

Environmental Compliance Monitoring Report **2014–15**



environment
SOUTHLAND
Te Taiao Tonga



Environmental Compliance Monitoring Report

2014/15

**Report by –
Environment Southland
Compliance Division**

Environment Southland Publication No 2015/5

Environment Southland is the brand name of
the Southland Regional Council



Foreword

Council has been producing the Compliance Monitoring Report since 1998 and since that time Southland has undergone some significant changes, particularly with regard to land use and pressure being placed on our environment.

The report has been modified and improved over the years, but has always aimed to provide information on how Southland's resource users are performing in regard to compliance with their consent conditions.

In this report groupings have been made where appropriate, to provide an overview of performance by an industry, group or activity.

It's again been a year of pleasing results with industry, incidents and the dairy sector.

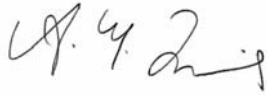
For the third year in a row there has been a reduction in significant non-compliance on effluent discharge consents. The rate of significant non-compliance is now at 4.5%, down from 6% last year.

Incidents have also reduced again this reporting period to 617, from 712 last year. These can increase and decrease from a range of factors from extreme weather to new laws and new industry, but it's pleasing to see the total number of reported incidents declining.

Despite the excellent results contained in the report, there have been several ongoing prosecutions where contaminants continue to enter ground or surface water. Activities under scrutiny in these cases are often significantly diminishing the localised water quality, in some cases for many years. Punitive actions such as enforcement orders and prosecutions are taken as a last resort when there has been a recurring behaviour or the environmental impact has been significant.

The coming year is likely to be another busy one for the Compliance Division, as well as to the Council as a whole. The Compliance Division will be taking an education-first approach to the implementation of the Proposed Regional Air Plan. We'll be working to support change in home heating with the goal of improving air quality. The notification of the Water and Land Plan later in the year may also see some changes for the division. All in all it will mean a busy period ahead as the organisation strives to meet the Government's legislative requirements and our own communities' goals for water and air quality.

The Council would like to take the opportunity to thank Compliance Manager, Simon Mapp, and his team for their dedication and commitment in carrying out their role in a fair and equitable manner which is appreciated and respected by clients and ratepayers.



A M Timms
Chairman
Environment Southland



NMG Cook
Chairman
Regulatory Committee

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Introduction

Environment Southland's Compliance Monitoring Report has been designed to provide an overview of compliance activities from across Southland during the 2014/15 year. It does not cover all of the activities of the division in detail.

Activities with similar parameters, particularly enforcement, incidents, dairy discharge consents and whitebait stands, have been combined to give a broad overview, rather than reporting on individual conditions or circumstances.

In this report, the dairy industry is reported as a collective as the consent conditions for each farm are similar and compliance with these can be easily compared. Dairy inspections result in each farm receiving a grade which ranges from 1: Fully compliant through to 10: Significant non-compliance.

Other industries reported here are either the only one of their type in Southland, or significant differences exist between them that would make comparison of their consent conditions too difficult.

Major industrial consents, or those of special interest to Southland, have been identified and are included in the report. Industrial consents are often very complex. This is largely due to the nature of the activity and volume of contaminants that an industry uses or discharges. The industries reported here often have their own environment assessment teams, or use third party contractors to complete the requirements of their consent.

For each of the major industry reports, a table has been included to assess how well the company has kept Environment Southland informed of monitoring results and how they respond to issues. A second table provides an overall assessment of performance against their consent conditions.

Both tables provide a rating in the form of a traffic light system and a comparison between the 2013/14 and 2014/15 year (see below).

Key

| Site or Consent holders Name | | | |
|---------------------------------|-------|-------|-------|
| Description of noteworthy event | 12/13 | 13/14 | 14/15 |

Background denotes overall results for year shown in box

Year

Grading

| | |
|---|--|
| Good to excellent: Consent holder has excellent communication with Environment Southland; they have contingency measures in place; reports supplied on time and compliant; minor to no exceedances with no environmental impact. | |
| Moderate to Technical Issues: Consent holder reports late; has minor exceedances over period of time; moderate exceedances with minor impact on the environment. | |
| Significant non-compliance: Consent holder has exceedances with measurable impact on the environment; reports not supplied; negligent or intentional non-compliance. | |

Also considered in the gradings are the completeness and quality of the results, evidence of contingency planning, prompt notification of events, completion of full and thorough investigations, maintenance of good communications with Environment Southland, proactive in addressing or highlighting potential issues and evidence of environmental ethics.

This report is separated into three main parts, Inspection and Audit Activities, Incident Response, and Enforcement.

Since the first Compliance Monitoring report in 1998, the format and detail of the report has changed. If there is an area you would like to see more detail on or something you would like added to the report next year, please let us know.

Part A

Inspection and Audit Activities

Compliance Division

There is a continuing downward trend in all facets of non-compliance, most pleasingly in the serious non-compliance category.

1.0 Agricultural Audits

1.1 Dairy Inspection Overview

The Compliance Division undertakes inspections of dairy farms to ensure that there is compliance with the conditions of discharge consents. Discharge consents allow farms to irrigate dairy shed effluent to land.

Dairy shed effluent is created from the milking shed and platform on clean down and is a combination of water and effluent and as such it is an excellent natural liquid fertiliser. It contains nitrogen, phosphorus, potassium, magnesium, sulphur and trace elements essential for grass growth. Normally a farm would have to pay for these nutrients to be applied to pasture.

However, pasture can only use so much effluent at a time. It's important for the person in charge of the system to match the irrigation depth to the capability of the pasture to utilise the nutrients. Over-application of effluent can result in the following outcomes:

- kill pasture – especially where effluent has ‘ponded’ on the soil surface;
- pollute groundwater – by seeping too deep into the soil;
- pollute nearby streams and rivers – where it runs off paddocks into waterways;
- be an ineffective use of nutrients - by seeping past the root zone before the plant can utilise it.

There are five outcomes following an inspection that determine a dairy farms performance against the conditions of their consent.

1. score of 1 means the farm is *Fully compliant* – complies with all conditions of its consent;
2. score of 2 means the farm has *Minor non-compliance* – has not complied with ‘administrative’ conditions of its consent;
3. score of 5 means the farm has some *Marginal non-compliance* – there is evidence that an incident is likely, or has happened, but the environmental effect does not warrant any more action than advice and education;
4. score of 7 means that the farm has some *Non-compliance* – e.g. more than the consented number of cows;



5. score of 10 means the farm has *Significant non-compliance* – requires re-inspection and may lead to an investigation and punitive measures being taken.

1.1.1 Discharge Consent Inspections

During 2014/15, 912 on-farm dairy effluent discharge consent inspections were completed. Of these, 617 were fully compliant, 225 were graded 2 or 5, five farms were found to have non-compliance with cow numbers and 65 were graded 10 for significant non-compliance (down 10 on the previous year). Figure 1 represents results compared with previous years.

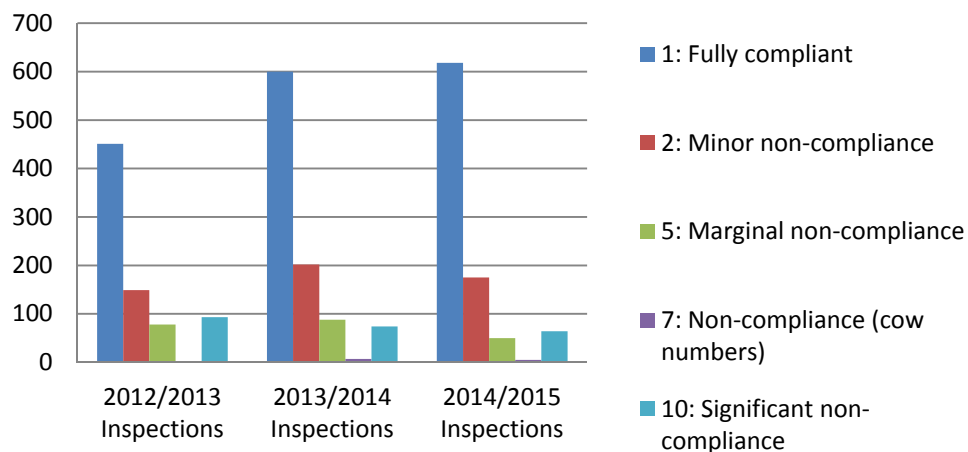


Figure 1 - Comparison of on-site dairy inspection outcomes over the last three years.

If an inspection results in a grade of 10 (Significant non-compliance), a re-inspection is conducted. Figure 2 represents the results of the 39 re-inspections completed for the year. At the end of the reporting period, 25 re-inspections were still to be completed.

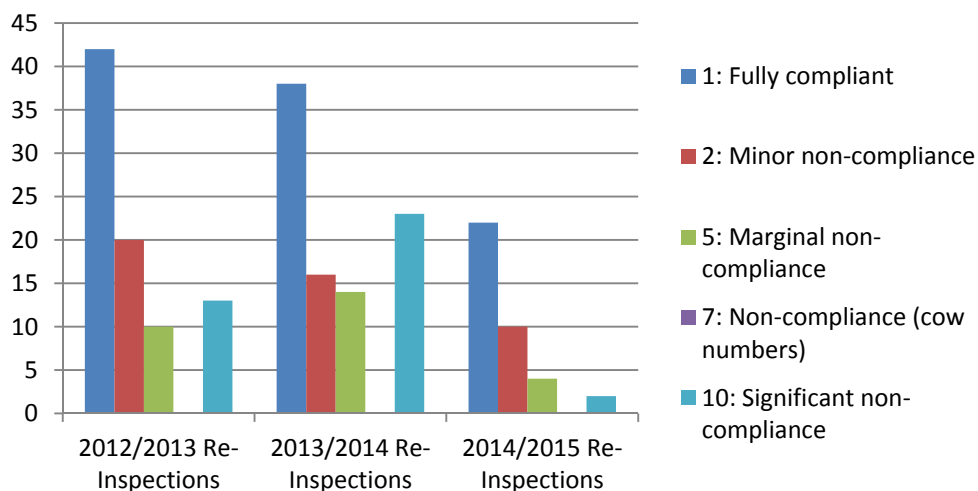


Figure 2 – Results of re-inspections.



1.1.2 Aerial Inspections

In 2014/15 Environment Southland staff completed 550 aerial inspections of farm dairy effluent discharge consents. Of these, 498 were fully compliant and 52 required further investigation. Staff can only assess full compliance from the air; any possible non-compliance noted from the aerial inspections is then followed up with an on-farm inspection.

Please note, on-farm inspections have been included in the discharge consent inspections (above).

1.1.3 Wintering Pad Inspections

Wintering stock on crop is a common activity in Southland; however holding stock on purpose-built wintering pads can, in some circumstances, provide a favourable alternative to paddock-based wintering.

A total of 65 wintering pad inspections were undertaken during the 2015 season, with 65% (42 consents) found to be fully compliant. There were 19 properties (29%) found to have technical or marginal non-compliance and four properties (6%) that had significant non-compliance with their discharge consent (Figures 3).

