Fonterra Whareroa
Compliance Monitoring Programme
Annual Report
2013-2014

Technical Report 2014–73

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Executive summary

Fonterra Co-operative Group Limited (Fonterra) operates a dairy processing complex located on Whareroa Road at Hawera, in the Tangahoe, Tawhiti and Tasman catchments. The company hold resource consents to allow for the abstraction of water from the Tawhiti Stream and Tangahoe River; the discharge of water treatment wastewater back to those two streams; the discharge of stormwater to unnamed tributaries of the Tawhiti Stream, the Tangahoe River and an unnamed coastal stream; the discharge of stormwater and sediment to land; the discharge of dairy factory wastewater to the Tasman Sea; the discharge of laboratory waste and unprocessable wastes to waste pits; and the discharge of emissions to air. This report for the period July 2013-June 2014 describes the monitoring programme implemented by the Taranaki Regional Council (the Council) to assess the Company's environmental performance during the period under review, and the results and environmental effects of the Company's activities.

Fonterra holds a total of 26 resource consents, which include conditions setting out the requirements that the Company must satisfy. The Company holds four consents to allow it to take and use water and for associated structures, eight consents to discharge stormwater, sediment, and back flushing from sand filters (and their associated structures) into the unnamed tributaries of the Tangahoe, Tawhiti and an unnamed coastal stream, or to land where it may enter water, six consents to discharge wastewater to the Tasman Sea along with associated structures, two consents to discharge waste to land, and six consents to discharge emissions into the air at this site.

The Council's monitoring programme for the year under review included ten site inspections; three composite samples from the outfall discharge for inter-laboratory comparison; 30 samples of stormwater pond discharge collected for physicochemical analysis; 11 grab samples of the outfall discharge for microbiological analysis; one freshwater bio-inspection downsteam of the stormwater pond discharge points; one fish survey in the Tawhiti Stream; two intertidal surveys; 30 deposition gauging samples; 12 nitrogen oxides (NO_x) samples and two periods of fine airborne particles (PM_{10}) monitoring in relation to air emissions, and auditing of monitoring data collected by Fonterra.

During the 2013-2014 year, Fonterra demonstrated a variable level of environmental performance overall. Of the 21 consents for which compliance and environmental performance could be categorised, 3 (14%) were rated 'improvement required' and 18 (86%) 'high'. During the year under review there were two incidents associated with the Whareroa site (one regarding an exceedance of stormwater BOD resulting in the issuing of an abatement notice, and one due to excessive dust during construction).

Water abstraction from the Tawhiti Stream and from the Tangahoe River were in accordance with consent conditions.

The volume of wastewater discharged from the site complied with conditions of consent **1450**. Monitoring of the wastewater by Fonterra showed that water quality of the discharges were compliant with consent conditions. Inter-laboratory comparisons showed an acceptable level of agreement between results reported by the Council and Fonterra laboratories.

The results of the marine ecological monitoring over the 2013-2014 period indicate that the combined Fonterra and South Taranaki District Council Hawera Oxidation Ponds wastewater discharge was not having detectable adverse effects on the intertidal reef communities.

The results from both the Tawhiti and Tangahoe stormwater ponds complied with all consent conditions. The Southern (unnamed) stormwater pond discharge breached the consent condition for BOD on one occasion.

A freshwater biological inspection undertaken in each of the tributaries that drain the stormwater ponds indicated that any preceding discharges from the dairy factory site had not had a significant adverse effect on the macroinvertebrate communities of the streams.

A fish survey was undertaken in the Tawhiti Stream to assess the impact of the water intake weir operated by the factory. Overall, the survey did not indicate that the intake, fish pass or discharge of sediment undertaken in relation to the Fonterra Whareroa water abstraction have had any impact on the fish communities of the Tawhiti Stream.

Emissions to air were in compliance with consent conditions and relevant air quality guidelines.

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 report is the Annual Report for the period July 2013-June 2014 by the Taranaki Regional Council (the Council) on the monitoring programme associated with resource consents held by Fonterra Co-operative Group Limited (from now on referred to as Fonterra). Fonterra operates a dairy processing complex situated on Whareroa Road at Hawera, including the Tangahoe, Tawhiti and Tasman catchments.

This report covers the results and findings of the monitoring programme implemented by the Council in respect of the consents held by Fonterra that relate to abstractions and discharges of water within the Tangahoe, Tawhiti and Tasman catchments, and the air discharge permits held by Fonterra to cover emissions to air from the site.

One of the intents of the *Resource Management Act (1991)* (RMA) is that environmental management should be integrated across all media, so that a consent holder's use of water, air, and land should be considered from a single comprehensive environmental perspective. Accordingly, the Council generally implements integrated environmental monitoring programmes and reports the results of the programmes jointly. This report discusses the environmental effects of Fonterra's use of water, land, and air, and is the 21st combined annual report by the Council for the Company.

1.1.2 Structure of this report

Section 1 sets out general information about compliance monitoring under the RMA and the Council's obligations and general approach to monitoring sites through annual programmes, the resource consents held by Fonterra, the nature of the monitoring programme in place for the period under review, and a description of the activities and operations conducted at the Whareroa site and associated catchments.

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

Section 3 discusses the results, their interpretation, 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 RMA primarily addresses environmental 'effects' which are defined as positive or adverse, temporary or permanent, past, present or future, or cumulative. Effects may arise in relation to:

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

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

1.1.4 Evaluation of environmental 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 an overall rating. The categories used by the Council, and their interpretation, are as follows:

- a **high** level of environmental performance and compliance indicates that essentially there were no adverse environmental effects to be concerned about, and no, or inconsequential (such as data supplied after a deadline) non-compliance with conditions.

- a **good** level of environmental performance and compliance indicates that adverse environmental effects of activities during the monitoring period were negligible or minor at most, or, 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, or, there were perhaps some items noted on inspection notices for attention but these items were not urgent nor critical, and follow-up inspections showed they have been dealt with, and any inconsequential non compliances with conditions were resolved positively, co-operatively, and quickly.

- **improvement required (environmental)** or **improvement required (administrative compliance)** (as appropriate) indicates that the Council may

have been obliged to record a verified unauthorised incident involving measurable environmental impacts, and/or, there were measurable environmental effects arising from activities and intervention by Council staff was required and there were matters that required urgent intervention, took some time to resolve, or remained unresolved at the end of the period under review, and/or, there were on-going issues around meeting resource consent conditions even in the absence of environmental effects. Abatement notices may have been issued.

- **poor performance (environmental)** or **poor performance (administrative compliance)** indicates generally that the Council was obliged to record a verified unauthorised incident involving significant environmental impacts, or there were material failings to comply with resource consent conditions that required significant intervention by the Council even in the absence of environmental effects. Typically there were grounds for either a prosecution or an infringement notice.

For reference, in the 2013-2014 year, 60% of consent holders in Taranaki monitored through tailored compliance monitoring programmes 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.

1.2 Process description

The Whareroa dairy factory was established in 1972 and is currently operated by Fonterra. The site processes up to 14 million litres of milk a day and produces the largest volume of dairy ingredients from a single factory worldwide. Annually, the factory produces about 428,000 tonnes of milk powder, cheese, cream, protein and lactic casein ingredients (Table 1).

Table 1 Product manufactured at Fonterra annually

Generic product	Metric tonnes/season
Whole & skim milk powders	200,000
Cheese products	95,000
Cream products	88,000
Protein products	35,000
Lactic casein	10,000
Total	**428,000**

The Whareroa site covers approximately 25 ha and is situated on Whareroa Road, east of Hawera (Photograph 1). The site includes five milk powder dryers, two cheese plants, a casein plant, a butter plant, a whey plant, a laboratory, a tanker depot, a cogeneration plant, a water treatment plant, a rail siding and storage for finished product.

Significant expansion of the factory occurred during the 1996-1997 season. Kiwi Co-operative Dairies greatly increased its milk supply area through the acquisition of small dairy companies in the South Island and the Hawke's Bay and through a merger with the Tui Dairy Company in the Manawatu. Accordingly, the construction of a number of new plants, the upgrade of several existing plants, and improvements

in waste treatment systems were undertaken during the 1996-1997 monitoring period.

Currently, the site obtains its water supply from two nearby surface waterways and supplements this with water derived from the milk process (i.e. condensate). Wastewater is discharged through a long marine outfall (1,845 m). Energy is mainly sourced from two on-site gas-fired cogeneration plants, operated as a joint venture with Todd Energy Ltd. The 68 Mega Watt plants provides all the steam and electricity requirements for the site.

The consolidation of the dairy industry in Taranaki has led to a corresponding centralisation of discharges to both air and water. In 1981 there were 22 dairy processing sites in Taranaki and the resulting discharges to air and water and abstraction of water were dispersed throughout the region. Now the environmental effects are largely confined to the activities at the Whareroa site.

Photograph 1 The Fonterra Whareroa site

1.3 Resource consents

1.3.1 Water abstraction permits

Section 14 of the RMA 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 it falls within some particular categories set out in Section 14.

Fonterra holds water permit **0047** to cover the abstraction of water from the Tawhiti Stream (Photograph 2), a tributary of the Tangahoe River, for the processing and manufacture of dairy products, cleaning of plant, and cooling purposes. This permit was re-issued by the Council on May 1996 under Section 87(d) of the RMA and the fourth version of this consent granted since 1973. It is due to expire on 1 June 2015.

There are five special conditions attached to the consent.

Condition 1 requires that the abstraction shall be managed to ensure a flow of not less than 50 litres per second (L/s) is maintained in the Tawhiti Stream at all times. Condition 2 requires Fonterra to maintain a measuring device to record daily rates of abstraction, and to supply this information to the Council upon request.

Condition 3 allows the Council the right to suspend or reduce the abstraction temporarily during extreme low flow events in order to protect the biological communities in the stream.

Condition 4 deals with review of the consent.

Condition 5 stipulates that the abstraction rate not exceed 184 L/s when flow is less than 800 L/s and turbidity is less that 150 Nephelometric Turbidity Units (NTU).

Photograph 2 Tawhiti water intake

Fonterra holds water permit **4508** to cover the abstraction of water from the Tangahoe River, for the processing and manufacture of dairy products, cleaning of plant, and cooling purposes. This permit was re-issued by the Council on September 1997 under Section 87(d) of the RMA and the second version of the consent granted since 1994. It is due to expire on 1 June 2015.

There are three special conditions attached to the consent.

Condition 1 allows the Council the right to suspend or reduce the abstraction temporarily during extreme low flow events, in order to protect the biological communities in the river.

Condition 2 requires the Company to maintain a measuring device to record daily rates of abstraction, and to supply this information to the Council upon request.

Condition 3 deals with review provisions.

Copies of these permits are attached to this report in Appendix I.

1.3.2 Water discharge permits

Section 15(1)(a) of the RMA stipulates that no person may discharge any contaminant into water, unless the activity is expressly allowed for by a resource consent or a rule in a regional plan, or by national regulations.

Fonterra holds coastal permit **1450** to cover the discharge of 40,000 cubic metres per day (m^3/day) of dairy factory wastewater into the Tasman Sea via a marine outfall. This consent was issued by the Council in September 1995 under Section 87(e) of the RMA. It is due to expire in June 2015.

An application for a change of condition on coastal permit 1450, to increase the maximum daily discharge volume limit from 26,000 m^3/day to 40,000 m^3/day, was received on 8 February 2002. The variation to consent conditions was granted on 19 September 2006. A further change to the purpose of the consent was granted on 29 June 2007, to include the temporary discharge of lactose solids from the Fonterra Kapuni site.

There are 16 special conditions attached to the consent.

Condition 1 requires the discharge of lactose solids to be managed in accordance with documentation submitted in support of the application.

Condition 2 states that lactose solids of approximately 400 m^3 be discharged prior to 1 August 2007 only.

Condition 3 requires that all whey and whey permeate to be removed from the wastewater by 31 December 1996.

Condition 4 requires the Company to maintain a loss minimisation programme to reduce product losses to wastewater throughout the term of the consent.

Condition 5 details standards relating to suspended solids, fats and chemical oxygen demand (COD).

Condition 6 required the Company to install an outfall extension which would result in the achievement of no significant visual, chemical or ecological impacts outside a mixing zone.
Condition 7 requires the Company to supply plans and design details for the outfall extension and condition 8 establishes a 200 m mixing zone which applied after the outfall had been commissioned.

Condition 9 outlines a number of numerical standards that the wastewater shall not exceed up until the time the new outfall had been installed.

Condition 10 requires that there shall be no discharge of raw or treated domestic sewage from the Whareroa site. (Domestic wastes are piped to Hawera sewerage for treatment).

Condition 11 requires the Company to provide a contingency plan outlining procedures to be taken in the event of a spillage of stored chemicals, accidental discharge, accumulation of off-specification effluent or accumulation under emergency conditions of whey or whey permeate.

Condition 12 requires the consent holder to install a system to monitor pipeline structural performance.

Condition 13 requires the consent holder to provide a report reviewing any technological advances in dairy wastewater management and how these might be applicable at the Whareroa site, and detailing any measures taken by the consent holder to improve or minimise the wastewater discharge.

Condition 14 requires the Company and Council staff to meet with submitters to the consent and any other interested party at least once a year to discuss any matters relating to the exercise of the consent and to facilitate ongoing consultation.

Conditions 15 and 16 allow the Council to undertake a review of the special conditions on the consent.

Note: South Taranaki District Council (STDC) also holds a consent to discharge from the marine outfall owned and used by Fonterra. Consent **5079** was granted on 22 March 1998 to provide for the discharge of up to 12,000 m^3/day of municipal wastes from Hawera oxidation ponds. This consent was first exercised in February 2001. Monitoring of this consent is reported separately.

Fonterra holds water discharge permits **3902, 3907** and **4133** to discharge stormwater from the Whareroa sites. These consents were originally issued by the Council in June 1999 under Section 87(e) of the RMA. The consents were re-issued during the monitoring period, on 14 February 2014, and are due to expire on 1 June 2028.

Discharge permit **3902** provides for the discharge of stormwater from the Whareroa milk processing site into an unnamed tributary of the Tangahoe River.

Discharge permit **3907** covers the discharge of stormwater, back flushing from the sand filters, and intermittent discharges of treated water from a reservoir, from the Whareroa milk processing site into an unnamed tributary of the Tawhiti Stream.

Discharge permit **4133** covers the discharge of stormwater from the Whareroa milk processing site into Unnamed coastal stream 18.
There are eight special conditions attached to consent 3907, while consents 3902 and 4133 both have nine. The conditions of these consents are essentially the same as each other and are discussed below.

Condition 1 deals with best practicable option to prevent or minimise adverse environmental effects.

Condition 2 states the catchment area for each pond.

Conditions 3 and 4 require the preparation and maintenance of contingency and stormwater management plans.

Conditions 5 to 7 deal with effects on the receiving waters.

Condition 8 (in 3902 and 4133) requires maintenance of existing fencing and plantings downstream.

Condition 9 (8 in 3907) deals with review provisions.

Fonterra held consent **4234** to cover the intermittent discharge of up to 50 L/s of chlorinated water through the existing stormwater system to an unnamed tributary of the Tawhiti Stream. This consent was issued by the Council in 1993 under Section 87(e) of the RMA. It expired in June 2010.

The consent was not renewed as it was combined with consent 3907 which covers stormwater discharges to the Tawhiti Stream.

Fonterra holds consent **4927** to cover the discharge of up to 1.05 m^3/day of river silt and sand from mechanical pre-filtering of river water during abstraction of water, by returning it into the Tawhiti Stream. This consent was issued by the Council in May 1996 under Section 87(e) of the RMA. It is due to expire in June 2015.

There are three special conditions attached to this consent.

Condition 1 requires the discharge be operated on a continuous purge basis in order to mitigate adverse effects on the Tawhiti Stream.

Condition 2 allows a 50 m mixing zone, with limits set for the suspended solids of the receiving water.

Condition 3 outlines a number of potential adverse effects in the Tawhiti Stream which shall not occur outside the 50 m mixing zone and condition 4 allows the Council to undertake a review of the special conditions on the consent.

Fonterra holds consent **5148** to cover the discharge of up to 1.2 m^3/day of river silt and sand from mechanical pre filtering of river water during abstraction of water, by returning it into the Tangahoe River. This consent was issued by the Council in May 1997 under Section 87(e) of the RMA. It is due to expire in June 2015.

There are three special conditions attached to this consent.

Condition 1 requires the discharge to be operated on a continuous purge basis in order to mitigate adverse effects on the Tangahoe River.

Condition 2 states that no adverse effects shall arise in the Tangahoe River outside the 50 m mixing zone and condition 3 allows the Council to undertake a review of the special conditions on the consent.

Fonterra holds consent **9621** to cover the discharge of stormwater and sediment from earthworks onto and into land in circumstances where it may enter water. This consent was issued by the Council on 25 July 2013 under Section 87(e) of the RMA. It is due to expire in June 2018.

There are six special conditions attached to this consent.

Condition 1 gives more information on the authorisation.

Condition 2 requires the consent holder to notify Council prior to commencement of works.

Conditions 3 and 5 deal with sediment control measures.

Condition 4 requires that exposed areas must be stabilised within 6 months of completion of disturbance activities.

Condition 6 deals with best practicable option.

1.3.3 Other water permits

Fonterra holds consent **4953** to erect, place and maintain two earth dams at the headwaters of an unnamed tributary of the Tangahoe River for stormwater collection and treatment purposes. This consent was issued by the Council in May 1999 under Section 87(e) of the RMA. It is due to expire in June 2016.

There are four special conditions attached to this consent.

Condition 1 requires the consent holder to maintain and operate the dams in a safe and appropriate manner.

Condition 2 states the notification period prior to commencement of any construction work or maintenance.

Condition 3 requires the consent holder to prevent the discharge or placement of silt and contaminants, and minimise the disturbance of the bed during construction or maintenance.

Condition 4 allows the Council to undertake a review of the special conditions on the consent.

Fonterra holds consent **5016** to allow the permanent diversion of the unnamed stream, which passes through the accessway gully for the purpose of protecting the outfall pipeline and associated structures. This consent was issued by the Council in 1996 under Section 87(e) of the RMA. It is due to expire in June 2015.

There are four special conditions attached to this consent.

Condition 1 states the notification period of three days prior to the construction or maintenance works.

Condition 2 requires the diversion to be constructed in accordance with the documentation submitted with the application.

Condition 3 requires that construction or maintenance shall be undertaken in a way that prevents the discharge or placement of silt, organics or contaminants into the stream and minimise disturbance of the stream bed.

Condition 4 allows the Council to undertake a review of the special conditions on the consent.

Fonterra holds consent **5337** to cover the damming of an unnamed tributary of the Tawhiti Stream for stormwater and backwash water collection and treatment purposes. This consent was issued by the Council in May 1997 under Section 87(e) of the RMA. It is due to expire in June 2016.

There are four special conditions attached to this consent.

Condition 1 requires 48 hours' notification to the Council prior to construction, completion and any subsequent maintenance works.

Condition 2 states that during construction or maintenance the consent holder shall prevent the discharge or placement of silt and contaminants, and minimise the disturbance of the bed.

Condition 3 requires the consent holder to operate and maintain a safe dam.

Condition 4 allows the Council to undertake a review of the special conditions on the consent.

Copies of these permits are attached in Appendix I.

1.3.4 Coastal permits

Section 12(1)(b) of the RMA stipulates that no person may erect, reconstruct, place, alter, extend, remove, or demolish any structure that is fixed in, on, under, or over any foreshore or seabed, unless the activity is expressly allowed for by a resource consent, a rule in a regional plan, or by national regulations.

Fonterra holds consent **4977** to allow Fonterra to erect, place and maintain a marine outfall and diffuser structure of approximately 1,845 metres length in the coastal marine area. Consent **4977** is a restricted coastal activity (RCA) where the consent was issued by the Minister of Conservation in 1996. It is due to expire in June 2015.

There are seven special conditions attached to this consent.

Conditions 1 and 2 require the Company to construct and maintain the structure in accordance with the documentation submitted with the application and that the Council is notified at least three days prior to the commencement of construction or any major maintenance works.

Condition 3 requires that during construction and subsequent maintenance works that every practicable measure be observed to minimise any discharge of contaminants to the environment and any disturbance of the foreshore and seabed. After construction, condition 4 requires that the intertidal construction area be reinstated as far as practicable.

Condition 5 requires that the intertidal section of the pipeline shall not be visible at any stage of the tide.

Condition 6 requires the structure to be removed and the area reinstated if and when it is no longer required.

Condition 7 allows the Council to undertake a review of the special conditions on the consent.

Fonterra holds consent **5013** to cover the construction and maintenance of a rock wall 100 m in length in the coastal marine area for the protection of the outfall, stream diversion pipelines and associated structures. This consent was issued by the Council in 1996 under Section 87(e) of the RMA. It is due to expire in June 2015.

There are eight special conditions attached to this consent.

Condition 1 requires a notification period of 3 days prior to the construction or maintenance works.

Condition 2 requires the rock wall to be constructed in accordance with the documentation submitted in support of the application.

Condition 3 states that the construction and maintenance shall be undertaken in a manner that minimises disturbance of seabed, foreshore and the discharge of contaminants.

Following completion, conditions 4 and 5 require the construction site to be reinstated and revegetated, and monitoring for any erosion affects at least 200 m either side of the rock wall.

Condition 6 states that should erosion be occurring the Company will compensate for any losses. If the consent is no longer required condition 7 states the rock wall shall be removed and the area reinstated.

Condition 8 allows the Council to undertake a review of the special conditions on the consent.

1.3.5 Air discharge permits

Section 15(1)(c) of the RMA stipulates that no person may discharge any contaminant from any industrial or trade premises into air, unless the activity is expressly allowed for by a resource consent, a rule in a regional plan, or by national regulations.

Fonterra holds air discharge permit **4103** to cover the discharge of emissions into the air arising from the manufacture and processing of milk products and associated

processes at the factory premises on Whareroa Road, Hawera. This permit was issued by the Council on September 1992 under Section 87(e) of the RMA. This consent expired on 1 June 2004 and was renewed on 4 October 2006. It is due to expire on 1 June 2025.

The consent was renewed in such a way as to 'split' the consent in two so that one of the consents would cover emissions from the milk processing plant (4103) while the other consent would cover emissions from the cogeneration and services plant (6273, discussed below). This restructure of the consent is to allow the consents to be considered separately if a change to one of the operations is sought.

There are 15 special conditions attached to consent 4103.

Conditions 1 and 2 deal with best practicable option to prevent or minimise adverse effects on the environment.

Condition 3 deals with alterations to the plant, process or operations.

Condition 4 requires the consent holder to provide the Council, within five years of granting the consent, and every six years thereafter, a report on various aspects of the air discharge.

Conditions 5 to 11 deal with various aspects of the discharge, including limits on various parameters, odour and monitoring requirements.

Condition 12 requires the consent holder to hold an annual meeting with Council and interested submitters to discuss matters pertaining to the discharge.

Condition 13 allows the processing of skim milk powder through Powder-5 only with prior notice and with a monitoring programme in place.

Conditions 14 and 15 deal with review of the consent.

Fonterra holds air discharge permit **5044** to cover the discharge of emissions into air from the disposal of laboratory wastes, unprocessable dairy wastes and stormwater sump cleanings onto and into land. This permit was issued by the Council on September 1992 under Section 87(e) of the RMA. It is due to expire in June 2022.

There are six special conditions attached to the consent.

Condition 1 requires the Company to adopt the best practicable option at all times to prevent or minimise the potential for adverse effects on the environment with respect to the discharge of odours into the air.

Condition 2 requires the exercise of this consent to be undertaken in accordance with the documentation submitted in support of the application.

Condition 3 requires the Company to provide a management plan and outline methods to adopt the best practicable option to prevent or minimise adverse effects on the environment.

Conditions 4 and 5 require that the exercise of the consent shall not result in any offensive or objectionable odour at or beyond the boundary of the property and states the definitions of an odour to be offensive or objectionable.

Condition 6 allows the Council to undertake a review of the special conditions on the consent.

Fonterra holds air discharge permit **6257** to cover the discharge of emissions into air from dual fuel boilers (gas or coal) with a maximum energy output of 250 MW together with associated processes. This permit was issued by the Council on 7 December 2005 under Section 87(e) of the RMA. It is due to expire in June 2034.

There are 29 special conditions attached to the consent.

Conditions 1, 4, 5 and 6 deal with best practicable option to prevent or minimise adverse effects on the environment.

Conditions 2 and 3 require the exercise of the consent is undertaken in accordance with documentation submitted in support of the application.

Condition 7 stipulates that the minimum height of discharges from the boiler stack are at least 60 m above ground.

Condition 8 requires that approval is gained from Council prior to significant plant alterations.

Conditions 9 to 13 deal with emission limits on discharges to the atmosphere.

Conditions 14 to 19 deal with ambient and workplace limits on discharges.

Conditions 20 to 26 deal with recording and reporting requirements.

Condition 27 requires the consent holder to conduct a liaison meeting with Council and interested submitters annually (subsequent to commissioning of the energy centre).

Conditions 28 and 29 deal with lapse and review of the consent.

Fonterra holds air discharge permit **6273** to cover the discharge of emissions into air from 'Cogen-I" and 'Cogen-II' gas fired co-generation energy generating plants (Photograph 3) with an energy output of 70 MW together with associated processes. This permit was issued by the Council on 4 October 2006 under Section 87(e) of the RMA. It is due to expire in June 2025.

There are 15 special conditions attached to the consent.

Conditions 1 and 2 deal with best practicable option to prevent or minimise adverse effects on the environment.

Condition 3 requires the consent holder to consult with the Council prior to undertaking any alterations to the plant, processes or operations.

Condition 4 requires the consent holder to provide a report on various aspects of the emissions.

Conditions 5 to 13 deal with emissions of contaminants to the atmosphere.

Condition 14 requires a suitable water treatment regime for the cooling water system.

Condition 15 deals with review of the consent.

Copies of these permits are attached in Appendix I.

Photograph 3 Air discharges from 'Cogen-I" and 'Cogen-II'

Fonterra holds air discharge permit **7465** to cover the discharge of emissions into air from the combustion of waste wood packaging (photograph 4). This permit was issued by the Council on 31 March 2009 under Section 87(e) of the RMA. It is due to expire in June 2028.

There are nine special conditions attached to the consent.

Conditions 1 and 2 detail the type and volume of waste wood allowed to be burned.

Condition 3 deals with best practicable option.

Condition 4 requires the consent holder to have regard to wind direction so that there are no adverse effects beyond the boundary of the property (Conditions 5 and 6).

Condition 7 requires that a record of each burning event is maintained.

Conditions 8 and 9 deal with lapse and review of the consent.

Fonterra holds air discharge permit **9620** to cover the discharge of contaminants (dust) to air from earthworks associated with construction activities. This permit was issued by the Council on 25 July 2013 under Section 87(e) of the RMA. It is due to expire in June 2018.

There are ten special conditions attached to the consent.

Conditions 1 and 2 require the preparation and adherence of/to a dust control management plan.

Condition 3 deals with best practicable option.

Condition 4 requires that the soil exposure not exceed 15.15 ha.

Condition 5 requires that the consent holder notify Council prior to exercising the consent.

Conditions 6 and 7 deal with dust deposition beyond the property boundary.

While conditions 8 to 10 deal with any complaints received.

Photograph 4 Burning waste wood packaging in the burn pit

1.3.6 Discharges of wastes to land

Sections 15(1)(b) and (d) of the RMA stipulate that no person may discharge any contaminant onto land if it may then enter water, or from any industrial or trade premises onto land under any circumstances, unless the activity is expressly allowed for by a resource consent, a rule in a regional plan, or by national regulations.

Fonterra holds discharge permit **4406** to cover the discharge of laboratory wastes onto and into land. This permit was issued by the Council on October 1996 under Section 87(e) of the RMA. It is due to expire in June 2022.

There are 15 special conditions attached to this consent.

Condition 1 requires the Company to adopt the best practicable option at all times to prevent or minimise the potential for adverse effects on the environment.

Condition 2 requires the exercise of this consent to be undertaken in accordance with the documentation submitted in support of the application.

Condition 3 states the daily discharge limit of 1 m^3/day.

Conditions 4 and 5 require the consent holder to provide a management plan for the discharge site and the discharge pit shall be to the satisfaction of the Chief Executive, Taranaki Regional Council.

Condition 6 states the discharge shall not occur within 50 m from any bore, well or spring used for water supply purposes, or 25 m near any surface body of water, or within 100 m from the coastal cliff edge.

Conditions 7, 8 and 9 require the disposal does not intercept the water table or lead to contaminants entering the water body from overland surface flows, or result in any adverse impacts on groundwater due to leaching.

Condition 10 states the types of wastes to be discharged shall only consist of Petri dishes, their contents and the plastic they are wrapped in.

Condition 11 requires 50 mm of earth is to cover the discharged material.

Conditions 12 and 13 requires after each pit is full, it shall be reinstated with a soil cover of 0.5 m, compacted and contoured to maintain its integrity and the vegetation re-established.

Condition 14 requires records to be kept of all uses of the pits, including date, volume discharged and product type.

Condition 15 allows the Council to undertake a review of the special conditions on the consent.

Fonterra holds discharge permit **5036** to allow for the discharge of waste material from stormwater sumps and road sump and unprocessable dairy factory wastes onto and into land. This permit was issued by the Council on February 2004 under Section 87(e) of the RMA. It is due to expire in June 2022. Changes were made to the conditions of the consent in December 2012 in order to provide for irrigation of unprocessable wastes onto land.

There are 18 special conditions attached to this consent.

Condition 1 of this consent requires that the consent holder shall adopt the best practicable options to prevent or minimise any adverse effects on the environment from the exercise of this consent.

Condition 2 states application loading limits for when irrigating unprocessable dairy factory wastes to land.

Condition 3 requires that the consent is undertaken in accordance with documentation submitted in support of the applications.

Condition 4 provides the allowable volumes of discharge of the different types of waste.

Condition 4 requires the Company to provide a management plan for the discharge site within three months of granting the consent, and updated regularly as required.

Conditions 6 and 7 require that the discharge shall not occur within 50 m of any bore, well or spring used for water supply purposes, nor within 25 m of any surface water body, or within 100 m from the coastal cliff edge, and the disposal pits shall not intercept the water table.

Conditions 8 and 9 require that the exercise of the consent shall not lead to contaminants entering a waterbody from overland surface flows, or result in any adverse impacts on groundwater as a result of leaching, or surface water including aquatic ecosystems.

Conditions 10 and 11 require that the discharged material shall be covered with up to 50 mm of earth or suitable cover, within a period of 7 days, and all liquid shall be removed from the disposal pit prior to the application of covering material.

Condition 12 states that only materials authorised by the consent and outlined in the consent application shall be discharged to the disposal pits, all non-biodegradable material shall be removed before the material is discharged.

Conditions 13 and 14 require each disposal pit to be reinstated soil cover with a minimum thickness of 0.5 m to be placed over the material and the vegetation re-established. The consent holder also shall compact, contour and maintain the cover layer of soil to ensure its integrity at all times.

Condition 15 states that disposal of waste shall not give rise to objectionable or offensive odours beyond the property boundary.

Condition 16 requires the consent holder to maintain a record of all discharges to land including date, volume discharged, product type, and the reason for discharge and that these records be available to the Council upon request.

Condition 17 states that the discharge of unprocessable waste shall only occur after all other reasonable waste disposal options have been exhausted.

Condition 18 allows the Council to undertake a review of the special conditions on the consent.

Copies of the above permits are attached in Appendix I.

1.3.7 Land use consents

Section 13(1)(a) of the RMA stipulates that no person may, in relation to the bed of any lake or river, use, erect, reconstruct, place, alter, extend, remove, or demolish any structure or part of any structure in, on, under or over the bed, unless the activity is expressly allowed for by a resource consent, a rule in a regional plan, or by national regulations.

Fonterra holds consent **5015** to dam an unnamed stream which passes through the accessway gully for stream flow control and marine outfall pipeline installation purposes. The unnamed stream is dammed approximately 700 m from the cliff edge to create a pond. This consent was issued by the Council in 1996 under Section 87(e) of the RMA. It is due to expire in June 2015.

Fonterra holds consent **5017** to cover the drainage and excavation of the bed of the unnamed stream and the use of that bed to erect, place, use and maintain outfall and stream diversion pipeline associated structures. This consent was issued by the Council in 1996 under Section 87(e) of the RMA. It is due to expire in June 2015.

There are six special conditions attached to this consent.

Condition 1 states the notification period of 3 days prior to the construction or maintenance works.

Condition 2 requires the drainage and excavation to be constructed in accordance with the documentation submitted with the application.

Condition 3 requires the outfall and stream diversion pipelines and any associated structures shall keep in with the natural character of the coastal environment. Following construction condition 4 states that the site will be revegetated. If the consent is no longer needed condition 5 requires the outfall and stream diversion pipelines to be removed and the areas reinstated.

Condition 6 allows the Council to undertake a review of the special conditions on the consent.

Fonterra holds consent **5143** to provide for the construction and maintenance of the water intake structure in the Tangahoe River. This consent was granted in May 1997 under Section 87(d) of the RMA. The structure must conform to a specified design, with a minimum amount of disturbance to the riverbed. It is due to expire on June 2015.

There are six special conditions attached to this consent.
Fonterra holds consent **5845** to remove, reconstruct, erect, place, and maintain dam and fish pass for the Tawhiti Stream water intake structure. This consent was granted on 31 July 2001 under Section 87(d) of the RMA to provide for replacement of the existing (unlicensed) water intake structure and associated fish pass on the Tawhiti Stream. The structure must conform to a specified design, with a minimum amount of disturbance to the riverbed, and not obstruct the passage of fish. It is due to expire on June 2015.

There are 13 special conditions attached to this consent.

Copies of these land use consents are attached in Appendix I.

1.4 Monitoring programme

1.4.1 Introduction

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

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.

The monitoring programme for the Whareroa site consisted of six primary components.

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

The Whareroa site was visited ten times during the monitoring period. With regard to consents for the abstraction of or discharge to water, the main points of interest were plant processes with potential or actual discharges to receiving watercourses, including contaminated stormwater and process wastewaters. Air inspections focused on plant processes with associated actual and potential emission sources and characteristics, including potential odour, dust, noxious or offensive emissions. Sources of data being collected by the consent holder were identified and accessed, so that performance in respect of operation, internal monitoring, and supervision could be reviewed by the Council. The surrounding area was surveyed for environmental effects.

Four additional inspections were undertaken in relation to consents **9620** and **9621**. Inspections focused on the controls in place for the discharge of dust, silt and sediment from exposed soil during construction works associated with the dry store expansion.

1.4.4 Chemical sampling

1.4.4.1 Water

The stormwater discharge was sampled on ten occasions (from three points) and the samples analysed for alkalinity, COD, biological oxygen demand (BOD and filtered carbonaceous BOD), conductivity, pH, free and total chlorine, oil and grease and suspended solids.

The outfall discharge was sampled on 11 occasions and analysed for *E. coli* and enterococci, total grease, suspended solids, COD, pH and conductivity.

Inter-laboratory comparisons of a 24 hour flow-proportional sample were carried out on three occasions and analysed for conductivity, pH, fats, COD, alkalinity, BOD, suspended solids, nitrogen, phosphorus, faecal coliforms and turbidity.

1.4.4.2 Air

The Council undertook sampling of both the emissions from the site and the ambient air quality in the areas surrounding the site.

Deposition gauges were placed at five selected sites in the vicinity of the factory on six occasions. The samples collected were analysed for total deposited milk powder and pH.

Monitoring of ambient nitrogen oxides (NO_x) levels at the site was conducted on three occasions at four sites. This monitoring involved placing NO_x passive absorption discs at four sampling sites for between two to four weeks. The discs were sent to an external laboratory for analysis.

A 'DustTrak' monitor was deployed on two occasions in the vicinity of the site for approximately 48 hours each time in order to monitor levels of inhalable particulates (PM_{10}).

1.4.5 Freshwater surveys

A biological inspection was performed on one occasion in tributaries of the Tawhiti Stream, Tangahoe River and unnamed coastal stream, to determine whether or not the discharge of stormwater from the site has had a detrimental effect upon the biological communities of the streams.

A fish survey was undertaken in the Tawhiti Stream in order to assess if the intake, fish pass, or discharge of sediment undertaken in relation to the Fonterra Whareroa water abstraction have had any impact on the fish communities of the Tawhiti Stream.

1.4.6 Marine ecological surveys

A marine ecological survey was performed on two occasions at sites on the coast surrounding the marine outfall to determine whether the discharge of wastewater through the outfall has had a detrimental effect upon the intertidal marine communities.

1.4.7 Review of Fonterra monitoring data

Fonterra routinely monitors the wastewater discharge for a number of chemical and biochemical parameters. Results are forwarded to the Council along with data relating to abstractions from the Tangahoe catchment.

Fonterra also carried out air testing, supplying results for total particulate concentration from the milk powder to the Council. The Council undertook a review of all data upon receipt.

2. Results

2.1 Water

2.1.1 Inspections

Routine site inspections were conducted on a monthly basis throughout the 2013-2014 dairy season. A total of ten inspections were undertaken between August 2013 and May 2014, which included a full inspection of the site covering stormwater management, chemical storage, truck wash areas, and general site maintenance and management. Inspection of the three stormwater discharges and the wastewater discharge to the Tasman Sea were also part of the visits.

Overall, site management was found to be good throughout the monitoring period. Minor issues, such as small leaks, bunds that required emptying, and rubbish that needed to be removed from sumps were noted during some inspections, however these were generally resolved promptly by Fonterra. Moderate to high milk powder deposition was occasionally observed on site.

An additional four inspections were conducted during early 2014 in relation to earthworks for the construction of the dry goods store expansion under consents **9620** and **9621**. Inspections focused on the controls in place for the discharge of dust, silt and sediment from exposed soil during the construction of the dry store expansion.

Consent conditions were being complied with at the time of the inspections.

Controls in place to minimise silt and sediment discharge from the site included stormwater being collected in a retention pond, with water stored within the retention pond then used to fill water carts which are discharged on site to minimise the discharge of dust. There was no visible impact to the downstream receiving water as a result of the earthworks.

There was no noticeable dust beyond the site boundary during any of the inspections. Measurements were taken on one occasion for suspended particulate matter, both on site and beyond the site boundary downwind of the earthworks and construction site. All results were below those prescribed in consent conditions.

Some stabilisation had been undertaken with vegetation.

2.1.2 Water abstraction

Fonterra holds consents to take water at two points in the Tangahoe catchment up to a total volume of 30,000 m^3/day. The abstraction points are situated on an unnamed tributary of the Tawhiti Stream (consent **0047**), and on the Tangahoe River below the confluence (consent **4508**).

The maximum allowable rate of abstraction from the Tawhiti Stream is reduced from 30,000 to 15,900 m^3/day when the flow of the stream is below 800 L/s, and the turbidity of the water at the Tangahoe intake is less than 150 NTU. A residual flow of 50 L/s must be maintained in the Tawhiti Stream.

The maximum allowable rate of abstraction from the Tangahoe River (Photograph 5) is 16,000 m^3/day.

Exercise of the two consents is monitored by both Fonterra and the Council. Fonterra measures abstraction rate continuously for both intakes. Daily abstraction rate data are supplied on a monthly basis to the Council for review. The Council maintains a telemetered hydrologic recorder in the Tawhiti Stream downstream of the abstraction point to monitor compliance with flow restrictions on consent 0047.

Photograph 5 Tangahoe River intake

A summary of the abstraction data provided by Fonterra is presented in Table 2. The hydrograph for the Tawhiti Stream below Fonterra's intake, at Duffy's Farm, for the 2013-2014 monitoring period is shown in Figure 1. Compliance with conditions on maximum allowable abstraction rate has been determined in terms of number of days that limits were breached.

Table 2 Summary of abstraction rate data for 2013-2014

Month	Tawhiti Stream			Tangahoe River			Total abstraction		
	Mean m^3/day	Max m^3/day	Breach days	Mean m^3/day	Max m^3/day	Breach days	Mean m^3/day	Max m^3/day	Breach days
July	11,370	15,170	0	2,191*	3,124	0	11,864	16,539	0
August	14,117	15,536	0	5,129	9,484	0	19,246	23,517	0
September	14,720	15,353	0	8,516	11,252	0	23,093	26,021	0
October	14,831	19,092	0	7,951	9,409	0	22,782	24,579	0
November	14,514	14,916	0	8,572	10,574	0	23,087	25,203	0
December	14,411	14,932	0	9,126	10,171	0	23,537	24,935	0
January	14,360	15,098	0	9,031	10,752	0	23,390	25,489	0
February	11,788	14,510	0	11,867	13,624	0	23,655	26,197	0
March	9,688	11,054	0	9,890	13,297	0	19,579	23,056	0
April	10,627	13,481	0	7,406	8,814	0	18,033	20,063	0
May	9,812	13,050	0	5,956	9,071	0	15,768	19,611	0
June	4,393	7,726	0	3,180**	4,181	0	4,711	10,830	0

* Mean for days when water was abstracted - 25th July to 31st July
** Mean for days when water was abstracted - 1st June to 3rd June

The flow of the Tawhiti Stream regularly dropped below the 800 L/s consent limit over the monitoring period (Figure 1). The limit on maximum abstraction rate of 15,900 m³/day when flow in the stream dropped below 800 L/s was complied with throughout the monitoring period.

The results obtained from the Council's telemetered hydrologic recorder in the Tawhiti Stream shows that the minimum residual flow of 50 L/s, required under consent **0047,** was maintained throughout the reporting period. The lowest flow recorded during the 2013-2014 period was 209 L/s on 25 February 2014.

