring programmes 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 2016-2017 monitoring period. Additionally, the “not-otherwise monitored” 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 are carried out, in line with consent conditions.

Monitoring programmes for surface water abstraction 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 gaugings 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 holder’s in managing inputs to their operations, identifying potential energy savings, identifying operational issues and making water use efficiency gains².

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 requirement³;
- 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, 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.

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

² Sustainable Water Programme of Action, Ministry for the Environment.

³ Refer to the document Resource Management (Measuring and reporting of Water Takes) Regulations 2010. REF 2010/267.

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.

Resource consents issued by the Council generally stipulate the range and frequency of data that a consent holder must record in relation to their water take. Specific requirements have become more stringent as monitoring requirements and expectations have evolved. In addition to the requirements set out in consent conditions, all takes captured under the Regulations are required to meet the data recording and submission requirements set out therein. This includes a minimum requirement to measure and record the daily volume of water taken or weekly where an exception is granted under section 9 of the Regulations. Records are required to cover the entire water year (1 July to 30 June) and be provided to the Council by 31 July of each year. The Council retains the authority to apply more stringent requirements on consent holders over and above those set out in the Regulations.



Photo 4 Good installation of a flowmeter

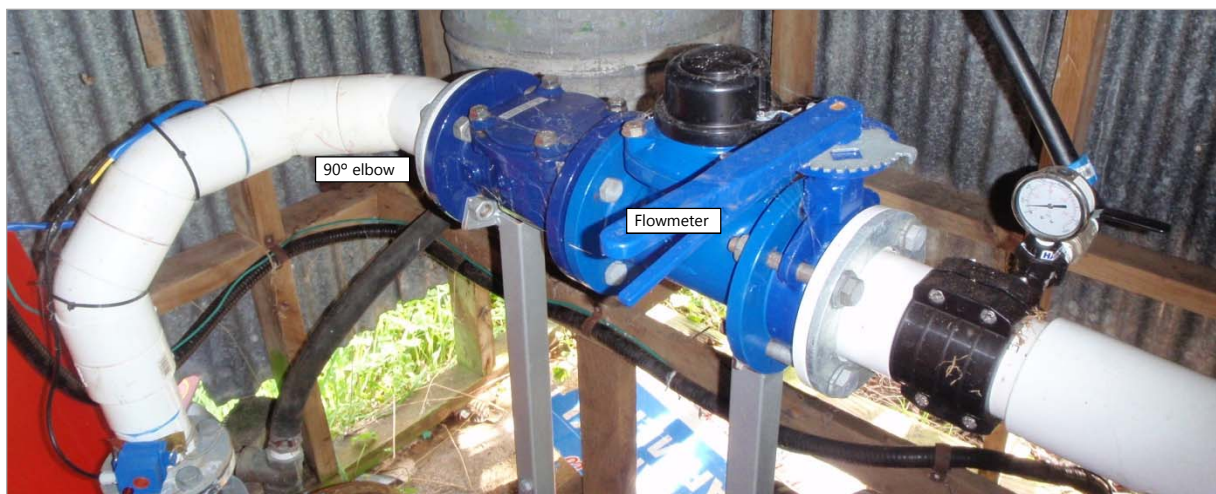


Photo 5 Poor installation of a flowmeter

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.

1.3.5 Residual flow monitoring

Compliance with consent conditions set to safeguard the intrinsic values of Taranaki streams is based on recognising that the taking of water is only allowed when there is water available above the minimum flow set out in the consent. If flows drop below this level, then irrigation is to cease until there is adequate water to allow for irrigation to recommence. To determine compliance 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.

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.

1.3.7 Groundwater quality assessment

Sampling of groundwater for hydrochemical analysis is undertaken from irrigation bores in close proximity to the coast. The purpose of this sampling is to monitor for changes in groundwater composition that may occur as a result of groundwater abstraction in these environments. Most significant is the potential for saline water to be drawn into freshwater aquifers as a result of over abstraction. This process, referred to as saline intrusion, has the potential to severely impact groundwater quality and its usability.

2 Results

2.1 Site Inspections

The Council carried out annual compliance monitoring inspections at all sites where irrigation consents were exercised during 2016-2017 irrigation season. This represented 67 separate sites, compared to 68 inspections carried out for the 2015-2016 irrigation season. The reduced number of year on year inspections was as a result of a consent being surrendered during 2016-2017, when compared to the preceding 2015-2016 year.

