environment SOUTHLAND
Te Taiao Tonga

Environmental Compliance Monitoring Report

2008/09

Report by –
Environment Southland
Compliance Division

Environment Southland Publication No 2009/06

Foreword

There are over 3,900 live resource consents that have been issued by Environment Southland for activities within the region. These include 772 groundwater takes, 135 surface water takes and 770 dairy shed effluent discharges to land. Many of these resource consents have conditions that require monitoring by Environment Southland's Compliance Division.

Thanks to all those consent holders who met their consent conditions and complied with Plans and legislative requirements.

Through the Council's recent Long-term Council Community Plan consultative process we received some valuable feedback, in particular from a number of dairy farmers. As a result, the entire process of monitoring resource consents is being reviewed to ensure this occurs in the most efficient and effective manner. This review is taking place in consultation with Federated Farmers representatives and others within the industry.

During the past year 845 incidents have been responded to - 110 less than last year. This reduction is mostly due to far fewer odour complaints being received within the South Invercargill area. Staff work hard to respond to incidences as quickly as possible, but more serious events are given priority over those assessed as having a lesser adverse environmental effect.

It is hoped that in the coming year our Dairy Liaison Officer will be able to focus on working with current poor performers to lift the level of their consent condition compliance. Until recently, this part of the Officer's role has not been delivered effectively due to the work load involved for the large number of dairy farm conversions. This role is seen as a very positive one within the farming community

Many farmers are showing real innovation, with the installation of new systems of effluent dispersal to comply with new requirements for low application rates. Large effluent ponds are now a feature of the Southland landscape. Farmers are urged to work with Environment Southland to ensure pond construction and management give the best environmental outcomes in our challenging climatic conditions. Keeping these valuable nutrients "on-farm" is a win-win for the farmers pocket and the local environment.

A real success story this year has been the big reduction in stock truck effluent spillage around "gypsy day". This is due in large part to a successful combined effort by Environment Southland staff, stock truck firms and farmers. A big improvement in the number of farmers standing their stock before transportation means improved compliance by trucking firms and a whole lot less muck on our roads.

The Pollution Prevention Officer is available to all consent holders to assist with achieving good environmental outcomes.

During the past year there have been ten successful prosecutions of serious compliance breaches and pollution incidents and a further 15 cases are

awaiting resolution through the Court process. The Council remains committed to prosecuting the worst and/or recidivist offenders.

Once again, the Council congratulates Mark Hunter and his Compliance team for their work over the past year and for responding and adapting to the high standards of environmental compliance being required in Southland; a situation which is unfortunately not the case in a number of other regions in New Zealand.

D S Collie
Chairman
Environment Southland

A M Timms
Chairman
Environmental Management Committee

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1.0 Monitoring - Bathing

The following investigations arose as a response to Environment Southland's State of the Environment monitoring.

1.1 Waikaia River Bathing Investigation

Elevated levels of microbial contamination in the Waikaia River have existed since early 2000. Environment Southland's long term monitoring sites in the River have shown that, at particular times of the year elevated levels of faecal coliforms exist. To identify the possible source of the bacteria, an investigation has been undertaken to pinpoint the hot spots in the Waikaia River, upstream of Waikaia township.

The ultimate long term goal was to see improvements in microbiological water quality at the Waikaia River bathing site adjacent to Waikaia township. A secondary goal was to identify the links between land use changes in the catchment, non-point source pollution and their possible effects on water quality. This is a preliminary investigation, as it will only provide a snapshot of the current water quality. It will not provide trends for the state of the Waikaia waterways. It is envisaged that this work will feed into a second phase of investigation and monitoring by the Compliance Division.

Water quality in the Waikaia River is indicative of a catchment which has been developed for pastoral beef and sheep farming. The upper catchment is largely undeveloped and covered in native forest, with good water quality. The mid and lower catchment sees a marked decrease in water quality, with increased faecal contamination and nutrients in the surface waters of the Waikaia River and its tributaries. The decrease is closely related to the intensity of the land use, where sheep and beef farms closely border waterways and stock has unrestricted access to waterway margins. The Waikaia catchment is not a highly polluted system by national and international standards. However, in periods of both high and low flow during summer, it represents a moderate public health risk associated with primary contact recreation.

This investigation has been ongoing and will continue and be extended to engage the community to implement best management practices, to minimise the risk of faecal contaminants entering the waterways.

1.2 Bluff Bathing Beach Investigation

On a number of occasions this year, Environment Southland's bathing beach monitoring programme detected elevated levels of bacteria in the area of Morrison's Beach. In an attempt to locate a possible source of the faecal coliform bacteria, the Environmental Information and Compliance Divisions undertook a preliminary investigation in that area. The investigation began in July 2009 and has focused on the stormwater system in Bluff. Two separate days of sampling, in wet and dry conditions, revealed multiple exceedances to the national bathing standard of 550 CFU/100 ml, set by the Ministry for the

Environment (2003). Recorded faecal levels have ranged from 1100 CFU to 3700 CFU, in the drain system of lower Henderson and Onslow Streets. This is immediately upstream of the outlet, which is adjacent to Morrison's Beach. This data will now be handed over to the Invercargill City Council for action, and all public health authorities have been contacted.

2.0 Water Irrigation

2.1 Irrigation water takes

There are currently 77 water consents for irrigation purposes. The majority of irrigation consents are for irrigation of pasture. The balance includes consents to take water for crop irrigation, golf courses and horticulture (e.g. bulb washing). Nine consents are for surface water takes and 68 are groundwater takes.

Most consent holders are required to submit records specifying the volume of water taken each day. Some consent holders are also required to monitor groundwater depth of either production wells or adjacent monitoring wells on a weekly basis, or at specified times over the irrigation season. Those with irrigation consents are also required to notify Environment Southland of their intention to commence irrigation at the beginning of each season.

Water abstraction reports have become a more important issue over the last few years, with increasing pressure from central government on regional councils to gather sufficient good quality information to effectively manage the resource. Records being sent from consent holders have been poor over previous seasons, with a number of abatement notices being issued to ensure the consent holder provides these records on an annual basis.

Last year the Council provided the opportunity for consent holders to send the data in electronically to the Councils database via File Transfer Protocol (FTP). This method was adopted after considering other options. New and renewed irrigation consents will require electronic reporting. Additionally, consent holders who continually fail to provide records will have their consent amended to require electronic reporting.

Several electronic suppliers offer information management services to take care of this process on the consent holder's behalf, also providing real-time access to the information via a site-specific web page for farm management purposes. When this system was initiated in early 2008 there were some data management suppliers and installers who promised they could deliver to the standards, bur proved unable to supply the service required in a timely manner for consent holders and Environment Southland. Environment Southland now has a list of competent suppliers and installers who have demonstrated that they can supply the appropriate equipment and electronic data to our FTP site.

Irrigation reporting compliance

Of the 77 irrigation permits, Environment Southland received commencement notification from 29 consent holders and abstraction records from 61 consent holders (Figure1). This is an improvement from previous seasons where approximately 75% of consent holders supplied records. As with previous years, the majority of consent holders are still not compliant with all conditions in their consent, in particular the supply of groundwater

depth monitoring records is very poor. Consent holders should also be aware that if their consent requires a report, that report must be filed by the due date, even if it is to report a nil take, indicating that the consent was not exercised. It was disappointing to note that a large proportion of reports were submitted late, despite consent holders being reminded to supply records. Most consents specify that reports must be submitted by 30 June each year.

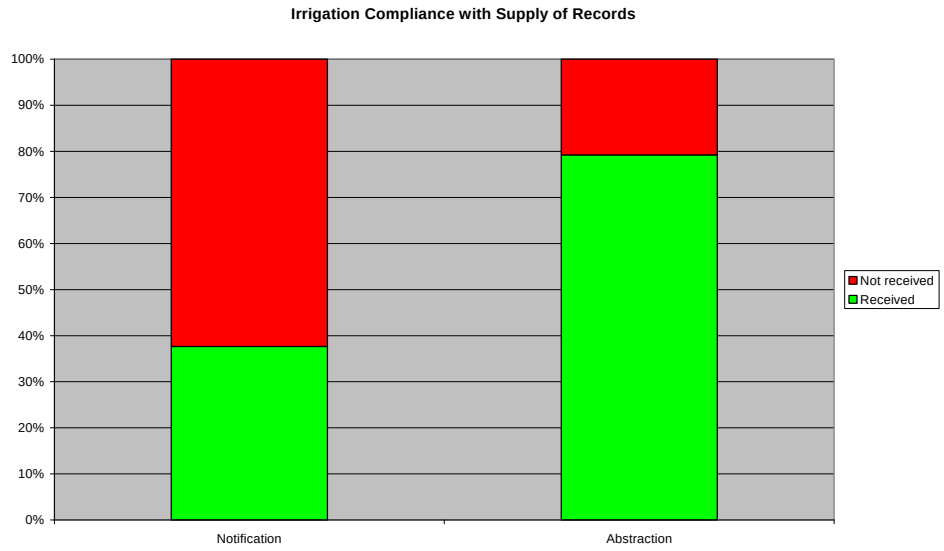


Figure 1 – Irrigation reporting performance 2008/09

Most irrigation records received by Environment Southland have now been assessed for abstraction compliance, with all but two consents compliant with their annual abstraction limits. With the increasing number of consents being exercised which specify more than one well to take groundwater, consent holders need to be familiar with their daily abstraction limits. Unless otherwise specified, the daily and annual abstraction limits apply to the total amount of water taken at all wells associated with a property or consent. Another issue identified is the multiple water use for a well. Some properties have water permits for two purposes, irrigation and dairy, with both uses coming from the same well. Consent holders need an accurate method for measuring the water take for each use, to ensure each consent is reported accurately. Most water permits require, at a minimum, that a flow meter be installed. There was one instance where a farm submitted records for a dairy water permit, but failed to take into account that some of this water was being used for irrigation. As such, the farm was reported to be over their consented limit.

The data supplied by consent holders is collated and analysed by the Environmental Information Division and is made available on the Environment Southland website. The groundwater information page is a useful source of information for readers interested in Southland's groundwater resources. Click on "Environmental Information" then "Groundwater" in the left hand menu at www.es.govt.nz .

3.0 Compliance Monitoring

3.1 Tank Pulls

A tank pull is the removal of an underground storage tank (UST). These normally involve petrol or diesel tanks, ranging in capacity from a few hundred to several thousand litres. The tanks are commonly located at service stations, but can also be found on farms, airports, bus or truck depots, train yards and shipping yards. Tanks are removed for a number of reasons ranging from damage and corrosion, age, unsuitability, or they are no longer in use.

The removal of the underground storage tanks provides the property owner with the opportunity to assess the integrity of the original tank and any impact that this may have had on the receiving environment. The company typically engages a professional consulting company to report on its findings and on the need for any remedial actions or monitoring to be undertaken. These reports are reviewed by Environment Southland staff and assessed against the Ministry for the Environment (MfE) guidelines for the assessment and management of petroleum hydrocarbon contaminated sites in New Zealand.

Tank Pull Reports

The quality of the reports received by Environment Southland varies, but typically these reports follow the MfE guidelines and address:

- the soil quality in the old UST pit and the surrounding environs. A basic Tier 1 test is conducted which assesses the concentrations of total petroleum hydrocarbon (TPH) and BTEX compounds in the soil (benzene, toluene, ethylbenzene and total xylenes). If the TPH results exceed the soil acceptance criteria, then more specific tests of polycyclic aromatic hydrocarbons (PAHs) (Naphthalene, pyrene, benzo(a)pyrene equivalent and benzo(a)pyrene) are required. These are more specific tests which have acceptance levels that supersede the TPH acceptance levels;

- the groundwater sensitivity in the surrounding area. This is assessed by thoroughly investigating the soil type in the immediate and general area surrounding the old storage tank, the presence and extent of any contamination that may have penetrated into the soil profile, the depth of the aquifers and use of the groundwater in the area;

- the potential impacts on surface water in the surrounding area.

Reports Received in 2009

The removal of eight UST's was reported to Environment Southland in 2009. This is a significant increase on previous years. There are a number of contributing factors to this, including:

- companies carrying out plans to replace the old tanks;
- the reduction in petrol stations over Southland;
- the UST are no longer required;
- the bio-fuels legislation introduced by the Labour Government in 2005, which was then withdrawn in late 2008.

Figure 2 -The removal of an underground storage tank

Figure 3 - The area within the blue circle indicates an example of contaminated soil as a result of a leaking underground storage tank

Figure 4 - The areas within the blue circles indicate holes found in an underground storage tank once it has been removed

3.2 Foam on the Mataura River

During April 2009, an investigation was conducted into the source of foam that is periodically detected on the surface of the Mataura River. The foam appeared to originate at the foot of the Mataura Falls, upstream of any industrial discharges in the Mataura township area. Samples were collected and forwarded to the Environment Southland laboratory service provider.

The findings reported were not conclusive, but they indicated that the foam was more than likely to be organic in nature. These findings do not confirm the source of the foam, but it does support the original theory that the foam events that had been observed were natural. It is possible that, while the make-up of the foam is believed to be natural, it may be exacerbated by natural compounds present in upstream discharges. The laboratory service provider has further investigative tools to assist whenever another incident is reported.

Staff will continue to monitor this issue.

Figures 5 & 6 - Pockets of foam observed on the Mataura River in April 2009

4.0 Dairy Monitoring

4.1 Dairy Liaison

Environment Southland, with partial funding from Dairy New Zealand, has appointed a Dairy Liaison Officer. This co-funded work has been going on for the past two years, as a means of achieving a higher rate of compliance with farm dairy effluent consent conditions.

Consent conditions now require low effluent application rates and larger storage systems to minimise the discharge of effluent to land when soil moisture is at elevated levels. This requirement is to allow a consent holder to manage the application of effluent so that discharges to waterways from overland flow, or subterranean drainage are prevented.

Over the past two milking seasons, more than 100 dairy conversions have been carried out in Southland. The Dairy Liaison Officer role has enabled a close working relationship between those converting farms and Environment Southland, during the conversion process and the following milking seasons. Farmers are accepting that the Dairy Liaison Officer is someone that they can approach for help and assistance when systems, or staff are at risk of failure.

Existing consent holders appear to be making more use of the Dairy Liaison Officer to find out what systems are available and how these can be incorporated into their farm systems.

Each year, at the beginning of June, Environment Southland sends out a dairy pack containing information and recording forms, as well as a letter explaining the different consent condition requirements. This letter also contains an invitation for farm owners to have their staff undergo a short information and training session for the management of the farm dairy effluent disposal system. These sessions are carried out at the farm, so that there is minimal disruption to the farm work schedule.

Ongoing work with dairy farmers and equipment suppliers has resulted in better on-farm effluent management and developments in the equipment, including the travelling irrigator, that will reduce the rate which at which effluent is applied.

The Dairy Liaison Officer can provide information on best management practices for the collection and disposal of effluent and leachate from wintering pads, feedlots, silage pads, underpasses, lanes, and their location, with due regard to the proximity of water ways, as well as advice on a variety of Regional Plan rules, such as intensive winter grazing and the creation of a buffer zone between grazed areas and waterways.

Figure 7 – Mechanical solids separation

Figure 8 – Weeping wall solids separation

Figure 9 - Low rate effluent disposal

Figure 10 – Rotary boom travelling irrigator

Figure 11 – Oscillating boom travelling irrigator

Figure 12 – Membrane pond liner

4.2 Effluent Discharge Consents (Dairy Shed and Wintering Pad Effluent)

During the 2008/09 financial year, 1148 inspections against effluent discharge consents were completed for 752 consents, as follows:

Routine ground inspection	738
Routine aerial inspection	260
Re-inspection	89
Wintering Pad inspection	61
Total Inspections	**1148**

Methods

The number of routine inspections on each farm is prescribed by consent conditions and the Long Term Council Community Plan (LTCCP). Staff inspected each farm at least once, on the ground. Farms requiring multiple inspections may have had subsequent inspections done aerially.

- Routine ground inspections were carried out by Council staff visiting the dairy farm and physically checking the maintenance and operation of the effluent storage and disposal system. Staff also checked for compliance with other condition requirements, such as reporting and sampling.

- Routine aerial inspections were made by helicopter during April 2009. These were a surveillance of:
  - pond;
  - stone-trap;
  - waterways;
  - disposal method.

- Re-inspections were made by Council staff on those farms that scored "10: Re-inspection: Significant noncompliance" for a routine inspection this season.

- Wintering pad inspections were made between May and September for effluent systems which also store and dispose of pad effluent. Inspections were carried out on the same basis as routine ground inspections.

Table 1 – Discharge consent inspection grades

Environment Southland grades		*Examples*
1	Pass.	No non-compliance detected.
2	Pass with minor issues with potential for adverse effects.	Consent not displayed, disposal system maintenance issues (split nozzles, leaking centre pivot) or management issues (slow speed) but adverse effects are not visible, measurable or likely.
5	Marginal pass - issues with minor adverse effects, but problem cleared up on site.	Storage pond full, lack of contingency plan, over application to pasture but adverse effects are not visible, measurable or likely.
7	Fail - unauthorised activity and follow-up enforcement required	Herd size greater than consent limit, no current consent, capacity of effluent storage is less than consent requirement.
10	Fail - significant non-compliance, Adverse effects and re-inspection required.	Effluent liquid and sludge disposal with adverse effects that are visible, measurable or likely, effluent storage pond overflowing, discharge to surface water, objectionable or offensive odour.

Results

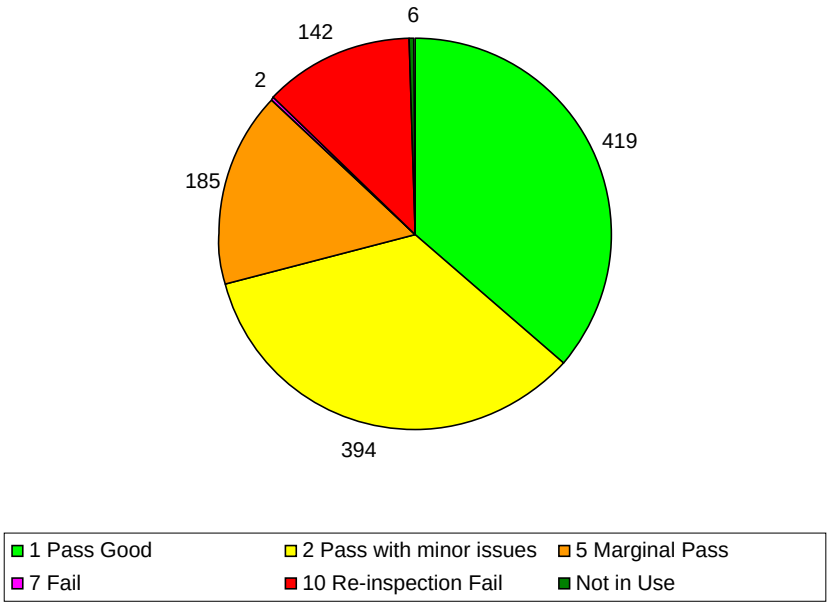


Figure 13 – Performance ratings, 2008/09 inspections

Performance rating grades were distributed amongst the different types of inspections as follows:

Figure 14 - Over-application using an un-consented disposal method too close to the property boundary and road.

Issues of significant non-compliance

The 142 failed inspections included seven common issues which are outlined below. Almost half of the inspections failed for one or more of the reasons in Table 2.

Table 2 – Reasons inspections failed

Common reasons for failing an inspection	*Examples*	*Number of fails*
Application area	Outside consented area, too close to waterways, bores, property boundaries.	12
Discharge method	Effluent applied to land inappropriately, i.e. from end of hose or breaks in hose, split cup-links, burst hydrants.	16
Discharge to water	Effluent discolouring waterway.	23
Over-application	Visible heavy application of effluent to land.	89
Pond damage	Cracks in pond, degraded banks, exposed or broken pipe connections to storage.	12
Pond overflow	Storage capability exceeded and effluent overflowing.	36
Stone-trap overflow	Blockage and overflow resulting in ponding and runoff of effluent.	12

Any issues or non-compliance highlighted during the inspections are usually dealt with via re-inspections, until the system used is seen to be operating acceptably.

Since June 2007, the Council has recognised several of the main issues causing non-compliance and has introduced new measures to help address these issues.

Common issues have been over-application, pond overflows and discharge to water. All new consents now prescribe the use of a low-application rate

system, a 60-90 day storage system, or other large storage system to tackle the pond overflow problem and most new consents also require regular surface water sampling. Any visible discharges located during inspections require water sample collection.

Deferred storage ponds and low-application rate systems aim to encourage effluent disposal when soil conditions are suitable. Environment Southland measures soil moisture levels at various locations in Southland and updates the information online to show when soils are suitable for various types of effluent disposal. This information can be found on the website: www.es.govt.nz click "Farming" and "Effluent Guidelines"

While the use of a low-application rate system will assist in reducing non-compliance, 10 of the significant over-application incidents during the past season were from low-application rate systems. These non-compliance issues were usually associated with the disposal system being set up along swales, or depressions, which has resulted in siphoning or runoff to low points and effluent subsequently entering underground drainage systems.

A further issue causing runoff and leaching is sludge clearings from ponds and stone traps. These are often left in large piles to dry before being worked into paddocks. Runoff and leaching can become a problem if they are placed on an unsealed area. Environment Southland staff have been encouraging clearings to be placed on a sealed pad, where excess runoff can be channelled back into the containment pond. Sludge can later be applied to land, usually via a muckspreader, at a rate of no more than 7 mm.

Figure 15 - Example of failed inspection for discharge method, over-application and discharge to water

4.3 Dairy Water Take Monitoring

Under the Proposed Regional Water Plan for Southland, the taking of more than 20,000 L of groundwater, or 10,000 L of surface water, per landholding

per day, for dairy purposes requires a water permit. During the 2008/09 season, 688 dairy farms held current water take permits, with the remaining farms acting under existing rights. These will be required to obtain a water permit upon renewal of their discharge permit. For the purposes of this report, there is no distinction made between groundwater takes and surface water takes.

All but the earliest water permits require the fitting of a suitable water meter to adequately record water taken and all permit holders are required to submit periodic reporting to Council of water taken. Reporting requirements can vary, but will fit into three categories:

- daily readings for a continuous two week period once a season;
- once a month readings for the entire season;
- once a week readings for the entire season.

The appropriate forms for recording water takes are posted annually to all dairy consent holders in the dairy pack and are also available on the Environment Southland web page at www.es.govt.nz/compliance/forms.

Historically, compliance with dairy water take reporting has been poor, with approximately 25% failing to supply data on an annual basis. Figure 16 compares the dairy water take reporting performance with the previous two seasons. The 2007/08 season was exceptionally bad, with 45% failing to report water takes for the season. This makes managing the resource difficult and can affect future renewals and applications. It is pleasing to note that there have been improvements in the reporting of dairy water takes for the 2008/09 season, although 27% of those required to report still failed to supply the data.

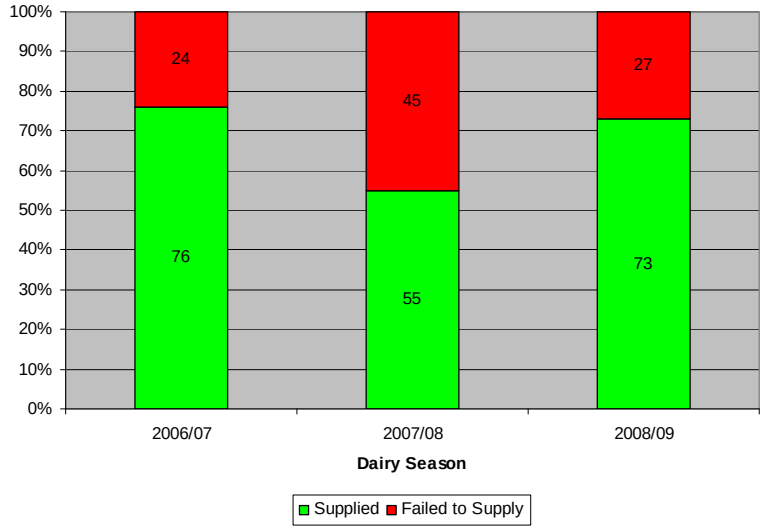


Figure 16 - Dairy water take reporting compliance 2006-09

Failure to report water takes for the season usually results in a charge per occasion for following up the non-supply of data. Those who persistently fail to report may also be issued with an abatement notice, requiring that the data be continually recorded. A small proportion of dairy water permits now require that data be recorded and supplied electronically to the Council.

Environment Southland recommends the use of 50 L of water, per cow, per day as a maximum in the dairy shed. Reducing the amount of water used will reduce the pump running costs, reduce the quantity of effluent and water that needs to be disposed of and increase the efficiency of storage. Water take information is converted into average volume used per day, per cow, based on the maximum numbers of cows reported on-farm during the season. This is to normalise the data between the different report types and generally results in a representative figure for the property, if slightly underestimated. Historical data, as illustrated in Figure 17, shows the overall average water usage per cow, per day as being close to double the recommended usage. It is important to note that these figures reflect water use for both dairy shed purposes and stock drinking water (typically, 50 L/cow/day) combined.