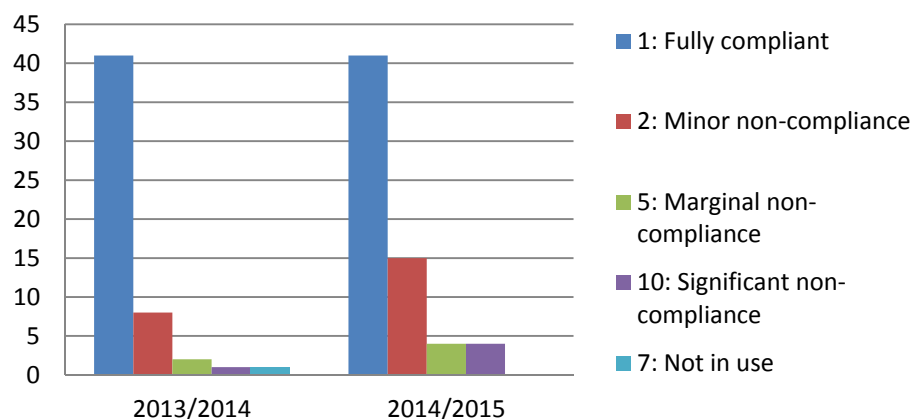


Figure 3 – Comparison of dairy wintering pad inspection outcomes over the past two years.

1.2 Dairy Groundwater Quality Sampling

The groundwater in our aquifers is recharged by water filtering through from the ground above. The quality of the groundwater can be impacted by water carrying contaminants, which can impact the suitability of the water supply for certain uses.

Land use activities that have the potential to impact on groundwater quality are typically described as either point or non-point source discharges.



Groundwater sampling is a tool used to monitor compliance with dairy effluent discharge consents. The purpose is to look for measureable changes over time in the groundwater quality in the areas where effluent is applied.

Water samples are collected from shallow bores near the effluent disposal field. They are then analysed and the results from a three to five-year period can give a reasonable indication of the effects effluent application is having on groundwater. If deterioration is noted, further investigation will be required to try to identify the cause of the changes, and whether the change is associated with land use activities in the area.

In Southland there are around 230 discharge consents where the effects of dairy effluent discharge on groundwater are required to be monitored by collection of representative samples from a specified monitoring bore. This sampling typically occurs twice a year, in November and April. The Nitrate and *E. coli* results for each sampling period are shown below (Figures 4 and 5).

The nitrate results are reported by the NO₃N classes as described in an Environment Southland technical report, *The extent of nitrate in Southland groundwaters* (2012).

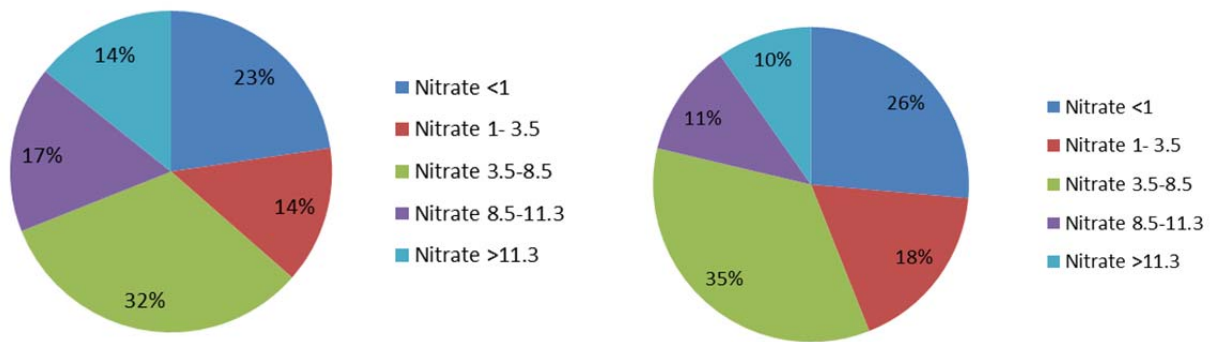


Figure 4 – Dairy groundwater monitoring results for Nitrate (Left - November 2014; Right - April 2015).

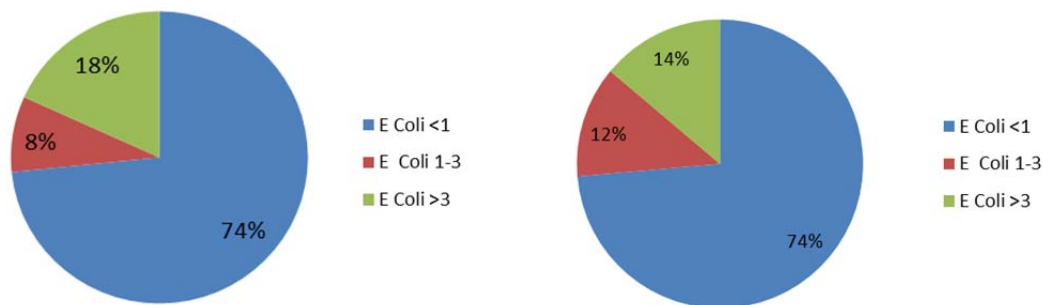


Figure 5 – Dairy groundwater monitoring results for *E. coli* (Left - November 2014; Right - April 2015).



Insufficient well head protection can cause elevated *E. coli* levels. All consent holders with poor *E. coli* results from their bores have been asked to investigate this as a possible source of contamination. If well head protection appears sufficient, and future samples continue to return unsatisfactory results, the source of contamination will need to be investigated further.

1.3 Dairy Surface Water Quality Sampling

In 2014/15, 731 effluent discharge consents required surface water monitoring as a condition. Where the sample is taken depends largely on where the effluent is being irrigated on the day of the inspection, and whether a waterway is likely to be at risk. Most discharge consents specify that samples may be collected up to three times a year, and some consents require samples to be collected on more than one occasion per season. Where possible, samples are collected in conjunction with a routine inspection to minimise costs to consent holders.

Water Quality Results

Of the 731 discharge consents that required monitoring, 556 site visits were made. Of the 556 sites visited, 97 samples were taken – a decrease of 82 samples on the previous year. The results were interpreted with reference to national guidelines and other relevant factors including the weather immediately prior to sampling and comparisons between the upstream and downstream sample water quality. The samples were then graded as either ‘good’, ‘marginal’ or ‘unsatisfactory’.

Of the 97 samples taken:

- 71% received a ‘good’ grade - this indicated that on the day the samples were collected, the effluent discharge to land was having either no or minimal impact on surface water quality downstream of the effluent disposal field. This is on par with last year;
- 5% received a ‘marginal’ grade, indicating there had been a change in water quality below the effluent disposal field when compared to the water quality above the disposal field;
- 24% received an ‘unsatisfactory’ grade, showing that activities on the farm appeared to be having an impact on surface water quality.



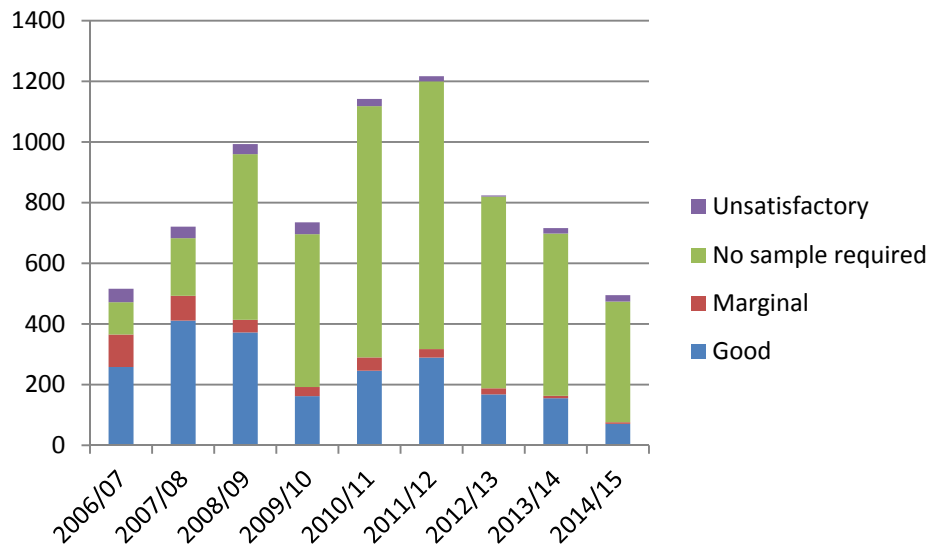


Figure 6 – Annual comparison of dairy surface water quality sampling results.

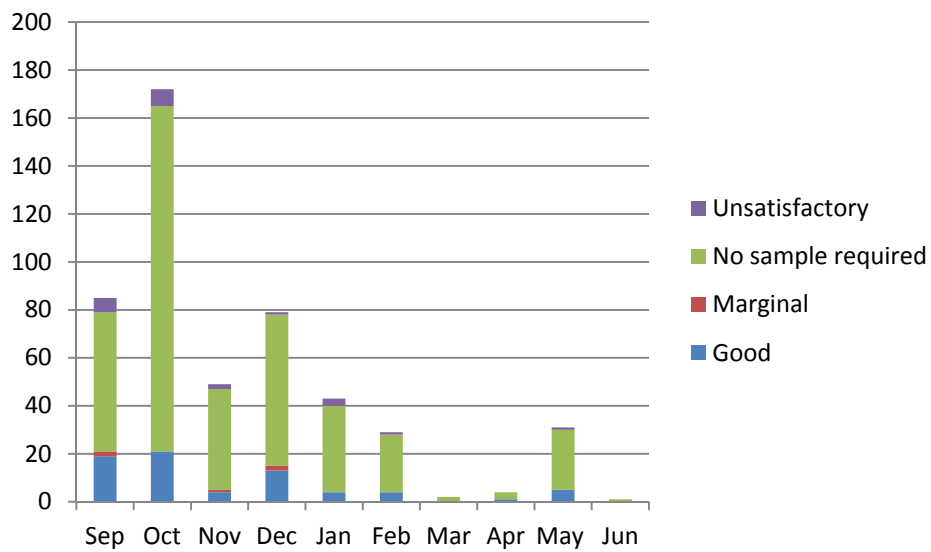


Figure 7 - Comparison of monthly sampling results during the 2014/15 season.

The monthly sampling results (Figure 7) show that a large proportion of the samples were taken at the beginning of the season. There are slightly more ‘marginal’ and ‘unsatisfactory’ results during the wetter months, as farmers are faced with more challenging conditions.



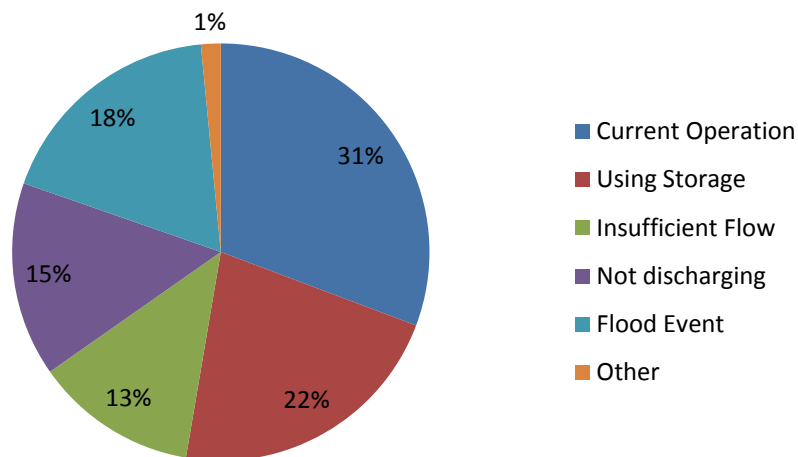


Figure 8 - Reasons why no samples were collected.

Of the 565 farms visited, 456 did not require any sampling. Of these, two thirds were as a result of good management of the effluent system. This has been described as Current Operation or Using Storage in Figure 8.

Reasons why no samples were required (refer to Figure 8):

- *Current Operation* – the farm manager has located the irrigator in a position where it wouldn't impact on the waterway;
- *Using Storage* – at the time of the inspection the consent holder was using the storage capacity in their storage ponds and did not need to discharge effluent to land;
- *Insufficient Flow* – there was insufficient flow in the waterway to enable the inspector to collect a sample;
- *Not Discharging* – the consent holder had not irrigated effluent to land in the area of the waterway for 2-3 days prior to the inspection;
- *Flood Event* – the waterway was in flood at the time of the inspection.