The annual inspections occur between May and June each year, once the irrigation season has ended. Due to the timing of these inspections, most systems have been decommissioned and are undergoing maintenance by this time, 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.

One non-compliance was identified during inspection visits, as a replacement flowmeter had been installed but not verified before abstraction occurred for the season. There were also two instances of the consent holder not supplying abstraction records on time.

2.2 Residual flow compliance

During the period under review, compliance with residual flow conditions for surface water abstraction sites was assessed 17 times in 13 waterways. This is significantly lower than 2015-2016 (73 gaugings), due to regular rainfall and limited periods of low flows.

Stream gaugings were generally targeted to coincide with the periods of low surface water flows. Of the 17 gaugings carried out, flows were measured below residual flow limits on only 1 occasion. 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

During the 2016-2017 monitoring period, 46 of the 75 consents to take and use water for irrigation purposes were exercised.

The majority of the consent holders who exercised their consents during the 2016-2017 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. There were two consent holders who either did not provide records on time or had a problem with their datalogger, which is discussed further in later sections of this report.

Analysis of the water take data collected shows that irrigation in Taranaki occurred from November 2016, with the majority of irrigation occurring between January and March 2017.

The highest water usage for the season was from Roger Dickie Family Trust, abstracting 554,203 m³. This consent took an average of 210 L/s, with irrigation occurring from late November to early March. The second highest water user was Spenceview Farms with 449,669 m³. Both takes were operated within the conditions of their respective consents for the duration of the monitoring period. The average usage for all water users for the year was 72,391 m³.

Knowing the actual water usage is an important aspect of any consent monitoring programme, not only to enable the assessment of consent compliance, but also to assist the Council in their overall management of the water resource and determining water allocation limits. The data collected also allows the consent holder to make robust assessments of their water use and resultant benefits.

Appendix III lists each consent holder's 2016-2017 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 940,014 m³. This is vastly different to the actual average annual usage for the 2016-2017 season of 72,391 m³. This is due to the takes only being exercised for a small portion of the year, as demand only spikes during dry periods of the year. 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 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 2016-2017 data, seven 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 five coastal sites to assess salinity levels in aquifers being pumped. The results indicate groundwater salinities in the range expected in coastal areas and measured values during the 2016-2017 monitoring period show little deviation from historical mean values at each site.

Further sampling of these bores during forthcoming monitoring periods will allow any changes in groundwater salinity levels to be detected.

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
5950-1	GND1203	23/03/2017	33.3 (34.5)	32.4 (31.9)	8.5 (8.6)	60.4 (59.1)	6
6026-1	GND1233	23/03/2017	64.7 (57.9)	50.6 (47.6)	7.8 (7.8)	42.8 (41.1)	5
9561-1	GND2108	23/03/2017	38.2 (44.4)	33.0 (39.5)	8.1 (8.1)	25.4 (25.5)	3
	GND2109	23/03/2017	47.8 (39.6)	40.0 (36.0)	8.1 (8.1)	25.2 (25.4)	3
9608-1	GND2354	23/03/2017	94.8 (87.5)	69.9 (74.8)	8.9 (8.6)	184.0 (189.3)	4

2.5 Investigations, interventions, and incidents

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 holder. 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.

The Council operates and maintains a register of all complaints or reported and discovered excursions from acceptable limits and practices, including non-compliance with consents, which may damage the environment. The incident register includes events where the Company concerned has itself notified the Council. The register contains details of any investigation and corrective action taken.

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 company is indeed the source of the incident (or that the allegation cannot be proven).

Compliance with consent conditions was assessed for all irrigation consents exercised 2016-2017 period. Of the 46 consent holders who exercised their irrigation consents during the monitoring year, seven (15%) had incidents recorded against them, which required further investigation by the Council.

Following investigation of all registered incidents, two consent holders were found to have a statutory defence, or breaches were sufficiently minor to not warrant further action from the Council, over and above a formal warning regarding their future conduct. Five incidents resulted in enforcement action being brought by the Council, which included the issuing of four abatement notices and one infringement notice. This equates to a non-compliance rate across all active irrigation consents of 11% during the 2016-2017 monitoring year, which is a reduction from 2015-2016 monitoring year which had eight (13%) incidents requiring enforcement action.

A summary of each incident identified during the 2016-2017 year, and the Council's response, is presented in Table 3.