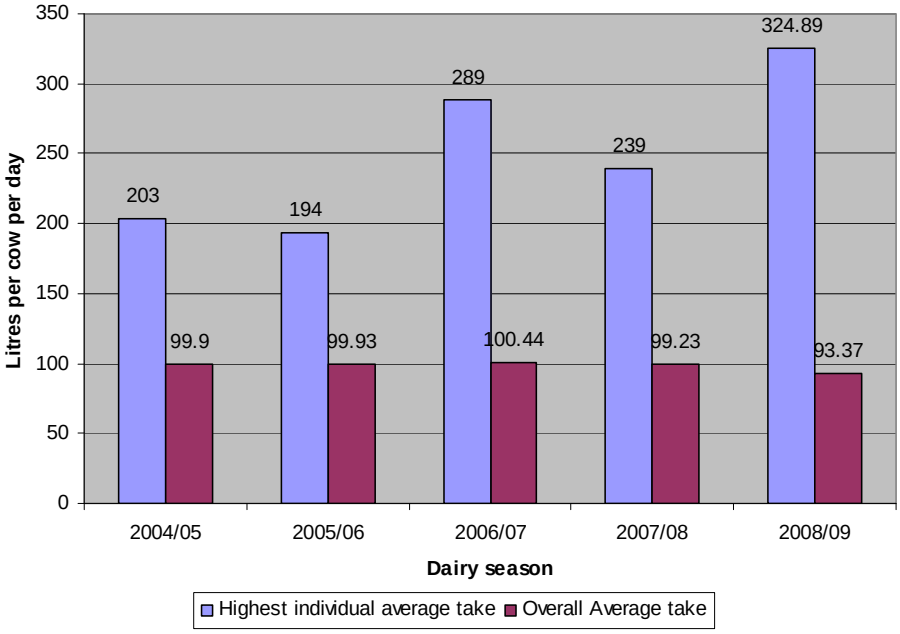


Figure 17 - Average water take volume per cow per day 2004-09

The highest take for the 2008/09 season was 324.89 L per cow per day. In this case, the consent holder also uses water from the dairy shed bore for crop irrigation. As this is not metered independently, the figure of 324.89 L is an over representation of water used per cow for the sampling period. This highlights the need for accurate data, for both the consent holder and Environment Southland. Accurate data collection, including the breakdown of water use, is a useful tool for resource budgeting. As all consents have an allocated water allowance, it is important to know where water is being used to ensure allocation thresholds are not exceeded. Additionally, an analysis of water use is helpful in identifying where problems may lie when equipment failure goes unnoticed.

Of those who supplied data to Environment Southland, compliance with consented water take limits has been relatively consistent over the past two seasons, despite the increase in the number of dairy water take permits being issued. The 2008/09 season saw an increase of 103 water permit returns from 2007/08, although only one additional farm reported use over its consented

limit (Figure 18). This is a pleasing result. Those who exceed their limits appear to be using extra water for use other than at the dairy shed. If consent holders find they are exceeding their limit, or using their consented allowance for a use that is not prescribed in their consent, they may need to apply for a consent amendment to increase their water take allowance, or apply for an additional consent depending on the volume of the additional water required.

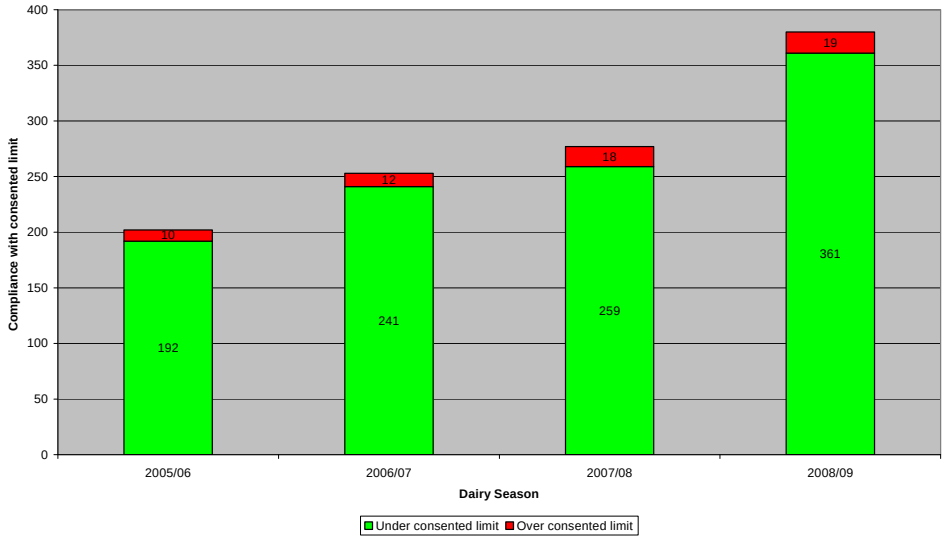


Figure 18 - Dairy water take limit compliance 2005-09

4.4 Surface Water Quality Monitoring

The end of the 2008/09 dairy season saw 453 dairy effluent discharge consents requiring surface water sampling to monitor the effects of the dairy effluent disposal system on surface water (Figure 19). This is a 40% increase on the previous season and can be attributed to new consents being issued from the tail end of the surge in dairy conversions for 2008 and surface water sampling being added to renewed or varied discharge consents.

The frequency of surface water sampling is specified in the consent conditions. This frequency can vary from one consent to another, depending on the degree of risk that contaminants may enter a waterway. Although not an exhaustive list, this risk is generally based on parameters such as soil type, the number of streams or ditches on a property and historical compliance. Most consents require sampling up to three or four times per year. The concentration of this sampling is conducted over the milking period from September through to April.

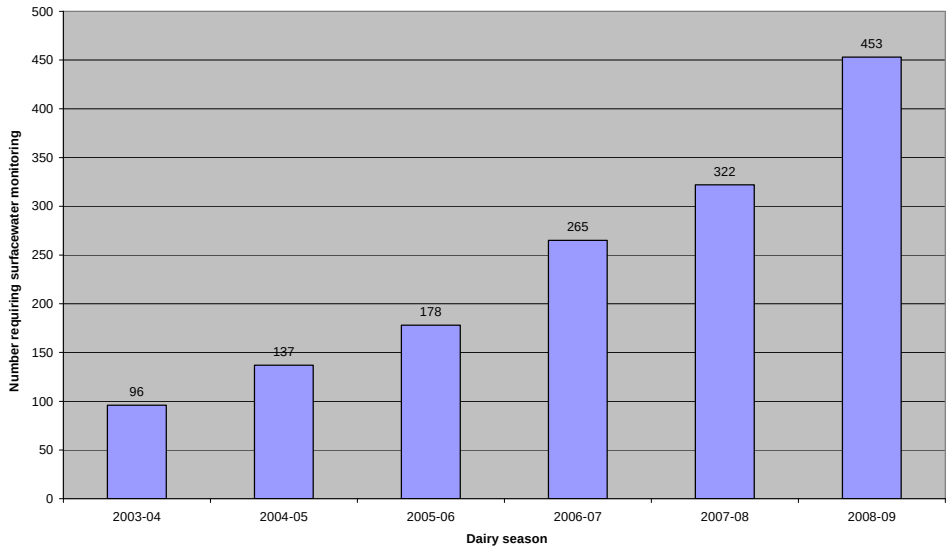


Figure 19 - Number of dairy consents requiring surface water monitoring by season

At 1 September 2009, 1333 surface water sampling visits are scheduled for the 2009/10 season. These samples are to be collected from 453 farms. This is an increase of 268 sampling visits when compared to the 2008/09 season, where 1065 surface water samples were scheduled. During the 2008/09 dairy season, samples were collected on 483 visits. The remaining 582 visits were "no sample" events. The 2008/09 season saw an unusually high number of "no sample required" events. This was primarily because the sampling conditions in the consent could not be met and is due to several factors such as the specified waterway or drain was not flowing (a large proportion during the near-drought conditions of last summer), a consent condition specifying rainfall or cow numbers that trigger the sampling event not being reached, or the effluent disposal system was not in use. Many consent holders have increased their effluent storage facilities over the past season and wait until conditions are appropriate before discharging, avoiding the over-application of effluent and the potential for contaminants to enter a waterway. Where a "no sample" event occurs this is classified as having complied with the consent conditions.

The numbers of visibly "green streams" identified during routine sampling were slightly fewer when compared with the previous season. Additionally, there was a reduction in the number of incidents where effluent was being applied within 20 m of a waterway.

Sample collectors also reported several incidents of over application that were usually due to a failure of the effluent disposal system such as split nozzles on travelling irrigators or cup-link failures on irrigator hoses. Failsafe devices, such as TIMS or Gator-Buddy, detect drops in pressure, switch off the effluent disposal system and have the capability to send a warning message to the dairy shed, or a cell phone. Systems such as this, together with regular maintenance and checking of effluent disposal systems can help reduce the likelihood of over-application.

Sample results are interpreted by staff who consider national standards and guidelines, sample trends over time for the property or waterway concerned, soil and weather conditions and other factors such as the presence of waterfowl. Samples are then graded as either "Good", "Marginal" or "Unsatisfactory".

Monitoring Results

Figure 20 shows the number of samples collected and the grades given. While the number of sites requiring monitoring increased, the actual samples collected has decreased between the 2008/09 season and the 2007/08 season, and it was pleasing to note that the proportion of marginal and unsatisfactory grades was lower than in previous years. It should be noted that these grades are based on water quality alone. The Australia and New Zealand Environment and Conservation Council (ANZECC) Stock Drinking Water Guidelines and The Ministry for the Environment freshwater bathing "action" guidelines are used when assessing the quality of surface water. If non-compliance is identified at the time of sampling, the event is investigated by a Compliance Officer and usually resolved separately through the incident process.

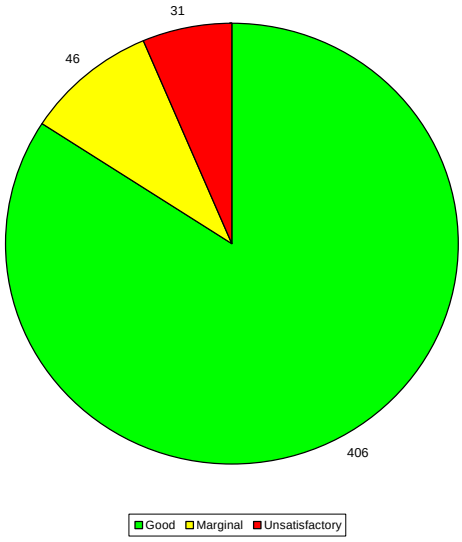


Figure 20 – Surface water monitoring grades - 2008/09 dairy season

Surface water monitoring results have shown an improvement since 2005 with the number of farms receiving good grades increasing, and the number of marginal and unsatisfactory results decreasing. This is demonstrated in Figure 21.

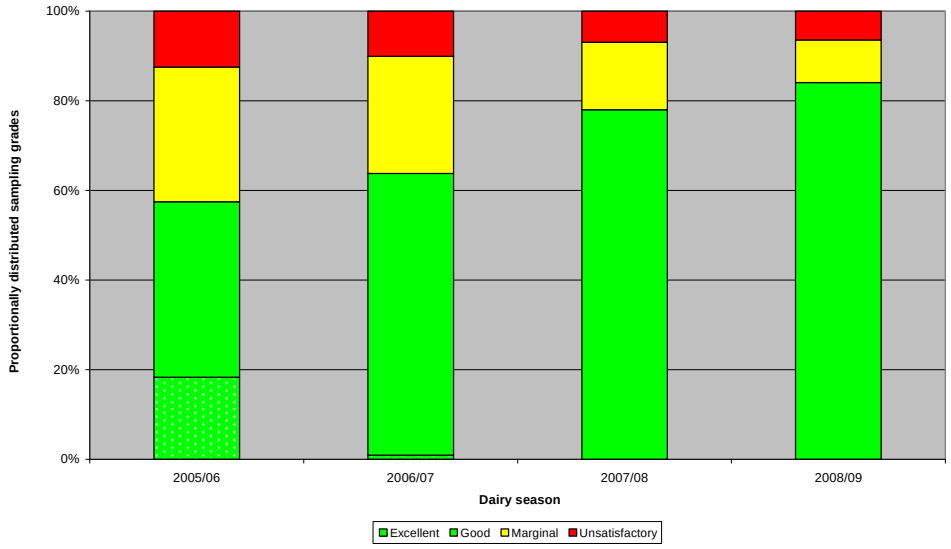


Figure 21 – Proportionally distributed surface water sample grades based on the number of samples collected over the season

For the majority of discharge consents, surface water sampling involves collecting a representative sample of water upstream and downstream of the effluent discharge area. Samples are then analysed for several common analytes. The presence of *E coli*, ammoniacal nitrogen and dissolved reactive phosphorous above the thresholds expected (as defined by the ANZECC guidelines) are the three key indicators used to detect the presence of dairy effluent. The statistical analysis of these indicators is shown in the graphs below and is compared with the results from the 2007/08 season (Figures 22 to 24). Each sampling event is interpreted by considering all the information available, including field observations and weather conditions.

The median value for each season (spring, summer and autumn) is indicated on the graphs below and represents the middle value in the data range. The values contained within the box represent 50% of the data, with 25% of the remaining data below, and 25% above, the box. The median may not necessarily be in the exact centre of the box. When this is the case, it indicates that a small number of extreme values may be skewing the data.

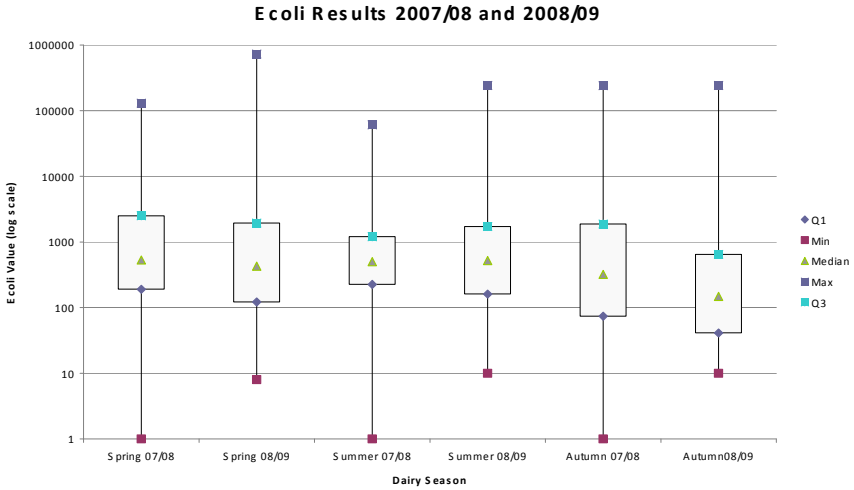


Figure 22 – *E. coli* results comparing 2007/08 and 2008/09 seasons

The typical *E. coli* value for surface water quality is <300 MPN, however this value is likely to fluctuate between 300-5000 MPN when there is a possible rain effect. The *E. coli* results show there was only a small amount of difference between the median values. The median ranges between 530 MPN in spring 2007/08 and 148 MPN in August 2008/09. The spring 2008/09 samples showed the highest maximum *E. coli* results of 727,000 MPN. Overall, it can be said that 50% of the samples collected fell within the 300-5,000 MPN range, or below. For the 2008/09 season it is interesting to note that fewer samples fell into the lower 25% range and there were significant numbers of high extreme values. All three seasons contained high extreme values which were usually associated with a visible discharge observed at the time of sampling. These incidents were treated separately through the incident process.

It is also important to note that dairy effluent is not the only source of *E. coli* and, as such, *E. coli* results are interpreted in conjunction with other common contaminants of farming practices. Many farms have duck ponds, which are considered when interpreting the results, along with other field observations noted by the sampler.

Figure 23 considers the levels of ammoniacal nitrogen, another common contaminant of waterways as a result of farming practices. The conservative value used for ammoniacal nitrogen is <0.2. It is pleasing to see that, in most instances, 75% of the data falls below 0.2. However, 25% still exceeds this level, with 25% falling between 0.12 and 90. It is noticeable that this data is highly skewed, with a considerable number of extreme values. This is concerning, as this is one of the key indicators of the presence of dairy effluent in waterways.

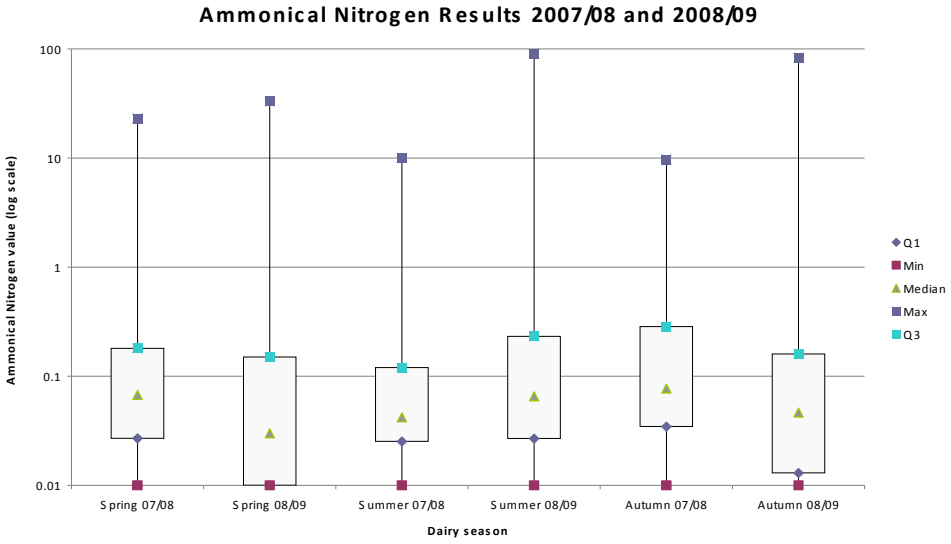


Figure 23 – Ammoniacal nitrogen Results comparing 2007/08 and 2008/09 seasons

Figure 24 relates to dissolved reactive phosphorus (DRP) results for the 2007/08 and 2008/09 seasons. Once again, DRP is used in conjunction with *E. coli* and ammoniacal nitrogen results to assess the level of contamination

from dairy effluent. The conservativel level for DRP is <0.05. From the graph below it can be seen that 75% of the data falls below 0.2. The average range for the middle 50% of the data is between 0.01-0.04, which is positive. As with the *E. coli* and NH4 results, it is obvious that the data is highly skewed by a number of extreme values. The average maximum value is 7.58, which is significantly elevated above the typical level.

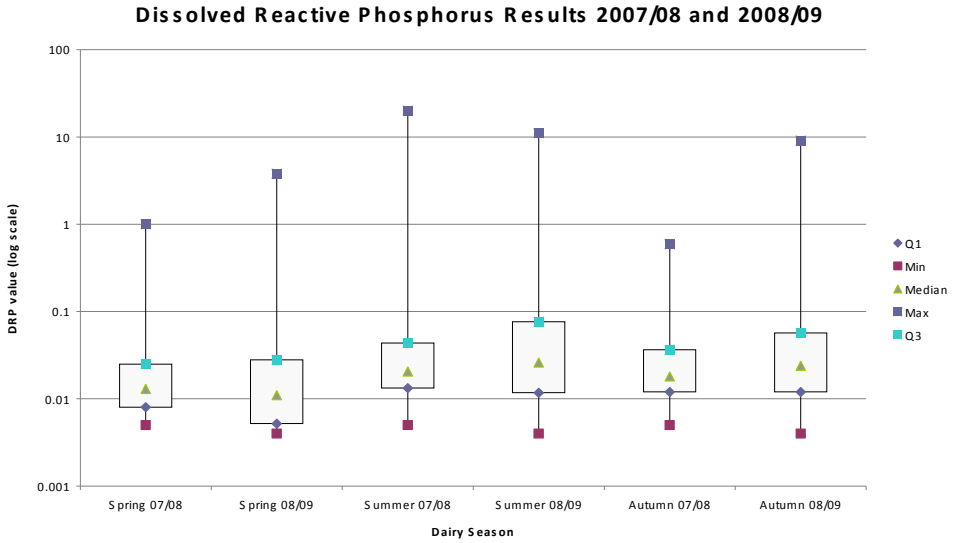


Figure 24 – Dissolved reactive phosphorus results comparing 2007/08 and 2008/09 seasons

Results from the 2008/09 dairy surface water monitoring season indicate that the highest risk periods for effluent application to land resulting in degradation of surface water quality are spring and autumn. This is due to a variety of changes which take place, such as new staff on a farm which are not familiar with drainage systems on the property, and climatic changes, with periods of high instantaneous rainfall and extended periods of rain. The introduction of minimum storage capacity for effluent will enable the discharge of effluent to land to be conducted when conditions are appropriate and there is less risk for effluent to enter a waterway. Many dairy discharge permits now require the consent holder to consider soil moisture levels before applying effluent. The data from a small network of soil moisture monitoring sites can be accessed at any time from the dairy effluent page on our website, www.es.govt.nz. Soil moisture probes can also be installed on-farm, with the data available via telemetry direct to the farm computer, mobile phone or PDA, or available on a personalised website.

4.5 Groundwater Quality Monitoring

Groundwater monitoring is intended to detect possible contamination of groundwater from farming activities. Groundwater samples are collected from the water table aquifer near the effluent disposal field. The monitoring frequency is usually twice a year.

At the end of the 2008/09 dairy season there were 185 dairy discharge consents that required groundwater monitoring. This is an increase of 25 from the previous season. As with surface water monitoring, this is due to

new consents being issued for new conversions and the renewal of existing consents that now include a groundwater monitoring requirement.

Most discharge consents that require groundwater sampling specify the particular bore to be sampled, if one is already available on the property and its location meets Council requirements. If there is no suitable existing bore, the consent will generally specify an acceptable location to place a monitoring bore. In order to gain a representative sample, monitoring bores should be drilled to reach water, then drilled an additional 2-3 m to allow for seasonal changes in groundwater levels.

The "Drinking water Standards for New Zealand" (Ministry of Health, 2000), and the "Australia and New Zealand Environment and Conservation Council (ANZECC) Stock Drinking Water Guidelines" are used when assessing the potability of groundwater. These standards have health-based maximums, and taste/smell/appearance aesthetic guidelines.

Sampling is conducted as per the Ministry for the Environment's National Protocol for State of the Environment Groundwater Sampling. A trained technician will visit the monitoring bores every six months to ensure consistency and reliability of results. The bore is run for a period to make sure the sample is representative of the aquifer, rather than stagnant bore water. Water samples are taken and bottled for dispatch to a certified laboratory for analysis. Results received back from the laboratory are then interpreted by staff using the Drinking Water Standards and findings are reported to consent holders.

To maintain meaningful records, ensure bore life, and prevent contamination of groundwater from bores and wells it is recommended that:

- the bore casing extends far enough above the ground to prevent stormwater runoff entering the bore or well. If possible, a sloping concrete pad around the casing may be used to deflect storm water and prevent weed growth;
- the top of the bore or well is securely sealed to prevent debris and rainfall entering (tip: silage tape is excellent for sealing around pipes and cables to make the well head secure);
- chemicals, fertilisers, etc in the vicinity of the bore or well are removed;
- the bore is fenced off and protected from damage by vandalism and/or livestock;
- pipes, fittings and pumps are checked for leaking oil, grease and water.

In previous years, water quality results indicated that many samples were coming from confined or semi-confined aquifers. Last season specific criterion were set for well depth, to ensure the reliability of sampling as a tool for assessing the effects of the effluent disposal system as an on-farm activity. As a result, some consent holders were required to install monitoring bores that met the requirements to ensure that representative groundwater samples, rather than confined aquifer samples, could be collected. Other consent holders were required to install a sampling tap, as sampling from the tank inlet was considered a health and safety risk.

This past season, a project was undertaken to label all monitoring bores with the bore number assigned by the Council. This was in response to samples being incorrectly collected from inappropriate bores in previous years. This will ensure consistency and improve the reliability of results.

Figure 25 - Excellent bore construction and protection

Figure 26 - Inadequate well head protection from stock and other contaminants

Figure 27 - Excellent bore construction and protection

Figure 28 - Chemicals and other contaminants stored next to well

Monitoring Results

Over the 2008/09 dairy season, 371 sampling visits were undertaken. Some sites were unable to be sampled as the bore location and/or depth was unsuitable, or the sampling point was inadequate to gain a representative sample. Sample results were graded according to the ANZECC guidelines with 212 results graded as "good", 65 graded "marginal" and six graded as "unsatisfactory", Figure 29. The rating of "Unsatisfactory" was issued due to a combination of persistent bacterial contamination and increasing trends in nitrate and electrical conductivity levels, or spikes in contaminant levels. Marginal ratings were issued where nitrates were considered high, but did not exceed ANZECC guidelines.

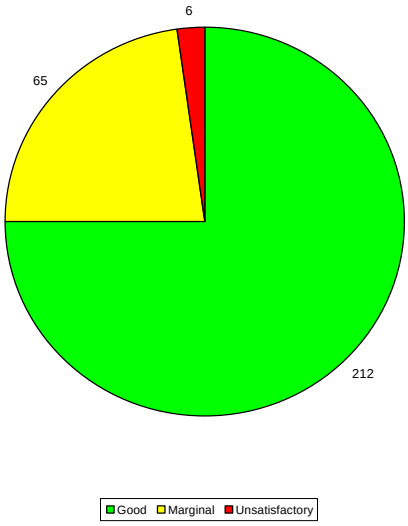


Figure 29 – Groundwater monitoring grades - 2008/09 dairy season

Compared with the previous season, the number of results that fell into the "good" category has declined and the number of "marginal" results has increased. The number of samples that received a grade of unsatisfactory has remained relatively the same since the 2007/08 season, Figure 30. These ratings are based solely on sample results. Interpretation and comments made to the consent holder regarding the results takes into account observations made by the sample collector, such as well-head protection or suitability of the bore itself, with respect to consent conditions.

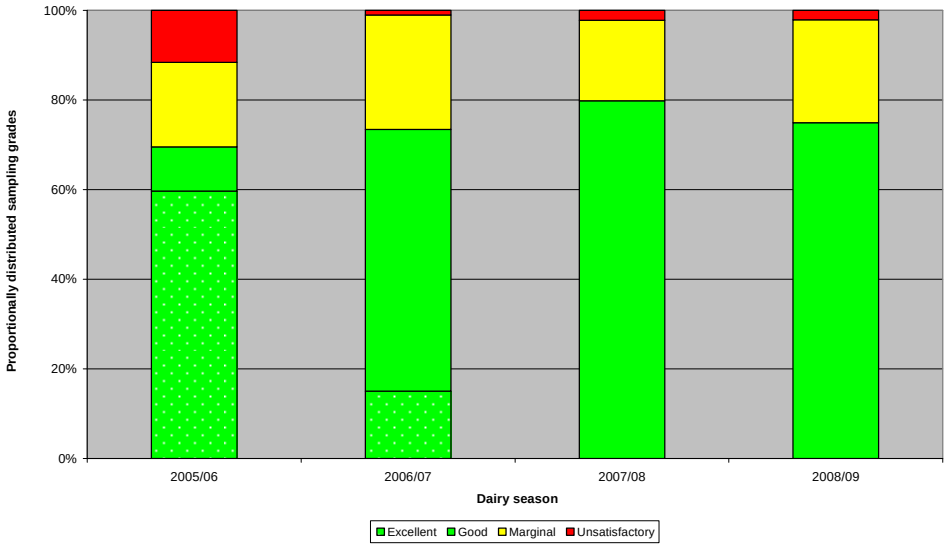


Figure 30 - Proportionally distributed groundwater sample grades based on the number of samples collected over the season

As in previous years, a small number of bores sampled revealed nitrate nitrogen levels in excess of the ANZECC Drinking Water Standard of 11.3mg/L. This continues to be of concern and the affected consent holders

have been advised that the water should not be used for domestic purposes. High nitrate nitrogen levels in drinking water can in some cases result in "blue baby syndrome". There were also a few farms where nitrate nitrogen leel displayed an increasing tend with time and, if this exceeded 8 mg/L – N, they were advised to pay particular attention to nitrogen inputs on the property. Environment Southland groundwater scientists have identified areas where nitrate levels appear to be increasing and are monitoring the situation.