1.4 Irrigation Water Consents

During the 2014/15 irrigation season, there were 112 current irrigation consents in Southland. Of these, 90 were for abstractions from groundwater, and 22 were for abstractions from surface water.

Each consent holder has a daily abstraction limit, and is required to submit records of the volume of water taken each day, to show compliance with their consent conditions. It is also a condition for consent holders to contact Environment Southland with their intention to commence irrigation. If there has been no irrigation for the season, a NIL return must be reported to Environment Southland.

Irrigation in Southland is predominantly for pasture growth, with 85 of the irrigation consents identified as being for pasture irrigation, 18 for crop irrigation, one for horticulture, and eight for recreational use (Figure 9).

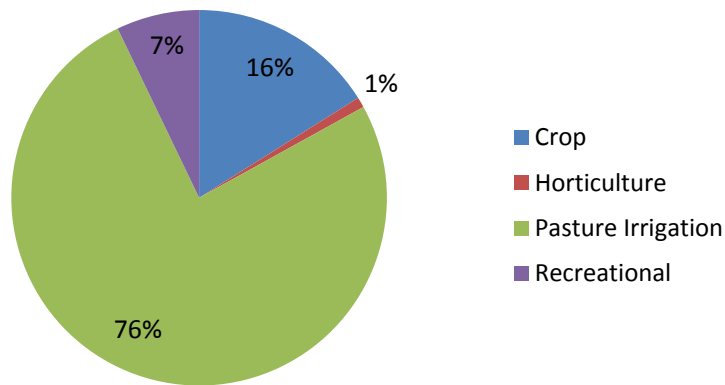


Figure 9 –Irrigation use in Southland

Water Metering Regulations

The information provided by consent holders is used by Environment Southland’s scientists to model groundwater resources in Southland. Modelling is done to provide an estimate of how much water is available for all users, without impacting on the water available for the environment as a whole. Full and accurate data is required to confirm the accuracy of the model.

Data provided by consent holders is required to be sent to the Ministry for the Environment, and is also used during the review, renewal and granting of new consents. A lack of data, or the existence of a poor performance history for a site, may impact on the flexibility of conditions within the new consent.

Environment Southland has been working closely with Irrigation NZ to improve our understanding of the meters and systems used to abstract water. Environment Southland has also worked with Otago Regional Council and Environment Canterbury to help with the application of the regulations. It is expected that this work will improve the quality of the data produced by all



meters used by consent holders. A list of preferred service providers has been developed and the names of these service providers has been made available to consent holders.

Of the consents that have been issued for the purpose of irrigation and require data to be supplied via telemetry equipment, 44 consent holders have complied with their data reporting requirements, 13 were not operational yet or not in use, and one reported a NIL take. Sixteen consent holders have not supplied data to the standard required by their consent; two of these have supplied daily records manually, but as yet have not installed telemetry equipment.

To date, emphasis has been on getting data in from consent holders. Letters have been sent where there was non-supply of data, and enforcement action will be considered for those that continue to not supply data.

All consented irrigation takes require the use of meters which comply with the NES. These meters have to be verified at five-yearly intervals by an approved supplier. If a mechanical meter is in place, more frequent verification will be required.



2.0 Industrial Audits – Major Industries

2.1 Meat Industry

2.1.1 Alliance Group Limited

Alliance Group Limited operates three meat processing plants in Southland, at Lorneville, Makarewa and Mataura. The compliance performance for the three plants during 2014/15 was assessed against the current resource consents.

What we look at

The consents issued for the Alliance Group's plants permit the discharge of treated wastewater into water and onto land. Alliance also holds resource consents for discharges to air, as well as land use and water abstraction.



Consents

Alliance Group Limited holds 11 resource consents for the purpose of meat processing at its Lorneville plant.

They include:

- to discharge waste water to the Makarewa River;
- to take surface water from the Makarewa and Oreti River;
- to discharge sludge to land;
- to discharge contaminants to air;
- to discharge stormwater into an open drain.



Complaints and Self-reported Incidents

| | | | |
|---|-------|-------|-------|
| <p>Seven complaints were received alleging odour issues had originated from the Alliance Lorneville Plant. Two were confirmed to have originated from the plant, but both were not considered objectionable or offensive when investigated by Environment Southland staff.</p> <p>One incident was reported alleging issues with the irrigation of effluent. This was not confirmed when investigated by Environment Southland staff.</p> <p>One incident of a burst ammonia gas pipe was reported. Environment Southland staff investigated and provided advice.</p> <p>Alliance staff self-reported a burst water pipe. Alliance staff addressed the issue resulting in no impact on the environment.</p> | 12/13 | 13/14 | 14/15 |
|---|-------|-------|-------|

Consent Performance

| | | | |
|---|-------|-------|-------|
| <p>The quality of the effluent from meat processing at the Alliance Group’s Lorneville plant met all consent requirements for the 2014/15 period.</p> | 12/13 | 13/14 | 14/15 |
|---|-------|-------|-------|

Makarewa

Consents

Alliance Group Limited holds eight resource consents for the purpose of meat processing at its Makarewa plant.

They include:

- to discharge waste water to the Makarewa River;
- to take groundwater from a bore;
- to take surface water from the Makarewa River;
- to discharge waste water and



- effluent to land;
- to discharge contaminants to air;
- to discharge stormwater to the Makarewa River.

| Complaints and Self-reported Incidents | | | |
|---|-------|-------|-------|
| There were no complaints relating to the Makarewa Plant for the reporting period. | 12/13 | 13/14 | 14/15 |

| Consent Performance | | | |
|--|-------|-------|-------|
| Alliance Group Makarewa consent to discharge treated wastewater to the Makarewa River from the Makarewa Plant has not been exercised this season. The last date that effluent was discharged to the Makarewa River was 20 June 2014. | 12/13 | 13/14 | 14/15 |

Mataura

- Consents – Mataura**
- Alliance Group Limited holds nine resource consents for the purpose of meat processing at its Mataura plant.
- They include:
- to discharge wastewater to the Mataura River;
 - to discharge cooling water to the Mataura River;
 - to discharge sludge to land on selected properties;
 - to divert water.

| Complaints and Self-reported Incidents |
|---|
|---|



| | | | |
|--|-------|-------|-------|
| Three complaints were received alleging that odour issues had originated from the Alliance Mataura Plant for the reporting period. One was confirmed to have originated from the plant, however the odour was not considered objectionable or offensive. | 12/13 | 13/14 | 14/15 |
|--|-------|-------|-------|

| Consent Performance | | | |
|---|-------|-------|-------|
| Alliance Group's Mataura plant reported the quality of the treated effluent being discharged from meat processing plant. Weekly monitoring reported on one occasion the ammoniacal nitrogen concentration exceeded the 'consistently maintain' level, but at no time did the concentration exceed the maximum limit. The Total Suspended Solids concentration exceeded the 'consistently maintain' limit on two occasions but at no time did it exceed the maximum limit. Compliance was achieved with all other limits for the reporting period. | 12/13 | 13/14 | 14/15 |



2.1.2 Blue Sky Meats (NZ) Limited

Consents

Blue Sky Meats (NZ) Limited holds four resource consents for the purpose of meat processing at its Morton Mains plant.

They are:

- to discharge contaminants to the ground through the operation of offal pits;
- to take groundwater from a bore;
- to discharge wastewater to land via a spray irrigator;
- to discharge contaminants to air.

Blue Sky Meats Limited operates a meat processing plant at Morton Mains, near Woodlands.

What we look at

Blue Sky Meats has two consents to discharge. Compliance is assessed against current resource consents.

| Complaints and self-reported incidents | | | |
|--|-------|-------|-------|
| Three incidents were received during this reporting period. Two were confirmed incidents involving effluent from the irrigation system flowing into the waterway. This resulted in two charges being laid against the company in court. The company was found guilty on both charges and ordered to pay a fine and had an Enforcement Order imposed to improve their effluent disposal system. The third incident was a public complaint of an objectionable odour originating from the plant. This was not confirmed. | 12/13 | 13/14 | 14/15 |

| Consent performance | | | |
|---|-------|-------|-------|
| Blue Sky Meats completed the monitoring in accordance with the consent requirements, but exceeded some of the water quality limits as required by the consent. Blue Sky Meats were also technically non-compliant with the provision of data in accordance with their reporting requirements. | 12/13 | 13/14 | 14/15 |



2.1.3 South Pacific Meats Limited

Consents

South Pacific Meats Limited holds three resource consents for the purpose of meat processing at its Awarua plant.

They are:

- to discharge stormwater containing contaminants into the New River estuary;
- to discharge contaminants to air from the rendering plant, wastewater treatment plant, boiler and associated processes;
- to discharge meat works effluent sludge to land.

South Pacific Meats Limited operates a meat processing plant at Awarua, approximately 10 km south of Invercargill.

What we look at

South Pacific Meats has three consents to discharge. Compliance is assessed against current resource consents.

Some key elements referred to are:

- **Total Nitrogen (TN)** – an important element in the growth of plant material. It is required for protein formation and consequently animals have a significant nitrogen content. Total Nitrogen is a measure of all nitrogen present.
- **Loading** - the quantity of contaminates discharged over a set period of time.

| Complaints and self-reported incidents | | | |
|---|-------|-------|-------|
| There was one odour complaint which was not confirmed by Environment Southland. | 12/13 | 13/14 | 14/15 |

| Consent performance | | | |
|--|-------|-------|-------|
| The plant was fully compliant with all of their consent conditions. Compliance was achieved with the Total Nitrogen loading limit for the discharge of sludge to land. | 12/13 | 13/14 | 14/15 |



2.1.4 Prime Range Meats Limited

Consents

Prime Range Meats Limited is in the process of reviewing how the treated effluent will be managed in the future and is currently operating under Rights of Continuance under section 124 of the Resource Management Act (RMA) 1991.

The expired consent allowed:

- a discharge up to 1500 m³/day of treated wastewater to the Waikiwi Stream, approximately 500 metres downstream of the West Plains Road Bridge.

The company also holds the following air discharge consent:

- to discharge contaminants to air from a meatworks and rendering plant, including a wastewater treatment system.

Prime Range Meats Limited is a meat processing plant on the banks of the Waikiwi Stream in Invercargill.

What we look at

Prime Range Meats is operating two consents to discharge. Compliance is assessed against current resource consents.

Key elements that are referred to are:

- **Particulate Matter** - the un-burnt material that is commonly discharged along with the gas or smoke from a fire or boiler;
- **Discharge Quality** - does the concentration, and loading, of contaminants in the treated wastewater comply with the consented limits?
- **Waikiwi Stream Quality** - have the concentrations in the Waikiwi Stream, downstream of the treated wastewater discharge, increased beyond the consented limits?

| Complaints and Self-reported Incidents | | | |
|--|-------|-------|-------|
| There were no complaints for the 2014/15 season. | 12/13 | 13/14 | 14/15 |

| Consent performance | | | |
|--|-------|-------|-------|
| Prime Range Meats Limited was fully compliant with all standards set out in its resource consent for the discharge of contaminants to water and air. There was a technical non-compliance due to the lateness of receipt of the annual report. | 12/13 | 13/14 | 14/15 |



2.2 Dairy Industry

2.2.1 Fonterra Co-operative Group Limited

Consents

Fonterra Co-operative Group Limited holds nine resource consents related to dairy processing at its Edendale Plant.

They include:

- to discharge wastewater to land;
- to take groundwater from bores;
- to discharge wastewater and stormwater to water;
- to discharge contaminants to air;
- to discharge sludge to land.

