

Irrigation Water
Compliance Monitoring Programme
Annual Report
2013-2014

Technical Report 2014-67

ISSN: 1178-1467 (Online)
Document: 1412435 (Word)
Document: 1526381 (Pdf)

Taranaki Regional Council
Private Bag 713
STRATFORD

July 2015

Executive summary

This is the eleventh 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. The report covers the period 1 July 2013 – 30 June 2014. It encompasses the data collected for compliance monitoring for resource consents for pasture irrigation, horticultural and golf courses irrigation as per the recommendations from the previous reports. Every year the Council prepares a monitoring programme for all irrigation water permits.

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 and will not be wasted – 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.

At 30 June 2014, a total of 78 resource consents to take and use freshwater for irrigation purposes were registered in the Council's databases. Of that number, 57 were for pasture irrigation, 11 for horticultural activities and 10 for recreational purposes (golf clubs). Sixty-five consents authorised abstractions from surface water (83%) while 13 (17%) utilised groundwater sources.

Other water takes for general farm and water supply purposes have also been granted by the Council, but as the water abstraction is not used for irrigation purposes they are not commented on in the main body of this report, but are commented on in Appendix II.

The 2013-2014 monitoring programme for irrigation water permits comprised three primary components; liaison with consent holders, site inspections and data gathering and the review and assessment of data for compliance. It was a busy season for the Council's hydrological unit, as the weather conditions meant the demand for irrigation was high. Most irrigation had commenced by the middle of December.

Over the five month summer irrigation period, Mount Taranaki recorded between 69% and 88% of normal rainfall which meant that rivers were running well below mean flows for the entire period. The low stream flows necessitated close and frequent monitoring by the Council 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 sites was assessed by the Council on a total of 54 separate occasions across 25 waterways.

The Council also carried out compliance monitoring inspections at 73 sites during the 2013-2014 irrigation season. The inspections included visual checks of the intake structures, screens, staff gauges, fencing around the pump sheds, downloading of data and stream gaugings.

All irrigators had ceased taking water for this purpose by the middle of April 2014. As happens each year, 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 entered a total of 23 incidents over the course of the 2013-2014 period in relation to irrigation consents. These incidents were reported to Council and staff implemented appropriate responses as they were identified. Enforcement actions included the issuing of 20 abatement notices for consent non-compliances. The majority of incidents and follow-up actions were resolved quickly and co-operatively by the consent holders concerned.

During the 2013-2014 year, 44% of irrigation consent holders in Taranaki achieved a high level of environmental performance and compliance with their consents, while 28% require improvement in their compliance performance. For reference, 60% of all consent holders in Taranaki monitored through tailored compliance monitoring programmes achieved a high level of environmental performance and compliance with their consents during the same period, while another 29% demonstrated a good level of environmental performance and compliance with their consents.

In addition to the conditions of resource consents for water abstractions, The Resource Management (Measurement and Reporting of Water Takes) Regulations 2010 place further legislative requirements on holders of consents for water abstractions greater than five litres per second. These include specific requirements for the installation of water measuring devices, verification of the accuracy of water measuring devices and data reporting. The Regulations allow for a staged implementation of the requirements, dependent on abstraction rate. All abstractions are to be compliant with the Regulations by 10 November 2016. The Council will be actively monitoring the implementation of the Regulations during forthcoming monitoring periods.

It is important to note that inspections carried out by the Council identified that many flowmeter installations across the region are sub-standard, compromising the accuracy of the abstraction data being recorded. Irrigators and the Council need to be confident that their equipment will work accurately and effectively, therefore it is preferred that a reputable contractor be hired for the installation water measuring and recording equipment.

This report includes recommendations for the 2014-2015 year.

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1. Introduction

1.1 Compliance monitoring programme reports and the Resource Management Act 1991

1.1.1 Introduction

This is the eleventh 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. The report covers the period 1 July 2013 – 30 June 2014. It encompasses the data collected for compliance monitoring for resource consents for pasture irrigation, horticultural and golf courses irrigation as per the recommendations from the previous reports.

Irrigation in this report does not refer to any effluent (wastewater) application; it applies to the use of freshwater to supply dry soils with enough moisture for assisting in growing pasture. In pasture production, irrigation is mainly used to replace precipitation during periods of drought and to fulfil crop water requirements.

The irrigation requirements during the 2013-2014 season were on par with previous years.

1.1.2 Structure of this report

Section 1 of this report is a background section. It sets out general information about compliance monitoring under the *Resource Management Act 1991* (RMA), the Regional Freshwater Plan for Taranaki and the Council's obligations and general approach to monitoring sites through annual programmes, the resource consents held by pasture irrigators to take and use freshwater, the nature of the monitoring programme in place for the period under review, and a description of the activities and operations conducted in the consent holder'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 2014-2015 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 a discharger, 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 (eg, recreational, cultural, or aesthetic):
- (e) risks to the neighbourhood or environment.

In its management of freshwater, the Taranaki Regional Council must:

- Sustain the potential of freshwater resources to meet the reasonably foreseeable needs of future generations;
- Safeguard the life-supporting capacity of freshwater and freshwater ecosystems;
- Avoid, remedy or mitigate any adverse effects of activities on the environment.

1.1.4 Regional Freshwater Plan

Section 14(1)(a) of the Act stipulates that no person may take, use, dam, or divert any water unless the activity is expressly allowed for by a resource consent, or a rule in a regional plan, or meets criteria set out in Section 14(3) of the Act.

The Regional Freshwater Plan for Taranaki (RFP) became operative on 8 October 2001. It is a statutory document which outlines the Taranaki Regional Council's policy with respect to activities in relation to freshwater under the Act.

Rule 15 of the RFP provides for the abstraction of up to 50 cubic metres per day (m³/day) of surface water at a maximum rate of 1.5 litres per second (L/s) as a permitted activity for each certificate of title. The same provision applies for groundwater under Rule 48 of the RFP. The permitted allocations (*as of right entitlements*) allow for reasonable domestic and stock water needs without the need for a resource consent, provided that other conditions of the permitted rules are satisfied.

However, most irrigation abstractions demand significantly more water than the daily permitted allocation and consequently require resource consents. Appendix I gives an example of a typical set of conditions for a consent to take and use surface water for irrigation purposes.

Following the trend from previous years, there has been increased interest in pasture irrigation on dairy farms in Taranaki. Sources of water are rivers and streams, as these are the easiest and most economical options, but groundwater abstractions have become a possible alternative to supplement surface water use for irrigation.

1.1.5 Evaluation of environmental and consent performance

Besides discussing the various details of the performance and extent of compliance by the consent holder/s during the period under review, this report also assigns a rating with regard to their environmental and administrative performance.

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 (i.e. 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 issues 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 compliance

- **High** The administrative requirements of the resource consent were met, or any failure to do this had trivial consequences and was addressed promptly and co-operatively.
- **Good** Perhaps some administrative requirements of the resource consent were not met at a particular time, however these are 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 consent 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 consent. Significant intervention by the Council was required. Typically there were grounds for an infringement notice.

For reference, in the 2013-2014 year, 60% of consent holders achieved a high level of environmental performance and compliance with their consents, while another 29% demonstrated a good level of environmental performance and compliance with their consents.

1.1.6 Regional freshwater allocation

At 30 June 2014, there were a total of 78 resource consents to take and use freshwater for irrigation purposes. Fifty-seven consents were for pasture irrigation, 11 for horticultural activities and 10 for recreational purposes (Figure 1).

The breakdown of freshwater allocation in the region indicates that other uses¹ represent 70% of all consented water takes; pasture irrigation represents 21% of the total consented water abstractions. Other types of irrigation (golf courses and for horticultural purposes) add up to only 9% (Figure 2).

Surface water is the predominant source for pasture irrigation, accounting for 49 of the 57 consented water abstractions (83%). The remaining 13 consents (17%) authorise abstractions from groundwater (Figure 3).

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, 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.

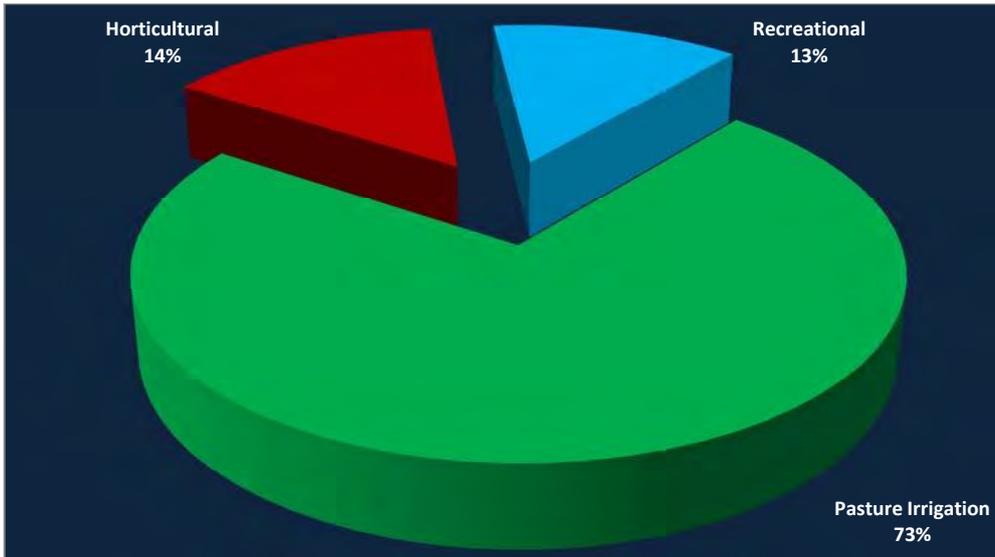


Figure 1 Percentage of water irrigation allocation per activity in the Taranaki Region

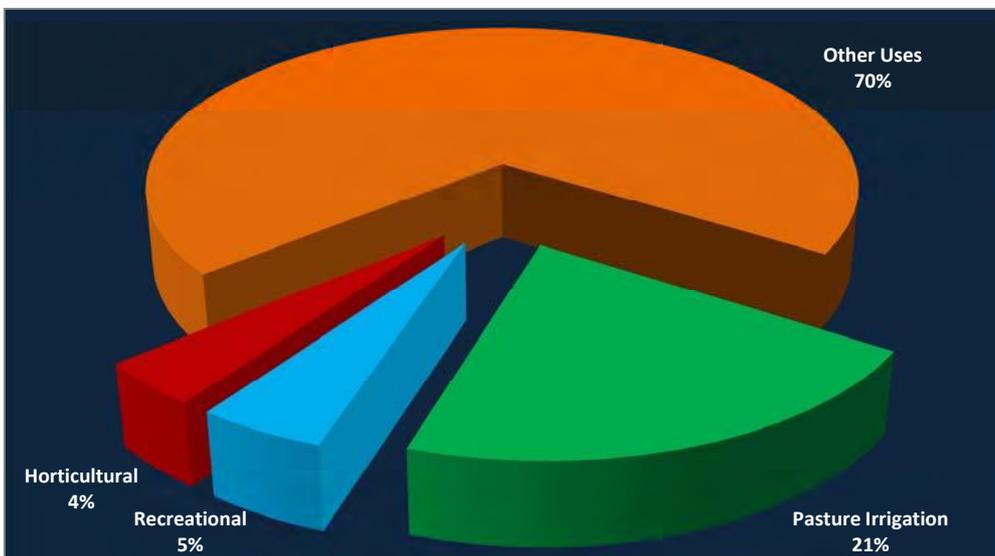


Figure 2 Total consented water abstractions – distribution by activity 2013-2014

Typically, groundwater abstractions are used as supplementary irrigation water supply. The relatively low yields from Taranaki's aquifers are not sufficient to supply an entire irrigation system. In addition, the capital and running costs of groundwater supply bores often make them uneconomic for use as a primary source of water for irrigation supply.