In most cases, the source for farms which repeatedly returned results with high bacterial contamination was likely to be poor well-head protection, rather than a generalised effect on the aquifer, as indicated in the field notes and photographs of the bore. This is still of concern and the affected parties have been advised to bring the bores or wells up to standard.

4.6 Effluent Application Testing

Effluent application testing commenced in mid 2008, in response to a change in Councils dairy discharge consent conditions requiring that irrigator systems be audited to check compliance with application rates and depths.

As a result of this decision, 128 out of 206 new consents were monitored during the 2008/09 dairy season. Of the remainder, 32 consents were deferred due to other factors, such as conversions that had not been completed. The unusually wet spring conditions limited the number of tests able to be carried out as, under current consent conditions, irrigation cannot occur when soil moisture levels are high, therefore many areas were unable to be assessed before Christmas.

Results from the testing programme have provided the dairy industry and Environment Southland advisers with very useful information around irrigator performance. Several potential maintenance issues have been identified and staff have witnessed some practices and improvements that can be passed on, to help others improve their current systems.

Of continuing concern is the lack of fail safe devices on travelling irrigators – these are now being required by present consent conditions.

As a result of the testing programme, Environment Southland has also been able to scrutinise and amend our own testing procedures. This means that the assessment methods we now use are more suited to on-farm conditions and better reflect the operating strengths and weaknesses of particular systems. Accordingly, a number of farms were reviewed and approved for use after initial "fail" results. A further 14 farms were able to review their operating procedures, or make repairs to plant which allowed them to meet their consent requirements on a retest.

Table 3 – Effluent application testing results

Irrigator make/ model	*Irrigator speed setting*	*Time taken for pass*	*Diameter of spread*	*Average depth recorded*	*Maximum depth recoded*	*Consented Maximum Depth*	*Average Rate Recorded*	*Max Rate Recorded*	*Consented Maximum Rate (mm/hr)*
ACM	2 cams 3 teeth	32 mins		11.4	16.9	15	11.4	16.9	10
ACM	2 lobes 3 teeth	21 min 02 sec	30	7.19	10.4	8	7.19	10.4	n/a
ACM		23 min 01 sec	36.9	5.86	12.1	8	5.86	12.1	n/a
Briggs 10	2 cams 4 teeth	51 min 29 sec	29.8	16.36	20.4	15	16.36	20.4	n/a
Briggs 10	2 cams 3 teeth	19 min 48 sec	25.5	12.4	21.6	15	12.4	21.6	10
Briggs 10	2 cam 3 teeth	33 min 52 sec	24.2	14.5	27.4	15	14.5	27.4	10
Briggs 10	2 cam 5 teeth	13 min 31 sec	23.27	6	11	15	26.8	48.8	10
Briggs 15	5 cams 1 tooth	40 min	38.95	8.5	13.1	15	8.5	13.1	n/a
Briggs 15	2 cams 4 teeth	32 min 59 sec	20.9	8.1	19	15	8.1	19	10
Briggs 15	5 cam 1 tooth	33 min 5 sec		9.8	17.5	10	9.8	17.5	10
Briggs 15	5 cams 2 teeth	45 min 55 sec	37.1	8.36	14.7	8	8.36	14.7	n/a
Briggs 15	5 cam 1 tooth	69 min		17.5	32.2	8	14.3	37.03	n/a
Briggs 15	5 cams 1 tooth	54 mins 17 sec		7.08	15.6	8	7.08	15.6	n/a
Briggs Roto Rainer	7 cams 1 tooth	77 min 10 sec	67.4	6.8	14.3	10	5.3	18.4	10
Enviro-spreader	3 cam 1 tooth	35 min 10 sec	27.1	12.3	20.7	15	12.3	20.7	10
Enviro-spreader	fastest	19 min 48 sec	25.5	8.8	18.2		8.8	18.2	10
Enviro-spreader	3 lobes (fastest)	17 Min	29.1	4.7	10.7	15	4.7	10.7	10
Enviro-spreader	Fastest	19 min 53 sec	17.1	6.49	8.3	15	6.49	8.3	10
Humes	2 cams 2 teeth	24 min		15.4	35	15	15.4	35	10
Irripods	4/20 pods	49 min 50 sec	15.1	4.5	8.8	15	5.43	10.6	5
Irripods	3/6 Pods	53 min 04 sec	18.9	3.4	10.5	10	4.5	11.9	5
Irripods	3/6 pods	42 min 20 sec	15	3.2	6.4	15	4.498	9.1	5
Irripods	4/6 pods	44 min 15 sec	20.5	3.7	9.1	15	4.6	12.3	5
Irripods	4/6 pods	34 min 43 sec		1.95	4.8	15	3.88	8.3	5
Irripods	3/6 pods	49 min 17 sec	22.9	2	7	15	3.32	9	5

Irrigator make/ model	*Irrigator speed setting*	*Time taken for pass*	*Diameter of spread*	*Average depth recorded*	*Maximum depth recoded*	*Consented Maximum Depth*	*Average Rate Recorded*	*Max Rate Recorded*	*Consented Maximum Rate (mm/hr)*
Irripods	3/6 pods	46 min 23 sec		1.788	6.4	15	2.31	8.28	5
Irripods	3/6 pods	41 min 31 sec		3.3	7.6	15	4.77	11	5
K-line	4/6 pods	32 min 33 sec	15.8	3.3	5.9	10	3.3	5.9	5
K-line	4/6 pods	30 min 7 sec	16.4	2.4	5.1	15	4.8	7.2	5
K-line	4/6 pods	34 min 37 sec	14.5	2.06	3.9	15	3.55	6.76	5
K-line	3/12 pods	33 min 38 sec		2.8	4.5	15	4.98	8	5
K-line	3/6 pods	37 min 57 sec	15.8	1.3	6	15	3.35	9.5	5
K-line	4/6 pods	51 min 25 sec	19.5	4.35	7.2	15	5.14	8.4	5
K-line	3/6 pods	43 min 34 sec	15	2.1	4.3	15	3.42	5.9	5
K-line	3/6 pods	37 min 18 sec	24.8	2.27	5.46	15	5	8.8	15
Plucks	2 cams 4 teeth	28 mins 6 secs	34.5	7.1	14.7	15	15.1	31.4	10
Plucks	2 cams 4 teeth	38 min 26 sec	34.5	11.2	18.3	15	18.23	28.6	10
Plucks	2 cams 4 teeth	59 min 39 sec	33.1	14.7	26	8	14.8	29.7	n/a
Plucks	2 cam 2 tooth	38 min		17.1	42.6	8	27	67.26	n/a
Spitfire		39 min		9.9	17.4	15	9.9	17.4	5
Spitfire		57 min 50 sec	52.9	10.22	19.6	15	10.22	19.6	5
Williams	2 lobes 3 teeth	46 min 02 sec	29.7	9.65	17	15	9.65	17	10
			30	14.17	17.9	18			n/a
	fastest	26 min 16 sec		11	17.3	15	11	17.3	10
Enviro-spreader	3 cams 1 tooth	29 min 7 sec		7.22	12.84	15	7.22	12.84	10
Briggs 15	2 cams 2 teeth	42 min 35 sec		8.84	14.4	15	8.84	14.4	10
Enviro-spreader	3cams 3 teeth	19 min 32 sec		4.85	7.54	15	4.85	7.54	10
Plucks	2 cams 2 teeth	25 min 06 sec		10.85	25.77	8	10.85	25.77	n/a
Plucks	2 cams 4 teeth	14 min 46 sec		5.5	8.41	15	5.5	8.41	10
Plucks	?	23 min		6.25	10.4	15	6.25	10.4	10
K-line	3/6 pods	43 min 43 sec		1.53	3.64	15	2.09	5	5
Briggs 15	5 cams 5 teeth	51 min 12 sec		9.82	17.52	10	9.82	17.52	n/a
Briggs 15	5 cams 5 teeth	56 min 36 sec		8.4	15.09	15	8.4	15.09	5

Irrigator make/ model	*Irrigator speed setting*	*Time taken for pass*	*Diameter of spread*	*Average depth recorded*	*Maximum depth recoded*	*Consented Maximum Depth*	*Average Rate Recorded*	*Max Rate Recorded*	*Consented Maximum Rate (mm/hr)*
K-line	3/6 pods	34 min 06 sec		1.49	3.64	15	2.63	6.4	5
Irripods		45 min		2.4	4.68	15	3.2	6.2	5
ACM	2 lobes 3 teeth	51 min 07 sec		15.56	25.1	8	18.27	29.5	n/a
ACM	2 lobes 3 teeth	21 min 53 sec		7.63	14.6	8	20.93	40.1	n/a
Irripods	3/6 pods	32 min 08 sec		2.33	16.48	5	4.35	30.8	5
Irripods	4/6 pods	34 min 33 sec		1.84	5.37	15	3.2	9.3	5
Slurry Tanker	low ratio/c /3rd gear	4 sec		2.23	2.34	8	2.23	2.34	n/a
Spitfire		57 min 50 sec		10.22	19.6	15	10.22	19.6	5
Plucks	2 lobes 4 teeth	16 min 58 sec		6.19	10.06	8	6.19	10.06	n/a
Irripods		50 min		2.16	4.33	15	2.59	5.2	5
K-line		50 min		2.55	4.42	15	3.06	5.3	5
K-line	4/12 pods	49 min 02 sec		2.46	5.11	15	3.01	6.3	5
K-line	3/6 pods	37 min 18 sec		2.27	5.46	15	3.65	8.8	5
Irripods	3/6 pods	43 min 26 sec		2.85	8.6	5	3.94	11.9	n/a
K-line	?	40 min		1.86	3.3	15	2.79	5	5
Irripods	4/12 pods	29 min 05 sec		1.73	3.38	15	3.57	7	5
Irripods	3/6 pods	46 min 38 sec		2.88	7.37	15	3.71	9.5	5
Briggs 15	5 cams 5 teeth	29 min 52 sec		7.06	14.23	8	7.06	14.23	8
Briggs 15	5 cams 5 teeth	39 min 22 sec		6.67	14.75	15	6.67	14.75	5
Irripods	3/6 pods	38 min 52 sec		2.14	4.85	15	3.33	7.6	5
Irripods	3/6 pods	41 min 41 sec		2.68	5.46	15	3.85	7.9	5
Briggs 15	5 cams 5 teeth	26 min 31 sec		6.02	15.61	8	6.02	15.61	n/a
Muck Spreader	1700 RPM/ low ratio/ 2nd gear	10.13 sec		2.27	2.77	8	2.27	2.77	n/a
Numatic Adcam 750	2 lobes 4 teeth	32 min 44 sec		10.76	17.35	15	10.76	17.35	10
Irripods	3/6 pods	35 min 14 sec		1.92	3.64	Aug-15	3.26	6.2	5-May

Irrigator make/ model	*Irrigator speed setting*	*Time taken for pass*	*Diameter of spread*	*Average depth recorded*	*Maximum depth recoded*	*Consented Maximum Depth*	*Average Rate Recorded*	*Max Rate Recorded*	*Consented Maximum Rate (mm/hr)*
Briggs 10	3 cams 3 teeth	26 min 33 sec		7.27	14.57	n/a	7.27	14.57	12
Irripods	3/6 pods	41 min 43 sec	23	1.83	5.2	15	2.63	7.5	5
Irripods	3/6 pods	43 min 24 sec	21.8	1.85	8.06	15	2.56	11.1	5
Enviro-spreader	2 lobes 2 teeth	14 min 23 sec		3.47	6.5	8	3.47	6.5	n/a
Spitfire	A	47 min 14 sec	50.7	10.5	13.01	8	10.5	13.01	n/a
Spitfire	A	33 min 49 sec	54	6.29	7.37	8	6.29	7.37	n/a
Plucks	2 lobes 6 teeth	27 min 36 sec	23.2	10.41	21.69	10	10.41	21.69	n/a
Irripods	3/6 pods	44 min 33 sec	22.4	2.95	7.28	15	4	9.8	5
ACM	2 lobes 6 teeth	36 min 56 sec	21.7	11.76	22.56	15	11.76	22.56	10
Irripods	3/6 pods	49 min 14 sec	19.9	1.64	6.5	15	2.7	7.9	5
Irripods	1/1 pods	22 min 12 sec	10.4	3.38	12.14	15	11.19	32.8	5
K-line	4 pods	44 min 58 sec	67.5	3.99	5.37	15	5.41	7.2	5
Irripods	3/6 pods	45 min 50 sec	21.4	2.42	8.85	15	3.87	11.6	5
Spitfire	A	25 min 43 sec	63	3.99	11.36	8	3.99	11.36	n/a
K-line	3/6 pods	57 min 41 sec	19.8	4.51	6.33	15	4.62	6.6	5
K-line	3/6 pods	48 min 15 sec	18.2	2.43	5.98	10	3.42	7.4	n/a
K-line	4/6 pods	41 min 47 sec	16.3	2.08	5.03	15	3.39	7.1	5
Briggs 15	5 cams 5 teeth	63 min 57 sec	36.7	9.98	25.16	15	9.98	25.16	5
Briggs 15	5 cams 5 teeth	37 min 17 sec	33.5	9.54	18.22	15	9.54	18.22	5
Plucks	2 lobes 7 teeth	11 min 36 sec	26.2	4.55	7.98	15	23.57	41.3	10
Plucks	2 lobes 8 teeth	42 min 00 sec	25.5	7.76	18.39	15	13.01	26.3	10
ACM	2 lobes 6 teeth	21 min 08 sec	28.4	8.32	10.41	15	8.32	10.41	10
Enviro-spreader	3 cams 3 teeth	23 min 26 sec	35.8	5.37	8.32	8	5.37	8.32	n/a
K-line	4/6 pods	41 min 33 sec	17.8	2.08	3.21	15	2.98	4.6	5
Ranger	B4 1000 rpm	29.50 sec	27.6						
Ranger	A2 800 rpm	59.41 sec	27.6						

Irrigator make/ model	*Irrigator speed setting*	*Time taken for pass*	*Diameter of spread*	*Average depth recorded*	*Maximum depth recoded*	*Consented Maximum Depth*	*Average Rate Recorded*	*Max Rate Recorded*	*Consented Maximum Rate (mm/hr)*
Tri-max	3 cams 3 teeth	96 min 58 sec	35.35	14.75	32.53	8	9.92	20.1	n/a
Briggs 15	5 cams 5 teeth	29 min 17 sec	37	6.07	9.02	6	6.07	9.02	n/a
Irrimax 16	3 cams 3 teeth	37 min 22 sec	34.6	10.93	21.34	8	10.93	21.34	n/a
K-line	4/6 pods	44 min 16 sec	17.2	2.42	4.33	15	2.96	5.9	5
Irripods	3/6 pods	47 min 05 sec	20.4	2.25	6.85	15	3.53	8.7	5
K-line	3/7 pods	52 min 48 sec	16.7	1.99	6.24	15	2.66	7.1	5
K-line	3/7 pods	37 min 48 sec	18.3	2.29	4.51	15	3.64	5.1	5
Briggs 15	4 of 5 cams 4 teeth	55 min 00 sec	31.53	12.99	18.74	8	12.99	18.74	n/a
Plucks	2 lobes 6 teeth	29 min 29 sec	30.4	6.3	14.66	15	12.84	29.8	10
Plucks	2 lobes 5 teeth	23 min 56 sec	28.4	7.52	11.1	15	18.85	27.8	10
Briggs 15	5 cams 5 teeth	54 min 01 sec	50.2	8.59	14.92	15	8.59	14.92	10
K-line	3/6 pods	49 min 04 sec	14.3	2.43	4.77	15	2.98	5.8	5
Irripods	4/6 pods	48 min 21 sec	18.2	2.71	13.01	15	3.37	16.1	5
Irripods	3/6 pods	41 min 58 sec	19.94	2.76	5.9	15	3.94	8.4	5
K-line	4/6 pods	50 min 59 sec	17.7	2.46	5.29	15	2.89	6.2	5
Plucks	2 lobes 23 teeth	36 min10 sec	24.3	13.82	31.92	15	13.82	31.92	10
Irripods	3/6 [pods	43 min 23 sec	27.8	2.23	5.98	15	3.09	8.3	5
Briggs 100	6 cams 6 teeth	85 min 48 sec	68.8	4.7	14.5	10	3.29	10.1	10
K-line	4/6 pods	44 min 14 sec	18.1	1.83	5.11	15	2.48	6.9	5
Irripods	3/6 pods	37 min 21 sec	20.6	4.436	43.38	15	6.29	61.5	5
Schuite Maker Perfecta 180	4 km per hour	8.9 sec	19	1.3	2.77	15	1.3	2.77	5
Briggs 15	5 cams 5 teeth	20 min 12 sec	30.7	6.47	17.44	8	6.47	17.44	n/a
Spitfire	A	23 min 48 sec	52.8	5.29	8.85	8	5.29	8.85	n/a
Spitfire	A	23 min 14 sec	51.2	5.4	8.93	8	5.4	8.93	n/a
ACM	2 cams 4 teeth	52 min 37 sec	28.9	23.24	38.17	8	23.24	38.17	n/a

Irrigator make/ model	*Irrigator speed setting*	*Time taken for pass*	*Diameter of spread*	*Average depth recorded*	*Maximum depth recoded*	*Consented Maximum Depth*	*Average Rate Recorded*	*Max Rate Recorded*	*Consented Maximum Rate (mm/hr)*
Briggs 15	5 cams 5 teeth	63 min 18 sec	37.9	10.48	16.65	15	9.93	15.8	8
Irripods	3/6 pods	35 min 34 sec	19	2.92	4.07	15	4.92	6.9	5
Irripods	3/6 pods	44 min 57 sec	17.3	3.24	8.32	15	4.32	11.1	5
K-line	3/6 pods	37 min 23 sec	18.4	4.29	7.98	15	6.89	12.8	5
Irripiods	3/6 pods	34 min 27 sec	22.7	1.89	5.37	15	3.3	9.4	5
Plucks	2 lobes 7 teeth	46 min 45 sec	31.7	8.57	14.92	8	8.57	14.92	n/a
Briggs 15	5 cams 5 teeth	41 min 33 sec	32.3	9.47	19.26	15	9.47	19.26	10
Briggs 10	2 cams 6 teeth	21 min 28 sec	24.1	9.67	25.51	15	9.67	25.51	10
Irripods	3/6 pods	43 min 04 sec		1.45	5.64	15	2.02	7.9	5
Briggs 10	2 cams 6 teeth	27 min 42 sec	25.8	11.16	19.95	8	11.16	19.95	n/a
Briggs 10	3 cams 3 teeth	20 min 55 sec	27	7.82	11.8	8	7.82	11.8	n/a
K-lines	3/6 pods	38 min 43 sec	21.1	2.93	4.77	10	4.54	7.4	n/a
Irripods	3/6 pods	40 min 11 sec	19.35	2.27	6.78	15	3.39	10.1	5
K-lines	3/3 pods	44 min 57 sec	22.9	1.98	5.2	15	2.64	6.9	5
Briggs 15	5/5 cams 5 teeth	35 min 09 sec	38.4	8.83	15.44	10	8.83	15.44	n/a
Valley (pivot irrigator)		20 min 17 sec	18.3	4.5	5.72	5	4.5	5.72	n/a
Valley (pivot irrigator)		9 min 49 sec	18.5	3.71	5.03	5	3.71	5.03	n/a
ACM	2 cams 4 teeth	24 min 41 sec	25.1	9.7	16.31	15	9.7	16.31	10
Irripods	3/6 pods	42 min 41 sec	23.8	2.5	8.32	15	3.52	11.7	5
Plucks	2 lobes 8 teeth	39 min 59 sec	35.87	9.23	17.35	8	9.23	17.35	n/a
Irripods	3/6 pods	39 min 17 sec	20.2	2.18	5.64	15	3.32	8.6	5
K-line	3/6 pods	41 min 35 sec	22.4	2.99	4.16	15	4.3	6	5
Enviro-spreader	3 cams 3 teeth	16 min 14 sec		4.39	7.28	5	4.39	7.28	10
Plucks	2 cams 6 teeth	32 min 17 sec	20.5	8.06	11.8	15	8.06	11.8	n/a
Spitfire	A	22 min 30 sec	46.7	4.67	8.24	8	4.67	8.24	n/a

Irrigator make/ model	*Irrigator speed setting*	*Time taken for pass*	*Diameter of spread*	*Average depth recorded*	*Maximum depth recoded*	*Consented Maximum Depth*	*Average Rate Recorded*	*Max Rate Recorded*	*Consented Maximum Rate (mm/hr)*
K-line	3/6 pods	39 min 24 sec	19.1	2.42	4.16	15	3.68	6.3	5
Irripods	3/6 pods	46 min 43 min	20.4	2.57	5.72	15	3.3	7.3	5
Enviro-spreader	3 cams 3 teeth	19 min 23 sec	25.8	6	11.1	8	6	11.1	n/a
Irripods	3/6 pods	50 min 54 sec	20.2	3.47	6.33	15	4.1	7.5	5
Briggs 15	5 cams 5 teeth	31 min 53 sec	35.3	6.13	10.58	8	6.13	10.58	n/a

Figure 31 - Ponding from a failed irrigator test

Figure 32 - Irripods in operation during testing

Figure 33 - Travelling irrigator during testing

5.0 Structures in Waterways

5.1 Whitebait Structures

Environment Southland is responsible for the management of structures used for the purpose of whitebaiting throughout the Southland and Fiordland regions.

Resource consent is required for a whitebait structure over a waterway. A total of 657 resource consents are currently held across seven rivers in the Southland and Fiordland regions for the purpose of whitebaiting. Environment Southland has no plans to increase the amount of structures allowed for whitebaiting.

A breakdown of the number of consents for whitebait structures per river is as follows:

- Mataura 329
- Aparima 165
- Titiroa 97
- Waikawa 28
- Pourakino 17
- Awarua 15
- Hollyford 6

The majority of consents are to use, occupy and erect a structure in a coastal marine area. There are nine consents that are for land use, as they fall outside the coastal marine area.

Whitebait structure inspections were carried out on the Mataura, Titiroa, Waikawa, Aparima and Pourakino rivers during the 2008 whitebait season. There is no provision for whitebait structures on the Oreti and Makarewa rivers and no compliance monitoring was carried out during the 2008 season on these rivers.

Compliance with consent requirements has not improved when results are compared to the 2006 season (below Figure 34). The number of structures that did not display the proper identification requirements was higher than the 2006 season, as were the structures found in an unsatisfactory condition. The most disappointing result was the two-fold increase in the amount of structures that required minor repair work. Consent holders are required to maintain their structure in good repair, appearance and condition. This is important to minimise the effect on the landscape and to protect members of the public.

Also of concern was the number of structures (45) that did not meet the measurements of the submitted plan on file. It should be noted that inspections were not carried out during the 2007 season. Consent holders are required to submit a plan of their structure that accurately represents what is

physically on, or over the waterway. If any alterations are to be made, written approval from the council must be obtained.

Other issues included incidents such as unconsented bank protection work, old stands not being removed and back ropes/buoys creating a navigational hazard on restricted water ways like the Titiroa River. Three unconsented structures were located, one of which was a building within the coastal marine area (CMA).

Figure 34 – Results of whitebait inspections 2005-2008

Notes on grading

- ***Unsatisfactory***
  - old structures not being removed;
  - stands that were unsafe due to boards missing or not sufficiently braced;
  - generally appearing in an unsafe state;
  - illegal dumping of tyres/iron etc within the CMA;
  - general depositing of rubbish into the CMA.

- ***Minor Repairs***
  - general tidy up required due to loose boards, rotten timber, or flood damage with debris;
  - odd board missing.

- ***No name or highlighting required***
  - structure number was missing;
  - number was barely legible and needed highlighting.

6.0 Truckwashes

There were 25 consented truck wash inspections undertaken by the Compliance Division during the 2008/09 year. A total of three sites were non-compliant with their consent requirements. Two of these were due to non-provision of data.

One inspection resulted in a revisit being deemed necessary, due to contaminants having flowed out of a sealed containment area and into a gully. That consent holder has subsequently failed the re-inspection and is now facing another re-inspection and possible enforcement action.

Several other sites were also looked at to assess compliance with their permitted activity status. There were no significant issues noted at these sites.

It is pleasing to note that no unconsented truck wash operations were found during the year, which is an improvement on previous years.

7.0 Coastal Marine Area

7.1 South Coast Inspections

The south coast structure inspections are monitored at three yearly intervals. The inspections include coastal areas around Southland, but exclude Fiordland, Stewart Island and the wharves in Bluff and Riverton Harbours.

The structures are mainly boatsheds, ramps, jetties and marine farms, but can include anything that is placed in, or over the coastal marine area (excluding whitebait stands). The marine farms were inspected in the Bluff Harbour/Awarua Bay area by boat, with all other structures being inspected from the land.

Consents are issued for a structure in the coastal marine area, but do not allow the consent holder to hold exclusive occupation rights. The coastal marine area is defined as being up to the mean high water spring mark.

Consent holders are required to display a name and number on their structure and keep the structure well maintained. The condition of piles, rails, external cladding and any other attachments are assessed.

In 2009 compliance staff inspected a total of 42 consented structures. Of those, 37 were compliant with their resource consent. Four structures were found to have no visible name and number and one structure was in need of some minor repairs. Three structures were noted as being in an unsatisfactory state.

The consent on one structure was found to have expired. The owner has been sent a warning letter to apply for resource consent immediately. The structure is also in an unsatisfactory condition.

Another structure was found to be in poor condition, with a new owner having taken it over and not wanting to accept responsibility for repairs. This site is still under investigation.

A further large structure was found and appears to have no resource consent, this matter is currently under investigation.