Fonterra Co-operative Group Limited operates a dairy processing facility in the Edendale township.

What we look at

Fonterra has nine consents to take and discharge. Compliance is assessed against these.

Complaints and self-reported incidents

Environment Southland recorded four self-reported incidents relating to the Edendale plant. Issues related to two accidental discharges to the stormwater collection system. The discharges were contained within this system and resulted in no discharge of contaminants to water. One incident of discharge to air occurred due to a failure in the system used to filter the air prior to discharge, and one of over-application of waste to land. Fonterra has addressed and resolved many of these issues with corrective actions currently being implemented for the remainder.

| Complaints and self-reported incidents | | | |
|---|-------|-------|-------|
| Environment Southland recorded four self-reported incidents relating to the Edendale plant. | 12/13 | 13/14 | 14/15 |

Consent performance summary

Fonterra has a consent to discharge solids removed from wastewater after treatment and whey onto farm pasture in Riversdale, Wyndham and Edendale.

Regular monitoring is undertaken to assess compliance with these consents. A high level of compliance was achieved with the only issue being reported that there was confusion between contractors and Fonterra, which led to crossover application on several pastures.



Fonterra fully investigated the incident and has now put measures in place to prevent any reoccurrence.

There were no issues arising from the monitoring of the air discharge consent.

Fonterra also has a consent to discharge treated wastewater, under certain conditions, as well as stormwater and cooling water to the Maitava River.

Regular monitoring is undertaken to assess compliance with this consent. A moderate level of compliance was achieved with ten issues reported:

- the total phosphorus concentration limit for stormwater discharges to the river was exceeded five times;
- the Total Suspended Solids concentration limit for stormwater discharges to the river was exceeded three times;
- biological oxygen demand and nitrogen concentration limits for stormwater discharges to the river were exceeded once;
- the consent requires that 95% of the stormwater discharged over a 12 month period complies with the TP loading limit. Only 92% of stormwater TP complied with the limit.

| Consent performance | | | |
|--|-------|-------|-------|
| Fonterra has a consent to discharge solids removed from wastewater after treatment and whey onto farm pasture in Riversdale, Wyndham and Edendale. A high level of compliance was achieved with only one issue reported. | 12/13 | 13/14 | 14/15 |
| Fonterra also has consent to discharge treated wastewater, under certain conditions, as well as stormwater and cooling water to the Maitava River. A moderate level of compliance was achieved with ten issues reported. | | | |



2.2.2 Open Country Dairy (NZ) Limited

Consents

Open Country Dairy holds two resource consents related to dairy processing at its Awarua Plant. They are:

- to discharge condensate to a farm drain;
- to discharge contaminants to the air from the milk processing plant and boiler.

Open Country Dairy (NZ) Limited operates a milk processing plant at Awarua, approximately 10 km south of Invercargill.

It has two consents to discharge, both of which are in the process of being varied.

What we look at

Compliance is assessed against the current resource consents.

Complaints and self-reported incidents

No complaints or self-reported incidents were received regarding operations at the Open Country Dairy (NZ) Limited plant.

| Complaints and self-reported incidents | | | |
|--|-------|-------|-------|
| No complaints or self-reported incidents were received regarding operations at the Open Country Dairy plant. | 12/13 | 13/14 | 14/15 |

Consent performance summary

Compliance was achieved for all limits set by this consent, with the following exception:

- one parameter on the discharge was in breach of consented limits. This limit is measured over three out of four sampling occasions.

| Consent performance | | | |
|--|-------|-------|-------|
| Compliance was achieved for all limits set by this consent, with only one exception. | 12/13 | 13/14 | 14/15 |



2.3 Energy Industry

2.3.1 Pioneer Generation Limited

Consents

Pioneer Generation Limited holds 20 resource consents for the ongoing operation and maintenance of the Monowai Station. The consents are for the ongoing operation and maintenance of the Monowai Power Station. They control the take, use and discharge of water for power generation, while maintaining minimum flows in all of the existing waterways.

These include:

- to take surface water;
- to use, maintain and alter an existing earth dam;
- to discharge water to water;
- to discharge contaminants to land;
- to dam and divert.

The power generation station at Monowai, owned by Pioneer Generation Limited, is a community owned electricity provider and wholesaler. The station was owned by Trust Power until 2003, when it was sold to Pioneer, which is owned by the Alexandra based charitable trust, The Central Lakes Trust. The company operates 13 power stations in Central Otago and Southland.

What we look at

Pioneer Generation Limited has 20 consents to operate their power generation scheme. Compliance is assessed against these consents.

Complaints and self-reported incidents

| | | | |
|---|-------|-------|-------|
| No incidents or complaints were received for the reporting period | 12/13 | 13/14 | 14/15 |
|---|-------|-------|-------|

Consent performance

| | | | |
|---|-------|-------|-------|
| Pioneer has achieved compliance with the Operating Guidelines for the management of Lake Monowai. | | | |
| The consented guideline flow regime was complied with on all but four days over the reporting period. The exceedances were due to heavy rainfall. | | | |
| Independent reviews of proposed fish pass monitoring programmes and effectiveness of fish passage are completed and approved | 12/13 | 13/14 | 14/15 |
| Compliance was achieved with all other consented monitoring and reporting requirements for the reporting period. | | | |



2.3.2 Meridian Energy Limited

Consents

Meridian Energy Limited holds 33 resource consents related to the operation of Manapouri Power Scheme.

They include:

- to dam and divert the waters for hydro-electric power generation
- to take and use water for hydro-electric production, and for domestic supplies
- to discharge treated sewage to land
- to discharge stormwater to land
- to carry out bed disturbance
- to discharge contaminants to air
- to discharge water and contaminants to the coastal marine area
- to occupy Lake Manapouri and coastal marine area with wharves.

Meridian Energy Limited operates the largest hydroelectric power station in New Zealand at West Arm, Lake Manapouri within the Fiordland National Park. Electricity is generated using water stored in Lakes Te Anau and Manapouri. The stored water from the lakes is controlled using structures at the outlet of Lake Te Anau and the Lower Waiau River. The water used to generate electricity is discharged through two tunnels to Deep Cove, Doubtful Sound. The compliance performance during the 2014/15 year was assessed against the current resource consents.

What we look at

Meridian Energy Limited has 33 consents to operate their power generation scheme. Compliance is assessed against these consents.

Complaints and self-reported incidents

There have been no occasions where compliance with consented flow conditions was not achieved for the reporting period.

| Complaints and self-reported incidents | | | |
|--|-------|-------|-------|
| Full compliance with all consent conditions has been achieved. | 12/13 | 13/14 | 14/15 |

Consent performance summary

Compliance was achieved with consented limits and was also achieved with consented monitoring and reporting requirements. No further issues arose in the 2014/15 year.

| Consent performance | | | |
|---|-------|-------|-------|
| Compliance was achieved with consented limits and was also achieved with consented monitoring and reporting requirements. | 12/13 | 13/14 | 14/15 |



2.4 Manufacturing Industry

2.4.1 New Zealand Aluminium Smelters Limited

Consents

NZ Aluminium Smelters Limited holds six discharge consents that require inspecting.

They include:

- discharge contaminants to land, including circumstances where they may enter coastal water;
- discharge treated sewage to land;
- discharge treated effluent into Foveaux Strait;
- discharge contaminants to air from the aluminium smelter and related activities;
- discharge Haysoms dross to the onsite landfill.

The New Zealand Aluminium Smelters Limited (NZAS) is located on the Tiwai peninsular at Awarua, Invercargill and produces some of the purest aluminium in the world.

What we look at

NZAS has six consents to discharge. Compliance during 2014/15 was assessed against the current resource consents.

Complaints and self-reported incidents

Environment Southland received one self-reported incident from NZAS during the 2014/15 year. These related to dust and smoke emissions due to bag house failure. Actions employed by NZAS were appropriate and timely. No complaints were received from the public for the period

| Complaints and self-reported incidents | | | |
|---|-------|-------|-------|
| Environment Southland received one self-reported incident relating to smoke and dust emissions between 2014/2015. | 12/13 | 13/14 | 14/15 |

Consent performance summary

NZAS remained fully compliant with consent limits during the reporting period.

Environment Southland granted an amendment to air discharge sampling in December 2014 to reduce sampling sites and test parameters. Granting of the amendment was based on exemplary compliance with all measured parameters.



Consent performance

NZAS remained fully compliant with consent limits during the reporting period.

12/13

13/14

14/15



Aluminium ingots awaiting transportation



2.4.2 Dongwha Patinna New Zealand Limited

Consents

Dongwha Patinna New Zealand Limited holds five resource consents for the manufacture of MDF. They are:

- to discharge contaminants to the air from fibreboard processing, including the treatment of wastewater;
- to discharge effluent and treatment pond seepage to land;
- to discharge untreated stormwater and treated wastewater to water;
- to discharge stormwater to land;
- to discharge from a tile drain to a watercourse.

Dongwha Patinna New Zealand Limited is a mixed density fibreboard (MDF) manufacturing plant, located south of the Maitua township.

What we look at

Dongwha Patinna has five consents to discharge. Compliance is assessed against these.

Some key elements referred to are:

- **Formaldehyde** - formaldehyde is an organic compound that is a by-product of the resins used to bind the MDF particles together.
- **Total Filterable Particulate Matter** - quantity of particles collected on a filter.

Complaints and self-reported incidents

One public incident relating to storage of material was received during the 2014/15 year and confirmed by Environment Southland staff. No odour complaints were received by either Environment Southland or Dongwha for the period.

| Complaints and self-reported incidents | | | |
|---|-------|-------|-------|
| One confirmed complaint was received by Environment Southland for the period. | 12/13 | 13/14 | 14/15 |

Consent performance summary

Dongwha was mostly compliant with standards set out in its resource consents. Minor issues relating to late provision of reports were noted. To date Dongwha has not exercised the consent that allows the discharge of treated wastewater to the Maitua River and has not indicated any intent to do so. Instead, all wastewater has been irrigated to land. Emission testing conducted in 2015 determined both formaldehyde and Total Filterable Particulate Matter levels remained significantly lower than consented limits.



| Consent performance | | | |
|--|--------------|--------------|--------------|
| <p>Dongwha was compliant with their consent conditions on all but one occasion during the 2014/15 reporting period.</p> <p>Emission testing conducted in March 2015 determined that both formaldehyde and Total Filterable Particulate Matter levels remained significantly lower than consented limits.</p> | 12/13 | 13/14 | 14/15 |



Dongwha site office



2.5 Fertiliser Industry

2.5.1 Ballance Agri-Nutrients Limited

Consents

Ballance Agri-Nutrients Limited holds three resource consents for its fertiliser manufacturing plant at Awarua. They are:

- to discharge treated and untreated stormwater from a fertiliser manufacturing, storage and dispatch facility;
- to take groundwater from bores;
- to discharge contaminants to air.

Ballance Agri-Nutrients Limited operates a fertiliser manufacturing facility at Awarua, about 10 km south of Invercargill.

What we look at

Ballance Agri-Nutrients Limited holds three consents. Compliance is assessed against the current resource consents.

Complaints and self-reported incidents

One incident was reported of an odour originating from the spillage of urea on the road. This was resolved. This incident was not related to the Ballance consent.

12/13

13/14

14/15

Consent performance

Ballance Agri-Nutrients has been fully compliant with all consent conditions.

12/13

13/14

14/15



2.5.2 Ravensdown Fertiliser Co-operative Limited

Consents

Ravensdown Fertiliser Co-operative Limited holds two resource consents for the purpose of operating a limestone quarry at its Dipton site. They are:

- to discharge treated stormwater to water;
- to discharge contaminants to air from the Dipton lime works.