For the Tangahoe River abstraction, the maximum limit of 16,000 m³/day was complied with throughout the monitoring period. The maximum daily abstraction rate was 13,624 m³ on 18 February 2014. An abstraction rate of up to 30,000 m³/day in the Tangahoe catchment was complied with throughout the monitoring period.

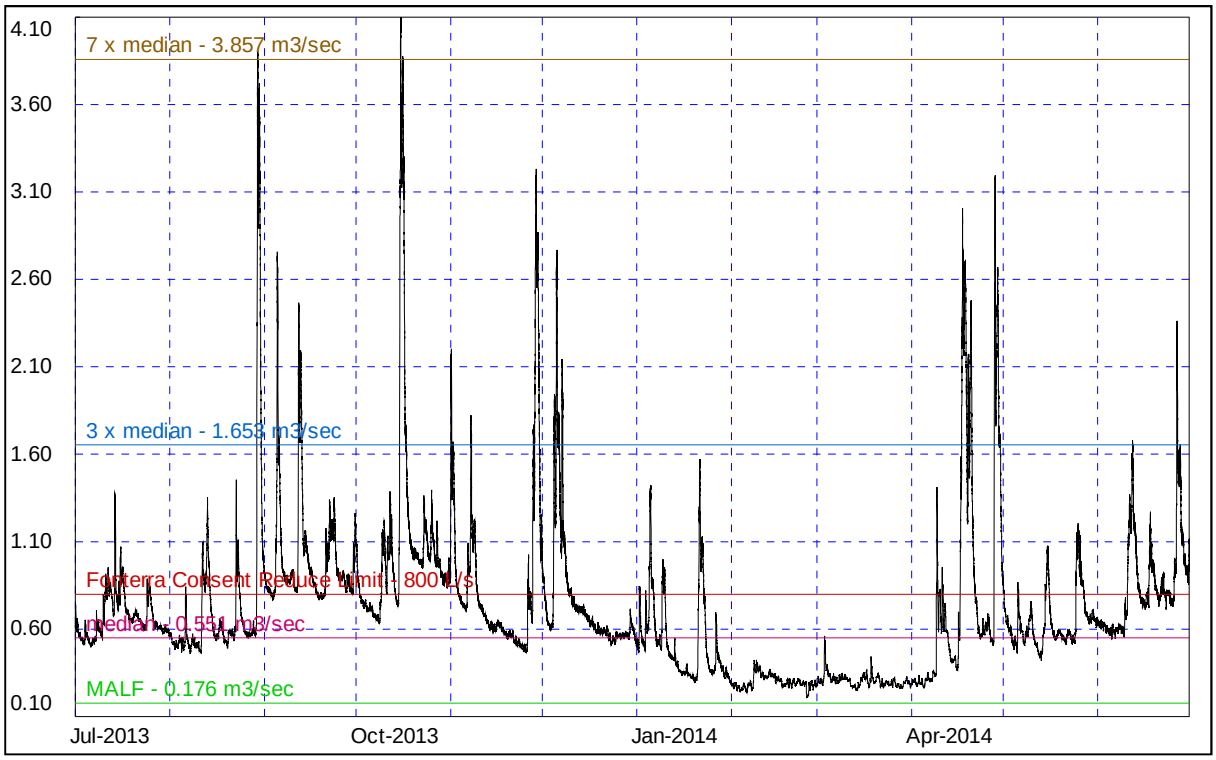

Figure 1 Tawhiti Stream flow (m^3/second) at Duffy's Farm from 1 July 2013 to 30 June 2014

2.1.3 Wastewater discharge

2.1.3.1 Composite samples

Fonterra forward monitoring results to the Council monthly. This includes daily discharge volume, fats, COD, pH, suspended solids, and mean daily temperature of the discharge. The chemical measurements are based on 24 hour flow-proportioned composite samples. A summary of wastewater volume data for the period under review is provided in Table 3.

Table 3 Summary of wastewater volume data for 2013-2014

Month	Mean m^3/day	Maximum m^3/day	Non-compliance (days) < 40,000 m^3/day
July	5,770	11,087	0
August	20,629	29,437	0
September	30,221	33,893	0
October	29,954	32,386	0
November	30,225	34,120	0
December	30,376	33,706	0
January	29,960	33,451	0
February	27,859	31,173	0
March	22,003	26,409	0
April	19,225	23,289	0
May	14,166	20,674	0
June	2,904	7,397	0

The highest maximum daily volume discharged was 34,120 m^3 on 28 November 2013. The highest average volume discharged per day occurred in the month of December (30,376 m^3). This coincided with the period of highest processing throughput. As in the previous three monitoring periods, the maximum allowable discharge rate of 40,000 m^3/day was not exceeded.

Daily discharge volumes for the 2013-2014 monitoring period are presented in Figure 2. The wastewater composition discharged through the outfall in terms of daily values for suspended solids, COD and fat concentrations, as supplied by Fonterra, is shown in Figures 3, 4, and 5 and summarised in Tables 4 and 5.

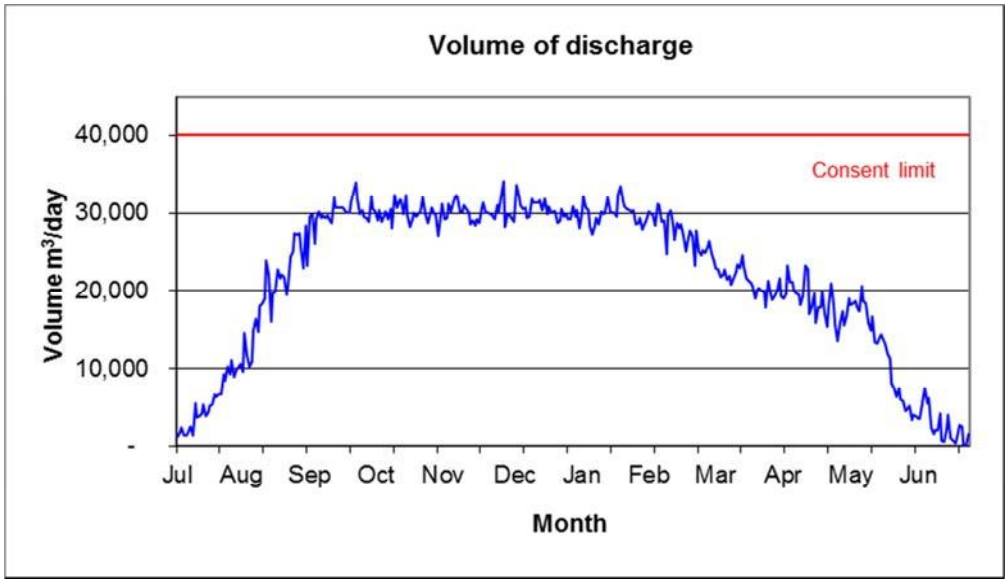

Figure 2 Volume of wastewater discharged through the Fonterra ocean outfall

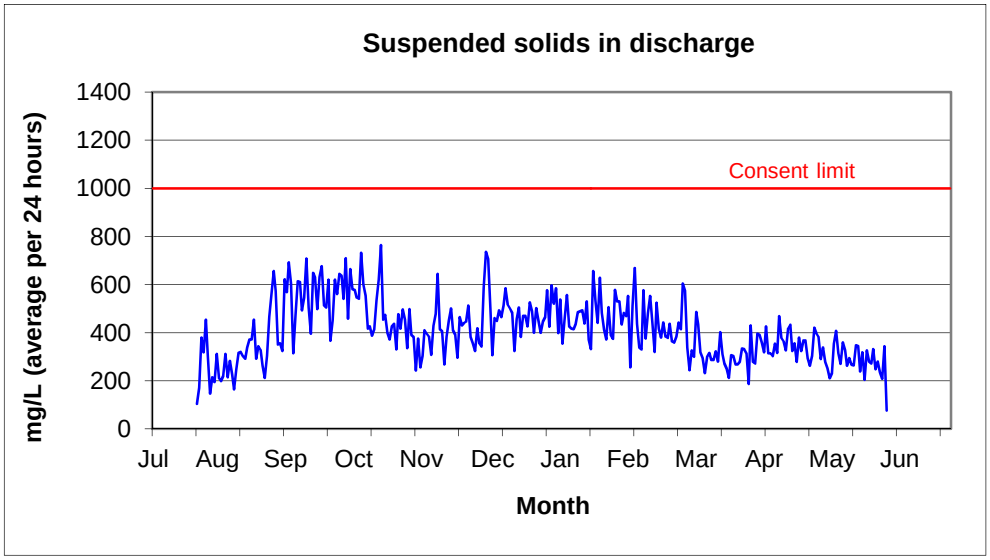

Figure 3 Concentration of suspended solids in wastewater discharge

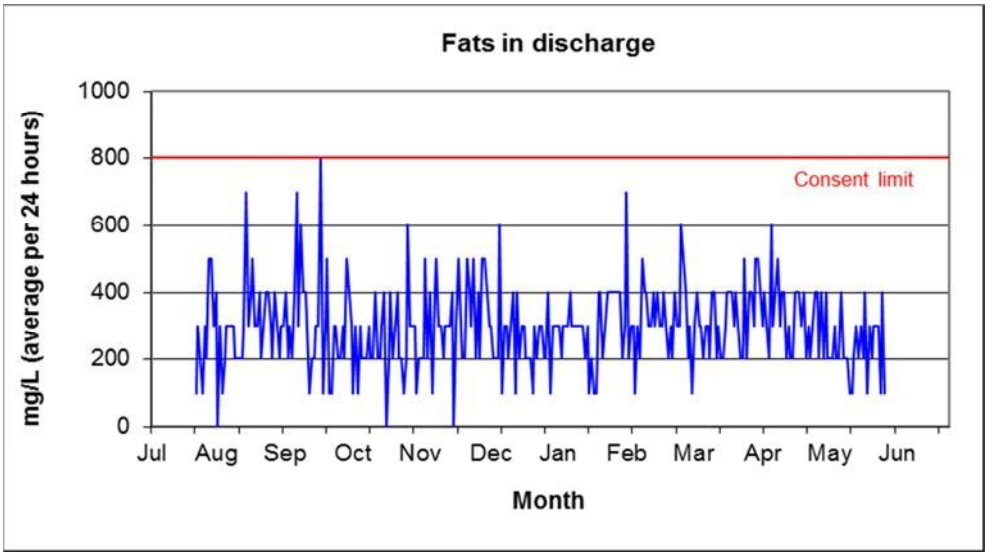

Figure 4 Concentration of fats in wastewater discharge

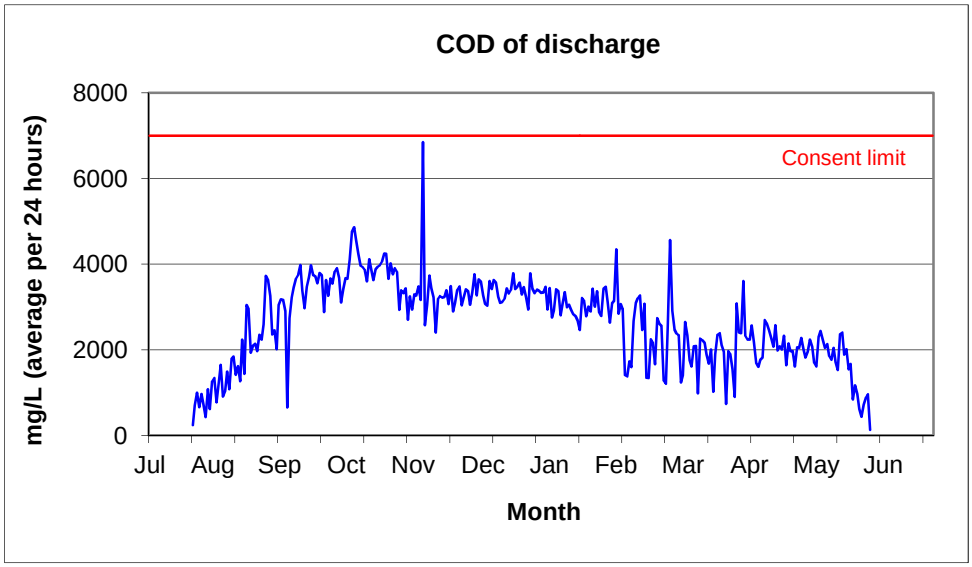

Figure 5 COD in wastewater discharge

It should be noted that these data relate to 24 hour flow proportioned samples, and therefore represent daily average values. The Council analysed three (24 hour flow proportioned) samples taken from the discharge of this wastewater and these results are presented in Section 2.1.3.3 (Table 7).

The discharge volumes, and the concentrations of suspended solids, COD and fats contained within the discharge complied with consent conditions during the monitoring period.

For the 2013-2014 dairy season, 7,996,558 m^3 of wastewater was discharged through the outfall, an increase from the previous monitoring period when 7,149,150 m^3 was discharged.

Table 4 Summary of wastewater composition data for 2013-2014

Month	Suspended solids		Fat		COD	
	Mean (mg/L)	Max (mg/L)	Mean (mg/L)	Max (mg/L)	Mean (mg/L)	Max (mg/L)
July	255	454	300	500	820	1,344
August	350	656	300	700	2,086	3,725
September	563	710	300	800	3,405	3,981
October	462	764	200	600	3,828	4,862
November	422	736	300	500	3,355	6,852
December	477	706	300	600	3,381	3,787
January	470	656	300	400	3,047	3,474
February	440	668	300	700	2,487	4,560
March	316	574	300	500	1,946	3,086
April	350	468	300	600	2,187	3,607
May	293	408	200	400	1,675	2,441
June	76	76	100	100	132	132
Consent limit	≤ 1,000		≤ 800		≤ 7,000	

NB: The factory is not operational in June.

Table 5 provides a monthly summary of total volumes discharged of various parameters for both the 2012-2013 and 2013-2014 seasons.

Table 5 Summary of wastewater mass discharge rate data for 2012-2013 and 2013-2014

Month	Volume m^3		Suspended solids (tonnes)		Fat (tonnes)		COD (tonnes)	
	2012-13	2013-14	2012-13	2013-14	2012-13	2013-14	2012-13	2013-14
July	148,828	178,872	22	27	21	28	70	87
August	566,066	639,497	161	238	153	199	1,141	1,427
September	842,509	906,625	302	509	222	286	2,650	3,089
October	897,144	928,574	409	430	298	229	3,454	3,556
November	879,028	907,353	378	382	214	290	3,254	3,046
December	892,792	941,665	392	449	259	245	2,973	3,183
January	820,458	928,772	324	437	235	278	2,339	2,828
February	652,943	780,049	299	344	177	256	1,707	1,941
March	585,344	682,103	215	216	204	208	1,444	1,335
April	435,998	576,755	133	202	130	200	910	1,262

Month	Volume m^3		Suspended solids (tonnes)		Fat (tonnes)		COD (tonnes)	
	2012-13	2013-14	2012-13	2013-14	2012-13	2013-14	2012-13	2013-14
May	340,193	439,159	100	130	89	108	606	794
June	87,729	87,133	-	-	-	-	-	-
Total	7,149,150	7,996,558	2,735	3,364	2,002	2,327	19,633	22,548

NB: The factory is not operational in June

The amount of suspended solids discharged through the outfall in 2013-2014 increased 23% (by 629 tonnes) from the 2012-2013 season. Fat discharged increased 16% (325 tonnes) compared with 2012-2013. COD increased 15% (by 2,915 tonnes) compared with 2012-2013.

2.1.3.2 Grab samples

Grab samples of the wastewater, prior to discharge through the Fonterra outfall, were collected by the Council on 11 occasions during the 2013-2014 dairy season. These samples were analysed for conductivity, pH, turbidity, total grease, *E. coli* and enterococci bacteria.

The main purpose of collecting the grab samples was to measure the microbiological quality of the discharge, which cannot be undertaken on 24 hour composite samples. These results also allow an assessment of the range of effluent component concentrations, rather than the 'average' results that are produced by composite samples.

Total grease concentrations were below the levels prescribed by consent **1450** on all occasions. COD values exceeded the consent limit on one occasion, while suspended solids concentrations exceeded the consent limit twice. As the consent limits in special condition 5, consent **1450** apply to the composite samples and not the grab samples, these exceedances do not count as a breach of consent.

High concentrations of faecal indicator bacteria, in particular enterococci, were recorded in the grab samples (Table 6). The discharge of domestic wastes in the dairy wastewater itself is specifically prohibited, and this condition was complied with. It is not unusual for high numbers of faecal indicator bacteria to be found in dairy factory wastewater in the absence of domestic wastes, as has been found elsewhere in the country e.g. at Clandeboye and Westland Milk Hokitika (Palliser *et al*., 2013 and referenced therein). In order to determine whether elevated numbers of faecal indicator bacteria in the wastewater occur as a result of faecal contamination (e.g. from birds and rodents) or growth of environmental strains, further testing of waste streams is currently being undertaken by Fonterra (Palliser *et al*., 2013).

In all grab samples, enterococci counts were notably higher than those for *E. coli*. Enterococci are more tolerant of extreme growth conditions than faecal coliforms (including *E. coli*), with the high temperatures and variable pH occurring in the wastewater potentially depressing the growth of the latter (Palliser *et al*., 2013).

Table 6 Results of analyses of wastewater grab samples for 2013-2014

Date	Temp (ºC)	COD g/m³	Conductivity (20ºC mS/m)	pH	SS g/m³	Total grease g/m³	*E. coli* cfu/100ml	Enterococci cfu/100ml
7-Aug-2013	29.5	150	224	11.9	79	<5	<16	<160
11-Sep-2013	30.1	1,080	337	12.1	960	610	<16	70
2-Oct-2013	28.5	3,900	205	10.3	210	11	<16	$4.0x10^4$
22-Oct-2013	29.4	300	310	11.7	360	57	<11	$7.0x10^4$
6-Nov-2013	27.5	1,600	135	10.4	330	94	-	$2.7x10^4$
4-Dec-2013	27.5	2,600	202	4.7	290	160	$5.4x10^3$	$2.8x10^4$
8-Jan-2014	28.8	4,300	188	7.4	**1,240**	270	$>1.6x10^4$	$8.5x10^6$
11-Feb-2014	29.8	910	91	10.8	230	118	10	$7.8x10^3$
12-Mar-2014	27.6	1,600	181	4.6	410	270	10	$1.1x10^5$
3-Apr-2014	34.9	**8,320**	290	8.2	**2,000**	370	$1.1x10^5$	$8.7x10^4$
7-May-2014	30.9	610	94	10.9	130	30	<16	<160
Consent limit (composite samples)		**≤7,000**			**≤1,000**	**< 800**		

2.1.3.3 Inter-laboratory comparisons

An inter-laboratory comparison was performed on three occasions during the 2013-2014 season on the 24 hour flow proportioned samples taken from the wastewater discharge. The results obtained by both laboratories are presented in Table 7.

Table 7 includes an agreements column which summarises the acceptability of the difference in each result for the two laboratories. Differences of less than 10% of the mean of the two values were considered acceptable. Differences of 10-25% are considered to constitute a difference between the two laboratories and a difference of greater than 25% are considered significantly different.

The level of suspended solids in the sample collected in October 2013 was within 10-25 % of the mean, while there was an acceptable level of agreement between the two laboratories with regards to suspended solids and COD results in the remaining samples.

Table 7 Inter-laboratory comparison performed on 24 hour composite wastewater sample 2013-2014

Parameter	Unit	2-Oct-2013			8-Jan-2014			12-Mar-2014		
		TRC	Fonterra	Agree	TRC	Fonterra	Agree	TRC	Fonterra	Agree
Conductivity @ 20°C	mS/m	235			202			188		
pH	pH	9.3			9.2			112		
Total alkalinity	g/m^3CaCO_3	254			218			459		
Suspended solids	g/m^3	420	546	*	400	416	✓	380	315	✓
Total grease/fats	g/m^3	83			160			120		
COD	g/m^3	3,400	4,111	✓	3100	2,807	✓	1,800	2,087	✓
BOD	g/m^3	2,040			1900			1,500		
Total nitrogen	g/m^3	283			139			109		
Total phosphorus	g/m^3	51			41			19		
Faecal coliforms	cfu/100ml	$1.3x10^4$			$3.5x10^2$			$2x10^3$		

Note: ✓ = acceptable agreement
* = within 10% - 25% difference from the mean
** = significantly different (i.e. > 25% difference from the mean)

2.1.4 Marine ecological surveys

In order to assess the effects of the Whareroa dairy factory and Hawera Waste Water Treatment Plant combined outfall discharge on the nearby intertidal communities, surveys were conducted in November 2013 (peak season) and March 2014 (post-peak season) at four sites (Figure 6, see Appendix II for photographs). The two survey reports, including statistical analysis of results and further discussion of the findings, are included in Appendix II. Section 2.1.4 summarises the main findings of these survey reports.

These surveys included three potential impact sites either side of the outfall (two southeast and one west) and one control site to the northwest. It is expected that adverse effects of the marine outfall discharge on the intertidal communities would have been evident as a significant decline in species richness and diversity at the potential impact sites relative to the control site. No such adverse effects were evident during the 2013-2014 season. During both the November 2013 and March 2014 surveys, both species richness and diversity were higher at the two potential impact sites closest to the outfall relative to the control site, and results from sites closest to the outfall have not declined notably in recent years, therefore the results indicate that the marine outfall discharge was not having detectable adverse effects on the intertidal reef communities of South Taranaki. Natural environmental factors, including coastal erosion, exposure and substrate mobility, appeared to be dominant drivers of species richness and diversity at the sites surveyed.

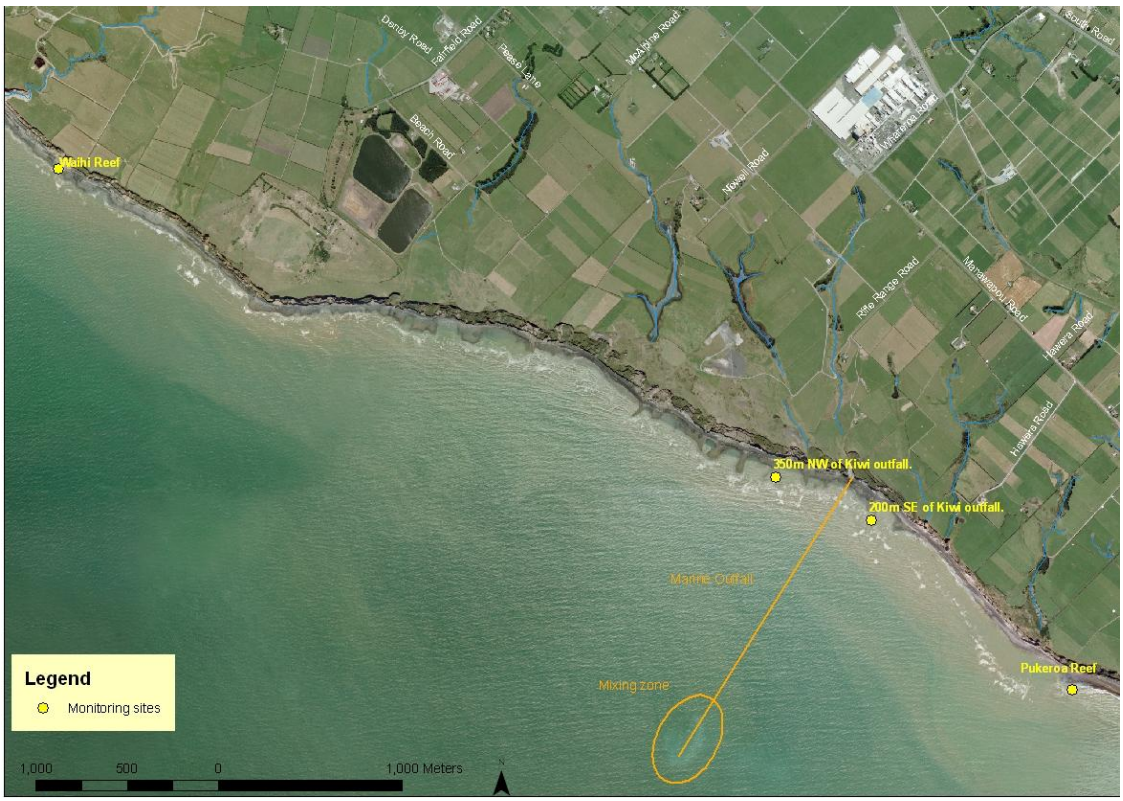

Figure 6 Location of the four intertidal survey site

From the historical record it can be seen that prior to the installation of the long marine outfall in August 1997, generally there was lower species richness and diversity (number of species and Shannon-Weiner Index per quadrat) at the impact site 200 m SE relative to the control site at Waihi Reef (Figures 7, 8, 9 and 10). Other

adverse effects observed at the time included the coating of rocks and tidal pools with fats and significant coverage by filamentous algal and bacterial species (Appendix II). A sharp increase in species diversity occurred at the site 200 m SE following installation of the outfall (Figures 7 and 8). Since then (August 1997), sites have shown inter-annual variability in both number of species and Shannon-Weiner Index, but there has been no noticeable difference in trends between the impact site and the control sites over this period.

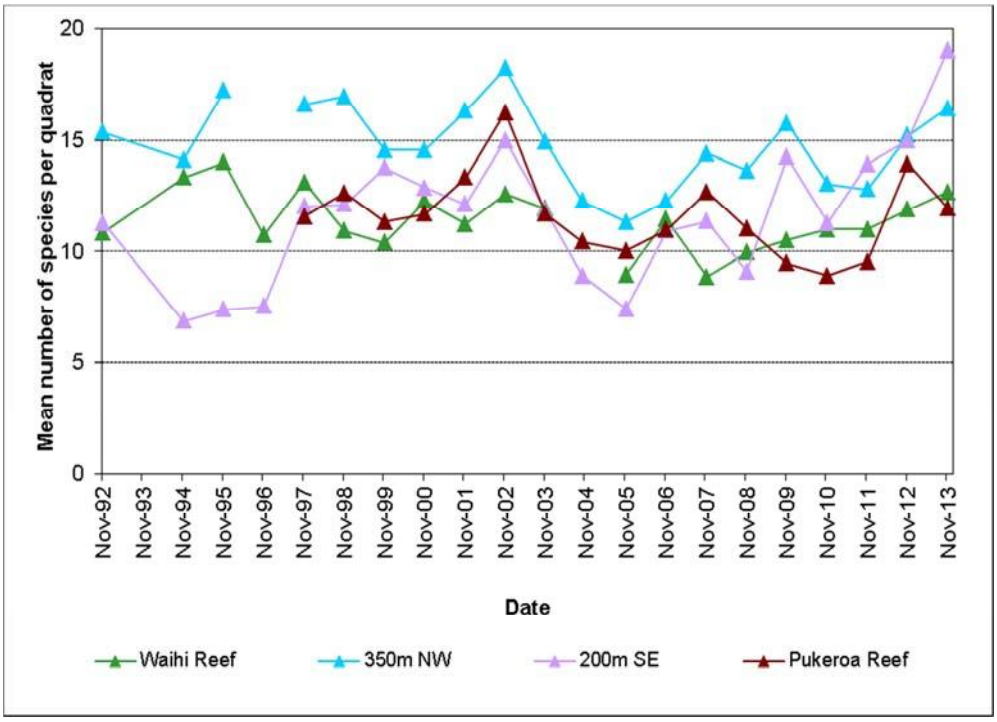

Figure 7 Mean number of species per quadrat: spring surveys 1992-2013

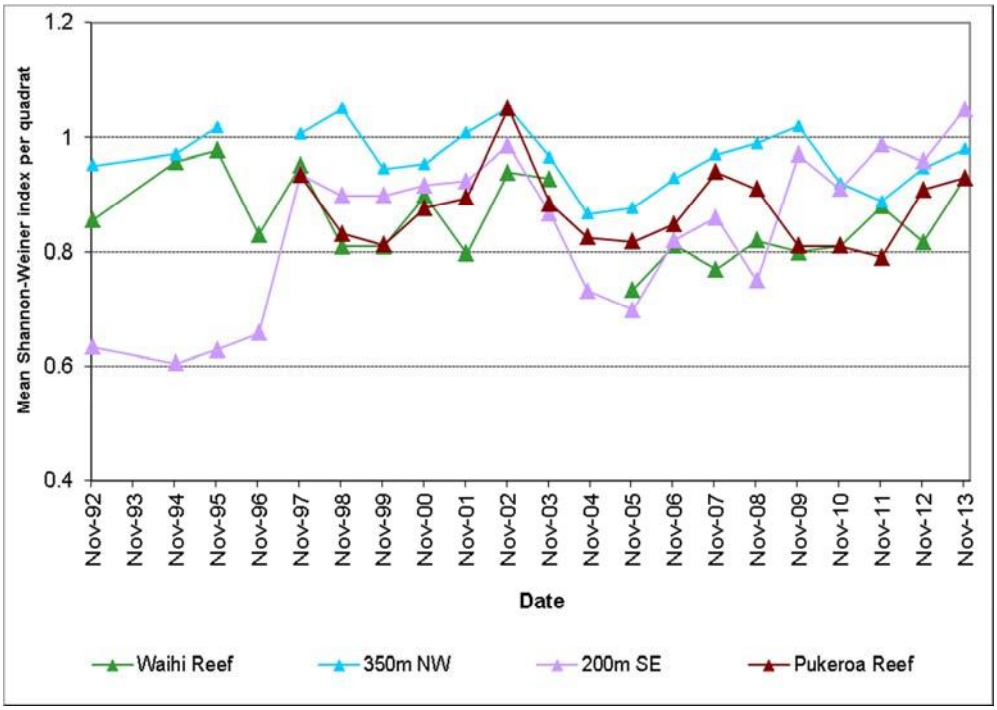

Figure 8 Mean Shannon-Weiner index per quadrat: spring surveys 1992-2013

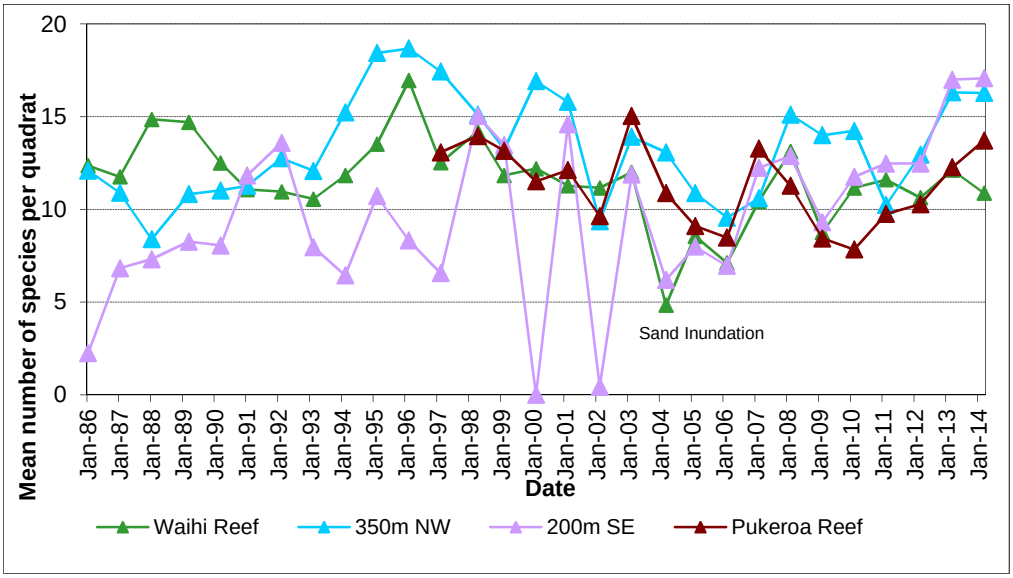

Figure 9 Mean number of species per quadrat: summer surveys 1986-2014

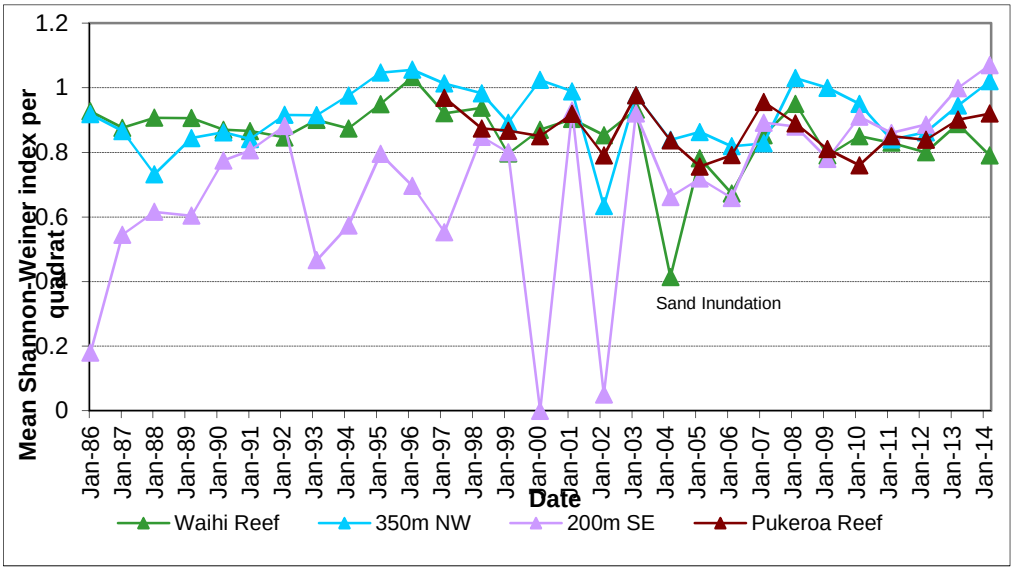

Figure 10 Mean Shannon-Weiner index per quadrat: summer surveys 1986-2014

2.1.5 Stormwater discharges

There are three stormwater catchments covering the Whareroa site. The northern catchment drains to an unnamed tributary of the Tawhiti Stream (consent **3907**), the eastern catchment to an unnamed tributary of the Tangahoe River (consent **3902**), while the southern catchment drains to an unnamed coastal stream (consent **4133**). The discharge to the unnamed tributary of the Tawhiti Stream can also include intermittent discharges of back flushing from sand filters and chlorinated water from the water reservoir. The approximate stormwater catchment areas at the Whareroa site are shown in Figure 11.

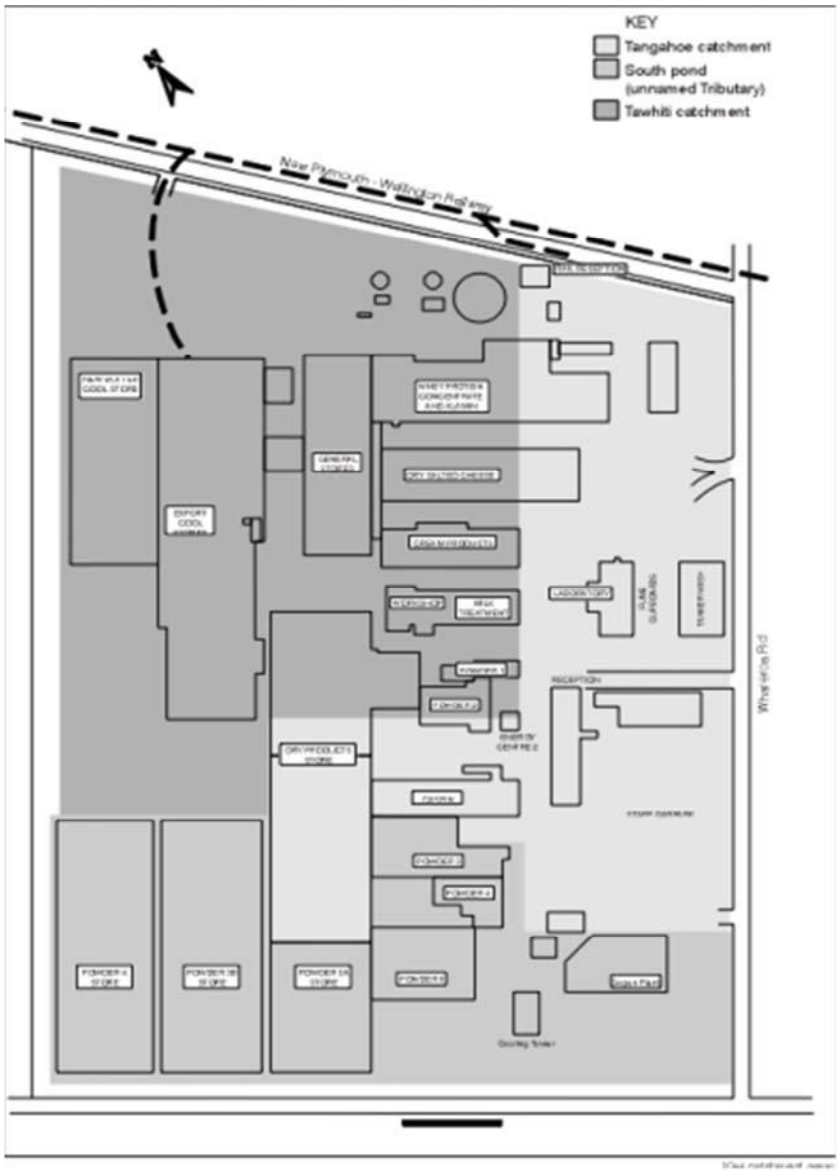

Figure 11 Approximate stormwater catchments at the Whareroa site

Each of the discharges are from a detention pond system designed to contain any spillage that occurs on the site and to attenuate storm flows. The two-pond system in the Tangahoe catchment was completed in May 1996. The benefits of this system were immediately apparent in the results of monitoring in the unnamed tributary.

There is a single pond and wetland in the Tasman catchment (the unnamed coastal stream).

The detention pond system at the headwaters of the unnamed tributary of the Tawhiti Stream (Photograph 6) was upgraded in July 1998. The previous single pond rapidly filled with sediment from sand filter back flushing and was therefore ineffective as a detention pond. This pond was replaced with a three-pond system. In response to Abatement Notice 11657, issued February 2011, Fonterra undertook extensive works on the Tawhiti stormwater system during 2011 in order to prevent the growth of sewage fungus in the Tawhiti stormwater ponds and the downstream tributaries. These works included cleaning out the third settlement pond, modifying the outlet structures between the three ponds and repairs to the stormwater isolation

sump adjacent to the water treatment plant. A marked improvement in pond water quality has occurred following completion of these works (Section 2.1.5.1, Table 9).

Photograph 6 Tawhiti stormwater pond following remedial work

In a voluntary initiative, Fonterra has fenced off and planted areas around the ponds with native vegetation and wetland plants (Photograph 7), to create wetlands that will help maintain the health and habitat of the small streams that receive the discharges. The plantings are progressively being extended down the riparian margins under Riparian Plan 372, and have been found to be well tended during inspections by the Council.

During the 2013-2014 reporting period, the monitoring of stormwater discharges consisted of chemical monitoring of the stormwater discharge to each of the unnamed tributaries, a freshwater biological inspection in each of the unnamed tributaries and a fish survey in the Tawhiti Stream.

Photograph 7 Fencing and riparian planting around the southern pond

2.1.5.1 Chemical monitoring

In the Council's 2009-2010 Annual Report, it was recommended to increase stormwater sample collection to every inspection (as opposed to the usual five per year), as sewage fungus had been found downstream of the Tawhiti pond discharge. In addition it was recommended that each sample was additionally tested for filtered carbonaceous biochemical oxygen demand (BODCF). It was also recommended that Fonterra put an internal stormwater monitoring programme in place, which commenced in October 2010.

Discharge samples were tested for a variety of parameters by the Council (Table 8), and the results obtained for each discharge are presented in Tables 9 to 11.

Table 8 Limits for stormwater composition for each parameter 2013-2014 (consents 3902, 3907, 4133)

Parameter	Units	Consent limit*		
		3902	3907	4133
Temperature	°C	25	25	25
Oil and grease	g/m^3	5	5	5
Total residual chlorine	g/m^3	0.2	0.2	0.2
pH		6.0 - 9.0	6.0-9.0	6.0-9.0
Suspended solids	g/m^3	30	30	100
BOD	g/m^3	10 or 15	10	10 or 15
BODCF	g/m^3	2.0 or 3.5	2.0	2.0 or 3.5

* As of February 2014 consent limits apply to eight out of ten consecutive samples over the course of an annual monitoring period

Tributary of Tawhiti Stream

Samples of the discharge to the Tawhiti tributary are taken at the outlet of the three-pond system. Subsequent to the construction of the three-pond system, there has been a marked reduction in the BOD and suspended solids concentration in the discharge. Temperature, conductivity and pH remained consistent. Oil and grease (O&G) and free chlorine levels have remained low.

A summary of discharge sampling results since the installation of the three-pond system are included in Table 9 for comparison.