7.2 Marine Farms

In 2005 Environment Southland was provided with details of all licences and marine farm permits for the Southland region by the Ministry of Fisheries. Pursuant to Sections 10(1) and 20(2) of the Aquaculture Reform (Repeals and Transitional Provisions) Act 2004 (ARA 2004), all these licences and marine farm permits are now deemed to be a coastal permit granted under the Resource Management Act 1991.

On 14 December 2005, pursuant to Sections 10(4) (licences) and 20(3) (marine farm permits) of the ARA 2004, the Council commenced a review of the deemed coastal permits, including the conditions of the permits.

The review will, if the Council considers it necessary, vary, add, or delete conditions for the purpose of making the conditions consistent with the Resource Management Act 1991.

A significant part of the review process included surveying all marine farm sites to determine whether or not they occupy their authorised space. If a marine farm site was found to be off-site, the Council required an application, lodged prior to 31 December 2006, for the farm to remain in its actual space (unless the marine farmer chooses to move the farm back to its authorised space). Marine farms with sites that were found to be oversized (occupying more space than allowed for in the coastal permit) had to reduce the size of the farm. Another issue of concern, specific to the Big Glory Bay marine farm sites, was off-site anchor and anchor lines. This was dealt with by including all off-site anchor and anchor lines within the aquaculture management area for each respective marine farm.

The survey work described above has now been completed, with consent holders contributing to the cost. The review of consent conditions is still to be worked through.

It was previously decided no inspections would be undertaken until the coastal permit review process had been completed. This was to avoid duplication of work and cost to the consent holders. Inspection options to check previous non compliant structures/farms will be evaluated in the near future.

7.3 Commercial Surface Water Activities

The Resource Management Act 1991 (RMA), in conjunction with the Regional Coastal Plan for Southland, allows for the undertaking of commercial surface water activities in Fiordland by way of resource consent, commonly know as a coastal permit.

Environment Southland is responsible for ensuring compliance with conditions of coastal permits that have been issued pursuant to the RMA and policies/rules contained within the Regional Coastal Plan for Southland.

This is achieved, firstly, by monitoring activity logs submitted by authorised commercial surface water consent holders no later than one month following each calendar quarter. There has been a high level of compliance with this requirement during the past year.

Enforcement patrols, conducted jointly with Ministry of Fisheries and Department of Conservation staff, provided a physical "on the water" presence in Fiordland and also provided an opportunity for face to face interaction with consent holders, recreational and other commercial users of the marine environment.

One such patrol was completed during late March/early April 2009, however inclement weather and sea conditions encountered outside the fiords restricted monitoring activity to the internal waters only.

Several consented vessels were inspected and one recreational vessel operator was spoken to, and education provided, as to the legality of the activity being undertaken.

A prosecution in relation to alleged illegal commercial surface water activities in Fiordland, which arose from an investigation in 2008, is currently before the Court and one abatement notice was issued this year to a commercial surface water consent holder believed to be operating outside of their consent conditions.

Figure 35 – Kayakers enjoying the wilderness

8.0 Major Industries

8.1 Alliance Group - Mataura

Monitoring

Alliance Group Mataura holds a number of discharge, water use and land use consents. Listed below are the main resource discharge consents that require regular monitoring to:

- discharge wastewater to the Mataura River;
- discharge cooling water to the Mataura River;
- discharge contaminants to air from the meat plant; and
- discharge sludge to land on selected properties.

Phosphorus was identified as a key element in effluent discharge when the current consent was granted in 2004. A three year period was provided to investigate, trial and establish a new treatment system, but in December 2007 (when the new limit became current) the effluent failed to continuously achieve the targeted dissolved reactive phosphorus (DRP) loading in the 2007/08 season. This was highlighted as a serious issue and one of concern to Environment Southland. Alliance staff were requested to explain the position to Council and prepare an action plan to address the issue.

A number of changes and modifications were made over the 2008 off-season, but in November 2008 it became evident that some improvements made had not been successful in helping achieve full compliance with the DRP loading condition. Progress against the action plan was regularly reported directly to the Council's Environmental Management Committee and significant investment and investigation was undertaken. In February 2009, Alliance staff were able to report that they believed that they had identified the reason for a significant proportion of the non-compliance.

At that time it was discovered that a significant part of the problem was related to the way that monitoring samples were collected and stored. Small subsamples of effluent were collected from each of the main treatment tanks that feed into the final discharge to the Mataura River. These subsamples were combined and stored in the same vessel for 24 hours until it was removed and sent for analysis. This was not a true representation of the discharge, as the effluent from the alkaline based treatment section was being stored in acid conditions, artificially releasing some of the tightly bound phosphorus into solution. This elevated the quantity of dissolved reactive phosphorus measured in the sample taken for analysis. The sample collection process was reconfigured to store the samples from each treatment tank separately, combining them just before they are sent for analysis. This reconfigured system was run in conjunction with the existing system through January and February 2009 to verify the process before fully implementing it in April 2009.

Since April 2009 the dissolved reactive phosphorus results have been compliant with this condition.

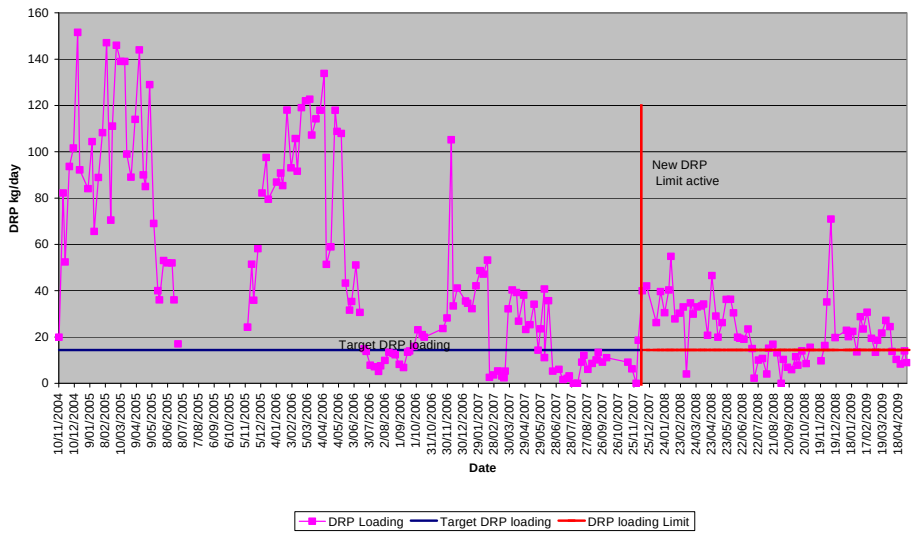


Figure 36 - Dissolved reactive phosphorus loading discharged to the Mataura River from the Alliance Group Mataura with respect to previous seasons monitoring

The meat processing industry also generates waste in the form of semi-solid sludge. This material has high nutrient value and is spread to land on a number of consented properties in the Northern Southland area. The sludge is applied to land by a private contractor and has been fully compliant with the consent during the 2008/09 season.

Complaints and self-reported incidents

One complaint was received from a local resident in Mataura relating to an odour allegedly being discharged from the Alliance Group Mataura Plant. This was investigated with no odour detected, but a representative indicated that a problem in the rendering plant had been experienced and that this had been resolved.

The Alliance Environmental Manager self-reported one incident of a relatively minor discharge of untreated waste. This was investigated and resolved.

One complaint of the application of effluent sludge to an area of non-consented land was received. This was investigated and confirmed. All involved parties were reminded of their responsibilities under this consent.

Issues

The dissolved reactive phosphorus loading has been a serious issue for the last two seasons. A considerable amount of time and money has gone into the resolution of this issue and it is expected that the plant will be fully compliant with the consent during the 2009/10 season.

A bacterial growth called "sewage fungus" was observed to be present this year in the Mataura River, downstream of the Alliance Mataura discharge. This bacteria tends to thrive and bloom in the presence of specific biological sugars. Several investigations have been done to identify the possible source of these sugars, but more work is scheduled to be conducted to resolve this issue.

Total sulphide is typically discharged from the fellmongery, or the pelt house. Later in the season some unusually elevated concentrations of sulphide were detected in the river discharge. While the concentration of sulphide remained fully compliant with the consent, this is another area which Alliance staff have signalled will be investigated in the new season

General

As a measure of its commitment to environmental management the Alliance Group has achieved ISO 14001 certification. This is an international certification that is externally audited annually, which demonstrates that the company has the systems in place to actively manage environmental issues on its plants and promotes the principle of continual improvement within the company.

Table 4 – Alliance Group Limited Mataura plant – performance summary

Issue	*Score*	*Comments*
Provision of data/results.	Excellent	Data was reported on time and was completed as required by the consent.
Compliance with consent conditions.	Very Good	Overall compliance was good, with two issues arising during the year. The first was DRP compliance and the second was the growth of sewage fungus in the river below the outfall.
Responsiveness to issues.	Very Good	Alliance management responded promptly and personally to all issue that arose during the year
Keeping Environment Southland informed of intentions, changes, etc.	Excellent	Alliance staff are very good at communicating their intentions.

8.2 Alliance Group - Lorneville

Monitoring

Alliance Group Lorneville holds the following resource discharge consents that required monitoring to:

- discharge wastewater to the Makarewa River;
- discharge wastewater to land;
- discharge contaminants to air discharge from the meat plant;

- discharge leachate from two closed landfills and;
- discharge to land via a contingency short term storage pond.

A well established meat processing plant, Alliance Group Lorneville dates back to the early 1900's. Since this time the treatment of the water based effluent has evolved considerably, based largely around the establishment of approximately 34 hectares of treatment ponds used to biologically treat the effluent. This generally produces a consistent quality of effluent, but it still requires close management.

The consistency of the effluent produced by this type of system can be clearly demonstrated in the concentration of the nutrients present in the effluent being discharged. Figure 37 shows that the concentration of ammonia nitrogen and total phosphorus, whilst seasonal, has changed little over the past six seasons.

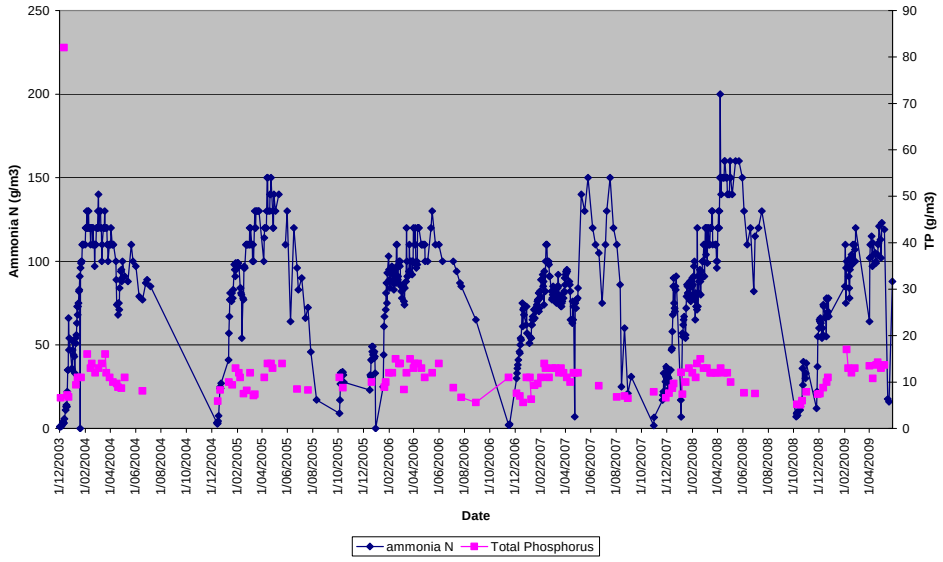


Figure 37 - Concentration of ammonia nitrogen and total phosphorus in the Alliance Group Lorneville discharge over recent seasons

Management still remains an issue, which can be demonstrated in Figure 38. The $cBOD_5$ and total suspended solids concentrations in the discharge this year were consistently lower, showing that the Alliance staff managed the operation of the ponds very well and the quality of the discharge remained well within the consented limits.

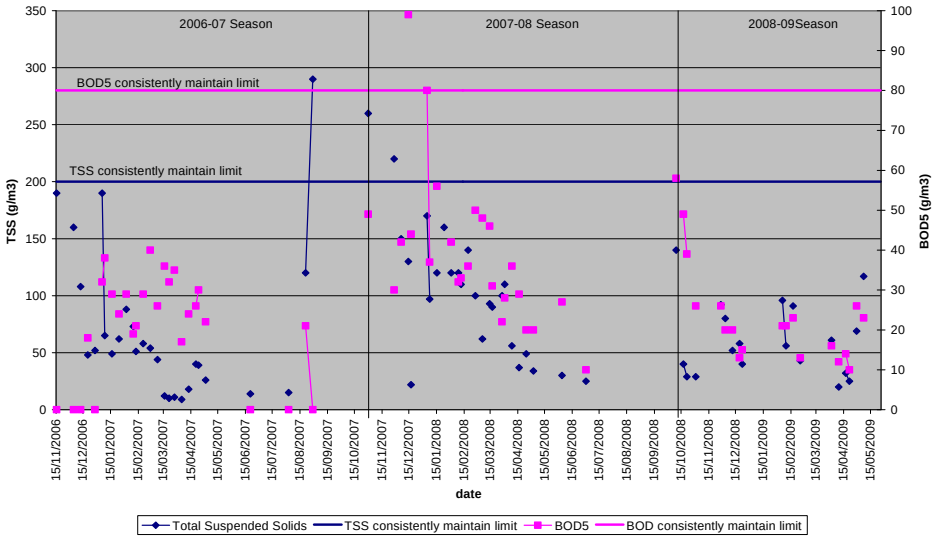


Figure 38 - Concentration of cBOD$_5$ and TSS in the Alliance Group Lorneville discharge over recent seasons

As well as discharging effluent to the Makarewa River, Alliance has consent to discharge effluent to land. This consent was exercised between mid-February and mid-March 2009. The annual report to measure compliance against this consent was not available at the time of preparing this report, but historically performance against this consent has been good.

Complaints and self-reported incidents

Environment Southland did not receive any environmental complaints relating to the Alliance Group Lorneville plant this year.

Issues

The main challenge for the Alliance Group Lorneville plant continues to be the need to reduce the ammonia nitrogen and dissolved reactive phosphorus concentrations in the discharge. While the company continues to be fully compliant with the current consent (which expires in 2016), the concentration of both contaminants will be closely scrutinised when an application to renew this consent is received. Ammonia nitrogen has the potential to be toxic to aquatic organisms at elevated levels and the increased levels of nitrogen and phosphorus enhance the growth of nuisance weed and periphyton (algal growths).

General

As a measure of its commitment to environmental management, the Alliance Group has achieved ISO 14001 certification. This is an international certification that is externally audited annually, which demonstrates that the company has the systems in place to actively manage environmental issues on its plants and promotes the principle of continual improvement within the company.

Table 5 - Alliance Group Limited Lorneville plant – performance summary

Issue	*Score*	*Comments*
Provision of data/results.	Excellent	Data was reported on time and was complete as required by the consent.
Compliance with consent conditions.	Very Good	Good management of the treatment system has resulted in only a few issues.
Responsiveness to issues.	Excellent	Alliance management responded promptly and personally to all issues that arose during the year
Keeping Environment Southland informed of intentions, changes, etc.	Excellent	Alliance management responded promptly and personally to all issues that arose during the year

8.3 Alliance Group - Makarewa Plant

Monitoring

Alliance Group Makarewa currently holds the following resource discharge consents that require monitoring to:

- discharge wastewater to the Makarewa River;
- discharge wastewater to land;
- discharge contaminants to air discharge from the meat plant;
- discharge leachate from two closed landfills to land; and
- discharge cooling water to the Makarewa River.

The processing plant on this site has a long history in the meat processing industry. Originally established to process sheep, the Alliance Group Makarewa and its processors established an extensive biological pond treatment system designed to treat effluent, meeting the requirements of its discharge consent. Since then the plant has undergone a number of changes to the point where it is now a double shift venison slaughter and further processing plant. The volume of effluent produced by the current processing system is considerably less than the system was originally designed for, consequently the pond system has significant storage capacity to enable the company to discharge to the river only when the river levels are between 10 and 17 m^3/s or greater.

In March 2009 a new consent was granted for the discharge of treated meat processing wastewater to the Makarewa River. The effluent quality of the discharge for the 2008/09 season was fully compliant with the two consents.

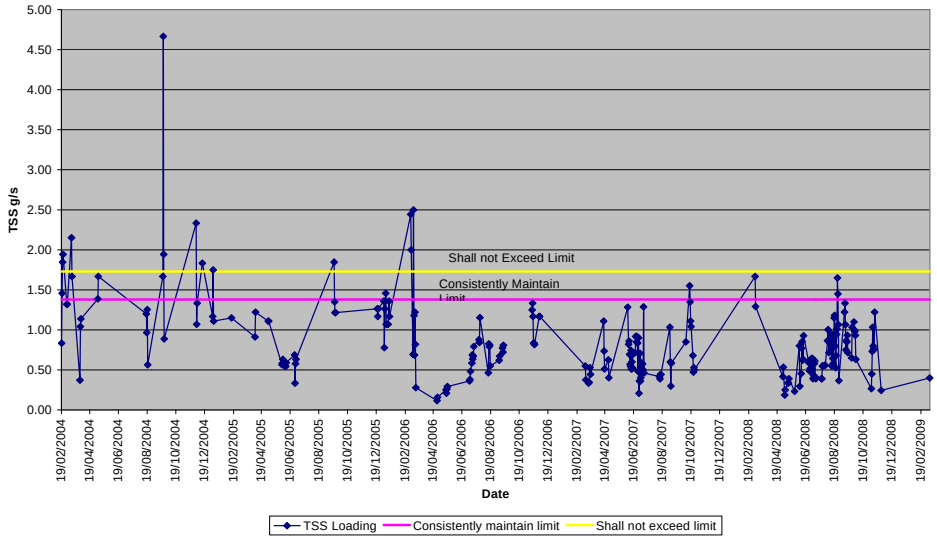


Figure 39 - Total suspended solids loading in the Alliance Group Makarewa discharge as required in consent number 201308 which was superseded by a new consent in March 2009

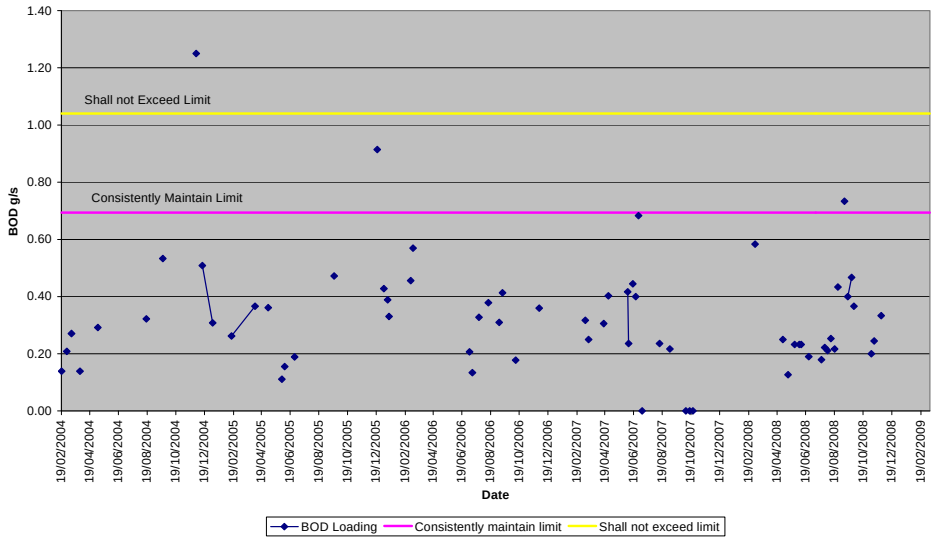


Figure 40 - Biochemical Oxygen Demand loading in the Alliance Group Makarewa discharge as required in consent number 201308, which was superseded by a new consent in March 2009

The consent to discharge effluent to land was exercised between late January and February 2009. The operation of the irrigation system was fully compliant with the conditions in this consent.

Alliance has, in the past, operated two landfills for ash and general refuse. The quality of the leachate from these closed landfills was somewhat variable, but compliant with the consent.

The cooling water discharge was fully compliant with consent conditions.

Complaints and self-reported incidents

Environment Southland did not receive any environmental complaints relating to the Alliance Group Makarewa plant this year.

General

As a measure of its commitment to environmental management, the Alliance Group has achieved ISO 14001 certification. This is an international certification that is externally audited annually and demonstrates that the company has the systems in place to actively manage environmental issues on its plants and promotes the principle of continual improvement within the company.

Table 6 – Alliance Group Limited Makarewa plant – performance summary

Issue	*Score*	*Comments*
Provision of data/results.	Excellent	Data was reported on time and was completed as required by the consent.
Compliance with consent conditions.	Very Good	Good management of the treatment system has resulted in few issues
Responsiveness to issues,	Excellent	Alliance management responded promptly and personally to all issue that arose during the year
Keeping Environment Southland informed of intentions, changes, etc.	Excellent	Alliance staff are very good at communicating their intentions.

8.4 Ballance Agri-Nutrients - Awarua

Monitoring

Ballance Agri-Nutrients fertiliser manufacturing plant at Awarua currently holds the following resource discharge consents that require monitoring to:

- discharge stormwater from a fertiliser manufacturing facility to water;
- discharge contaminants to air from a process for manufacturing phosphatic based fertilisers.

Both consents held by Ballance continue to have an excellent compliance history, with only one minor breach in fluoride concentration found in an ungrazed grass sample collected at the "east airstrip" and "airstrip" sites, and a breach of pH levels.

Ballance continued with its programme to continually improve its Awarua site. This year the objective was to decommission the old effluent storage pond located in the south eastern corner of the property. Silica/rock phosphate had accumulated in this pond over the past 25 years and had been identified as a possible source of some of the pH issues experienced in the

stormwater discharge. The recent upgrade of the stormwater system resulted in this pond becoming redundant. Consequently, the silica/rock phosphate sediment was being removed from the pond and returned to the manufacturing process. Once the sediment has been removed from the pond, the area will be contoured and planted out to reduce the amount of exposed soil and the risk of sediment or low pH runoff to the stormwater system during rainfall events.

Issues

In December 2008 a low level pH, below the consented limit, was recorded in the stormwater discharge to the Mokotua Stream. This was a one-off event experienced during a period of low rainfall, therefore the cause was not able to be identified. However, in April 2009, when a similar course of events were recorded (again during a period of low rainfall), further investigations were conducted and a number of potential causes were identified. To remedy these, the company implemented a number of corrective actions to address the issues. These included:

- the installation of an ultrasonic flow meter able to more accurately measure the low flows without the risk of interference due to floating detritus;
- the installation of a pH meter and submersible pump at the discharge point. This is automatically set up to stop the discharge to the stream and return the low pH water to the treatment system using a newly installed submersible pump and;
- the development of an accurate, representative sampling procedure based on effluent flow rather than time based sampling.

Complaints and self-reported incidents

Environment Southland has not received any complaints relating to the Ballance Agri-Nutrients Awarua site. Environment Southland received notification promptly when breaches of consent were identified by Ballance.

General

As a measure of its commitment to quality management, Ballance Awarua has achieved ISO 9001 certification. This is an international certification which is audited annually which demonstrates that the company has the systems in place to actively manage issues on its plants and promotes the principle of continual improvement within the company.

Table 7 – Balance Agri-Nutrients – performance summary

Issue	*Score*	*Comments*
Provision of data/results.	Excellent	Data is always provided as required, with appropriate explanations and observations and included.
Compliance with consent conditions.	Very Good	Two minor breaches were identified, reported to Environment Southland and investigated by Ballance.
Responsiveness to issues.	Excellent	Ballance staff have responded promptly to all issues as they arise.
Keeping Environment Southland informed of intentions, changes, etc.	Excellent	Ballance has consulted regularly with Environment Southland on all issues, intentions and changes over the year.

8.5 Blue Sky Meats

Monitoring

Blue Sky Meats processing plant has four current discharge consents to:

- discharge meat processing and rendering plant wastewater to land via a spray irrigator;
- discharge offal and wool wastes to ground via an offal pit;
- discharge contaminants to the air from a meat processing plant, rendering and blood drying plant and associated boilers;
- discharge wastewater to land via soakage.

Blue Sky Meats and the plant at Morton Mains were established in 1987. During peak season the boning room operates 20 hours per day, seven days a week. The plant handles approximately 30,000 stock units per week. Blue Sky Meats currently processes approximately 5% of the South Island sheep and lamb production and is the seventh largest meat processing company in New Zealand. Effluent from the processing plant is screened and disposed of via irrigation to land.

To improve the efficiency of the disposal system, Blue Sky Meats has purchased additional land, increasing the disposal area available to receive effluent and effectively enabling the lighter application of effluent.

The Waihopai River catchment is fed by mixed agricultural activities, predominately sheep and dairy, and a few small community townships, with Blue Sky Meats being the main industry. There have been a number of concerns around the water quality in this area, but no one sector has been identified as a significant contributor to this system. Historical monitoring of a tributary to the Waihopai River up and downstream of the Blue Sky Meats site reinforced some of these concerns, but also highlighted that there may be a number of influences in the area contributing to the deterioration in water

quality. Therefore, to address this and reflect the increased land available for irrigation, the monitoring programme was reviewed and refined.

This year the consent monitoring process identified two serious issues, one on 17 December 2008 and the second on 26 February 2009. On both occasions the concentration of ammonia nitrogen increased significantly between the up and downstream sites.