The company holds one resource consent for its Balfour site, which is:

- to discharge stormwater from a limestone quarry at Balfour.

Ravensdown Fertiliser Co-operative Limited operates two limestone quarries in Southland, one at Dipton and the other at Balfour.

What we look at

Ravensdown operates two sites and holds three consents to discharge. Compliance is assessed against the current resource consents.

| Complaints and self-reported incidents | | | |
|--|-------|-------|-------|
| No complaints were received from the public relating to the consents or operations at the limestone quarries by Environment Southland over the 2014/15 period. | 12/13 | 13/14 | 14/15 |

| Consent performance | | | |
|--|-------|-------|-------|
| The Ravensdown sites at Dipton and Balfour met all the requirements set out in its consents. | 12/13 | 13/14 | 14/15 |



2.6 Mining Industry

2.6.1 Solid Energy New Zealand Limited

Solid Energy New Zealand Limited operates three mines in Southland at Ohai and Waimumu (New Vale, Goodwin). In Maitua it also manages a briquetting plant and a disused mine pit. The compliance performance of Solid Energy's sites during the 2014/15 year was assessed against current resource consents.

What we look at

The consents issued for Solid Energy's mines allow the discharge of treated mine water and stormwater. The mines also hold consents for the discharge of contaminants to air and ash to land. The quantity that can be discharged is restricted by the consent and compliance with these requirements being audited.

| | |
|---|--|
| <p>Goodwin and New Vale Mine Sites</p> | <p>Consents</p> <p>Solid Energy New Zealand Limited holds four consents for mining activity at the Goodwin and New Vale mine sites. They include:</p> <ul style="list-style-type: none"> to discharge ash to land from the operation of a lignite mine into both mine sites; to discharge contaminants to the air from the mining, crushing, screening and stockpiling of lignite. <p>Applications to renew expired consents are currently being processed.</p> |
|---|--|

The Goodwin and New Vale Mine sites at Waimumu have met all requirements set out in the consents.

| Complaints and self-reported incidents | | | |
|--|-------|-------|-------|
| No complaints or self-reported incidents were received regarding the sites at Waimumu. | 12/13 | 13/14 | 14/15 |

| Consent performance | | | |
|---|-------|-------|-------|
| Both the Goodwin and New Vale Mine sites have met all requirements set out in the consents. | 12/13 | 13/14 | 14/15 |



Ohai Mine Site

Consents

Solid Energy New Zealand Limited holds nine consents for mining activities at the Ohai site. They include:

- to discharge contaminants to air from mining, screening and stockpiling of coal;
- to discharge treated mine water and stormwater to Morley Stream.

Complaints and self-reported incidents

One self-reported incident was received regarding the Ohai Mine relating to discharge of water from an old mine shaft. This incident was not consent related. Daily and weekly monitoring was employed by Solid Energy to determine impacts to Morley Stream. Results show the discharge was having no impact on the waterway.

| Complaints and self-reported incidents | | | |
|--|-------|-------|-------|
| One self-reported incident was received regarding the Ohai site. This was resolved. This incident was not consent related. | 12/13 | 13/14 | 14/15 |

| Consent performance summary | | | |
|--|-------|-------|-------|
| Ohai mine has met all the obligations of its consents. | 12/13 | 13/14 | 14/15 |



Mataura Sites

Consents

Solid Energy holds 10 consents in the Mataura area. Six are associated with the briquetting plant, one with the abstraction of surface water for mine operations and three with the dewatering of the disused mine pit. They include:

- to discharge contaminants to the air including boiler emissions;
- to take surface water from the Mataura mine pit;
- to discharge water and boiler blow-down water to a former mine pit.

The briquette plant ceased operations at the end of September 2013, however Solid Energy remains committed to following its environmental monitoring programme and continues to supply results to Environment Southland as required by its consents.

Complaints and self-reported incidents

No complaints or self-reports were received by Environment Southland for the period.

| Complaints and self-reported incidents | | | |
|---|-------|-------|-------|
| No complaints or self-reported incidents were received by Environment Southland for the period. | 12/13 | 13/14 | 14/15 |

Consent performance summary

Solid Energy is committed to continuing testing requirements of its resource consents. Sample results show no impacts on waterways from historic activities.

| Consent performance | | | |
|---|-------|-------|-------|
| No complaints or self-reported incidents were received regarding the Mataura briquette plant. | 12/13 | 13/14 | 14/15 |



2.6.2 Takitimu Coal Limited

Consents

Takitimu Coal Limited holds 13 consents for mining activities at the Company Road and Coal Dale sites at Nightcaps. They include:

- to discharge coal ash from industrial operations, mixed with overburden, to land;
- to discharge treated site water to the Wairio Stream;
- to discharge contaminants to air.

Takitimu Coal Limited operates two mines at Nightcaps – Company Road and Coal Dale. The Coal Dale site has recently commenced operations and has yet to exercise its water discharge consents.

The compliance performance for Takitimu Coal during 2014/15 was assessed against current resource consents.

What we look at

The consents issued for Takitimu Coal's mines allow the discharge of treated site water into the nearby Wairio Stream. The mines also hold consents for the discharge of contaminants to air and ash to land. The quantity they can discharge is restricted by the consent and compliance with these requirements is audited.

| Complaints and self-reported incidents | | | |
|--|-------|-------|-------|
| Environment Southland received an anonymous complaint relating to discolouration of the Wairio Stream. Investigations were conducted. It was found that the sediment levels had increased due to a significant rainfall, causing a landslip, resulting in the visual clarity of the stream at McGregor Park being affected. This was not related to activities on the Takitimu site. | 12/13 | 13/14 | 14/15 |

| Consent performance | | | |
|---|-------|-------|-------|
| Takitimu Coal Ltd was mostly compliant with all standards set out in its resource consents for discharges to land, air and water. Issues relating to flow meter data collection were noted and addressed by the mine. The flow meter is in the process of being relocated to a more suitable site in an effort to mitigate the issue. There are no adverse effects on the surrounding environment relating to this issue. | 12/13 | 13/14 | 14/15 |



2.7 Sawmill Industry

There are four sawmill companies in Southland that hold resource consents for discharge purposes. They are at Otautau, Winton, Ryal Bush and Tuatapere. Their compliance performance during 2014/15 was assessed against the current resource consents.

What we look at

Environment Southland audits the water sampling results for levels of metals, which in high concentrations can be toxic to aquatic life.

- **CCA Metals (timber treatment)** - Arsenic (As), Chromium (Cr) and Copper (Cu) are the usual metals analysed for when considering the timber treatment process;
- **Total Particulate Matter** - the unburnt material that is commonly discharged with the gas or smoke from a fire or boiler.

2.7.1 Craigpine Timber Limited

Consents

Craigpine Timber Limited holds two discharge consents that require inspection. They are:

- to discharge contaminants to the air from timber processing activities;
- to discharge timber yard stormwater and condensate to water.

Craigpine Timber Limited operates a sawmilling plant at Winton.

What we look at

Craigpine Timber Limited has two consents to discharge. Compliance is assessed against current resource consents.

Complaints and self-reported incidents

No public complaints.

12/13

13/14

14/15

Consent performance

Compliance with consent conditions was achieved for the reporting period. Craigpine Timber Limited has made process changes in order to help achieve a higher quality stormwater discharge.

The discharge quality from the Craigpine Timber Limited treatment plant at Winton has shown an improvement. On one occasion the level of metals exceeded the ANZECC guidelines, however the exceedance did not breach the consent limit. Results from samples taken from Marshall Creek were within normal limits.

The required boiler emissions report showed full compliance for the 2014/15 year.

12/13

13/14

14/15



2.7.2 Findlater Sawmilling

Consents

Findlater Sawmilling holds one discharge consent that requires inspection. The consent is to:

- discharge treated stormwater and wastewater to a wetland from a sawmilling operation.

The Findlater Sawmilling Limited operates a sawmilling plant at Ryal Bush.

What we look at

Findlater Sawmilling Limited has one consent to discharge. Compliance is assessed against the current resource consent.

| Complaints and self-reported incidents | | | |
|---|-------|-------|-------|
| No complaints or self-reported incidents were received regarding the Findlater Sawmilling facility. | 12/13 | 13/14 | 14/15 |

| Consent performance | | | |
|---|-------|-------|-------|
| There were no issues arising in the 2014/15 year. | 12/13 | 13/14 | 14/15 |

2.7.3 Lindsay & Dixon Limited

Consents

Lindsay & Dixon Limited is located in Tuatapere and holds two discharge consent that require inspection. these are:

- to discharge settling pond sludge to land from a sawmilling and timber processing site;
- to discharge stormwater to water.

Lindsay & Dixon Limited operate a sawmilling plant at Tuatapere.

What we look at

Compliance is assessed against conditions in the two discharge consents.

| Complaints and self-reported incidents | | | |
|---|-------|-------|-------|
| No incidents or complaints have been received for the 2014/15 period. | 12/13 | 13/14 | 14/15 |

| Consent performance | | | |
|---|-------|-------|-------|
| Water and sediment monitoring was carried out on 4 February and 26 March 2015. Results from the samples were fully compliant with consent conditions. | 12/13 | 13/14 | 14/15 |



3.0 Sewage Treatment Systems

3.1 Invercargill City Council

Consents

The Invercargill City Council holds 11 discharge consents. They include consents to:

- discharge treated wastewater to an estuary;
- discharge contaminants to land;
- discharge biosolids to land;
- discharge stormwater and wastewater to land;
- discharge processed wastewater to coastal water.

The Invercargill City Council (ICC) holds resource consents for discharging treated sewage at three locations: Clifton, Omaui and Bluff. The Council also discharges biosolids (dried sludges from the sewerage system) to land at Station Road and Sandy Point. The compliance performance during 2014/15 was assessed against current resource consents.

What We Look At

As part of the consent requirements for the ICC, the quantity of effluent being discharged and the quality of the effluent and its receiving waters are assessed.

Complaints and Self-reported Incidents

A total of five incidents were investigated between July 2014 and June 2015. One was received from the public, while four were self-reported. The incidents all related to sewage discharges. All were investigated by Environment Southland.

Consent Performance

| Bluff Wastewater | | | |
|---|-------|-------|-------|
| Monitoring has complied with consent conditions for 2014/15. | | | |
| ICC self-reported one incident of a burst sewer pipe in the area of Bluff and was investigated. This incident was remote from the Treatment Plant and not related to the consent. | 12/13 | 13/14 | 14/15 |

| Clifton Wastewater | | | |
|--|-------|-------|-------|
| Monitoring has complied with consent conditions for 2014/15. There has been technical non-compliance with this consent due to results not being received within the timeframes required. | | | |
| ICC self-reported two sewage related incidents within the Invercargill City boundary. These incidents were resolved and were remote from the Treatment Plant and therefore not related to the consent. | 12/13 | 13/14 | 14/15 |



| Omaui Wastewater | | | |
|--|-------|-------|-------|
| No issues arose during the 2014/15 year. Monitoring was required this season and was compliant with consents conditions. | 12/13 | 13/14 | 14/15 |

| Sandy Point Biosolids to Land | | | |
|--|-------|-------|-------|
| No issues arose during the 2014/15 year. | 12/13 | 13/14 | 14/15 |
| Notification of commencement date was received. The annual report is still to be received. | 12/13 | 13/14 | 14/15 |

| Station Road Biosolids to Land | | | |
|--|-------|-------|-------|
| No issues arose during the 2014/15 year. | 12/13 | 13/14 | 14/15 |
| This consent has expired. Application for new consent has begun. | 12/13 | 13/14 | 14/15 |



3.2 Southland District Council

Consents

The Southland District Council holds 19 discharge consents, including consents to:

- discharge processed wastewater to land;
- discharge processed wastewater to water;
- discharge processed wastewater to coastal water.

