



Environmental Compliance Monitoring Report

2006/07

**Report by -
Environment Southland
Compliance Division**

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Environment Southland is the brand name of
the Southland Regional Council



In the 2004/05 Environmental Compliance Monitoring Report it was reported that an Abatement Notice was issued to Mr Peter James Hargest. This was incorrect. No Abatement Notice was issued by Environment Southland against Mr Hargest.

Council apologise for this mistake. The Council's Compliance Manager has personally contacted Mr Hargest and has changed the way Abatement Notices are processed, so that this mistake cannot occur again.

Foreword

The Compliance Division provides a 24 hour, 365 day response to public complaints involving matters pertaining to our environment. Due to good publicity and education by Environment Southland, it is agreed that the public now has a much better understanding of what is or is not acceptable when it comes to environmental issues. It is quite clear that the public will no longer tolerate the adverse actions of environmental vandals. Public awareness has undoubtedly contributed to a 40% increase in complaints directed to this division this year.

Under the management of Mark Hunter, our dedicated Compliance staff have worked well to keep on top of all issues. A testing time was recently had with odour problems at the Clifton Wastewater Treatment Plant. Pressure was put on the Invercargill City Council to act and address the issues affecting the Clifton residents, and we are now hopeful that this matter has been resolved.

The Coastal Plan has now become operative and a new staff member has been appointed to assist with the implementation of this plan. Another new staff member has been appointed to the team, to assist with the increased dairy farm advisory requirements. Dairy farm conversions are continuing at a rapid pace and it is likely to result in more labour resources being required in the near future.

The Compliance Division undertakes at least two aerial flights a year to examine waterways in Southland. Previously, fixed wing aircraft were used, but helicopter flight has proved to be superior for surveying properties and final costings are very similar. It is a very effective and time saving method of ensuring that there is no stock in waterways, unauthorised works, or silage pit discharges to water.

Finally, our Councillors would like to congratulate our Compliance team for continuing to maintain a very high standard of compliance throughout the Southland region, in what was our busiest year.



D S Collie
Chairman
Environment Southland



E J Tapper
Chairman
Environmental Management Committee

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1.0 Air

The Southland community is becoming increasingly aware of its air quality. Council received approximately 120 more air related incidents than it did in the previous year, bringing the number of complaints to 281 for the 2006/07 year. The majority of these incidents were received through Council's 24-hour pollution hotline. Air incidents are generally categorised into smoke, odour and dust and are usually reported to Council because of the nuisance effects they cause across neighbouring boundaries.

1.1 Odour Incidents

The 2006/07 year had a considerable number of odour related incidents. A total of 203 odour incidents were recorded for the year. Many of these incidents were related to the Invercargill City Council Wastewater Treatment Plant and Prime Range Meats Limited (a meat rendering plant), and resulted in infringement notices being issued to both organisations.

Odour investigations require two Environment Southland staff to attend an incident. All warranted compliance officers had their noses calibrated to assess each individual's sensitivity to odour.

1.2 Other Air Quality Incidents

The remainder of the incidents reported to Council comprised of nuisance smoke, dust and spray drift. Dust incidents related to fertilisers, alumina and crushed dust from yards.



Figure 1 – Black smoke being emitted from the burning of bitumen



Incidents involving nuisance smoke from burning vegetation in rural and semi-urban areas were common, especially on fine days during the summer months. Some of these incidents included the burning of trade wastes, plastics, rubbish, aerosol cans and baleage wrap.

An incident of particular note involved the receipt of a report of black smoke in Tramway Road, Invercargill. Staff found Fulton Hogan Limited to be burning bitumen on its site. This activity not only breached the Air Quality Plan for Southland, but also the Resource Management (National Environmental Standards Relating to Certain Air Pollutants, Dioxins and Other Toxics) Regulations 2004. This was the first time that Environment Southland has dealt with a breach of the Resource Management Act that also breached a National Environmental Standard.