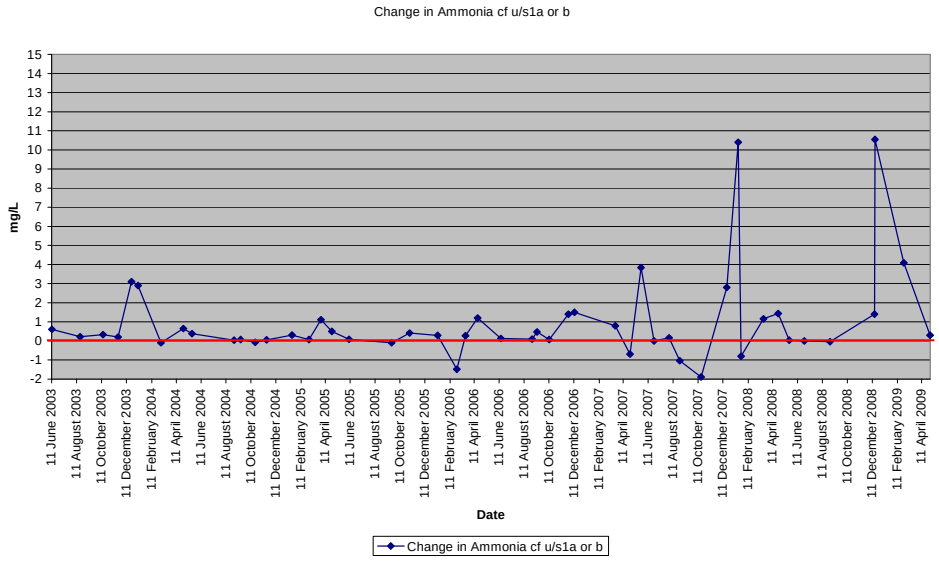


Figure 41 - Change in ammonia nitrogen concentrations between the up and downstream sites in the tributary to the Waihopai River

Complaints and self reported incidents

Environment Southland has not received any complaints from members of the public relating to Blue Sky Meats over the past year. However, as reported earlier, the routine monitoring conducted on two occasions highlighted significant water quality issues in the tributary to the Waihopai River. These incidents are currently being considered by Council.

Table 8 – Blue Sky Meats – performance summary

Issue	*Score*	*Comments*
Provision of data/results.	Good	Data provision has improved from previous years to an acceptable level, however there are still delays in receiving some reports.
Compliance with consent conditions.	Marginal	Breach of consented limits for acceptable water quality continues to be an issue, however there have been positive moves to improve this.
Responsiveness to issues.	Good	Responsiveness to issues has improved over the past year.
Keeping Environment Southland informed of intentions, changes, etc.	Good	There has been improved communication with the Compliance Division.

8.6 Prime Range Meats Limited

Prime Range Meats Limited is a meat processing and rendering plant. It processes livestock for the local and export markets, as well as processing and rendering raw product from a number of other local companies. The Prime Range Meats Limited site, which was initially owned by Southland Butchers By-Products Limited, has been at its current location on the banks of the Waikiwi Stream since 1914. Over time, the Invercargill city has grown closer and closer to the plant. This is one of the main reasons why Prime Range Meats Limited receives a number of odour complaints compared to other more isolated meat processing plants.

The management at Prime Range Meats Limited changed in May 2008. A prosecution for odour events prior to this was underway when this happened. The change in management has lead to improved communication between Prime Range Meats Limited and Environment Southland. The result is an improved level of compliance with the water discharge consent conditions and management are also actively trying to reduce odour emissions from the plant.

In an effort to reduce odours, Prime Range Meats Limited has taken the following actions:

- in January 2009 a new larger fan from the saveall to the bio-filter was installed, this moves around twenty times the volume of the previous fan;
- the bio-filters are checked daily for moisture, flow and potential leaks;
- a plant engineer is in the rendering area full time to ensure maintenance of the plant is kept up to date.

Monitoring

The Prime Range Meats Limited processing plant currently holds the following resource consent:

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

Prime Range Meats Limited is currently operating under Rights of Continuance, under Section 124 of the Resource Management Act (RMA) 1991 and currently holds the following expired resource consent:

- to discharge up to 1500 m^3/day of treated wastewater to the Waikiwi Stream, approximately 500 m downstream of the West Plains Road bridge.

The improvements in the effluent systems and the operation of the treatment system have resulted in an overall improvement in the quality of the effluent. The cBOD5 concentration and loading results have both been more

consistent, with only one cBOD5 concentration in November 2008 exceeding the consent limit.

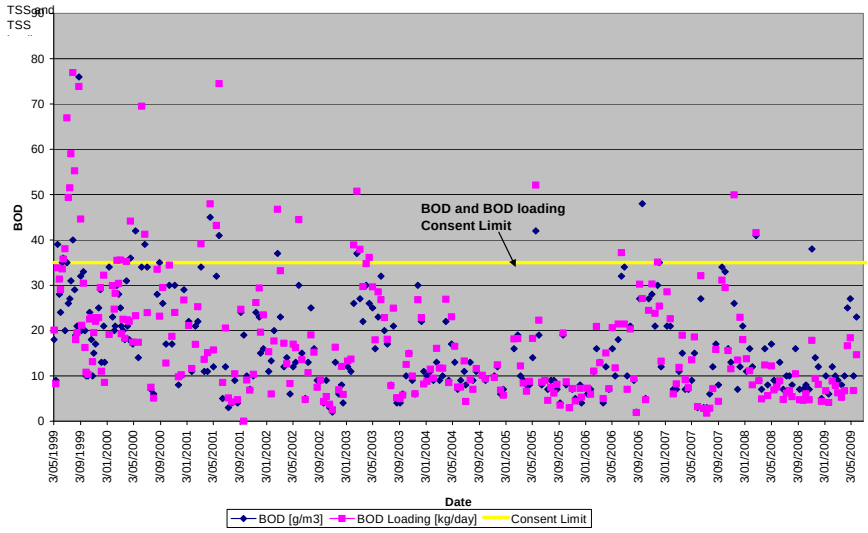


Figure 42 - Concentrations of BOD_5 and BOD loading in the Prime Range Meats effluent with respect to previous seasons and the current consent conditions

The total suspended solids (TSS) concentration and loading results were also more consistent this season. The main issues were the concentrations of TSS and the TSS loading on four occasions in the late November/December period. The cause of the non-compliance was investigated and quickly identified, with the necessary adjustments made.

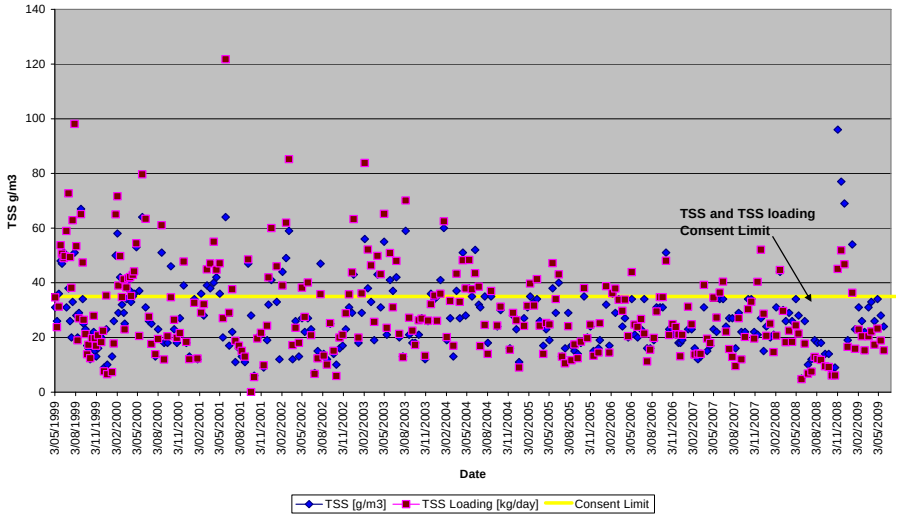


Figure 43 - Concentrations of TSS and TSS loading in the Prime Range Meats effluent with respect to previous seasons and the current consent conditions

The monitoring conditions in the Waikiwi Stream were largely met in terms of the water chemistry monitoring, however, as reported last year, there still remains an issue with the concentrations of ammonia nitrogen present downstream of the effluent discharge.

The author of the macroinvertebrate monitoring report noted that the low scores at the upstream sites indicate poor diversity of invertebrates and dominant populations of pollution tolerant species at these sites. This has the effect of limiting the sensitivity of the programme to detect significant changes downstream of the discharge. Consequently, the report found that the discharge was having no significant impact on the benthic invertebrate communities.

Complaints and self-reported incidents

Six charges of non-compliance during the period July 2007-June 2008 were considered this year by the District Court. Prime Range Meats Limited pleaded guilty to the charges and was fined $40,000 (refer section 17 of this report).

A further seven charges of non-compliance with the air discharge permit are presently being considered by the Court. The outcome of this action will be reported in next year's publication.

Consent Issues

The current operating consent for discharge to water expired in June 2008. The application to renew this consent is still under consideration, pending further information. Until that process is complete, Prime Range Meats Limited continues to operate under the terms of Section 124 of the Resource Management Act 1991.

Table 9 – Prime Range Meats – performance summary

Issue	*Score*	*Comments*
Provision of data/results.	Very Good	Data has been supplied in a timely manner.
Compliance with consent conditions.	Marginal	The discharge appears to be having less of an impact on the water quality downstream. Objectionable odours were detected beyond the property boundary and the company is therefore non-compliant with the air discharge consent.
Responsiveness to issues.	Very Good	Staff have responded to notifications of odour complaints, and have been very responsive when dealing with written correspondence.
Keeping Environment Southland informed of intentions, changes, etc.	Excellent	Information has been shared regarding improvements to reduce odour and improve water monitoring processes. Information has also been shared regarding issues that have arisen that may create odour.

8.7 Dongwha Patinna NZ Limited

Monitoring

Dongwha Patinna New Zealand Limited currently holds the following resource discharge consents that require monitoring to:

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

The formaldehyde emissions from the drier cyclone, the press and the energy centre are monitored twice per year by an external IANZ accredited consultant. Monitoring conducted in April indicated that the efficiency of the combined press and energy centre formaldehyde capture system was lower than normal, however the discharge remained fully compliant with the consent as the assessment is based on a 24 month average.

Individually, the drier cyclone and total press results were all well within the consented limits.

Table 10 – Formaldehyde concentrations at the drier cyclone and press

	Drier Cyclone		Press	
	West (kg/hr)	East (kg/hr)	Total (kg/hr)	Capture (%)
October 2008	3.1	3.5	0.28	90
April 2009	7.0	7.5	0.29	74
24 Month Average	6.1	5.9	0.18	84
Consent Limit*	**8.25**	**8.25**	**0.5**	**>75**

*** The consent limit is a 24 month moving average**

Dongwha Patinna environmental specialists also monitor the ambient air quality at six sites surrounding the manufacturing plant. "Real time" monitoring is conducted using a German instrument called the "aerolaser". This instrument draws air through the instrument and continually measures the formaldehyde concentration. This is located at each site for a minimum of one month. The concentrations of formaldehyde measured were all well within the resource consent limits

Table 11 – Concentrations of formaldehyde

Wind Positive (30 minute Average Period)			
		Formaldehyde Concentration	
	Number of results	Average (µg/m³)	Maximum (µg/m³)
Perkin's Hill	422	0.4	10.3
Perkin's Deer Shed	224	1.1	20.2
Weatherburn Road	469	0.7	12.1
Johnstone's property	835	1.0	19.5
Duncan's property	90	0.5	3.3
Solid Energy's property	363	1.0	9.8
Resource Consent Requirements (30 minute average)		**60**	**100**

The two yearly air monitoring of volatile organic compound (VOC) was conducted in October 2008. The monitoring covered a wide range of compounds and was not restricted to those required by this consent. As expected, the compounds with the highest emission rates were the pinenes, which emit a pine-like odour. All other compounds identified were found in relatively low concentrations, or generally near the detection limits of the test method.

Dongwha has consent to discharge wastewater to land or to water. This year all effluent was discharged to land and no wastewater was discharged to water. The irrigation of wastewater to land was fully compliant with consent limits.

Complaints and self-reported incidents

One smoke complaint was investigated by Environment Southland, in January 2009. It was confirmed that some smoke/blue haze was observed being discharged, however this was not in breach of consent conditions. The likely cause of the smoke emission was the burning of sander dust from an alternative resin that was being trialled. Resin trails are now reported to Environment Southland before commencement.

General

There is a developing market for MDF products that contain very low, or no added formaldehyde. To meet this demand Dongwha Patinna trialled a new eMDI resin in January 2009. This resin contains no formaldehyde. These trials provide information that allow for the further development of the resin handling equipment, to improve the manufacturing process and to assess the impact that the new resin will have on the quality of the emissions. Consent has been granted for a further six eMDI resin trials to be conducted. However, given the current economic conditions, it is unknown when these trials will take place.

As a result of the potential changing make-up of the emissions, Dongwha Patinna has lodged a consent amendment to account for any impact that the new process may have on the discharge quality.

As a measure of its commitment to environmental management, Dongwha Patinna New Zealand Limited has achieved ISO 14001 certification. This is an international certification that is externally audited annually, which demonstrates that the company has the systems in place to actively manage environmental issues on its plants and promotes the principle of continual improvement within the company.

Table 12 – Dongwha Patinna – performance summary

Issue	*Score*	*Comments*
Provision of data/results.	Excellent	Data is provided within the monitoring report framework and within time requirements.
Compliance with consent conditions.	Excellent	There was no non-compliance reported or detected.
Responsiveness to issues.	Excellent	Issues raised with the company have been addressed promptly.
Keeping Environment Southland informed of intentions, changes, etc.	Excellent	Environment Southland is kept well informed.

8.8 Fonterra, Edendale

Monitoring

Fonterra Edendale currently holds the following resource discharge consents that require annual reporting to:

- abstract water from the ground for dairy factory use (Homestead Road bore);
- abstract water from the ground for dairy factory use (Edendale site bore);
- discharge dairy factory wastewater on to land, that land being approximately 230 ha of the Fonterra property named Mararua Farm;
- discharge factory wastewater onto land, that land being approximately 147 ha of the Fonterra property named Leondale Farm;
- discharge treated dairy factory wastewater and activated sludge to land and associated aerosols and odours to air, that land being approximately 317 ha of the Fonterra property named Inglemere Farm;
- discharge treated dairy processing wastewater, cleaning water, condensate, stormwater and denitrification and demineralisation water to the Mataura River;
- discharge contaminants and odour to the air from a dairy factory and ancillary operations;
- discharge non-toxic dairy factory sludge to land.

Particulate emissions from the three coal fired boilers have been maintained for a second season, due to an improvement focussed around operational and maintenance procedures. The New Zealand Clean Air Society awarded its annual Clean Air Award to Fonterra Edendale this year for successfully lifting its environmental performance with the installation of a pressurised boiler bag house.

To meet the increasing volumes of milk being produced in the Southern region, Fonterra has recently constructed a new milk powder drier on its Edendale site. This also resulted in the support facilities of a coal fired boiler, irrigation farm, milk reception bay and noise bund wall all being changed at the same time. These changes have required Fonterra to place significant environmental emphasis on these activities. All contractors arriving on site are briefed with environmental policies, procedures and activities. This has resulted in good compliance with the relevant Environment Southland resource consents.

The expansion of the Edendale plant is expected to increase daily wastewater flows. To allow for this, Fonterra expanded its wastewater operations to include a new 100 hectare disposal area. As with other wastewater disposal areas, groundwater and soil quality will be monitored to ensure nutrient uptake by pasture is maximised.

Routine monitoring of the wastewater discharges to the disposal fields have all been fully compliant with the respective consents and raised no environmental issues. The air discharge consent was amended in October 2008 to include conditions for the fourth coal fired boiler. Additional discharge consents have been granted to include the new wastewater disposal area.

Complaints and self-reported incidents

Several odour complaints were investigated over the last year, relating to the irrigation of wastewater to land. The majority of these occurred over a three day period in March, following repairs conducted at the wastewater treatment plant. Fonterra is working towards improved communication with local residents and Environment Southland to address odour issues and advising when potential odours may occur due to maintenance conducted at the site.

Three incidents involving rolled milk tankers and the potential contamination of waterways were investigated over the last year.

Fonterra reported an issue with the concentration of total phosphorus in its stormwater/condensate during the 2008/09 season. The increase resulted in a breach of consent conditions. A considerable amount of work has been conducted on site to trace the source of the total phosphorus, but, to date, no source has been identified. Fonterra recognises that this needs to be resolved and will continue to conduct its investigations in the 2009/10 season and report its findings to Environment Southland.

A major chemical incident occurred on the plant site and resulted in the release of toxic gas on the site. Council staff were called upon by the Fire Service and Police to attend the incident and received an unfriendly response from Fonterra staff when they got to the site.

Fonterra failed to officially notify Council of this incident and, when this was discussed with the company, it failed to see why Council was involved, even though the plant had an unauthorised discharge to air. Discussions took place with senior staff from Fonterra and future incidents will be dealt with in a different manner.

Bouquet

Fonterra – Procedures to Reduce Tanker Spills

Over the period from July 2007 to January 2009, Environment Southland received notification of six Fonterra milk tanker incidents in Southland. Fonterra self reported all of these and on each occasion took immediate action to address any environmental issues that arose. The increased number of accidents is of concern to Environment Southland, as no matter how many remedial steps are taken to resolve an incident, the risk of contaminants reaching the natural environment increases, not withstanding the equipment and production costs to Fonterra.

To address these concerns Fonterra introduced new procedures to help reduce the risk of tanker crashes. These include:

- top tanker speed of 90 kph;
- tankers are serviced every 15,000 km (~2 weeks);
- electronic breaking system (EBS) on trucks;
- scheduled driver breaks/rests;
- extensive driver assessment, including:
  - 5 day induction;
  - 4-6 day on the job buddy training;
  - full assessment;
  - follow up assessment 2-4 months later.

New initiatives included:

- showing the 'Slosh' DVD since March 2009. The DVD shows the movement of liquid loads while driving. This has already been shown to 97% of drivers and has been well received;
- new trailers have EBS brakes and existing ones are being up graded with EBS brakes;
- installation of Tanker Activity Management System (TAMS) onto every truck by August 2009.

The TAMS is a computer which records and reports the performance, location and usage of trucks. It provides real time data (such as heavy breaking, high revs, excessive G force, etc) that will allow for targeted training for drivers (e.g. drivers that come into corners too fast and have to break heavily). The TAMS will be used to improve training and safety for the drivers and as a tool to improve maintenance and reduce the running cost of trucks.

Table 13 – Fonterra, Edendale – performance summary

Issue	*Score*	*Comments*
Provision of data/results.	Very good	The provision of monitoring data has been very good this year.
Compliance with consent conditions.	Good	Compliance issues that occurred related to odour, irrigation and discharge limit consent conditions. All other consent compliance has been good.
Responsiveness to issues.	Good	Fonterra staff have generally responded well to issues raised by Environment Southland, and have addressed them appropriately.
Keeping Environment Southland informed of intentions, changes, etc.	Good	Two parties are involved from Fonterra, the manufacturing and transport divisions. Some early issues existed, these have been addressed and the level of communication is now good.

8.9 New Zealand Aluminium Smelters Limited

New Zealand Aluminium Smelter (NZAS) runs four pot-lines that produce some of the world's best aluminium. Due to the loss of a transformer in September 2008, pot-line one was shut down. The shut down of pot-line one decreased NZAS's ability to remove fluoride from the gas emissions going out the main stack. This was because the reduction in alumina used at the plant meant that less alumina could be put through the dry scrubbers to bind and remove the fluoride from the discharge to the air. The alumina, used to make aluminium, first goes through the dry scrubbers to bind the gaseous fluoride before being used in the pot-lines. The innovations, changes and improvements that NZAS implemented to meet the fluoride emission standards deserves commendation. Pot-line number one was brought back on line in May 2009.

Monitoring

New Zealand Aluminium Smelters (NZAS) currently holds the following resource consents that require monitoring:

- discharge and coastal permits for discharges from the north, south and west drains;
- discharge permit for treated sewage to land;
- coastal permit for the discharge of treated effluent;
- air discharge consent from an aluminium smelter and related activities;
- discharge consent to land at the smelter's landfill site.

A wide range of monitoring is undertaken to measure the environmental impact that the smelter is having on the environment. This includes monitoring of:

- the air being discharged from the main stack;
- the air being discharged from the main smelting buildings;
- the ambient air quality at several sites in the Awarua and Bluff areas;
- the vegetation and pine needle quality with respect to fallout from the air;
- water quality in Awarua Bay and Foveaux Strait;
- groundwater quality;
- gaseous emissions.

The above monitoring is required under the different consents held by NZAS. The routine monitoring is conducted by NZAS, with regular audits conducted by Environment Southland to ensure the validity of the results. This year, with the exception of two dust collection results, all monitoring results were fully compliant with the respective resource consents.

One set of dust collection results in October 2008 was found to exceed the consent limit. This was investigated by NZAS and the cause was found to be a series of holes in some of the dust collector bags. These were replaced and the dust emissions brought back under consent limit within one month of testing, as required by the consent.

A second set of dust collection results in November 2008 was also found to exceed the consent limit. This was, again, investigated by NZAS and the cause was again found to be associated with the dust collector bags, but this time it appeared that the bags were not up to industry standard. A new batch of bags was ordered and replaced the suspect bags. The dust emissions were brought back under consent limit within one month of testing, as required by the consent.

Complaints and Self-reported Incidents

One incident was reported by the public. This incident involved dust from the ships at the Tiwai Wharf being blown into the waters of Bluff Harbour. Dust was confirmed to be present around the ships, however the situation did not exceed any of the NZAS consent conditions. As the result of the incident NZAS has made improvements regarding the unloading of ships at the wharf.

NZAS was very active in self reporting minor events and the reporting of these events is to be commended. The alerts received by Environment Southland resulted in no significant environmental impact. The alerts received included:

- 10 litres of hydraulic oil was spilled on to the Tiwai Wharf. This was caused by a ruptured hydraulic hose. The oil was contained and removed by the use of specialised absorbent material. The incident was

fully investigated and appropriate remedial action taken. Impact was assessed as minor;

- 10-15 litres of hydraulic oil entered the south drain. The oil was contained then removed from the drain. Follow up monitoring at costal sites confirmed that no oil or grease was observed in Awarua Bay or Bluff Harbour. Impact was assessed as minor. The incident was fully investigated and the cause was found to be an "O" ring on the hydraulic oil line that was damaged during installation. This resulted in 150 litres of hydraulic oil mixing with the cooling water, however the majority of the leak was contained in the cooling towers. Preventative measures have been put in place to eliminate a repeat of this type of incident

General

As a measure of its commitment to environmental management the New Zealand Aluminium Smelter has achieved ISO 14001 certification. This is an international certification that is externally audited annually, which demonstrates that the company has the systems in place to actively manage environmental issues at its plants and promotes the principle of continual improvement within the company.

Table 14 – New Zealand Aluminium Smelters – performance summary

Issue	Score	Comments
Provision of data/results.	Excellent	Data is provided on time at monthly, quarterly and annual intervals.
Compliance with consent and plan conditions.	Very Good	There were no significant non-compliance issues, some minor events were reported by NZAS staff.
Responsiveness to issues, e.g. drought.	Excellent	Responses to incidents or other issues are well thought through, implemented and results are reported back to Council.
Keeping Environment Southland informed of intentions, changes, etc.	Excellent	NZAS staff are very pro-active in communicating with Environment Southland when there is potential for smelter operations to impact on the environment.

8.10 South Port

2008/09 Audit

At the end of 2008, an audit was completed to assess the effectiveness of compliance by South Port. South Port owns and operates port related commercial undertakings at the Port of Bluff. The audit considered the requirements of the discharge agreement and code of practice, as well as the management of risks associated with discharge of contaminants significant to port activities.

Figure 44 – Offloading cargo at South Port

Background

On 26 April 2006, (pursuant to Rules 7.3.2.10 and 8.2 of the Southland Regional Coastal Plan) South Port entered into a discharge agreement with Environment Southland, the purpose of which was:

- to provide methods of management within the framework of the Resource Management Act (1991), as an alternative to the need for resource consents; and

- to recognise and provide for self regulation, by South Port, of discharge of contaminants in or onto the occupation area of the type and level described in the agreement, incidental to the activities undertaken or managed by South Port.

The agreement applies to discharges of contaminants into air, into water and onto land (where it may enter water) secondary to activities undertaken within, or managed by, South Port in the occupation area. Provided South Port abides by the terms of the agreement, there is no obligation on the part of South Port to seek and hold resource consents for discharge of contaminants of the type and extent described in the agreement.

The agreement requires South Port to prepare and maintain a code of practice setting out its duties and obligations in respect of carrying out activities. The code of practice applies to South Port, and commercial operators who hold a "preferred operator" status with South Port. South Port has a supervisory role in ensuring its preferred operators are aware of, and comply with, the code of practice.

Figure 45 – Removal of material from the hull of a ship, South Port.

Findings

One of the main issues identified during this process was the need for the Code of Practice Agreement, agreed to by South Port and Environment Southland, to be a living document. The current format of the document needs to be expanded to clearly establish lines of responsibility and authority and it needs to be able to address the changing nature of the activities and cargo being handled at the Port of Bluff.

The Port of Bluff has the potential to expand and diversity into a number of different fields in the future, therefore it is important that any agreement is current and able to reflect the nature of that activity, the environmental risks associated with those activities and has the capacity to involve all of the relevant regulatory authorities with an interest in the port activities.

South Port does not currently have a staff person specifically responsible for environmental compliance. The consequences of this include:

- compliance to the code of practice is not formally monitored, or reported;
- continuous improvement in environmental practices is not championed;
- no specific point of contact within the organisation for liaison between stakeholders.

We could find no evidence of a risk management approach to environmental impacts. The organisation does not hold ISO 14001 compliance. A risk management audit previously identified risks related to storage of oil, but did not address other environmental risks.

This contrasts unfavourably with evidence of current best practice, both overseas and within New Zealand, which favours development of environmental management plans to manage risks.

The code of practice requires an incident to be recorded in a computer based system. South Port's current system (The Vault) is an OSH database and,

while management views this as adequate to record an environmental incident, this has not been tested.

The code of practice and discharge agreement do not acknowledge, or evaluate the role of other government organisations in the South Port Operating Agreement, e.g. Maritime New Zealand, MAF. The activities that these agencies carry out could potentially complement, or alternatively impede, the effectiveness of the discharge agreement and code of practice.

There is no forum for ongoing dialogue between the different parties to address any issues that may arise during the period of the agreement. This results in the discharge agreement and code of practice not being a "living document" subject to regular discussion, review and improvement.

Given that Environment Southland is a major shareholder in South Port, there is a reputational risk for Environment Southland in a failure to adequately manage the environmental issues associated with the port activities.

9.0 Miscellaneous Commercial Operations

9.1 Slink Skins Limited Thornbury

Slink Skins Limited Thornbury is a company that collects and prepares slink skins during the period from August to October and the tanning and dying of various skins throughout the rest of the year. Slink Skins Limited Thornbury currently holds one consent requiring routine monitoring. This consent is for the discharge of pre-treated tannery and fellmongery wastewater to land.