Table 3 Consents found to be in breach and the incidents registered

Consent	Consent holder	Reason incident lodged	Outcome
0880-3	IHC New Zealand Inc	No records	Abatement notice issued to provide records. Records received. Consent holder has complied with abatement notice.
1223-3	EO & CP Lander	Rate breaches	14 day letter issued. Letter of explanation was received and Council accepted.
3312-3	The Tom Lance Trust	Volume breaches	14 day letter issued. Letter of explanation was received and Council accepted.
4450-1	Waitara Golf Club Inc	Rate and volume breaches	14 day letter issued. Letter of explanation was received and Council accepted.
4494-2	CT & JM McDonald	Flowmeter not verified	Abatement notice issued to complete verification by 01/11/2017 (before the start of the new irrigation season).
4993-2	J & E Sanderson	Faulty datalogger readings	14 day letter issued. Manual records and explanation provided by consent holder. Council accepted explanation.
5571-1	Jimian Limited	No records, as datalogger failed.	14 day letter issued. Letter of explanation was received and Council accepted.

3 Discussion

3.1 Discussion of site performance

Given that this report jointly covers 75 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 2016-2017 monitoring year revealed that seven of the 46 consent holders (15%) who exercised their consents breached one or more conditions of their resource consent. Three of these breaches related to exceedances of an abstraction rate and/or volume limit, one for having an unverified flowmeter, one for a faulty datalogger record and two for not providing water take records on time, or at all.

Discussed below are some of the key points and issues arising from the monitoring of irrigation water takes during the 2016-2017 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 ensure data being collected by a flowmeter is accurate; the accuracy of the meter 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 97% of meters in Taranaki have been verified, the Council has had to pursue enforcement action in a small number of instances to ensure compliance. Consent holders should be reminded that verification 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 also received several 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. In some cases, Council staff were only advised of these issues verbally while attending sites for end of year inspections. Often these issues had resulted in data not being recorded for a period of time, which in some cases accounted for large portions of the irrigation season. Consent holder 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 holders record water take data on dataloggers. Data from these loggers is subsequently 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 2016-2017 monitoring year, a number of consent holders identified as non-compliant were interested in what technologies were available to enable them to view water use data in real-time and which allowed them to be notified of any impending consent exceedances. Such systems are widely available, using telemetry to transmit data electronically via the cell phone or radio

network. This data can be accessed by the consent holder and automated alarms can be set up to notify them of any breaches of authorised abstraction rate of volume. The Council promotes the installation of telemetry systems as a means of improving consent compliance and allowing 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 maximising pasture production but can also save irrigators money by avoiding the application of water 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 are urged to contact the Council for further information.

3.2 Evaluation of performance

A tabular summary of all the irrigation 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	Manaia Golf Club	High	High
0124-5	Kaitake Golf Club Inc	High	High
0132-3	Hawera Golf Club Inc	High	High
0184-3	Inglewood Golf Club Inc	Good	High
0189-4	AI & KJ Williams	n/a	n/a
0270-3	Westown Golf Club Incorporated	High	High
0278-4	NRGE Farms Limited/Oceanview Trust	n/a	n/a
0464-3	Oakura Farms Limited	n/a	n/a
0647-3	IG Cassie	n/a	n/a
0714-2	G McCallum	n/a	n/a
0721-3	MD Aiken Family Trust	n/a	n/a
0880-3	IHC New Zealand Inc	Good	Improvement required
1223-3	EO & CP Lander	Improvement required	High
1721-3	Manukorihi Golf Club Inc	n/a	n/a
1877-3	Te Ngutu Golf Club Inc	High	High
1879-3	Wairau Nurseries	n/a	n/a
2138-3	Riverside Farms Taranaki Ltd	High	High
3171-3	Taranaki Greenhouses Limited	High	High
3312-3	The Tom Lance Trust	Improvement required	High
3859-2	Living Light 2000 Limited	High	High
4450-2	Waitara Golf Club Inc	Improvement required	High