The Southland District Council (SDC) holds resource consents for the purpose of treating and discharging sewage at 18 locations within the Southland region. The compliance performance during 2014/15 was assessed against current resource consents.

What we look at

The quantity of water being discharged and quality of the effluent and receiving waters are assessed.

Some key elements referred to are:

- ***cBOD₅*** - Carbonaceous Biochemical Oxygen Demand – a measure of the ability of contaminants to remove oxygen from water.
- ***Total Phosphorus*** – Phosphorus is an important element in the growth of plant material. Total Phosphorus is a measure of all phosphorus present, including all forms of phosphorous whether it is tightly bound to particulate matter or potentially available to plant life.
- ***Total Nitrogen*** – an important element in the growth of plant material. It is required for protein formation and consequently animals have a significant N content.
- ***Dissolved Inorganic Nitrogen*** – Nitrate + Nitrite Nitrogen plus Ammoniacal Nitrogen.
- ***Dissolved Oxygen (DO)*** – oxygen is important to sustain life. Dissolved Oxygen is the amount of oxygen dissolved in water.
- ***Faecal Coliforms*** – sub group of total coliforms. Coliforms generally originate from the gut of warm blooded animals indicator of faecal contamination. Adhere to solid particles so the removal of particles can reduce Faecal Coliforms in sample.
- ***E. coli*** - Escherichia coli - *E.coli* is a bacterium that is commonly found in the lower intestine of warm-blooded organisms. They are a subset of the Faecal Coliform group and are regarded as an indicator of faecal



contamination and therefore the presence of pathogenic (harmful) bacteria.

Consent Performance

| | | | |
|--|-------|-------|-------|
| Balfour | | | |
| One exceedance of consented limits on one sampling occasion was reported. Compliance was achieved for the monitoring requirements and all other limits specified by this consent. | 12/13 | 13/14 | 14/15 |
| Browns | | | |
| Compliance was achieved with consented limits and monitoring requirements. | 12/13 | 13/14 | 14/15 |
| Edendale/Wyndham | | | |
| Full compliance was achieved with the effluent quality and impact on the receiving environment. Compliance with both the consented average daily flow and maximum flow limits was achieved. | 12/13 | 13/14 | 14/15 |
| Gorge Road | | | |
| There were no breaches of consented limits for the reporting period. Compliance was achieved with all consented limits and monitoring requirements. | 12/13 | 13/14 | 14/15 |
| Lumsden | | | |
| Compliance was achieved with consented effluent quality and reporting requirements for the 2014/15 period. However, there were 25 breaches of the discharge flow limits. | 12/13 | 13/14 | 14/15 |
| Manapouri | | | |
| Compliance was achieved with consented effluent quality limits and reporting requirements for the 2014/15 period. Compliance was also achieved with consented flow limits for the same period. | 12/13 | 13/14 | 14/15 |
| Monowai | | | |
| The consented faecal coliform limit was exceeded on one monitoring occasion for the 2014/15 reporting period. Compliance was achieved with all other consented limits and monitoring requirements for the same period. | 12/13 | 13/14 | 14/15 |
| Nightcaps | | | |
| Compliance was achieved with consented effluent quality limits and reporting requirements for the oxidation pond discharge for the 2014/15 reporting period. However, there were 20 breaches of the discharge flow limits for the same period. | 12/13 | 13/14 | 14/15 |



| Ohai | | | |
|---|-------|-------|-------|
| The DO concentration in the receiving waters fell outside the consent limit on one out of four sampling occasions for the 2014/15 reporting period. There have been a total of 13 breaches of the daily water abstraction limit. Compliance was achieved with all other consented limits and monitoring requirements. Southland District Council is waiting on an amendment to the consent. | 12/13 | 13/14 | 14/15 |

| Otautau | | | |
|---|-------|-------|-------|
| Compliance was achieved with consented effluent quality limits and reporting requirements for the 2014/15 period. | 12/13 | 13/14 | 14/15 |

| Riversdale | | | |
|--|-------|-------|-------|
| Compliance was achieved with consented limits and monitoring requirements for the oxidation pond discharge for the 2014/15 reporting period. There have been a total of 67 breaches of discharge flow limits for the same period. Not all exceedances relate to wet weather conditions. A new consent application has been lodged and is currently being considered. | 12/13 | 13/14 | 14/15 |

| Riverton Rocks | | | |
|---|-------|-------|-------|
| The consented daily discharge limit was exceeded four times. Compliance was achieved with all other consented limits and monitoring requirements for 2014/15. | 12/13 | 13/14 | 14/15 |

| Riverton Township | | | |
|---|-------|-------|-------|
| Compliance was achieved with consented effluent quality limits and reporting requirements for the 2014/15 period. However, the consented daily discharge limit was breached eleven times. | 12/13 | 13/14 | 14/15 |

| Stewart Island | | | |
|---|-------|-------|-------|
| Compliance was achieved with consented limits and monitoring requirements for the 2014/15 reporting period. Compliance was also achieved with consented flow limits. No issues arose during the reporting period. | 12/13 | 13/14 | 14/15 |

| Te Anau | | | |
|---|-------|-------|-------|
| Routine monitoring results showed that the trigger value (initiating additional reporting) for the concentration of Dissolved Inorganic Nitrogen in the lake water was exceeded on two monitoring occasions. There was no corresponding exceedance of either Dissolved Inorganic Nitrogen or Dissolved Reactive Phosphorous in samples collected downstream of the discharge on any of those monitoring occasions. Compliance was achieved with consented limits and monitoring requirements for the 2014/15 reporting period. Compliance was also achieved with consented flow limits. | 12/13 | 13/14 | 14/15 |

| Tokonui | | | |
|---|-------|-------|-------|
| Compliance was achieved with consented effluent quality limits and reporting requirements for the 2014/15 period. However, the maximum daily wastewater flow limit was exceeded on ten occasions. | 12/13 | 13/14 | 14/15 |



| Tuatapere | | | |
|---|-------|-------|-------|
| The <i>E.coli</i> limit in the receiving environment exceeded the consent limit at both the up and downstream sites on one monitoring occasion during 2014/15. The exceedance was not due to the discharge therefore was not a breach of consent. Compliance was achieved with consented flow limits. | 12/13 | 13/14 | 14/15 |

| Winton Sewage | | | |
|---|-------|-------|-------|
| Compliance was achieved with all consented limits and monitoring requirements. No other issues arose during the 2014/15 reporting period. | 12/13 | 13/14 | 14/15 |



3.3 Gore District Council

Consents

The Gore District Council holds three resource consents for discharging treated sewage. They include consents to:

- discharge processed wastewater to water;
- discharge contaminants to air.

The Gore District Council holds resource consents for discharging treated sewage. The compliance performance during 2014/15 was assessed against the current resource consents.

What We Look At

As part of the consent requirements for Gore District Council, the quantity of water being discharged and the quality of the effluent and receiving waters are assessed.

Some key elements referred to are:

- ***Dissolved Reactive Phosphorus (DRP)*** - a form of phosphorus that is readily available to plants to sustain growth. High levels of phosphorus and nitrogen in receiving waters can promote the growth of nuisance weeds in waterways.
- ***Ammoniacal Nitrogen (NH₄-N)*** - rarely found at high levels in natural waters. Its presence is an excellent means of detecting pollution. It is a major component in urine excreted by mammals. High levels of ammoniacal nitrogen are potentially toxic to aquatic life.
- ***Total Suspended Solids (TSS)*** - very small particles that have the potential to affect the colour and clarity of a waterway and can potentially settle out onto a streambed smothering aquatic life in waterways.
- ***Escherichia coli (E. coli)*** - bacterium that is commonly found in the lower intestine of warm-blooded organisms. They are a subset of the faecal coliform group and are regarded as an indicator of faecal contamination and therefore the presence of pathogenic (harmful) bacteria.
- ***Carbonaceous Biochemical Oxygen Demand (cBOD₅)*** – a measure of the ability of contaminants to remove oxygen from water.

Complaints and Self-reported Incidents

Two self-reported incidents were received regarding the community sewerage system at Gore. Incidents related to plant equipment malfunctions.



Consent Performance

| Gore | | | |
|---|-------|-------|-------|
| All measured parameters for both discharge and receiving waters were compliant for the 2014/2015 year | 12/13 | 13/14 | 14/15 |

| Mataura | | | |
|---|-------|-------|-------|
| Five samples were collected between July 2014 and April 2015. Of these, four were collected prior to granting of amendments to the discharge consent in March 2015. The NH ₄ -N concentration in the effluent exceeded the consent limit on 1 out of 4 sampling occasions. The DRP concentration in the effluent exceeded the consent limit on 3 out of 4 sampling occasions. The TSS concentration in the effluent exceeded the consent limit on 1 out of 4 sampling occasions. The quality in the receiving water was fully compliant during the reporting period. | 12/13 | 13/14 | 14/15 |

| Waikaka | | | |
|---|-------|-------|-------|
| Information provided for the 2014/15 period showed all measured parameters remained within consent limits. However issues with flow data recording for the previous three years have led to significant non-compliance. Flow meter data issues are ongoing and council is considering appropriate action. | 12/13 | 13/14 | 14/15 |



4.0 Quarrying

4.1 Gravel Extraction

The Resource Management Act 1991 and/or a rule in a Council plan require that a resource consent is necessary to disturb the bed of a river.

Environment Southland currently has 162 land use consents to extract gravel from Southland rivers. During the 2014/15 financial year Environment Southland granted 17 new/renewals to extract up to a total of 423,330 m³ of gravel. Of these 17 consents six are yet to commence being exercised.



Aparima River at Jacobs Bridge, new channel excavation and gravel extraction

Consent holders are required to advise the Council prior to commencement and upon completion of works and to keep a record of all gravel removed under the terms of their consent (removed is defined as taken and may be placed into storage or immediately processed). In 2014/15 Environment Southland received monthly returns for a total of 208,615 m³ of gravel that was extracted.

Environment Southland continued to undertake its monitoring programme this year, including resource assessment surveys and an analysis of the main stems of the Oreti and Mataura rivers. There were no major channel forming, river events in the last financial year.



5.0 Landfills

5.1 S J Timpany Cleanfill

Consents

S J Timpany holds two resource consents, however only the second consent requires inspection. They are:

- to discharge cleanfill to land;
- to discharge solid waste to land.

S J Timpany operates a cleanfill and a limited-scope landfill accepting solid waste from the demolition of housing and commercial buildings, asbestos and some contaminated soils at its Otatara site. The site also has a holding pad which allows for sample testing of contaminated soils and encapsulation of contaminants prior to discharge.

What we look at

S J Timpany has two consents to discharge. Compliance is assessed against the current resource consents.

| Complaints and self-reported incidents | | | |
|---|-------|-------|-------|
| No complaints or self-reported incidents were received regarding the S J Timpany Cleanfill. | 12/13 | 13/14 | 14/15 |

| Consent performance | | | |
|---|-------|-------|-------|
| S J Timpany was fully compliant with all the standards set out in its discharge consents. | 12/13 | 13/14 | 14/15 |



Holding pad for retaining contaminated soils for sampling and encapsulation of contaminants.



5.2 AB Lime Landfill

Consents

AB Lime Limited holds six resource consents. They are:

- to discharge stormwater to a tributary of the Lochiel Stream;
- to discharge solid waste onto or into land;
- to discharge contaminants to air from a landfill;
- to take ground and surface water for landfill operations.

AB Lime operates an agricultural fertiliser and lime business and a Class A landfill business about 4 km east of the Winton township.