Effluent from the factory is characterised by the high concentrations of sodium and BOD_5 and elevated concentrations of potassium, phosphorus and nitrogen. The factory effluent is pre-treated to extract any chromium from the waste then stored in an aerobic tank before being irrigated to pasture.

One of the main issues associated with an effluent of this nature is the high concentration of sodium and the potential impacts that this may have on the soil structure. If not well managed, this has the potential to reduce the productivity of the land and reducing the porosity of the soil, increasing the risk of ponding or runoff of effluent. Consequently, the limits in the consent have been designed to:

- monitor the quality of the effluent;
- control the volume of effluent being applied;
- control the rate at which effluent is applied to the land;
- control where the effluent can be applied; and
- the frequency at which the effluent can be applied to each block of land.

The quality of the effluent has remained consistent from year to year, indicating that while the number of pelts being processed may vary, the operation of the treatment system appears to be reasonably stable.

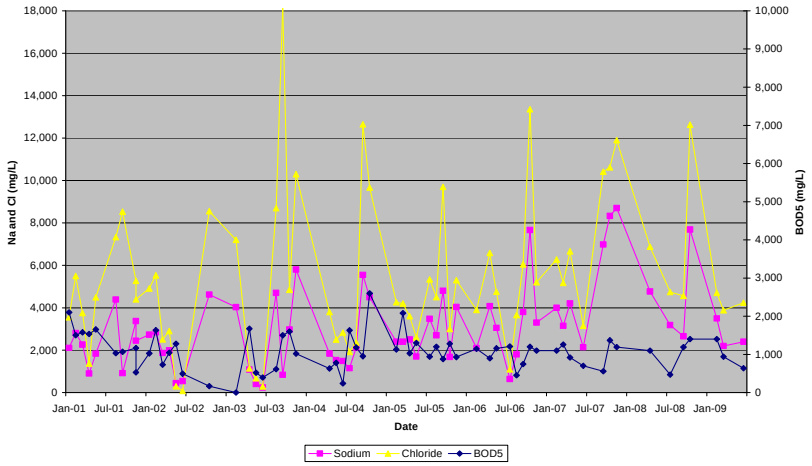


Figure 46 - Effluent Sodium, Chloride and BOD_5 concentrations between 2001 and 2009

The tanning process involves the addition of chromium, however the bulk of this is removed from the effluent during pre-treatment stage.

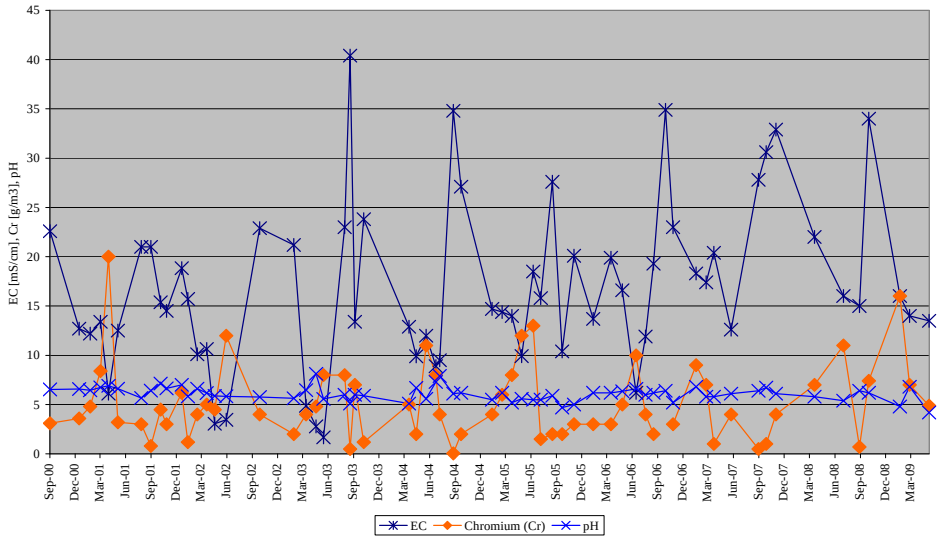


Figure 47 - Effluent Conductivity, Chromium and pH concentrations between 2000 and 2009

The effluent has been fully compliant with consent conditions over the past year.

As indicated, the effluent is irrigated to land. Weekly monitoring is conducted by the consent holder on two small creeks that run through the irrigation blocks. This monitoring is designed to detect general change in water quality which, if observed, triggers a need to investigate why the change has occurred, or to move the irrigator to a more suitable paddock. There have been no significant differences in the effluent conductivity between the two sites over the past year.

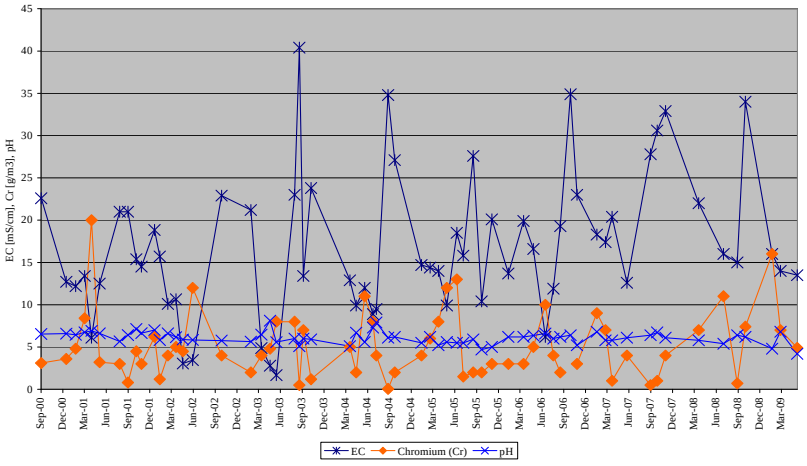


Figure 48 - Effluent Conductivity, creek monitoring

The characteristics of the effluent require a full assessment of the soils in the effluent disposal areas, conducted annually by an independent consultant.

This assesses the chemical and physical characteristic of the soil and makes recommendations to maintain good soil health.

Overall, the effluent disposal system has functioned reasonably well this year, however an incident of non-compliance was confirmed in October 2008 when a significant area of ponding was identified. This was highlighted to management and steps to mitigate the problem were implemented.

9.2 Whitehouse Hotel

The Whitehouse Hotel is a privately owned tavern located at Lorneville, approximately 3 km beyond the Invercargill City boundary. The hotel has consent to operate its own small scale package sewage treatment system, which discharges to a tributary of the Waikiwi Stream.

The ownership of the Whitehouse Hotel changed in September 2008. The new owners continue to use the existing activated sludge treatment plant. To ensure full compliance with the consent, they have had to implement a number of upgrades to improve its efficiency. The changes include:

- replacement of stones in the trap;
- replacement of pump with a brand new one;
- replacement of the UV filter with a brand new one;
- hiring of a technician to do regular maintenance on the treatment system.

Monitoring

Environment Southland conducted two inspections during the year, to collect effluent discharge and water samples to assess compliance with the consent. The monitoring in February 2009 indicated that the plant was operating efficiently, producing a fully compliant effluent. The very low level of faecal coliform bacteria detected in the sample confirmed that the UV filter was functioning correctly. The chemical results for the treated sewage were also well within consented limits.

Samples from the tributary showed an increase in the level of ammonia nitrogen between the up and downstream sites. The affect on in-stream water quality was not significant and the Whitehouse Hotel has been assessed as fully compliant with the consent.

Figure 49 - Sewage treatment system discharge after final UV treatment

9.3 Piggeries

There are currently only two consented piggeries left in Southland. Both were inspected by compliance staff during the 2008/09 year and were compliant with their consent conditions.

Under the Regional Land Application Plan for Southland, consents for piggeries are only required for properties servicing over 70 50-kg pig equivalents. The consent regulates the disposal of effluent onto land.

There are a number of operations that have farrowing stalls where pigs are housed for a short time and then are returned out to free range paddocks. These types of operations are considered permitted activities as long as no more than 70 50-kg pig equivalents are being housed at one time.

10.0 Mining/Quarrying

Mining in Southland currently involves the extraction of gravel, rock, peat, lime, gold and coal/lignite. Gravel extraction is currently inspected by the Councils' Catchment Division. The Compliance Division inspect all other mining activities. A total of fifteen mining/quarrying operations were inspected throughout Southland during the 2008/09 year.

It was pleasing to note that there was no significant non-compliance, only minor matters mainly relating to non-provision of data.

The End of an Era

The Solid Energy site at Ohai has now shut down, after having first started mining coal around 1920. At the peak (1980s), around 600 people were employed at this site, with approximately 300,000 tonnes of coal per annum being extracted.

Figure 50 - Under Pit 3 there are still approximately 1 million tonnes of coal reserves.

The rehabilitation programme for the site is ongoing. The Ohai number 6 pit is being de-watered so it can be filled in by using the hill to the south. A coal seam underneath the hill is currently on fire and there is an estimated half a million tonnes of coal reserves. The cost of this rehabilitation work is estimated to be $25M.

Dust monitoring at four points on the site will continue, with the information being forwarded to Environment Southland.

Environment Southland staff have worked with Barry Sayers (Laboratory and Environmental Co-ordinator) for a significant period of time and wish him well in his future endeavours.

10.1 Gravel Extraction Report

The Compliance Division is responsible for auditing the inspections on gravel consents and the Catchment Division is responsible for the onsite introduction and ongoing inspections of these consents. It was identified by Compliance that the compliance rate for land use gravel extraction permits was very low.

Compliance staff undertook to review the processes in an attempt to increase the compliance rate. A recent audit has found that, of 15 consent holders randomly selected, only three complied with all of the conditions of their consent.

An information sheet was sent to all current consent holders to educate and advise them of the two conditions not being met. This information is now sent to all new consent holders.

The two conditions that were not being complied with were:

3. *The consent holder shall notify the Council's Compliance Manager, in writing (fax 03 211 5252), prior to commencing the extraction.*

9. *The consent holder shall keep a record of all gravel removed under the terms of this consent. A copy of each month's record shall be submitted to the Council by the tenth working day of the following month.*

The feedback from consent holders was positive, with only a very small number being displeased with the information provided. An increase in data being returned followed and several consent holders phoned to ensure they were meeting their requirements.

Compliance also identified that current internal processes were inconsistent and not well managed. A review was undertaken and as a result processes have been streamlined and improvements made to ensure administration support is provided for the Catchment Division.

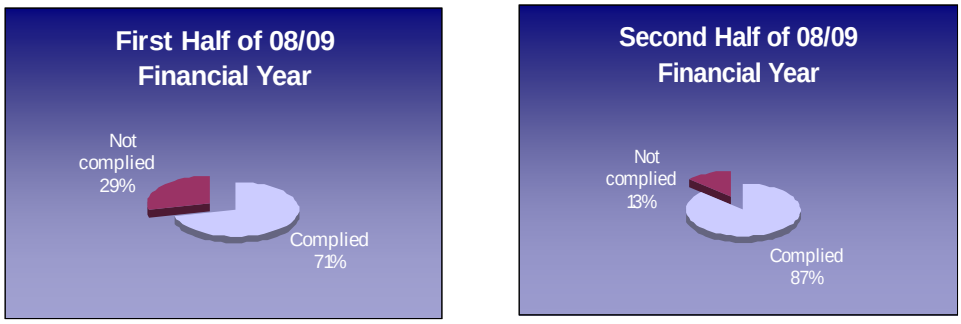


Figure 51 – Compliance rate for gravel consents 2008/09 financial year

As a result of the improved processes, the compliance rate for gravel consents has increased from 71% in the first half of the 2008/09 financial year to 87% in the second half of the 2008/09 financial year.

Compliance will continue to work with the Catchment Division to improve results in this area.

11.0 Sewage Treatment Plants

11.1 Invercargill City Council – Invercargill Sewage Treatment Plant, Clifton

The Invercargill City Council currently holds the following resource consents/coastal permits that require monitoring to:

- discharge treated wastewater to water from a wastewater treatment plant;
- discharge contaminants to land via seepage from a wastewater treatment process;
- sporadically discharge screened wastewater to the New River Estuary, when compliance with Resource Consent 200749 cannot be achieved due to plant mechanical failure or extreme weather events;
- discharge contaminants (including odour) to the air from a wastewater treatment and disposal facility;
- discharge a deodorizing agent to the air to mask odours from the sludge ponds at the sewage treatment plant.

Over the years of operation, there have been numerous odour complaints relating to odours emitted from the sewage treatment plant.

In July 2009, Invercargill City Council was convicted and fined on two charges involving the discharge of contaminants to air, following confirmed objectionable odours occurring in January and February of 2008.

Environment Southland responded to a number of complaints relating to odour from the treatment plant over the 2008/09 year from local residents living within a 1-2 km radius of the plant. It is pleasing to note, however, that the overall number of confirmed objectionable odour incidents relating to the plant has decreased compared with the 2007/08 year. This declining trend has been attributed to the Invercargill City Council committing time and money to the upgrade of the plant facilities and procedures to address the odour issues.

These improvements include:

- a major reduction in sludge production;
- improved digester retention of sludges;
- dosing of digested sludge to reduce sludge lagoon odour;
- improved control of tanked waste, with odorous loads not accepted;
- aerobic lagoon treatment of industrial wastes.

As indicated, the improvements have come at a cost of $2.5M, with Invercargill City Council remaining committed to further upgrading if necessary.

During the period October to November 2008, compliance with the coastal permit to discharge treated effluent to the estuary was poor, but the results showed a similar improving trend as has been seen over comparable periods in prior years. The main areas of non-compliance have been the failure to comply with the faecal coliform and enterococci indicator organism limits. The introduction of tertiary maturation ponds to polish the effluent prior to discharging to the estuary improved the bacteria quality significantly, but has failed to improve the quality of the discharge to the standards required by the discharge permit. The non-compliance has been highlighted as a serious problem requiring attention.

The maturation ponds rely on natural Ultraviolet (UV) light provided by the sun to provide the necessary disinfection. Disinfection is most effective in summer, when UV light is at its greatest, and least effective in winter. This cyclic fluctuation is clearly illustrated in Figure 52.

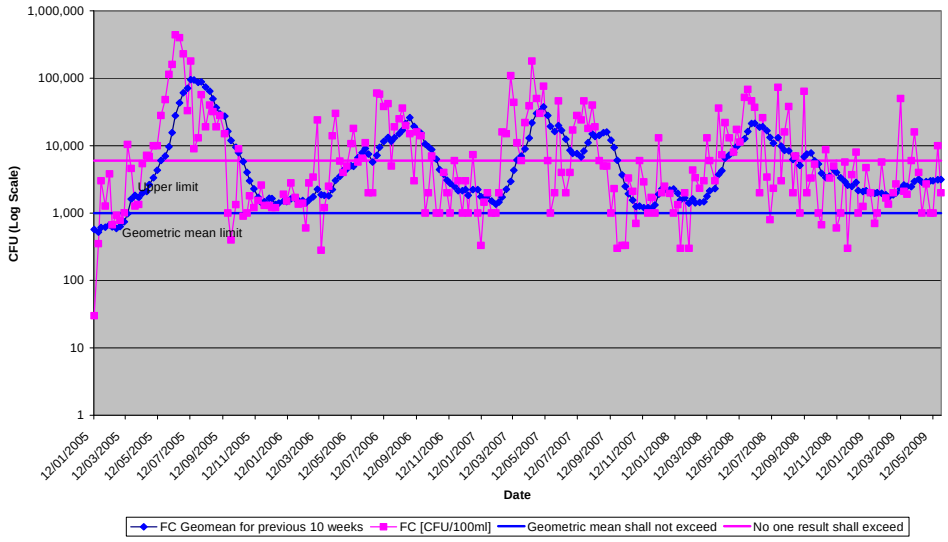


Figure 52 - Faecal Coliform levels 2005-2009 - note that the bacterial numbers on the y axis have been reported using a log scale

Another issue associated with this cyclic trend is the concentration of total suspended solids (TSS), which usually increases in summer due to the increased algal growth in the discharge. Historically, limits in the resource consent conditions have been significantly exceeded, however, over the last year there has been a decrease in the limits being exceeded, as demonstrated in Figure 53.

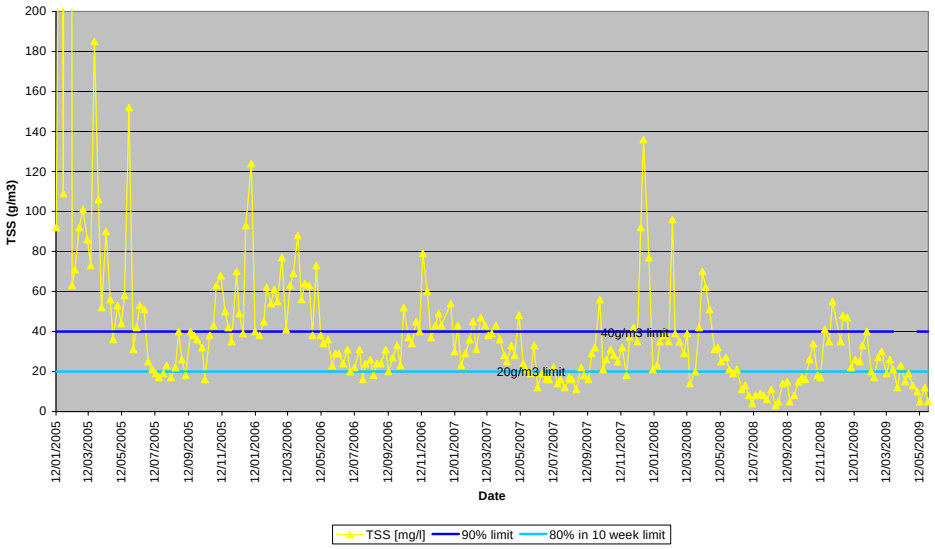


Figure 53 - Total Suspended Solids levels 2005-2009

An application to address this issue is currently being considered by Environment Southland's Consents Division.

11.2 Gore District Council – Gore Wastewater Treatment

The Gore township has a population of approximately 8,000 and is currently served by a two pond oxidation system, located on the southern boundary of Gore. During dry weather 4,000 to 7,000 m^3/day of treated wastewater is discharged to the Mataura River. This can rise to over 20,000 m^3/day during wet weather, as a portion of the sewers in Gore are still combined (i.e. they carry both stormwater and wastewater).

Routine monitoring is conducted on the quality of the discharge and the Mataura River. The monitoring frequency is dependent on the river flow. The level of monitoring required by the consent increases as the flow in the river decreases. The increased monitoring is required because, as the river flow decreases, there is greater potential that the nutrients in the discharge will increase. Nutrient enriched water poses the potential risk of nuisance weed and periphyton growth on the riverbed. These growths can impact on the naturally occurring macroinvertebrate communities in the river and affect biodiversity within the river system.

During 2008, Gore District Council (GDC) commenced the installation of an additional treatment system - the Actiflo plant. This plant has been primarily designed to reduce the phosphorus concentrations in the discharge, but it can also reduce the concentrations of BOD_5 and total suspended solids in the discharge. The Actiflo plant first started operating on 28 October 2008 and has continued to operate on an "as required" basis. The Actiflo plant is operational every time the river flow is less than 25 m^3/s and the phosphorus levels in the discharge are greater than 1 mg/L. At these times the river ecosystems or biodiversity values are at greatest risk. This means that the Actiflo plant mainly operates during summer and dry periods.

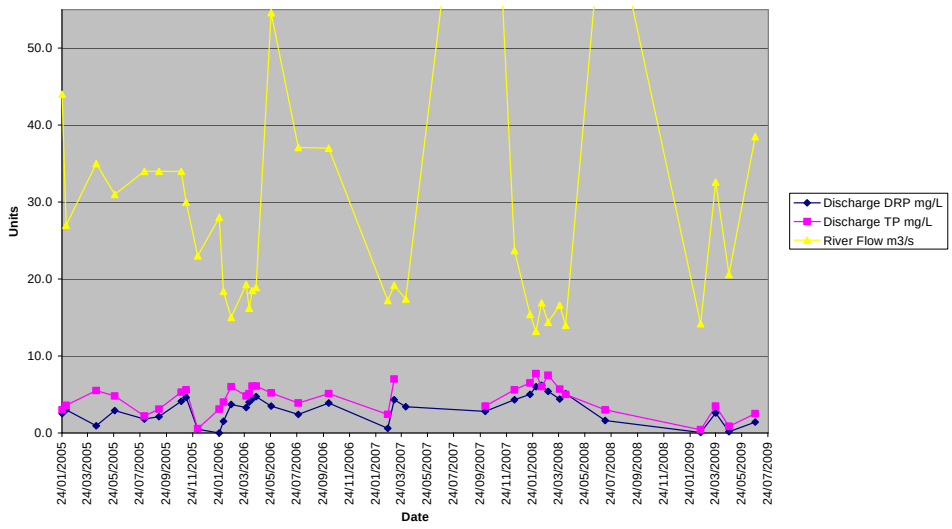


Figure 54 - Discharge DRP and TP results in comparison to river flow.
Note the improvement in the DRP since the installation of the Actiflo plant in October 2008

The water chemistry monitoring conditions for the Mataura River and the Gore oxidation pond discharge were all fully compliant during the 2008/09 year.

This year the benthic macroinvertebrate survey found that the discharge was causing subtle changes to the macroinvertebrate community in the Mataura River, immediately downstream of the discharge. This is potentially in breach of the consent which requires that *"there must not be any destruction of natural aquatic life by reason of a concentration of toxic substances."* However, this form of biological monitoring is very time sensitive. This survey was conducted only five months after the installation of the Actiflo plant and, therefore, may have been too early to assess the long term benefits of the Actiflo plant. Future benthic macroinvertebrate surveys will be conducted to assess the changes in the river as a result of the installation of the new treatment system.

11.3 Gore District Council – Mataura Wastewater Treatment

The Mataura township has a population of 1,560 (2006 Census) and is currently served by a single oxidation pond, located to the south west of the township. This pond is designed to receive effluent from a population equivalent of 4000 people, based on water usage of approximately 500L/person/day.

The oxidation pond and the Mataura River are monitored a minimum of four times per annum. As with the Gore sewage treatment system, additional monitoring is required during periods when the river flow drops below 25 m^3/s. The increased monitoring is required because, as the river flow decreases, there is greater potential that the nutrients in the discharge will increase. Nutrient enriched water poses the potential risk of nuisance weed and periphyton growth on the riverbed. These growths can impact on the

naturally occurring macroinvertebrate communities in the river and affect biodiversity within the river system.

During December 2008, Gore District Council (GDC) planted a series of wetlands, which filter effluent from the oxidation pond, before discharging to the river. The constructed wetlands were designed to reduce the total suspend solids (TSS), E.*coli* bacteria concentrations and the BOD_5 concentration of the sewage. Some reduction in total nitrogen may also occur. Constructed wetlands take at least a year to become properly established and may take even longer to provide a sustainable level of treatment.

The monitoring results for this year show that the TSS and BOD_5 concentration were slightly lower than historically. However, it is still too early to determine if the wetlands will show a continued improvement on the discharge results.

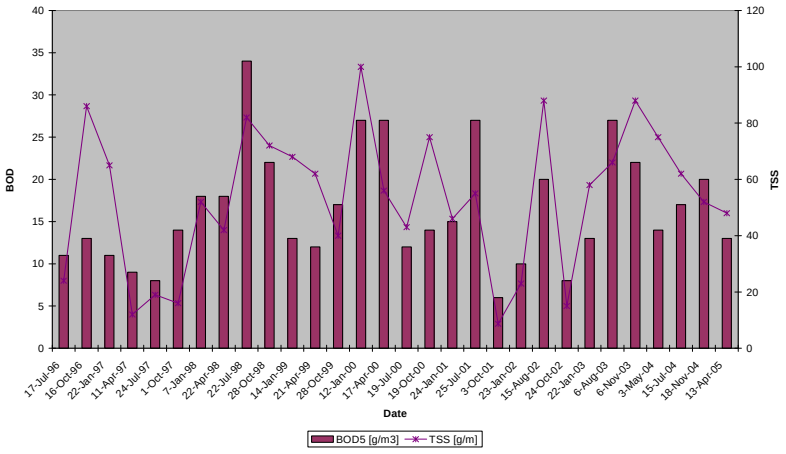


Figure 55 - Discharge BOD_5 and TSS results – note an improvement in the BOD_5 and TSS can be seen since the installation of the wetlands in December 2008

The water chemistry monitoring conditions for the Mataura River and the Gore oxidation pond discharge were all fully compliant during the 2008/09 year.

The benthic macroinvertebrate survey this year concluded that the discharge from the Mataura oxidation pond outfall is not adversely affecting the local benthic macroinvertebrate and periphyton communities of the Mataura River. This is different to historical surveys, which have shown that the discharge was causing subtle changes to the macroinvertebrate community in the Mataura River immediately downstream of the discharge.

It is possible that the introduction of the wetlands may have contributed to this observed improvement in the results. However, at this stage it is too soon to draw any definitive conclusions. The 2010 survey will give a better indication of the long term effects of the wetlands on the macroinvertebrate community in the Mataura River.

Figure 56 - One of the Mataura oxidation pond wetland cells

11.4 Southland District Council Sewage Treatment Systems

Table 15 - Compliance summary for the Southland District Council community sewage treatment systems

Community Sewage Treatment Schemes	*Consent compliance*			
	Fully compliant	*Partial non compliance*	*Significant non compliance*	*Notes*
Balfour sewage		✓		1 out of 2 breached ammonia
Browns sewage			✓	1 out of 2 breached BOD 1 out of 2 breached TSS
Gorge Road Sewage	✓			
Lumsden sewage		✓		Report as required in condition 8 (c) has not been completed
Manapouri Sewage	✓			
Monowai sewage	✓			
Nightcaps sewage		✓		1out of 2 breached Class D (not be unpalatable, nor contain toxic substances to the extent that they are unsafe for consumption by farm animals). FC >1000 (1999 ANZECC stock drinking water)
Ohai sewage			✓	1 out of 4 breached BOD 3out of 4 breached Class D (not be unpalatable, nor contain toxic substances to the extent that they are unsafe for consumption by farm animals). FC >1000 (1999 ANZECC stock drinking water)
Otautau sewage		✓		Report as required in condition 12 (b)

Community Sewage Treatment Schemes	*Consent compliance*			
	Fully compliant	*Partial non compliance*	*Significant non compliance*	*Notes*
Te Anau sewage		✓		1 DRP exceedance
Tokonui sewage	✓			
Tuatapere sewage	✓			Report required for condition 8(c) due July 09
Riverton sewage at Havelock Street	✓			
Riverton sewage at Foveaux Strait	✓			
Riversdale sewage	✓			
Stewart Island sewage	✓			
Winton sewage		✓		
Wyndham sewage			✓	3 out of 7 results resulted in an increase in E coli that breached bathing limits 4 out of 7 results, significant increase in E coli but upstream already exceeded bathing limits
Edendale/Wyndham sewage				Not currently operational

11.5 Southland District Council - Winton Sewage

Winton is a township within the Southland Province, it has a population of 2,100 (2001 Census). Sewage from the township is piped approximately 2 km (from the centre of Winton) to a 1.96 ha aerated oxidation pond. The treated sewage is then discharged to the Winton Stream, via a 1.4 ha wetland.