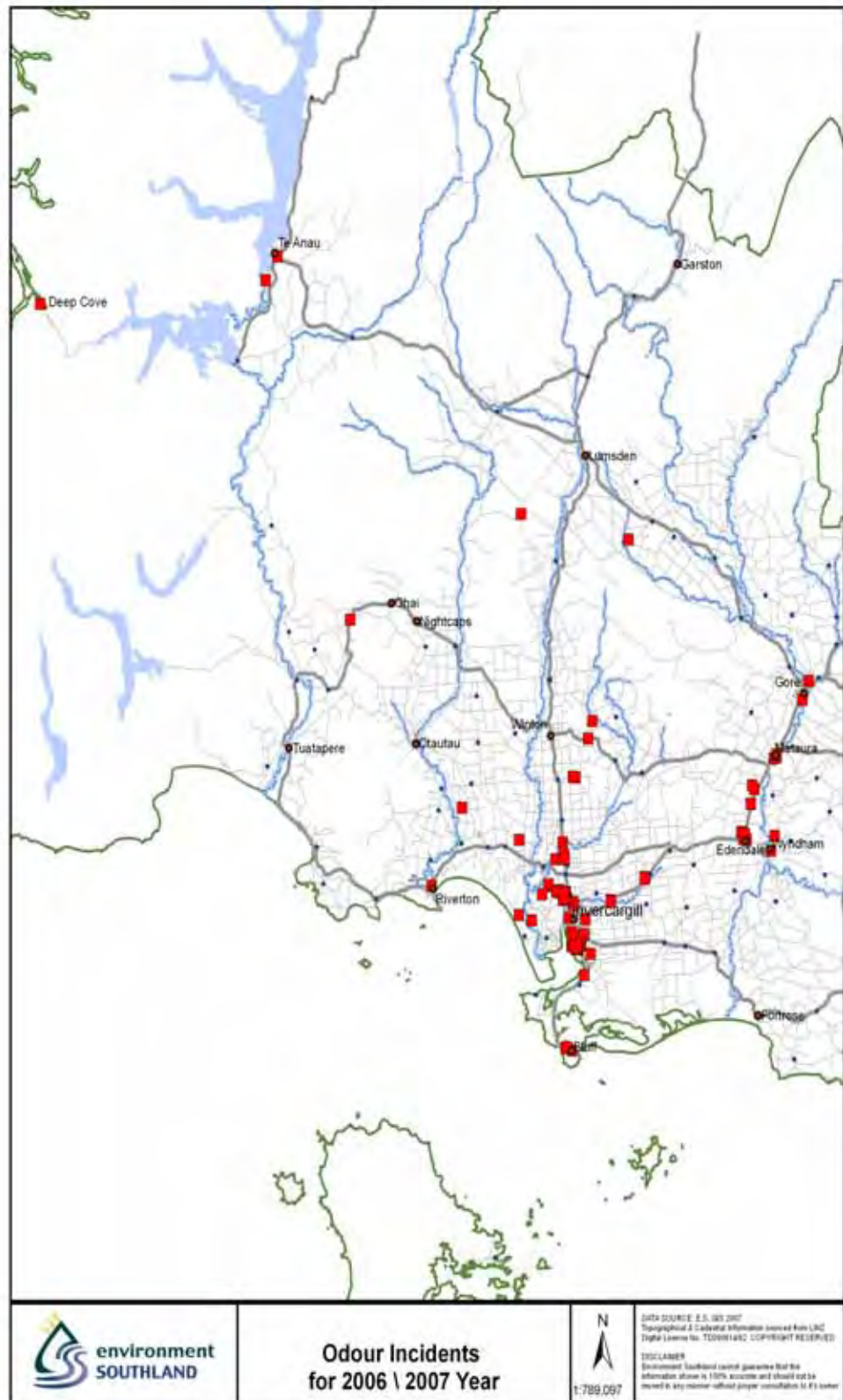


Figure 2 – Odour incidents for 2006/07 year (squares indicate locations)



2.0 Water Irrigation

2.1 Water Abstraction Volume Monitoring

The Proposed Regional Water Plan for Southland requires that all water takes of more than 20,000 litres per day and/or >2 litres per second require resource consent, unless they are exclusively for stock drinking water or domestic use, or fit within existing use rights.