Consent	Consent Holder	Environmental compliance achieved?	Administration compliance achieved?
4494-2	CT & JM McDonald	Improvement required	High
4783-3	Larsen Trust Partnership	n/a	n/a
4993-2	J & EG Sanderson	Improvement required	High
4994-2	J & EG Sanderson	High	High
5128-2	Coastal Country Farms Limited	n/a	n/a
5568-1	Cornwall Park Farms Limited	High	High
5570-2	Kaihihi Trust	n/a	n/a
5571-1	Jimian Limited	Improvement required	Improvement required
5623-2	W & S Morrison	High	High
5636-1	Waiwira Trust	High	High
5709-2	KCCG Sole	n/a	n/a
5773-1	Goodin FJ & Sons Limited	n/a	n/a
5778-1	Mara Trust	n/a	n/a
5781-2	Waikaikai Farms Limited	High	High
5791-1	AL & LA Campbell	High	High
5807-2	Pihama Farms Limited	High	High
5827-2	Roger Dickie Family Trust	High	High
5829-1	Walker & McLean Partnership	High	High
5840-2	RM & MC Julian Family Trust	High	High
5863-2	Gibbs G Trust	High	High
5876-1	Geary AR Trust	High	High
5878-2	GA & RJ Dorn	n/a	n/a
5879-1	Woollaston Family Trust Partnership	High	High
5887-1	BR & RG Harvey Family Trust	High	High
5896-2	Kohi Investments Limited	n/a	n/a
5898-2	David Pease Family Trust	High	High
5950-2	W & S Morrison	High	High
5973-2	Crosbig Trusts Partnership	n/a	n/a
6026-1	JR & DM Baker	Good	Good
6159-1	Pinehill Land Company Limited	n/a	n/a
6193-1	RA & SM Geary Trusts Partnership	n/a	n/a
6292-1	New Plymouth Golf Club Inc	High	High
6429-1	Leatherleaf Limited	High	High
6430-1	Fonic Farms Limited	High	High
6628-1	JW & MT Hamblyn Family Trusts	n/a	n/a

Consent	Consent Holder	Environmental compliance achieved?	Administration compliance achieved?
7270-1	Estate Ian Mantey Family Trust & Sally Mantey Family Trust	n/a	n/a
7346-1	Spenceview Farms	High	High
7372-1	Pukeone Partnership	High	High
7527-1	Pukeone Partnership	High	High
7528-1	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	n/a	n/a
7866-1	Stratford Golf Club Inc	n/a	n/a
7895-1	Ohawe Farm Limited	High	High
7981-1	Taranaki Community Rugby Trust	n/a	n/a
9561-1	Kereone Farms Limited	High	High
9577-1	MJ Washer Trusts Partnership	High	High
9597-1	Nilock & Camole Trusts	High	High
9608-1	DR Wilson	High	High
9936-1	GSJ Trust	n/a	n/a
10135-1	Luttrell Trust Partnership	n/a	n/a
10369-1	Inglewood Golf Club Inc	High	High

n/a = not applicable – Consent not exercised

During the year, 80% of exercised irrigation consents in Taranaki achieved a high environmental performance and compliance rating as defined in Section 1.1.4. A further 15% are required to show improvement.

Ninety eight percent of consent holders who exercised their consents during the 2016-2017 year achieved a high level rating for their administrative performance and compliance.

3.3 Recommendations from the 2015-2016 Annual Report

In the 2015-2016 Annual Report, it was recommended:

1. THAT the monitoring and the downloading of abstraction data occurs mid season for those that had water takes breaches during the 2015-2016 season.

Recommendation 1 was implemented during the period under review.

2. THAT the Council encourages consent holders that do not supply good quality records to install a datalogger and transfer data electronically to the Council database via telemetry.
3. THAT the Council continues to actively enforce the implementation of the Resource Management (Measuring and Reporting of Water Takes) Regulations 2010.

The Council continues to work with consent holders on these matters.

3.4 Alterations to monitoring programmes for 2017-2018

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 2017-2018 that monitoring of irrigation consents continues at the same levels as during the 2016-2017 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 2017-2018.

4 Recommendations

1. THAT in the first instance, monitoring and reporting of consented irrigation activities for the 2017-2018 year continue at the same level as in 2016-2017.
2. THAT should there be issues with environmental or administrative performance in 2017-2018, 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 2015-2016 and 2016-2017 seasons.
4. THAT the Council encourages consent holders that do not supply good quality records to install a datalogger and transfer data electronically to the Council database via telemetry
5. THAT the Council continues to actively enforce the implementation of the Resource Management (Measuring and Reporting of Water Takes) Regulations 2010.

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 20°C and expressed in mS/m.
Cumec	A volumetric measure of flow- 1 cubic metre per second (1 m ³ 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.
mS/m	Millisiemens per metre.
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.
Temp	Temperature, measured in °C (degrees Celsius).