The new wetland polishing treatment system was constructed in 2006. The plants in a wetland system can take some time to get established, but should now be operating at full efficiency. The organic loading and level of suspended solids appear to be relatively stable and possibly improving, as can be seen in Figure 57.

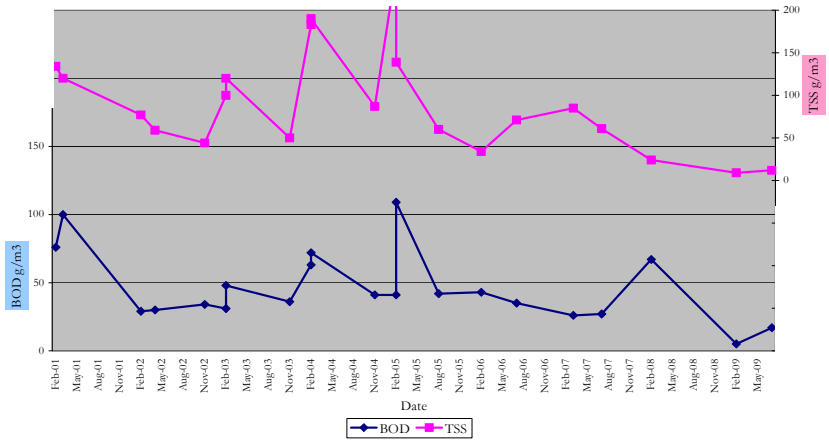


Figure 57 - Organic loading and suspended solids levels

The concentration of ammonia nitrogen and total phosphorus continues to relatively stable.

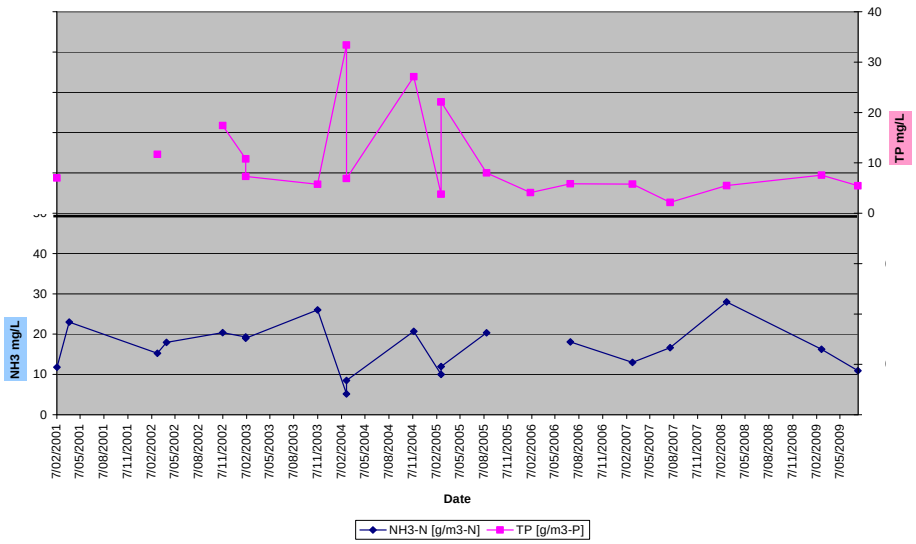


Figure 58 - Concentration of ammonia nitrogen and total phosphorus

The concentration of nutrients in the Winton Stream at the downstream site, however, tends to suggest that the effluent is having a greater impact on the water quality. Ammonia nitrogen, when present at certain pH levels, has the potential to be toxic to aquatic organisms. This year the level of ammonia nitrogen did not exceed the Australia and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC) trigger levels, but did approach this in February 2009.

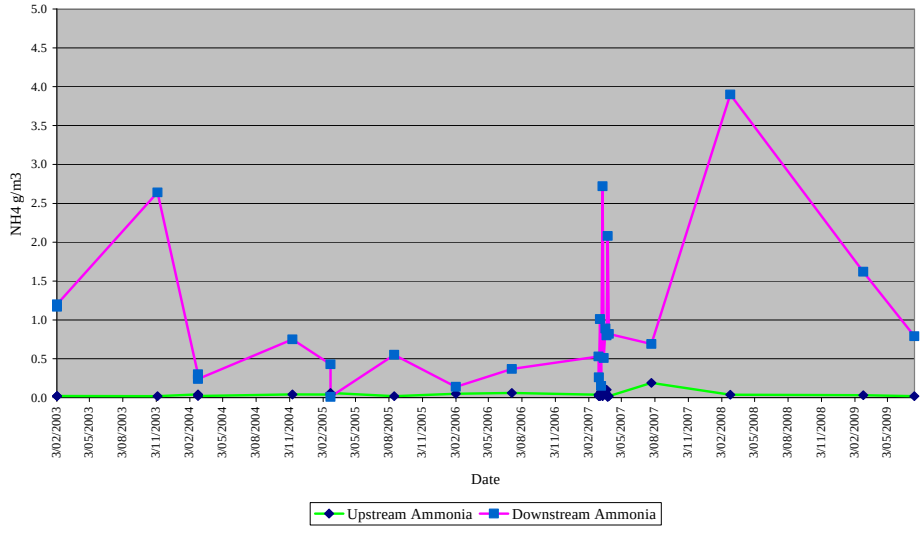


Figure 59 - Upstream and downstream ammonia levels

The level of dissolved reactive phosphorus in the Winton Stream, downstream of the discharge, also indicated that the effluent was having a greater impact on water quality. The levels recorded at the downstream site are likely to increase the growth of nuisance weed and algae on the streambed,

which in turn is likely to impact on the natural macroinvertebrate communities in the river.

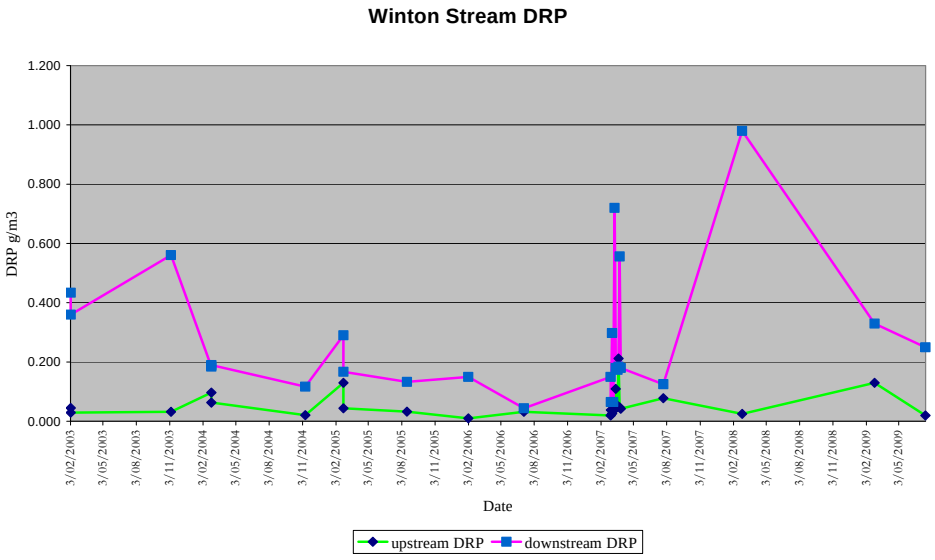


Figure 60 - Upstream and downstream dissolved reactive phosphorus levels

A periphyton and macroinvertebrate study designed to assess the biological effects of this effluent was due to be completed in 2007. Southland District Council is in breach of this consent in having not supplied this report.

12.0 Landfills

12.1 A B Lime Landfill

A B Lime, originally established to produce agricultural lime, identified an opportunity in the late 1990s/early 2000s to set up a landfill site at its quarry between Winton and Browns. This resolved the long standing issue of where the Southland wide regional landfill would be located. Consents for the landfill were granted in June 2003. The site was developed, the waste cells lined and the company received its first load of waste as the Southland regional landfill in 2004.

Listed below are the main resource discharge consents that require regular monitoring to:

- discharge stormwater to a tributary of the Lochiel Stream;
- discharge solid waste onto or into land; and
- discharge contaminants to air discharge from a landfill.

Monitoring

All consent monitoring reports have been received on time and the data they contain has been complete, meeting all of the requirements of the various consents.

URS conducted the annual audit in May 2009. The only issue arising from its report was associated with the capping trials conducted to cover the first cell in December 2008 and February/March 2009. The materials and processes used were fully compliant with the relevant consent conditions, however the auditor noted that the capping did not meet the quality control specifications for the current industry guidelines. A B Lime has revised the capping planned for this cell and plans to complete this work in the 2009/10 summer season. This will ensure that the capping meets both the consent and industry standards. All other aspects of the auditor report noted that the landfill site was operating efficiently and meeting the requirements of the relevant consents.

Environment Southland staff attended the audit with URS staff. The landfill was very tidy with no rodent or bird activity. The only issue was the presence of a faint 'gaseous' odour detected on the working site within the property boundary. The permanent gas flare had been installed but was not fully operational at that time.

The capping of this first cell has enabled A B Lime to finally install a permanent gas flare and gas extraction system to remove the waste gas from the site and reduce the risk of gas odours being discharged beyond the property boundary. This replaces the temporary flares and actively extracts gas from the cell from four wells and plumbs it to the permanent flare where the gas is burnt. Currently, only 200m^3 of gas is produced per hour. As the

volume of gas produced increases, it is planned to utilise the energy from the burning of the gas in the Lime manufacturing plant, or to generate electricity.

Figure 61 - Gas extraction well (front left of picture) and permanent flare (rear green structure)

Complaints and self-reported incidents

A B Lime received a total of eight complaints over the year, all associated with the discharge of odour beyond the property boundary. A B lime staff attended these and detected a low intensity odour on five of these occasions. The odours detected were not deemed to be objectionable or offensive.

Environment Southland received eight odour complaints. Three of these coincided with complaints received by A B Lime. At the time of the Environment Southland investigations no odour was able to be detected, but A B Lime staff did confirm that a low intensity odour had existed prior to the arrival of Environment Southland investigators on two of these occasions. On the other five investigations, Environment Southland staff detected a low intensity odour on only one occasion, which was not classed as objectionable or offensive.

The majority of the odour complaints were received during the autumnal and early winter periods. The timing of the complaints was usually early in the morning or late in the evening. It is believed that the cool, still conditions and the development of an inversion layer was exacerbating the potential for odours to exist or be carried beyond the property boundary.

Bouquet

AB Lime Landfill – Better Management of Waste Gas

The completion of the first cell has enabled A B Lime to make significant progress to better manage waste gas on the site. This, together with the improved capping scheduled for the 2009/10 summer should minimise the risk of odour issues emitting from this site. Other initiatives implemented last year have been:

- to reduce the open working face;
- commence the final cover/capping of 'fill' areas;
- continuation of daily cover practises;
- the installation of a permanent active landfill gas extraction system with flaring.

Table 16 - AB Lime – performance summary

Issue	*Score*	*Comments*
Provision of data/results.	Very Good	Overall on time and complete, some odour reports and data delayed.
Compliance with consent condition.	Excellent	Management is very aware of the consent requirements and immediately contact Council staff to discuss concerns.
Responsiveness to issues.	Excellent	Management has been very helpful in assisting with unforeseen circumstances.
Keeping Environment Southland informed of intentions, changes, etc.	Excellent	Management has actively engaged Council staff in proposals that could affect the operation of the landfill.

12.2 Cleanfills

Cleanfill is defined in the Regional Solid Waste Plan for Southland as material having no putrescible, pollutant, inflammable or hazardous components. Under rule 4.5.5 of the plan, the deposition of cleanfill to land is a permitted activity if the quantity is under 500 m^3 in volume, not greater than two metres depth and is not located on the bed of any river or lake. A consent is necessary if these requirements cannot be met.

Consent holders are supplied with a list of acceptable and unacceptable materials with their resource consent and have a responsibility to monitor incoming materials and keep a log. Other conditions require the consent holder to annually submit a record of the volume of area still requiring infilling, an estimate of the length time to complete the infilling and any other operational or management details that have changed which could adversely affect the environmental impact of the site.

Acceptable cleanfill materials are soil, rock, sand, clay, gravel concrete, ceramics, asphalt (cured), and glass.

Some materials are acceptable under certain conditions, such as cement, mine tailings, glass fibres (including pink bats), plasterboard, plastic, polystyrene, (natural) timber and tyres. This means that the materials may be acceptable with restrictions being placed on the total quantity.

If the quantity exceeds those restrictions, the material becomes unacceptable. Other unacceptable materials generally include any putrescible type materials which are not inert.

Environment Southland inspected a total of 19 cleanfill sites throughout Southland during the 2008/09 year. Overall compliance was very good. Out of the 19 sites inspected only one site is currently the subject of enforcement action, due to inappropriate material being deposited over the face where infilling was occurring. An abatement notice was subsequently issued that required the removal of the unauthorised materials. Further conditions were imposed that required the consent holder and/or his agents to provide documentation that confirms the removal and deposition into a lawful site.

It is accepted that materials are brought in to a site and can contain an assortment of acceptable and unacceptable materials. Environment Southland allows unacceptable materials to be sorted on site and stockpiled for future deposition to appropriate sites, but under no circumstances are any unauthorised materials allowed to be placed over the face or where infilling is occurring.

Figure 62 - A good management practise of stockpiling unacceptable cleanfill materials (metals, treated timbers) for future transfer to a recycling or lawful site.

12.3 Closed Landfills

Minimal monitoring of closed landfills was undertaken in the 2008/09 year. However, several matters are in progress which it is useful to report at this time.

Work has been progressing to fully identify and label all Southland region landfills, as part of a Hazardous Activities and Industries List (HAIL) site register. Landfills are considered to be hazardous industries due to the high potential for hazardous substances to be contained within them, particularly with older and long-standing landfills. In the long-term, it is anticipated that a spatial database using GIS will be used to mark all identified HAIL sites in Southland, including closed landfills. This will then allow Environment Southland to investigate sites identified as being at high risk of contamination.

The former Nightcaps landfill was relocated under consent by Takitimu Coal Limited, in May 2009. As part of this consent, the holder was required to construct a cell lining for the relocated waste, to provide a greater level of protection than was previously in place.

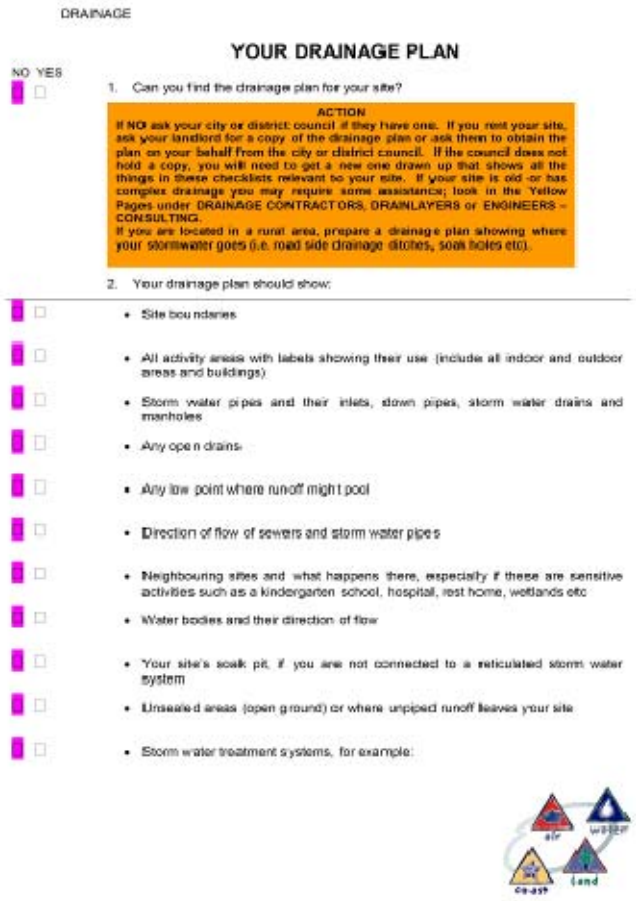
Figure 63 - Diggers forming cell lining for relocation of Nightcaps landfill – photograph supplied by Takitimu Coal Limited

Figure 64 - Capping of relocated Nightcaps landfill – photograph supplied by Takitimu Coal Limited

13.0 Pollution Prevention

Pollution Prevention is a new programme established at Environment Southland in the 2008/09 year. The programme was set up as a means of providing education and assistance for Southland's industrial and commercial businesses, in much the same way as the Dairy Liaison position has provided for dairying.

Due to staff constraints during the year, most pollution prevention work carried out was of an ad hoc nature and priority was given to planning and preparation. The major milestone achieved during the year was the substantial completion of the Southland Pollution Prevention Guide, a self-audit tool for businesses to assess and reduce their environmental risk. The Guide will be used as the lynch pin of the programme in years to come.



DRAINAGE

YOUR DRAINAGE PLAN

NO YES

1. Can you find the drainage plan for your site?

ACTION

If NO ask your city or district council if they have one. If you rent your site, ask your landlord for a copy of the drainage plan or ask them to obtain the plan on your behalf from the city or district council. If the council does not hold a copy, you will need to get a new one drawn up that shows all the things in these checklists relevant to your site. If your site is old -or has complex drainage you may require some assistance; look in the Yellow Pages under DRAINAGE CONTRACTORS, DRAINLAYERS or ENGINEERS – CONSULTING.

If you are located in a rural area, prepare a drainage plan showing where your stormwater goes (i.e. road side drainage ditches, soak holes etc).

2. Your drainage plan should show:

- Site boundaries
- All activity areas with labels showing their use (include all indoor and outdoor areas and buildings)
- Storm water pipes and their inlets, down pipes, storm water drains and manholes
- Any open drains
- Any low point where runoff might pool
- Direction of flow of sewers and storm water pipes
- Neighbouring sites and what happens there, especially if these are sensitive activities such as a kindergarten school, hospital, rest home, wetlands etc
- Water bodies and their direction of flow
- Your site's soak pit, if you are not connected to a reticulated storm water system
- Unsealed areas (open ground) or where unpiped runoff leaves your site
- Storm water treatment systems, for example:

Figure 65 - Example of a worksheet from the Pollution Prevention Guide

Substantial time was also spent on identifying particular areas to be targeted by the Pollution Prevention programme. These areas were partially influenced by the activities of the Living Streams programme within the Waihopai River catchment. Areas to be given priority attention in the 2009/10 year will be:

- Prestonville/Waikiwi;
- Otepuni Stream, east of Lindisfarne Street;
- South Gore (between the Racecourse and Charlton Roads);
- Winton Stream urban catchment;
- IAG collision repairers.

Activities will be expanded to other areas, as required and as resources allow. It is anticipated that referral work will still remain an integral factor in the delivery of pollution prevention in Southland.

Figure 66 - Unidentified colouring of Otepuni Stream, 9 April 2009

13.1 Hazardous Sites Register

Environment Southland has a duty under the provisions of the Resource Management Act 1991 to investigate land for the purposes of identifying and monitoring contaminated land. In the past, information held regarding potentially contaminated sites has been fragmented in nature and has been difficult to access. In recent years the Ministry for the Environment has published several guidelines relating to the collection and storage of potentially contaminated sites information.

In early 2009 it was decided to collate information about potentially contaminated sites held by Environment Southland into a single database, known as the Sites Associated with Hazardous Substances database. The primary focus of this work to date has been to collate information in one place, allowing for effective and efficient monitoring and identification of sites. The information held is intended to comply with the Ministry for the Environment *Contaminated Land Management Guidelines No 4 – Classification and Information Management Protocols.*

13.2 Challenges/Looking Ahead

Sediment

Sediment runoff from a variety of sources has been identified as an area which will need closer scrutiny in the future. This issue has been highlighted with the stormwater provisions in the Proposed Regional Water Plan for Southland becoming operative. Sediment entering surface water bodies can result in water discolouration as well as more significant effects such as de-oxygenation, siltation of gravel river beds and impacts on natural habitats (for example filter feeding macroinvertebrates).

Previously, agricultural sediment runoff has been addressed through mob stocking and winter grazing rules and encouraging the restoration of riparian margins. The logical next step is to examine the runoff of sediment from trade and industrial premises (for example truck washing), urban development (building sites) and other projects involving significant earthworks, such as roading projects.

An initial approach to these areas is likely to involve workshops with stakeholders such as contractors, to educate around the requirements for sediment control.

Stormwater

As of January 2008, stormwater discharges onto or into land which were unable to comply with Rule 12 of the Proposed Regional Water Plan for Southland were required to apply for discharge consents from Environment Southland.

As of 1 May 2009, any stormwater discharges to water which were unable to comply with Rule 11 of the Proposed Regional Water Plan for Southland also required consent to do so.

To date, industry response to these rule changes has been disappointing, with few consent applications received. Information relating to the rule changes was sent to a number of larger industrial businesses early in 2009. These companies will be approached, via the Pollution Prevention programme, in the 2009/10 year to determine whether stormwater discharge permits are required for sites, or whether simple changes to practice on site could reduce the need for a consent. Staff will also be identifying where consents are required and ensuring that these parties apply as required.

Work was carried out in May 2009 to look at the quality of stormwater discharges at sites in several Southland townships and within the Invercargill area. This work will be followed up during the 2009/10 year to identify sites of concern and target pollution prevention work in these areas.

Hazardous Substances Use and Storage

Environment Southland previously had involvement in the use and storage of hazardous substances. This has reduced in recent years. As part of the Pollution Prevention programme, liaison work will be carried out with relevant parties, including territorial authorities and the Department of Labour, to ensure that a comprehensive approach is taken to issues around hazardous substances.

A module addressing hazardous substance storage has been drafted and included in the Pollution Prevention Guide, to assist participants to identify those parts of present legislation (Hazardous Substances and New Organisms Act 1996 and Resource Management Act 1991) they must comply with. The module includes site risk reduction tools.

14.0 Incidents

Incidents are made up of three components:

- issues found by Environment Southland staff during monitoring;
- self reported issues by the responsible party;
- incidents reported by any third party.

In the financial year 1 July 2008 to 30 June 2009 there were 851 incidents, approximately 11% less than the previous year. Most of these are reported to Environment Southland by members of the public or staff at Environment Southland, however 16 self-reports were received from consented industries. Of the 851 incidents, 704 incidents required an inspection to measure environmental effects.

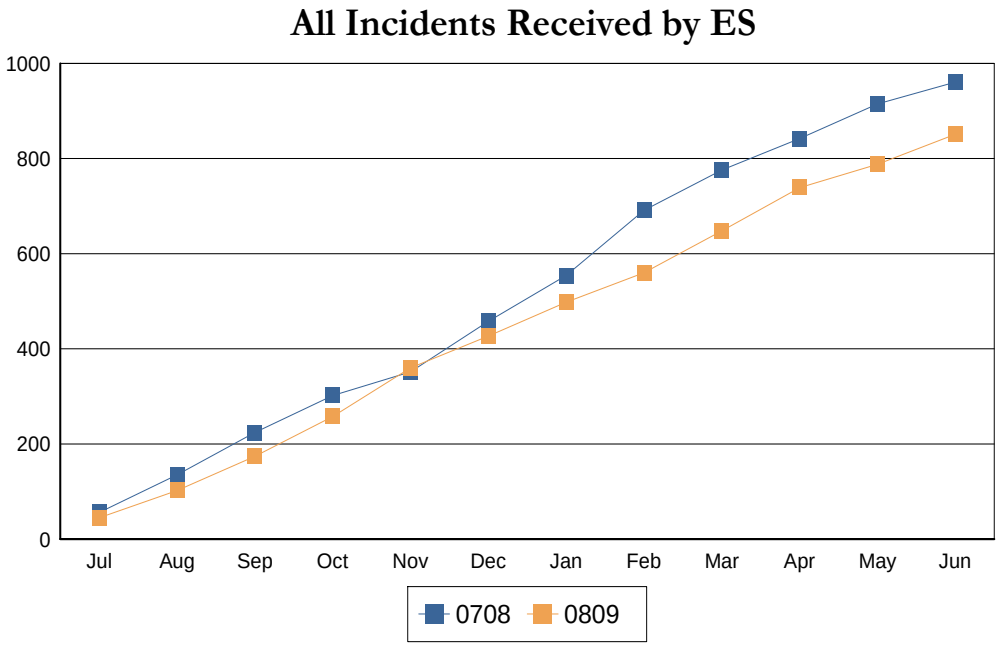


Figure 67 -All incidents received by Environment Southland in the 2007/08 year

When members of the public report an incident to Environment Southland they have the option of remaining anonymous, or their contact details being recorded. Generally, those that report an incident wish to know whether the action they have reported was considered undesirable and that the incident has been dealt with. Some outcomes are unable to be reported, as legal action prevents this until the event becomes public.

All incidents are categorised as being related to air, coast, land, or water.

Seasons play a major role in the type and frequency of incidents reported by members of the public, for example, water related incidents increase in September/October. This is due to the onset of extended day light hours allowing easier access to outdoor pursuits and recreational activities.

Air incidents generally increase in the summer months, with odour issues more obvious to the general public due to increased outdoor activities, such as barbeques and family activities. There has been a recent increasing trend of reports of nuisance smoke within urban areas during the winter months.