What we look at

AB Lime Limited has six consents to operate their landfill. Compliance is assessed against current resource consents.

Complaints and self-reported incidents

AB Lime received one odour complaint regarding the operation of the landfill. The presence of an odour was not confirmed by AB Lime at the time. A new deodorising unit is working well and planting around the current working cell bund has been actioned.

One incident was reported to Environment Southland by AB Lime in August 2014 relating to water vapour in fresh gas. An automatic release valve was added to the system to rectify the issue.

| Complaints and self-reported incidents | | | |
|--|-------|-------|-------|
| One non confirmed odour complaint was received by AB Lime and one self-reported incident related to gas vapour was rectified in a timely manner. | 12/13 | 13/14 | 14/15 |

Consent performance summary

Peer review was conducted in March 2015 with no major issues identified. Area 13 stage 2 (the new landfill cell) has received final sign off.

| Consent performance | | | |
|---|-------|-------|-------|
| AB Lime was compliant with all standards set out in its resource consents for discharges to land, air and water, with minor issues noted relating to timeliness of reporting. | 12/13 | 13/14 | 14/15 |



6.0 Coastal Marine Area

6.1 South Port and New Zealand Aluminium Smelter Limited's Coastal Plan Agreements

Southland's port facilities operate out of Bluff and are divided into two separate operations:

- the import and export operations based in Bluff township, managed by South Port;
- the import and export operations based on the Tiwai Peninsula, servicing and managed by New Zealand Aluminium Smelter Limited (NZAS).

Activities on these sites are managed by means of individual agreements, as allowed for in the Regional Coastal Plan for Southland. The agreements describe a series of systems which each party has agreed to abide by, to ensure that the management of port activities are compliant with the Resource Management Act 1991.

Any issues are addressed at an annual meeting, held to address any outstanding matters.

At both the NZAS and South Port meetings, all:

- on-site incidents and remedial action taken is tabled and discussed;
- maintenance programmes for the coming 12 months are discussed;
- monitoring conducted over the previous 12 months is tabled;
- procedural issues that may have arisen out of the agreement over the previous 12 months are discussed.

Incidents Reported

South Port

Two incidents were reported that may have been linked to activities at the port:

- one incident report was for a potential oil slick being discharged from a vessel as it was being moved. This was investigated, but no slick was observed and the source of any discharge was not confirmed;
- the second reported incident was associated with palm kernel being discharged to Bluff harbour during the unloading of a large vessel. Dust was observed during the unloading process, but no visible sign of a slick was observed in the harbour.

NZAS Wharf

Environment Southland received no incident reports for the NZAS wharf.



6.2 Whitebait Stands



Whitebait stands on the Pourakino River.

Environment Southland is responsible for whitebait stands under the Coastal Plan, and undertakes an annual inspection of these each year. Huts associated with the stands are controlled by the Southland District Council, while the Department of Conservation control the fishing of whitebait.

The Coastal Plan for Southland has set a limit on the number of whitebait stands in Southland at those that were occupied at 15 February 1997. Any new whitebait stands are prohibited.

In 2014/15 Environment Southland began removing illegal stands that had been identified from the previous year's inspections. During the inspections, additional illegal stands were located and notification was left attached to these stands for the owners to contact Environment Southland.

Whitebait stands were inspected towards the end of the season, which allowed owners additional time for repairs. It was noted that there was a high level of compliance with these consents.



6.3 Coastal Surface Water Activities in Fiordland

Coastal permits are required for undertaking commercial activities on surface water bodies in Fiordland.

Environment Southland is responsible for ensuring compliance with conditions of coastal permits that have been issued according to the Resource Management Act 1991 and rules in the Regional Coastal Plan for Southland. This is achieved firstly by monitoring activity logs submitted by permit holders. There has been a high level of compliance with this requirement during 2014.

In 2015, two patrols were conducted, with the purpose of providing a physical 'on the water' presence in Fiordland, and also to provide an opportunity for face-to-face interactions with consent holders, recreational users and commercial users of the marine environment. One patrol was conducted in Chalky and Paterson's inlet, and another in the lower Fiordland area, from Doubtful Sound south, in conjunction with the Ministry of Fisheries and the Department of Conservation.

During a patrol in April 2015, nine coastal structures were inspected, and staff spoke to the owners of nine non-commercial private vessels, eight commercial vessels, and four commercial fishing vessels. Staff gave advice and education and noted no non-compliance during this visit.

Future patrols are considering the inclusion of Milford Sound.



Inspection of a vessel in Fiordland.



7.0 Crown Agencies

7.1 Department of Conservation

Consents

The Department of Conservation holds resource consents for the following purposes:

- coastal - 16
- discharge - 33
- land use - 27
- water - 18

The Department of Conservation (DOC) holds 94 current resource consents, however the majority of these consents have either not been exercised during 2014/15, or do not have inspection conditions attached to them.

The main consents exercised were for discharge along the Milford, Kepler and Routeburn tracks. These consents relate to the disposal of sewage and wastewater from the huts along the tracks.

What do we look at?

On the Milford, Kepler and Routeburn tracks the Department of Conservation has 10 discharge consents. Compliance is assessed against these consents.

Complaints and self-reported incidents

| Complaints and self-reported incidents | | | |
|---|-------|-------|-------|
| No complaints or self-reported incidents were received regarding the Milford, Kepler or Routeburn tracks. | 12/13 | 13/14 | 14/15 |

Consent performance summary

| Consent performance | | | |
|--|-------|-------|-------|
| No issues arose during the 2014/15 year at any of the following locations: | | | |
| <ul style="list-style-type: none"> • Clinton Hut • Mintaro Hut • Dumpling Hut • Sandfly Point • Luxmore Hut • Iris Burn Hut • Moturau Hut • McKenzie Hut • Howden Hut • Pit or containment toilets | 12/13 | 13/14 | 14/15 |





Iris Burn Hut discharge holding tanks.



Moturau Hut discharge pipes.



8.0 Small Consented Activities

8.1 Cleanfill Sites

Cleanfill sites are spread throughout Southland. There are 25 consented sites in total, with three not currently in use.

Cleanfills are a landfill that only accepts materials that, when buried, have no adverse effects on people or the environment. Cleanfill materials include virgin natural materials such as clay, soil, rock, and other inert materials such as bricks.

It is important that cleanfills are free from combustible, degradable, hazardous or liquid wastes because they are not designed to protect the environment from contact with them in the same way as landfills. Appropriate use of cleanfills helps divert a large portion of the waste stream from landfills.

During 2014/15, 15 inspections were completed and seven are pending. One site was found to have unauthorised materials in the form of demolished housing, making them non-compliant.



An example of green waste which is not allowed to be discharged to a cleanfill.



8.2 Truck Wash Inspections

Truck washes are usually inspected annually, unless otherwise stated in the resource consent. There are 22 consented truck washes in Southland. Of these 20 were found to be fully compliant, one was non-compliant and one did not require an inspection during the 2014/15 year.



Example of good practice at Northern Southland Transport's truck wash.



Part B

Incident Response

9.0 Incidents

There was a further decrease in incidents reported to Environment Southland in this year compared with the previous two years. There were 617 incidents recorded which was 95 less incidents reported than in 2013/14 (712 incidents).

The costs involved in attendance and investigation of an incident are charged where an offending party can be identified. Unfortunately the removal of litter, rubbish and dead stock from waterways has little chance of being linked its owner.

Currently Environment Southland has six officers covering the after-hours call out roster. When called upon to attend an incident after hours, all officers have to determine whether or not they will attend based on several factors.

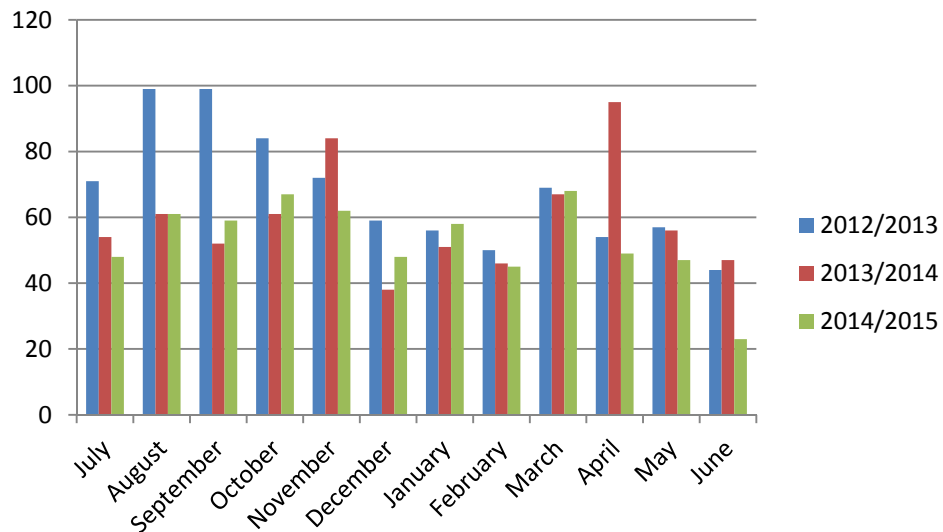


Figure 10 - Reported incidents per month compared over three years.

Incidents have many sources. Most incidents are completed within a very short time frame following a callout; however some can lead to in-depth investigations that can span many months.

Incidents are assigned a priority from one hour for urgent matters, to six months for matters with low environmental impacts. Priorities are determined by taking into account several factors such as potential harm to the environment, the need for evidence collection and the receiving environment.

Figure 11 represents the high, medium and low priority response times for incidents from the 2014/15 year compared to previous years.



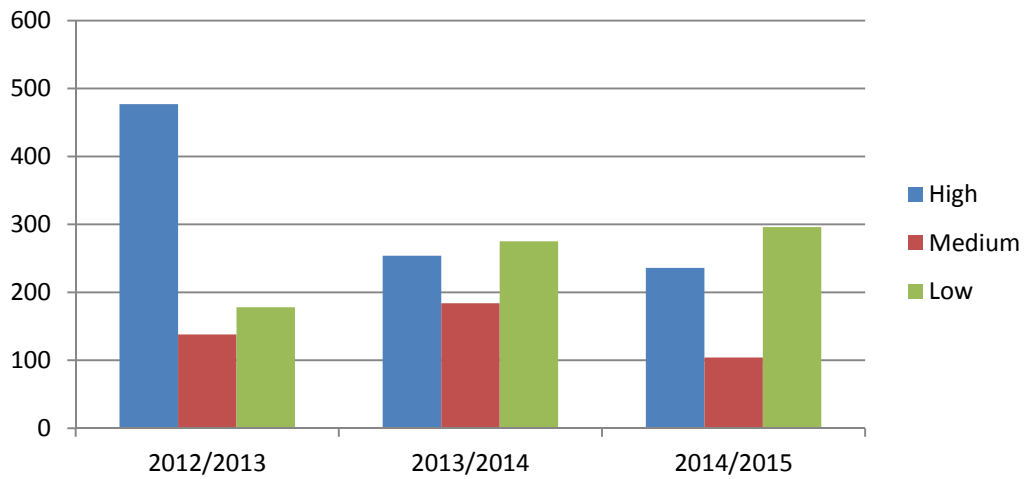


Figure 11 - Priority response category compared to previous years

Incidents have the ability to change and fluctuate from one year to another due to things like extreme weather events, new laws, new industry. It is, however, pleasing to see that the total number of reported incidents is declining.



Part C

Enforcement

10.0 Enforcement

Enforcement is a necessary, albeit regrettable part of the administration and implementation of the law. For many, enforcement is more closely associated with the police and law courts, however other organisations (including Environment Southland) have statutory roles and responsibilities with regard to the enforcement of specific laws.