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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: JW & MT Hamblyn Family Trusts
(Trustees: John William & Maria Theadora Hamblyn)
115 Faull Road
RD 43
Waitara 4383

Decision Date 17 October 2014
(Change):

Commencement Date 17 October 2014
(Change):

Conditions of Consent

Consent Granted: To take and use water from the Waitara River for pasture irrigation purposes

Expiry Date: 01 June 2021

Review Date(s): June 2015

Site Location: 107 Faull Road, Tikorangi

Legal Description: Lots 1-3 DP 8490 Blk V Waitara SD (Site of take & use)

Grid Reference (NZTM) 1708430E-5678430N

Catchment: Waitara

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

Consent

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 27 litres per second, and the volume taken in any 24 hour period ending at midnight (New Zealand Standard Time) shall not exceed 2098 cubic metres.
2. 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.

3. 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.
4. 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.
5. The water meter and 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.

Consent

6. 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;
 - (b) specifically record the water taken as 'zero' when no water is taken; and
 - (c) for each 12-month period ending on 30 June, be provided to the Chief Executive, Taranaki Regional Council within one month after end of that period.
7. The taking of water authorised by this consent shall cease when the flow in the Waitara River at Bertrand Road hydrological recorder station is less than 5633 litres per second.
8. The consent holder shall undertake and maintain fencing and riparian planting in accordance with the Riparian Management Plan for the property before October 2015.
9. At all times the consent holder shall adopt the best practicable option to prevent or minimise any actual or likely adverse effect on the environment associated with the abstraction of water, including, but not limited to, the efficient and conservative use of water.
10. The consent holder shall ensure that no modification is made to the intake that:
 - (a) increases the aperture size of any intake screen; or
 - (b) increases velocity of water toward any screen (approach velocity) or across any screen (sweep velocity); or
 - (c) in any other way that could increase the likelihood of juvenile fish entering the intake or being trapped against the screen.
11. 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 during the month of June 2015 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.

Signed at Stratford on 17 October 2014

For and on behalf of
Taranaki Regional Council

AD McLay
Director - Resource Management

Appendix II

Active irrigation consents in Taranaki
July 2016 to June 2017

Irrigation Water Takes

Surface water takes

Consent	Consent Holder	Usage	Irrigation system
0017-3	Manaia Golf Club	Recreational	K – line
0124-5	Kaitake Golf Club Inc	Recreational	K – line
0132-3	Hawera Golf Club Inc	Recreational	K – line
0184-3	Inglewood 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	NRGE Farms Limited/Oceanview Trust	Pasture Irrigation	K – line and flood irrigation
0464-3	Oakura Farms Limited	Horticultural	n/a
0647-3	IG Cassie	Horticultural	K – line
0880-3	IHC New Zealand Inc (NORTH TARANAKI)	Horticultural	K – line
1223-3	EO & CP Lander	Horticultural	K – line
1721-3	Manukorihi Golf Club Inc	Recreational	K – line
1877-3	Te Ngutu Golf Club Incorporated	Recreational	K – line
1879-3	Wairau Nurseries	Horticultural	n/a
2138-3	Riverside Farms Taranaki Ltd	Pasture Irrigation	K - line
4450-2	Waitara Golf Club Inc	Recreational	K - line
4494-2	CT & JM McDonald	Pasture Irrigation	K - line
4783-2	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
5128-2	Coastal Country Farms Limited	Pasture Irrigation	K – line and travelling irrigator
5568-1	Cornwall Park Farms Limited	Pasture Irrigation	Travelling irrigator
5570-2	Kaihihi Trust	Pasture Irrigation	K - line
5571-1	Jimian Limited	Pasture Irrigation	K - line
5623-2	WD & SC Morrison	Pasture Irrigation	Centre pivot and K - line
5636-1	Waiwira Trust	Pasture Irrigation	Centre pivot and K - line
5709-2	KCCG Sole Trust	Pasture Irrigation	K – line
5773-1	Goodin FJ & Sons Limited	Pasture Irrigation	K – line
5778-1	Mara Trust	Pasture Irrigation	K – line
5781-2	Waikaikai Farms Limited	Pasture Irrigation	K – line
5791-1	AL & LA Campbell	Pasture Irrigation	K – line
5797-1	Pihama Farms Limited	Pasture Irrigation	K – line
5807-2	Dickie Roger Family Trust	Pasture Irrigation	Centre pivot and K – line