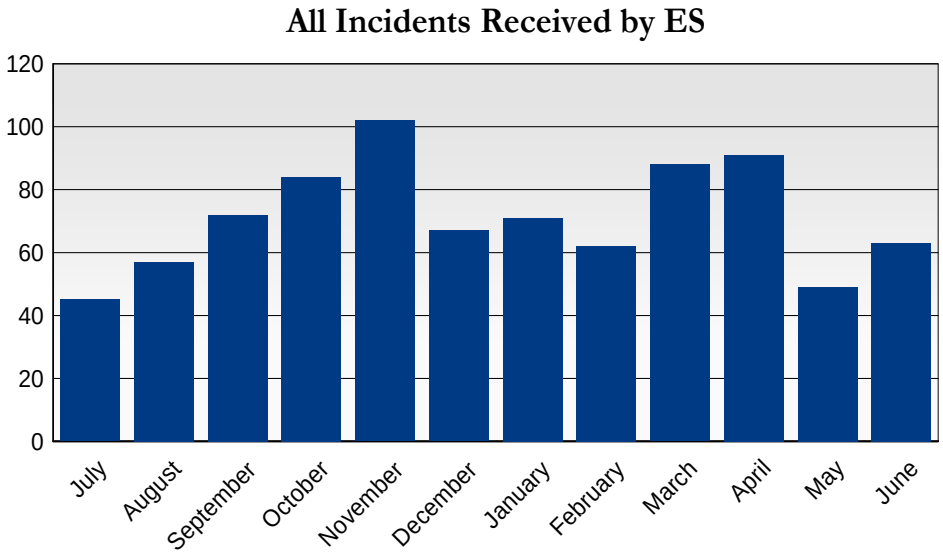


Figure 68 - Graph showing monthly incidents totals for 2008/09 year

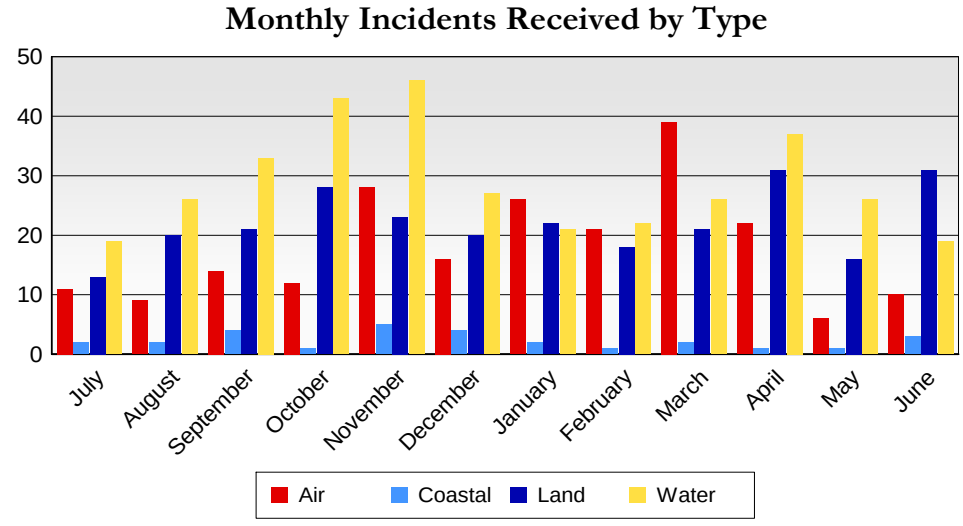


Figure 69 - Monthly incidents received by type

14.1 Cost Recovery

After consultation with ratepayers, Council requires that when the Environmental Compliance Division investigates an incident and identifies a responsible party, 60% of the investigation costs incurred should be recovered from that party.

For the year 1 July 2008 to 30 June 2009 a total of $218,295.13 was recovered, an approximate 14.6% increase on the year before.

The result is encouraging, as offenders are paying for staff time spent investigating public reports of non compliance, rather than this cost being covered by the general ratepayer.

It is expected that the upward trend will continue as staff resolve more incidents.

15.0 Infringement Notices

Infringement notices are an effective enforcement tool suitable for situations where an offence requires a penalty, but is not considered serious enough to warrant prosecution. It is an efficient and inexpensive means of enforcement. The decision to issue an infringement notice is made by an Infringement Panel, made up of Environment Southland Senior Managers. Penalties are prescribed by regulations and vary depending on the section of the Resource Management Act 1991 contravened.

Figure 70 - Carcass of a cow left in a creek near Ryal Bush

There were 11 infringement notices issued in the 2008/09 financial year. Seven of the infringements were for farm dairy effluent to land and/or water, three for other contaminants to water and one for stock truck effluent contaminants to land.

Table 17 - Infringement notices issued 2008/09

Issued to	*Offence*	*RMA Section*	*Fine*
K M & S P Buchanan	Allowed a contaminant, namely dairy effluent, to be discharged into or onto land in circumstances which resulted in that contaminant entering water, when that discharge was not expressly allowed by a rule in a regional plan or in any relevant proposed regional plan, resource consent, or regulations.	Section 15(1)(b)	$750
Herberts Transport Limited	Allowed a contaminant, namely stock truck effluent, to be discharged onto a road via the open	Section 15(2)	$300

Issued to	*Offence*	*RMA Section*	*Fine*
	effluent holding tank closure flap on the trailer unit of a stock truck that was transporting sheep, in a manner that was not expressly allowed by Section 5.4.1 of the Regional Effluent Land Application Plan for Southland.		
Robert Baty	Allowed a contaminant, namely farm dairy effluent, to be discharged onto land in circumstances which resulted in contaminants entering water, in a manner that was not expressly allowed by a rule in a relevant proposed regional plan, resource consent, or regulations.	Section 15(1)(b)	$750
Roger Whyte	Allowed a contaminant, namely effluent, to be discharged into or onto land in circumstances which may result in that contaminant entering water when that discharge was not expressly allowed by a rule in a regional plan or in any relevant proposed regional plan, resource consent, or regulations.	Section 15(1)(b)	$750
Premier Dairies Limited	A cow carcass was left in a stream resulting in the discharge of contaminants to water.	Section 15(1)(a)	$750
Daniel Francis Jenkins (Manager, Premier Dairies Limited)	A cow carcass was left in a stream resulting in the discharge of contaminants to water.	Section 15(1)(a)	$750
McNeills Poultry Farm (2006) Limited	Confirmed odour which contravened an abatement notice previously issued.	Sections 15(1)(c), 17(1) and 338(1)(c)	$750
Peter Douglas Maxwell	Application of a contaminant, namely farm dairy effluent, to land in a manner not expressly permitted by a rule in a plan, a resource consent condition or regulations.	Section 15(2)	$300
Fulton Hogan	Discharge of contaminants, namely human sewage, onto and into land so that they entered water at Jacobs River Estuary, Riverton, in a manner not expressly permitted by a rule in a plan, resource consent condition or regulations.	Section 15(1)(b)	$750
Hedgehope Pastoral Limited	Discharge of contaminants, namely dairy shed effluent, onto and into land where it entered a roadside drain, in a manner not expressly permitted by a rule in a plan, resource consent condition or regulations.	Section 15(1)(b)	$750

Issued to	*Offence*	*RMA Section*	*Fine*
Mr L J McKenzie	Allowed a contaminant, namely effluent, to be discharged into or onto land in circumstances which may result in that contaminant entering water when that discharge was not expressly allowed by a rule in a regional plan or in any relevant proposed regional plan, resource consent, or regulations.	Section 15(1)(b)	$750

16.0 Abatement Notices

Abatement notices are issued to individuals or parties who have committed an offence against a plan, rule or other legislative requirement.

Abatement notices have been recognised as a valuable tool for the compliance staff of local government agencies to use for enforcement under the Resource Management Act 1991. They are a cost effective method of providing a formal directive to an offender, without having to take the incident before the court.

It has been recognised that abatement notices must be served to the involved parties, the consent holder and/or company and directors individually, to allow the formal evidential use of such documents, should the incident need to be taken further. It is not always known at the time of issuing the abatement notice who the responsible and accountable parties are.

An abatement notice has a prescribed format in which the following detail is required:

- the name of the person or company;
- the activity or action that the offender has to cease/not undertake or take action on;
- the location the notice applies to, preferably legal description or map co-ordinates;
- the time allowed for the offender to meet the requirements of the notice;
- any further conditions that the officer has specified;
- the reasons for the notice, i.e. rules breached and standards that should be met;
- a warning that non-compliance with the notice could lead to a prosecution;
- advice on how to appeal the notice;
- what authorisation the officer issuing the notice has;
- the signature of the officer who issues the notice.

Compliance Officers need to be mindful that the requirements of an abatement notice are reasonable and the offenders have the opportunity to comply within a prescribed timeframe.

The offender has the right to appeal for the notice to be cancelled or stayed by a District Court judge. Non-compliance with the notice can result in further enforcement action, such as prosecution for breach of notice.

During the 2006/07 year, 25 abatement notices were issued. This figure more than doubled to 53 in 2007/08. During 2008/09 42 notices were issued. The abatement notices issued against the type of offence is indicated in Figure 71.

There has been a downward trend in the number of coast related abatement notices and an increase in those issued in relation to discharges of contaminants to land and water over the three year period. During this financial year, six notices were issued that required the installation of equipment in accordance with the conditions of the resource consents.

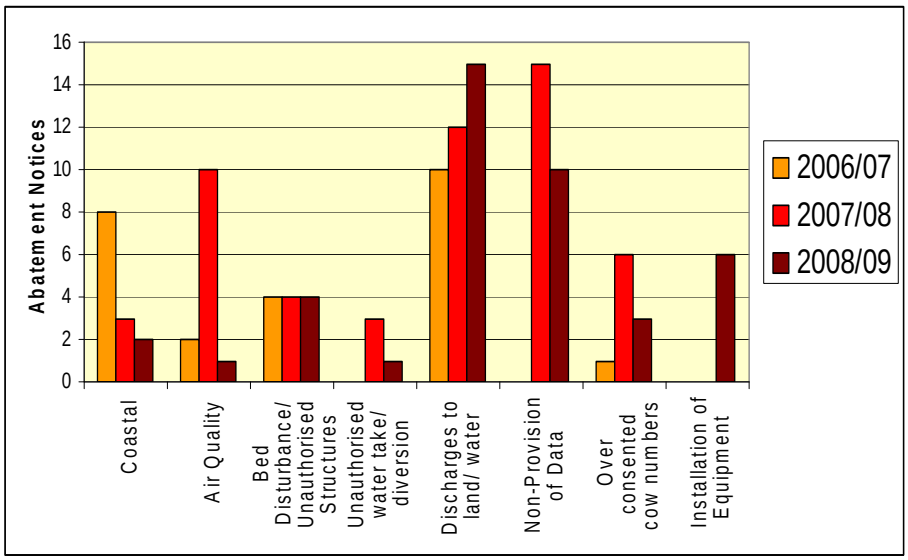


Figure 71 - Abatement notices issued for incidents during the 2008/2009 financial year

Abatement notices for the 2008/09 year were issued for the following activities:

Coastal	- 2
Air quality issues	- 1
Bed disturbance/diversion/unauthorised structures	- 5
Unauthorised discharges to land/water	- 15
Non-provision of data	- 10
Discharge without consent/Over consented cow numbers	- 3
Installation of equipment as per consent	- 6
Total issues	**- 42**

Table 18 - Coastal compliance

Issued to	*Summary of Offence*
Gary Huggins	**Location:** Thule Bay, Stewart Island. **Offence:** The yacht *Port Oxley* was grounded at Thule Bay and had been there for some time. A breach of section 12(2)(a) and 12(3)(a) of the Resource Management Act 1991.
Southern Aqua Adventures Limited	**Location:** The internal waters of Fiordland between Yates and Puysegur points, except the area identified in resource consent/coastal permit 203302. **Offence:** Commercial surface water activities other than as expressly allowed by a coastal permit. Non-compliance with Section 14(1)&(3) of the Resource Management Act 1991.

Table 19 - Air quality: unauthorised discharges

Issued to	*Summary of Offence*
The Niagara Sawmilling Company	**Location:** Land occupied and affected by The Niagara Sawmilling Company situated at, and inclusive of, various properties on East Road, Kennington Road and Clapham Road. **Offence:** Objectionable dust/particulate was being omitted beyond the property boundary resulting in adverse effects to neighbouring properties.

Table 20 - Bed disturbance, diversion and unauthorised structures in waterways

Issued to	*Summary of Offence*
P G Pullar	**Location:** 66 Crichton Park Road. **Offence:** The unauthorised bed disturbance, bank alteration and dam construction across a waterway without a resource consent.
Neil J & Yvonne M Jefcoate	**Location:** 263 Dunns Road. **Offence:** Concrete rubble was used as erosion protection works along the Oreti river (two notices, one to cease/not undertake and one to remove).
R M Dickson	**Location:** Land leased or owned by R M Dickson bordering the Waikaia River. **Offence:** Stock were congregating under the Waikaia River Bridge and had degraded and altered the profile of the bank of a waterway.
HKT Holdings Limited	**Location:** 850 Ohai-Clifden Highway. **Offence:** A dam had been constructed along a tributary of the Ourauea River (two notices, one to cease/not undertake and one to remove).
Waimarino Land Company Limited	**Location:** 178 Wyndham Valley. **Offence:** The excavation, diversion and damming of water along a tributary of the Don River.

Table 21 - Water quality: unauthorised discharges to land and to water

Issued to	*Summary of Offence*
DM Sixtus	**Location:** Hedgehope, Invercargill. **Offence:** Unauthorised discharge of contaminants to land from a wintering pad containment facility by overflow to land in circumstances where they may enter water.
Talisker Farm Company Limited	**Location:** 84 and 233 Hilda Road, Edendale. **Offence:** Talisker Farm Company Limited and/or its agents have allowed the unauthorised discharge of contaminants to land from a wintering pad containment facility by overflow to land in circumstances where they may enter water.
P J & C A Roberts	**Location:** 112 Wilson Road **Offence:** Unauthorised discharge of wintering pad contaminants that overflowed from the containment facility onto land and into surface water.
Southern Friesians Limited	**Location:** 375 Lochiel Branxholme Road **Offence:** Dumping of dead stock, plastic baleage wrap, a wrecked car, chemical drums and other items of a general nature into a gravel pit which contained water.

Issued to	*Summary of Offence*
Douglas Martin Sixtus	**Location:** 2237 Winton-Hedgehope Highway, Hedgehope. **Offence:** Farm dairy effluent overflowed from, and seeped out of, the effluent storage ponds to land in circumstances where it entered water. Over-application to land of farm dairy effluent from a travelling irrigator in circumstances where it entered water.
D E & V J Stafford	**Location:** 86 Charlton Siding Road. **Offence:** Groundwater investigations showed significantly elevated nitrates in a bore in close proximity to the effluent containment sump, which was leaking. Farm dairy effluent was overflowing and seeping out of both effluent storage ponds to land in circumstances where it may have entered groundwater. The travelling irrigator did not meet consent application rate requirements, as per resource consent 204546.
Navillus Farms Ltd	**Location:** 42 and 43 Hall Road. **Offence:** It was observed that dairy shed effluent, wire and other rubbish were stored/disposed of in a disused gravel pit at the property along with dead animals and other solid waste (two notices, one to cease/not undertake and one to remove).
South Hughes Farms Ltd	**Location:** 406 Taramoa Road, Invercargill. **Offence:** A significant overflow of farm dairy effluent emanating from the effluent storage pond resulting in overland flow and ponding in circumstances where it could enter water.
Hedgehope Pastoral Limited	**Location:** 96 Millar Road. **Offence:** Silage leachate around the silage pit had ponded and flowed over onto land and into a gully system. The pit did not appear to be sealed, or to have an integral waterproof concrete lining, or equivalent to prevent further non-compliance.
Hedgehope Pastoral Limited	**Location:** 96 Millar Road. **Offence:** Unauthorised discharge of contaminants, namely sewage or foul water, entering a drain which in turn entered a waterway.
Gowan Lea Holdings Limited	**Location:** Teviotdale Road, Isla Bank. **Offence:** Farm dairy shed effluent was being collected in a large pond measuring 186 X 41 metres. The pond had been in use for 4-6 weeks, with dairy shed effluent from 800 cows going into the pond twice daily. No effluent has been irrigated to land since the pond was first used.
Otago Foundation Trust Board	**Location:** 89S Kaiwera Road, Pukerau, RD 2, Gore. **Offence:** Foul water from the foul water drainage system at Camp Columba (Kaiwera Road, Pukerau) was being discharged from pipes in a manner which created a pool of sewage and/or grey water approximately 50 metres in length and at least four feet deep. The resulting pool was located adjacent to an existing waterway and there was evidence that the pool had previously overflowed allowing foul water or sewage to contaminate the waterway.
Somerton Farming Company Limited	**Location:** 286 Rimu Road, RD 1, Kennington. **Offence:** Foul water from a nearby septic tank was piped directly into the dairy shed effluent system. The discharge of foul water into the dairy shed effluent system is not permitted by resource consent 202888 and was, therefore, unlawful.
Laurie Holdings Limited	**Location:** Lower Scotts Gap Road. **Offence:** Dead stock/offal, wire, wood, chemical drums and other items of a general nature were disposed of into a rubbish hole which contained water (two notices, one to cease/not undertake and one to remove).

Issued to	*Summary of Offence*
Wairau Agribusiness Investment Limited	**Location:** 174 Tramway Road East, RD 3, Wyndham. **Offence:** The contamination of a waterway as a result of effluent overflowing from the stone trap. The effluent pond was full and overflowed to the adjoining ground and had the potential to make its way to water.

Figure 72 - Offal disposed of with landfill matter to water, Lochiel

Table 22 - Non provision of data

Issued to	*Summary of Offence and Action Required*
Pyramid Dairies Limited	**Location:** Riversdale Pyramid Road, Riversdale. **Offence:** Non provision of water abstraction and/or environmental monitoring reports as required by conditions 6(a)-(c) and 8 of water permit 201211.
Southland Ostrich Export Corporation Limited	**Location:** 117 Ellis Road, Lumsden. **Offence:** Non provision of water abstraction and/or environmental monitoring reports as required by conditions 5 and 6 of water permit 202867.
C F Smaill	**Location:** 56 Main Wendonside Road, RD 7, Gore. **Offence:** Non provision of water abstraction and/or environmental monitoring reports as required by conditions 5 and 6 of water permit 203270.
H M and K A English, Three Poplars Trust	**Location:** 160 Breakneck Road, Dipton. **Offence:** Non provision of water abstraction and/or environmental monitoring reports as required by conditions 5 and 6 of water permit 203460.
Hamish English, Holmesdale Trust	**Location:** Ellis Road, Lumsden. **Offence:** Non provision of water abstraction and/or environmental monitoring reports as required by conditions 6 and 7 of water permit 204364.
Lindsay Kirker	**Location:** 295 Lowther Road, RD 3, Lumsden. **Offence:** Non provision of water abstraction and/or environmental monitoring reports as required by conditions 6 and 7 of water permit 204511.
Clodagh Limited	**Location:** Ellis Road, Lumsden. **Offence:** Non provision of water abstraction and/or environmental monitoring reports as required by conditions 5 and 6 of water permit 204980.

Issued to	*Summary of Offence and Action Required*
Fortune Farming Limited	**Location:** Fortune Road, Mandeville. **Offence:** Non provision of water abstraction and/or environmental monitoring reports as required by conditions 6(a)-(c) and 8 of water permit 203129.
Triflor New Zealand Limited	**Location:** Edendale-Seaward Downs Road, Edendale. **Offence:** Non provision of water abstraction and/or environmental monitoring reports as required by conditions 5 and 6 of water permit 203281.
I & A M Tulloch	**Location:** Dunn and Cody Road, Riversdale. **Offence:** Non provision of water abstraction and/or environmental monitoring reports as required by conditions 5 and 6 of water permit 204204.

Table 23 - Discharge without resource consent and from greater cow numbers than specified on the consent

Issued to	*Summary of Offence and Action Required*
Oreti Dairies Limited	**Location:** Hamilton Road, Oreti Plains, McFetridge Road. **Offence:** The unauthorised discharge of dairy shed effluent as a result of being over the cow numbers specified in resource consent 204793.
HKT Holdings Limited	**Location:** 850 Ohai-Clifden Highway. **Offence:** Discharge of dairy shed effluent onto land without a resource consent. Whilst a discharge permit had been applied for, it had not yet been granted.
D I & J L Diprose	**Location:** Ermedale, Riverton. **Offence:** The unauthorised discharge of dairy shed as a result of being over the cow numbers specified in the discharge permit.

Table 24 - Installation of equipment to meet consent conditions

Issued to	*Summary of Offence and Action Required*
P L and T M Gollan	**Location:** 86 Kingsbury Road, Riversdale. **Requirement:** To allow for bore sampling to be undertaken a tap had not been installed as required by resource consent 204158.
R M and C K Alty for McFarm Trust	**Location:** 1230 Edandale-Woodlands Highway. **Requirement:** The existing bore was not suitable for discharge permit monitoring. A new bore needed to be constructed to enable groundwater monitoring to be conducted as required by resource consent 201098.
A P and L R Hardegger for Longacre Trust	**Location:** 159 Teviotdale Road. **Requirement:** A bore needed to be repaired to enable groundwater monitoring as required by resource consent 202119.
Strathallen Farms Limited	**Location:** Evans Road, Tisbury, Invercargill. **Requirement:** Repairs to the irrigator, as it applied effluent in excess of the depth stipulated by the consent and that an automatic switch off system be installed per condition 9(c) of the discharge permit, number 204830.
R W & H A Trotter	**Location:** Dacre-Morton Mains Road, Morton Mains. **Requirement:** That an anti-siphon device and automatic cut off system be installed per the conditions of resource consent 204982, as this equipment was not in place at the time of a routine inspection.

Issued to	*Summary of Offence and Action Required*
Engliston Pastoral Company Limited	**Location:** 946 Dipton-Winton Highway, Benmore. **Requirement:** To allow for water samples to be collected, a tap was to be installed per the conditions of resource consent 204591.

17.0 Prosecutions

Table 25 – Miscellaneous prosecutions

Defendant	*Case*	*Decision*
Prime Range Meats Ltd	**Charge:** The company plead guilty to five separate charges of the discharge of objectionable odour.	Fined a total of $40,000, costs were included in the total.
S Drummond & Southern Pastoral Holdings	**Charge:** Both S Drummond and Southern Pastoral Holdings were found guilty following a defended hearing.	Fines of $3,000 and $9,000 were imposed. Costs had been taken into account when setting the fines.
Invercargill City Council	**Charge:** Plead guilty to two charges of emitting odour beyond the boundary.	Fined a total of $35,000.
Egan	**Charges:** Convicted and fined for disturbance of bed under S13 (1) (b) and convicted and discharged on S15 (1) (a) charge of discharging a contaminant to water.	Fined $5,000 and costs of $2,309.22.

Table 26 – Dairy prosecutions

Defendant	*Case*	*Decision*
Coldstream Downs Ltd	**Charge:** Plead guilty to two charges of discharging dairy effluent to a waterway.	Fined $20,000 plus costs.
Peter Gubb	**Charge:** Plead guilty to a charge of discharging dairy effluent to a waterway.	Fined $4,000 and costs of $1,458.43.
Brent Hayston	**Charge:** Plead guilty to a charge of discharging dairy effluent to a waterway.	Fined $8,000 and costs of $1703.58.
Sixtus	**Charge:** A plea of guilty was entered on two charges of causing a discharge of a contaminant to water.	Fines of $15,000 and $25,000 were imposed.
407 Dairies Ltd	**Charge:** Plead guilty to the discharge of dairy effluent to a waterway.	Fined a total of $35,000.
M T Clinton	**Charge:** Plead guilty to the discharge of dairy effluent to a waterway.	Fined a total of $29,000.

Glossary

AFDW	Ash free dry weight - used for periphyton monitoring to remove any sediment included in the sample.
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.
BOD_5	Biochemical Oxygen Demand - this is a measure of the ability the waste has to remove Dissolved Oxygen from a receiving water or waterway by decomposition.
CFU	Colony Farming Units.
Chl *a*	Chlorophyll *a* - the pigment in plant cells which captures light energy for photosynthesis.
DAF Unit	Dissolved Air Flotation unit where air is pumped into the effluent under pressure. When it discharges into the unit under atmospheric pressure the dissolved air comes out of suspension and forms bubbles on any particulate matter. This then floats and is removed as a sludge.
DRP	Dissolved Reactive Phosphorus - DRP is a subgroup of the Total Phosphorus and is an arbitrary measure of the phosphorus that is readily available to the plants to sustain growth.
dsm^3	Dry standard cubic metre - this is used for determining the contaminant levels in exhaust gases by standardising temperature and pressure, and removing the effect of variable water contents.
E. coli	Escherichia coli - these are a subset of the Faecal Coliform group and are regarded as a more specific indicator of faecal contamination and hence the presence of pathogenic bacteria.
EC	Electrical Conductivity - the ability of a water to conduct electricity. This gives a conservative measure of the mineral content of a water. Generally, the greater the conductivity of the water the greater the mineral content of the water.
Faecal Coliforms (FC)	Faecal Coiforms - 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	A measure of concentration in a liquid or gas. Grams of material in 1 cubic metre of water.

HFA	Hydrofluoric Acid.
IANZ	International Accreditation New Zealand.
ISO	International Organisation of Standardisation.
ISO 1400 1	A standard produced by ISO defining the requirements for an environmental management system.
LTCCP	Long-term Council Community 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).
MLTR	Makarewa Low Temperature Rendering plant.
MPN	Most Probable Number – a statistical estimate of the mean density of bacteria in a water sample.
N	Nitrogen - Nitrogen is an important element in the growth of plant material. It is required for protein formation and consequently animals have a significant N content.
NH4-N	Ammonical Nitrogen, ionised ammonia - a reduced form of nitrogen. Ammonia is rarely found at high levels in natural waters. Its presence is an excellent means of detecting pollution.
NH_3	Unionised ammonia, ammonia - this form of ammonia is significantly more toxic that the ionised form as above. The relationship between the ionised and unionised forms is dependant on temperature and pH of the water.
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 with the aerodynamic particle size of 10 Micrometers or less.
SO_2	Sulphur Dioxide.

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 solids.
$\mu g/m^3$	A measure of concentration in a liquid or gas. Micrograms of material in 1 cubic metre of water. 1 gram = 1,000,000 micrograms.
USEPA	United States Environmental Protection Agency. The USEPA provides the environmental regulation within the United States. Its data and standards are frequently used as the internal standards by other countries such as New Zealand.