Table 9 Chemical water quality of stormwater discharge to an unnamed tributary of the Tawhiti Stream (STW 001002), including a summary of previous data (Nov 1998 - May 2013)

Date	Parameter										
	Temp °C	Cond @ 20°C mS/m	pH	Alkalinity g/m³CaCO₃	SS g/m³	O&G g/m³	COD g/m³	BOD g/m³	BODCF g/m³	Total Cl_2 g/m³	Free Cl_2 g/m³
Number	92	94	94	88	92	91	92	95	30	94	93
Maximum	21.4	31.9	9.9	157	660	7.3	210	21	7.7	0.3	0.3
Minimum	8.0	20.8	7.1	38	<2	<0.5	<5	<0.5	<0.1	<0.1	<0.1
Median	14.9	27.1	7.6	64	8	<0.5	11	1.1	0.5	<0.1	<0.1
7-Aug-13	12.4	28.5	7.7	62	18	<0.5	8	1.2	0.5	<0.1	<0.1
11-Sep-13	14.1	28.1	7.6	62	29	<0.5	14	0.9	<0.5	<0.1	<0.1
2-Oct-13	13.4	25.8	7.6	49	4	<0.5	8	0.6	<0.5	<0.1	<0.1
6-Nov-13	15.8	25.7	7.4	58	5	<0.5	12	0.8	<0.5	<0.1	<0.1
4-Dec-13	17.2	26.2	7.4	58	7	<0.5	12	0.8	<0.5	<0.1	<0.1
8-Jan-14	17.3	25.7	7.6	65	2	<0.5	10	0.8	<0.5	<0.1	<0.1
11-Feb-14	17.1	28.5	7.8	74	9	<0.5	9	0.5	<0.5	<0.1	<0.1
12-Mar-14	17.3	29.0	7.8	78	12	<0.5	6	0.8	<0.5	<0.1	<0.1
3-Apr-14	15.6	29.1	7.6	77	9	<0.5	18	0.6	<0.5	<0.2	<0.1
7-May-14	16.0	28.7	7.5	66	6	<0.5	10	1.1	0.5	<0.1	<0.1
Consent limit*	**25.0**	**-**	**6.0 - 9.0**	**-**	**30**	**5**	**-**	**10**	**2.0**	**0.2**	**-**

Refer to glossary for an explanation of abbreviations

* Consent limits apply to eight out of ten consecutive samples over the course of an annual monitoring period

Temperature, pH, suspended solids, O&G, BOD, carbonaceous filtered BOD and total chlorine were within limits prescribed by consent conditions (**3907**) in all ten samples.

Tributary of Tangahoe River

Samples of the discharge to the Tangahoe tributary are taken at the outlet of the two-pond system. Since the ponds were constructed, the characteristics of the discharge have changed. In general, the temperature, conductivity, alkalinity, BOD and O&G values recorded have reduced, while the pH and chlorine values have increased.

A summary of the results of discharge sampling carried out since the installation of the two-pond system is included in Table 10 for comparison.

Table 10 Chemical water quality of stormwater discharge to tributary of the Tangahoe River (Site STW001004), including a summary of previous monitoring data (May 1996 – May 2013)

Date	Parameter										
	Temp °C	Cond @ 20°C mS/m	pH	Alkalinity g/m³CaCO₃	SS g/m³	O&G g/m³	COD g/m³	BOD g/m³	BODCF g/m³	Total Cl_2 g/m³	Free Cl_2 g/m³
Number	98	100	101	95	99	96	99	100	30	97	97
Minimum	8.1	4.0	7.3	36	<2	<0.5	5	0.6	<0.5	<0.1	<0.1
Maximum	23.5	57.6	9.4	235	110	1.7	220	93	3.6	0.5	0.4
Median	16.4	36.1	8.0	114	12	<0.5	23	6	1.1	0.1	<0.1
7-Aug-13	11.9	45.8	7.8	117	5	<0.5	14	4.2	2.3	<0.1	<0.1
11-Sep-13	13.5	35.0	7.8	92	5	<0.5	19	2.5	0.6	<0.1	<0.1
2-Oct-13	14.7	41.6	7.9	115	4	<0.5	11	2.3	0.7	<0.1	<0.1
6-Nov-13	17.5	37.9	7.9	116	7	<0.5	24	4.4	0.7	<0.1	<0.1
4-Dec-13	19.5	31.9	8.6	120	9	<0.5	20	4.6	1.1	0.1	0.1
8-Jan-14	18.5	36.6	8.7	146	23	<0.5	36	7.9	1.1	0.1	0.1
11-Feb-14	19.3	41.1	8.2	170	10	<0.5	30	2.9	1.2	0.1	0.1
12-Mar-14	18.7	45.8	8.9	193	30	<0.5	41	11.0	0.7	0.1	0.1
3-Apr-14	17.8	48.1	8.4	200	23	<0.5	43	9.3	1.1	0.1	0.1
7-May-14	16.3	29.4	8.0	102	18	<0.5	24	9.0	0.8	<0.1	<0.1
Consent limit*	**25.0**	**-**	**6.0 - 9.0**	**-**	**30**	**5**	**-**	**15****	**3.5*****	**0.2**	**-**

* Consent limits apply to eight out of ten consecutive samples over the course of an annual monitoring period
** BOD limit is 15 g/m³ during the period February 2014 – February 2016, thereafter it decreases to 10 g/m³
*** BODCF limit is 3.5 g/m³ during the period February 2014 – February 2016, thereafter it decreases to 2 g/m³

Temperature, pH, suspended solids, O&G, BOD (both total and carbonaceous filtered), and total chlorine were all within limits prescribed by consent conditions at all times.

Unnamed coastal stream

Samples of the discharge to the unnamed coastal stream are presented in Table 11, along with a summary of previous results since November 1994 for comparison.

Temperature, pH, suspended solids, O&G, and total chlorine were all within the limits prescribed by consent conditions.

Both total BOD and carbonaceous filtered BOD recorded high results during the monitoring period. Prior to a new consent being granted in February 2014, the upper limit on BOD was 10 g/m³, therefore the 22 g/m³ in the sample collected on 7 August 2013 breached the consent limit, this is discussed further in section 2.3.

Prior to the new consent being granted there were no prescribed limits on carbonaceous filtered BOD, therefore the 5.4 g/m³ recorded on 7 August 2013 is not a breach of consent. The 5.9 g/m³ recorded on 7 May 2014 falls under the new consent where the consent limits apply to eight out of ten consecutive samples and therefore does not breach consent conditions.

Table 11 Chemical water quality of stormwater discharge to the unnamed coastal stream (Site: STW 002020), including a summary of previous monitoring data (Nov 1994 - May 2012)

Date	Parameter										
	Temp °C	Cond @ 20°C mS/m	pH	Alkalinity g/m^3CaCO_3	SS g/m^3	O&G g/m^3	COD g/m^3	BOD g/m^3	BODCF g/m^3	Total Cl_2 g/m^3	Free Cl_2 g/m^3
Number	102	103	104	99	103	101	102	104	30	101	102
Maximum	21.2	51.2	8.5	130	78	1.5	97	20	5	0.7	0.6
Minimum	7.7	3.6	6.6	23	<2	<0.5	5	0.9	0.6	<0.1	<0.1
Median	15.6	29.4	7.4	80	20	<0.5	34	8.6	20	<0.1	<0.1
7-Aug-13	11.3	27.0	7.4	64	35	<0.5	48	**22**	**5.4**	<0.1	<0.1
11-Sep-13	13.5	21.4	7.2	47	22	<0.5	27	11	1.5	<0.1	<0.1
2-Oct-13	14.2	25.8	7.4	63	18	<0.5	31	8.7	3.3	<0.1	<0.1
6-Nov-13	17.4	21.5	7.1	55	26	<0.5	33	11	1.0	<0.1	<0.1
4-Dec-13	19.4	20.5	7.2	56	27	<0.5	83	10	2.0	<0.1	<0.1
8-Jan-14	17.7	23.6	7.0	72	33	<0.5	57	14	2.5	0.1	0.1
11-Feb-14	17.5	33.5	7.3	93	13	2.8	32	4.8	1.4	<0.1	<0.1
12-Mar-14	18.5	37.2	7.6	108	44	<0.5	46	15	1.6	<0.1	<0.1
3-Apr-14	17.7	37.6	7.5	111	16	<0.5	44	8.4	1.4	<0.1	<0.1
7-May-14	15.9	25.8	7.0	64	26	<0.5	36	14	**5.9**	<0.1	<0.1
Consent limit*	**25.0**	**-**	**6.0 - 9.0**	**-**	**100**	**5**	**-**	**15****	**3.5*****	**0.2**	**-**

* Consent limits apply to eight out of ten consecutive samples over the course of an annual monitoring period from February 2014

** BOD limit is 10 g/m^3 up to February 2014, 15 g/m^3 during the period February 2014 – February 2016, thereafter it decreases to 10 g/m^3

*** BODCF limit is 3.5 g/m^3 during the period February 2014 – February 2016, thereafter it decreases to 2 g/m^3

2.1.5.2 Freshwater biomonitoring

Freshwater biomonitoring was not undertaken during the period under review. This is next scheduled during the 2014-2015 monitoring period.

2.1.5.3 Freshwater Biological inspection

The inclusion of a spring biological inspection in the monitoring programme is a direct response to the results of water quality and biological monitoring undertaken in January 2011. At this time, the discharge to the Tawhiti Stream tributary was found to have caused the establishment of undesirable heterotrophic growths. It became apparent that these growths may have been present since spring. As a result, the monitoring programme was augmented to include a spring biological inspection, to increase monitoring at a time when factory throughput is often the highest.

Due to the layout of the stormwater treatment systems, no upstream site is available in any of the tributaries. As a result only downstream observations were possible. The inspection included the collection of a small sample, which was then sorted on site to assess what live invertebrates were present in the community. As the fresh sort was not performed using magnification, the level of identification was quite low, except for those invertebrates that could be easily identified to a higher level e.g. *Austrosimulium*.

Tawhiti Tributary

The stream flowing from the stormwater ponds had a low and slow flow, which was cloudy but uncoloured. The macroinvertebrate habitat downstream of the stormwater discharge was sparse, with water cress present on the edges of the

stream, and only minor amounts on the stream bed. This reflected the time of year that the inspection was undertaken, with the macrophytes not yet recovered from the winter die back. Nevertheless, the small invertebrate sample, which was live-sorted on site, contained damselfly larvae, water boatman, adult beetles, water strider (*Microvelia*) *Triplectides* caddisfly larvae and snails. No *Chironomus* blood worms or oligochaete worms were observed in the sample. The presence of these species, especially *Chironomus*, can be an indication of organic enrichment. In addition to these observations, no undesirable heterotrophic growths (sewage fungus) were observed, either on the water cress habitat, or at the outflow of the stormwater pond.

The presence of caddisfly larvae, which are a moderately sensitive taxon, and the lack of undesirable heterotrophic growths on the bed, indicates that any preceding discharges from the dairy factory site had not had a significant adverse effect on the macroinvertebrate communities of the unnamed tributary of the Tawhiti Stream.

Tangahoe Tributary

The Tangahoe tributary had a clear and uncoloured flow where it flowed from the stormwater ponds. There was a slight iron oxide sheen present, although it was not very widespread. There were few macrophytes growing in the stream bed downstream of these ponds, with only a small amount of water cress observed. The live sample was primarily collected from grass that was hanging in the stream, and fine grade substrate (silt and sand). This is not ideal macroinvertebrate habitat, but nevertheless the live sort recorded oligochaete worms (extremely abundant), sphaeriid fingernail clams (abundant), snails, damselfly larvae and copepods. No undesirable heterotrophic growths (sewage fungus) were observed growing on the sampled habitat, and neither was there any collected in the live sample. The growths observed on the concrete ramp over which the discharge flowed during the last inspection were no longer present.

The presence of oligochaete worms in abundance, and the lack of any 'sensitive' taxa indicated that the community was possibly in reduced health compared with the previous inspection. However, this live sampling technique can produce variable results, and overall, the results, including the lack of undesirable heterotrophic growths on the bed, indicate that any preceding discharges from the dairy factory site had not had a significant adverse effect on the macroinvertebrate communities of the unnamed tributary of the Tangahoe River.

Unnamed coastal Stream

The unnamed coastal stream was inspected immediately below the stormwater pond, which is some way upstream of the site sampled during the full biomonitoring survey. At the time of this inspection, the stream had a slow but clear flow. There was a good growth of water cress throughout the stream channel, which indicated little impact from high flows, and that these macrophytes had not died off in the winter. The live sample collected contained an extremely abundant population of oligochaete worms. A number of other taxa were also observed, but in reduced abundance, including snails, leeches, copepods, amphipods, damselfly larvae, cranefly (*Zelandotipula*) and *Chironomus* blood worms. Although blood worms were observed in the live sample, they were rare, and not an unusual result for this type of habitat. The relatively high community richness, presence of 'moderately sensitive' taxa, and the lack of any sewage fungus, indicate that any preceding discharges from

the dairy factory site had not had a significant adverse effect on the macroinvertebrate communities of the unnamed coastal stream.

A full copy of this report is included in Appendix III.

2.1.5.4 Fish survey

On 14 and 15 January 2014, two sites were surveyed for freshwater fish in the Tawhiti Stream, in relation to the water intake weir and fish pass associated with the Fonterra Whareroa dairy factory. Site 1 was located approximately 720 m upstream of the intake, while site 2 was located approximately 350 m downstream of the intake (Figure 12). The survey method involved deploying baited fine and coarse mesh fyke nets and g-minnow traps at each site overnight. These nets and traps were recovered the following morning, with all fish identified, counted and measured.

At the time of this survey, flow in the Tawhiti Stream was moderate, and instream fish habitat was abundant, with undercut banks, macrophyte beds, overhanging vegetation and woody debris present at both sites. In addition, the low altitude and close proximity to the coast of these sites would be expected to result in a relatively diverse and potentially abundant community.

Only two species of eel were recorded, along with freshwater crayfish. The upstream site had the highest abundance of fish, with 10 individuals recorded, compared with the six fish and two crayfish recorded downstream. The downstream site recorded the highest species richness, with longfin eel, shortfin eel and crayfish present. Only longfin eel were recorded at the upstream site. Of note was the observation of trout in the stream, with a moderate sized rainbow trout observed feeding voraciously downstream of site 2.

The low numbers of fish at site 2 may be related to activities undertaken at the weir. For example, low flows or the discharge of sediment may result in habitat that is from time to time unsuitable, and unable to sustain a community for an extended period of time. This could result in fewer fish becoming resident in that reach of stream. However, this does not seem likely, as flows did not drop below MALF for over 9 months prior to this survey, and no significant issues have been noted with the discharge of sediment. It is more likely that the sampling technique may have influenced results, as fyke nets favour the capture of eels, especially when baited, and anecdotal evidence indicates that kokopu species may avoid nets that contain eels. In addition, other influences may exist, such as commercial fisherman targeting eels in this stream.

However, this does not explain the lack of fish captured in the g-minnow traps. It was expected that these traps would catch bully species and possibly inanga, and their absence may indicate the presence of a barrier to fish passage downstream, either natural or artificial. This is an area that may need further investigation.

In assessing whether the intake weir itself is a barrier to fish passage, it is necessary to compare the species diversity downstream with that recorded upstream. Unfortunately, this assessment is inhibited by the lack of species recorded downstream. The results of this survey, and other work undertaken further upstream which recorded shortfin eel, indicates that the intake weir and fish pass does not

constitute a barrier to the passage of those species recorded downstream of the weir. A visual inspection of the pass confirmed this, although it was noted that the vegetation around the pass needed maintenance, with flax covering a part of it.

Overall, this survey does not indicate that the intake, fish pass, or discharge of sediment undertaken in relation to the Fonterra Whareroa water abstraction have had any impact on the fish communities of the Tawhiti Stream. It is recommended that subsequent surveys use the same techniques, as the habitat does not suit electric fishing or spotlighting. However, it could be possible to electric fish immediately below the weir, and this may provide additional useful information.

A full copy of this survey is included in Appendix IV.

Figure 12 Location of the two sampling sites in relation to the intake, weir and fish pass.

2.2 Air

2.2.1 Inspections

During each monthly site visit a good standard of housekeeping was observed and no unusual emissions to air were noticed. Occasional product odour was noted around the site during the surveys, but these were never obnoxious and did not occur beyond the boundaries of the site.

2.2.2 Results of discharge monitoring on receiving environment

2.2.2.1 Deposition gauging

Many industries emit dust from various sources during operational periods. In order to assess the effects of the emitted dust, industries have been monitored using deposition gauges.

Deposition gauges are basically buckets elevated on a stand to about 1.6 m. The buckets contain deionised water to ensure that any dust that settles out of the air is not re-suspended by wind. A copper sulphate solution at a concentration of 5 g/L acts as a preservative to prevent growth of algae and bacteria.

Deposition gauges were deployed at five sampling sites on six occasions around the Whareroa site for periods of approximately three weeks, between July and December 2013. The contents of the gauges were analysed for COD. The COD results are compared with the theoretical COD value for dry milk powder and a "total deposited milk powder" (TDMP) value is calculated.

The locations of the five air deposition monitoring sites are provided in Figure 13.

Figure 13 Location of air deposition sites

TDMP values for each monitoring site are presented in Table 12. The 2013-2014 results for the three sites nearest the powder plants are shown in Figure 14.

The Council's guideline value for total particulate deposited to cause a nuisance is 130 mg/m^2/day, but the Council does not have a specific guideline value for milk powder deposited. The Fonterra deposition survey determines deposition due to milk powder only, not total deposition.

The results for TMPD indicate that fallout occurred in the immediate vicinity of the powder plants and did not extend far beyond the site boundaries. Deposition of

milk powder on the site is not of great environmental significance, providing the stormwater management systems perform satisfactorily.

Table 12 Total deposited milk powder values (mg/m^2/day) for each monitoring site during 2013-2014

Site ID	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6
	25 July to 15 August	15 August to 3 September	3 September to 26 September	26 September to 18 October	18 October to 8 November	8 November to 2 December
AIR002409	37	43	90	161	190	86
AIR002416	18	29	49	74	90	26
AIR002422	15	40	42	61	17	39
AIR002424	15	26	19	25	36	13
AIR002426	17	20	18	23	30	29
TRC's guideline	**130 mg/m^2/day**					

As expected, the highest values of TDMP at or outside the boundaries were recorded for sites downwind (in relation to the prevailing winds from the north-west quadrant) of the powder plants. The staff car park entrance (AIR002409) recorded significantly higher levels of milk powder compared with the other sites. Levels recorded were similar to those for previous years, and peaked over the period October to November, around the peak time of maximum milk powder production.

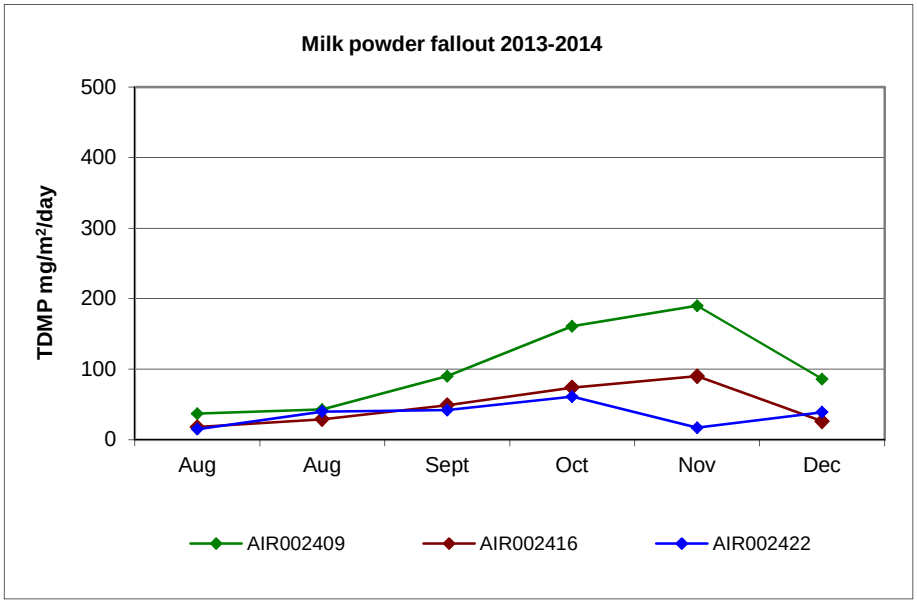

Figure 14 Milk powder fallout at three air deposition sites surrounding Whareroa

2.2.2.2 Emission source analysis

Consent **4103** places a limit of 125 mg/m^3 of gas flow on powder emissions to the atmosphere from the spray drying process cyclone exhaust.

The Company's independent consultants, CRL Energy Limited, carried out powder emission measurements on drier exhaust stacks (Powders 2, 3, 4, 5, and whey products) during December 2013. These results are presented in Table 13.

Results from the driers tested were all below the limit of 125 mg/m^3 prescribed by consent 4103.

Table 13 Emission source analysis 2013-2014

Plant		Date	Emission concentration (mg/m^3 0ºC, 1 atm, dry gas)
Powder 1	North stack	13 Dec 2013	4.7
	South Stack		5.9
Powder 2	Drier stack	12 Dec 2013	3.0
Powder 3	East stack	10 Dec 2013	44
	West stack		15
	Fluid Bed exhaust		35
Powder 4	Wt scrubber exhaust	16 Dec 2013	10
Powder 5	East stack	9 December 2013	19
	West stack		20
	North stack		28
	South stack		18
Whey products	WPC Drier	12 Dec 2013	1.5
Casein	Drier stack 1	17 Dec 2013	24
	Drier stack 2		25
Consent limit			**125**

2.2.2.3 Nitrogen oxide (NO_x) monitoring

Ambient NO_x monitoring was incorporated into the monitoring programme in 1996-1997 to monitor the effects of the co-generation plant at the site. In October 1997, the Company commissioned a second co-generation plant (Co-gen 2) in response to increased milk coming to the site. NO_x is the main emission of concern associated with Fonterra's co-gen plants, from the perspective of potential environmental effects. Special condition 7 of consent **6273** set limits for nitrogen dioxide emissions:

> *"The consent holder shall control all emissions of nitrogen dioxide or its precursors to the atmosphere from the site, so as to ensure that the maximum ground level concentration of nitrogen dioxide measured under ambient conditions does not exceed 200 micrograms per cubic metre [µg/m^3] [one-hour average], or 100 micrograms per cubic metre [mg/m^3] [twenty-four hour average], at or beyond the boundary of the site."*

The Council uses passive absorption discs to monitor ambient nitrogen dioxide (NO_2). The gases diffuse into the discs and any target gases (nitrogen dioxide) are captured. These discs are deployed for periods of approximately three weeks and then sent to an external laboratory for analysis.

Passive NO_x discs were placed in four locations surrounding Whareroa site (Figure 15) on three occasions during 2013-2014.

Figure 15 NO_x sample site locations around the Whareroa plant

From the average concentration measured, it is possible to calculate a theoretical maximum daily concentration that may have occurred during the exposure period. Council data on NO_x is gathered over a time period other than exactly 1 hour or 24 hour. There are mathematical equations used by air quality scientists to predict the maximum concentrations over varying time periods. These are somewhat empirical, in that they take little account of local topography, micro-climates, diurnal variation, etc. Nevertheless, they are applied conservatively and have some recognition of validity.

One formula generally used is:

$$C(t_2) = C(t_1) \times \left(\frac{t_1}{t_2}\right)^P$$

where C(t) = the average concentration during the time interval t, and p = a factor lying between 0.17 and 0.20. When converting from longer time periods to shorter time periods, using p = 0.20 gives the most conservative estimate (i.e. the highest calculated result for time period t_2 given a measured concentration for time period t_1). Using the 'worst case' factor of p = 0.20, the monitoring data reported above has been converted to equivalent 'maximum' 24 hour exposure levels.

Table 14 presents the actual levels found, theoretical maximum 1 hour and 24 hour concentration of NOx, and consent 6273 limits.

Table 14 Results of NO_x monitoring during the 2012-2013 and 2013-2014 periods

Monitoring period	NO_x concentration µg/m^3											
	AIR002410			AIR002411			AIR002412			AIR002413		
	$NO_{x(Lab)}$	24 $h_{(Cal)}$	1 $h_{(Cal)}$	$NO_{x(Lab)}$	24 $h_{(Cal)}$	1 $h_{(Cal)}$	$NO_{x(Lab)}$	24 $h_{(Cal)}$	1 $h_{(Cal)}$	$NO_{x(Lab)}$	24 $h_{(Cal)}$	1 $h_{(Cal)}$
20-Nov-12 to 14-Dec-12	8.8	16.6	31.4	20.5	38.7	73.1	5.4	10.2	19.3	5.2	9.8	18.6
14-Dec-12 to 11-Jan-13	5.5	10.7	20.2	22.1	43.0	81.3	4.2	8.2	15.4	4.2	8.2	15.4
11-Jan-13 to 23-Jan-13	3.4	5.6	10.5	19.0	31.2	59.0	5.6	9.2	17.4	4.9	8.0	15.2
Consent Limit		**100**	**200**		**100**	**200**		**100**	**200**		**100**	**200**

24 h = 24 hour average
1 h = 1 hour average

Throughout both the 2013-2014 season NO_x concentrations remained well below consent condition limits (consent **6273**, special condition 7 - 200 mg/m^3 one hour average, 100 mg/m^3 24 hour average).

The variation in NO_x concentration values can be explained in terms of distance from possible NO_x sources, namely the plant and road traffic, and the wind speed and direction.

2.2.2.4 Inhalable particulate (PM_{10}) monitoring

The report for PM_{10} monitoring at the Whareroa site over the 2013-2014 season is provided in Appendix V. Special condition 9 of consent **4103** sets a limit on the emissions of PM_{10} to the atmosphere from the site to a maximum of 50 µg/m^3 (24 hour average).

During the reporting period, a "DustTrak" PM_{10} monitor was deployed on two occasions in the vicinity of the dairy complex. The deployments lasted from 25 to 46 hours, with the instrument placed in a down-wind position at the start of the deployment. Monitoring consisted of continual measurements of PM_{10} concentrations. The results from the sampling runs are shown in Figure 16.

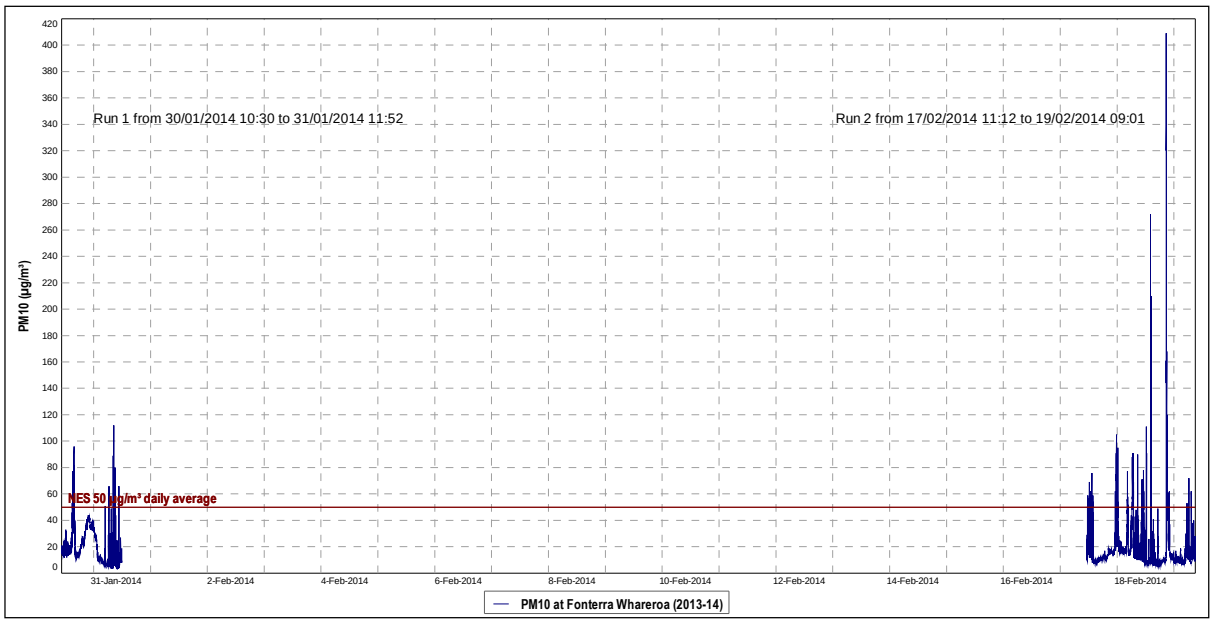

Figure 16 PM_{10} concentrations (µg/m^3) at the Whareroa dairy complex

During the first 25 hour run, from 30 January to 31 March 2013, the average recorded PM_{10} concentration was 20 µg/m^3. This 24 mean equates to 40% of the 50 µg/m^3 value that is set by both the National Environmental Standard and the resource consent **4103-2**.

During the second 46 hour run, from 17 February to 19 February 2014, the average recorded PM_{10} concentration for the first 24 hour period was 21 µg/m^3 and 18 µg/m^3 for the second 24 hour period. These daily means equate to 42% and 36% respectively, of the 50 µg/m^3 value that is set by both the National Environmental Standard and the resource consent **4103-2**.

Background levels of PM_{10} in the region have been found to be around 11 •g/m^3.

2.3 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 causes of non-compliance or failure to maintain good practices. A pro-active approach that in the first instance avoids issues occurring is favoured.

The Council operates and maintains a register of all complaints or reported and discovered excursions from acceptable limits and practices, including non-compliance with consents, which may damage the environment. The 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 two recorded incidents associated with the Whareroa site.

During routine monitoring on 7 August 2013, BOD in the sample collected from the Southern stormwater pond was found to be 22 g/m^3 (consent limit at this time was 10 g/m^3). A letter of explanation was received from Fonterra and Abatement Notice 12125 was issued by the Council requiring works to be undertaken to ensure that resource consent conditions are complied with.

Fonterra received a complaint from a neighbour on 30 January 2014 in relation to dust generated from the construction site of the dry goods store expansion. Monitoring carried out by contractors to Fonterra showed that the dust deposition rate at the boundary of the site was 19.18 $g/m^2/30$ days over the period of 16 December 2013 to 18 January 2014. The resource consent for air discharges associated with the dry store expansion (**9620**) specifies a deposition rate of less than 4.0 $g/m^2/30$ days.

Particulate discharges were also measured at the site boundary on several occasions, with the results ranging from 4.95 mg/m^3 to 7.56 mg/m^3. Consent 9620 specifies a suspended particulate matter limit of 3 mg/m^3 beyond the boundary of the site.

Fonterra undertook several measures to decrease the dust deposition – contractors increased the number of water carts and the rate of 'wetting down' of the exposed earthworks. Access routes top the earthworks were routed away from the neighbours house to reduce the risk of dust generation into the neighbouring property. Extra monitoring was undertaken to assess the ongoing compliance with conditions of consent **9620**. Ongoing communication was undertaken with the affected neighbour regarding mitigating the effects from the dust.

3. Discussion

3.1 Discussion of plant performance and environmental effects

3.1.1 Water

3.1.1.1 Inspections

Regular inspections of the Whareroa site did not note any major areas of concern. Minor issues were resolved in a timely manner.

Additional inspections in relation to the construction of the dry goods store expansion found the site to be well managed with regards to dust, silt and sediment discharge.

3.1.1.2 Abstractions

Throughout the 2013-2014 monitoring period, Fonterra was in compliance with conditions of their consents to abstract water from the Tangahoe River. Water abstraction from the Tawhiti Stream also complied with consent conditions. The minimum residual flow of 50 L/s in the Tawhiti Stream was maintained at all times, where the minimum flow recorded was 209 L/s on 25 February 2014.

Inspections showed no adverse effect on the appearance of the streams in connection with the discharge of back-washings from the mechanical pre-filters. In view of the demonstrated lack of effect of filter back-washings on the Tawhiti Stream and Tangahoe River, biological monitoring of those two streams was suspended after the 1999-2000 monitoring period. Should the results of inspection indicate any undue increase in rate of sand filter backwashing, or adverse effect of such discharges on those streams, the biological monitoring may recommence.

3.1.1.3 Wastewater discharge

Since June 1997, wastewater from the Whareroa dairy complex has been discharged through a 1,845 m long marine outfall. Previously, the wastewater was discharged at the low water mark.

A discharge of up to 40,000 m^3/day of dairy factory wastewater is provided for by consent **1450**. Changes to the consent in September 2006 added specific limits on the concentration of fats, suspended solids and COD. The consent also controls the environmental effects of the discharge by narrative standards placed on the effects of the discharge at the boundary of a mixing zone, no discharge of raw or treated milk, or milk products, cream, whey or whey permeate is allowed, except under emergency provisions defined in a contingency plan.

Remedial measures undertaken to reduce wastewater in recent years have included: increased level of resourcing in the loss monitoring/CIP optimisation personnel, installation of a second grade water system that reuses up to 3,000,000 L/day of water, and a chemical recovery extension to the nitric acid cleaning system.

Over recent monitoring years, video surveillance has found that the new long outfall had performed according to design. The effluent field that formed above the diffuser

moved parallel to the coast, and was not observed to impinge upon the shore. The plume was conspicuous (subjectively) for a small percentage of time.

Occasional surface films formed which did not impact adversely at the shore. There was no evidence of accumulation of material on the seabed near the outfall. Monitoring of the wastewater discharge during the reporting period consisted of measurement of flow and chemical composition by the Company, occasional sampling by the Council, and ecological monitoring of the effects of the discharge on intertidal communities.

The limit on the daily volume of wastewater discharged was not exceeded during the 2013-2014 season. Results of wastewater composite monitoring (daily average) by Fonterra showed that consent conditions were complied with throughout the monitoring period.

Grab samples were collected by the Council on 11 occasions during the monitoring period. The majority of the results complied with consent limits (**1450**), however COD exceeded the consent limit on one occasion and suspended solids exceeded the consent limit on two occasions. As the consent limits in special condition 5, consent **1450** apply to the composite samples and not the grab samples, these exceedances do not count as a breach of consent.

An inter-laboratory comparison performed on three occasions found a generally good level of agreement between the Council laboratory and the Fonterra laboratory.

3.1.1.4 Marine ecological surveys

The results of the intertidal surveys over the 2013-2014 period (Appendix II) indicate that the combined Fonterra dairy factory and Hawera Oxidation Ponds wastewater discharge was not having detectable adverse effects on the intertidal communities at the Waihi Reef, the 350 m NW of the outfall, the Pukeroa Reef or the 200 m SE of the outfall sites.

Treated wastewater from Hawera municipal oxidation ponds was introduced to the outfall in February 2001, under consent **5079** held by South Taranaki District Council. The Council has carried out monitoring of shoreline water quality and shellfish to assess the effects of the discharge. Although some high counts were obtained for faecal coliforms in mussel flesh, they were not linked to the municipal discharge. Details are given in the Council's report on the monitoring of Hawera municipal oxidation ponds (TRC report 14-26).

3.1.1.5 Stormwater discharges

There are three stormwater discharges from the Fonterra site. Each discharge flows into a detention pond system and then to a small stream. The northern stormwater discharges to a three-pond system, and then to an unnamed tributary of the Tawhiti Stream. The eastern stormwater discharges to a two-pond detention system and then to an unnamed tributary of the Tangahoe River. The southern stormwater discharges to a wetland and pond system and then to an unnamed coastal stream.

Chemical monitoring of each of the three stormwater discharges was undertaken on ten occasions during the reporting period. The results from both the Tawhiti and

Tangahoe stormwater ponds complied with all consent conditions. The Southern (unnamed) stormwater pond discharge breached the consent condition for BOD on one occasion.

Extensive work is planned for the Tangahoe and Southern (unnamed) stormwater ponds during the remainder of 2014, and 2015, with the aim of improving water quality of the stormwater pond discharges.

Freshwater biomonitoring surveys were not conducted during the 2013-2014 monitoring period.

A freshwater biological inspection undertaken in each of the tributaries that drain the stormwater ponds indicated that any preceding discharges from the dairy factory site had not had a significant adverse effect on the macroinvertebrate communities of the streams.

A fish survey was undertaken in the Tawhiti Stream to assess the impact of the water intake weir operated by the factory. Overall, the survey did not indicate that the intake, fish pass or discharge of sediment undertaken in relation to the Fonterra Whareroa water abstraction have had any impact on the fish communities of the Tawhiti Stream.

It is noted that management of the three stormwater catchments within the site is specifically addressed in Fonterra's Environmental Management Manual, and that improvements are an ongoing process in which the Council is closely involved.

3.1.2 Air

Emissions to air were monitored through visual inspection, odour survey, gauging of milk powder deposition, measurement of ambient nitrogen concentration, and PM_{10} monitoring. Throughout the 2013-2014 dairy season, Fonterra was found to be compliant with conditions of the Company's consents to discharge emissions to air.

3.1.2.1 Results of discharge monitoring on receiving environment

Atmospheric particulate matter can arise from a number of sources, both natural and from human activity e.g. vegetation pollens, smoke and ash, sea spray, dust from soils and paved surfaces, and manufacturing processes. While extremely fine particles may remain floating in the atmosphere for weeks or months, coarser dusts may settle out within timeframes ranging from a few seconds to minutes.

Deposition gauging was conducted around the Whareroa site for the nineteenth year during the 2013-2014 monitoring period. The results from the deposition gauging indicated the highest values of TMPD at or outside the boundaries were recorded for sites downwind (in relation to the prevailing winds from the north-west quadrant) of the powder plants. The staff car park entrance (AIR002409) recorded significantly higher levels of milk powder compared with the other sites. Levels recorded were similar to those for previous years, and peaked around October through to November, around the peak time of maximum milk powder production. These results continue the trend over recent years of improvement in the rate of TMPD since the 1997-1998 monitoring period. This improvement is credited to the success

of the Powder 4 wet scrubber installed in 1997, the upgrade of Powder 2 plant in 2000, and improved management practices.

Powder emission analysis was undertaken at the Whareroa site by consultants to Fonterra. All stacks tested were below the consent limit for consent 4103 of 125 mg/m^3 for gas flow on powder emissions to the atmosphere from the spray drying process cyclone exhaust.

The NO_x levels recorded during the 2013-2014 monitoring period were generally similar to the levels recorded since 1997, when the second co-generation plant was commissioned. Results of both the one-hour and 24-hour averages were well within the limits prescribed by consent **6273** (i.e. not exceeding 200 $\mu g/m^3$ and 100 $\mu g/m^3$ respectively).

PM_{10} concentrations measured during the 2013-2014 monitoring period were all well within the 50 $\mu g/m^3$ value that is set by both the National Environmental Standard and the resource consent **4103**.

3.1.2.2 Reporting

Condition 4 of consent **6273** requires:

The consent holder shall provide to the Council within five years from the granting of this consent and every six years thereafter a written report:

a) reviewing any technological advances in the reduction or mitigation of emissions, how these might be applicable and/or implemented at the Whareroa site, and the costs and benefits of these advances;

b) detailing an inventory of emissions from the site of such contaminants as the Chief Executive, Taranaki Regional Council, may from time to time specify following consultation with the consent holder;

c) detailing any measures that have been taken by the consent holder to improve the energy efficiency of the Whareroa site; and

d) addressing any other issue relevant to the minimisation or mitigation of emissions from the Whareroa site that the Chief Executive, Taranaki Regional Council, considers should be included.

This report (dated July 2014) was due in October 2011 and received from Fonterra in November 2014.

Condition 4 of consent **4103** requires that:

The consent holder shall provide to the Taranaki Regional Council within five years from the granting of this consent, and every six years thereafter a written report:

a) reviewing any technological advances in the reduction or mitigation of emissions, especially but not exclusively in respect of milk powder and other particulate emissions, how these might be applicable and/or implemented at the Whareroa site, and the costs and benefits of these advances; and

b) detailing an inventory of emissions from the site of such contaminants as the Chief Executive, Taranaki Regional Council, may from time to time specify following consultation with the consent holder; and

c) addressing any other issue relevant to the minimisation or mitigation of emissions from the Whareroa site that the Chief Executive, Taranaki Regional Council, considers should be included.

This report was received in July 2013 and is next due in 2019.

3.2 Evaluation of performance

A summary of the Company's compliance record for the year under review is set out in Tables 15-40.