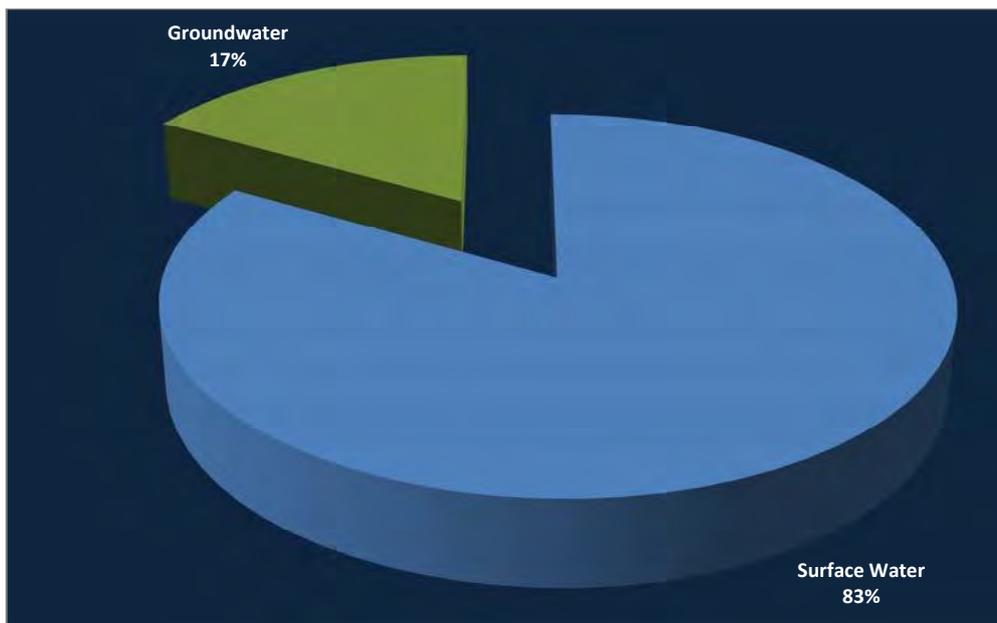


Figure 3 Source of water for irrigation in Taranaki during the 2013-2014 period

Table 1 lists all the irrigation water consents issued by the Council to 30 June 2014 classified by source and usage.

Table 1 Total consents granted for irrigation water in Taranaki to 30 June 2014

Consent	Consent Holder	Source	Usage
0017-3	Manaia Golf Club	Surface Water	Recreational
0124-5	Kaitake Golf Club Inc	Surface Water	Recreational
0132-3	Hawera Golf Club Inc	Surface Water	Recreational
0164-2	JR & DM Baker	Surface Water	Pasture Irrigation
0184-3	Inglewood Golf Club Inc	Surface Water	Recreational
0189-4	AI & KJ Williams	Surface Water	Pasture Irrigation
0270-2	Westown Golf Club Inc	Surface Water	Recreational
0278-4	NRGE Farms Limited/Oceanview Trust	Surface Water	Pasture Irrigation
0464-3	Oakura Farms Limited	Surface Water	Horticultural
0647-3	IG Cassie	Surface Water	Horticultural
0714-2	GD & HM McCallum	Groundwater	Pasture Irrigation
0721-3	MD Aiken Family Trust	Groundwater	Horticultural
0880-3	IHC New Zealand Inc (NORTH TARANAKI)	Surface Water	Horticultural
1193-3	Vickers B & NM & Church G & CG	Surface Water	Horticultural
1223-3	EO & CP Lander	Surface Water	Horticultural
1253-3	KA & RD Southall	Surface Water	Horticultural
1721-3	Manukorihi Golf Club Inc	Surface Water	Recreational
1877-3	Te Ngutu Golf Club Incorporated	Surface Water	Recreational
1879-3	Wairau Nurseries	Surface Water	Horticultural
2138-3	Riverside Farms Taranaki Ltd	Surface Water	Pasture Irrigation
3171-3	Taranaki Greenhouses Limited	Groundwater	Horticultural
3312-3	GH Lance	Groundwater	Horticultural

Consent	Consent Holder	Source	Usage
3859-2	Living Light 2000 Limited	Groundwater	Horticultural
4450-2	Waitara Golf Club Inc	Surface Water	Recreational
4494-2	CT & JM McDonald	Surface Water	Pasture Irrigation
4783-2	Larsen Trusts Partnership	Surface Water	Pasture Irrigation
4993-2	J & EG Sanderson	Surface Water	Pasture Irrigation
4994-2	J & EG Sanderson	Surface Water	Pasture Irrigation
5128-2	Coastal Country Farms Limited	Surface Water	Pasture Irrigation
5568-1	Cornwall Park Farms Limited	Surface Water	Pasture Irrigation
5570-2	Kaihihi Trust	Surface Water	Pasture Irrigation
5571-1	Jimian Limited	Surface Water	Pasture Irrigation
5623-1	WD & SC Morrison	Surface Water	Pasture Irrigation
5636-1	Waiwira Trust	Surface Water	Pasture Irrigation
5696-1	Kokako Road Limited	Surface Water	Pasture Irrigation
5709-2	KCCG Sole Trust	Surface Water	Pasture Irrigation
5773-1	Goodin FJ & Sons Limited	Surface Water	Pasture Irrigation
5778-1	Mara Trust	Surface Water	Pasture Irrigation
5781-2	Waikakai Farms Limited	Surface Water	Pasture Irrigation
5791-1	AL & LA Campbell	Surface Water	Pasture Irrigation
5797-1	Pihama Farms Limited	Surface Water	Pasture Irrigation
5807-1	Dickie Roger Family Trust	Surface Water	Pasture Irrigation
5827-2	Walker & McLean Partnership	Surface Water	Pasture Irrigation
5829-1	Julian RM & MC Family Trust	Surface Water	Pasture Irrigation
5840-2	Gibbs G Trust	Surface Water	Pasture Irrigation
5863-2	Geary AR Trust (A R Geary)	Surface Water	Pasture Irrigation
5876-1	GA & RJ Dorn	Surface Water	Pasture Irrigation
5878-1	Woolleston Family Trust Partnership	Surface Water	Pasture Irrigation
5879-1	BR & RG Harvey Family Trust	Groundwater	Pasture Irrigation
5887-1	A & EN Barkla	Surface Water	Pasture Irrigation
5896-1	Kohi Investments Limited	Surface Water	Pasture Irrigation
5898-2	David Pease Family Trust	Surface Water	Pasture Irrigation
5950-1	WD & SC Morrison	Groundwater	Pasture Irrigation
5973-1	DR & AJ Gibson	Surface Water	Pasture Irrigation
6026-1	JR & DM Baker	Groundwater	Pasture Irrigation
6159-1	Pinehill Land Company Limited	Surface Water	Pasture Irrigation
6193-1	Cradles Farm Trust No 2	Groundwater	Pasture Irrigation
6292-1	New Plymouth Golf Club Inc	Surface Water	Recreational
6429-1	Leatherleaf Limited	Surface Water	Pasture Irrigation
6430-1	Ellingworth Margaret Trust	Surface Water	Pasture Irrigation
6486-1	GM & PJ Rutten Family Trust Partnership	Groundwater	Pasture Irrigation
6628-1	Hamblyn Family Trusts	Surface Water	Pasture Irrigation
7270-1	Ian Mantey Family Trust & Sally Mantey Family Trust	Surface Water	Pasture Irrigation
7346-1	Spenceview Farms	Surface Water	Pasture Irrigation
7372-1	Pukeone Partnership	Surface Water	Pasture Irrigation

Consent	Consent Holder	Source	Usage
7527-1	Pukeone Partnership	Surface Water	Pasture Irrigation
7528-1	Kereone Farms Limited	Surface Water	Pasture Irrigation
7626-1	NW & DM King	Surface Water	Pasture Irrigation
7733-2	Hawken Family Trust	Surface Water	Pasture Irrigation
7768-1	Carter AJ Limited	Surface Water	Pasture Irrigation
7781-1	D Krumm	Surface Water	Pasture Irrigation
7866-1	Stratford Golf Club Inc	Groundwater	Recreational
7895-1	Ohawe Farm	Surface Water	Pasture Irrigation
9561-1	Kereone Farms Limited	Groundwater	Pasture Irrigation
9577-1	SB & J May Family Trust	Surface Water	Pasture Irrigation
9597-1	T & V Gibson Limited	Surface Water	Pasture Irrigation
9608-1	D Wilson	Groundwater	Pasture Irrigation
9936-1	G SJ Trust	Surface Water	Pasture Irrigation

1.1.7 Irrigation zones

A regional study commissioned for the Taranaki Regional Council in 2002 (Rout, 2003) identified eight irrigation zones based mainly 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*). The water demand modelled for Taranaki's eight irrigation zones are given in Table 2 below.

Table 2 Irrigation zones – modelled water demand (after Rout, 2003)

Zone N ^o	Take rate (L/s / Ha)	Daily volume (m ³ /Ha)	Annual volume (m ³ /Ha)	Application depth (mm)
1	0.40	31	2,200	44
2	0.51	40	4,840	44
3	0.58	46	6,400	32
4	0.67	53	5,120	32
5	0.63	50	4,200	30
6	0.63	50	3,600	30
7	0.53	42	4,000	50
8	0.46	37	3,960	44