The region's aquifers have identified abstraction volumes allocated subject to the plan. It is important for the management of the groundwater resources on a national and regional level that an account is kept of actual known takes from the resource.

The largest proportion of the 752 consents for water takes are for dairy purposes (66%), and these are addressed in the Dairy Monitoring section of this report. A further 24% of water abstraction consents either have no reporting requirement (generally because they are old "water rights" that have not yet come up for renewal, or the take is of a trivial or consistent nature), or are reported as part of an inclusive annual report (for example, municipal water supplies, back-country huts and significant industries). The remaining 10% are for irrigation purposes.



Figure 3 – A large pasture irrigator near Mossburn

There are presently 77 water take permits issued for irrigation purposes, with 65 of these required to report annually. In general, these consents allow the consent holder to remove large volumes of water from the region's underground resources. It is particularly important that usage records are supplied so that they can be assessed against the allocation limits set for the affected aquifer.

Water take consent reporting regimes vary, due to Council's information requirements at the time the consent was issued. The largest single allocation is to Ellis Road Farming, which allows 1,426,000 m³/year to be taken from groundwater. If the water was drawn at a constant rate, it would work out at 45 litres per second, every second of the year. Accordingly, there are stringent monitoring conditions attached.



The majority of irrigation consents are for irrigation of pasture. The balance include permits to take water for horticulture (for example, bulb cultivation), crop irrigation and golf courses. Thirteen consents are for surface water takes and 64 are for groundwater takes.

Last year 31 consent holders notified Council of the commencement of irrigation during the 2006/07 season and 25 supplied records.

This year an irrigators' information pack was sent to all irrigation consent holders with environmental information sheets, consent advice and a number of blank record sheets, to help improve reporting of abstraction volumes and effects monitoring. Although these were intended for use next season, a large proportion have been received already and this has made the database-entry of abstraction records much easier for Council staff. In future, consent holders may download more copies of the template from our website, at www.es.govt.nz.

During the 2006/07 irrigation season:

- 36 (56%) consent holders reported on time and had no compliance issues;
- 12 (18%) consent holders reported on time but either reported takes in excess of their allocation, failed to provide all of the information required, or failed to notify the Council upon commencement of irrigation for the season;
- 17 (26%) consent holders failed to submit a report as required, including six who had notified Council of commencement.

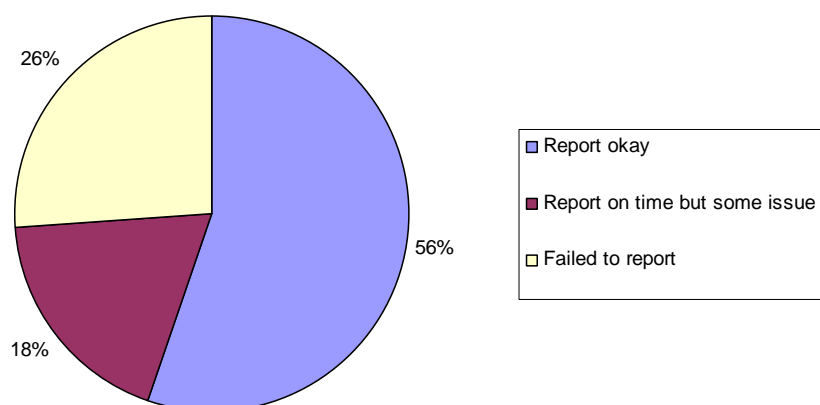


Figure 4 – Irrigation water-take reporting 2006/07 season

Overall, reporting compliance was improved on previous years. At the time of preparing this report, consent holders with some non-compliance issues (44%) were being followed up. Some of the larger allocation holders report in real time by telemetry and we hope to see more consent holders take up this option in future.