Table 15 Summary of performance for Consent 0047 - to take water from Tawhiti Stream for use in manufacturing, cleaning and cooling

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Minimum river flow	Council's telemetered sites	Yes
2. Maintenance of a measuring device for recording daily rates of abstraction	Results are forwarded to the Council and reviewed by Council officers	Yes
3. Reserved right to temporarily suspend abstraction		N/A
4. Optional review provision re. environmental effects	No further reviews available	N/A
5. Limited rate of abstraction under certain flow and turbidity conditions	Council's telemetered sites	Yes
Overall assessment of consent compliance and environmental performance in respect of this consent		**High**

N/A = not applicable

Table 16 Summary of performance for Consent 1450 - discharge of dairy factory wastewater into the Tasman Sea

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Discharge of lactose solids managed in accordance with application		N/A
2. Approx 400m³ lactose solids to be discharged prior to 1 August 2007		N/A
3. Removal of whey from wastewater	LOSS monitoring and Council composite inter-lab samples	Yes
4. Maintenance of a waste minimisation programme	LOSS monitoring	Yes
5. Limits on wastewater	LOSS monitoring, physicochemical monitoring of	Yes

Condition requirement	Means of monitoring during period under review	Compliance achieved?
	composite samples	
6. Installation of an outfall extension	Outfall extended in 1997	Yes
7. Design details for outfall extension		N/A
8. Discharge cannot cause specified adverse effects beyond mixing zone	Visual inspections	Yes
9. Discharge complies with specified quality standards (prior to construction of outfall		N/A
10. Discharge of domestic sewage not permitted	Outfall samples tested for faecal indicator bacteria levels	Yes
11. Implementation of a contingency plan for action to be taken in the event of a spillage	Contingency plan submitted to Council	Yes
12. Installation of a pipeline monitoring system	The Company carries out an annual dive inspection of the entire length of the outfall pipeline. As a result of this inspection, any necessary repairs of maintenance works are carried out. The most recent dive inspections were carried out on 1-5 April 2014, 1-5 May 2014 and 13-14 June 2014.	Yes
13. Review of technological advancements in dairy wastewater management	Fonterra submitted report to Council	Yes
14. Regular consultation with interested parties	Re-consenting meeting held in September 2013	Yes
15. Optional review provision re. adverse effects attributable to discharge	No further reviews available, expires June 2015	N/A
16. Optional review provision re. environmental effects	No further reviews available, expires June 2015	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		**High**

N/A = not applicable

Table 17 Summary of performance for Consent 3902-discharge of stormwater into Tangahoe River

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Adopt best practicable option to prevent or minimise adverse effects	Site inspections	Yes
2. Catchment area not to exceed 10 ha	Site inspections	Yes
3. Consent holder to prepare and maintain contingency plan	Due August 2014	N/A

Condition requirement	Means of monitoring during period under review	Compliance achieved?
4. Consent holder to prepare and maintain stormwater management plan	Due August 2014	N/A
5. Effects on receiving waters	Site inspections, Physicochemical analysis, freshwater biomonitoring surveys	Yes
6. No visible bacterial and/or fungal growths downstream	Site inspections and freshwater biomonitoring surveys	Yes
7. Limits on chemical composition of discharge	Physicochemical analysis	Yes
8. Maintenance of fencing and planting of riparian margin	Site inspections	Yes
9. Optional review provision re. environmental effects	Next optional review in June 2016	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		**High**

N/A = not applicable

Table 18 Summary of performance for Consent 3907- discharge of stormwater into Tawhiti Stream

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Adopt best practicable option to prevent or minimise adverse effects	Site inspections	Yes
2. Catchment area not to exceed 13 ha	Site inspections	Yes
3. Consent holder to prepare and maintain contingency plan	Due August 2014	N/A
4. Consent holder to prepare and maintain stormwater management plan	Due August 2014	N/A
5. Effects on receiving waters	Site inspections, Physicochemical analysis, freshwater biomonitoring surveys	Yes
6. No visible bacterial and/or fungal growths downstream	Site inspections and freshwater biomonitoring surveys	Yes
7. Limits on chemical composition of discharge	Physicochemical analysis	Yes
8. Maintenance of fencing and planting of riparian margin	Site inspections	Yes
9. Optional review provision re. environmental effects	Next optional review in June 2016	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		**High**

N/A = not applicable

Table 19 Summary of performance for Consent 4103 – discharge to air

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Adopt best practicable option to prevent or minimise adverse effects	Review of contingency and management plans and air quality monitoring	Yes
2. Measures representing best practicable option may be reviewed		N/A
3. Any alterations to the plant, processes or operations must be approved by Council	No alterations	N/A
4. Written report with regard to emissions, improvements and mitigation within 5 years and every 6 thereafter	Report submitted July 2013	Yes
5. BPO to minimise environmental effects	Liaison with consent holder, review of report submitted as per condition 4	Yes
6. Use of most appropriate process equipment and controls to minimise emissions and impacts	Report detailing emissions and technology received	Yes
7. Powder emissions to atmosphere <125 mg/m^3	Air quality monitoring	Yes
8. Limits on depositions beyond boundary	Air quality monitoring	Yes
9. PM_{10} not to exceed 50 $\mu g/m^3$	Air quality monitoring	Yes
10. No odour at or beyond boundary	Inspections	Yes
11. Monitoring of emissions	Air quality monitoring	Yes
12. Annual meeting with Council and submitters	Meeting undertaken with interested parties	Yes
13. Powder 5 can only process skim milk powder if Council are given 5 days notice and a monitoring programme for the emissions is developed		N/A
14. Review of conditions if Condition 13 activated		N/A
15. Council may review consent for the purpose of dealing with any adverse effects	Next optional review in June 2015, recommendation in section 3.5	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		**High**

N/A = not applicable

Table 20 Summary of performance for Consent 4133 - discharge of stormwater to unnamed coastal stream

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Adopt best practicable option to prevent or minimise adverse effects	Site inspections	Yes
2. Catchment area not to exceed 21 ha	Site inspections	Yes
3. Consent holder to prepare and maintain contingency plan	Due August 2014	N/A
4. Consent holder to prepare and maintain stormwater management plan	Due August 2014	N/A
5. Effects on receiving waters	Site inspections, Physicochemical analysis, freshwater biomonitoring surveys	Yes
6. No visible bacterial and/or fungal growths downstream	Site inspections and freshwater biomonitoring surveys	Yes
7. Limits on chemical composition of discharge	Physicochemical analysis	**One breach of BOD under 4133-2**
8. Maintenance of fencing and planting of riparian margin	Site inspections	Yes
9. Optional review provision re. environmental effects	Next optional review in June 2016	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		**Improvement Required**

N/A= not applicable

Table 21 Summary of performance for Consent 4406 - discharge of laboratory wastes onto land

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Adoption of action likely to minimise adverse effects on the environment	Management plan reviewed by Council officers	Yes
2. Enacted in accordance with the terms of the application	No longer disposed of to land	N/A
3. Limitations on size of discharge	No longer disposed of to land	N/A
4. Management plan for discharge site provided	Reviewed by Council officers	Yes
5. Siting of discharge pits	No longer disposed of to land	N/A
6. Limitations on placing of discharge sites	No longer disposed of to land	N/A
7. Disposal pits cannot intercept water table	No longer disposed of to land	N/A
8. Contaminants entering other bodies of	No longer disposed of to land	N/A

Condition requirement	Means of monitoring during period under review	Compliance achieved?
water not permitted		
9. Cannot lead to adverse impacts on surrounding bodies of water	No longer disposed of to land	N/A
10. Items permitted to be discharged	No longer disposed of to land	N/A
11. Earth cover over discharge	No longer disposed of to land	N/A
12. Soil and vegetation cover over pits	No longer disposed of to land	N/A
13. Maintenance of soil cover	No longer disposed of to land	N/A
14. Records to be kept on pit usage	No longer disposed of to land	N/A
15. Optional review provision re. environmental effects	Next optional review in June 2016	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		**N/A consent not currently in use**

N/A = not applicable

Table 22 Summary of performance for Consent 4508 – abstraction of water from Tangahoe

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Reserved right to temporarily suspend abstraction		N/A
2. Maintenance of a measuring device for recording daily rates of abstraction	Measuring device is well maintained	Yes
3. Optional review provision re. environmental effects	No further reviews available, expires June 2015	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		**High**

N/A = not applicable

Table 23 Summary of performance for Consent 4927 - discharge of river silt and sand

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Discharge operated on a continuous purge basis		Yes
2. Raising the suspending solids of the receiving water not permitted	Freshwater biomonitoring originally took place but was stopped due to no adverse effects	Yes
3. Adverse effects not to be present below discharge	Biological inspection, fish survey	Yes
4. Optional review provision re. environmental effects	No further reviews available, expires June 2015	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		**High**

N/A = not applicable

Table 24 Summary of performance for Consent 4953 - erect, place and maintain earth dams

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Safe maintenance and operation of dams	Management plan and site inspections	Yes
2. Notification of maintenance work		N/A
3. Prevention of discharge into the watercourse during maintenance		N/A
4. Removal of structures when no longer required		N/A
5. Optional review provision re. environmental effects	No further reviews available, expires June 2016	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		**High**

N/A = not applicable

Table 25 Summary of performance for Consent 4977 - erect, place and maintain marine outfall

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Notification of maintenance work		N/A
2. Construction and maintenance in accordance with documentation		N/A
3. Adoption of action likely to minimise adverse effects on the environment		N/A
4. Reinstatement of intertidal construction area		N/A
5. Visibility of outfall pipeline	Site inspections	Yes
6. Removal of outfall pipeline when no longer required		N/A
7. Optional review provision re. environmental effects	No further reviews available, expires June 2015	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		**High**

N/A = not applicable

Table 26 Summary of performance for Consent 5013 - construction and maintenance of a rock seawall

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Notification prior to maintenance works		N/A
2. To be constructed and maintained in accordance with the application		N/A

Condition requirement	Means of monitoring during period under review	Compliance achieved?
3. Minimisation of disturbance to seabed and foreshore		N/A
4. Revegetation following the completion of the wall		N/A
5. Monitoring of erosion	Marine ecological inspections	Yes
6. Compensation to neighbours in the event of loss of land from erosion		N/A
7. Removal of rock wall when no longer required		N/A
8. Optional review provision re. environmental effects	No further reviews available, expires June 2015	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		**High**

N/A = not applicable

Table 27 Summary of performance for Consent 5015 - damming of unnamed stream

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Notification prior to maintenance works	No works undertaken during period under review	N/A
2. To be constructed and maintained in accordance with the application		Yes
3. Minimisation of discharge of contaminants		N/A
4. Removal of dam when no longer required		N/A
5. Optional review provision re. environmental effects	No further reviews available, expires June 2015	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		**N/A consent not in use during period under review**

N/A = not applicable

Table 28 Summary of performance for Consent 5016 - diversion of unnamed stream

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Notification prior to maintenance works	No works undertaken during period under review	N/A
2. To be constructed and maintained in accordance with the application		N/A

Condition requirement	Means of monitoring during period under review	Compliance achieved?
3. Minimisation of discharge of contaminants		N/A
4. Optional review provision re. environmental effects	No further reviews available, expires June 2015	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		**N/A consent not in use during period under review**

N/A = not applicable

Table 29 Summary of performance for Consent 5017 - to drain and excavate an unnamed stream, and erect and use an outfall on the streambed

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Notification prior to maintenance works	No works undertaken during period under review	N/A
2. To be constructed and maintained in accordance with the application		Yes
3. Natural colour of outfall		Yes
4. Revegetation of site following construction		Yes
5. Removal of dam when no longer required		N/A
6. Optional review provision re. environmental effects	No further reviews available, expires June 2015	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		**N/A consent not in use during period under review**

N/A = not applicable

Table 30 Summary of performance for Consent 5036 - discharge of waste material onto land

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Adoption of action likely to minimise adverse effects on the environment	Review of management plan	Yes
2. Disposal of unprocessable wastes via irrigation to comply with nitrogen and COD loading limits	Not monitored during period under review	N/A
3. Exercise of consent in accordance with applications	Site inspections and liaison with consent holder	Yes
4. Limits on discharge of stormwater sump cleanings and unprocessable dairy waste	Site inspections and liaison with consent holder	Yes

Condition requirement	Means of monitoring during period under review	Compliance achieved?
5. Consent holder to provide management plan	Latest version received January 2013	Yes
6. Discharge not within 50 m of bore, 25 m of surface water, 100 m from cliff	Site inspections	Yes
7. Disposal pit(s) not to intercept the water table	Site inspections	Yes
8. Exercise of consent not to lead to contaminants entering a water body via overland surface flows	Not monitored during period under review	N/A
9. Exercise of consent not to result in adverse impacts on groundwater	Not monitored during period under review	N/A
10. Discharged material to be covered by 50 mm soil	Site inspections	Yes
11. Liquid to be removed from disposal pits prior to covering	Site inspections	Yes
12. Only materials outlined in application to be discharged	Site inspections and requirements in management plan	Yes
13. Disposal pits to be reinstated and re-vegetated	Site inspections	Yes
14. Cover layer to be suitably maintained	Site inspections	Yes
15. Disposal not to give rise to objectionable or offensive odours beyond boundary	Site inspections	Yes
16. Consent holder to maintain records of discharge	Received November 2014	Yes
17. Discharge of unprocessable wastes to occur only after all other options have been exhausted	Site inspections, liaison with consent holder	Yes
18. Optional review provision re. environmental effects	Next optional review scheduled in June 2016	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		**High**

N/A = not applicable

Table 31 Summary of performance for Consent 5044 - discharge of emissions into air

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Adoption of action likely to minimise adverse effects on the environment	Set out in management plan and emission report submitted to Council	Yes
2. To be constructed and maintained in accordance with the application	Site inspections	Yes
3. Approval of a management plan	Reviewed by Council officers	Yes

Condition requirement	Means of monitoring during period under review	Compliance achieved?
4. Discharges resulting in no objectionable odours at site boundary	Site inspections	Yes
5. Characteristics of an objectionable odour		N/A
6. Optional review	Next optional review in June 2016	Yes
Overall assessment of consent compliance and environmental performance in respect of this consent		**High**

N/A = not applicable

Table 32 Summary of performance for Consent 5143 - erect, place and maintain and use a water intake structure

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Notification prior to maintenance works		N/A
2. To be constructed and maintained in accordance with the application		Yes
3. Adoption of action likely to minimise adverse effects on the environment	Requirements of the management plan and visited during site inspections	Yes
4. Minimisation of disturbance to the riverbed	Management plan and site inspections	Yes
5. Removal of infrastructure when no longer required		N/A
6. Optional review provision re. environmental effects	No further reviews available, expires June 2015	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		**High**

N/A = not applicable

Table 33 Summary of performance for Consent 5148 - discharge of river silt and sand

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Discharge operated on a continuous purge basis	Management plan	Yes
2. Discharge cannot cause specified adverse effects beyond mixing zone	Site inspections and previous freshwater biomonitoring surveys	Yes
3. Optional review provision re. environmental effects	No further reviews available, expires June 2015	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		**High**

N/A = not applicable

Table 34 Summary of performance for Consent 5337 - to dam an unnamed tributary of the Tawhiti Stream

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Notification prior to maintenance works		N/A
2. Adoption of action likely to minimise discharge of contaminants and adverse effects on the environment	Management plan and site inspections	Yes
3. Safe operation and maintenance of the dam		N/A
4. Optional review provision re. environmental effects	No further reviews available, expires June 2016	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		**High**

N/A = not applicable

Table 35 Summary of performance for Consent 5845 - removal, reconstruction and maintenance of a dam (with fish pass)

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Notification before removal of structure		N/A
2. Notification before maintenance work		N/A
3. To be constructed and maintained in accordance with the application		Yes
4. Adoption of action likely to minimise discharge of contaminants and adverse effects on the environment	Management plan and site inspection	Yes
5. Adoption of action likely to minimise discharge of contaminants and adverse effects on water quality	Reviewed in management plan	Yes
6. Minimisation of disturbance to streambed		N/A
7. Reinstatement of disturbed areas		Yes
8. Obstruction of fish passage not permitted	Fish survey	Yes
9. Design of fish passage required prior to construction		N/A
10. Screening of intake		Yes
11. Maintenance of structures		Yes
12. Reinstatement of area after structure no longer required		N/A

Condition requirement	Means of monitoring during period under review	Compliance achieved?
13. Optional review provision re. environmental effects	No further reviews available, expires June 2015	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		**High**

N/A = not applicable

Table 36 Summary of performance for Consent 6257 – emissions to air from fuel centre

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Best practicable option to prevent or minimise adverse environmental effects	Consent not yet exercised	N/A
2. Exercise of consent in accordance with application	Consent not yet exercised	N/A
3. Characteristics of coal similar to that described in application	Consent not yet exercised	N/A
4. Report on best practicable option within 3 months of commissioning	Consent not yet exercised	N/A
5. Review of measures relating to best practicable option	Consent not yet exercised	N/A
6. Minimisation of emissions	Consent not yet exercised	N/A
7. Minimum height of discharges 60 m	Consent not yet exercised	N/A
8. Approval from Council prior to plant alterations	Consent not yet exercised	N/A
9. Discharges not to exceed 20% obscuration	Consent not yet exercised	N/A
10. Discharges of particulate not to exceed 100 mg/Nm^3	Consent not yet exercised	N/A
11. Sulphur dioxide discharges not to exceed 385 kg/hr	Consent not yet exercised	N/A
12. Discharges of particulate not to exceed 43 kg/hr	Consent not yet exercised	N/A
13. Discharges of nitrogen oxides not to exceed 319 kg/hr	Consent not yet exercised	N/A
14. Maximum ground level concentration of sulphur dioxide not to exceed 350 mg/m^3	Consent not yet exercised	N/A
15. Maximum ground level concentration of nitrogen dioxide not to exceed 350 mg/m^3	Consent not yet exercised	N/A

Condition requirement	Means of monitoring during period under review	Compliance achieved?
16. Maximum ground level concentration of PM_{10} not to exceed 50 mg/m^3	Consent not yet exercised	N/A
17. Maximum ground level concentration of each or any metal not to exceed guideline values	Consent not yet exercised	N/A
18. Maximum ground level concentration of other contaminants not to exceed workplace exposure standards	Consent not yet exercised	N/A
19. Discharges not to give rise to significant ecological effects	Consent not yet exercised	N/A
20. Analysis of coal on a monthly basis	Consent not yet exercised	N/A
21. Consent holder to install and maintain various measuring devices	Consent not yet exercised	N/A
22. Consent holder to undertake annual source emission monitoring	Consent not yet exercised	N/A
23. Monitoring programme prepared	Provisional programme in place	Yes
24. Reporting regarding advances in technology	Consent not yet exercised	N/A
25. Reporting regarding emissions	Due 12 months from exercise of consent	N/A
26. Cultural impact report	Due 12 months from exercise of consent	N/A
27. Consent holder to undertake annual liaison meetings	Within 12 months of commissioning of energy centre	N/A
28. Consent lapse		N/A
29. Review of conditions	Next optional review in June 2016	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		**N/A Consent not yet exercised**

N/A = not applicable

Table 37 Summary of performance for Consent 6273 – emissions to air from Cogen I and II

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Best practical option to minimise adverse effects on environment	Site inspections, report as required by condition 4	**Partially – report received late**
2. Review of best practical option measures	No review undertaken	N/A
3. Approvals to be obtained for alterations	No alterations during period under review	N/A

Condition requirement	Means of monitoring during period under review	Compliance achieved?
4. Report on emissions and new technologies	First report due by October 2011 Report (dated July 2014) received November 2014	**No- report received late**
5. Carbon monoxide < 10 mg/m^3 (8 hour exposure) or <30 mg/m^3 (one-hour exposure)	Not monitored during period under review	N/A
6. Sum of nitrogen oxides not to exceed 48 g/s	Not monitored during period under review	N/A
7. Nitrogen dioxide not to exceed 200 µg/m^3 (one-hour average) or 100 µg/m^3 (24-hour average)	Air quality monitoring	Yes
8. PM_{10} not to exceed 50 µg/m^3 (24-hour average)	Air quality monitoring	Yes
9. Control of emissions so that max concentration of any contaminant is not increased by more than 1/30th of the relevant Workplace Exposure Standard	Not monitored during period under review	N/A
10. Minimum height of discharge 17.5 m above ground		Yes
11. Minimisation of emissions and impacts by selection of most appropriate equipment etc.	Air quality monitoring As discussed in Report required by condition 4	Yes
12. Consent holder to undertake monitoring of emissions and their effects	Monitoring plan in place	Yes
13. No emissions of visible smoke or plume of water vapour	Inspections	Yes
14. Water treatment regime to the satisfaction of Council	Inspections	Yes
15. Optional review of consent	Next optional review in June 2015, recommendation in section 3.5	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		**Improvement Required**

N/A = not applicable

Table 38 Summary of performance for Consent 7465 – emissions to air from combustion of wood

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Only untreated timber packaging to be burned	Site inspections	Yes
2. Total volume not to exceed 4m^3	Site inspections	Yes

Condition requirement	Means of monitoring during period under review	Compliance achieved?
3. Best practicable option to minimise environmental effects	Site inspections	Yes
4. Regard to wind and weather conditions	Site inspections	Yes
5. Discharge not to give rise to contaminants beyond boundary	No complaints received	Yes
6. Discharge not to give rise to odour beyond the boundary	No complaints received	Yes
7. Records to be maintained of burning events		Yes
8. Consent lapse if not given effect before 2014	Activity undertaken	N/A
9. Optional review of consent	Next scheduled optional review in June 2016	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		**High**

N/A = not applicable

Table 39 Summary of performance for Consent 9620 – emissions to air from construction activities

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Prepare dust control management plan	Plan received October 2013	Yes
2. Consent holder to adhere to dust control plan	Site inspections	Yes
3. Best practicable option to minimise environmental effects	Site inspections	Yes
4. Area of soil exposure not to exceed 15.15 ha	Site inspections	Yes
5. Notification required prior to exercise of the consent	Notification received	Yes
6. Limits on dust deposition beyond boundary of property	Air quality monitoring	**No**
7. Discharge not to be at offensive, objectionable, noxious or toxic levels	Air quality monitoring	**No**
8. Consent holder to maintain record of complaints received	Records kept by consent holder	Yes
9. Consent holder to notify TRC of any complaints within 24 hours	Consent holder notified Council staff	Yes
10. Complaints record to be made available to TRC on request	Not requested	N/A

Condition requirement	Means of monitoring during period under review	Compliance achieved?
Overall assessment of consent compliance and environmental performance in respect of this consent		**Improvement desirable**

N/A = not applicable

Table 40 Summary of performance for Consent 9621 – discharge stormwater and sediment from earthworks

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Consent authorises stormwater discharge from no more than 15.15 ha	Site inspections	Yes
2. Notification required prior to exercise of the consent	Notification received	Yes
3. Run off to pass through settlement ponds or sediment traps	Site inspections	Yes
4. Earthworks to be stabilised within 6 months after completion	Stabilisation begun	Yes
5. Obligation described in condition 3 no longer to apply once area stabilised		N/A
6. Best practicable option to minimise environmental effects	Site inspections	Yes
Overall assessment of consent compliance and environmental performance in respect of this consent		**High**

N/A = not applicable

During the 2013-2014 year, Fonterra demonstrated a variable level of environmental performance overall. Of the 21 consents for which compliance and environmental performance could be categorised, 3 (14%) were rated 'improvement required' and 18 (86%) 'high'. During the year under review there were two incidents associated with the Whareroa site (one regarding exceedance of BOD in stormwater results which resulted in the issuing of an abatement notice, and one due to excessive dust during construction).

Water abstraction from the Tawhiti Stream and from the Tangahoe River were in accordance with consent conditions.

The volume of wastewater discharged from the site complied with conditions of consent **1450**. Monitoring of the wastewater by the consent holder showed that water quality of the discharges were compliant with consent conditions. Inter-laboratory comparisons between the Council and Fonterra showed an acceptable level of agreement between each laboratory.

The results of the marine ecological monitoring over the 2013-2014 period indicate that the combined Fonterra and the South Taranaki District Council Hawera Oxidation

Ponds wastewater discharge was not having detectable adverse effects on the intertidal reef communities.

The results from both the Tawhiti and Tangahoe stormwater ponds complied with all consent conditions. The Southern (unnamed) stormwater pond discharge breached the consent condition for BOD on one occasion.

A freshwater biological inspection undertaken in each of the tributaries that drain the stormwater ponds indicated that any preceding discharges from the dairy factory site had not had a significant adverse effect on the macroinvertebrate communities of the streams.

A fish survey was undertaken in the Tawhiti Stream to assess the impact of the water intake weir operated by the factory. Overall, the survey did not indicate that the intake, fish pass or discharge of sediment undertaken in relation to the Fonterra Whareroa water abstraction have had any impact on the fish communities of the Tawhiti Stream.

Emissions to air were in compliance with consent conditions and relevant air quality guidelines.

A cultural impact report, as required by condition 26 of consent **6257,** will be due after the consent has been exercised.

3.3 Recommendations from the 2012-2013 Annual Report

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

1. THAT monitoring of air emissions from the Whareroa plant in the 2013-2014 year continues at the same level as in 2012-2013.

2. THAT monitoring of water discharges (including stormwater) and abstractions for the Whareroa plant in the 2013-2014 year continues at the same level as in 2012-2013.

3. THAT freshwater and marine ecological monitoring in the 2013-2014 year continues at the same level as in 2012-2013.

4. THAT combined inspections of the Whareroa plant for monitoring of air emissions and of water abstractions and discharges in the 2013-2014 year continues at the same level as in 2012-2013.

These recommendations were all implemented during the 2013-2014 period.

3.4 Alterations to monitoring programmes for 2014-2015

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

In the case of the Whareroa site, the programme for 2013-2014 was unaltered from 2012-2013.

It is proposed that the monitoring programme for 2014-2015 remain unaltered from that of 2013-2014.

A recommendation to this effect is attached to this report.

3.5 Exercise of optional review of consent

Resource consent **4103-2** provides for an optional review of the consent in June 2015. Condition 15 allows the Council to review the consent, for the purpose of ensuring that the conditions are adequate to deal with any significant adverse effects on the environment arising from the exercise of this consent.

Resource consent **6273** also provides for an optional review of the consent in June 2015. Condition 15 allows the Council to review the consent, for the purpose of:

a) dealing with any significant adverse effect on the environment arising from the exercise of the consent which was not foreseen at the time the application was considered and which it is appropriate to deal with at the time of the review; and/or

b) requiring the consent holder to adopt the best practicable option to remove or reduce any adverse effect on the environment caused by the discharge; and/or

c) to alter, add, or delete limits on mass discharge quantities or discharge or ambient concentrations of any contaminant or contaminants; and/or

d) taking into account any Act of Parliament, regulation, national policy statement, national environmental standard, regional policy statement or regional rule which relates to limiting, recording, or mitigating products of combustion and which is relevant to emissions from the co-generation plants.

Based on the results of monitoring in the period under review, and in previous years as set out in earlier annual compliance monitoring reports, it is considered that there are no grounds that require a review to be pursued or grounds to exercise the review option.

A recommendation to this effect is presented in Section 4 of this report.

4. Recommendations

1. THAT monitoring of air emissions from the Whareroa plant in the 2014-2015 year continues at the same level as in 2013-2014.

2. THAT monitoring of water discharges (including stormwater) and abstractions for the Whareroa plant in the 2014-2015 year continues at the same level as in 2013-2014.

3. THAT freshwater and marine ecological monitoring in the 2014-2015 year continues at the same level as in 2013-2014.

4. THAT combined inspections of the Whareroa plant for monitoring of air emissions and of water abstractions and discharges in the 2014-2015 year continues at the same level as in 2013-2014.

5. THAT the option for a review of resource consents **4103** and **6273** in June 2015, as set out in conditions 15 of the consents, not be exercised, on the grounds that the current conditions are adequate to deal with any potential environmental effects.

Glossary of common terms and abbreviations

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

Anlene	Arange of dairy products enriched with a scientifically-formulated complex of essential bone nutrients. These include vitamin D, zinc, magnesium and, in New Zealand and Asia Phyto K or Phylloquinone, which acts to lock in bone nutrients. Anlene is available in 13 countries across Asia and Australasia. In New Zealand it is available as a fresh low-fat milk drink and yoghurt.
Biomonitoring	Assessing the health of the environment using aquatic organisms.
BOD	Biochemical oxygen demand. A measure of the presence of degradable organic matter, taking into account the biological conversion of ammonia to nitrate.
BODF	Biochemical oxygen demand of a filtered sample.
Bund	A wall around a tank to contain its contents in the case of a leak.
Casein	Either acid casein or rennet casein. Acid casein is produced by the controlled acidification of pure, pasteurised skim milk to pH 4.6. Acidification is achieved by the addition of a mineral acid or lactic fermentation. Rennet casein is produced by the controlled precipitation of casein from pure, pasteurised skim milk through the action of rennet. Casein is suitable for making nutritional foods and processed cheese. Casein also has a long history of use in non-food applications such as paper and cardboard coating, adhesives, leather tanning and plastics.
BODCF	Carbonaceous filtered biochemical oxygen demand. A measure of the presence of degradable organic matter, excluding the biological conversion of ammonia to nitrate.
cfu	Colony forming units. A measure of the concentration of bacteria.
COD	Chemical oxygen demand. A measure of the oxygen required to oxidise all matter in a sample by chemical reaction.
Conductivity	Conductivity, an indication of the level of dissolved salts in a sample, usually measured at 20°C and expressed in mS/m.
E.coli	*Escherichia coli,* an indicator of the possible presence of faecal material and pathological micro-organisms. Usually expressed as the number of colonies per 100 ml.
Ent	Enterococci, an indicator of the possible presence of faecal material and pathological micro-organisms. Usually expressed as the number of colonies per 100 ml.
FC	Faecal coliforms, an indicator of the possible presence of faecal material and pathological micro-organisms. Usually expressed as the number of colonies per 100 ml.
Free Cl_2	Free available chlorine.
Fresh	Elevated flow in a stream, such as after heavy rainfall.

g/m^3	Grammes per cubic metre, and equivalent to milligrammes per litre (mg/L). In water, this is also equivalent to parts per million (ppm), but the same does not apply to gaseous mixtures.
Incident	An event that is alleged or is found to have occurred that may have actual or potential environmental consequences or may involve non-compliance with a consent or rule in a regional plan. Registration of an incident by the Council does not automatically mean such an outcome had actually occurred.
Intervention	Action/s taken by Council to instruct or direct actions be taken to avoid or reduce the likelihood of an incident occurring.
Investigation	Action taken by Council to establish what were the circumstances/events surrounding an incident including any allegations of an incident
L/s	Litres per second.
MCI	Macroinvertebrate community index; a numerical indication of the state of biological life in a stream that takes into account the sensitivity of the taxa present to organic pollution in stony habitats.
mS/m	Millisiemens per metre.
Mixing zone	The zone below a discharge point where the discharge is not fully mixed with the receiving environment. For a stream, conventionally taken as a length equivalent to 7 times the width of the stream at the discharge point.
MPC	Milk protein concentrates. Manufactured by membrane filtration through which dairy proteins are isolated from fresh skim milk. Milk protein concentrates are used in infant formula, adult medical foods, enteral foods, weight management products, liquid nutritional beverages, cheese products, cultured foods, powdered dietary supplements, and sports nutrition products.
NO_x	Nitrogen oxides in emissions to air.
O&G	Oil and grease, defined as anything that will dissolve into a particular organic solvent (e.g. hexane). May include both animal material (fats) and mineral matter (hydrocarbons).
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.
Physicochemical	<easurement of both physical properties(e.g. temperature, clarity, density) and chemical determinants (e.g. metals and nutrients) to characterise the state of an environment.
PLC	Programmable Logic Controller, a type of computer with multiple input and output arrangements commonly used in industry for automation of processes.
PM_{10}	Relatively fine airborne particles (less than 10 micrometre diameter.

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	Resource Management Act 1991 and subsequent amendments.
SMP	Skim milk powder.
$SQMCI_5$	Tkes into account taxa abundances as well as sensitivity to pollution.
SS	Suspended solids.
TDMP	Total deposited milk powder.
Temp	Ttemperature, measured in °C.
Total Cl_2	Ttotal available chlorine.
UI	Unauthorised Incident.
UIR	Unauthorised Incident Register – contains a list of events recorded by the Council on the basis that they may have the potential or actual environmental consequences that may represent a breach of a consent or provision in a Regional Plan.
WMP	Whole milk powder.
WPC	Whey protein concentrates are manufactured from fresh whey by membrane filtration processes. They are suitable for use in a variety of applications such as yoghurts, beverages, dairy desserts and meat systems, nutritional products and infant food.

For further information on analytical methods, contact the Council's laboratory

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Appendix I

Resource consents held by Fonterra Whareroa

Discharge Permit

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

Name of Consent Holder:	Fonterra Co-operative Group Limited P O Box 444 HAWERA 4640
Decision Date:	14 February 2014
Commencement Date:	14 February 2014

Conditions of Consent

Consent Granted:	To discharge stormwater from the Whareroa milk processing site into an unnamed tributary of the Tangahoe River
Expiry Date:	1 June 2028
Review Date(s):	June 2016, June 2022
Site Location:	89 Whareroa Road, Hawera
Legal Description:	Lot 1 DP 12929 Lots 1 & 2 DP 13689 Lot 1 DP 17308 Lot 1 DP 17686 Lots 1-3 DP 19722 Pt Sec 234 Blk X Hawera SD (Discharge source) Lot 2 DP 2777 Blk X Hawera SD (Discharge site)
Grid Reference (NZTM)	1711975E-5614565N
Catchment:	Tangahoe

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 to section 36 of the Resource Management Act 1991.

Special conditions

1. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any adverse effects on the environment from the exercise of this consent.

2. The stormwater discharged shall be from a catchment area not exceeding 10 hectares.

3. Before 31 August 2014, the consent holder shall prepare and maintain a contingency plan that details measures and procedures to be undertaken to prevent spillage or any discharge of contaminants not authorised by this consent. The contingency plan shall be followed in the event of a spill or unauthorised discharge and shall be certified by the Chief Executive, Taranaki Regional Council as being adequate to avoid, remedy or mitigate the environmental effects of such a spillage or discharge.

4. Before 31 August 2014, the consent holder shall prepare and maintain a stormwater management plan that documents how the site is to be managed to minimise the contaminants that become entrained in the stormwater. This plan shall be followed at all times, shall be certified by the Chief Executive, Taranaki Regional Council, and shall include but not necessarily be limited to:

   a) cleaning procedures for the site catchments discharging to the Eastern Pond; and
   b) details of maintenance and cleaning programmes to remove the accumulated sediment from the ponds.

   A Stormwater Management Plan template is available in the Environment section of the Taranaki Regional Council's web site www.trc.govt.nz.

5. After allowing for reasonable mixing, within a mixing zone extending 10 metres below the discharge point, the discharge shall not give rise to any of the following effects in the receiving waters:

   a. the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;
   b. any conspicuous change in the colour or visual clarity;
   c. any emissions of objectionable odour;
   d. the rendering of fresh water unsuitable for consumption by farm animals; and
   e. any significant adverse effects on aquatic life, habitats or ecology.

6. There shall be no visible bacterial and/or fungal growths downstream of the discharge.

7. Constituents of the discharge shall meet the standards shown in the following table for eight of ten consecutive samples taken at least two weeks apart over the course of an annual monitoring period:

Constituent	Standard
Oil and grease	Concentration not greater than 5 gm^{-3}
pH	Within the range 6.0 to 9.0
Suspended solids	Concentration not greater than 30 gm^{-3}
BOD	Concentration not greater than 15 gm^{-3} for the first two years following the date of issue of this consent, and 10 gm^{-3} thereafter
Filtered carbonaceous BOD	Concentration not greater than 3.5 gm^{-3} for the first two years following the date of issue of this consent, and 2 gm^{-3} thereafter
Temperature	Not greater than 25°C
Total residual chlorine	Concentration not greater than 0.2 gm^{-3}

This condition shall apply before entry of the treated stormwater into the receiving waters at a designated sampling point approved by the Chief Executive, Taranaki Regional Council.

8. The consent holder shall maintain the existing fencing and planting of the riparian margins of the receiving water body for a distance of 500 metres downstream of the discharge point for the purpose of mitigating the effects of the discharge.

9. 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 2016 and/or June 2022, for the purpose of 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.

Signed at Stratford on 14 February 2014

For and on behalf of
Taranaki Regional Council

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A D McLay
Director-Resource Management

Discharge Permit

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

Name of Consent Holder:	Fonterra Co-operative Group Limited P O Box 444 HAWERA 4640
Decision Date:	14 February 2014
Commencement Date:	14 February 2014

Conditions of Consent

Consent Granted:	To discharge stormwater, back flushing from the sand filters and intermittent discharges of treated water from a reservoir, from the Whareroa milk processing site into an unnamed tributary of the Tawhiti Stream
Expiry Date:	1 June 2028
Review Date(s):	June 2016, June 2022
Site Location:	89 Whareroa Road, Hawera
Legal Description:	Lot 1 DP 12929 Lots 1 & 2 DP 13689 Lot 1 DP 17308 Lot 1 DP 17686 Lots 1-3 DP 19722 Pt Sec 234 Blk X Hawera SD (Discharge source) Pt Lot 2 DP 15204 Blk X Hawera SD (Discharge site)
Grid Reference (NZTM)	1711919E-5615318N
Catchment:	Tangahoe
Tributary:	Tawhiti

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 to section 36 of the Resource Management Act 1991.

Special conditions

1. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any adverse effects on the environment from the exercise of this consent.

2. The stormwater discharged shall be from a catchment area not exceeding 13 hectares.

3. Before 31 August 2014, the consent holder shall prepare and maintain a contingency plan that details measures and procedures to be undertaken to prevent spillage or any discharge of contaminants not authorised by this consent. The contingency plan shall be followed in the event of a spill or unauthorised discharge and shall be certified by the Chief Executive, Taranaki Regional Council as being adequate to avoid, remedy or mitigate the environmental effects of such a spillage or discharge.

4. Before 31 August 2014, the consent holder shall prepare and maintain a stormwater management plan that documents how the site is to be managed to minimise the contaminants that become entrained in the stormwater. This plan shall be followed at all times, shall be certified by the Chief Executive, Taranaki Regional Council, and shall include but not necessarily be limited to:

   a) cleaning procedures for the site catchments discharging to the Northern Pond; and
   b) details of maintenance and cleaning programmes to remove the accumulated sediment from the ponds.

   A Stormwater Management Plan template is available in the Environment section of the Taranaki Regional Council's web site www.trc.govt.nz.

5. After allowing for reasonable mixing, within a mixing zone extending 10 metres below the discharge point, the discharge shall not give rise to any of the following effects in the receiving waters:

   a. the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;
   b. any conspicuous change in the colour or visual clarity;
   c. any emissions of objectionable odour;
   d. the rendering of fresh water unsuitable for consumption by farm animals; and
   e. any significant adverse effects on aquatic life, habitats or ecology.

6. There shall be no visible bacterial and/or fungal growths downstream of the discharge.

7. Constituents of the discharge shall meet the standards shown in the following table for eight of ten consecutive samples taken at least two weeks apart over the course of an annual monitoring period:

Constituent	Standard
Oil and grease	Concentration not greater than 5 gm^{-3}
pH	Within the range 6.0 to 9.0
Suspended solids	Concentration not greater than 30 gm^{-3}
BOD	Concentration not greater than 10 gm^{-3}
Filtered carbonaceous BOD	Concentration not greater than 2 gm^{-3}
Temperature	Not greater than 25°C
Total residual chlorine	Concentration not greater than 0.2 gm^{-3}

This condition shall apply before entry of the treated stormwater into the receiving waters at a designated sampling point approved by the Chief Executive, Taranaki Regional Council.

8. 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 2016 and/or June 2022, for the purpose of 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.

Signed at Stratford on 14 February 2014

For and on behalf of
Taranaki Regional Council

_____

A D McLay
Director-Resource Management

Discharge Permit

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

Name of Consent Holder:	Fonterra Co-operative Group Limited P O Box 444 HAWERA 4640
Decision Date:	14 February 2014
Commencement Date:	14 February 2014

Conditions of Consent

Consent Granted:	To discharge stormwater from the Whareroa milk processing site into Unnamed Stream 18
Expiry Date:	1 June 2028
Review Date(s):	June 2016, June 2022
Site Location:	89 Whareroa Road, Hawera
Legal Description:	Lot 1 DP 12929 Lots 1 & 2 DP 13689 Lot 1 DP 17308 Lot 1 DP 17686 Lots 1-3 DP 19722 Pt Sec 234 Blk X Hawera SD (Discharge source) Lot 4 DP 2625 (Discharge site)
Grid Reference (NZTM)	1711403E-5614339N
Catchment:	Unnamed Stream 18

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 to section 36 of the Resource Management Act 1991.

Special conditions

1. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any adverse effects on the environment from the exercise of this consent.

2. The stormwater discharged shall be from a catchment area not exceeding 21 hectares.

3. Before 31 August 2014, the consent holder shall prepare and maintain a contingency plan that details measures and procedures to be undertaken to prevent spillage or any discharge of contaminants not authorised by this consent. The contingency plan shall be followed in the event of a spill or unauthorised discharge and shall be certified by the Chief Executive, Taranaki Regional Council as being adequate to avoid, remedy or mitigate the environmental effects of such a spillage or discharge.

4. Before 31 August 2014, the consent holder shall prepare and maintain a stormwater management plan that documents how the site is to be managed to minimise the contaminants that become entrained in the stormwater. This plan shall be followed at all times, shall be certified by the Chief Executive, Taranaki Regional Council, and shall include but not necessarily be limited to:

   a) cleaning procedures for the site catchments discharging to the Southern Pond; and
   b) details of maintenance and cleaning programmes to remove the accumulated sediment from the ponds.

   A Stormwater Management Plan template is available in the Environment section of the Taranaki Regional Council's web site www.trc.govt.nz.

5. After allowing for reasonable mixing, within a mixing zone extending 10 metres below the discharge point, the discharge shall not give rise to any of the following effects in the receiving waters:

   a. the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;
   b. any conspicuous change in the colour or visual clarity;
   c. any emissions of objectionable odour;
   d. the rendering of fresh water unsuitable for consumption by farm animals; and
   e. any significant adverse effects on aquatic life, habitats or ecology.

6. There shall be no visible bacterial and/or fungal growths downstream of the discharge.

7. Constituents of the discharge shall meet the standards shown in the following table for eight of ten consecutive samples taken at least two weeks apart over the course of an annual monitoring period:

Constituent	Standard
Oil and grease	Concentration not greater than 5 gm^{-3}
pH	Within the range 6.0 to 9.0
Suspended solids	Concentration not greater than 100 gm^{-3}
BOD	Concentration not greater than 15 gm^{-3} for the first two years following the date of issue of this consent, and 10 gm^{-3} thereafter
Filtered carbonaceous BOD	Concentration not greater than 3.5 gm^{-3} for the first two years following the date of issue of this consent, and 2 gm^{-3} thereafter
Temperature	Not greater than 25°C
Total residual chlorine	Concentration not greater than 0.2 gm^{-3}

This condition shall apply before entry of the treated stormwater into the receiving waters at a designated sampling point approved by the Chief Executive, Taranaki Regional Council.

8. The consent holder shall maintain the existing fencing and planting of the riparian margins of the receiving water body for a distance of 500 metres downstream of the discharge point for the purpose of mitigating the effects of the discharge.

9. 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 2016 and/or June 2022, for the purpose of 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.

Signed at Stratford on 14 February 2014

For and on behalf of
Taranaki Regional Council

_____

A D McLay
Director-Resource Management

Discharge Permit

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

Name of Consent Holder:	Fonterra Co-operative Group Limited P O Box 444 HAWERA 4640
Decision Date:	25 July 2013
Commencement Date:	25 July 2013

Conditions of Consent

Consent Granted:	To discharge stormwater and sediment from earthworks onto and into land in circumstances where it may enter water
Expiry Date:	1 June 2018
Site Location:	84 Whareroa Road, Hawera
Legal Description:	Lot 1 DP 19882 (Discharge source & site)
Grid Reference (NZTM)	1711183E-5615361N
Catchment:	Tangahoe
Tributary:	Tawhiti

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.