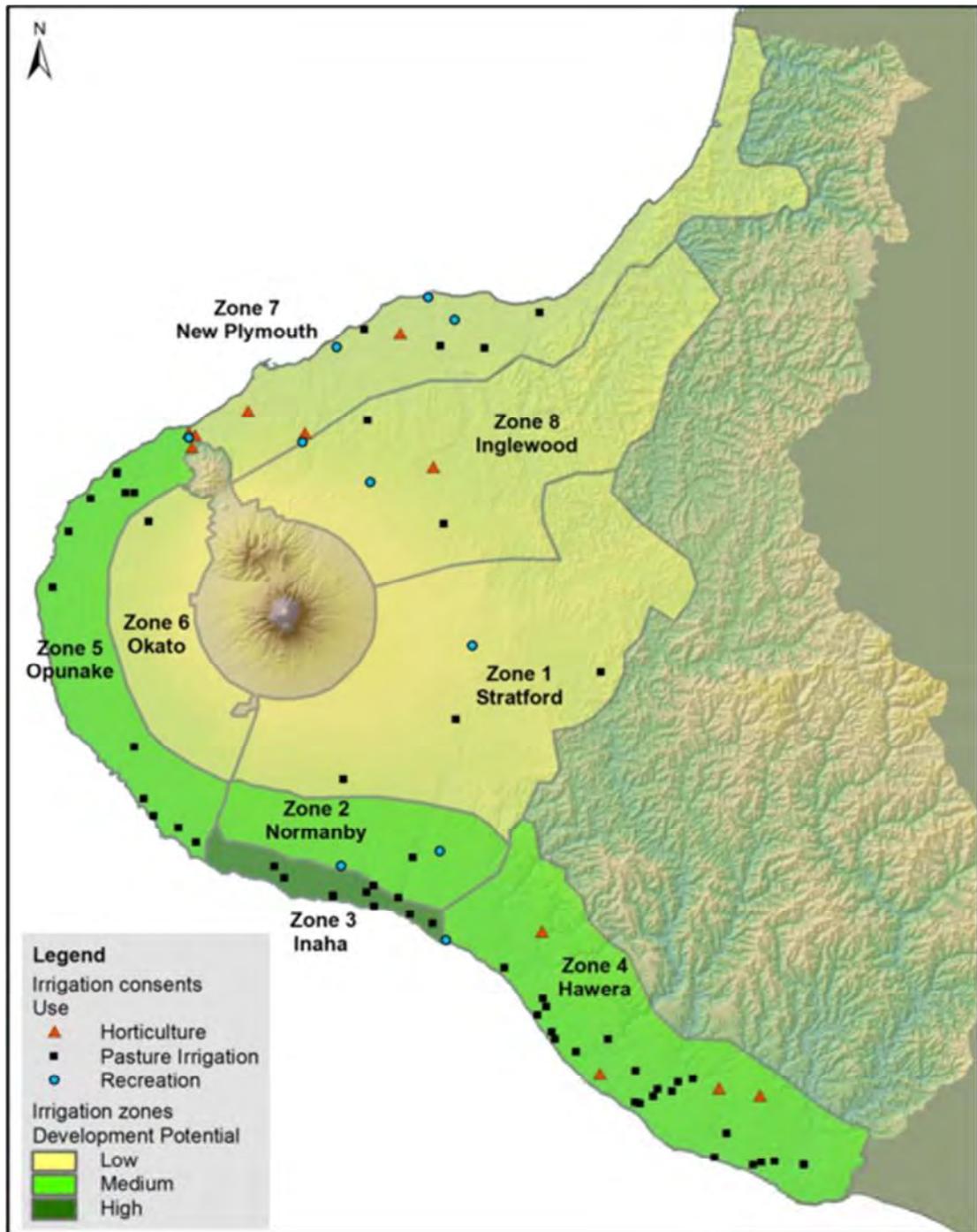


Figure 4 Pasture irrigation zones and locations of consented irrigation takes in Taranaki

As illustrated in Figure 4, most of the pasture irrigation in Taranaki takes place within a 10 km-wide belt of coastal land stretching from Oakura to Waitotara, with the rest of the sites located between Inglewood and Eltham.

The geographical patterns for the development of irrigation in the coastal region are influenced by a combination of meteorological, topographical and soil conditions. Coastal areas generally have lower rainfall rates, a higher density of small streams, more exposure to drying winds and have lighter and more freely-draining soils than in other parts of the province.

Irrigation in Taranaki dairy farms usually occurs over a 3 to 6 month period depending on location and climatic conditions. Irrigation typically commences in mid October-November and ends in late March-early April, with water uses peaking in January and February.

1.1.8 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 and some of their advantages and disadvantages are summarised below:

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

Advantages:

- low capital cost;
- are simple in construction and are relatively easy to operate;
- easily adapted to existing farm layouts and topography;
- allows low application rates;
- low operating pressures;
- K-lines particularly suited to windy conditions due to sprinkler cowling; and
- consists of flexible hoses line designed to ease irrigation applications.

Disadvantages:

- high maintenance; and
- high labour input to shift (*drag and drop*).



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

Centre pivot type - spray nozzles mounted on a movable lateral (Photograph 2)

Advantages:

- large circulating area;
- allows versatility in application rates and return periods;
- low operating pressures;
- low maintenance;
- low labour input;

- frequently desirable on steep, rocky, or uneven soils;
- most are provided with automatic controls and metering equipment; and
- widely used both in New Zealand and worldwide.

Disadvantages:

- high capital cost; and
- not ideal where energy supply may be unreliable or expensive.



Photo 2 Mosaic of pictures depicting centre pivot

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

Advantages:

- low capital cost;
- may cover a large irrigation area;
- simple operation; and
- allows some control with application rates.

Disadvantages:

- poor performance in windy conditions;
- uneven application, particularly at end of runs;
- not suited to irregular farm layout (*boom irrigators only*); and
- high operating pressures (*hard hose gun irrigators only*).



Photo 3 Mosaic of pictures depicting travelling irrigator systems

The distribution of these types of irrigation systems in the province are charted below in Figure 5.

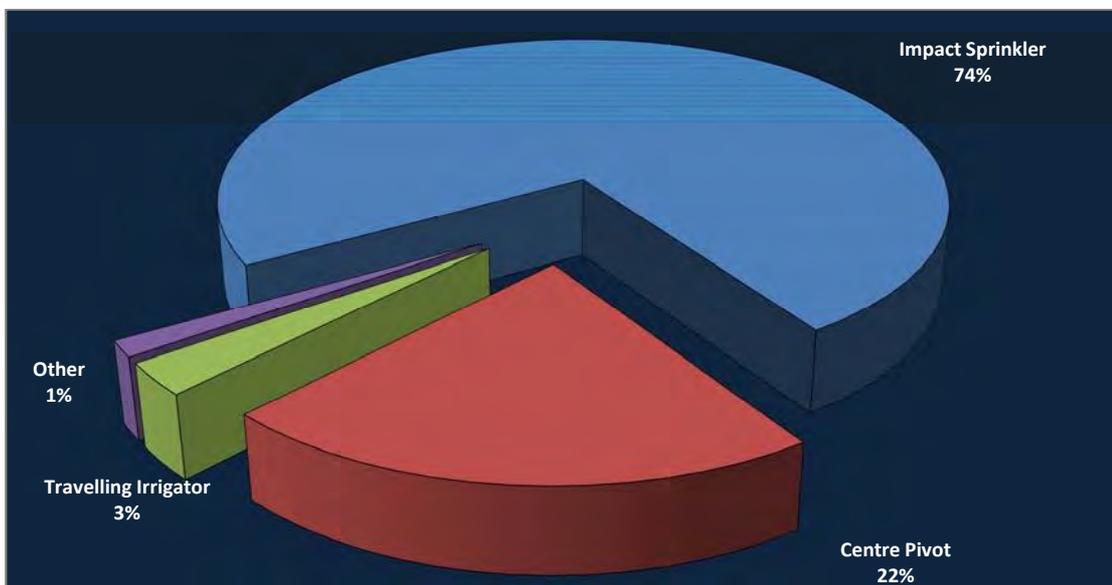


Figure 5 Percentage of irrigation system types in Taranaki

1.1.9 Water demand and availability

The establishment of new irrigation schemes in several catchments within Zones 2, 3, 4, and 5 (TRC, 2003) may be limited by the increasing demands and restricted availability of surface freshwater in these irrigation zones.

However, in spite of being a more costly option, the development of deep groundwater resources (well fields) will always be an alternative, provided the appropriate environmental considerations and scientific evaluations are conducted for new projects.

1.1.10 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 abstractions

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 exercise of water permits.

The majority of surface water permits for irrigation require the abstraction to cease when the flow in the abstracted waterway reaches, or falls below, a specified level (minimum flow). Policy 6.1.5 of the RFWP states that at least two-thirds of habitat within a rivers or streams at 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 thoroughly assessed by the Council during the processing of a resource consent application for a groundwater take.

Groundwater levels in coastal bores should be maintained above mean sea level to avoid the risk of sea water intrusion into freshwater aquifers. Water with elevated salinity is generally unsuitable for irrigation. Elevated levels of sodium, chloride, sulphate, and hardness resulting from sea water contamination can affect the taste and corrosiveness of water and can cause scale (Cameron & White, 2004). Irrigation with saline water reduces the ability of the plant's roots to take up water. In between irrigation cycles, as the soil moisture decreases, the salts in the soil concentrate to several times the initial value in irrigation water.

Fortunately in Taranaki, the risk of saltwater intrusion is minor due to the limited number of high yielding coastal bores. In any case, the Council does monitors water quality at four coastal sites as part of the irrigation consent compliance monitoring programmes 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 sandy and free-draining.

Irrigation schemes in Zones 2, 3 and 4 occur in areas where groundwater is known to be at risk of nitrate contamination (TRC 1998, 2005). In these zones, careful management of irrigation water and fertiliser application regimes is required to minimise the risk of groundwater and surface water contamination with nitrates.

The implementation of riparian management plans, fencing and planting of riparian margins can further reduce the potential for any nutrient rich runoff from irrigated pasture entering surface water systems.

1.1.11 Stream flow measurements

Compliance with consent conditions set to safeguard the intrinsic values of Taranaki's 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.