Consent	Consent Holder	Usage	Irrigation system
5827-2	Walker & McLean Partnership	Pasture Irrigation	Centre pivot
5829-1	Julian RM & MC Family Trust	Pasture Irrigation	K – line and travelling irrigator
5840-2	Gibbs G Trust	Pasture Irrigation	Centre pivot
5863-2	Geary AR Trust (A R Geary)	Pasture Irrigation	Centre pivot and K – line
5876-1	GA & RJ Dorn	Pasture Irrigation	K - line
5878-2	Woolleston Family Trust Partnership	Pasture Irrigation	Travelling irrigator
5887-1	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
5973-2	Crosbig Trusts Partnership	Pasture Irrigation	K – line
6159-1	Pinehill Land Company Limited	Pasture Irrigation	K – line & travelling irrigator
6292-1	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	Hamblyn Family Trusts	Pasture Irrigation	K – line
7270-1	Ian Mantey Family Trust & Sally Mantey Family Trust	Pasture Irrigation	Travelling irrigator
7346-1	Spenceview Farms	Pasture Irrigation	Centre pivot
7372-1	Pukeone Partnership	Pasture Irrigation	Centre pivot
7527-1	Pukeone Partnership	Pasture Irrigation	Centre pivot
7528-1	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
7981-1	Taranaki Community Rugby Trust	Pasture Irrigation	n/a
9577-1	MJ Washer Trusts Partnership	Pasture Irrigation	K – line and travelling irrigator
9597-1	Nilock & Camole	Pasture Irrigation	Centre pivot
9936-1	GSJ Trust	Pasture Irrigation	n/a
10135-1	Luttrell Trust Partnership	Pasture Irrigation	n/a

Groundwater takes

Consent	Consent Holder	Usage	Irrigation system
0714-2	GD & HM McCallum	Pasture Irrigation	K – line and travelling irrigator
0721-3	MD Aiken Family Trust	Horticultural	n/a
3171-3	Taranaki Greenhouses Limited	Horticultural	K – line
3312-3	The Tom Lance Trust	Horticultural	K – line
3859-2	Living Light 2000 Limited	Horticultural	n/a
5879-1	BR & RG Harvey Family Trust	Pasture Irrigation	n/a
5950-2	WD & SC Morrison	Pasture Irrigation	Centre pivot and K - line
6026-1	JR & DM Baker	Pasture Irrigation	K – line
6193-1	RA & SM Geary Trusts Partnership	Pasture Irrigation	n/a
7866-1	Stratford Golf Club Inc	Recreational	n/a
9561-1	Kereone Farms Limited	Pasture Irrigation	Centre pivot
9608-1	D Wilson	Pasture Irrigation	Centre pivot
10369-1	Inglewood Golf Club Inc	Recreational	K – line

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

Appendix III

Water take consent usage for 2016-2017

Water take consent usage for 2016-2017

Consent	Consent holder	Consented allowable annual usage (m ³ /annum)	Actual water usage from 1 July 2015 to 30 June 2016 (m ³ /annum)
0017-3	Manaia Golf Club	36,500	6,143
0124-5	Kaitake Golf Club Inc	47,450	6,398
0132-3	Hawera Golf Club Inc	91,250	n/a*
0184-3	Inglewood Golf Club Inc	21,900	0
0189-4	AI & KJ Williams	365,000	0
0270-3	Westown Golf Club Inc	131,400	860
0278-4	NRGE Farms Limited/Oceanview Trust	4,320,432	0
0464-3	Oakura Farms Limited	36,500	0
0647-3	IG Cassie	30,660	0
0714-2	GD & HM McCallum	182,500	0
0721-3	MD Aiken Family Trust	30,660	0
0880-3	IHC New Zealand Inc (NORTH TARANAKI)	32,120	2,607
1223-3	EO & CP Lander	108,405	5,418
1721-3	Manukorihi Golf Club Inc	69,350	0
1877-3	Te Ngutu Golf Club Incorporated	73,000	7,612
1879-3	Wairau Nurseries	33,215	0
2138-3	Riverside Farms Taranaki Ltd	756,864	58,796
3171-3	Taranaki Greenhouses Limited	22,630	4,793
3312-3	The Tom Lance Trust	29,200	20,745
3859-2	Living Light 2000 Limited	27,594	722
4450-2	Waitara Golf Club Inc	18,250	4,121
4494-2	CT & JM McDonald	788,400	108,002
4783-2	Larsen Trusts Partnership	1,169,825	0
4993-2	J & EG Sanderson	1,022,000	115,730
4994-2	J & EG Sanderson	1,186,250	106
5128-2	Coastal Country Farms Limited	851,545	0
5568-1	Cornwall Park Farms Limited	287,437.5	20,950
5570-2	Kaihihi Trust	547,500	0
5571-1	Jimian Limited	1,261,440	121
5623-2	WD & SC Morrison	3,547,800	317,306
5636-1	Waiwira Trust	2,584,930	350,608
5709-2	KCCG Sole Trust	912,500	4,762