Special conditions

1. This consent authorises the discharge of stormwater from (no more than 15.15 hectares of land where earthworks is being undertaken for the purpose of constructing the expansion of the Whareroa Distribution Centre at the Fonterra facility, as shown in the drawings provided with the application for this consent.

2. At least 7 working days prior to the commencement of works the consent holder shall notify the Taranaki Regional Council of the proposed start date for the work. Notification shall include the consent number and a brief description of the activity consented and shall be emailed to worknotification@trc.govt.nz.

3. All run off from any area of exposed soil shall pass through settlement ponds or sediment traps with a minimum total capacity of:

   a) 100 cubic metres for every hectare of exposed soil between 1 November to 30 April; and

   b) 200 cubic metres for every hectare of exposed soil between 1 May to 31 October;

   unless other sediment control measures that achieve an equivalent standard are agreed to by the Chief Executive of the Taranaki Regional Council.

4. All earthwork areas shall be stabilised vegetatively or otherwise as soon as is practicable and no longer than 6 months after completion of soil disturbance activities.

5. The obligation described in condition 3 above shall cease to apply, and accordingly the erosion and sediment control measures may be removed, in respect of any particular area only when the site is stabilised.

   Note: For the purpose of conditions 3 and 5 'stabilised' in relation to any site or area means inherently resistant to erosion or rendered resistant, such as by using rock or by the application of basecourse, colluvium, grassing, mulch, or another method to the reasonable satisfaction of the Chief Executive, Taranaki Regional Council and as specified in the Taranaki Regional Council's Guidelines for Earthworks in the Taranaki Region, 2006. Where seeding or grassing is used on a surface that is not otherwise resistant to erosion, the surface is considered stabilised once, on reasonable visual inspection by an officer of the Taranaki Regional Council, an 80% vegetative cover has been established.

6. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any actual or likely adverse effect on the environment associated with the discharge of contaminants from the site.

Signed at Stratford on 25 July 2013

For and on behalf of
Taranaki Regional Council

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Director-Resource Management

Discharge Permit

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

Name of Consent Holder:	Fonterra Co-operative Group Limited P O Box 444 HAWERA 4640
Decision Date:	25 July 2013
Commencement Date:	25 July 2013

Conditions of Consent

Consent Granted:	To discharge contaminants (dust) to air from earthworks associated with construction activities
Expiry Date:	1 June 2018
Site Location:	84 Whareroa Road, Hawera
Legal Description:	Lot 1 DP 19882 (Discharge source & site)
Grid Reference (NZTM)	1711183E-5615361N

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 consent holder shall prepare a dust control management plan that details the methodology that will be used to ensure that discharges to air comply with the conditions of this consent, in particular special conditions 3, 6 and 7. The plan shall be submitted for approval to the Chief Executive, Taranaki Regional Council, acting in a certification capacity, at least 10 working days prior to earthworks commencing.

2. The consent holder shall at all times adhere to the dust control management plan, approved under condition 1 of this consent

3. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any adverse effects on the environment from the exercise of this consent.

4. The area of soil exposed on the site at any time shall not exceed 15.15 ha.

5. The consent holder shall notify the Chief Executive, Taranaki Regional Council, in writing at least seven days prior to the exercise of this consent. Notification shall include the consent number and a brief description of the activity consented and be emailed to worknotification@trc.govt.nz.

6. The dust deposition rate beyond the property boundary arising from the discharge shall be less than 4.0 $g/m^2/30$ days or 0.13 $g/m^2/day$.

7. Any discharge to air from the site shall not give rise to any offensive, objectionable, noxious or toxic levels of dust at or beyond the boundary of the property, and in any case, suspended particulate matter shall not exceed 3 mg/m^3 (measured under ambient conditions) beyond the boundary of the site.

8. The consent holder shall maintain a permanent record of any complaints received alleging adverse effects from or related to the exercise of this consent. This record shall include the following, where practicable:

    a) the name and address of the complainant, if supplied;
    b) date, time and details of the alleged event;
    c) weather conditions at the time of the alleged event (as far as practicable);
    d) investigations undertaken by the permit holder in regards to the complaint and any measures adopted to remedy the effects of the incident/complaint; and
    e) measures put in place to prevent occurrence of a similar incident.

9. The consent holder shall notify the Chief Executive, Taranaki Regional Council, or his delegate, of any complaints received, which relate to the exercise of this permit, within 24 hours of being received. At the grant date of this consent, the Council's phone number is 0800 736 222 (24 hr service).

10. The consent holder shall make the complaints record available to officers of Taranaki Regional Council, on request.

Signed at Stratford on 25 July 2013

For and on behalf of
Taranaki Regional Council

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Director-Resource Management

Discharge Permit

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

Name of Consent Holder:	Fonterra Co-operative Group Limited P O Box 444 HAWERA 4640
Decision Date (Change):	19 December 2012
Commencement Date (Change):	19 December 2012 (Granted: 3 February 2004)

Conditions of Consent

Consent Granted:	To discharge waste material from stormwater sumps and road sump and unprocessable dairy factory wastes onto and into land at or about (NZTM) 1711451E-5613271N
Expiry Date:	1 June 2022
Review Date(s):	June 2016
Site Location:	Rifle Range Road, Hawera
Legal Description:	Pt Lot 13 DP 2625 Blks IX & X Hawera SD (Discharge source & site)
Catchment:	Unnamed catchment 18

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

General condition

a) On receipt of a requirement from the Chief Executive, Taranaki Regional Council the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.

b) Unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.

c) The consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:

   i) the administration, monitoring and supervision of this consent; and
   ii) charges authorised by regulations.

Special conditions

1. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any adverse effects on the environment from the exercise of this consent.

2. Wherever practicable, the consent holder shall seek to dispose of unprocessable dairy factory wastes as authorised by this consent by irrigation to land in accordance with the following application loading limits:

   Nitrogen (N) – 250 kg/ha/year

   Chemical Oxygen Demand (COD) – 4500 kg/ha/day

3. The exercise of this resource consent shall be undertaken generally in accordance with the documentation submitted in support of applications 2748, 3326 and 7284. In the case of any contradiction between the documentation submitted in support of applications 2748, 3326 and 7284 and the conditions of this consent, the conditions of this resource consent shall prevail.

4. The discharge of stormwater sump cleanings and road sump cleanings authorised by this consent shall not exceed 120 cubic metres per week. The discharge of unprocessable dairy wastes authorised by this consent shall not exceed 250 cubic metres per day.

5. The consent holder shall provide a management plan for the discharge site to the Chief Executive, Taranaki Regional Council, for written approval within three months of the granting of this consent, and regularly updated as required, to ensure that the conditions of this consent can be met, including but not limited to:

   For Pit Disposal;

   i) Means of pit excavation;
   ii) Pit preparation;
   iii) Dimensions of each pit;
   iv) Placement and covering of wastes;
   v) Stormwater control;
   vi) Site control;
   vii) Nature of wastes
   viii) Location of all present and previous pits;
   ix) An outline of site options for future pit use;

   For Irrigation Disposal;

   x) Location and area (ha) of area used for irrigation;
   xi) Volume of material applied;
   xii) Application loading rates (N and COD);
   xiii) Mitigation measures for odour control.

6. The discharge shall not occur within 50 metres of any bore, well or spring used for water supply purposes, nor within 25 metres of any surface water body, nor within 100 metres from the coastal cliff edge.

7. The disposal pit(s) shall not intercept the water table.

8. The exercise of this consent, including the design and management of the burial pit(s), shall not lead to or be liable to lead to contaminants entering a water body from overland surface flows.

9. The exercise of this consent shall not result in any adverse impacts on groundwater as a result of leaching, or surface water including aquatic ecosystems, and/or result in a change to the suitability of use of the receiving water as determined by the Chief Executive, Taranaki Regional Council.

10. Where the discharge is to pits, the discharged material shall be covered with up to 50 millimetres of earth or other suitable cover, within a period of 7 days or less following each discharge.

11. All liquid shall be removed from the disposal pit prior to the application of covering material as required in special condition 9.

12. Only those materials as authorised by this consent and outlined in applications 2748, 3326 and 7284 shall be discharged of to the disposal pits or irrigated to land. Prior to each discharge operation the consent holder shall remove all non-biodegradable material entrained in the material to be discharged, as far as is practicable to the satisfaction of the Chief Executive, Taranaki Regional Council.

13. Each disposal pit shall be reinstated with a low permeability, clean, compacted soil cover with a minimum thickness of 0.5 metre to be placed over the material, and vegetation re-established to the satisfaction of the Chief Executive, Taranaki Regional Council.

14. The consent holder shall compact, contour, and maintain the cover layer of soil so as to ensure its integrity at all times to the satisfaction of the Chief Executive, Taranaki Regional Council.

15. The disposal of wastes as authorised by this consent shall not give rise to objectionable or offensive odours beyond the property boundary.

16. The consent holder shall keep records of all discharges to land including date, volume discharged, disposal method, disposal location, product type, and the reason for discharge and make these available to the Chief Executive, Taranaki Regional Council, upon request.

17. The discharge of unprocessable dairy waste under this consent shall only occur after all other reasonable waste disposal options have been exhausted, and the consent holder shall notify the Chief Executive, Taranaki Regional Council, in writing of the options assessed.

18. 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 2010 and/or June 2016, for the purpose of 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.

Signed at Stratford on 19 December 2012

For and on behalf of
Taranaki Regional Council

_____

Director-Resource Management

Consent 0439-3

TARANAKI REGIONAL COUNCIL

CHIEF EXECUTIVE
PRIVATE BAG 713
47 CLOTEN ROAD
STRATFORD
NEW ZEALAND
PHONE: 06-765 7127
FAX: 06-765 5097
www.trc.govt.nz

Please quote our file number on all correspondence

Discharge Permit

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

Name of Consent Holder:	Fonterra Co-operative Group Limited P O Box 444 HAWERA 4640
Consent Granted Date:	25 June 2010

Conditions of Consent

Consent Granted:	To discharge treated farm dairy effluent from an oxidation pond treatment system into the Motumate Stream at or about (NZTM) 1697539E-5627105N
Expiry Date:	1 December 2029
Review Date(s):	June 2017, June 2023
Site Location:	Manaia Road, Manaia
Legal Description:	Lot 1 DP 6039 Blk III Waimate SD
Catchment:	Motumate

Treatment/Discharge System[s]:

three oxidation ponds:	length	width	depth	[metres]
anaerobic:	40	20	4.5	
first aerobic:	40	18	1.2	
second aerobic:	40	17	1.2	

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 [the Council] all the administration, monitoring and supervision costs of this consent, fixed in accordance to section 36 of the Resource Management Act.

Special conditions

1. The effluent discharged shall be from the milking of no more than 450 cows.

2. The discharge point shall be located at or about 1697320E-5627191N.

3. A minimum dilution rate of 1 part effluent to 100 parts receiving water shall be maintained at all times in the receiving water at the point of discharge.

4. After treatment in an oxidation pond treatment system, the concentrations of the constituents shown in the table below shall not be exceeded in the effluent discharged:

Constituent	Concentration
Total carbonaceous BOD_5	110 gm^{-3}
Suspended solids	100 gm^{-3}

5. After allowing for mixing, within a mixing zone extending 4 metres downstream of the discharge point, the discharge shall not cause the concentrations shown in the following table to be exceeded:

Constituent	Concentration
Unionised ammonia	0.025 gm^{-3}
Filtered carbonaceous BOD_5	2.0 gm^{-3}

6. After allowing for mixing, within a mixing zone extending 4 metres downstream of the discharge point, the discharge shall not give rise to any of the following effects in the receiving water:

   (a) the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;
   (b) any conspicuous change in the colour or visual clarity;
   (c) any emission of objectionable odour;
   (d) the rendering of fresh water unsuitable for consumption by farm animals;
   (e) any significant adverse effects on aquatic life, habitats or ecology;
   (f) the generation of undesirable heterotrophic growths [sewage fungus].

7. The treatment and discharge system shall be designed, managed, operated and regularly maintained to ensure that the conditions of this consent are met.

8. Where, for any cause [accidental or otherwise], untreated or partially treated effluent associated with the consent holder's operations escapes to surface water, the consent holder shall:

   (a) immediately notify the Taranaki Regional Council on Ph 0800 736 222 [notification must include either the consent number or farm dairy number]; and
   (b) stop the discharge and immediately take steps to control and stop the escape of untreated or partially treated effluent to surface water; and
   (c) immediately take steps to ensure that a recurrence of the escape of untreated or partially treated effluent to surface water is prevented; and
   (d) report in writing to the Chief Executive, Taranaki Regional Council, describing the manner and cause of the escape and the steps taken to control it and to prevent it reoccurring. The report shall be provided to the Chief Executive within seven [7] days of the occurrence.

9. The Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during June 2017 and/or June 2023, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this consent, which either were not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 25 June 2010

For and on behalf of
Taranaki Regional Council

Director-Resource Management

Consent 1450-2

TARANAKI REGIONAL COUNCIL
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Please quote our file number on all correspondence

Coastal Permit

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

Name of Consent Holder:	Fonterra Co-operative Group Limited, Whareroa P O Box 444 HAWERA
Change To Conditions Date:	29 June 2007 [Granted: 12 September 1995]

Conditions of Consent

Consent Granted:	To discharge up to 40,000 cubic metres per day of dairy factory wastewater from the Whareroa Dairy Factory Complex and to temporarily discharge lactose solids from Fonterra Kapuni via a marine outfall into the Tasman Sea at or about GR: Q21:214-747
Expiry Date:	1 June 2015
Review Date(s):	June 2007, June 2010
Site Location:	Tasman Sea, Rifle Range Road, Hawera
Legal Description:	Pt Lot 13 DP 2625 & Foreshore Blks IX & X Hawera SD
Catchment:	Tasman Sea

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

General conditions

a) On receipt of a requirement from the Chief Executive, Taranaki Regional Council the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.

b) Unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.

c) The consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:

i) the administration, monitoring and supervision of this consent; and
ii) charges authorised by regulations.

Special conditions

Conditions 1 and 2 - new

1. The discharge of lactose solids shall be managed in accordance with the documentation submitted in support of application 4679 [dated 5 June 2007]. In the case of any contradiction between the documentation submitted in support of application 4679 and the conditions of this consent, the conditions of this consent shall prevail.

2. Lactose solids from the Fonterra Kapuni site, with a volume of approximately 400 m^3, may be discharged before 1 August 2007. No other discharge of lactose from the Kapuni site is authorised.

Conditions 3 to 16 – unchanged (previously conditions 1 to 14)

3. All whey and whey permeate shall be removed from the wastewater to the satisfaction of the Chief Executive, Taranaki Regional Council, by 31 December 1996, except as provided for in condition 11.

4. The consent holder shall maintain, to the satisfaction of the Chief Executive, Taranaki Regional Council, a loss minimisation programme to reduce product losses to wastewater throughout the term of this consent.

5. Wastewater may include all wastewater from dairy factory processes and associated processes, and stormwater, and shall comply with the following standards, based on analysis of 24 hour composite time-proportioned samples:

suspended solids	≤ 1,000 milligrams/litre
total fats	≤ 800 milligrams/litre
chemical oxygen demand [COD]	≤ 7000 milligrams/litre

6. The consent holder shall, by 31 August 1996, or such later time before 31 August 1997 as the Chief Executive, Taranaki Regional Council, may approve, install an outfall extension to the satisfaction of the Chief Executive, Taranaki Regional Council, which will result in the achievement of no significant visual, chemical or ecological impacts attributable to the discharge, outside a mixing zone, established in condition 8, or above mean low water spring level.

7. The consent holder shall supply plans and design details for the outfall extension and diffuser to the satisfaction of the Chief Executive, Taranaki Regional Council, by 28 February 1996.

8. Following the outfall extension, the discharge authorised by this consent shall not give rise to any of the following effects in the Tasman Sea beyond a mixing zone of 200 metres from the centre line of the outfall diffuser:

   a) the production of conspicuous oil or grease films, scums or foams, or floatable suspended materials;
   b) any conspicuous change in the colour or visual clarity
   c) any emission of objectionable odour;
   d) any significant adverse effects on aquatic life.

9. Up to such time as an outfall extension is installed and operational, the discharge shall comply with the following standards, based on analysis of 24-hour flow-proportioned samples:

suspended solids	< 1,000 milligrams/litre
fats [total]	< 600 milligrams/litre
pH within range	4.5 - 11.5

10. There shall be no direct discharge of raw or treated domestic sewage from the Whareroa site pursuant to this consent.

11. The consent holder shall provide for written approval of the Chief Executive, Taranaki Regional Council, a contingency plan outlining all procedures to be undertaken in the event of a spillage of stored chemicals, accidental discharge, accumulation of off-specification effluent or accumulation under emergency conditions of whey or whey permeate which, if discharged, would result in the breaching of other conditions of this consent; such a plan to be in the hands of the Chief Executive, Taranaki Regional Council, no later than 1 December 1995.

12. The consent holder shall install, to the satisfaction of the Chief Executive, Taranaki Regional Council, a system to monitor pipeline structural performance.

13. The consent holder shall provide to the Chief Executive, Taranaki Regional Council, a report reviewing any technological advances in dairy wastewater management and how these might be applicable at the Whareroa site, and detailing any measures taken by the consent holder to improve or minimise the wastewater discharge.

14. The consent holder and staff of the Taranaki Regional Council shall meet as appropriate, and at least once per year, with representatives of Tangahoe Iwi, Ngati Ruanui Iwi and other submitters to the consent, and any other interested party, at the discretion of the Chief Executive, Taranaki Regional Council, to discuss any matter relating to the exercise of this resource consent, in order to facilitate ongoing consultation.

15. The Taranaki Regional Council may review, under section 128 of the Resource Management Act 1991, the conditions of this consent if, at any time after the outfall extension is installed, any significant visual, chemical or ecological impacts attributable to the discharge occur beyond a mixing zone established in condition 8 or above mean low water spring level.

16. 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 2007 and/or June 2010, for the purpose of 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.

Signed at Stratford on 29 June 2007

For and on behalf of
Taranaki Regional Council

Director-Resource Management

Consent 0047-3

TARANAKI REGIONAL COUNCIL

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Please quote our file number on all correspondence

Water Permit

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

Name of Consent Holder:	Fonterra Co-operative Group Limited, Whareroa P O Box 444 HAWERA
Change To Conditions Date:	22 May 1998 [Granted: 1 May 1996]

Conditions of Consent

Consent Granted:	To take up to 30,000 cubic metres/day [347 litres/second] of water from the Tawhiti Stream in the Tangahoe Catchment for processing and manufacture of dairy products, cleaning of plant and cooling purposes, provided the total abstraction in the Tangahoe Catchment by the consent holder does not exceed 30,000 cubic metres/day at any time at or about GR: Q21:229-780
Expiry Date:	1 June 2015
Review Date(s):	June 1999, June 2004
Site Location:	Main South Road Hawera
Legal Description:	Lot 1 DP 3710 Pt Lot 1 DP 2629 Lot 1 DP 1087 Blk X Hawera SD
Catchment:	Tangahoe
Tributary:	Tawhiti

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

General conditions

a) That on receipt of a requirement from the Chief Executive, Taranaki Regional Council (hereinafter the Chief Executive), the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.

b) That unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.

c) That the consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:

i) the administration, monitoring and supervision of this consent; and
ii) charges authorised by regulations.

Special conditions

1. That the abstraction shall be managed to ensure that a flow of not less than 50 litres/second is maintained at all times in the Tawhiti Stream, as measured at the flow recorder site at or about Q21:243-773.

2. That the consent holder shall maintain, to the satisfaction of the Chief Executive, Taranaki Regional Council, a measuring device capable of recording daily rates of abstraction and shall make such records available to the Chief Executive, Taranaki Regional Council, upon request.

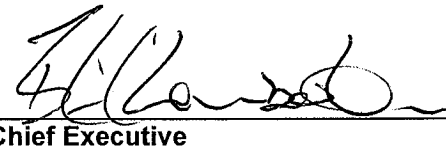
3. That the Taranaki Regional Council reserves the right to temporarily suspend or reduce the abstraction during extreme low flow events, in order to protect the biological communities in the stream, in accordance with section 329 of the Resource Management Act 1991.

4. That the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during June 1999 and/or June 2004 for the purpose of ensuring that the conditions are adequate to deal with any adverse effects of the abstraction on the environment.

5. That all times when the flow in the Tawhiti Stream, as measured at the flow recorder site at or about Q21:243-773, is less than 800 litres/second, and, when the turbidity of the Tangahoe River at or about Q21:258-742 is less than 150 nephelometric turbidity units [NTU], then, the maximum rate of abstraction shall not exceed 184 litres/second.

Transferred at Stratford on 4 November 2003

For and on behalf of
Taranaki Regional Council



Chief Executive

Consent 7465-1

TARANAKI REGIONAL COUNCIL

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Please quote our file number on all correspondence

Discharge Permit

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

Name of Consent Holder:	Fonterra Co-operative Group Limited, Whareroa P O Box 444 HAWERA
Consent Granted Date:	31 March 2009

Conditions of Consent

Consent Granted:	To discharge emissions into the air from the combustion of waste wood packaging at or about (NZTM) 1711447E-5613278N
Expiry Date:	1 June 2028
Review Date(s):	June 2016, June 2022
Site Location:	Rifle Range Road, Hawera
Legal Description:	Pt Lot 13 DP 2625 Blks IX & X Hawera SD

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

General conditions

a) On receipt of a requirement from the Chief Executive, Taranaki Regional Council the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.

b) Unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.

c) The consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:

i) the administration, monitoring and supervision of this consent; and
ii) charges authorised by regulations.

Special conditions

1. The consent only authorises the combustion of untreated timber packing waste originating from the Whareroa Dairy Factory site.

2. The total volume of waste that can be burned in calendar month shall not exceed 4 cubic metres.

3. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any adverse effects on the environment from the exercise of this consent by ensuring proper and effective methods of control and supervision of the discharge at all times.

4. The consent holder, prior to lighting any fire, shall have regard to wind direction and speed so as to minimise adverse effects upon neighbours. No burning shall occur during foggy conditions.

5. The discharges authorized by this consent shall not give rise to a level of a contaminant or contaminants at or beyond the boundary of the site that is noxious or toxic.

6. The discharges authorized by this consent shall not give rise to an odour at or beyond the boundary of the site that is offensive or objectionable.

7. The consent holder shall maintain a record of each burning event, including: the date, time and duration; the wind conditions [strength and direction] over the duration of the burning; any problems or issues that occurred; and details of any complaints received about the burning. This record shall be made available to the Chief Executive, Taranaki Regional Council upon request.

8. This consent shall lapse on 31 March 2014, 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.

9. 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 2016 and/or June 2022 for the purpose or purposes of 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.

Signed at Stratford on 31 March 2009

For and on behalf of
Taranaki Regional Council

Director-Resource Management

Consent 4977-1

TARANAKI REGIONAL COUNCIL

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Coastal Permit

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

Name of Consent Holder:	NZMP Whareroa P O Box 444 HAWERA
Consent Granted Date:	7 October 1996

Conditions of Consent

Consent Granted:	To erect, place and maintain a marine outfall and diffuser structure of approximately 1845 metres length in the coastal marine area adjacent to the end of Rifle Range Road, Hawera at or about GR: Q21:214-747
Expiry Date:	1 June 2015
Review Date(s):	June 2000, June 2005, June 2010
Site Location:	Off Rifle Range Road Hawera
Legal Description:	Pt Lot 13 DP 2625 And Foreshore Blks IX & X Hawera SD
Catchment:	Tasman Sea

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

General conditions

a) That on receipt of a requirement from the Chief Executive, Taranaki Regional Council (hereinafter the Chief Executive), the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.

b) That unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.

c) That the consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:

i) the administration, monitoring and supervision of this consent; and
ii) charges authorised by regulations.

Special conditions

1. THAT the consent holder shall notify the Taranaki Regional Council at least three days prior to the commencement of construction or any major maintenance works.

2. THAT the marine outfall and diffuser structure shall be constructed and maintained in accordance with the documentation submitted in support of application 96/109.

3. THAT during the construction phase and any subsequent maintenance works, the consent holder must observe every practicable measure to minimise any discharge of contaminants to the environment and to minimise the disturbance of the foreshore and seabed.

4. THAT following construction, the consent holder shall reinstate, as far as practicable, the intertidal construction area.

5. THAT the intertidal section of the outfall pipeline shall not be visible at any stage of the tide.

6. THAT the consent holder shall remove the marine outfall and diffuser structure covered by this consent and reinstate the area if and when it is no longer required.

7. THAT the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during June 2000 and/or June 2005 and/or June 2010 for the purpose of ensuring that the conditions are adequate to deal with any significant adverse effects of the structure on the environment arising from the exercise of this consent, which were not foreseen at the time the application was considered and which it was not appropriate to deal with at that time.

Transferred at Stratford on 31 October 2001

For and on behalf of
Taranaki Regional Council

Chief Executive

Consent 5013-1

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Coastal Permit

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

Name of Consent Holder:	NZMP Whareroa P O Box 444 HAWERA
Consent Granted Date:	30 August 1996

Conditions of Consent

Consent Granted:	To construct and maintain a rock wall 100 metres in length in the coastal marine area for the protection of outfall and stream diversion pipelines and associated structures at or about GR: Q21:214-747
Expiry Date:	1 June 2015
Review Date(s):	June 2000, June 2005, June 2010
Site Location:	Off Rifle Range Road, Hawera
Legal Description:	Pt Lot 13 DP 2625 And Foreshore Blks IX & X Hawera SD
Catchment:	Tasman Sea

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

Consent 5013-1

General conditions

a) That on receipt of a requirement from the Chief Executive, Taranaki Regional Council (hereinafter the Chief Executive), the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.

b) That unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.

c) That the consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:
   i) the administration, monitoring and supervision of this consent; and
   ii) charges authorised by regulations.

Special conditions

1. THAT the consent holder shall notify the Taranaki Regional Council at least three days prior to the commencement of construction or any major maintenance works.

2. THAT the rock wall shall be constructed and maintained in accordance with the documentation submitted in support of application 96/160 and to the satisfaction of the Chief Executive, Taranaki Regional Council.

3. THAT the construction and maintenance of the rock wall shall be undertaken in a manner which minimises both disturbance of the seabed and foreshore and the discharge of contaminants, to the satisfaction of the Chief Executive, Taranaki Regional Council.

4. THAT following completion of the rock wall, the consent holder shall revegetate and reinstate the construction site, to the satisfaction of the Chief Executive, Taranaki Regional Council.

5. THAT the consent holder shall monitor erosion at the cliff top at least 200 metres either side of the rock wall:
   a) at twelve monthly intervals; or
   b) immediately following storm events as requested by the Chief Executive, Taranaki Regional Council;

   in order to determine whether the rock wall is causing accelerated erosion to neighbouring properties.

6. THAT should the rock wall be shown to be causing accelerated erosion affecting neighbouring properties, the consent holder shall reasonably compensate any affected neighbours for the loss of land.

7. THAT the consent holder shall remove the rock wall covered by this consent and reinstate the area, to the satisfaction of the Chief Executive, Taranaki Regional Council, if and when it is no longer required.

8. THAT the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during June 2000 and/or June 2005 and/or June 2010, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this consent.

Transferred at Stratford on 31 October 2001

For and on behalf of
Taranaki Regional Council

Chief Executive

Consent 5015-1

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Land Use Consent

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

Name of Consent Holder:	NZMP Whareroa P O Box 444 HAWERA
Consent Granted Date:	23 August 1996

Conditions of Consent

Consent Granted:	To dam an unnamed stream between the Tangahoe River and the Waihi Stream for stream flow control and marine outfall pipeline installation purposes at or about GR: Q21:214-747
Expiry Date:	1 June 2015
Review Date(s):	June 2000, June 2005, June 2010
Site Location:	Off Rifle Range Road, Hawera
Legal Description:	Pt Lot 13 DP 2625 and Foreshore Blks IX & X Hawera SD
Catchment:	Waihi Tangahoe

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

General conditions

a) That on receipt of a requirement from the Chief Executive, Taranaki Regional Council (hereinafter the Chief Executive), the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.

b) That unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.

c) That the consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:

i) the administration, monitoring and supervision of this consent; and
ii) charges authorised by regulations.

Special conditions

1. THAT the consent holder shall notify the Taranaki Regional Council at least three days prior to the commencement of construction or any major maintenance works.

2. THAT the dam shall be constructed and maintained in accordance with the documentation submitted in support of application 96/162 and to the satisfaction of the Chief Executive, Taranaki Regional Council.

3. THAT during the construction period and any subsequent maintenance, the consent holder shall observe every practicable measure to prevent the discharge or placement of silt and/or organics and/or any other contaminant into the stream and to minimise disturbance of the stream bed, to the satisfaction of the Chief Executive, Taranaki Regional Council.

4. THAT the dam and any associated structures covered by this consent shall be removed and the area reinstated, to the satisfaction of the Chief Executive, Taranaki Regional Council, if and when it is no longer required.

5. THAT the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during June 2000 and/or June 2005 and/or June 2010, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this consent.

Transferred at Stratford on 31 October 2001

For and on behalf of
Taranaki Regional Council

Chief Executive

Consent 5017-1

TARANAKI REGIONAL COUNCIL

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Land Use Consent

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

Name of Consent Holder:	NZMP Whareroa P O Box 444 HAWERA
Consent Granted Date:	23 August 1996

Conditions of Consent

Consent Granted:	To drain and excavate the bed of an unnamed stream between the Tangahoe River and the Waihi Stream and to erect, place, use and maintain outfall and stream diversion pipelines and associated structures in or on that bed at or about GR: Q21:214-747
Expiry Date:	1 June 2015
Review Date(s):	June 2000, June 2005, June 2010
Site Location:	Off Rifle Range Road, Hawera
Legal Description:	Pt Lot 13 DP 2625 and foreshore Blks IX & X Hawera SD
Catchment:	Waihi Tangahoe

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

General conditions

a) That on receipt of a requirement from the Chief Executive, Taranaki Regional Council (hereinafter the Chief Executive), the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.

b) That unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.

c) That the consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:

i) the administration, monitoring and supervision of this consent; and
ii) charges authorised by regulations.

Special conditions

1. THAT the consent holder shall notify the Taranaki Regional Council at least three days prior to the commencement of excavation or construction or any major maintenance works.

2. THAT works associated with this consent shall be constructed and maintained in accordance with the documentation submitted in support of application 96/164 and to the satisfaction of the Chief Executive, Taranaki Regional Council.

3. THAT the outfall and stream diversion pipelines and any associated structures shall be of a colour in keeping with the natural character of the coastal environment.

4. THAT following construction, the consent holder shall revegetate the construction site, to the satisfaction of the Chief Executive, Taranaki Regional Council.

5. THAT the consent holder shall remove the outfall and stream diversion pipelines and any associated structures covered by this consent and reinstate the area, to the satisfaction of the Chief Executive, Taranaki Regional Council, if and when the structures are no longer required.

6. THAT the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during June 2000 and/or June 2005 and/or June 2010, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the envirionment arising from the exercise of this consent.

Transferred at Stratford on 31 October 2001

For and on behalf of
Taranaki Regional Council

Chief Executive

Consent 4103-2

TARANAKI REGIONAL COUNCIL
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Please quote our file number on all correspondence

Discharge Permit

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

Name of Consent Holder:	Fonterra Co-operative Group Limited, Whareroa P O Box 444 HAWERA
Consent Granted Date:	4 October 2006

Conditions of Consent

Consent Granted:	To discharge emissions into the air from the manufacture and processing of milk products and associated processes at or about GR: Q21:215-766
Expiry Date:	1 June 2025
Review Date(s):	June 2010, June 2015, June 2020
Site Location:	Whareroa Road, Hawera
Legal Description:	Lot 1 DP 12929 Lots 1 & 2 DP 13689 Lot 1 DP 17308 Lot 1 DP 17686 Lots 1-3 DP 19722 Pt Sec 234 Blk X Hawera SD

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

www.trc.govt.nz

General conditions

a) On receipt of a requirement from the Chief Executive, Taranaki Regional Council the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.

b) Unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.

c) The consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:

i) the administration, monitoring and supervision of this consent; and
ii) charges authorised by regulations.

Special conditions

1. The consent holder shall adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any actual or likely adverse effect on the environment associated with the discharge of contaminants into the environment from the site.

2. The measures representing the best practicable option may be reviewed in accordance with the procedure provided for in condition 15.

3. Prior to undertaking any alterations to the plant, processes or operations, as specified in applications 92/151, 95/141, 96/233, 97/112, 346, 391, and 2747 which may significantly change the nature or quantity of contaminants emitted from the site, the consent holder shall consult with the Chief Executive, Taranaki Regional Council, and shall obtain any necessary approvals under the Resource Management Act 1991 and any amendments.

4. The consent holder shall provide to the Taranaki Regional Council within five years from the granting of this consent, and every six years thereafter a written report:

a) reviewing any technological advances in the reduction or mitigation of emissions, especially but not exclusively in respect of milk powder and other particulate emissions, how these might be applicable and/or implemented at the Whareroa site, and the costs and benefits of these advances; and

b) detailing an inventory of emissions from the site of such contaminants as the Chief Executive, Taranaki Regional Council, may from time to time specify following consultation with the consent holder; and

c) addressing any other issue relevant to the minimisation or mitigation of emissions from the Whareroa site that the Chief Executive, Taranaki Regional Council, considers should be included.

5. The consent holder shall be permitted to discharge into the air emissions of contaminants arising from the spray drying processes in the facilities known as WPC, Alamin, Powder-1, Powder-2, Powder-3, Powder-4, Powder-5, Casein-1 and Casein-2, together with other milk processing facility and supporting utility services, as described in applications 92/151, 95/141, 96/233, 97/112, 346, 391, and 2747 to the Taranaki Regional Council, at all times adopting the best practicable option or options to prevent or minimise the adverse effects of the discharges on the environment provided.

6. The consent holder shall minimise the emissions and impacts of air contaminants discharged from the site by the selection of the most appropriate process equipment, process control equipment, emission control equipment, methods of control, supervision and operation, and the proper and effective operation, supervision, control and maintenance of all equipment and processes.

7. Powder emissions to the atmosphere from the spray drying process cyclone exhausts shall not exceed 125 milligrams per cubic metre [mg/m^3] of gas flow, adjusted to 0 degrees Celsius, 1 atmosphere pressure, and dry gas basis.

8. The discharges authorised by this consent shall not give rise to suspended or deposited dust at or beyond the boundary of the site that, in the opinion of at least one enforcement officer of the Taranaki Regional Council, is offensive or objectionable. For the purposes of this condition, effects in excess of the following limits are deemed to be offensive or objectionable:

   a) deposition of milk powder equivalent to 0.13 grams total deposited milk powder per square metre per day [$g/m^2/day$]; and/or

   b) a suspended milk powder level of 1 milligram per cubic metre [mg/m^3].

9. The consent holder shall control all emissions of fine particulates [PM_{10}] to the atmosphere from the site, in order that the maximum ground level concentration of fine particulates [PM_{10}] arising from the exercise of this consent measured under ambient conditions does not exceed 50 micrograms per cubic metre [$\mu g/m^3$] [twenty-four hour average], at or beyond the boundary of the site.

10. The discharges authorised by this consent shall not give rise to an odour at or beyond the boundary of the site that, in the opinion of at least one enforcement officer of the Taranaki Regional Council, is offensive or objectionable.

11. The consent holder, in conjunction with the Taranaki Regional Council, shall undertake monitoring of emissions and their effects upon the environment as required by the Chief Executive, Taranaki Regional Council.

12. The consent holder shall convene an annual meeting of representatives of the Taranaki Regional Council, and interested submitters to application 2747, to discuss any matter relating to the exercise of this consent.

13. The Powder-5 facility may process skim milk powder only if the consent holder has:

    a) given five [5] days prior notice to the Chief Executive, Taranaki Regional Council,; and

    b) developed a monitoring programme for the emissions and their effects upon the environment as required by the Chief Executive, Taranaki Regional Council,.

14. The Council shall, within six [6] months of notice under condition 13, serve notice that it intends to review the conditions of this consent, in accordance with section 128(1)(a) of the Resource Management Act 1991, for the purpose of dealing with any significant adverse effect on the environment arising from the use of the Powder-5 plant for skim milk powder production.

15. 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 within six months of receiving a report prepared by the consent holder pursuant to condition 4 of this consent, or in any case in June 2010 and/or June 2015 and/or June 2020, for the purposes of:

    a) dealing with any significant adverse effect on the environment arising from the exercise of the consent which was not foreseen at the time the application was considered and which it is appropriate to deal with at the time of the review; and/or

    b) requiring the consent holder to adopt the best practicable option to remove or reduce any adverse effect on the environment caused by the discharge; and/or

    c) to alter, add, or delete limits on mass discharge quantities or discharge or ambient concentrations of any contaminant or contaminants; and/or

    d) taking into account any Act of Parliament, regulation, national policy statement, national environmental standard, regional policy statement or regional rule which relates to limiting, recording, or mitigating airborne contaminants and which is relevant to emissions from the milk and milk product processing plants and/or associated processes.

Signed at Stratford on 4 October 2006

For and on behalf of
Taranaki Regional Council

Director-Resource Management

Consent 6273-1

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Discharge Permit

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

Name of Consent Holder:	Fonterra Co-operative Group Limited, Whareroa P O Box 444 HAWERA
Consent Granted Date:	4 October 2006

Conditions of Consent

Consent Granted:	To discharge emissions into the air from 'Cogen-I' and 'Cogen-II' gas-fired co-generation energy generating plants with an energy output of 70 MW together with associated processes at or about GR: Q21:215-766
Expiry Date:	1 June 2025
Review Date(s):	June 2010, June 2015, June 2020
Site Location:	Whareroa Road, Hawera
Legal Description:	Lot 1 DP 12929 Lots 1 & 2 DP 13689 Lot 1 DP 17308 Lot 1 DP 17686 Lots 1-3 DP 19722 Pt Sec 234 Blk X Hawera SD

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

General conditions

a) On receipt of a requirement from the Chief Executive, Taranaki Regional Council the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.

b) Unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.

c) The consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:

i) the administration, monitoring and supervision of this consent; and
ii) charges authorised by regulations.

Special conditions

1. The consent holder shall adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any actual or likely adverse effect on the environment associated with the discharge of contaminants into the environment from the site.

2. The measures representing the best practicable option may be reviewed in accordance with the procedure provided for in condition 15.

3. Prior to undertaking any alterations to the plant, processes or operations, as specified in applications 92/151, 95/141, 96/233, 97/112, 346, 391, and 2811 which may significantly change the nature or quantity of contaminants emitted from the site, the consent holder shall consult with the Chief Executive, Taranaki Regional Council, and shall obtain any necessary approvals under the Resource Management Act 1991 and any amendments.

4. The consent holder shall provide to the Taranaki Regional Council within five years from the granting of this consent and every six years thereafter a written report:

a) reviewing any technological advances in the reduction or mitigation of emissions, how these might be applicable and/or implemented at the Whareroa site, and the costs and benefits of these advances; and

b) detailing an inventory of emissions from the site of such contaminants as the Chief Executive, Taranaki Regional Council, may from time to time specify following consultation with the consent holder; and

c) detailing any measures that have been taken by the consent holder to improve the energy efficiency of the Whareroa site; and

d) addressing any other issue relevant to the minimisation or mitigation of emissions from the Whareroa site that the Chief Executive, Taranaki Regional Council, considers should be included.

5. The consent holder shall control all emissions of carbon monoxide to the atmosphere from the site, in order that the maximum ground level concentration of carbon monoxide arising from the exercise of this consent measured under ambient conditions does not exceed 10 milligrams per cubic metre [mg/m^3] [eight- hour average exposure], or 30 milligrams per cubic metre [mg/m^3] [one-hour average exposure] at or beyond the boundary of the site.

6. The sum of all discharges to the atmosphere of nitrogen oxides from the cogeneration plant shall not exceed 48 grams per second [g/s].

7. The consent holder shall control all emissions of nitrogen dioxide or its precursors to the atmosphere from the site, so as to ensure that the maximum ground level concentration of nitrogen dioxide measured under ambient conditions does not exceed 200 micrograms per cubic metre [$\mu g/m^3$] [one-hour average], or 100 micrograms per cubic metre [$\mu g/m^3$] [twenty-four hour average], at or beyond the boundary of the site.

8. The consent holder shall control all emissions of fine particulates [PM_{10}] to the atmosphere from the site, in order that the maximum ground level concentration of fine particulates [PM_{10}] arising from the exercise of this consent measured under ambient conditions does not exceed 50 micrograms per cubic metre [$\mu g/m^3$] [twenty-four hour average], at or beyond the boundary of the site.

9. The consent holder shall control all emissions to the atmosphere from the site of contaminants other than carbon dioxide, carbon monoxide, and nitrogen oxides, in order that the maximum ground level concentration for any particular contaminant arising from the exercise of this consent measured at or beyond the boundary of the site is not increased above background levels:

   a) by more than $1/30^{th}$ of the relevant Workplace Exposure Standard-Time Weighted Average, or by more than the Workplace Exposure Standard Short Term Exposure Limit at any time [all terms as defined in Workplace Exposure Standards, 2002, Department of Labour]; or

   b) if no Short Term Exposure Limit is set, by more than the General Excursion Limit at any time [all terms as defined in Workplace Exposure Standards, 2002, Department of Labour].

10. The minimum height of discharge of products of combustion from the Cogen I plant shall be 15 metres above ground level, and from Cogen II plant shall be 17.5 metres above ground.