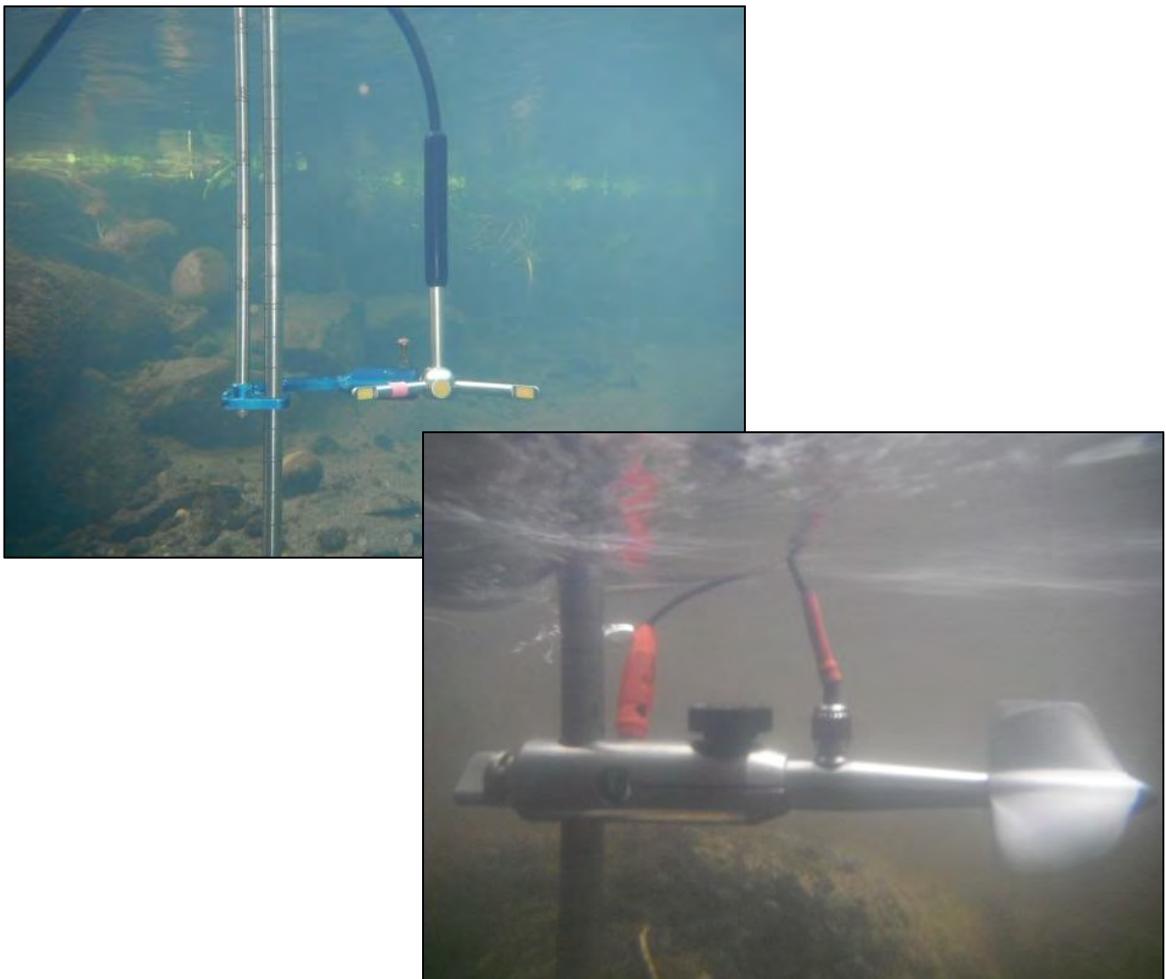


Photo 4 Mosaic of gauging flow meters calculating river flows

1.2 Irrigation water permits to June 2014

There were a total of 78 consents for the abstraction of freshwater for use in irrigation active across Taranaki as of 30 June 2014. This is a net increase of two from the previous monitoring period 2012-2013.

During the period under review, three new consents were granted, two existing consents were renewed, six had variations made to consent conditions and one consent expired (Table 3).

Table 3 New, renewed, varied and lapsed consents during 2013-2014

	Consent	Consent Holder	Catchment	Stream/River
New	9597-1	T & V Gibson Limited	Kaupokonui	Kaupokonui
	9608-1	D Wilson	Waitotara	Waitotara
	9936-1	GSJ Trust	Waitaha 1	Waitaha 1
Renewed	0189-4	AI & KJ Williams	Werekino	Werekino
	0278-4	NRGE Farms Limited/Oceanview Trust	Waiweranui	Waiweranui
	5623-2	WD & SC Morrison	Whenuakura	Whenuakura
	5709-2	KCCG Sole Trust	Kapoiaia	Kapoiaia
	5781-2	Waikaikai Farms Limited	Waikaikai	Waikaikai
	5863-2	Geary AR Trust	Waikaikai	Waikaikai
Varied	1877-3	Te Ngutu Golf Club Incorporated	Waihi 5	Waihi 5
	4494-2	CT & JM McDonald	Mangaroa	Mangaroa
	5128-2	Coastal Country Farms Limited	Kaihihi	Kaihihi
	5570-2	Kaihihi Trust	Kaihihi	Managlete 2
	5571-1	Jimian Limited	Whenuakura	Kohi
	5773-1	Goodin FJ & Sons Limited	Kaihihi	Kaihihi
Expired	5306-1	Kapuni Contractors Limited	Waiongana	Awai

In addition, one consent was transferred between July 2013 and June 2014, as listed in Table 4.

Table 4 Consents transferred during the 2013-2014 period

Consent	New Consent Holder	Previous Consent Holder
5879-1	Hilldale Trust	BR & RG Harvey Family Trust

1.3 Climatological data and irrigation requirements

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

Rainfall has a direct impact not only on river and stream flows but on the amount of water for recharge reaching the province'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.

During the period of 1 November 2013 to 31 March 2014, rainfall percentages for the region ranged between 63% and 88% of 'normal' rainfall volumes. The irrigation season did not start until December for many irrigators in Taranaki, due to good rainfall in October and the start of November. There were two weeks in the middle of November where there was little to no rainfall, but there were a substantial number of localised thunderstorms recorded at the end of the month. December rainfall ranged between 44% and 122% of normal, with the majority of the rainfall falling at the start of the month. January rainfall was at or above normal for the month, which meant there was less demand for irrigation. However, February and March 2014 rainfall was well below normal for all sites, so irrigation demand went up, with MALF levels being reached in most waterbodies from late February.

Accurate interpretation of climatological data is paramount 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 needed 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 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 required to be stored in the pasture root zone. The gross irrigation requirement then, 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 the 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 the 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 are minimised; and
- costs are reduced.

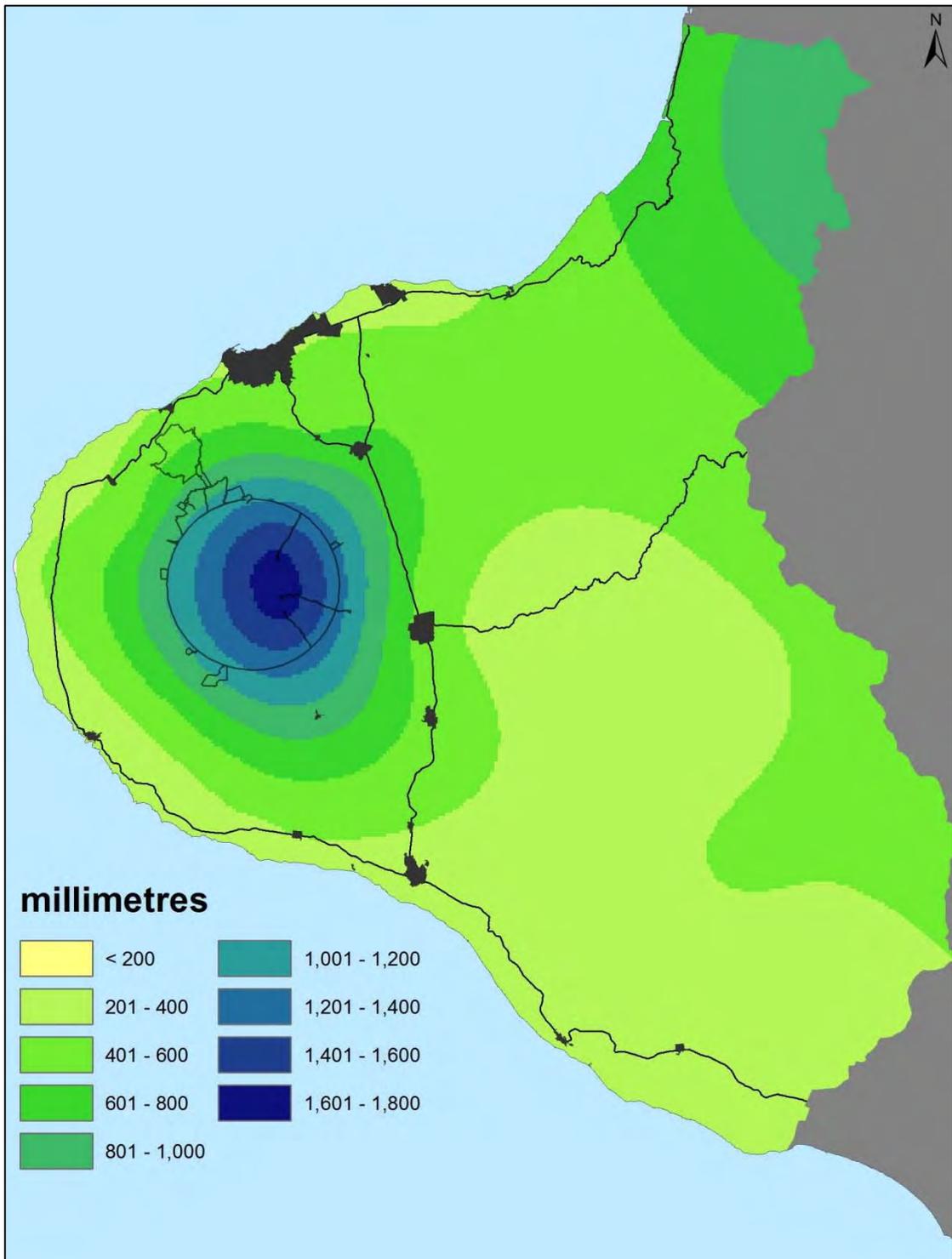


Figure 6 Distribution map of the total rainfall recorded from 1 November 2013 to 31 March 2014

1.3.1 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.

1.4 Monitoring programme

1.4.1 Introduction

Section 35 of the Act sets out an obligation upon the Council to gather information, monitor, and conduct research on the exercise of resource consents and the effects arising within the Taranaki region and report upon these.

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, but do require higher capital outlay.

The 2013-2014 monitoring programme for irrigation water permits comprised three primary components; liaison with consent holders, site inspections and data gathering and the review and assessment of data for compliance.

1.4.2 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 reviews;
- renewals;
- new consents;
- advice on the Council's environmental management strategies and content of regional plans; and
- consultation on associated matters.

1.4.3 Site inspections

During the period under review, the Council endeavoured to inspect all the water take compliance monitoring programmes in place. Additionally, the "not-otherwise

monitored” activities comprising of golf clubs, horticultural irrigation schemes and stock and dairy shed takes were also inspected.

The 2013-2014 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 97% of the active consents during the 2013-2014 monitoring period.

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 2.3 and Table 8.

Observance of allocated maximum daily volume and flow rates are assessed by direct measurement where dataloggers were fitted to the intake of the irrigation system, recording all the abstraction data, or indirectly through calculations based on abstraction data submitted by the consent holder.

For sites where no datalogger is fitted, assessments of water takes for the 2013-2014 year were carried out by a combination of data obtained from the consent holder’s records and information derived from previous calibration checks of the pump discharge rates.

Sites are normally not inspected if the Council receives information from the consent holder that the water permit is not to be exercised for that monitoring period.

1.4.4 Mesuring and reporting of water takes

A special condition of all irrigation water abstraction permits requires the consent holder to keep a record of abstraction. The information is important to the Council to help manage the resource more sustainably and assess compliance. Likewise, the information is useful to users for the management of inputs to their operations, identifying energy savings, identifying leakages in their systems and making water efficiency gains².

The rates and volumes of water abstraction are measured using water meters. If a water meter is not installed following manufacturer’s instructions and specifications, the data is not reliable as large errors may occur. The error produced by a valve installed immediately upstream of the flowmeter can be as much as 50% and errors produced by sharp bends upstream of the water meter can amount to up to 20% of the

² Water Programme of Action Ministry for the Environment

measured flow. Photograph 5 shows an example of a good installation of a flowmeter, while Photograph 6 shows an example of a poor installation of a flowmeter.



Photo 5 Good installation of a flowmeter



Photo 6 Poor installation of a flowmeter

The Resource Management (Measurement and Reporting of Water Takes) Regulations 2010 place further legislative requirements on holders of consents for water abstractions greater than 5 L/s, unless the taking of the water is for non-consumptive purposes. These regulations will apply directly to existing consents without review of individual consents. The regulations will help improve the management of fresh water in Taranaki by ensuring accurate measurement of water takes. The regulations require:

- All water permits allowing the take of 5 L/s or more to collect and report records to a set minimum requirement³;
- Measurement at the point where water is taken from a 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 to be responsible for recording and transferring the data to the Council.