Consent	Consent holder	Consented allowable annual usage (m ³ /annum)	Actual water usage from 1 July 2015 to 30 June 2016 (m ³ /annum)
5773-1	Goodin FJ & Sons Limited	630,720	0
5778-1	Mara Trust	630,720	386
5781-2	Waikaikai Farms Limited	2,269,205	102,812
5791-1	AL & LA Campbell	958,125	70,531
5797-1	Pihama Farms Limited	1,314,000	138,186
5807-2	Dickie Roger Family Trust	6,679,500	584,519
5827-2	Walker & McLean Partnership	821,250	50,476
5829-1	Julian RM & MC Family Trust	1,533,000	40,059
5840-2	Gibbs G Trust	821,250	47,525
5863-2	Geary AR Trust (A R Geary)	1,144,640	228,990
5876-1	GA & RJ Dorn	1,350,500	49,900
5878-2	Woollaston Family Trust Partnership	474,500	0
5879-1	BR & RG Harvey Family Trust	630,720	4,839
5887-1	Croftwest Trust	547,500	27,896
5896-2	Kohi Investments Limited	1,460,000	1,120
5898-2	David Pease Family Trust	946,080	182,277
5950-2	WD & SC Morrison	313,900	45,959
5973-2	Crosbig Trusts Partnership	584,000	0
6026-1	JR & DM Baker	189,070	16,553
6159-1	Pinehill Land Company Limited	237,250	0
6193-1	RA & SM Geary Trusts Partnership	262,800	0
6292-1	New Plymouth Golf Club Inc	292,000	27,018
6429-1	Leatherleaf Limited	912,500	82,760
6430-1	Fonic Farms Limited	1,741,050	113,065
6628-1	Hamblyn Family Trusts	765,770	349
7270-1	Ian Mantey Family Trust & Sally Mantey Family Trust	378,140	0
7346-1	Spenceview Farms	3,815,856	449,669
7372-1	Pukeone Partnership	1,261,440	170,442
7527-1	Pukeone Partnership	5,545,080	190,807
7528-1	Kereone Farms Limited	3,416,400	219,751
7626-1	NW & DM King	725,328	0
7768-1	Carter AJ Limited	126,144	0
7781-1	D Krumm	105,120	n/a*
7866-1	Stratford Golf Club Inc	25,550	0

Consent	Consent holder	Consented allowable annual usage (m ³ /annum)	Actual water usage from 1 July 2015 to 30 June 2016 (m ³ /annum)
7895-1	Ohawe Farm Limited	1,259,250	42,919
7981-1	Taranaki Community Rugby Trust	838,857.6	0
9561-1	Kereone Farms Limited	682,550	135,431
9577-1	MJ Washer Trusts Partnership	127,750	2,939
9597-1	Nilock & Camole	647,875	59,223
9608-1	D Wilson	946,080	122,224
9936-1	GSJ Trust	385,002	0
10135-1	Luttrell Trust Partnership	2,043,532.8	0
10369-1	Inglewood Golf Club Inc	36,500	1,143

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

Appendix IV

Report on consented water permits for farm and general water supply purposes

(Frodo Doc # 1965514)

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 2017 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 2010.

Current water take consents

At 30 June 2017, there were a total of 30 current water take consents for general farm and water supply purposes. Of these eight were from surface water and 22 were from groundwater sources (Table 1).

Table 1 Total consents granted for dairy farm and water supply purposes to 30 June 2017