Another electronic tool of value is a programme called “Alarmist”, which monitors environmental data such as river and groundwater levels and can send email alerts to consent holders. In early March 2007, some of the aquifers and stream flows reached levels low enough to result in this system alerting a small number of consent holders that they had to reduce or cease abstracting water, subject to a condition of their consent. The same system advises them when levels or flows are back within the acceptable range and they can begin abstracting again. The operation of this system requires a lot of staff input, however, we see value in this, as it assists consent holders to comply with their consent conditions.

Several absentee consent holders receive daily email updates of rainfall or groundwater levels as a courtesy, via “Alarmist”, to help them stay in touch with conditions at their property. This information can also be accessed at any time via our website, or by telephone.

The data supplied by consent holders is collated and analysed by the Environmental Information Division and will be made available on the Environment Southland website in due course. For readers interested in Southland’s groundwater resources, a useful source of information is the new Groundwater Information page.



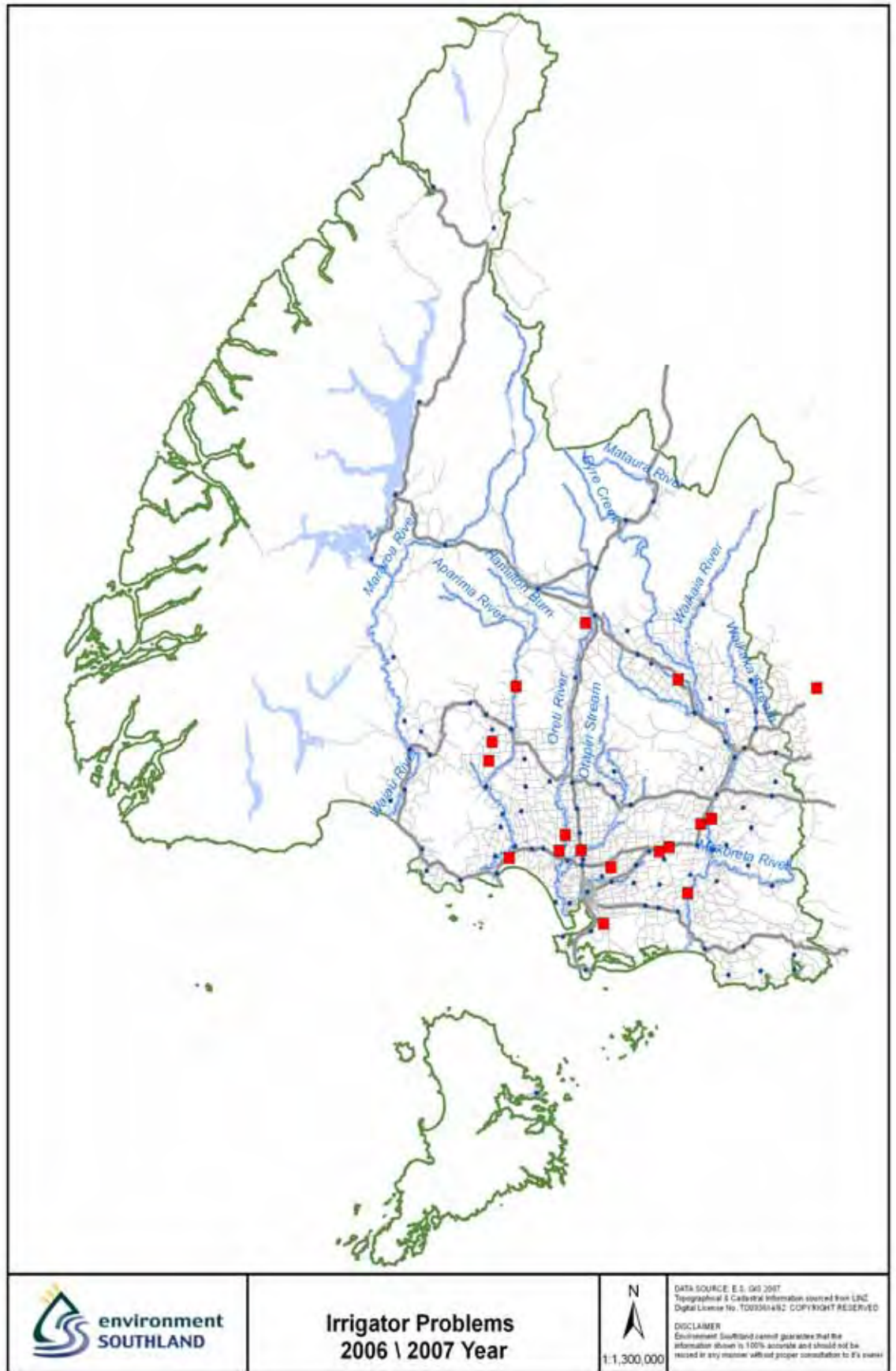


Figure 5 - Irrigator Problems 2006/07 Year (squares indicate the location)



3.0 Compliance Monitoring

A substantial component of the Compliance Divisions' work is the routine monitoring of resource consents. Some minor activities only require a completion inspection, while significant operations may require frequent inspections, sampling and analysis of data.

Staff undertook 4,590 documented consent compliance actions during the 2006/07 financial year. This was a 17% increase on the 2005/06 year (Figure 6). The major areas of increase in client reports were with commercial surface water activity logs, irrigation take reporting and bore construction reports. There was also a substantial increase in sampling inspections and routine dairy consent inspections, including wintering pads.

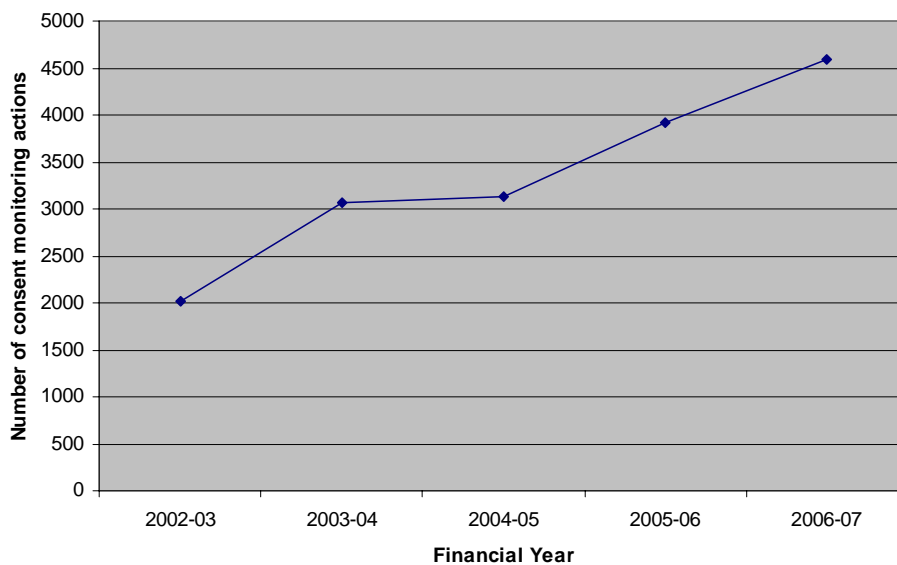


Figure 6 – Routine consent monitoring events, from 2002 to 2007

These consent monitoring actions are itemised in Table 1 below.