The enforcement tools available to the compliance division range from official warnings, infringement notices, abatement notices, enforcement orders and prosecution.

In most cases where an inspection of an incident occurs, the costs associated can be recovered.

10.1 Infringement Notices

The Environment Southland Compliance Division takes a measured approach when responding to offences.

An infringement notice imposes a relatively minor penalty and does not result in a conviction. Hence, it provides less deterrence, and should be used in cases where there are minor impacts on the environment.

The Resource Management Act infringement notice requires a detailed investigation as it can be disputed in court. The penalty for an infringement notice is relatively small (\$300-\$1,000) compared to prosecution penalties.

During the 2014/15 year, there were 26 formal warnings and 34 infringement notices issued, which is a slight decrease on the previous year when 39 infringement notices were issued (Figure 12).



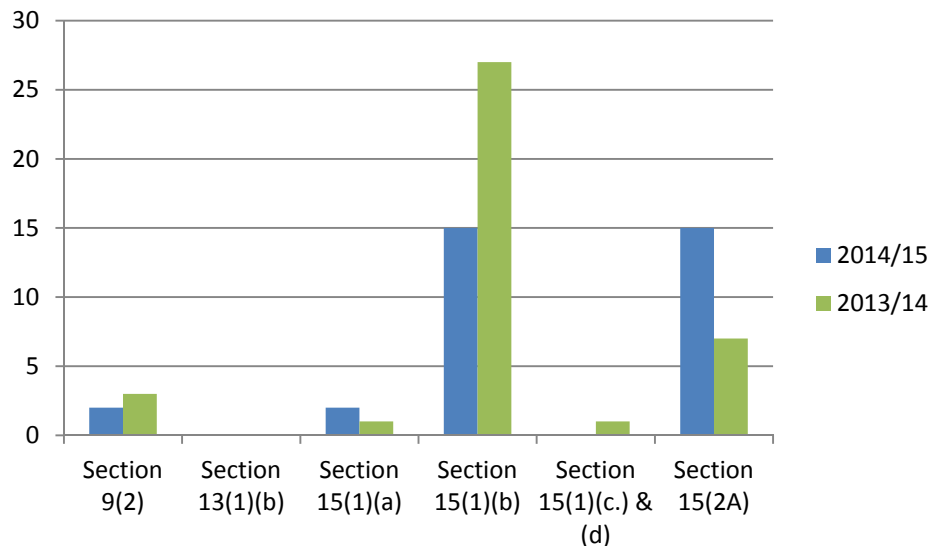


Figure 12 – Reasons for infringement notices issued comparing 2013/14 and 2014/15.

| | |
|-------------------------|--|
| Section 9 | Restrictions on use of land |
| Section 13 | Restriction on certain uses of beds of lakes and rivers |
| Section 15 (1)(a) | Discharge of contaminant or water into water |
| Section 15(1)(b) | Discharge of contaminant onto or into land in circumstances which may result in that contaminant entering water |
| Section 15 (1)(c) & (d) | Contaminant from any industrial or trade premises into air; or Contaminant from any industrial or trade premises onto or into land |
| Section 15(2A) | Discharge of a contaminant into the air, or into or onto land, from a place or any other source, whether moveable or not, in a manner that contravenes a regional rule |

10.2 Abatement Notices

An abatement notice requires compliance with the Resource Management Act (RMA) within the time specified in the notice. Only councils can issue these to get someone to stop or to start doing something. They are issued to people or organisations who breach a rule in the RMA, any regulations, or a resource consent. Unlike enforcement orders they are issued by compliance officers and do not require an application to be made to the Environment Court.

During the 2014/15 year, 21 abatement notices were issued. The majority of these were complied with, leading to a better outcome for both Environment Southland and the recipient.



10.3 Prosecutions

Prosecutions will only be initiated where the council is satisfied that the test for prosecution is met.

The test for prosecution is met if:

- the evidence which can be presented in court is sufficient to provide a reasonable prospect of conviction – the Evidential Test; and
- prosecution is required in the public interest – the Public Interest Test.

Each aspect of the test must be separately considered and satisfied before a decision to take prosecution action.

The council must analyse and evaluate all of the evidence and information in a thorough and critical manner and receive legal opinions before proceeding.

The matters that were prosecuted and completed in the 2014/15 year were:

R vs Kevin John Singh Belling

Mr Belling was charged with discharging effluent in circumstances where it may enter water.

Mr Belling received a \$48,000 fine for the discharge of effluent.

Southland Regional Council vs Allan Bruce Miller and Glendownes Dairy Farm Limited

Mr Miller and Glendownes Dairy Farm Limited were charged with six charges relating to three dairy farms for various unlawful discharge offences.

Mr Miller and Glendownes Dairy Farm Limited both received \$45,000 fines and were ordered to pay \$25,800 investigation costs.

Southland Regional Council vs Wilma Zeestraten

Ms Zeestraten was charged with two offences relating to unlawfully discharging silage leachate and effluent to land in circumstances where they may enter water.

Ms Zeestraten received a \$10,800 fine for effluent discharge and a \$21,600 fine for silage leachate discharge.



Southland Regional Council vs Christopher Kennel

Mr Kennel was charged with one charge relating to the discharge of silage leachate in circumstances where the leachate may enter water.

Mr Kennel received a \$64,800 fine for the discharge of silage leachate.

10.4 Enforcement Orders

An enforcement order is another way of getting someone to comply with the RMA. It is similar in some respects to an abatement notice, in that it is used to get someone to start or stop doing something.

It differs from an abatement notice in that anybody (not just the council) can apply for an enforcement order against somebody else. These are issued by the Environment Court rather than the council.

Enforcement orders offer more options than an abatement notice, including the ability to recover clean-up costs in avoiding, remedying or mitigating any adverse effect on the environment. The court may also order restoration of a natural or physical resource. If the order is not complied with, council may go ahead and comply on the respondent's behalf (and recover the cost of doing so).

If a problem or the options to resolve it are complex, enforcement proceedings provide a court-supervised procedure for bringing about a conclusion, and if problems are encountered during the implementation of the solution, direction can be sought from the court.

Three enforcement orders were applied for and granted during the 2014/15 year.

Southland Regional Council vs Allan Bruce Miller

Mr Miller received an enforcement order at sentencing requiring the construction of a wetland.

Southland Regional Council vs Taha Asia Pacific Limited and Crawford Enterprises Limited

Initially this order was an ex parte order to ensure that unlawfully discharged aluminium dross was not added to or removed from the site. The later enforcement order had the unlawfully discharged material removed to an authorised disposal facility and ordered groundwater to be tested for 12 months.



Southland Regional vs Kevin John Singh Belling

Mr Belling received an order ensuring that his effluent disposal system was fit for purpose and any modifications identified were completed.



Glossary

| | |
|---|--|
| Ammoniacal Nitrogen (NH ₄ N) | Ammoniacal nitrogen is rarely found at high levels in natural waters. Its presence is an excellent means of detecting pollution. It is a major component in urine excreted by mammals. High levels of ammoniacal nitrogen can potentially be toxic to aquatic life. |
| ANZECC | The Australia New Zealand Environmental Conservation Council. This organisation is developing guidelines similar to the USEPA but applicable to the Australian and New Zealand situations. |
| Black Water | Wastewater containing human faeces and urine. Generated from toilets. |
| CBOD ₅ | Carbonaceous Biochemical Oxygen Demand – a measure of the ability of contaminants to adversely remove oxygen from water |
| CCA | Copper (Cu), Chromium (Cr) and Arsenic (As) are the usual metals analysed for when taking the timber treatment process into consideration. High levels of metals can become toxic to aquatic life. |
| Clarity | The distance that can be seen through the water. The higher the clarity the greater the visibility in the water. |
| Chl <i>a</i> | Chlorophyll <i>a</i> – the pigment in plant cells which captures light energy for photosynthesis. |
| DAF Unit | Dissolved Air Flotation unit. This is an effluent treatment system whereby air is pumped into the effluent under pressure. When the air is discharged into the tank containing effluent, it returns to atmospheric pressure, the dissolved air comes out of suspension and forms bubbles on the particulate matter. These bubbles then float to the surface to be removed as sludge. |
| DIN | Dissolved Inorganic Nitrogen – Nitrate + Nitrite Nitrogen plus Ammoniacal Nitrogen. |
| DO | Dissolved Oxygen – Oxygen is important to sustain life. DO is the amount of oxygen dissolved in water. |
| DRP | Dissolved Reactive Phosphorus – a form of phosphorus that is readily available to plants to sustain growth. |




levels of Phosphorus and Nitrogen in receiving waters can promote the growth of nuisance weeds on water beds.

| | |
|-----------------------|---|
| <i>E. coli</i> | Escherichia coli - <i>E.coli</i> is a bacterium that is commonly found in the lower intestine of warm-blooded organisms. They are a subset of the Faecal Coliform group and are regarded as an indicator of faecal contamination and therefore the presence of pathogenic (harmful) bacteria. |
| EC | Electrical Conductivity – the ability of water to conduct electricity. This gives a conservative measure of the mineral content of water. Generally, the greater the conductivity of the water, the greater the mineral content of the water. |
| Faecal Coliforms (FC) | These are organisms that are present in the gut and faeces of warm-blooded animals and are used as indicators of the presence of pathogenic organisms. |
| g/m ³ | Grams of material in 1 cubic metre of water – A measure of concentration in a liquid or gas. |
| Grey Water | Wastewater that is generated from domestic activities like clothes washing, dishwashing and bathing. |
| Heavy Metals | A set of elements that exhibit metallic properties that typically have high atomic weights and that can damage living things and tend to accumulate in the food chain. |
| Loading | The quantity of contaminates discharged over a set period of time. |
| LTP | Long-Term Plan. This is a document projecting Council activities, as required by the Local Government Act 2002. |
| mg/kg | Unit to measure concentration in a solid (equivalent to ppm (parts per million) or g/m ³ the unit used to measure concentrations in liquids). |
| MPN | Most Probable Number – a statistical estimate of the mean density of bacteria in a water sample. |
| N | Nitrogen – An important element in the growth of plant material. It is required for protein formation and consequently animals have a significant N content. |



| | |
|--|--|
| Nitrate-N | An oxidised form of Nitrogen – Nitrate Nitrogen is soluble and is therefore readily available to plant life to sustain growth. |
| Odour Units (OU) | This is the unit for measuring odour. This unit does not refer to weight or volume as with g/m ³ etc, it is essentially based on the group of people being used, to establish the number of dilutions required before an odour cannot be detected. |
| PAH | Polycyclic Aromatic Hydrocarbons – A class of over 100 different organic molecules composed of only carbon and hydrogen. PAHs are flat molecules with each carbon having three adjacent carbon atoms similar to the structure of graphite. The USEPA has listed 16 of these as priority chemicals due to their potential health effects. |
| PM ₁₀ Particulate Matter | The unburnt material that is commonly discharged with the gas or smoke from a fire or boiler. This is measured as PM ₁₀ , meaning a particle size of 10 micrometers or less. |
| Sewage | A mixture of black and grey water. |
| TP | Total Phosphorus – Phosphorus is an important element in the growth of plant material. Total Phosphorus is a measure of all phosphorus present, including all forms of phosphorous whether it is tightly bound to particulate matter or potentially available to plant life. |
| TSS | Total Suspended Solid – Very small particles that have the potential to affect the colour and clarity of a water body and can potentially settle out onto a streambed smothering aquatic life in the waterways. |
| Turbidity | Turbidity is a laboratory measurement to determine the clarity of the water. The higher the result the more cloudy the water. |
| µg/m ³ | A measure of concentration in a liquid or gas. Micrograms of material in 1 cubic metre of water. 1 gram = 1,000,000 micrograms. |





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