Consent	Consent holder	Source
0095-2	GE Griffin	Surface Water
0865-3	Kathdan Trust Limited	Surface Water
1190-3	Pungarehu Farmers Group Water Scheme	Surface Water
5413-2	MJ Fahy	Groundwater
5990-1	ID & JA Armstrong	Surface Water
6133-1	DJ & ME McKenzie	Groundwater
6372-1	Naplin Trust	Groundwater
6380-1	Caiseal Trust Partnership	Groundwater
6903-1	Awatea Hawkes Bay Trust	Groundwater
7132-1	Aorere Farms Partnership	Groundwater
7272-1	Belmont Dairies Limited	Groundwater
7304-1	Gwerder Brothers	Groundwater
7497-1	Te Rua O te Moko 2B Ahuwhenua Trust	Surface Water
7540-1	AJ & DI Dravitzki Trusts Partnership	Groundwater
7569-1	Stoney River Dairy Limited	Groundwater
7608-1	MD Aiken Family Trust	Groundwater
7711-1	Pariroa Marae (The Trustees)	Groundwater
7783-1	Norwood Farm Partnership	Groundwater
7969-1	AB Middleton	Surface Water
9747-1	DP & JH Roper Family Trust Partnership	Groundwater
9886-1	Sona Chosta Limited	Surface Water
9900-1	Kaipu Holdings Limited	Groundwater
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	PKW Farms LP	Groundwater
10120-1	SC & MJ O'Neill Family Trust	Groundwater
10199-1	ClearAz Taranaki Spring Water	Groundwater
10421-1	Medley Partnership	Surface Water

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 datalogger was present or the records were to be sent to the Council by 31 July. Table 2 lists the consents annual allowable usage and actual water usage for 2016-2017 season.

Table 2 Consents allowable annual water take and 2016-2017 actual annual usage

Consent	Consent holder	Consented allowable annual usage (m ³ /annum)	Actual water usage from 1 July 2016 to 30 June 2017 (m ³ /annum)
0095-2	Ashbrook Farms Limited	31,536	n/a
0865-3	Kathdan Trust Limited	394,200	109,619
1190-3	Pungarehu Farmers Group Water Scheme	109,500	57,905
5413-2	MJ Fahy	71,540	1,240
5990-1	ID & JA Armstrong	29,200	6,877
6133-1	DJ & ME McKenzie	1,825	n/a
6372-1	Naplin Trust	18,250	n/a
6380-1	Caiseal Trust Partnership	36,500	8,278
6903-1	Awatea Hawkes Bay Trust	91,250	8,323
7132-1	Aorere Farms Partnership	65,700	17,578
7272-1	Belmont Dairies Limited	94,535	39,439
7304-1	Gwerder Brothers	78,214	35,865
7497-1	Te Rua O te Moko 2B Ahuwhenua Trust	28,470	6,881
7540-1	AJ & DI Dravitzki Trusts Partnership	18,250	n/a
7569-1	Stoney River Dairy Limited	78,840	not set up
7608-1	MD Aiken Family Trust	9,125	n/a
7711-1	Pariroa Marae (The Trustees)	18,250	1,950
7783-1	Norwood Farm Partnership	51,100	36,673
7969-1	AB Middleton	51,100	n/a
9747-1	DP & JH Roper Family Trust Partnership	36,500	19,981
9886-1	Sona Chosta Limited	24,455	3,951
9900-1	Kaipu Holdings Limited	220,752	68,134
9910-1	PKW Farms LP	40,150	19,673
9947-1	Ngatoro Poultry Limited	127,020	23,040
10029-1	Hernly Farms Limited	126,144	20,601
10112-1	Construction Mechanics (1993) Limited	47,450	4,883
10113-1	PKW Farms LP	45,625	18,210
10120-1	SC & MJ O'Neill Family Trust	43,800	n/a
10199-1	ClearAz Taranaki Spring Water	2,008	1,168
10421-1	Medley Partnership	78,840	not set up

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

Twenty-six of the consents had an end of year site inspection, with three of these being found to be non-compliant with their consent conditions, which resulted in incidents being lodged. A summary of each incident identified during the 2016-2017 year, and the Council's response, is presented in

Table 3.

Table 3 Consent non-compliances found during 2015-2016

Consent	Consent holder	Breach	Outcome
1190-3	Pungarehu Farmers Group Water Scheme	Volume breaches	An abatement notice was issued to comply with consent conditions. Consent holder has applied with a change of consent conditions.
5990-1	ID & JA Armstrong	Rate and volume breaches	14 day letter issued. Letter of explanation received and Council accepted.
10112-1	Construction Mechanics	No records	14 day letter issued. Received no response from consent holder. Abatement notice issued to comply with consent conditions.

Summary

Of the 26 sites inspected, there was an 11% non-compliance rate, with two of these being for the breaching their abstraction rate or volume and the other for not recording/providing records. Council will continue to work with all consent holders to ensure they do not exceed their limits in future seasons.

The biggest water user for the 2016-2017 season was Kathdan Trust Limited with 109,619 m³. The average annual water use across all consents was 24,299 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.