11. The consent holder shall minimise the emissions and impacts of air contaminants discharged from the site by the selection of the most appropriate process equipment, process control equipment, emission control equipment, methods of control, supervision and operation, and the proper and effective operation, supervision, control and maintenance of all equipment and processes.

12. The consent holder, in conjunction with the Taranaki Regional Council, shall undertake monitoring of emissions and their effects upon the environment as required by the Chief Executive, Taranaki Regional Council.

13. Notwithstanding conditions 1 and 11 above, the co-generation plants shall not be operated so as to generate emissions of visible smoke, nor shall any plume of visible water vapour from the cooling towers cross the boundary of the site.

14. The water treatment regime used in the cooling water system associated with Cogen I and Cogen II shall be to the satisfaction of the Chief Executive, Taranaki Regional Council.

15. 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 within six months of receiving a report prepared by the consent holder pursuant to condition 4 of this consent, or in any case in June 2010 and/or June 2015 and/or June 2020, for the purposes of:

    a) dealing with any significant adverse effect on the environment arising from the exercise of the consent which was not foreseen at the time the application was considered and which it is appropriate to deal with at the time of the review; and/or

    b) requiring the consent holder to adopt the best practicable option to remove or reduce any adverse effect on the environment caused by the discharge; and/or

    c) to alter, add, or delete limits on mass discharge quantities or discharge or ambient concentrations of any contaminant or contaminants; and/or

    d) taking into account any Act of Parliament, regulation, national policy statement, national environmental standard, regional policy statement or regional rule which relates to limiting, recording, or mitigating products of combustion and which is relevant to emissions from the co-generation plants.

Signed at Stratford on 4 October 2006

For and on behalf of
Taranaki Regional Council

Director-Resource Management

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Please quote our file number on all correspondence

Discharge Permit

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

Name of Consent Holder:	Fonterra Co-operative Group Limited P O Box 444 HAWERA
Consent Granted Date:	7 December 2005

Conditions of Consent

Consent Granted:	To discharge emissions into the air from dual fuel boilers [gas or coal] with a maximum energy output of 250 MW together with associated processes at or about GR: Q21:219-769
Expiry Date:	1 June 2034
Review Date(s):	June 2010, June 2016, June 2022, June 2028
Site Location:	Whareroa Road, Hawera
Legal Description:	Pt Lot 2 DP 15204 Lot 1 DP 15204 Lot 3 DP 19882 Blk X Hawera SD

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

General conditions

a) On receipt of a requirement from the Chief Executive, Taranaki Regional Council the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.

b) Unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.

c) The consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:

i) the administration, monitoring and supervision of this consent; and
ii) charges authorised by regulations.

Special conditions

Best practicable option and mitigation

1. The consent holder shall adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any actual or likely adverse effect on the environment associated with the discharge of contaminants into the environment from the site.

2. The exercise of this consent shall be undertaken generally in accordance with the documentation submitted in support of application 2785. In the case of any contradiction between the documentation submitted in support of application 2785 and the conditions of this consent, the conditions of this consent shall prevail.

3. Other than as set out within this consent, the characteristics of any coal burned in the exercise of this consent shall be as generally described and/or achieve a similar level of environmental performance as set out in the documentation supporting the application for this consent.

4. A general outline of the methods, specifications, operating guidelines or other measures which represent the best practicable option at the time of commissioning shall be supplied by the consent holder to the Chief Executive, Taranaki Regional Council, within three months of the commissioning of the energy centre, and thereafter attached to this consent as Schedule A. Matters to be addressed in Schedule A shall include, but not be limited to: preferred fuel type and specification; air pollution abatement systems; combustion temperatures; definitions of 'cold start' and 'warm start'; measures to be used in the case of sudden loss of boiler capacity; minimum operating temperatures for baghouses; air fuel ratios; discharge [stack exit] velocities; and protocols for measuring the sulphur content of fuel on an on-going basis. This schedule can be amended by the consent holder at any time during the term of this consent to reflect changes in the methods, specifications, operating guidelines or other measures.

5. The measures representing the best practicable option may be reviewed in accordance with the procedure provided for in condition 29.

6. The consent holder shall minimise the emissions and impacts of air contaminants discharged from the site by the selection of the most appropriate process equipment, process control equipment, emission control equipment, methods of control, supervision and operation, and the proper and effective operation, supervision, control and maintenance of all equipment and processes.

7. The minimum height of discharges to the atmosphere from the energy centre boiler stack shall be 60 metres above the ground level prevailing at the time of lodging the application for this consent.

8. Prior to undertaking any alterations to the plant, processes or operations, as specified in application 2785, which may significantly change the nature or quantity of contaminants emitted from the site, the consent holder shall consult with the Chief Executive, Taranaki Regional Council, and shall obtain any necessary approvals under the Resource Management Act 1991 and any amendments.

Emission limits

9. Discharges to the atmosphere from the energy centre boiler stack shall not exceed 20% obscuration, as measured by the photoelectric obscuration gauge and corrected for path length and temperature as set out in Addendum No. 1 [1972] to 2BS2742:1969, or any replacement measurement standard, for any continuous period of 2 minutes or for more than 4 minutes cumulative in any 60 minute period, except:

   (a) for up to 120 hours [cumulative] per boiler for initial commissioning of each boiler; and

   (b) for up to 250 hours [cumulative] per year for the purpose of lighting up all boilers from cold; and

   (c) for up to 100 hours [cumulative] per year for the purpose of lighting up all boilers from warm.

10. Discharges to the atmosphere of particulate from the energy centre boiler stack shall not exceed 100 milligrams per cubic metre [mg/Nm^3] adjusted to 12% carbon dioxide [CO_2] on a dry gas basis, except during those circumstances described in special condition 9(a), 9(b), and 9(c).

11. The sum of all discharges to the atmosphere of sulphur dioxide from the energy centre boiler stack shall not exceed 385 kilograms per hour [kg/hr].

12. The sum of all discharges to the atmosphere of particulate from the energy centre boiler stack shall not exceed 43 kilograms per hour [kg/hr].

13. The sum of all discharges to the atmosphere of nitrogen oxides from the energy centre boiler stack shall not exceed 319 kilograms per hour [kg/hr].

Ambient and workplace limits

14. The consent holder shall control all discharges of sulphur dioxide to the atmosphere from the site, in order that the maximum ground level concentration of sulphur dioxide arising from the exercise of this consent measured under ambient conditions on land does not exceed 350 micrograms per cubic metre [one-hour average exposure] or 120 micrograms per cubic metre [twenty-four hour average exposure] at or beyond the boundary of the site.

15. The consent holder shall control all discharges of nitrogen dioxide or its precursors to the atmosphere from the energy centre boiler stack, whether alone or in conjunction with any other discharges to the atmosphere from the site, in order that the maximum ground level concentration of nitrogen dioxide arising from the exercise of this consent measured under ambient conditions does not exceed 200 micrograms per cubic metre [one hour average exposure], or 100 micrograms per cubic metre [twenty-four hour average exposure], at or beyond the boundary of the site.

16. The consent holder shall control all discharges of particulate of effective diameter of less than 10 micrometres [PM_{10}] to the atmosphere from the energy centre boiler stack, whether alone or in conjunction with any other discharges to the atmosphere from the site, in order that the maximum ground level concentration of PM_{10} arising from the exercise of this consent measured under ambient conditions does not exceed 50 micrograms per cubic metre [twenty-four hour average exposure], at or beyond the boundary of the site, or at points within the site boundary where non-occupational exposure is likely to occur [such as residential dwellings].

17. The consent holder shall control all discharges of metals to the atmosphere from the energy centre boiler stack, whether alone or in conjunction with any other discharges to the atmosphere from the site, in order that the maximum ground level concentration of each or any metal arising from the exercise of this consent measured under ambient conditions does not exceed their respective guideline value set out in the 'Ambient Air Quality Guidelines 2002 Update', Air Quality Report No 32, Prepared by the Ministry for the Environment and the Ministry of Health, May 2002.

18. The consent holder shall control discharges to the atmosphere from the energy centre boiler stack of contaminants other than carbon dioxide and those addressed in conditions 10 to 17 above, whether alone or in conjunction with any discharges to the atmosphere from the site, in order that the maximum ground level concentration for any particular contaminant arising from the exercise of this consent measured at or beyond the boundary of the site, is not increased above background levels:

    (a) by more than $1/30^{th}$ of the relevant Workplace Exposure Standard-Time Weighted Average, or by more than the Workplace Exposure Standard-Short Term Exposure Limit at any time [all terms as defined in Workplace Exposure Standards, 2002, Department of Labour]; or

    (b) if no Short Term Exposure Limit is set, by more than the General Excursion Limit at any time [all terms as defined in Workplace Exposure Standards, 2002, Department of Labour].

19. The discharges authorised by this consent shall not give rise to any direct significant adverse ecological effect on any ecosystems in the Taranaki region, including but not limited to habitats, plants, animals, microflora and microfauna.

Recording and reporting

20. Analysis of the coal [including but not limited to the sulphur and ash content of the coal] shall be undertaken on a monthly basis during the processing season. This shall be undertaken upon the coal blend that is supplied to the consent holder. The sampling of the coal blend shall be a composite sample generated by daily sub-sampling of the coal blend that is delivered to the consent holder. The information shall be provided to the Chief Executive, Taranaki Regional Council, upon request.

21. The consent holder shall install, operate, maintain and calibrate :

    (a) opacity meters;
    (b) sulphur dioxide meters;
    (c) temperature meters;
    (d) oxygen meters; and
    (e) carbon monoxide meters

    for the measuring and recording of the respective parameters in the discharge stack from the boilers, to the satisfaction of the Chief Executive, Taranaki Regional Council.

22. The consent holder shall annually undertake source emission monitoring to the satisfaction of the Chief Executive, Taranaki Regional Council. The monitoring shall include a determination of the exhaust concentrations of sulphur dioxide, total suspended particulates, and PM_{10} particulates, in the manner set out in condition F1 within the application lodged for this consent, or to an equivalent standard. In addition, the consent holder shall monitor for mercury and arsenic, and the temperatures of the exhaust gases together with the generation loads prevailing at the time giving rise to those concentrations and mass emissions as determined in monitoring of the emissions. The results of the monitoring shall be provided to the Chief Executive, Taranaki Regional Council, and shall be made available annually to those invited to the liaison meeting convened under special condition 27.

23. A monitoring programme agreed between the consent holder and the Taranaki Regional Council, and provided to the Taranaki District Health Board and interested submitters to application 2785, shall be prepared within three months of the granting of this consent. The monitoring programme shall cover [at a minimum]: monitoring for ground level ambient concentrations of sulphur dioxide; soil and vegetation levels of mercury, arsenic, and sulphates at reference sites; levels of mercury and arsenic within aquatic species; and a model validation monitoring survey for PM_{10} [monitoring to be carried out to a recognised standard, by an accredited laboratory].

24. The consent holder shall provide to the Chief Executive, Taranaki Regional Council, within two years from the granting of this consent and again at four years from the granting of this consent and every six years thereafter a written report:

    (a) reviewing any technological advances in the reduction or mitigation of emissions, especially but not exclusively in respect of sulphur dioxide, dioxins, and heavy metals, how these might be applicable and/or implemented at the energy centre, and the costs and benefits of these advances; and

(b) addressing any other issue relevant to the minimisation or mitigation of emissions from the site that the Chief Executive, Taranaki Regional Council, reasonably considers should be included.

25. The consent holder shall provide to the Chief Executive, Taranaki Regional Council, within twelve months from the exercising of this consent and again every 12 months thereafter while the consent is being exercised, a written report:

(a) detailing an inventory of emissions from the site of such contaminants as the Chief Executive, Taranaki Regional Council, may from time to time specify [in accordance with the emissions identified in the application] following consultation with the consent holder;

(b) detailing any measures that have been taken by the consent holder to improve the energy efficiency of the energy centre; and

(c) detailing average sulphur content and maximum sulphur content [based on monthly analyses of daily representative samples] of all fuel consumed at the site and volume of fuel consumed, during the previous twelve months.

26. The consent holder shall develop or procure a cultural impact report within 12 months of the granting of this consent.

Liaison meeting

27. The consent holder shall invite staff of the Taranaki Regional Council and interested submitters to application 2785 to meet annually to discuss any matter relating to the exercise of this consent. The first liaison meeting shall be held within 12 months of the commissioning of the energy centre.

Lapse and review

28. This consent shall lapse on the expiry of 10 years after the date of issue of this consent, 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.

29. 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 within two months of receiving a report prepared by the consent holder pursuant to conditions 24, 25, and 26 of this consent, or following non-compliance with special condition 14, or in any case in June 2010 and/or June 2016 and/or June 2022 and/or June 2028, for the purposes of:

(a) dealing with any significant adverse effect on the environment arising from the exercise of the consent which was either not foreseen at the time the application was considered or which it is appropriate to deal with at the time of the review;

(b) requiring the holder to adopt the best practicable option to remove or reduce any adverse effect on the environment caused by the discharge;

(c) altering, adding, or deleting limits on discharge, receiving environment or ambient concentrations of any contaminant or contaminants, for the purpose of dealing with any significant adverse ecological effect on any ecosystem; or

(d) taking into account any Act of Parliament, regulation, national policy statement or national environmental standard which relates to setting maximum discharge or ambient concentrations of any air contaminant, and/or limiting, recording, or mitigating emissions of carbon dioxide, PM_{10} particulate, heavy metals, sulphur dioxide, and/or nitrogen dioxide, and which is relevant to the air discharge from the consent holder's energy centre if it is the express intention of any such mechanism to apply retrospectively to existing activities.

Signed at Stratford on 7 December 2005

For and on behalf of
Taranaki Regional Council

Director-Resource Management

Consent 4406-2

TARANAKI REGIONAL COUNCIL

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Please quote our file number on all correspondence

Discharge Permit

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

Name of Consent Holder:	Fonterra Co-operative Group Limited, Whareroa P O Box 444 HAWERA
Consent Granted Date:	3 February 2004

Conditions of Consent

Consent Granted:	To discharge laboratory wastes onto and into land at or about GR: Q21:215-750
Expiry Date:	1 June 2022
Review Date(s):	June 2010, June 2016
Site Location:	Rifle Range Road, Hawera
Legal Description:	Pt Lot 13 DP 2625 Blks IX & X Hawera SD
Catchment:	Tangahoe Waihi

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

General conditions

a) On receipt of a requirement from the Chief Executive, Taranaki Regional Council the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.

b) Unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.

c) The consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:

i) the administration, monitoring and supervision of this consent; and
ii) charges authorised by regulations.

Special conditions

1. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any adverse effects on the environment from the exercise of this consent.

2. The exercise of this resource consent shall be undertaken generally in accordance with the documentation submitted in support of application 2746. In the case of any contradiction between the documentation submitted in support of application 2746 and the conditions of this consent, the conditions of this resource consent shall prevail.

3. The discharge authorised by this consent shall not exceed 1 m^3/day.

4. The consent holder shall provide a management plan for the discharge site to the Chief Executive, Taranaki Regional Council, for written approval within three months of the granting of this consent, and regularly updated as required, to ensure that the conditions of this consent can be met, including but not limited to:

i) means of pit excavation;
ii) pit preparation;
iii) dimensions of each pit;
iv) placement and covering of wastes;
v) stormwater control;
vi) site control;
vii) nature of wastes;
viii) location of all present and previous pits; and
ix) an outline of the site options for future pit use.

5. The siting of each discharge pit shall be to the satisfaction of the Chief Executive, Taranaki Regional Council.

6. The discharge shall not occur within 50 metres of any bore, well or spring used for water supply purposes, nor within 25 metres of any surface water body, nor within 100 metres from the coastal cliff edge.

7. The disposal pit(s) shall not intercept the water table.

8. The exercise of this consent, including the design and management of the disposal pit(s), shall not lead to or be liable to lead to contaminants entering a water body from overland surface flows.

9. The exercise of this consent shall not result in any adverse impacts on groundwater as a result of leaching, or surface water including aquatic ecosystems, and/or result in a change to the suitability of use of the receiving water as determined by the Chief Executive, Taranaki Regional Council.

10. The only wastes to be discharged shall be petri dishes, their content and the plastic which they are wrapped in.

11. The discharged material shall be covered with up to 50 millimetres of earth or other suitable cover, within a period of four hours or less following each disposal.

12. Each disposal pit shall be reinstated with a low permeability, clean, compacted soil cover with a minimum thickness of 0.5 metre to be placed over the material, and vegetation re-established to the satisfaction of the Chief Executive, Taranaki Regional Council.

13. The consent holder shall compact, contour, and maintain the cover layer of soil so as to ensure its integrity at all times to the satisfaction of the Chief Executive, Taranaki Regional Council.

14. The consent holder shall keep records of all uses of the pits including date, volume discharged, and product type, and make these available to the Chief Executive, Taranaki Regional Council, upon request.

15. 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 2010 and/or June 2016, for the purpose of 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.

Signed at Stratford on 3 February 2004

For and on behalf of
Taranaki Regional Council

Director-Resource Management

Consent 4508-2

TARANAKI REGIONAL COUNCIL

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Water Permit

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

Name of Consent Holder:	Fonterra Co-operative Group Limited, Whareroa P O Box 444 HAWERA
Change To Conditions Date:	17 September 1997 [Granted: 1 May 1996]

Conditions of Consent

Consent Granted:	To take up to 16,000 cubic metres/day [210 litres/second] of water from the Tangahoe River for processing and manufacture of dairy products, cleaning of plant and cooling purposes, provided the total abstraction in the Tangahoe Catchment by the consent holder does not exceed 30,000 cubic metres/day at any time at or about GR: Q21:258-742
Expiry Date:	1 June 2015
Review Date(s):	June 1999, June 2004
Site Location:	Tangahoe River Rail Bridge Abutment, Hicks Road, Hawera
Legal Description:	Pt Blk I DP 5506 Pt Sec 248, 250 & 251 Patea Dist Blk X Hawera SD
Catchment:	Tangahoe

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

General conditions

a) That on receipt of a requirement from the Chief Executive, Taranaki Regional Council (hereinafter the Chief Executive), the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.

b) That unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.

c) That the consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:

i) the administration, monitoring and supervision of this consent; and
ii) charges authorised by regulations.

Special conditions

1. That the Taranaki Regional Council reserves the right to temporarily suspend or reduce the abstraction during extreme low flow events, in order to protect the biological communities in the stream, in accordance with section 329 of the Resource Management Act 1991.

2. That the consent holder shall install and operate, to the satisfaction of the Chief Executive, Taranaki Regional Council, a measuring device capable of recording daily rates of abstraction and shall make such records available to the Chief Executive, Taranaki Regional Council, upon request.

3. That the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during June 1999 and/or June 2004 for the purpose of ensuring that the conditions are adequate to deal with any adverse effects of the abstraction on the environment.

Transferred at Stratford on 4 November 2003

For and on behalf of
Taranaki Regional Council

Chief Executive

Consent 4927-1

TARANAKI REGIONAL COUNCIL

CHIEF EXECUTIVE
PRIVATE BAG 713
47 CLOTEN ROAD
STRATFORD
NEW ZEALAND
PHONE 06-765 7127
FAX 06-765 5097

Please quote our file number on all correspondence

Discharge Permit

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

Name of Consent Holder:	Fonterra Co-operative Group Limited, Whareroa P O Box 444 HAWERA
Consent Granted Date:	1 May 1996

Conditions of Consent

Consent Granted:	To discharge up to 1.05 cubic metres/day of river silt and sand from mechanical pre-filtering of river water during abstraction of water, by returning it into the Tawhiti Stream in the Tangahoe Catchment at or about GR: Q21:229-780
Expiry Date:	1 June 2015
Review Date(s):	June 1999, June 2004
Site Location:	Main South Road, Hawera
Legal Description:	Lot 1 DP 3710 Pt Lot 1 DP 2629 Lot 1 DP 1087 Blk X Hawera SD
Catchment:	Tangahoe
Tributary:	Tawhiti

General conditions

a) That on receipt of a requirement from the Chief Executive, Taranaki Regional Council (hereinafter the Chief Executive), the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.

b) That unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.

c) That the consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:

i) the administration, monitoring and supervision of this consent; and
ii) charges authorised by regulations.

Special conditions

1. That the discharge must be operated on a continuous purge basis in order to mitigate adverse effects on the receiving water of the Tawhiti Stream.

2. That allowing for a mixing zone of 50 metres downstream of the discharge pipe, the discharge shall not raise the suspended solids of the receiving water by greater than 30% or by greater than 30 gm^{-3}, whichever is less.

3. That allowing for a mixing zone of 50 metres extending downstream of the discharge pipe, the discharge shall not give rise to any of the following effects in the receiving water of the Tawhiti Stream:

(i) the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;
(ii) any conspicuous change in the colour or visual clarity;
(iii) any emission of objectionable odour;
(iv) the rendering of fresh water unsuitable for consumption by farm animals;
(v) any significant adverse effects on aquatic life, habitats, or ecology.

4. That the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during June 1999 and/or June 2004 for the purpose of ensuring that the conditions are adequate to deal with any adverse effects of the discharge on the environment.

Transferred at Stratford on 4 November 2003

For and on behalf of
Taranaki Regional Council

Chief Executive

Consent 4953-2

TARANAKI REGIONAL COUNCIL

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Land Use Consent

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

Name of Consent Holder:	Fonterra Co-operative Group Limited, Whareroa P O Box 444 HAWERA
Consent Granted Date:	20 January 1999

Conditions of Consent

Consent Granted:	To erect, place and maintain two earth dams at the headwaters of an unnamed tributary of the Tangahoe River for stormwater collection and treatment purposes at or about GR: Q21:219-765
Expiry Date:	1 June 2016
Review Date(s):	June 2004, June 2010
Site Location:	Whareroa Road Hawera
Legal Description:	Pt Sec 235 Pt Lot DP 2777 Blk X Hawera SD
Catchment:	Tangahoe

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

General conditions

a) That on receipt of a requirement from the Chief Executive, Taranaki Regional Council (hereinafter the Chief Executive), the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.

b) That unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.

c) That the consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:

i) the administration, monitoring and supervision of this consent; and
ii) charges authorised by regulations.

Special conditions

1. That it is the responsibility of the consent holder to maintain and operate the dams in a safe and appropriate manner and the Taranaki Regional Council accepts no responsibility in this regard.

2. That the consent holder shall notify the Taranaki Regional Council at least 48 hours prior to commencement of any work or maintenance associated with the dams.

3. That during work or maintenance, the consent holder shall observe every practicable measure to prevent the discharge or placement of silt and/or organics and/or any other contaminant into the watercourse, to the satisfaction of the Chief Executive, Taranaki Regional Council.

4. That the consent holder shall remove all structures covered by this consent and reinstate the area, to the satisfaction of the Chief Executive, Taranaki Regional Council, if and when they are no longer required.

5. That the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during the month of June 2004 and/or June 2010, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this consent, which were not foreseen at the time the application was considered and which it was not appropriate to deal with at that time.

Transferred at Stratford on 4 November 2003

For and on behalf of
Taranaki Regional Council

Chief Executive

Consent 5016-1

TARANAKI REGIONAL COUNCIL

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Please quote our file number on all correspondence

Water Permit

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

Name of Consent Holder:	Fonterra Co-operative Group Limited, Whareroa P O Box 444 HAWERA
Consent Granted Date:	23 August 1996

Conditions of Consent

Consent Granted:	To permanently divert an unnamed stream between the Tangahoe River and the Waihi Stream for the purpose of protecting an outfall pipeline and associated structures at or about GR: Q21:214-747
Expiry Date:	1 June 2015
Review Date(s):	June 2000, June 2005, June 2010
Site Location:	Off Rifle Range Road, Hawera
Legal Description:	Pt Lot 13 DP 2625 and foreshore Blks IX & X Hawera SD
Catchment:	Waihi Tangahoe

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

General conditions

a) That on receipt of a requirement from the Chief Executive, Taranaki Regional Council (hereinafter the Chief Executive), the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.

b) That unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.

c) That the consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:

i) the administration, monitoring and supervision of this consent; and
ii) charges authorised by regulations.

Special conditions

1. That the consent holder shall notify the Taranaki Regional Council at least three days prior to the commencement of construction or any major maintenance works.

2. That the diversion shall be constructed and maintained in accordance with the documentation submitted in support of application 96/163 and to the satisfaction of the Chief Executive, Taranaki Regional Council.

3. That during the construction of the diversion and any subsequent maintenance, the consent holder shall observe every practicable measure to prevent the discharge or placement of silt and/or organics and/or any other contaminants into the stream and to minimise disturbance of the stream bed, to the satisfaction of the Chief Executive, Taranaki Regional Council.

4. That the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during June 2000 and/or June 2005 and/or June 2010, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this consent.

Transferred at Stratford on 4 November 2003

For and on behalf of
Taranaki Regional Council

Chief Executive

Consent 5044-2

TARANAKI REGIONAL COUNCIL

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NEW ZEALAND
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FAX 06-765 5097

Please quote our file number on all correspondence

Discharge Permit

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

Name of Consent Holder:	Fonterra Co-operative Group Limited, Whareroa P O Box 444 HAWERA
Consent Granted Date:	3 February 2004

Conditions of Consent

Consent Granted:	To discharge emissions into the air from the disposal of laboratory wastes, and stormwater and sump cleanings onto and into land at or about GR: Q21:215-750
Expiry Date:	1 June 2022
Review Date(s):	June 2010, June 2016
Site Location:	Rifle Range Road, Hawera
Legal Description:	Lot 13 DP 2625 Blks IX & X Hawera SD

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

General conditions

a) On receipt of a requirement from the Chief Executive, Taranaki Regional Council the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.

b) Unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.

c) The consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:

i) the administration, monitoring and supervision of this consent; and
ii) charges authorised by regulations.

Special conditions

1. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any adverse effects on the environment from the exercise of this resource consent.

2. The exercise of this resource consent shall be undertaken generally in accordance with the documentation submitted in support of application 2749. In the case of any contradiction between the documentation submitted in support of application 2749 and the conditions of this resource consent, the conditions of this resource consent shall prevail.

3. The consent holder shall provide a management plan for the discharge site to the Chief Executive, Taranaki Regional Council, for written approval within three months of the granting of this consent, and regularly updated as required, outlining methods to adopt the best practicable option to prevent or minimise adverse effects on the environment with respect to discharges to air.

4. That the discharges authorised by this consent shall not give rise to an odour at or beyond the boundary of the site that is offensive or objectionable.

5. For the purposes of condition 4, without restriction, an odour shall be deemed to be offensive or objectionable if:

(a) it is held to be so in the opinion of an officer of the Taranaki Regional Council, having regard to the duration, frequency, intensity and nature of the odour; and/or
(b) an officer of the Taranaki Regional Council observes that an odour is noticeable, and either it lasts longer than three (3) hours continuously, or it occurs frequently during a single period of more than six (6) hours; and/or
(c) no less than three individuals from at least two different properties that are affected at the time, each declare in writing that an objectionable or offensive odour was detected beyond the boundary of the site, provided the Council is satisfied that the declarations are not vexatious and that the objectionable or offensive odour was emitted from the site as specified in (b). Each declaration shall include the individuals' names and addresses, the date and time the objectionable or offensive odour was detected, the location of the individual when it was detected and the prevailing weather conditions during the event. The declarations shall be signed and dated.

6. 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 2010 and/or June 2016, for the purpose of 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.

Signed at Stratford on 3 February 2004

For and on behalf of
Taranaki Regional Council

Director-Resource Management

Consent 5143-1

TARANAKI REGIONAL COUNCIL

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Please quote our file number on all correspondence

Land Use Consent

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

Name of Consent Holder:	Fonterra Co-operative Group Limited, Whareroa P O Box 444 HAWERA
Consent Granted Date:	20 May 1997

Conditions of Consent

Consent Granted:	To erect, place, use and maintain a water intake structure in the bed of the Tangahoe River for industrial water supply purposes at or about GR: Q21:258-742
Expiry Date:	1 June 2015
Review Date(s):	June 1999, June 2004
Site Location:	3 Hicks Road Hawera Property Owner: M Carr
Legal Description:	Lot 3 DP 5506 Pt Sec 248, 250 & 251 Patea District Blk X Hawera SD
Catchment:	Tangahoe

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

General conditions

a) That on receipt of a requirement from the Chief Executive, Taranaki Regional Council (hereinafter the Chief Executive), the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.

b) That unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.

c) That the consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:

i) the administration, monitoring and supervision of this consent; and
ii) charges authorised by regulations.

Special conditions

1. That the consent holder shall notify the Taranaki Regional Council, at least 48 hours prior to the commencement and upon completion of, the initial construction and again prior to and upon completion of, any subsequent maintenance works which would involve disturbance of, or deposition to the river bed or discharges to water.

2. That the structure authorised by this consent shall be constructed generally in accordance with the documentation submitted in support of the application and shall be maintained to ensure the conditions of this consent are met.

3. That the consent holder shall adopt the best practicable option to avoid or minimise the discharge of silt or other contaminants into water or onto the river bed and to avoid or minimise the disturbance of the river bed and any adverse effects on water quality .

4. That the consent holder shall ensure that the area and volume of river bed disturbance shall so far as is practicable, be minimised and any areas which are disturbed, shall so far as is practicable be reinstated.

5. That the structure authorised by this consent shall be removed and the area reinstated, if and when the structure is no longer required. The consent holder shall notify the Taranaki Regional Council at least 48 hours prior to structure removal and reinstatement.

6. That the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during the month of June 1999 and/or June 2004, for the purpose of ensuring that the conditions adequately deal with the environmental effects arising from the exercise of this consent, which were not foreseen at the time the application was considered and which it was not appropriate to deal with at the time.

Transferred at Stratford on 4 November 2003

For and on behalf of
Taranaki Regional Council

Chief Executive

Consent 5148-1

TARANAKI REGIONAL COUNCIL

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Please quote our file number on all correspondence

Discharge Permit

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

Name of Consent Holder:	Fonterra Co-operative Group Limited, Whareroa P O Box 444 HAWERA
Consent Granted Date:	28 May 1997

Conditions of Consent

Consent Granted:	To discharge up to 1.2 cubic metres/day of river silt and sand from mechanical pre-filtering of river water during abstraction of water, by returning it into the Tangahoe River at or about GR: Q21:258-742
Expiry Date:	1 June 2015
Review Date(s):	June 1999, June 2004
Site Location:	Tangahoe River Rail Bridge Abutment, Hicks Road, Hawera
Legal Description:	Lot 3 DP 5506 Pt Sec 248, 250 & 251 Patea Dist Blk X Hawera SD
Catchment:	Tangahoe

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

General conditions

a) That on receipt of a requirement from the Chief Executive, Taranaki Regional Council (hereinafter the Chief Executive), the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.

b) That unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.

c) That the consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:

i) the administration, monitoring and supervision of this consent; and
ii) charges authorised by regulations.

Special conditions

1. That the discharge must be operated on a continuous purge basis in order to mitigate the potential for adverse effects on the receiving water of the Tangahoe River.

2. That allowing for a mixing zone of 100 metres downstream of the discharge pipe, the discharge shall not give rise to all or any of the following effects in the receiving water of the Tangahoe River:

i) the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;

ii) any conspicuous change in the colour or visual clarity;

iii) any emission of objectionable odour;

iv) the rendering of fresh water unsuitable for consumption by farm animals;

v) any significant adverse effects on aquatic life, habitats, or ecology.

3. That the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during June 1999 and/or June 2004 for the purpose of ensuring that the conditions are adequate to deal with any adverse effects of the discharge on the environment arising from the exercise of this consent, which were not foreseen at the time the application was considered and which it was not appropriate to deal with at the time.

Transferred at Stratford on 4 November 2003

For and on behalf of
Taranaki Regional Council

Chief Executive

Consent 5337-1

TARANAKI REGIONAL COUNCIL

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Please quote our file number on all correspondence

Land Use Consent

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

Name of Consent Holder:	Fonterra Co-operative Group Limited, Whareroa P O Box 444 HAWERA
Consent Granted Date:	26 May 1998

Conditions of Consent

Consent Granted:	To dam an unnamed tributary of the Tawhiti Stream in the Tangahoe Catchment for stormwater and backwash water collection and treatment purposes at or about GR: Q21:222-773
Expiry Date:	1 June 2016
Review Date(s):	June 2004, June 2010
Site Location:	Unnamed Tributary Of Tawhiti Stream, Whareroa Road, Hawera
Legal Description:	Sub 2 Pt Sub 3 Secs 194, 195 Pt Secs 194-196 231-234 Blk X Hawera SD
Catchment:	Tangahoe
Tributary:	Tawhiti

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

General conditions

a) That on receipt of a requirement from the Chief Executive, Taranaki Regional Council (hereinafter the Chief Executive), the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.

b) That unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.

c) That the consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:

i) the administration, monitoring and supervision of this consent; and
ii) charges authorised by regulations.

Special conditions

1. That the consent holder shall notify the Taranaki Regional Council at least 48 hours prior to commencement and upon completion of construction, and again at least 48 hours prior to and upon completion of any subsequent maintenance works which would involve disturbance of, or discharge to, the unnamed tributary.

2. That during the construction and any subsequent maintenance, the consent holder shall observe every practicable measure to prevent the discharge or placement of silt and/or organics and/or any other contaminants into, and to minimise the disturbance of, the bed of the unnamed tributary.

2. That it is the responsibility of the consent holder to maintain and operate a safe dam[s] and the Taranaki Regional Council accepts no responsibility in this regard.

4. That the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during the month of June 2004 and/or June 2010 and/or in the twelfth month following the exercise of this consent, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this consent, which were not foreseen at the time the application was considered and which it was not appropriate to deal with at that time.

Transferred at Stratford on 4 November 2003

For and on behalf of
Taranaki Regional Council

Chief Executive

Consent 5845-1

TARANAKI
REGIONAL
COUNCIL

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Please quote our file number on all correspondence

Land Use Consent

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

Name of Consent Holder:	Fonterra Co-operative Group Limited, Whareroa P O Box 444 HAWERA
Consent Granted Date:	31 July 2001

Conditions of Consent

Consent Granted:	To remove, reconstruct, erect, place and maintain a dam structure and associated fish pass on the Tawhiti Stream for water intake purposes at or about GR: Q21:229-780
Expiry Date:	1 June 2015
Review Date(s):	June 2004, June 2010
Site Location:	Main South Road, Hawera
Legal Description:	Pt Lot 1 DP 2629 Pt Lot 1 DP 3710 Sec 689 Blk X Hawera SD
Catchment:	Tangahoe
Tributary:	Tawhiti

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

General conditions

a) That on receipt of a requirement from the Chief Executive, Taranaki Regional Council (hereinafter the Chief Executive), the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.

b) That unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.

c) That the consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:

i) the administration, monitoring and supervision of this consent; and
ii) charges authorised by regulations.

Special conditions

1. The consent holder shall notify the Chief Executive, Taranaki Regional Council, at least 48 hours prior to the commencement of removal of the existing structure and upon completion of all works licensed by this consent.

2. The consent holder shall notify the Chief Executive, Taranaki Regional Council, at least 48 hours prior to any maintenance works of the structure[s] or fish pass licensed by this consent which would involve disturbance of, or deposition to, the streambed or discharges to water.

3. The works licensed by this consent shall be undertaken in accordance with the documentation submitted in support of application 1471.

4. During the works licensed by this consent, the consent holder shall observe every practicable measure to prevent the discharge or placement of silt and/or organics and/or cement products and/or any other contaminants into the watercourse and to minimise disturbance of the streambed.

5. The consent holder, during removal of the existing structure and reconstruction of the structure and fish pass and maintenance, shall adopt the best practicable option to avoid or minimise the discharge of silt or other contaminants into water or onto the streambed and to avoid or minimise any adverse effects on water quality.

6. The consent holder shall ensure that the area and volume of streambed disturbance shall, so far as is practicable, be minimised and any areas which are disturbed shall, so far as is practicable, be reinstated.

7. All areas disturbed in association with the works, including the diversion channel, fences and replanting of vegetation, shall be reinstated to the satisfaction of the Chief Executive, Taranaki Regional Council.

8. The structure[s] licensed by this consent shall not obstruct fish passage.

9. Prior to construction of the fish pass, the consent holder shall supply a final design for the approval of the Chief Executive, Taranaki Regional Council.

10. The consent holder shall ensure that the intake is appropriately screened to avoid the entrapment of native fish.

11. The structure[s] authorised by this consent shall be maintained to ensure the conditions of this consent are met.

12. The structure[s] authorised by this consent shall be removed and the area reinstated, if and when the structure is no longer required. The consent holder shall notify the Taranaki Regional Council at least 48 hours prior to the removal of the structures and reinstatement of the area.

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 2004 and/or June 2010, for the purpose of 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.

Transferred at Stratford on 4 November 2003

For and on behalf of
Taranaki Regional Council

Chief Executive

Appendix II

Marine ecological monitoring reports

Internal Memorandum

To: Science Manager – Hydrology/Biology, Regan Phipps
From: Scientific Officer, Emily Roberts and Technical Officer Abbie Bates
File: #1381872
Date: 1 August 2014

Fonterra Whareroa/Hawera Municipal Combined Outfall – Marine Ecological Survey November/December 2013

Introduction

Consent 1450 allows the discharge of dairy factory wastewater from the Fonterra Whareroa factory via a marine outfall. The consent allowing this discharge was renewed in September 1995, requiring the Company to install a long outfall by 31 August 1997. Prior to the renewal of this consent, the wastewater was discharged via a short marine outfall at approximately mean low water spring (MLWS) level which caused significant adverse effects on marine intertidal ecology to at least 1000m southeast of the outfall.

In February 2001, wastewater from the Hawera Oxidation Ponds was connected to the long outfall by consent 5079, allowing a municipal wastewater discharge of 10,000 m^3/day. By comparison, the Fonterra Whareroa wastewater discharge limit was 26,000 m^3/day. As of 19 September 2006, the permitted volume of wastewater discharge increased to 40,000 m^3/day. The oxidation pond discharge was also increased to 12,000 m^3/day in December 2007.

Special condition 6 of consent 1450 and special condition 3 of consent 5079 requires there to be no significant visual, chemical or ecological impacts outside of a 200m mixing zone or within the intertidal zone. Specifically, consent 5079 requires the consent holder to ensure that a monitoring programme is established to record and analyse the effects on the intertidal reefs and water quality adjacent to the discharge. Accordingly, two intertidal surveys of the intertidal zone were carried out as part of the 2013-2014 monitoring programme for the combined marine outfall. The first survey for the 2013-2014 monitoring period was conducted at four sites between 4 November and 3 December 2013.

Methods

Field Work

Of the four sites surveyed, three have been identified by NIWA as having shoreline contact with the wastewater discharged from the outfall (Palliser *et al*., 2013): 350m northwest of the outfall (SEA906049), 200m southeast of the outfall (SEA906057) and 1550m southeast of the outfall on Pukeroa Reef (SEA906067) (Photographs 1-3, Figure 1). The control site at Waihi Reef (Photograph 4, Figure 1), approximately 4500m northwest of the outfall (SEA906025), has been identified by NIWA as unlikely to be impacted by the discharged wastewater (Palliser *et al*., 2013).

Photograph 1 Surveying 350m northwest of the outfall (2013)

Photograph 2 Survey site 200m southeast of the outfall (2013)

Photograph 3 Surveying Pukeroa Reef (2013)

Photograph 4 Survey control site Waihi Reef (2013)

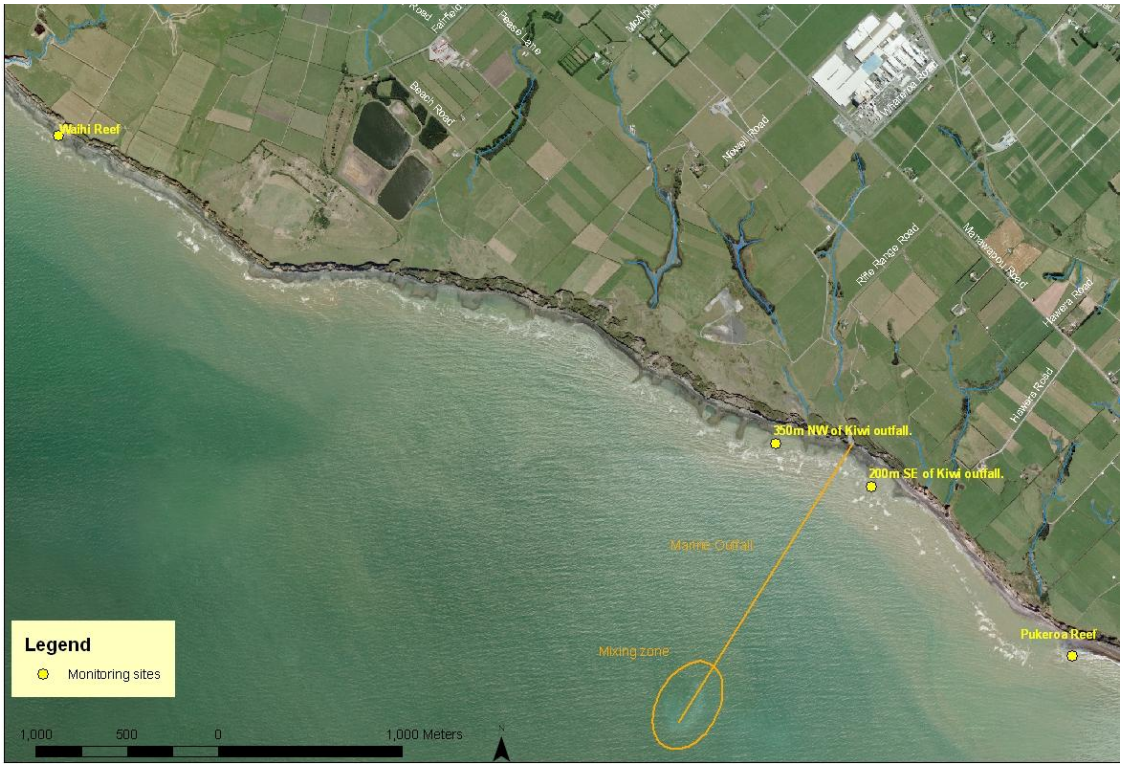


Figure 1 Survey sites in relation to the outfall

At each site, a 50m transect was used to establish five 5m x 3m blocks. Within each block, five random 0.25m^2 quadrats were laid giving a total of 25 random quadrats (Photograph 5). For each quadrat the percentage cover of algae and encrusting animal species was estimated using a grid. For all other animal species, individuals larger than 3mm were counted. Under boulder biota was counted where rocks and cobbles were easily overturned.