All abstractions are to be compliant with the Regulations by 10 November 2016. The Council will be actively monitoring and enforcing the implementation of the Regulations during forthcoming monitoring periods.

The Council may also apply more stringent requirement on consent holders, such as the ability to require measurement of water takes below 5 L/s or further requirements for measurement over the minimum standards specified by the regulations.

The Council reminds consent holders in late May/early June that their abstraction records are to be provided for the year ending 30 June by no later than 31 July of that year. The daily irrigation record should include:

- date/time when the pump was operated;
- water meter reading at start and end of day; and
- number of hours the pump was operated.

These records can be kept manually or electronically using an approved datalogger.

Consent holders who had fitted an approved datalogger on their intake system in time to record water usage during 2013-2014 irrigation season, were not required to submit annual hard copy records to the Council. Data logged on the dataloggers were downloaded in the field by Council staff, or were automatically transmitted through the radio or cellphone network to the Council.

By the end of 2013-2014 irrigation season, 52 dataloggers had been installed to electronically record abstraction data in relation to water takes for irrigation purposes, three of which were shared by multiple consent holders as their takes are within the same areas.

Table 5 provides details of current irrigation takes which have dataloggers fitted.

Over the course of the 2013-2014 monitoring year, all of the dataloggers were checked and downloaded where possible.

All abstraction data gathered as part of the monitoring programme is reviewed and then stored in the Council's hydrometric database. All records are available to the public on request.

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

Table 5 Dataloggers installed as of 30 June 2014

Consent	Consent Holder	Datalogger serial N ^o	Installation Date	Malfunctioning
0017-3	Manaia Golf Club	AG3-0700	Oct-2013	No
0164-2	JR & DM Baker	41084152	Oct-2010	No
0189-3	AI & KJ Williams	AG3-1145	Jun-2013	No
0270-2	Westown Golf Club Inc	41093229	Nov-2011	No
0278-4	NRGE Farms Limited/Oceanview Trust		Dec-2013	Yes ⁴
0714-2	GD & HM McCallum	41084139	Nov-2008	No
		41084137	Nov-2008	No
1721-3	Manukorihi Golf Club Inc	AG3-0114	Nov-2008	No
1877-3	Te Ngutu Golf Club	AG3-0040	Jan-2014	No
2138-3	Riverside Farms Taranaki Limited	AG3-0522	Dec-2010	No
4450-2	Waitara Golf Club Inc	AG3-1463	Sep-2013	No
4494-2	CT & JM McDonald	AG3-0484	Jan-2010	No
4783-2	Larsen Trust Partnership	AG3-0505	Nov-2010	No
4993-2	J & EG Sanderson	AG3-1114	Nov-2012	No
4994-2	J & EG Sanderson	AG3-1113	Nov-2012	No
5128-1	Coastal Country Farms Limited	AG3-0611	Nov-2010	No
5570-1	Kaihihi Trust	AG3-1151	Feb-2013	No
5571-1	Jimian Limited	AG3-1144	Dec-2012	No
5623-1	WD & SC Morrison	AG3-1081	Sep-2010	No
5636-1	Waiwira Trust	AG3-0525	Jan-2011	No
		AG3-0526	Jan-2011	No
5709-1	KCCJ Sole	AG3-0610	Nov-2010	No
5773-1	FJ Goodin & Sons Limited		Sep-2013	Yes ⁵
5778-1	Mara Trust	AG3-1681	Feb-2014	No
5781-1	Waikaikai Farms Limited	AG3-1123	Nov-2012	No
5797-1	Pihama Farms Limited	AG3-0609	Nov-2010	No
5827-2	Walker & McLean Partnership No1	AG3-0406	Nov-2009	No
5829-1	Julian RM & MC Family Trust	12706	Nov-2012	No
5840-2	Gibbs G Trust	AG3-0406	Nov-2009	No
5863-1	Geary AR Trust	AG3-0356	Mar-2013	No
5876-1	GA & RJ Dorn	AG3-0142	Feb-2010	No
5878-1	Woolleston Family Trust Partnership	41134353	Dec-2013	No
5879-1	Hilldale Trust	AG3-1124	Nov-2012	No
5896-1	Kohi Investments Limited	41081080	Nov-2008	No
5898-2	Pease David Family Trust	41081095	Feb-2008	Yes ⁶
5950-1	WD & SC Morrison	OP4953	Dec-2011	No
5973-1	DR & AJ Gibson	AG3-0523	Sep-2011	No
6026-1	JR & DM Baker	41084153	Jan-2009	No
6159-1	Pinehill Land Company Limited	302100277	Nov-2004	n/a ⁷

⁴ The flowmeter is also a datalogger and it broke down 3-4 days into abstraction starting.

⁵ Datalogger dead, unsure of the cause of this.

⁶ Battery was replaced last year, and the logger was not setup properly so very little data recorded.

Consent	Consent Holder	Datalogger serial N°	Installation Date	Malfunctioning
6193-1	Cradles Farm Trust No 2	30210050	Dec-2003	n/a ⁷
6292-2	New Plymouth Golf Club Inc	AG3-1086	Nov-2012	No
6429-1	Leatherleaf Limited	AG3-0527	Dec-2011	No
6430-1	Ellingworth Margaret Trust	AG3-0593	Jan-2011	No
6486-1	GM & PJ Ruiten Family Trust Partnership	302100143	Dec-2003	n/a ⁷
6628-1	Hamblyn Family Trust	AG3-0524	Jan-2012	No
7346-1	Spenceview Farms	OP5313	Jul-2012	No
7372-1	Pukeone Partnership	AG3-0563	Sep-2010	No
7527-1	Pukeone Partnership	AG3-1110	Nov-2011	No
7528-1	Kereone Farms Limited	AG3-1110	Nov-2011	No
7733-1	Hawken Family Trust	AG4-2233	Nov-2013	No
7895-1	Ohawe Farms	41112296	Mar-2013	No
9561-1	Kereone farms Limited	AG4-2233	Nov-2013	No
9577-1	SB & J May Family Trust	AG4-1675	Mar-2014	No
9608-1	D Wilson	AG4-1838 AG4-2150	Mar-2014 Mar-2014	No No

⁷ Unable to determine the state of the logger, as the site was not visited during the 2013-2014 season, as no irrigation took place.

2. Results

During the 2013-2014 monitoring period, 43 of the 57 current consents to take and use water for pasture irrigation were exercised. Fourteen consents were not exercised, with four of those not yet operational.

The results of the monitoring carried out by the Council over the course of the 2013-2014 monitoring period are outlined below in sections 2.1 to 2.7 and are summarised in Tables 6 to 11.

2.1 Site inspections

During 2013-2014 irrigation season, the Council carried out compliance monitoring inspections at 73 sites (Table 6), compared to 67 inspections carried out for the 2012-2013 irrigation season.

The assessment of efficient use of water has proven to be a difficult task to carry out as most of the irrigation events take place at night when inspections are not conducted (unless there is an obvious waste of water). Assessments of losses for deep percolation, drifting or ponding need to be evaluated at the on-farm level and can easily be missed when only one inspection per year is carried out.

Table 6 lists the consents inspected during the period being reviewed and reported on.

Table 6 Sites inspected during 2013-2014 to assess consent compliance

Consent	Consent Holder
0017-3	Manaia Golf Club
0124-5	Kaitake Golf Club Inc
0164-2	JR & DM Baker
0184-3	Inglewood Golf Club Inc
0189-4	AI & KJ Williams
0270-2	Westown Golf Club Inc
0278-4	NRGE Farms Limited/Oceanview Trust
0464-3	Oakura Farms Limited
0647-3	IG Cassie
0714-2	GD & HM McCallum
0721-3	MD Aiken Family Trust
0880-3	IHC New Zealand Inc (NORTH TARANAKI)
1193-3	Vickers B & NM & Church G & CG
1223-3	EO & CP Lander
1721-3	Manukorihi Golf Club Inc
1877-3	Te Ngutu Golf Club Incorporated
2138-3	Riverside Farms Taranaki Limited
3171-3	Taranaki Greenhouses Limited
3312-3	GH Lance
4450-2	Waitara Golf Club Inc
4494-2	CT & JM McDonald

Consent	Consent Holder
4783-2	Larsen Trusts Partnership
4993-2	J & EG Sanderson
4994-2	J & EG Sanderson
5128-2	Coastal Country Farms Limited
5568-1	Cornwalll Park Farms Limited
5570-2	Kaihihi Trust
5571-1	Jimian Limited
5623-1	WD & SC Morrison
5636-1	Waiwira Trust
5696-1	Kokako Road Limited
5709-2	KCCG Sole Trust
5773-1	Goodin FJ & Sons Limited
5778-1	Mara Trust
5781-2	Waikaikai Farms Limited
5791-1	AL & LA Campbell
5797-1	Pihama Farms Limited
5807-1	Dickie Roger Family Trust
5827-1	Walker & McLean Partnership
5829-1	Julian RM & MC Family Trust
5840-2	Gibbs G Trust
5863-2	Geary AR Trust
5876-1	GA & RJ Dorn
5878-1	Woollaston Family Trust Patnership
5879-1	Hilldale Trust
5887-1	A & EN Barkla
5896-1	Kohi Investments Limited
5898-2	David Pease Family Trust
5950-1	WD & SC Morrison
5973-1	DR & AJ Gibson
6026-1	JR & DM Baker
6159-1	Pinehill Land Company Limited
6193-1	Cradles Farm Trust No 2
6292-1	New Plymouth Golf Club Inc
6429-1	Leatherleaf Limited
6430-1	Ellingworth Margaret Trust
6486-1	GM & PJ Rutten Family Trust Partnership
6628-1	Hamblyn Family Trusts
7270-1	Ian Mantey Family Trust & Sally Mantey Family Trust
7346-1	Spenceview Farms
7372-1	Pukeone Partnership
7527-1	Pukeone Partnership
7528-1	Kereone Farms Limited
7626-1	NW & DM King

Consent	Consent Holder
7768-1	Carter AJ Limited
7781-1	D Krumm
7866-1	Stratford Golf Club Inc
7895-1	Ohawe Farms
9561-1	Kereone Farms Limited
9577-1	SB & J May Family Trust
9597-1	T & V Gibson Limited
9608-1	DRE Wilson

2.2 Non-exercised consents

Fifty-six of the 78 resource consents granted to date for water abstractions for irrigation purposes were exercised during the 2013-2014 monitoring period. The remaining 22 consents were not exercised during 2013-2014 year (Table 7).