Table 1 – Consent monitoring and compliance actions during the 2006/07 year

<i>Number</i>	<i>Compliance Action</i>	<i>Response</i>
1159	Client Reports	These range from activity logs for CMA activities, to annual reports for major industrial complexes. They are assessed against the consent limits, national standards and plan requirements.
141	Completion or commencement	Post-completion inspections are required in a number of circumstances. Initiation of work also triggers monitoring or data requirements.
83	Administration/file notes	Desk-based inspection actions that do not fit the categories above.
1067	Environment Southland samples	The samples collected by ES are for compliance with consents and audit of other organisations' sampling and analysis procedures.
2047	Routine inspections	These are on-site inspections to determine compliance with consent conditions.



<i>Number</i>	<i>Compliance Action</i>	<i>Response</i>
93	Follow-up/ reinspections	These inspections are undertaken to determine if non-compliance issues previously identified have been remedied.

In addition to the inspections shown above, staff maintained a 24/7 Pollution Response duty roster and responded to incidents or reports of consent or Resource Management Act 1991 breaches

During all these actions, staff also undertook non-specific monitoring of regional plan compliance.

3.1 Aerial Monitoring

Aerial monitoring is a proactive measure undertaken by compliance staff. The purpose is to identify activities that may be contravening a rule in a plan or consent and to then follow these up on the ground.

Up to three flights are undertaken each year. During the flights, any areas of concern are photographed and given a location using a Global Positioning System (GPS) which can be used at the office to identify landowners for follow-up.

Past issues have been:

- stock access to waterways;
- unauthorised works;
- wintering and feed pads adjacent to waterways;
- silage pits adjacent to waterways.

Six potential issues were identified during the August 2006 flight. All were dealt with using advice and education.



Figure 7 – Unrestricted access to waterway by sheep



4.0 Dairy Monitoring

4.1 Dairy Water Take Monitoring

Most dairy farm operations require resource consent, under the Proposed Regional Water Plan for Southland, to take water. The exceptions include water that is taken solely for stock drinking water or under certain existing use rights, or are operations that are self-sufficient and able to collect enough rainwater into a storage facility for wash-down and other needs.

There are 494 water permits for dairy abstractions, making up 66% of all water permits in Southland. Of these, 473 are for takes from bores or wells and only 21 are surface water takes. In general, surface water takes are less desirable for dairy use, as contaminant levels can be quite variable and the water often needs to be treated before use for things such as washing the milk vat.



Figure 8 – An ideal bore set up: sealed to prevent contamination and fitted with a flow meter

Although each individual take is generally of relatively low volumes, cumulatively the dairy water takes account for a substantial utilisation of the various groundwater aquifers. Because of this, it is important that a reliable account of actual water taken per season is recorded. For the past few seasons the Compliance Manager has requested dairy users to supply usage data through the annual dairy pack letter.

There are three different ways in which permit holders may have to report their usage. The older consent requirement is a daily record for a two week period sometime between November and March, with the data due by 30 April each year. The more recent permits require the take to be monitored



once a week, or once a month, for the entire year. This data is due by 31 May each year.

Results are converted to litres per day (l/d) for recording purposes. All consent holders have been invited to supply a monthly report instead, if they wish. The blank forms are available for download from our website if the original is misplaced.

This year, only 290 reports had been received by 31 May. A reminder letter was sent to the remainder, giving until 10 August to comply. By 14 August a further 85 consent holders had reported their water take. The outstanding 119 consent holders (24%) have been charged \$100 for failing to supply the data (Figure 9). Reporting compliance has improved steadily since 2003, when 50% of reports were not received by Council.

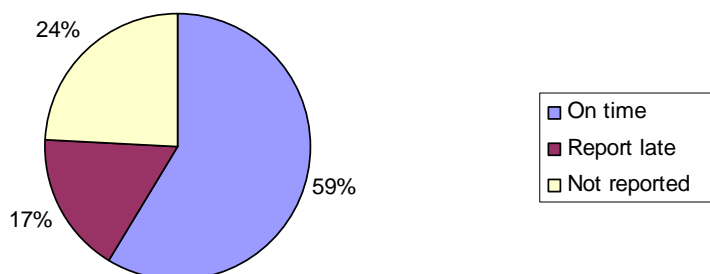


Figure 9 – Dairy Water Take Reporting Compliance 2006/07

A common reason for failing to comply with reporting requirements is lack of communication between consent holders and their staff. It is important that all staff are given the opportunity to read and understand any resource consents that they may have to comply with.