Photograph 5 Survey at 200m southeast of the outfall showing the quadrat and transect used

Results

Summary statistics, including the mean number of species per quadrat and the mean Shannon-Weiner indices, are shown in Table 1. The site 200m SE had the highest number of species, followed by 350m NW, Waihi Reef and Pukeroa Reef respectively. Diversity (Shannon-Weiner index) was highest at the site 200m SE followed by 350m NW, Pukeroa reef and Waihi reef.

Table 1 Mean results for the November/December 2013 survey

Site	No. of quadrats	Mean number of species per quadrat			Mean Shannon-Weiner indices per quadrat		
		Algae	Animals	Total Species	Algae	Animals	Total Species
Waihi Reef	25	3.52	9.16	12.68	0.36	0.86	0.93
350m NW	25	5.52	10.92	16.44	0.54	0.84	0.98
200m SE	25	10.28	8.76	19.04	0.77	0.81	1.05
Pukeroa Reef	25	3.20	8.76	11.96	0.42	0.79	0.93

Number of Species per Quadrat

Figure 2 shows the total number of species per quadrat as a box and whisker plot. The notched area of the box represents the median plus and minus a 95% confidence interval for the median. This form of graphical representation allows a quick comparison to be made between sites. Generally, if the notched areas of the boxes for the different sites do not overlap, one would expect to obtain a significantly different result with ANOVA.

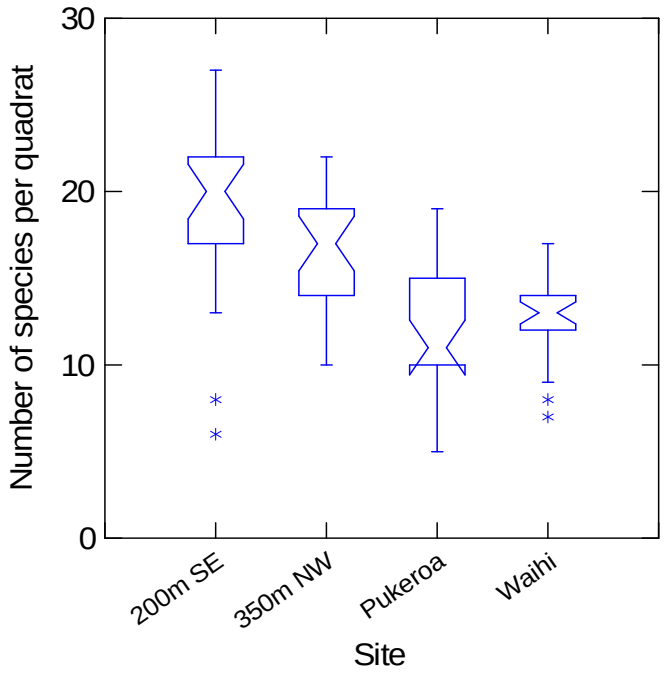


Figure 2 Box and whisker plots of mean number of species per quadrat

Only one site (200m SE) showed a significant deviation from normal distribution at the 95% confidence level (Lilliefors test, n = 25, P <0.001). There was a significant difference in mean number of species per quadrat between the sites (ANOVA, n = 25, F = 18.6, P = <0.001).

Table 2 Tukey's multiple comparison test of number of species per quadrat

Site	Waihi Reef	350m NW	200m SE
350m NW	SIG		
200m SE	SIG	NS	
Pukeroa Reef	NS	SIG	SIG

SIG = Significant difference
NS = No significant difference

Significant differences between sites were determined using Tukey's multiple comparison test (Table 2). At Waihi Reef and Pukeroa Reef the mean number of species per quadrat was significantly lower than that at 350m NW and 200m SE (Tukey's, N = 25, P = <0.05)

Shannon-Weiner Diversity Index

Figure 3 shows the mean Shannon-Weiner index data at each site as a box and whisker plot.

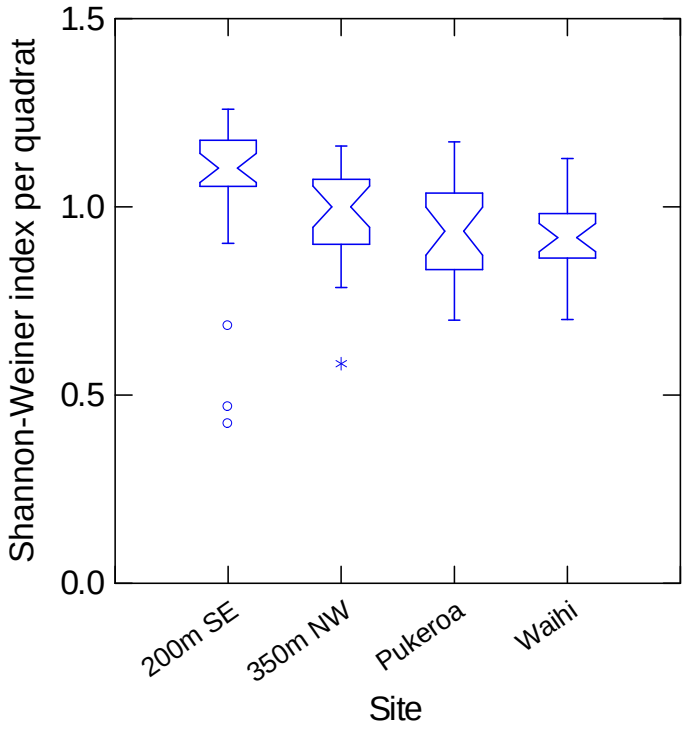


Figure 3 Box and whisker plots of mean Shannon-Weiner indices per quadrat

Only one site (200m SE) showed a significant deviation from normal distribution at the 95% confidence level (Lilliefors test, n = 25, P = < 0.001). There was a significant difference in the mean Shannon-Weiner index per quadrat between sites (ANOVA, n = 25, F = 3.1, P 0.032).

Table 3 Tukey multiple comparison test of Shannon-Weiner index per quadrat

Site	Waihi Reef	350m NW	200m SE
350m NW	NS		
200m SE	SIG	NS	
Pukeroa Reef	NS	NS	NS

SIG = Significant difference
NS = No significant difference

Significant differences between sites were determined using Tukey's multiple comparison test (Table 3). At Waihi Reef the mean Shannon-Weiner index per quadrat was significantly lower than that at 200 m SE (Tukey's, N = 25, P = 0.049)

Sand Coverage

The level of sand cover was low (<6.5%) at all sites (Table 4). Abundance and diversity of intertidal species/communities can be significantly impacted by sand cover of 30% and higher.

Table 4 Mean percentage sand cover per quadrat

Site	Mean coverage per quadrat (%)
Waihi Reef	1.4
350m NW	5.0
200m SE	6.3
Pukeroa Reef	0.9

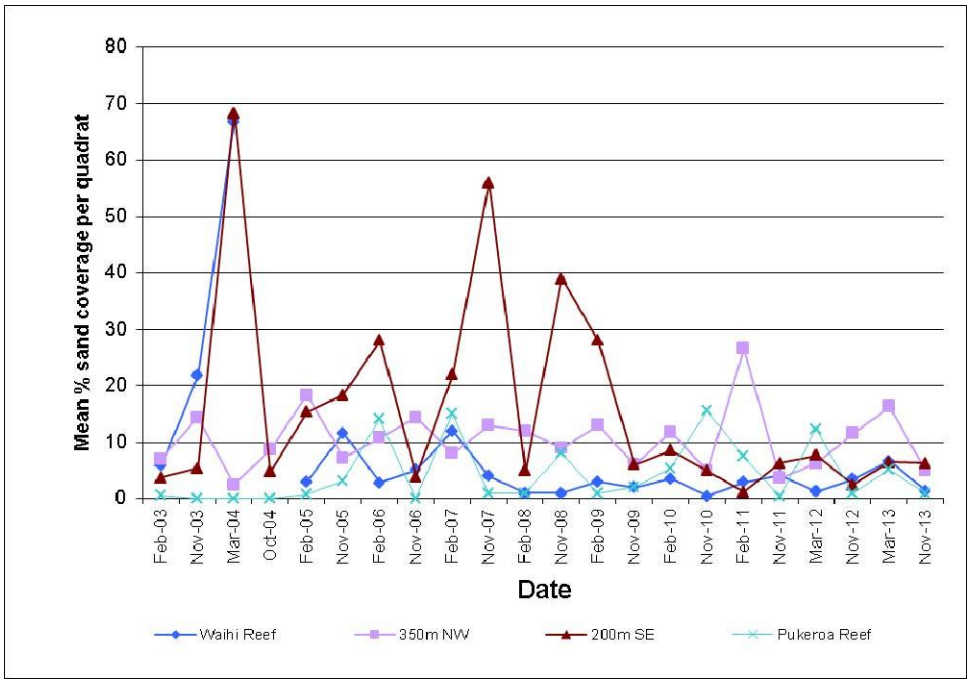


Figure 4 Mean percentage sand cover (summer & spring) by site since February 2003

Trends over time

Species number and diversity

Comparisons of the mean number of species per quadrat (Figure 5) and mean Shannon-Weiner diversity index per quadrat (Figure 6) for all spring surveys undertaken since November 1992 are shown below.

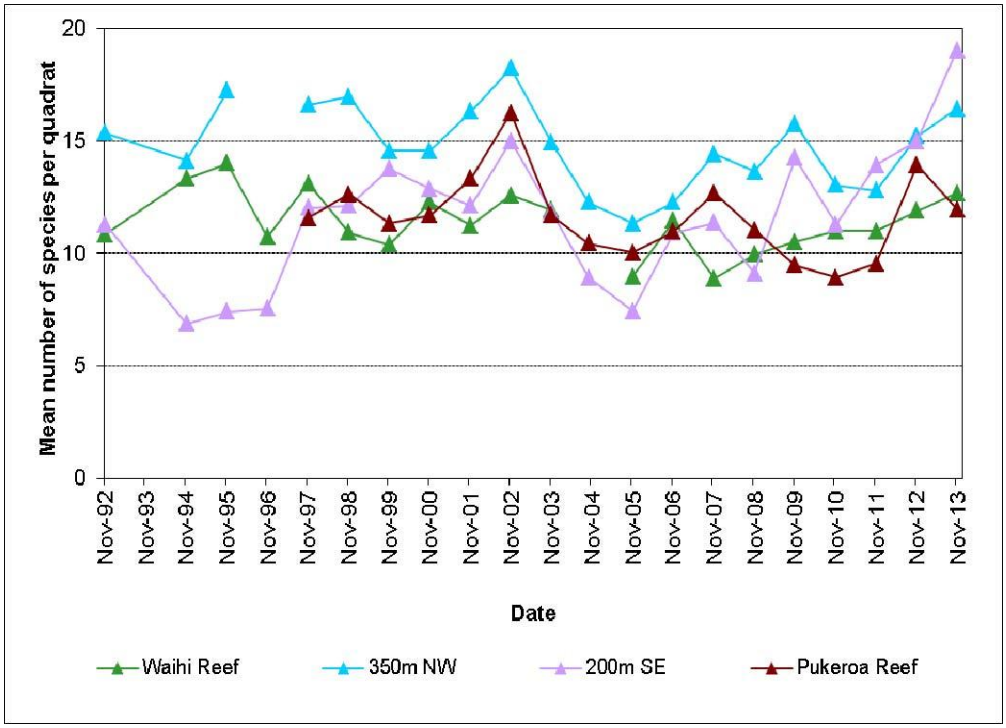


Figure 5 Mean number of species per quadrat for spring surveys 1992-2013

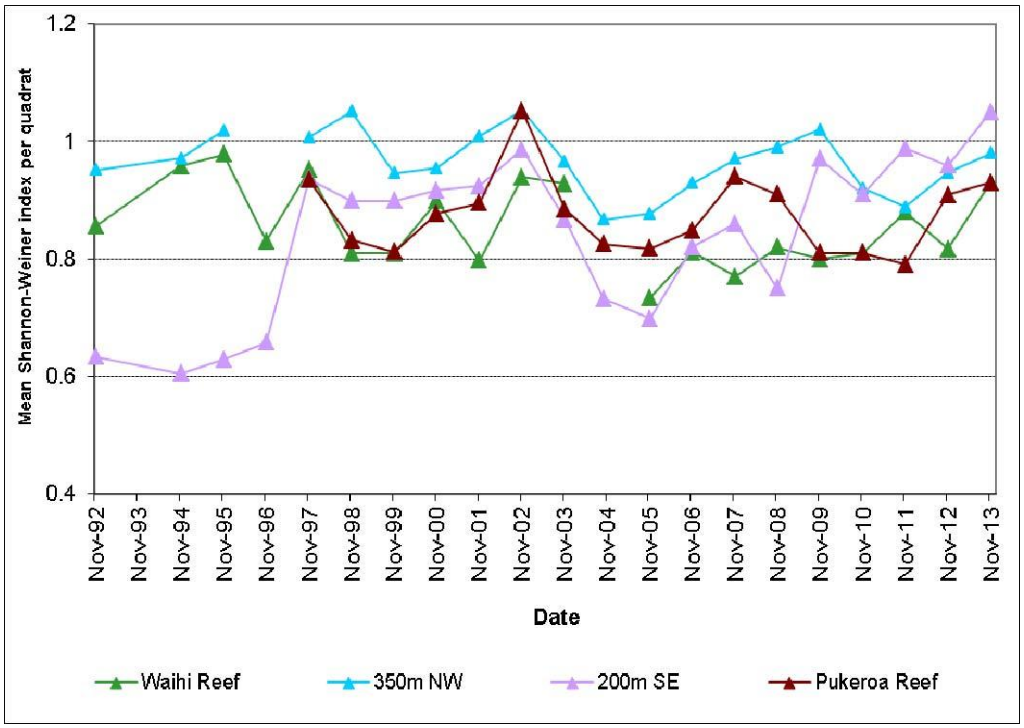


Figure 6 Mean Shannon-Weiner indices per quadrat for spring surveys 1992-2013

Prior to the installation of the long marine outfall in August 1997, there was notably lower species richness and diversity (number of species and Shannon-Weiner Index per quadrat) at the impact site 200m SE relative to the control site at Waihi Reef (Figures 5 and 6). A sharp increase in species diversity occurred at the site 200m SE following installation of the outfall (Figures 5 and 6). Since then (1997), sites have shown interannual variability in both number of species and Shannon-Weiner Index, but there has been no noticeable difference in trends between the impact site and the control sites over this period.

The results of the November 2013 survey show a slight decrease in the number of species at Pukeroa Reef since November 2012, however, at all other sites the survey show the number of species and Shannon-Weiner Index per quadrat increasing (Figures 5 and 6). The results at 200m SE were the highest number of species and Shannon-Weiner to date at this site, partly due to high algae diversity (Table 1).

Discussion

Previous surveys have shown that the dairy factory wastewater discharged through the near-shore outfall prior to 1997 (Photograph 1) was having significant adverse effects on the local intertidal community. The adverse effects recorded included the coating of rocks and tidal pools with fats, significant coverage by filamentous bacterial growths and a significant decrease in ecological diversity. The nature and magnitude of adverse effects varied with distance from the outfall, and were most apparent at the sites 30m and 200m southeast of the outfall (note that the former site is no longer surveyed as of 2007). In 1997 the dairy company installed a long outfall to discharge the wastewater nearly 2km offshore in order to mitigate the adverse effects occurring along the coastline. Numerous spring and summer intertidal surveys have now been undertaken along the Hawera coastline subsequent to installation of the long outfall. Results show a general improvement in the health of intertidal communities following installation of the outfall. In February 2001 the Hawera Oxidation Ponds municipal wastewater was also connected to the long outfall.

Photograph 6 Discharge from the dairy factory near-shore outfall prior to 1997

Impacts of the marine outfall discharge on the local intertidal communities were not evident from the November 2013 survey results (Figures 2 and 3). The impact sites 350m NW and 200m SE had a significantly higher number of species per quadrat than the control site at Waihi Reef.

Sand cover was low (<6.5%) at all sites during the November 2013 survey. Long term monitoring of intertidal rocky reefs around the Taranaki coastline have shown the abundance and diversity of these communities can be adversely affected when sand levels exceed 30% cover. Although it is not expected that sand cover would have impacted the reef communities monitored during the November 2013 survey, high percentage sand cover (>30%) has previously been recorded at the site 200m SE (Figure 4).

The historical record of survey results (Figures 5 and 6) showed no obvious impact of the marine outfall discharge on the local intertidal communities since installation of the long outfall in 1997. Both control and potential impact sites showed interannual variability and there were no obvious declining trends at the impact sites closest to the outfall relative to the control site. It must be noted that the high energy receiving environment combined with the effects of suspended sediments from nearby rivers/streams and eroding cliffs prevent the development of stable biological communities along the South Taranaki coastline (Clark *et al*., 2012). Such communities could potentially mask any subtle ecological effects from the outfall wastewater discharge. However, in spite of these limitations, the long term record indicates that the intertidal surveys are useful for detecting more noticeable effects from the wastewater, as the impact on intertidal communities prior to installation of the outfall is clearly evident (Figures 5 and 6, Clark *et al*., 2012).

The most notable change in species composition since the commissioning of the long outfall is the decline of *Chaetomorpha* sp. (Photograph 2) and the absence of filamentous bacterial growths at 200m SE (Figures 7 and 8). The adverse effects recorded prior to the long outfall also included the coating of rocks and tidal pools with fats and a significant decrease in ecological diversity. Sand/silt inundation resulting from cliff erosion (Photograph 8) can be an important factor effecting species composition and diversity along the South Taranaki coastline. The coast is in a constant state of erosion with layers of sand and silt often smothering marine life at some sites. Resulting high seawater turbidity can also affect light availability impacting on macroalgae. Observations indicate that freshly fallen boulders from the cliffs provide a poor habitat for intertidal organisms.

Photograph 7 Green filaments of *Chaetamorpha*, an algal genus often associated with high nutrient concentrations (North Taranaki)

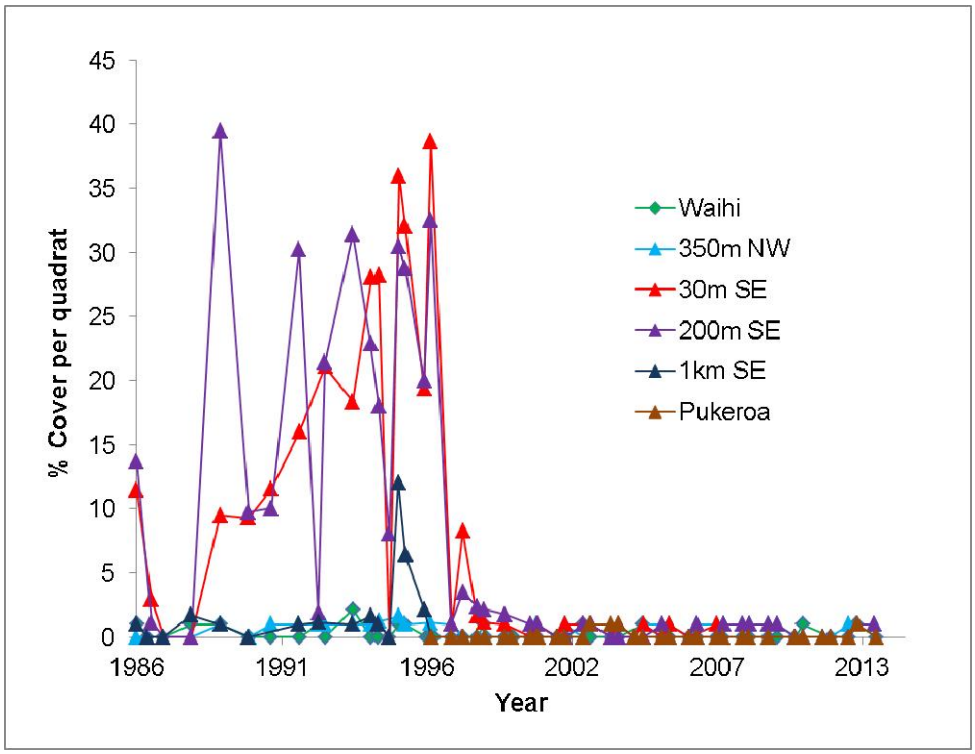


Figure 7 Percentage cover per quadrat of *Chaetamorpha* since 1986

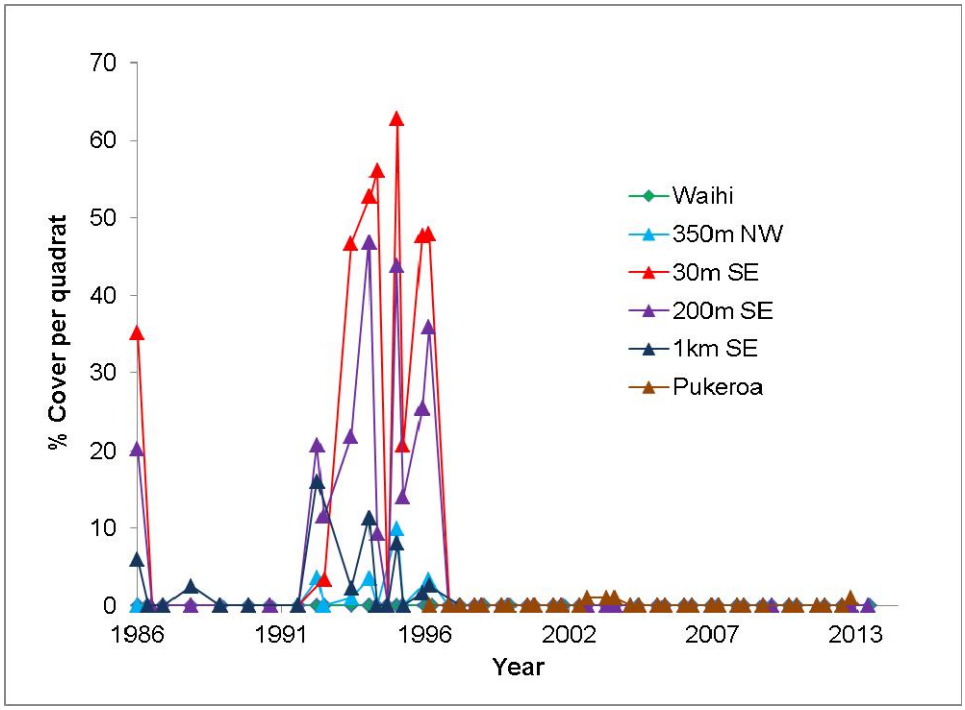


Figure 8 Percentage cover per quadrat of filamentous bacteria since 1986

N.B. Since 2007, the sites 30m SE and 1km SE are no longer monitored as part of the Fonterra Whareroa intertidal survey.

Photograph 8 Erosion of the cliffs close to 350m NW site (2013)

Conclusions

In order to assess the effects of the Fonterra Whareroa and Hawera Waste Water Treatment Plant outfall discharge on the nearby intertidal communities, surveys were conducted between 4 November and 3 December 2013 at four sites. These surveys included three potential impact sites either side of the outfall (two southeast and one west) and one control sites to the northwest. It is expected that adverse effects of the marine outfall discharge on the intertidal communities would have been evident as a significant decline in species richness and diversity at the potential impact sites relative to the control site.

As both species richness and diversity were higher at the two potential impact sites closest to the outfall relative to the control site, and results from sites closest to the outfall had not declined notably in recent years, the results indicate that the marine outfall discharge was not having detectable adverse effects on the intertidal reef communities of South Taranaki. Natural environmental factors, including coastal erosion, exposure and substrate mobility, appeared to be dominant drivers of species richness and diversity at the sites surveyed.

Emily Roberts
Marine Ecologist

Abbie Bates
Technical Officer

References

Palliser, C., McBride, G., Goodhune, N., Bell, R., Stott, R. (2013) Fonterra Whareroa Dairy Factory and Hawera WWTP, Stage 2 QMRA based on the combines discharge. NIWA Client Report No. HAM2013-050

Clark, D., Barter, P., Clement, D., Tremblay, L., Forrest, R. (2013) Whareroa Marine Outfall ecological investigation 2012. Cawthron Report No. 2348

Internal Memorandum

To: Science Manager – Hydrology/Biology, Regan Phipps
From: Scientific Officer, Emily Roberts and Technical Officer Abbie Bates
File: #1383183
Date: 1 August 2014

Fonterra Whareroa/Hawera Municipal Combined Outfall – Marine Ecological Survey March/April 2014

Introduction

Consent 1450 allows the discharge of dairy factory wastewater from the Fonterra Whareroa factory via a marine outfall. The consent allowing this discharge was renewed in September 1995, requiring the Company to install a long outfall by 31 August 1997. Prior to the renewal of this consent, the wastewater was discharged via a short marine outfall at approximately mean low water spring (MLWS) level which caused significant adverse effects on marine intertidal ecology to at least 1000m southeast of the outfall.

In February 2001, wastewater from the Hawera Oxidation Ponds was connected to the long outfall by consent 5079, allowing a municipal wastewater discharge of 10,000 m^3/day. By comparison, the Fonterra Whareroa wastewater discharge limit was 26,000 m^3/day. As of 19 September 2006, the permitted volume of wastewater discharge increased to 40,000 m^3/day. The oxidation pond discharge was also increased to 12,000 m^3/day in December 2007.

Special condition 6 of consent 1450 and special condition 3 of consent 5079 requires there to be no significant visual, chemical or ecological impacts outside of a 200m mixing zone or within the intertidal zone. Specifically, consent 5079 requires the consent holder to ensure that a monitoring programme is established to record and analyse the effects on the intertidal reefs and water quality adjacent to the discharge. Accordingly, two intertidal surveys of the intertidal zone were carried out as part of the 2013-2014 monitoring programme for the combined marine outfall. The second survey for the 2013-2014 monitoring period was conducted at four sites between 30 March and 15 April 2014.

Methods

Field Work

Of the four sites surveyed, three have been identified by NIWA as having shoreline contact with the wastewater discharged from the outfall (Palliser *et al*., 2013): 350m northwest of the outfall (SEA906049), 200m southeast of the outfall (SEA906057) and 1550m southeast of the outfall on Pukeroa Reef (SEA906067) (Photographs 1-3, Figure 1). The control site at Waihi Reef (Photograph 4, Figure 1), approximately 4500m northwest of the outfall (SEA906025), has been identified by NIWA as unlikely to be impacted by the discharged wastewater (Palliser *et al*., 2013).

Photograph 1 Surveying 350m northwest of the outfall (2013)

Photograph 2 Survey site 200m southeast of the outfall (2013)

Photograph 3 Surveying Pukeroa Reef (2013)

Photograph 4 Survey control site Waihi Reef (2013)

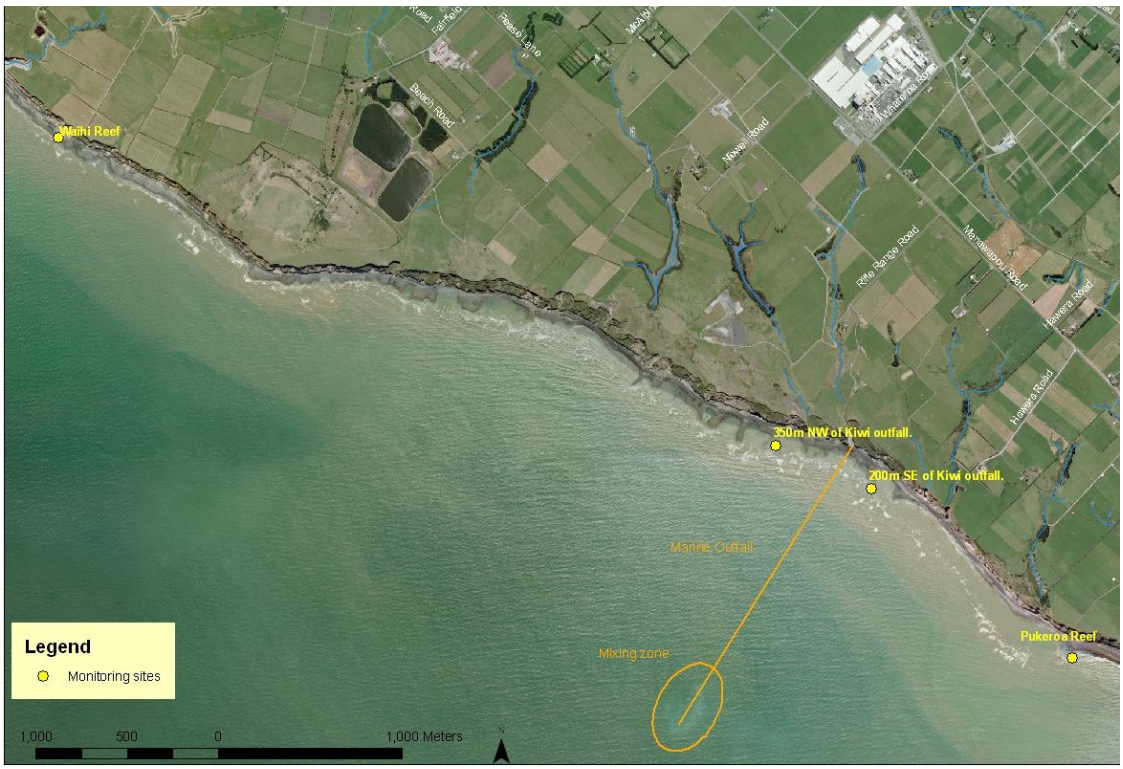


Figure 1 Survey sites in relation to the outfall

At each site, a 50m transect was used to establish five 5m x 3m blocks. Within each block, five random 0.25m^2 quadrats were laid giving a total of 25 random quadrats (Photograph 5). For each quadrat the percentage cover of algae and encrusting animal species was estimated using a grid. For all other animal species, individuals larger than 3mm were counted. Under boulder biota was counted where rocks and cobbles were easily overturned.

Photograph 5 Survey at 200m southeast of the outfall showing the transect used

Results

Summary statistics, including the mean number of species per quadrat and the mean Shannon-Weiner indices, are shown in Table 1. The site 200m SE had the highest number of species and diversity (Shannon-Weiner index), followed by 350m NW, Pukeroa Reef and Waihi Reef respectively.

Table 1 Mean results for the March/April 2013 survey

Site	No. of quadrats	Mean number of species per quadrat			Mean Shannon-Weiner indices per quadrat		
		Algae	Animals	Total Species	Algae	Animals	Total Species
Waihi Reef	25	3.04	7.84	10.88	0.35	0.68	0.79
350m NW	25	4.92	11.36	16.28	0.62	0.86	1.02
200m SE	25	7.88	9.20	17.08	0.73	0.81	1.07
Pukeroa Reef	25	3.80	9.92	13.72	0.49	0.78	0.92

Number of Species per Quadrat

Figure 2 shows the total number of species per quadrat as a box and whisker plot. The notched area of the box represents the median plus and minus a 95% confidence interval for the median. This form of graphical representation allows a quick comparison to be made between sites. Generally, if the notched areas of the boxes for the different sites do not overlap, one would expect to obtain a significantly different result with ANOVA.

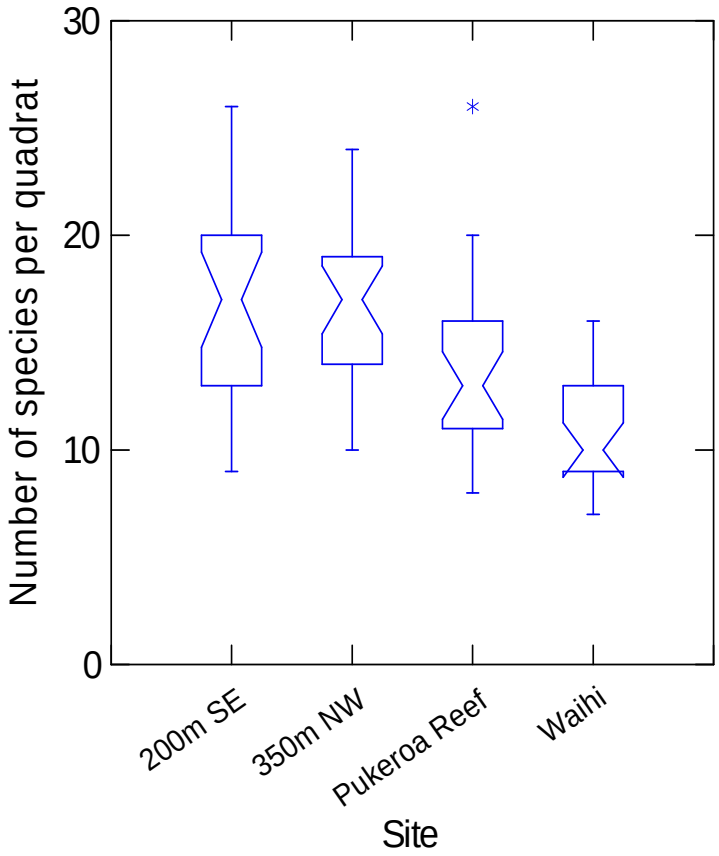


Figure 2 Box and whisker plots of mean number of species per quadrat

At all four sites, there was no significant deviation from normal distribution at the 95% confidence level (Lilliefors test, n = 25, P >0.05). There was a significant difference in mean number of species per quadrat between the sites (ANOVA, n = 25, F = 13.6, P <0.001).

Table 2 Tukey's multiple comparison test of number of species per quadrat

Site	Waihi Reef	350m NW	200m SE
350m NW	SIG		
200m SE	SIG	NS	
Pukeroa Reef	SIG	NS	SIG

SIG = Significant difference
NS = No significant difference

Significant differences between sites were determined using Tukey's multiple comparison test (Table 2). At 200m SE, 350m NW and Pukeroa Reef the mean number of species per quadrat was significantly higher than that at and Waihi Reef. The mean number of species per quadrat was significantly higher at 200m SE than at Pukeroa Reef.

Shannon-Weiner Diversity Index

Figure 3 shows the mean Shannon-Weiner index data at each site as a box and whisker plot.

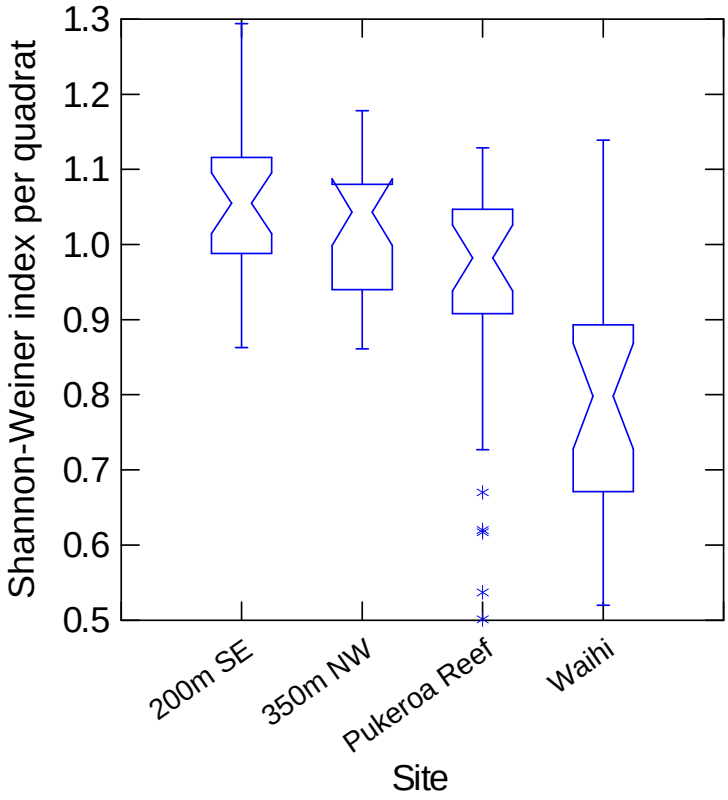


Figure 3 Box and whisker plots of mean Shannon-Weiner indices per quadrat

Only one site (Pukeroa Reef) showed a significant deviation from normal distribution at the 95% confidence level (Lilliefors test, n = 25, P <0.001). There was a significant difference in the mean Shannon-Weiner index per quadrat between sites (ANOVA, n = 25, F = 19.8, P <0.001).

Table 3 Tukey multiple comparison test of Shannon-Weiner index per quadrat

Site	Waihi Reef	350m NW	200m SE
350m NW	SIG		
200m SE	SIG	NS	
Pukeroa Reef	SIG	SIG	SIG

SIG = Significant difference
NS = No significant difference

Significant differences between sites were determined using Tukey's multiple comparison test (Table 3). At 200m SE, 350m NW and Pukeroa Reef the mean Shannon-Weiner index per quadrat was significantly higher than that at and Waihi Reef. The mean Shannon-Weiner index per quadrat was significantly higher at 200m SE and 350m NW than at Pukeroa Reef.

Sand Coverage

The level of sand cover was relatively low (<8.5%) at all sites (Table 4). Abundance and diversity of intertidal species/communities can be significantly impacted by sand cover of 30% and higher.

Table 4 Mean percentage sand cover per quadrat

Site	Mean coverage per quadrat (%)
Waihi Reef	0.9
350m NW	6.4
200m SE	8.3
Pukeroa Reef	1.2

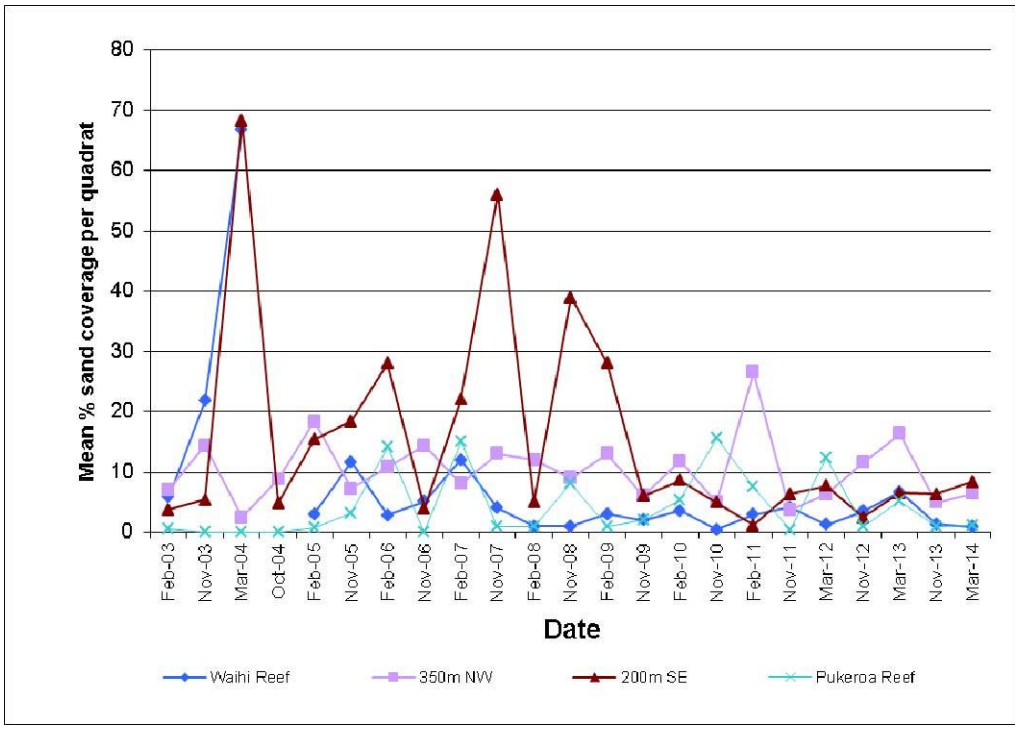


Figure 4 Mean percentage sand cover (summer & spring) by site since February 2003

Trends over time

Species number and diversity

Comparisons of the mean number of species per quadrat (Figure 5) and mean Shannon-Weiner diversity index per quadrat (Figure 6) for all summer surveys undertaken since January 1986 are shown below.