Table 7 Consents non-exercised during 2013-2014

Consent	Consent Holder
0189-4	AI & KJ Williams
0464-3	Oakura Farms Limited
0647-3	IG Cassie
0721-3	MD Aiken Family Trust
1193-3	Vickers B & NM & Church G & CG
1253-3	KD & RA Southall
1879-3	Wairau Nurseries
3859-2	Living Light 2000 Limited
4783-2	Larsen Trusts Partnership
5696-1	Kokako Road Limited
5878-1	Woollaston Family Trust Partnership
5973-1	D & A Gibson
6159-1	Pinehill Land Company Limited
6193-1	Cradles Farm Trust No 2
6486-1	GM & PJ Rutten Family Trust Partnership
7270-1	Ian Mantey Family Trust & Sally Mantey Family Trust
7626-1	NW & DM King
7733-2	Hawken Family Trust
7781-1	D Krumm
7866-1	Stratford Golf Club Inc
9597-1	T & V Gibson Limited
9936-1	GSJ Trust

2.3 Groundwater quality results

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

groundwater salinities in the range expected in coastal areas. Further sampling of these bores during forthcoming monitoring periods will allow changes in groundwater salinity levels to be detected.

The results of the sampling carried out are presented below in Table 8.

Table 8 Groundwater quality results

Consent	Site code	Chloride (g/m ³)	Conductivity (mS/m)	pH	Sodium (g/m ³)	Temperature (°C)
0714-2	GND1149	67.2	38.7	7.60	41.6	14.6
	GND1150	28.6	27.7	7.60	30.4	14.7
5950-1	GND1203	36.1	30.7	8.90	59.2	17.7
6026-1	GND1233	63.8	48.8	7.60	40.5	17.4

2.4 Residual flow compliance

During the period under review, compliance with residual flow conditions for surface water abstraction sites was assessed 54 times in 25 waterways. Flow gaugings were carried out between 14 November 2013 and 25 March 2014. Table 9 lists the consents assessed for residual flow compliance and the dates of the monitoring.

The periods when the stream gaugings activities take place coincide with the periods of low flows. Of the 54 gaugings, flow volumes were measured below residual flow requirements on 16 occasions. In these instances, irrigators taking water from the respective water bodies were required to stop taking until further notice. All irrigators ceased taking water following notification by the Council.

Photo 7 shows a stream gauging activity taking place downstream of one of the consented water takes.

Table 9 Stream gaugings carried out for residual flow compliance

Gauging Number	River	Site	Stage (m)	Flow (L/s)	Date/Time	Consent
8536	Kokako	Kokako Rd	0.666	43 ⁸	14/11/2013 9:32	5896-1
8556	Kokako	Kokako Rd	0.695	63	17/12/2013 10:59	5896-1
8568	Waiokura	Winks Rd	0.340	334	08/01/2014 13:29	5827-2, 5840-2
8580	Waiau 2	above 7372	0.462	121	28/01/2014 13:39	7372-1
8582	Waihi 5	Denby Rd	0.410	68	03/02/2014 11:38	5898-2
8587	Waiokura	Winks Rd	0.297	224	04/02/2014 11:08	5827-2, 5840-2
8588	Oeo	5797-1	0.491	287	04/02/2014 12:40	5797-1
8589	Ouri	SH45	0.428	305	04/02/2014 13:49	5791-1
8599	Punehu	SH45	0.250	492	12/02/2014 12:17	5876-1
8602	Whenuakura	Nicholson Rd	0.803	2,759	13/02/2014 13:30	5696-1, 5623-1, 7527-1, 7528-1
8606	Mangatete	Saunders Rd	0.204	179	18/02/2014 13:40	5570-1
8615	Otahi 2	Ihaia Rd	0.438	99 ⁹	24/02/2014 11:20	5973-1

⁸ Flow gauging was below residual flow cut-off.

⁹ Below residual flow cut-off but not exercising their consent.

Gauging Number	River	Site	Stage (m)	Flow (L/s)	Date/Time	Consent
8617	Mangatete	Saunders Rd	0.192	104	24/02/2014 14:30	5570-1
8618	Kaihihi	SH45	0.341	273 ⁸	24/02/2014 15:24	5128-1, 5773-2, 5778-1
8619	Waihi 5	Mawhitiwhiti Rd		6	24/02/2014 10:50	1877-2
8620	Waihi 5	Denby Rd	0.419	52	24/02/2014 11:32	5898-2
8621	Hauroto	Hauroto Rd		4	24/02/2014 12:30	6429-1
8622	Inaha	Lower Inaha Rd	0.380	254	24/02/2014 14:45	5887-1
8624	Makuri	Toko Rd	0.149	160 ⁹	25/02/2014 10:18	5878-1
8625	Mangamawhete	200m d/s confluence		329	25/02/2014 12:42	7270-1
8627	Oeo	5797-1	0.458	176	25/02/2014 12:08	5797-1
8628	Ouri	SH45	0.405	226	25/02/2014 13:22	5791-1
8629	Taungatara	SH45	0.240	665	25/02/2014 14:34	5829-1
8631	Tangahoe	Below Railway Bridge		720 ⁸	26/02/2014 9:04	6430-1
8632	Mangaroa	D/s Schriders Take	0.140	33	26/02/2014 11:12	4494-1, 5636-1
8635	Wairoa	Kohi Beach Farm	0.365	167	27/02/2014 10:37	4783-1
8636	Wairoa	D/s Dam	0.030	55	27/02/2014 12:07	5807-1
8637	Kokako	Kokako Rd	0.620	29 ⁹	27/02/2014 13:24	5896-1
8638	Werekino	Grays Rd		32	28/02/2014 8:00	0189-4
8639	Waiweranui	0278-3		316 ⁹	28/02/2014 9:10	0278-3
8640	Kohi	Hardens (Jimian)		409	04/03/2014 10:49	5571-1
8641	Kaikura	Below 7346	0.230	117	04/03/2014 11:27	7346-1
8642	Waiau 2	above 7372	0.442	112	04/03/2014 13:24	7372-1
8643	Inaha	Lower Inaha Rd (Barkla)	0.370	250	05/03/2014 12:00	5887-1
8644	Waihi 5	Denby Rd	0.410	50	05/03/2014 13:47	5898-2
8655	Kapoaiaia	Lighthouse	0.556	231 ⁸	11/03/2014 11:20	5709-2
8656	Kaihihi	SH45	0.318	196 ⁸	11/03/2014 13:39	5128-1, 5773-2, 5778-2
8657	Mangatete	Saunders Rd	0.174	87	11/03/2014 14:43	5570-1
8660	Punehu	SH45	0.195	306	12/03/2014 12:02	5876-1
8661	Ouri	SH45	0.410	180 ⁸	12/03/2014 13:03	5829-1
8662	Oeo	5797-1	0.435	130	12/03/2014 14:16	5797-1
8663	Waihi 5	Denby Rd	0.405	23 ⁸	13/03/2014 10:34	5898-2
8664	Waiokura	Winks Rd	0.272	141	13/03/2014 13:08	5827-2, 5840-2
8665	Hauroto	Hauroto Rd		4	13/03/2014 14:00	6429-1
8666	Waihi 5	Mawhitiwhiti Rd		6	13/03/2014 14:30	1877-2
8667	Waitara	Bertrand Rd	0.939	4,712 ⁸	14/03/2014 10:32	6628-1
8672	Waiweranui	SH45		253 ⁹	13/03/2014 14:07	0278-3
8673	Makuri	Toko Rd	0.131	134 ⁹	14/03/2014 9:05	5878-1
8676	Tangahoe	D/s railway bridge		920 ⁸	17/03/2014 11:30	6430-1
8677	Kohi	Hardens (Jimian)		309	18/03/2014 11:54	5571-1
8678	Whenuakura	Nicholson Rd	0.744	2,327	19/03/2014 14:14	5696-1, 5623-1, 7527-1, 7528-1
8679	Mangatete	Saunders Rd	0.246	264	19/03/2014 12:25	5570-1
8688	Waihi 5	Denby Rd	0.443	33 ⁸	25/03/2014 10:45	5898-2



Photo 7 Stream gauging by Council staff

2.5 Compliance with abstraction rate and volumetric limits

Compliance with abstraction rate and volume is assessed for all consent holders from whom data is available¹⁰. Compliance with abstraction rate limits was determined either by direct measurement or by calculating from records submitted by the consent holder.

Of the consents for which data was received, 80% were within compliance for flow-rate allocation. Non-compliance with consent conditions for abstraction rate and volume is discussed further in Section 3.

During the monitored period 11 consent holders did not submit records to the Council on time; details on these consents are reported under Section 2.6.

Table 10 displays the information for consents that were found to be in breach of the allocated flow-rate or volumetric amount at any time during the exercising of the consent during the 2013-2014 review period. These consent holders were advised of their breaches and that they needed to ensure this did not occur in the following season, otherwise enforcement action would follow. It is considered that a consent breaches abstraction limits when the exceedance is greater than 5% of the consented limit.

¹⁰ Three dataloggers were not checked, as no irrigation occurred during the 2013-2014 period.

Table 10 Consents breached for exceeding allocation limits during 2013-2014

Consent	Consent Holder	Source	Breach
0017-3	Manaia Golf Club	Surface Water	Rate
0164-2	JR & DM Baker	Surface Water	Rate
2138-2	Riverside Farms Taranaki Limited	Surface Water	Rate
5128-2	Coastal Country Farms	Surface Water	Rate
5570-2	Kaihihi Trust	Surface Water	Rate
5709-1	KCCG Sole Trust	Surface Water	Rate
5773-1	FJ Goodin & Sons Limited	Surface Water	Volume
5781-2	Waikaikai Farms Limited	Surface Water	Rate
6026-1	JR & DM Baker	Groundwater	Rate
6292-1	New Plymouth Golf Club Inc	Surface Water	Rate
7346-1	Spenceview Farms	Surface Water	Rate

2.6 Record keeping compliance

Abstraction records were received on time from 45 of the 56 consent holders who exercised their permits during the 2013-2014 period (Table 11). Written notifications and telephone calls received advising the non-exercising of consents were also taken as provision of records. Consent holders who have dataloggers fitted to their intake systems are exempted from providing data to the Council as the data collection is yearly undertaken by Council's staff as part of compliance monitoring programmes. Three dataloggers were found to have malfunctioned during the 2013-2014 season, meaning records were not recoverable for those takes. Further information regarding follow-up investigations and enforcement proceedings by the Council in relation to the non-supply of abstraction records is included in section 2.8.

Table 11 Consents for which data was not received by the Council as at 31 July 2014 for the 2013-2014 irrigation season

Consent	Consent Holder	Received?
0124-4	Kaitake Golf Club Inc	Yes – 29/10/2014
0865-3	Kathdan Family Trust	Yes – 07/10/2014
1223-3	EO Lander	Yes – 04/11/2014
3171-3	Taranaki Greenhouses Limited	Yes – 23/10/2014
5887-1	A & EN Barkla	No
6372-1	Naplin Trust	No
6380-1	Caiseal Trust Partnership	No
7304-1	Gwerder Brothers	Yes – 21/10/2014
7497-1	Te Rua O Te Moko 2B Ahuwhenua Trust	Yes – 07/10/2014
7768-1	AJ Carter Limited	Yes – 29/10/2014
9747-1	DP & JH Roper Family Trust	No – abstraction records not required as consent holder had not exercised consent for purpose for which it was granted.