The main reason for failure to supply water take information is that no water meter has been installed. It is likely that a national standard, currently under development, will require metering of all water takes in New Zealand from 2009. This season the charge for failing to supply data increases to \$200 per occasion. More importantly though, regular meter checks can alert the farmer to water leaks, sometimes saving hundreds of dollars in electricity and maintenance costs.

Number crunching

The average water take was 100.44 L/cow/day for the 2006/07 dairy season (Figure 10). This was not statistically different from the average (of all records since 2002) of 100.04 L/cow/day. The range was quite large this year, however, with the highest average take for a particular farm being 289 L/cow/day, and the lowest just 8 L/cow/day!



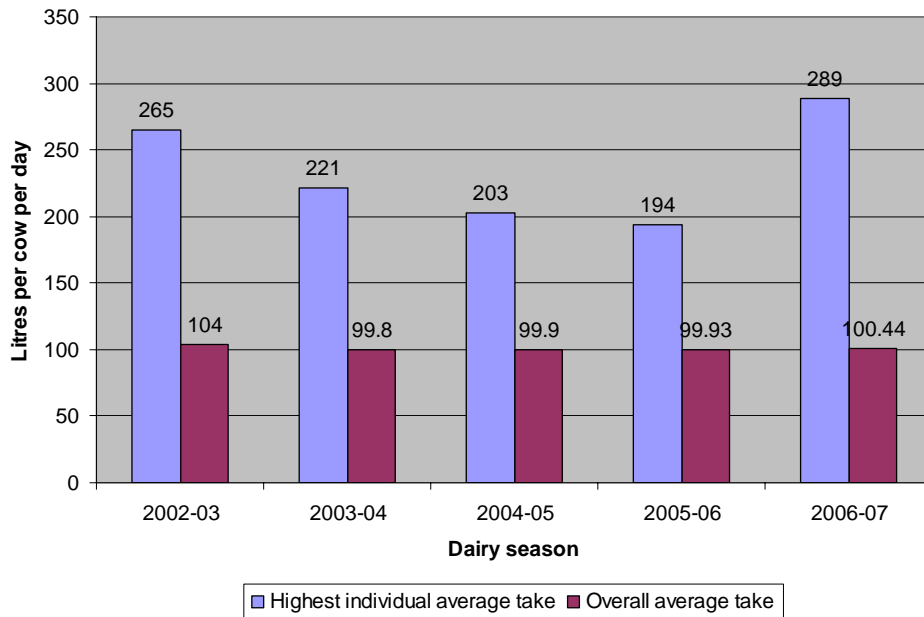


Figure 10 – Dairy water takes 2002-2007

It should be borne in mind that the highest take of 289 L/cow/day was recorded as part of a two-week take record, during the height of summer. Nevertheless, their average daily take was 3% over the consent limit, and last year's return of 139 L/cow/day was also quite high, so a dairy inspector will be visiting the consent holder to identify possible causes.

For another of the higher volume abstractions, the bore water at this property has a high iron content and, to prolong its service-life, the meter is only installed during the reporting period. Consequently, a major leak in an underground pipe to troughs was only discovered after readings began.

In contrast, the lowest reading of 8 L/cow/day was averaged across the whole season's reporting period, but the farm was not operating for much of that time.

The distribution of average takes per cow per day is shown in Figure 11.