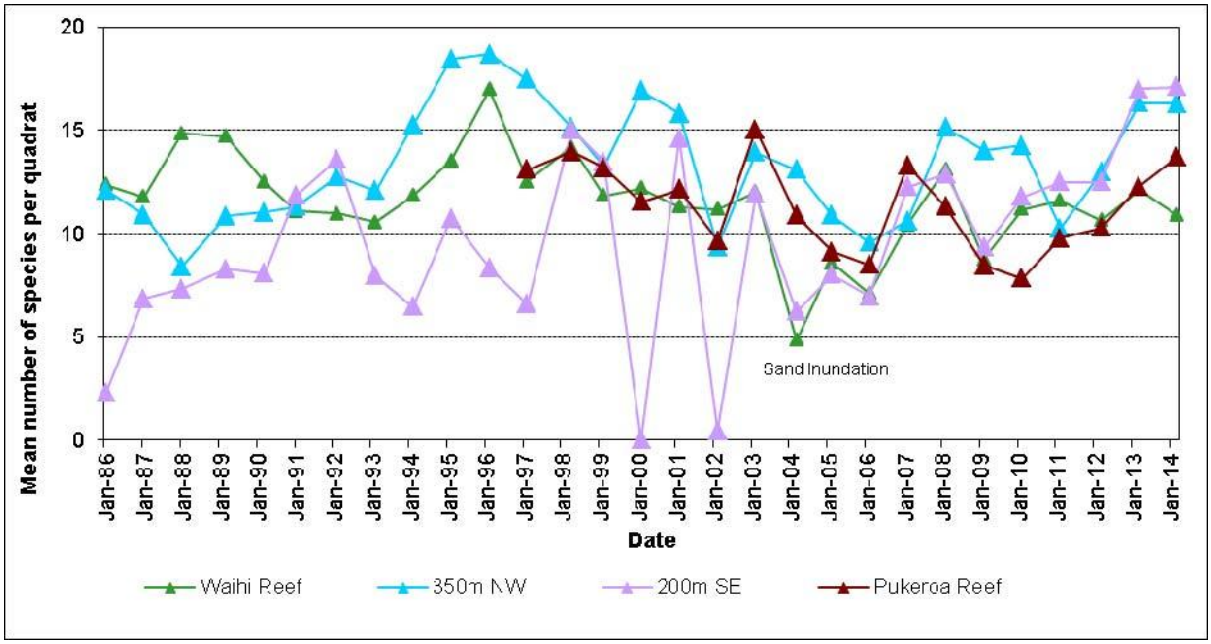


Figure 5 Mean number of species per quadrat for summer surveys 1986-2014

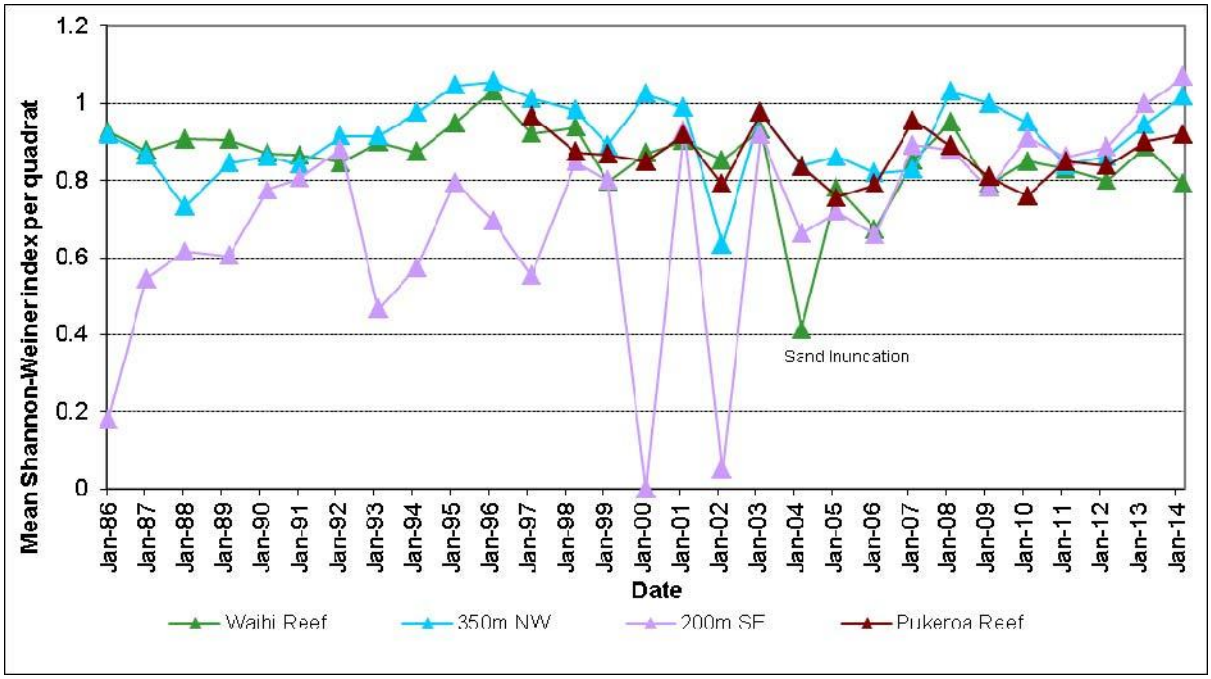


Figure 6 Mean Shannon-Weiner indices per quadrat for summer surveys 1986-2014

Prior to the installation of the long marine outfall in August 1997, both number of species and Shannon-Weiner Index per quadrat at the impact site 200m SE were generally lower than at the control site at Waihi Reef (Figures 5 and 6). Since then (1997), sites have shown interannual variability in both number of species and Shannon-Weiner Index, but there has been no noticeable difference in trends between the impact site and the control sites over this period, with the exception of years with heavy sand inundation (e.g. 2000 and 2002 at 200m SE, Figures 5 and 6).

The results of the March 2014 survey show a slight decrease in the mean number of species per quadrat at Waihi Reef since March 2013, however, at all other sites the survey show the number of species and Shannon-Weiner Index per quadrat increasing (Figures 5 and 6).

Discussion

Previous surveys have shown that the dairy factory wastewater discharged through the near-shore outfall prior to 1997 (Photograph 1) was having significant adverse effects on the local intertidal community. The adverse effects recorded included the coating of rocks and tidal pools with fats, significant coverage by filamentous bacterial growths and a significant decrease in ecological diversity. The nature and magnitude of adverse effects varied with distance from the outfall, and were most apparent at the sites 30m and 200m southeast of the outfall (note that the former site is no longer surveyed as of 2007). In 1997 the dairy company installed a long outfall to discharge the wastewater nearly 2km offshore in order to mitigate the adverse effects occurring along the coastline. Numerous spring and summer intertidal surveys have now been undertaken along the Hawera coastline subsequent to installation of the long outfall. Results show a general improvement in the health of intertidal communities following installation of the outfall. In February 2001 the Hawera Oxidation Ponds municipal wastewater was also connected to the long outfall.

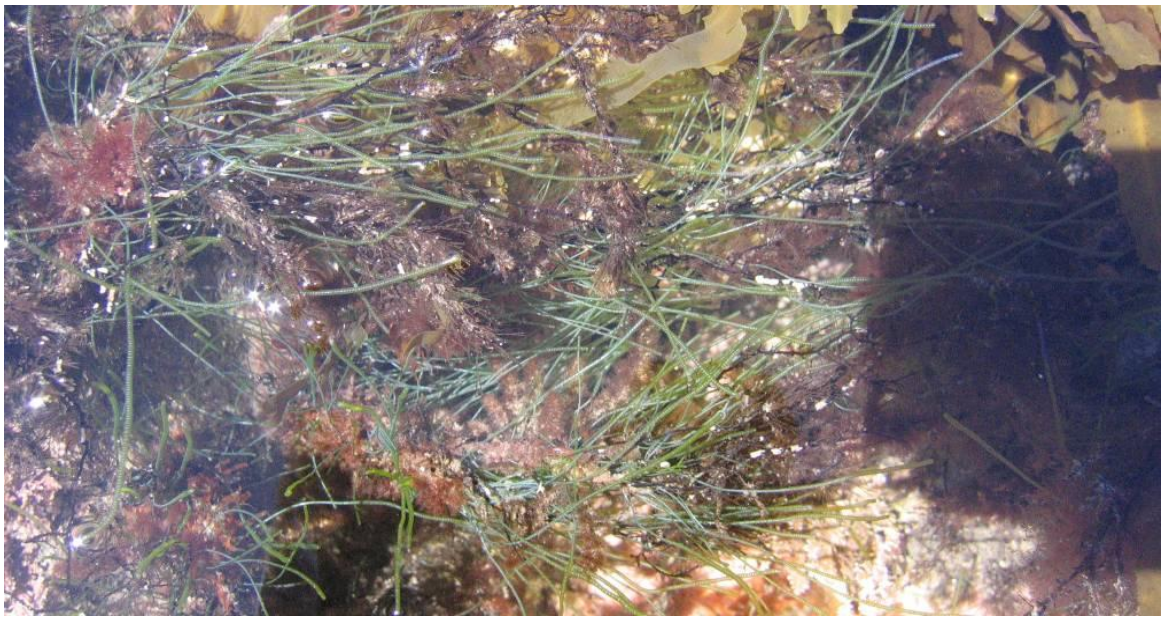
Photograph 6 Discharge from the dairy factory near-shore outfall prior to 1997

Impacts of the marine outfall discharge on the local intertidal communities were not evident from the March 2014 survey results (Figures 2 and 3). The impact sites 350m NW and 200m SE had a significantly higher number of species per quadrat than the control site at Waihi Reef.

Sand cover was low (<8.5%) at all sites during the March 2014 survey. Long term monitoring of intertidal rocky reefs around the Taranaki coastline have shown the abundance and diversity of these communities can be adversely affected when sand levels exceed 30% cover. Although it is not expected that sand cover would have impacted the reef communities monitored during the March 2014 survey, high percentage sand cover (>30%) has previously been recorded at the site 200m SE (Figure 4).

The historical record of survey results (Figures 5 and 6) showed no obvious impact of the marine outfall discharge on the local intertidal communities since installation of the long outfall in 1997. Both control and potential impact sites showed interannual variability and there were no obvious declining trends at the impact sites closest to the outfall relative to the control site. It must be noted that the high energy receiving environment combined with the effects of suspended sediments from nearby rivers/streams and eroding cliffs prevent the development of stable biological communities along the South Taranaki coastline (Clark *et al*., 2012). Such communities could potentially mask any subtle ecological effects from the outfall wastewater discharge. However, in spite of these limitations, the long term record indicates that the intertidal surveys are useful for detecting more noticeable effects from the wastewater, as the impact on intertidal communities prior to installation of the outfall is clearly evident (Figures 5 and 6, Clark *et al*., 2012).

The most notable change in species composition since the commissioning of the long outfall is the decline of *Chaetomorpha* sp. (Photograph 2) and the absence of filamentous bacterial growths at 200m SE (Figures 7 and 8). The adverse effects recorded prior to the long outfall also included the coating of rocks and tidal pools with fats and a significant decrease in ecological diversity. Sand/silt inundation resulting from cliff erosion (Photograph 8) can be an important factor effecting species composition and diversity along the South Taranaki coastline. The coast is in a constant state of erosion with layers of sand and silt often smothering marine life at some sites. Resulting high seawater turbidity can also affect light availability impacting on macroalgae. Observations indicate that freshly fallen boulders from the cliffs provide a poor habitat for intertidal organisms.



Photograph 7 Green filaments of *Chaetamorpha*, an algal genus often associated with high nutrient concentrations (North Taranaki)

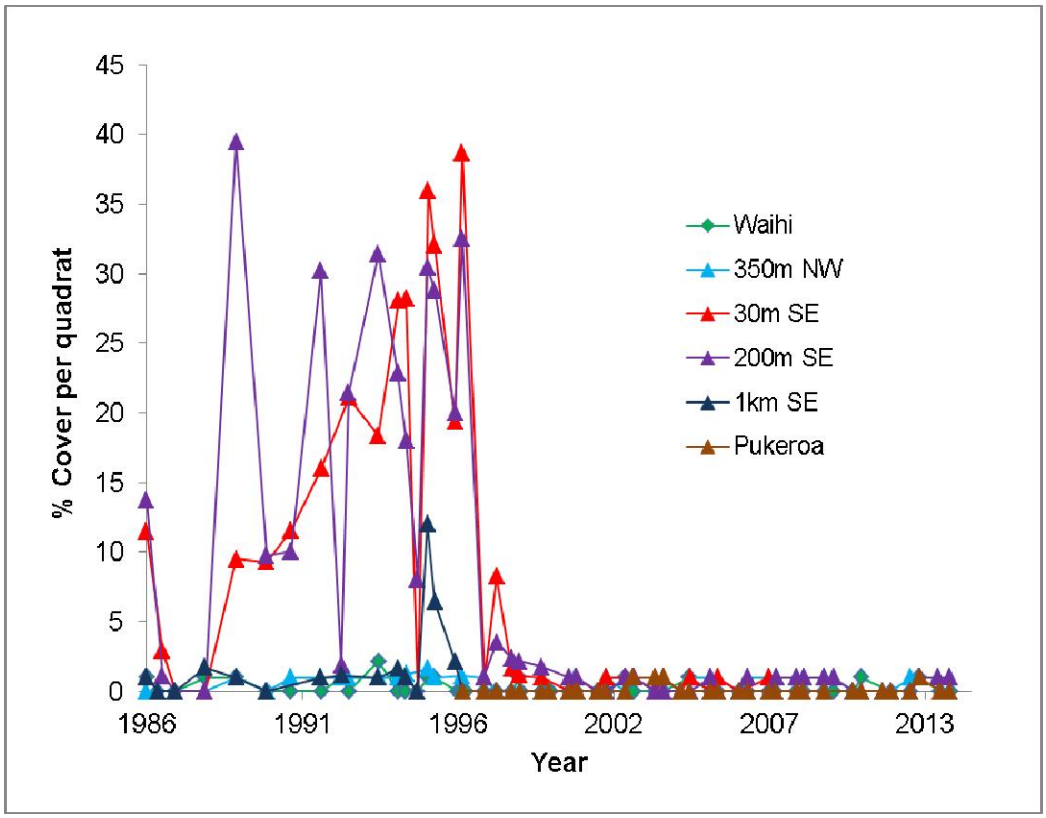


Figure 7 Percentage cover per quadrat of *Chaetamorpha* since 1986

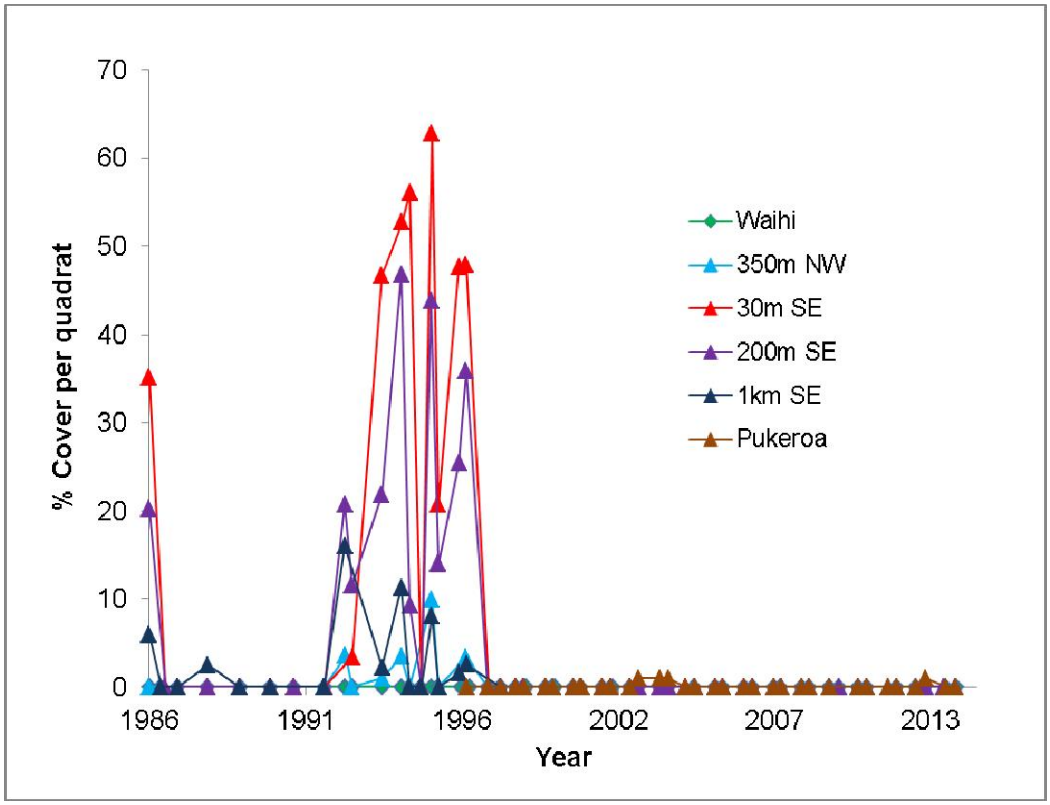


Figure 8 Percentage cover per quadrat of filamentous bacteria since 1986

N.B. Since 2007, the sites 30m SE and 1km SE are no longer monitored as part of the Fonterra Whareroa intertidal survey.

Photograph 8 Erosion of the cliffs close to 350m NW site (2013)

Conclusions

In order to assess the effects of the Fonterra Whareroa and Hawera Waste Water Treatment Plant outfall discharge on the nearby intertidal communities, surveys were conducted between 30 March and 15 April 2014 at four sites. These surveys included three potential impact sites either side of the outfall (two southeast and one west) and one control sites to the northwest. It is expected that adverse effects of the marine outfall discharge on the intertidal communities would have been evident as a significant decline in species richness and diversity at the potential impact sites relative to the control site.

As both species richness and diversity were higher at the two potential impact sites closest to the outfall relative to the control site, and results from sites closest to the outfall had not declined notably in recent years, the results indicate that the marine outfall discharge was not having detectable adverse effects on the intertidal reef communities of South Taranaki. Natural environmental factors, including coastal erosion, exposure and substrate mobility, appeared to be dominant drivers of species richness and diversity at the sites surveyed.

Emily Roberts
Scientific Officer - Marine Ecologist

References

Palliser, C., McBride, G., Goodhune, N., Bell, R., Stott, R. (2013) Fonterra Whareroa Dairy Factory and Hawera WWTP, Stage 2 QMRA based on the combines discharge. NIWA Client Report No. HAM2013-050

Clark, D., Barter, P., Clement, D., Tremblay, L., Forrest, R. (2013) Whareroa Marine Outfall ecological investigation 2012. Cawthron Report No. 2348

Appendix III

Freshwater biological survey

To	Job Manager, Emily Roberts
From	Scientific Officer, Bart Jansma
Report No	BJ216
Document No.	1269309
Date	25 October 2013

Biological inspection of unnamed tributaries of the Tawhiti Stream and Tangahoe River, and an unnamed coastal stream, in relation to the discharge of stormwater from the Fonterra Whareroa dairy factory, September 2013

1. Introduction

Fonterra Co-operative Group Limited holds a number of resource consents for activities associated with the operations of the Whareroa dairy processing complex near Hawera. This includes three consents to discharge stormwater into three separate streams, being an unnamed tributary of the Tawhiti Stream, an unnamed tributary of the Tangahoe River, and an unnamed coastal stream. A brief biological inspection was scheduled in the 2012-2013 monitoring year to monitor the effects of these discharges. This was conducted on 18 September 2013, and this is second time that this biological inspection has been undertaken, with the results of previous inspections discussed in reports included in the reference section.

A full biomonitoring survey of these streams is also scheduled in this monitoring period, to be undertaken in summer. The inclusion of a spring biological inspection in the monitoring programme is a direct response to the results of water quality and biological monitoring undertaken in January 2011 (Jansma, 2011). At this time, the discharge to the Tawhiti Stream tributary was found to have caused the establishment of undesirable heterotrophic growths. It became apparent that these growths may have been present since spring. As a result, the monitoring programme was augmented to include a spring biological inspection, to increase monitoring at a time when factory throughput is often the highest.

Due to the layout of the stormwater treatment systems, no upstream site is available in any of the tributaries. As a result only downstream observations were possible. The inspection included the collection of a small sample, which was then sorted on site to assess what live invertebrates were present in the community. As the fresh sort was not performed using magnification, the level of identification was quite low, except for those invertebrates that could be easily identified to a higher level e.g. Austrosimulium.

2. Observations

Tawhiti Tributary

The stream flowing from the stormwater ponds had a low and slow flow, which was cloudy but uncoloured. The macroinvertebrate habitat downstream of the stormwater discharge was sparse, as the water cress, was only present on the edges, with only a minor amount on the stream bed. This reflected the time of year that the inspection was undertaken, with the macrophytes not yet recovered from the winter die back. Nevertheless, the small invertebrate sample, which was live-sorted on site, contained

damselfly larvae, water boatman, adult beetles, water strider (*Microvelia*) *Triplectides* caddisfly larvae and snails. No *Chironomus* blood worms or oligochaete worms were observed in the sample. The presence of these species, especially *Chironomus*, can be an indication of organic enrichment. In addition to these observations, no undesirable heterotrophic growths (sewage fungus) was observed, either on the water cress habitat, or at the outflow of the stormwater pond.

The presence of caddisfly larvae, which are a moderately sensitive taxon, and the lack of undesirable heterotrophic growths on the bed, indicates that any preceding discharges from the dairy factory site had not had a significant adverse effect on the macroinvertebrate communities of the unnamed tributary of the Tawhiti Stream.

Tangahoe Tributary

The Tangahoe tributary had a clear and uncoloured flow where it flowed from the stormwater ponds. There was a slight iron oxide sheen present, although it was not very widespread. There were few macrophytes growing in the stream bed downstream of these ponds, with only a small amount of water cress observed. The live sample was primarily collected from grass that was hanging in the stream, and fine grade substrate (silt and sand). This is not ideal macroinvertebrate habitat, but nevertheless the live sort recorded oligochaete worms (extremely abundant), sphaeriid fingernail clams (abundant), snails, damselfly larvae and copepods. No undesirable heterotrophic growths (sewage fungus) were observed growing on the sampled habitat, and neither was there any collected in the live sample. The growths observed on the concrete ramp over which the discharge flowed during the last inspection were no longer present.

The presence of oligochaete worms in abundance, and the lack of any ' sensitive' taxa indicated that the community was possibly in reduced health compared with the previous inspection. However, this live sampling technique can produce variable results, and overall, the results, including the lack of undesirable heterotrophic growths on the bed, indicate that any preceding discharges from the dairy factory site had not had a significant adverse effect on the macroinvertebrate communities of the unnamed tributary of the Tangahoe River.

Unnamed coastal Stream

The unnamed coastal stream was inspected immediately below the stormwater pond, which is some way upstream of the site sampled during the full biomonitoring survey. At the time of this inspection, the stream had a slow but clear flow. There was a good growth of water cress throughout the stream channel, which indicated little impact from high flows, and that these macrophytes had not died off in the winter. The live sample collected contained an extremely abundant population of oligochaete worms. A number of other taxa were also observed, but in reduced abundance, including snails, leeches, copepods, amphipods, damselfly larvae, cranefly (*Zelandotipula*) and *Chironomus* blood worms. Although blood worms were observed in the live sample, they were rare, and not an unusual result for this type of habitat. The relatively high community richness, presence of 'moderately sensitive' taxa, and the lack of any sewage fungus, indicate that any preceding discharges from the dairy factory site had not had a significant adverse effect on the macroinvertebrate communities of the unnamed coastal stream.

References

Jansma B, 2011: Biomonitoring of unnamed tributaries of the Tangahoe River and the Tawhiti Stream, and an unnamed coastal stream which receive stormwater discharges from the Fonterra Whareroa dairy factory, January 2011. TRC Report BJ162.

Jansma B, 2013: Biological inspection of unnamed tributaries of the Tawhiti Stream and Tangahoe River, and an unnamed coastal stream, in relation to the discharge of stormwater from the Fonterra Whareroa dairy factory, September 2012. TRC report BJ215.

Appendix IV

Fish survey of the Tawhiti Stream

Memorandum

To	Emily Roberts, Scientific Officer
From	Bart Jansma, Scientific Officer
Report No	BJ239
Document	1410065
Date	29 September 2014

Fish Survey of the Tawhiti Stream in relation to the abstraction of water and the intake weir, associated with the Fonterra Whareroa dairy factory, January 2014

Introduction

This report describes the results of a fish survey of the Tawhiti Stream, which is part of the monitoring programme for the Fonterra Whareroa dairy factory. This was the only fish survey scheduled for the 2013-2014 monitoring year. Consents related to this survey are:

- 5845-1 to maintain a dam structure and associated fish pass on the Tawhiti Stream for water intake purposes
- 0047-3 to take up to 30,000 cubic metres/day of water from the Tawhiti Stream
- 4927-1 to discharge up to 1.05 cubic metres/day of river silt and sand from mechanical pre-filtering of river water during abstraction of water, by returning it into the Tawhiti Stream

Photo 1 The weir and fish pass on the Tawhiti Stream

This survey is the first of this kind undertaken in the Tawhiti Stream by the Taranaki Regional Council. It was included for the first time in the 13-14 monitoring period due to a recent heightened interest in the fish communities of the Tawhiti Stream.

Methods

In this survey, two sites were surveyed in the Tawhiti Stream. Site 1 was located upstream of the intake while site 2 was located downstream of the weir. Details of the sites surveyed are given in Table 1 and the locations of the sites surveyed in relation to the site are shown in Figure 1.

Table 1 Sampling sites surveyed in the Tawhiti Stream in relation to the Fonterra Whareroa intake, weir and fish pass

Site	Site code	Location	Altitude (m)	Distance from coast (km)
1	TWH000481	Approx. 720m upstream of intake structure	40	12.9
2	TWH000420	Approx. 350m downstream of intake structure	40	13.8

The fish populations were sampled using fyke nets and g-minnow traps (Photo 2). At each site, six g-minnow traps were set, and baited with marmite. They were set overnight, among macrophytes or alongside woody debris. Four fyke nets were also set at each site, two standard mesh (25mm) net and two fine mesh (13mm). The fyke nets were baited with fish food pellets. These nets were also set overnight. All fish caught were identified, counted and measured. All nets and traps were deployed on 14 January 2014, and retrieved on 15 January 2014.

Figure 1 Location of the two sampling sites in relation to the intake, weir and fish pass.

Photo 2 A fyke net set at site 2

Results and Discussion

At the time of this survey, the Tawhiti Stream had a moderate flow which was brown and cloudy, relatively typical for this stream. Flows had remained above mean annual low flow since 13 April 2013, a period of over 9 months (Figure 2). The substrate of the stream comprised a mixture of coarse substrate, such as cobbles and gravels, but over 50% of the stream bed comprised of sand or silt at both sites.

There was good fish habitat present, with both sites having undercut banks, overhanging vegetation, macrophyte beds and some instream woody debris. In addition, thanks to the overhanging vegetation, both sites were partially shaded.

The full results of the fish survey are shown in Table 2.

Table 2 Results of the fish survey undertaken in the Tawhiti Stream in relation to the Fonterra Whareroa dairy factory intake and weir.

Site:		Site 1			Site 2		
Net/Trap type:		Fyke net coarse mesh	Fyke net fine mesh	G-minnow trap	Fyke net coarse mesh	Fyke net fine mesh	G-minnow trap
Number of minutes fished:		2560	2560	7680	2580	2580	7740
Longfin eel (*Anguilla dieffenbachii*)	Number	1	8	1	2	2	0
	Length range (mm)	560	353-595	307	587-660	466-512	-
Shortfin eel (*Anguilla australis*)	Number	0	0	0	0	2	0
	Length range (mm)	-	-	-	-	640-895	-
Koura (*Paranephrops planifrons*)	Number	0	0	0	0	0	2
Total number of species		2			3		
Total number of fish		10			8		

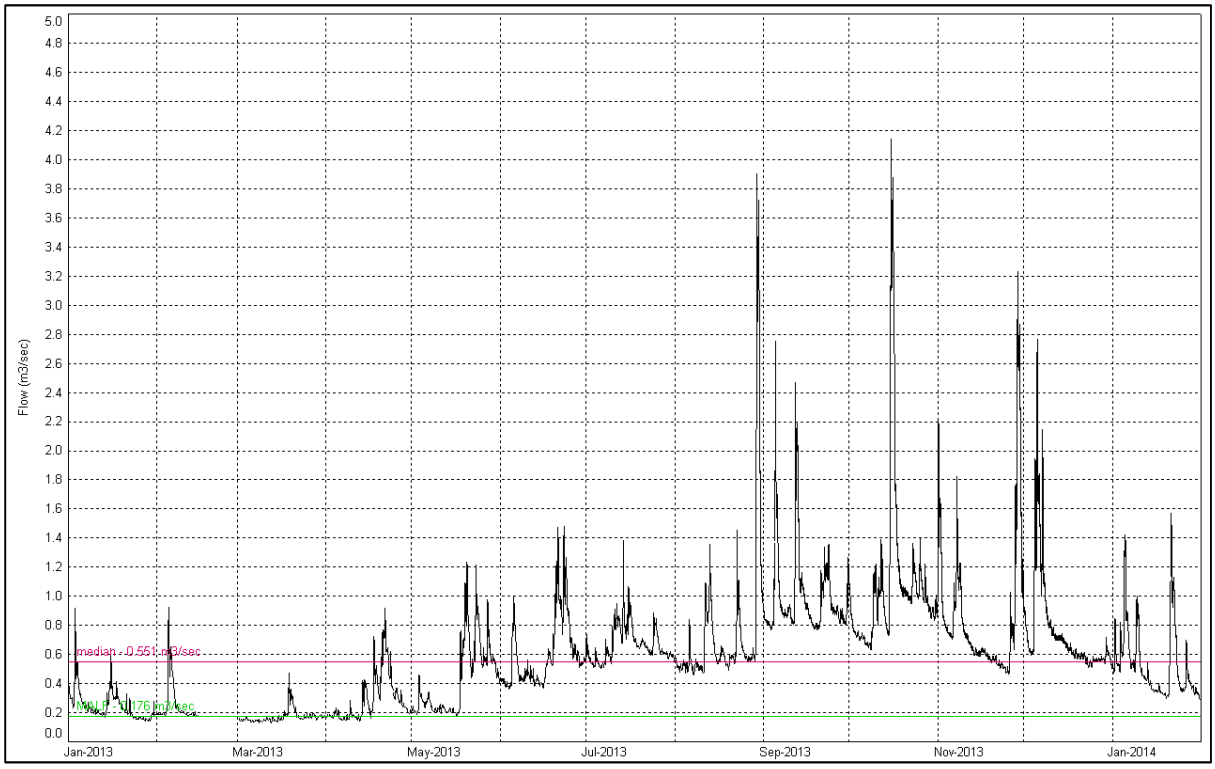


Figure 2 Flow in the Tawhiti Stream at Duffys farm, from 1 January 2013 to 1 February 2014

Site 1

Only one species was recorded at site 1, being longfin eel. The majority of these fish were recorded in the fine mesh fyke nets, with one each recorded in a coarse mesh fyke and G-minnow trap.

There was some variation in size, although no particularly large specimens were recorded. However, the largest longfin eel, at 595mm, is still likely to be more than 20 years old (Chisnall & Hicks, 1993). Assuming the eels in the Tawhiti Stream exhibit a weight to length relationship typical to the species, this means that fish weight will have ranged from approximately 0.06kg to 0.54 kg (Jellyman *et al* 2013)). Shortfin eel and koura, although not recorded at this site, are likely to be present, and were for some reason not collected in nets or traps. This was confirmed by another fish survey undertaken upstream, above Tawhiti Road, which recorded shortfin eel.

Site 2

This site, located downstream of the weir, contained the highest species richness (3), although only 8 individuals were recorded. This site recorded the largest longfin eel of the survey (660mm), which may have been as old as 30 years (Chisnall & Hicks, 1993), and would likely have weighed approximately 0.74kg. The two shortfin eels recorded at this site were of moderate size, being 640mm and 895mm, which would have weighed approximately 0.53kg and 1.59kg respectively.

Of note was a decent sized rainbow trout (*Oncorhynchus mykiss*) feeding voraciously downstream of this site (Photo 3). Another trout was observed feeding in the pool formed by the weir, although this trout could not be identified to species level.

Photo 3 A rainbow trout, observed downstream of site 2 in the Tawhiti Stream
Note: Photo colours augmented to aid visibility of fish.

Summary and conclusions

On 14 and 15 January 2014, two sites were surveyed for freshwater fish in the Tawhiti Stream, in relation to the water intake weir and fish pass associated with the Fonterra Whareroa dairy factory. Site 1 was located approximately 720m upstream of the intake, while site 2 was located approximately 350m downstream of the intake. The survey method involved deploying baited fine and coarse mesh fyke nets and g-minnow traps at each site overnight. These nets and traps were recovered the following morning, with all fish identified, counted and measured.

At the time of this survey, flow in the Tawhiti Stream was moderate, and instream fish habitat was abundant, with undercut banks, macrophyte beds, overhanging vegetation and woody debris present at both sites. In addition, the low altitude and close proximity to the coast of these sites would be expected to result in a relatively diverse and potentially abundant community.

Unfortunately only two species of eel were recorded, along with freshwater crayfish. The upstream site had the highest abundance of fish, with 10 individuals recorded, compared with the six fish and two crayfish recorded downstream. The downstream site recorded the highest species richness, with longfin eel, shortfin eel and crayfish present. Only longfin eel were recorded at the upstream site. Of note was the observation of trout in the stream, with a decent sized rainbow trout observed feeding voraciously downstream of site 2.

The low numbers of fish at site 2 may be related to activities undertaken at the weir. For example, low flows or the discharge of sediment may result in habitat that is from time to time unsuitable, and unable to sustain a community for an extended period of time. This could result in fewer fish becoming resident in that reach of stream. However, this does not seem likely, as flows did not drop below MALF for over 9 months prior to this survey, and no significant issues have been noted with the discharge of sediment. It is more likely that the sampling technique may have influenced results, as fyke nets favour the capture of eels,

especially when baited, and anecdotal evidence indicates that kokopu species may avoid nets that contain eels. In addition, other influences may exist, such as commercial fisherman targeting eels in this stream.

However, this does not explain the lack of fish captured in the g-minnow traps. It was expected that these traps would catch bully species and possibly inanga, and their absence may indicate the presence of a barrier to fish passage downstream, either natural or artificial. This is an area that may need further investigation.

In assessing whether the intake weir itself is a barrier to fish passage, it is necessary to compare the species diversity downstream with that recorded upstream. Unfortunately, this assessment is inhibited by the lack of species recorded downstream. The results of this survey, and other work undertaken further upstream which recorded shortfin eel, indicates that the intake weir and fish pass does not constitute a barrier to the passage of those species recorded downstream of the weir. A visual inspection of the pass confirmed this, although it was noted that the vegetation around the pass needed maintenance, with flax covering a part of it.

Overall, this survey does not indicate that the intake, fish pass or discharge of sediment undertaken in relation to the Fonterra Whareroa water abstraction have had any impact on the fish communities of the Tawhiti Stream. It is recommended that subsequent surveys use the same techniques, as the habitat does not suit electric fishing or spotlighting. However, it could be possible to electric fish immediately below the weir, and this may provide additional useful information.

References

Chisnall, BL and Hicks, BJ., 1993 Age and growth of longfinned eels (*Anguilla dieffenbachii*) in pastoral and forested streams in the Waikato River basin, and in two hydroelectric lakes in the North Island, New Zealand. *New Zealand Journal of Marine and Freshwater Research*, 27:317-332

Jellyman, PG, Booker, DJ, Crow, SK, Bonnett, ML & Jellyman, DJ., 2013. Does one size fit all? An evaluation of length-weight relationships for New Zealand's freshwater fish species. *New Zealand Journal of Marine and Freshwater Research* 47: 450-468.

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Appendix V

PM_{10} monitoring report

Memorandum

To Job Manager, Emily Roberts
From Scientific Officer -Air Quality, Brian Cheyne
File FRODO# 1407779
Date September 23, 2014

PM 10 monitoring at Fonterra Whareroa Dairy Complex

Figure 1 PM10 monitoring sites in 2013-2014 monitoring year

In September 2004 the Ministry for the Environment formally made public the National Environmental Standards (NESs) relating to certain air pollutants. The NES for PM10 is 50 µg/m^3 (24-hour average). Special condition 9 of the Consent 4103 sets the same limit on the emissions of fine particulates [PM10] to the atmosphere from the site, that is –

"*the maximum ground level concentration of fine particulates [PM10] arising from the exercise of this consent measured under ambient conditions does not exceed 50 micrograms per cubic metre [50µg/m^3] [twenty-four hour average], at or beyond the boundary of the site.*"

Particulates can be derived from many sources, including motor vehicles (particularly diesels), solid and oil-burning processes for industry and power generation, incineration and waste burning, photochemical processes, and natural sources such as pollen, abrasion, and sea spray.

PM10 particles are linked to adverse health effects that arise primarily from the ability of particles of this size to penetrate the defences of the human body and enter deep into the lungs significantly reducing the exchange of gases across the lung walls. Health effects from inhaling PM10 include increased mortality and the aggravation of existing respiratory and cardiovascular conditions such as asthma and chronic pulmonary diseases.

During the reporting period, a "DustTrak" PM10 monitor was deployed on two occasions in the vicinity of the dairy complex. The deployments lasted approximately from twenty-five to forty-six hours, with the instrument placed in a down-wind position at the start of the deployment. Monitoring consisted of continual measurements of PM10 concentrations. The locations of the "DustTrak" monitor during the sampling runs are shown in Figure 1.

The details of the sample runs are presented in Figure 2 and Table 1.

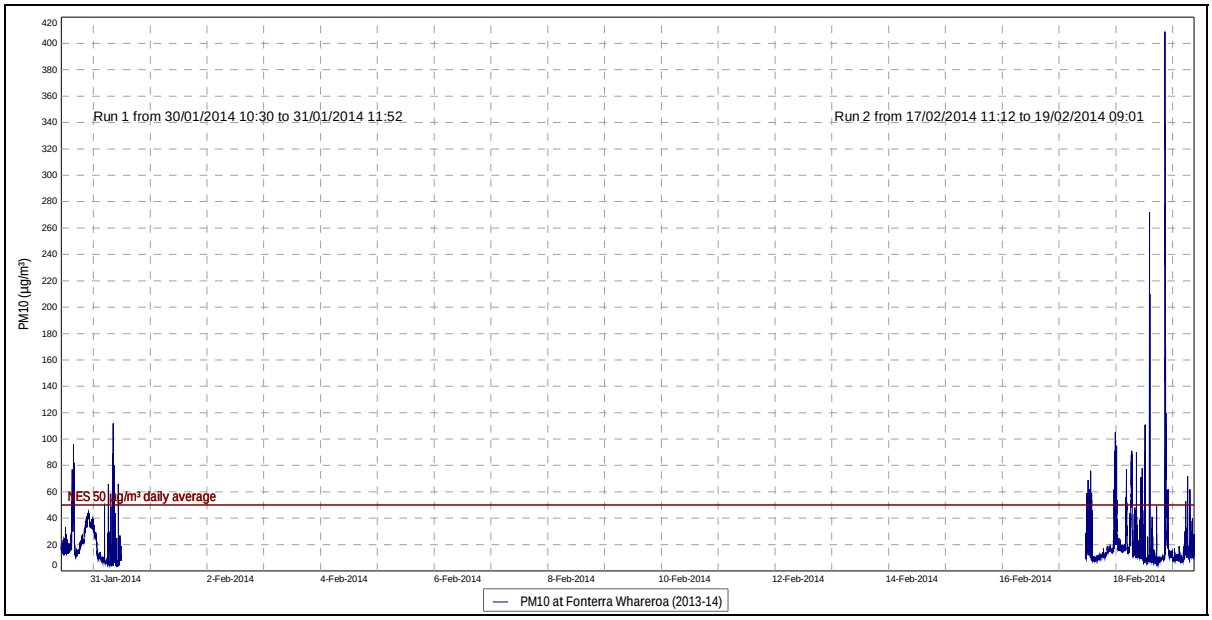

Figure 2 PM10 concentrations (µg/m³) at the Fonterra Whareroa dairy complex (2013-14)

	Run 1 (25 hours) (30-31/01/2014)	Run 2 (46 hours) (17-19/02/2014)	
24 hr. set	Day 1	Day 1	Day 2
Daily average	20.0 µg/m³	21.0 µg/m³	18.0 µg/m³
NES	50µg/m³		

Table 1 Daily mean of PM10 results during five days' monitoring at Whareroa dairy complex

Findings

First run:
During the first 25-hour run, from 30th of January to 31th of March 2013, the average recorded PM_{10} concentration was 20.0µg/m³. This daily mean equate to 40% of the 50 µg/m³ value that is set by both the National Environmental Standard and the resource consent.

Second run:
During the second 46-hour run, from 17th of February to 19th of February 2014, the average recorded PM_{10} concentration for the first twenty-four hour period was 21.0µg/m³ and 18.0µg/m³ for the second twenty-four hour period. These daily means equate to 42% and 36% respectively, of the 50 µg/m³ value that is set by both the National Environmental Standard and the resource consent 4103.

Background levels of PM_{10} in the region have been found to be around 11 µg/m³.

Appendix VI

Explanation of Box and Whisker Plots

Explanation of box and whisker plots

Box and whisker plots are a useful method of summarising data in a graphical form that allows rapid comparisons of data groups. The data is represented as a box with a whisker from each end.

The median (middle value of the sorted data; half of the data is either side of the median is represented by a single horizontal line. The notch, symmetrically spread around the median represents the 95% confidence interval of the median). It is a feature that allows rapid comparison between groups. If notches overlap, there is no significant difference between groups (at the 95 % confidence interval). If notches do not overlap, a statistical difference is expected.

The top and bottom of the box represent the upper and lower hinges respectively. The median splits the ordered group of data in half and the hinges split the remaining halves in half again. This means that 50% of the data lies within the box.

Hspread, comparable to the interquartile (25% and 75%) range is the difference between the values of the two hinges, ie, Upper hinge – Lower hinge = Hspread. The inner fences are defined as follows:

Lower fence = lower hinge – (1.5 x Hspread)
Upper fence = upper hinge + (1.5 x Hspread)

The outer fences are defined as follows:

Lower fence = lower hinge – (3 x Hspread)
Upper fence = upper hinge + (3 x Hspread)

The whiskers show the range of values that lie within the inner fences. Values outside the inner fence are plotted as asterisks (*). values outside the outer fence are plotted as open circles (o).