2.7 Irrigation water usage 2013-2014

Water use for irrigation is based on consent holder abstraction records. The following general comments can be made from the processed irrigation data:

- Of the non-exercised consents during 2013-2014, 50% of the irrigation systems were not yet operational. Eleven consents were not exercised even though the irrigation systems were in place.
- There were 11 breaches for exceeding limits on allocated rates and volumes compared to 2012-2013 where there were 18 breaches.
- Records were received from 80% of the consent holders that exercised their consent in the 2013-2014 season.
- All but one golf club exercised their water rights during the 2013-2014 season.
- Three new consents for pasture irrigation were granted during the period under review.

2.8 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 e.g. provision of advice and information, or investigation of potential or actual courses 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 Unauthorised Incident Register (UIR) 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).

In the 2013-2014 period, there were 23 incidents recorded by the Council that were associated with consent holder activities. All of these related to breaching one or more of their consent conditions. The incidents are listed in Table 12, showing the consent, consent holder, details of the incident and the outcome. These incidents were reported to Council and staff implemented appropriate responses as they were identified.

Table 12 Consents found to be in breach and the incidents registered

Consent	Consent Holder	Reason incident lodged	Outcome
0017-3	Manaia Golf Club	Breached rate on multiple occasions.	Abatement notice issued to comply with consent conditions. Compliance with abatement notice will be ascertained during the next annual compliance monitoring inspection.
0124-2	Kaitake Golf Club Inc	Failure to supply abstraction records.	14-day letter issued. Council accepted circumstances of breach. No further action.
0164-2	JR & DM Baker	Breached rate on multiple occasions.	Abatement notice issued to comply with consent conditions. Abstraction records downloaded on 09/02/2015, abatement notice is being complied with at that date.
0270-2	Westown Golf Club Inc	Their datalogger was faulty, so no records were kept after 30 th January 2014, but they continued to irrigate.	Abatement notice issued to comply with consent conditions. Datalogger sent away for new battery. As of 22/01/15 the abatement notice was being complied with.
0278-4	NRGE Farms Limited/Oceanview Trust	Flowmeter broke 4 days into irrigating and they were unable to download the data off it.	Abatement notice issued to comply with consent conditions. Ongoing issues with flowmeter and gravity fed irrigation system. Compliance will be ascertained during the next annual compliance monitoring inspection.
0714-2	GD & HM McCallum	The flowmeter is removable and wind is turning Bore 2's meter, so is showing taking when the system is not operational.	Abatement notice issued to comply with consent conditions. As of 26/01/2015 abatement notice was being complied with.
1223-3	EO & C Lander	Failure to supply records.	Abatement notice issued to comply with consent conditions. Consent holder supplied abstraction records and installed new flowmeter and datalogger. The abatement notice is being complied with.
3171-3	Taranaki Greenhouses Limited	Failure to supply records.	Abatement notice issued to comply with consent conditions. Consent holder supplied abstraction records. Abatement notice is being complied with.
5128-2	Coastal Country Farms	Breached rate on many occasions. Also flowmeter had not been verified.	Abatement notice issued to comply with consent conditions. Compliance with abatement notice will be ascertained during the next annual compliance monitoring inspection.
5568-1	Cornwall Park Farms Limited	No flowmeter present and no records kept.	Abatement notice issued to install a flowmeter and to comply with consent conditions. Consent holder has installed flowmeter. Compliance with abatement notice will be ascertained during the next annual compliance monitoring inspection.
5570-1	Kaihihi Trust	Breached rate on many occasions and has no verification for meter.	Abatement notice issued to comply with consent conditions. Compliance with abatement notice will be ascertained during the next annual compliance monitoring inspection.

Consent	Consent Holder	Reason incident lodged	Outcome
5709-1	KCCG Sole Trust	Abstraction rate breach on numerous occasions. Flowmeter not verified.	Abatement notice issued to comply with consent conditions. Compliance with abatement notice will be ascertained during the next annual compliance monitoring inspection.
5773-1	FJ Goodin & Sons Limited	Abstraction volume breach on multiple occasions. Flowmeter not verified.	Abatement notice issued to comply with consent conditions. Compliance with abatement notice will be ascertained during the next annual inspection.
5791-1	AL & LA Campbell	Consent holders flowmeter broke in early March, but they still continued to irrigate after this date. Also they have not had flowmeter verified.	Abatement notice issued to comply with consent conditions. Compliance with abatement notice will be ascertained during the next annual compliance monitoring inspection.
5887-1	A & EN Barkla	Failure to supply records.	Abatement notice issued to comply with consent conditions. Infringement notice issued for failure to supply records. Compliance with abatement notice will be ascertained during the next annual inspection.
5896-1	Kohi Investments Limited	Flowmeter pulse output faulty so no records kept. Consent holder advised of faulty flowmeter and was remedying the situation.	Abatement notice issued to comply with consent conditions. Consent holder has installed new flowmeter and datalogger. Compliance with abatement notice will be ascertained during the next annual inspection.
6026-1	JR & DM Baker	Breached rate throughout the monitoring period.	Abatement notice issued to comply with consent conditions. Compliance with abatement notice will be ascertained during the next annual compliance monitoring inspection.
6292-1	New Plymouth Golf Course	Breached abstraction rate.	Abatement notice issued to comply with consent conditions. Compliance will be ascertained during the next annual compliance monitoring inspection.
6372-1	Naplin Trust	Failure to supply records.	Abatement notice issued to comply with consent conditions. Compliance with abatement notice will be ascertained during the next annual compliance monitoring inspection.
6380-1	Caiseal Trust Partnership	Failure to supply records	Abatement notice issued to comply with consent conditions. IRIS 150 datalogger installed 27/01/15. Abatement notice is being complied with.
7346-1	Spenceview Farms	During analysis of telemetry data it was found that the consented rate of abstraction had been breached on numerous occasions between 7 December 2013 and 7 April 2014.	Consent holder applied for a change of consent conditions to increase abstraction and was granted change on 03/11/2014.

7768-1	AJ Carter Limited	Failure to supply records.	Abatement notice issued to comply.
9747-1	DP & JH Roper Family Trust Partnership	Failure to supply records. No permanent label on bore casing.	Abatement notice issued to comply with consent conditions. Following discussions with consent holder, notice was amended and re-issued as records were not required. Permanent label has been installed on bore casing. Abatement notice is being complied with.

3. Discussion

In drafting and reviewing conditions on water take permits and in implementing monitoring programmes, the Council assesses the “effects on the environment” as much as it is appropriate for each water take source. Monitoring programmes are therefore not only based on existing permit conditions, but also on the obligations of the Act to assess the effects on the environment from the exercising of consents.

Improving the efficiency of water use is a key outcome by the Water Programme of Action. Water is a public resource and the permission to take is granted through a resource consent. Associated with that permission is a public expectation that can be better met if the actual amounts of water taken are accurately monitored. Measuring actual water used is part of demonstrating and measuring progress towards more efficient water use.

3.1 Discussion of site performance

Each year the Council assesses consent holder performances based on compliance with allocated abstraction rates and maximum daily volumes, protection of minimum residual flows, and the provision of abstraction records.

The examination of the data supplied to the Council, revealed that 10 (18%) of the consent holders from 56 of the exercised consents breached limits for rate/volume abstracted.

As noted earlier, the number of poorly installed water meters (flowmeters) has become a concern for the Council. Most resource consents for water takes issued by the Council have specific conditions about the installation of a water meter device. A reliable and accurate flowmeter is crucial to providing good information to the consent holder and the Council alike.

To comply with Taranaki Regional Council requirements, the water meter should:

- Have an accuracy of +/- 5% under field conditions, with calibration certified;
- Be simple to operate and read;
- Be tamper-proof and sealed;
- Be capable of continuous measurements in cubic meters;
- Include a pulse output that is compatible with the dataloggers recommended by the Council;
- Have sufficient pipe length for Council to use a strap-on meter for periodic checks. Pipe length should be at least 10 times the diameter before the meter and five times the diameter after the meter or manufacturer’s specifications (Figure 7);

- A detailed plan of the installed meter and distances to any potential turbulence sources (e.g. elbows, bends, valves, etc) shall be submitted to the Council within 30 working days of the installation to certify that the flowmeter has been installed to the manufacturer's specifications;

It is important that the contractors hired for the installation of the flowmeter do so in accordance with the manufacturer's specifications. Good installations leave sufficient straight length of pipe between gate valves, elbows, etc. and the flowmeter to ensure there is no turbulence in the water passing through the meter, which reduces accuracy.

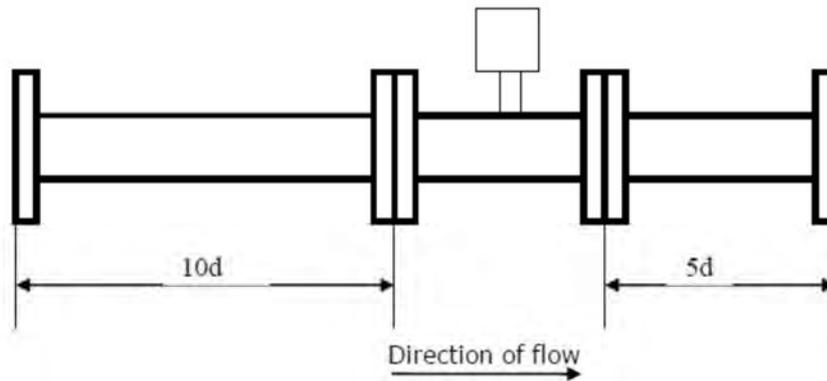


Figure 7 Flowmeters: Pipe layout recommendations

Most flowmeters should be installed so that there is a significant run of straight pipe before and after the location of the flowmeter. This is intended to allow the straight pipe run to “smooth out” any turbulence produced by the presence of valves, filters, chemical injectors and diffusers, and changes in pipe direction. This type of turbulence produces error in the reading of most flow meters. Flowmeter errors can be quite large if installed incorrectly. The error produced by a gate valve or a butterfly valve upstream of a flowmeter can be as much as 50-60%; the error produced from a partially closed ball valve can be as much as 50% for flowmeters. Chemical injectors can produce significant error in the flowmeter reading also¹¹.

3.2 Evaluation of performance

A tabular summary of the all the consent holder's compliance record for the year under review is set out in Table 13.

Table 13 Individual performance for all irrigation consent holders

Consent	Consent Holder	Compliance achieved?
0017-3	Manaia Golf Club	Improvement required (environmental)
0124-5	Kaitake Golf Club Inc	Improvement required (environmental)
0132-3	Hawera Golf Club Inc	High
0164-2	JR & DM Baker	Improvement required (environmental)
0184-3	Inglewood Golf Club Inc	High
0189-4	AI & KJ Williams	N/A

¹¹ Global Water Instrumentations; FLOW METERS: PIPE LAYOUT RECOMMENDATIONS. www.globalw.com

Consent	Consent Holder	Compliance achieved?
0270-2	Westown Golf Club Inc	Improvement required (environmental)
0278-4	NRGE Farms Limited/Oceanview Trust	Improvement required (environmental)
0464-3	Oakura Farms Limited	N/A
0647-3	IG Cassie	N/A
0714-2	GD & HM McCallum	Improvement required (environmental)
0721-3	MD Aiken Family Trust	N/A
0880-3	IHC New Zealand Inc (NORTH TARANAKI)	High
1193-3	Vickers B & NM & Church G & CG	N/A
1223-3	EO & CP Lander	Improvement required (environmental)
1253-3	KA & RD Southall	N/A
1721-3	Manukorihi Golf Club Inc	High
1877-3	Te Ngutu Golf Club Incorporated	High
1879-3	Wairau Nurseries	N/A
2138-3	Riverside Farms Taranaki Ltd	High
3171-3	Taranaki Greenhouses Limited	Improvement required (environmental)
3312-3	GH Lance	Improvement required (environmental)
3859-2	Living Light 2000 Limited	N/A
4450-2	Waitara Golf Club Inc	High
4494-2	CT & JM McDonald	High
4783-2	Larsen Trusts Partnership	N/A
4993-2	J & EG Sanderson	High
4994-2	J & EG Sanderson	High
5128-2	Coastal Country Farms Limited	Improvement required (environmental)
5568-1	Cornwall Park Farms Limited	Improvement required (environmental)
5570-2	Kaihihi Trust	Improvement required (environmental)
5571-1	Jimian Limited	High
5623-1	WD & SC Morrison	High
5636-1	Waiwira Trust	High
5696-1	Kokako Road Limited	N/A
5709-2	KCCG Sole Trust	Improvement required (environmental)
5773-1	Goodin FJ & Sons Limited	Improvement required (environmental)
5778-1	Mara Trust	High
5781-2	Waikaikai Farms Limited	High
5791-1	AL & LA Campbell	Improvement required (environmental)
5797-1	Pihama Farms Limited	High
5807-1	Dickie Roger Family Trust	High
5827-2	Walker & McLean Partnership	High
5829-1	Julian RM & MC Family Trust	High
5840-2	Gibbs G Trust	High
5863-2	Geary AR Trust (A R Geary)	High

Consent	Consent Holder	Compliance achieved?
5876-1	GA & RJ Dorn	High
5878-1	Woollaston Family Trust Partnership	N/A
5879-1	Hilldale Trust	High
5887-1	A & EN Barkla	Improvement required (environmental)
5896-1	Kohi Investments Limited	Improvement required (environmental)
5898-2	David Pease Family Trust	Improvement required (environmental)
5950-1	WD & SC Morrison	High
5973-1	DR & AJ Gibson	N/A
6026-1	JR & DM Baker	Improvement required (environmental)
6159-1	Pinehill Land Company Limited	N/A
6193-1	Cradles Farm Trust No 2	N/A
6292-1	New Plymouth Golf Club Inc	Improvement required (environmental)
6429-1	Leatherleaf Limited	High
6430-1	Ellingworth Margaret Trust	High
6486-1	GM & PJ Rutten Family Trust Partnership	N/A
6628-1	Hamblyn Family Trusts	High
7270-1	Ian Mantey Family Trust & Sally Mantey Family Trust	N/A
7346-1	Spenceview Farms	Improvement required (environmental)
7372-1	Pukeone Partnership	High
7527-1	Pukeone Partnership	High
7528-1	Kereone Farms Limited	High
7626-1	NW & DM King	N/A
7733-2	Hawken Family Trust	N/A
7768-1	Carter AJ Limited	Improvement required (environmental)
7781-1	D Krumm	N/A
7866-1	Stratford Golf Club Inc	N/A
7895-1	Ohawe Farm	High
9561-1	Kereone Farms Limited	High
9577-1	SB & J May Family Trust	High
9597-1	T & V Gibson Limited	N/A
9608-1	DRE Wilson	High
9936-1	G SJ Trust	N/A

N/A = not applicable as the consent was not exercised.

During the 2013-2014 year, 44% of irrigation consent holders in Taranaki achieved a high level of environmental performance and compliance with their consents, while 28% require improvement in their compliance performance. For reference, 60% of all consent holders in Taranaki monitored through tailored compliance monitoring programmes achieved a high level of environmental performance and compliance with their consents during the same period, while another 29% demonstrated a good level of environmental performance and compliance with their consents.

3.3 Recommendations from the 2012-2013 Annual Report

In the 2012-2013 Annual Report, it was recommended:

1. THAT monitoring of consented irrigation activities in the 2013-2014 year continue at the same level as in 2012-2013.
2. THAT Council continues to liaise with consent holders who have dataloggers that are failing, so improvements in compliance at all times with consent conditions are achieved.
3. 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.
4. THAT the Council requires all consent holders that take above 5 L/s to comply with the Measurement and Reporting of Water Takes Regulations 2010.
5. THAT the Council reports on the water permits held for farm and general water supply purposes as an Appendix to this report.

Recommendation 1 and 5 were implemented during the period under review.

With regards to recommendations 2, 3 and 4, the Council continues to work with consent holders to improve compliance with consent conditions and all relevant regulations.

3.4 Alterations to monitoring programmes for 2014-2015

In designing and implementing the monitoring programmes for air/water discharges in the region, the Council has taken into account the extent of information made available by previous authorities, its relevance under the Act, the obligations of the Act in terms of monitoring emissions/ discharges and effects, and subsequently 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 emitting to the atmosphere/ discharging to the environment.

It is recommended that monitoring for 2014-2015 be carried out at the same level as during the 2013-2014 period.

4. Recommendations

1. THAT monitoring and reporting of consented irrigation activities for the 2014-2015 year continue at the same level as in the 2013-2014 period.
2. THAT Council continues to liaise with consent holders who have dataloggers that are failing, so improvements in compliance at all time with consent conditions are achieved.
3. 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.
4. THAT the Council requires all consent holders that take above 5 L/s to comply with the Measurement and Reporting of Water Takes Regulations 2010.

Glossary of common terms and abbreviations

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

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 the circumstances/events surrounding an incident including any allegations of an incident.
L/s	Litres per second.
MALF	Mean annual low flow. How low the flow gets in a typical year. The lowest flow for each year is averaged across recorded years to estimate MALF.
mS/m	Millisiemens per metre.
m ³	Cubic metre (1,000 litres).
m ³ /s	Cubic metres per second.
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</i> 1991 and including all subsequent amendments.

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Taranaki Regional Council 2010: Irrigation Water Compliance Monitoring Annual Report 2009-2010. Technical Report 2010-49.

Taranaki Regional Council 2011: Irrigation Water Compliance Monitoring Annual Report 2010-2011. Technical Report 2011-53.

Taranaki Regional Council 2012: Irrigation Water Compliance Monitoring Annual Report 2011-2012. Technical Report 2012-70.

Taranaki Regional Council 2013: Irrigation Water Compliance Monitoring Annual Report 2012-2013. Technical Report 2013-100.

Water meter guidelines. Environment Waikato Regional Council.

Appendix I

Example surface water abstraction permit for pasture 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: GSJ Trust
 (Trustee: Glen Stephen Johnson)
 113 Airport Drive
 RD 3
 New Plymouth 4373

Decision Date: 19 June 2014

Commencement Date: 19 June 2014

Conditions of Consent

Consent Granted: To take and use water from the Waitaha Stream for pasture
 irrigation purposes

Expiry Date: 01 June 2032

Review Date(s): June 2020, June 2026

Site Location: 102 Wills Road, Bell Block

Legal Description: Lot 1 DP 20683 Blk II Paritutu SD (Site of take & use)

Grid Reference (NZTM) 1700248E-5680265N

Catchment: Waitaha

*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 12.2 litres per second.
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.

Consent 9936-1.0

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 Council officers can readily verify that it is accurately recording the required information.
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 be managed to ensure that the flow in the Waitaha Stream immediately downstream of the intake point is not less than 12.3 litres per second. No taking shall occur when the flow is less than 12.3 litres per second.
8. Staff gauges shall be installed and a low flow rating curve established and maintained that determines the flow in the Waitaha Stream immediately upstream and downstream of the take site. The cost of the installation, and the establishment and maintenance of the rating shall be met by the consent holder.
9. Within three months of the issue of this consent the consent holder shall make contact with the Taranaki Regional Council and request that it prepare a riparian management plan for the property. The Riparian Management Plan shall include the establishment and maintenance of fencing and planting along 1500 metres of stream bank (i.e. 750 on each side of the stream) before 30 September 2019.
10. 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.
11. The consent holder shall ensure that the intake is screened with a mesh size no greater than 1.5 mm.
12. This consent shall lapse on 30 June 2019, 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.

Consent 9936-1.0

13. 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 2020 and/or June 2026 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 19 June 2014

For and on behalf of
Taranaki Regional Council

B G Chamberlain
Chief Executive

Appendix II

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

Report on water permits for general farm and domestic supply

Introduction

This report is for water takes for general farm and domestic 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], but have not been reported on previously as only water takes for irrigation had. This report discusses the consents active to 30 June 2014 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 domestic 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, to that of 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 2014, there were a total of 22 current water take consents for general farm and domestic supply purposes. Of this eight were from surface water and 14 were from groundwater sources (Table 1).

Table 1 Total consents granted for dairy farm purposes to 30 June 2014

Consent	Consent Holder	Source
0095-2	Ashbrook Farms Limited	Surface Water
0865-3	Kathdan Trust Limited	Surface Water
1190-3	Pungarehu Farmers Group Water Scheme	Surface Water
1357-3	Oakura Farms Limited	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
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	Rata View (2008) 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	Bredin NR Family Trust	Surface Water
9900-1	Kaipip Holdings Limited	Groundwater
9910-1	PKW Farms LP	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. Also there were three consents that were granted near the end of the monitoring period (April and May 2014) so it was considered unnecessary to do an annual inspection at that time, as they were unlikely to have anything setup.

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

Sixteen of the consents had an end of year site inspection, with six of these being found to be non-compliant with their consent conditions. Table 2 list the consents inspected and whether they were compliant.

Table 2 Site inspections and compliance during 2013-2014

Consent	Consent Holder	Compliant	Reason non-compliant
0095-2	Ashbrook Farms Ltd	Yes	n/a
0865-3	Kathdan Trust Limited	No	Failure to supply records
5413-2	MJ Fahy	Yes	n/a
5990-1	ID & JA Armstrong	Yes	n/a
6372-1	Naplin Trust	No	Failure to supply records
6380-1	Caiseal Trust Partnership	No	Failure to supply records
6903-1	Awatea Hawkes Bay Trust	Yes	n/a
7272-1	Belmont Dairies Limited	Yes	n/a
7304-1	Gwerder Brothers	No	Failure to supply records
7497-1	Te Rua O te Moko 2B Ahuwhenua Trust	No	Failure to supply records
7608-1	MD Aiken Family Trust	Yes	n/a
7711-1	Pariroa Marae (The Trustees)	Yes	n/a
7783-1	Norwood Farm Partnership	Yes	n/a
9747-1	DP & JH Roper Family Trusts Partnership	No	Failure to supply records
9900-1	Kaipii Holdings Limited	Yes	n/a
7969-1	AB Middleton	Yes	n/a

All six of the non-compliances related to the non-provision of records, which has resulted in the consent holders receiving an abatement notice to provide them, as in accordance with their consent conditions.

Summary

Of the sixteen sites inspected, there was a 38% non-compliance rate, all due to the non-provision of abstraction records. Therefore there will be a greater emphasis that the consent holders need to provide records in future seasons, otherwise enforcement action will continue to occur.

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 consent being exercised.