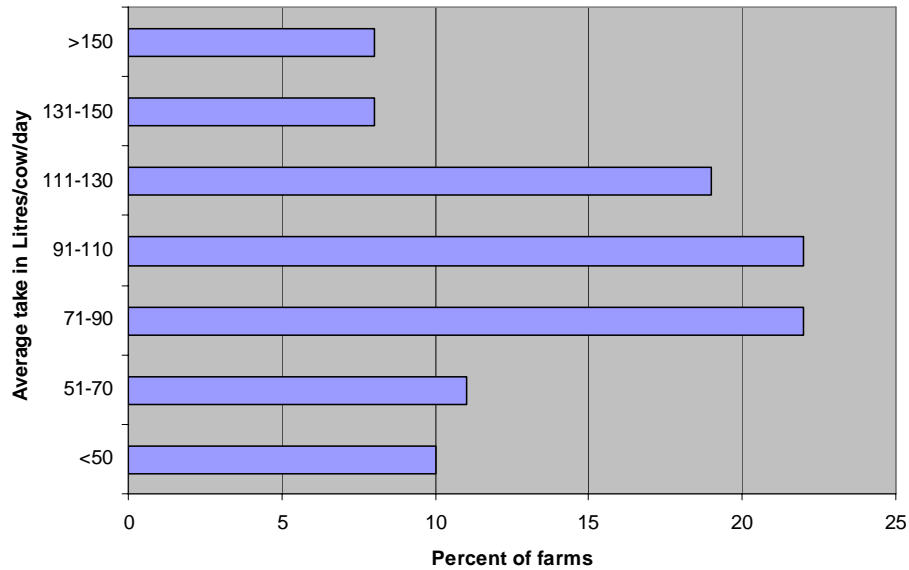


Figure 11 – Distribution of average takes, grouped by litres per cow per day

As in previous years, the majority of farms took less than 80% of their consented volume on average (Figure 12). This year, almost half of the farms took less than 60%.

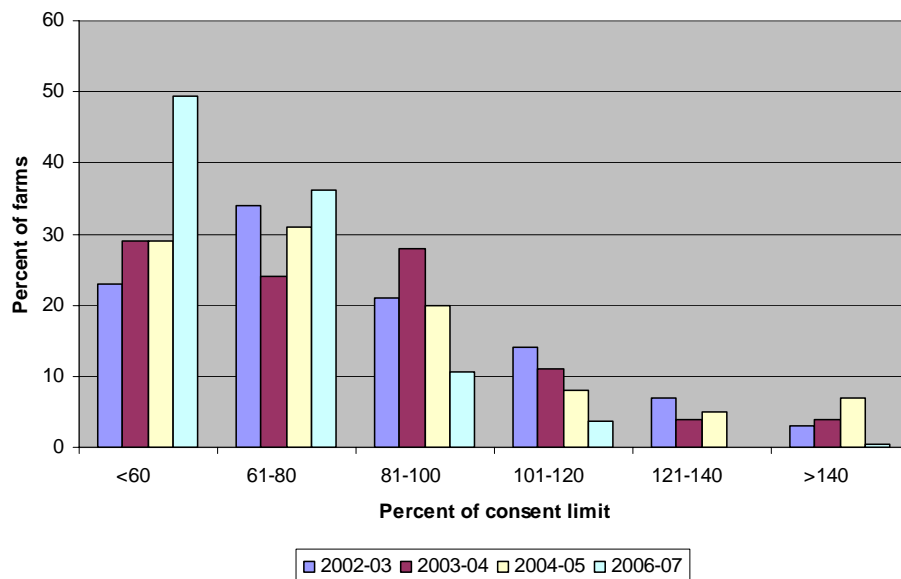


Figure 12 – Proportion of consented volume actually taken (by daily average)

The proportion of farms taking more than their consent limit was the lowest yet, with only one property taking more than 120%. This farm actually took, on average, 200.85% of its consented take. However, its take per cow was only 87.52 L/cow/day which is below average, and only 63% of the rule of thumb figure of 140 L/cow/day water consumption that most existing consents are based on. This farm changed hands in 2006 and although using water quite efficiently, the new owner stocks the property more heavily than the previous owner. It is clear that the previous owner only applied for enough water for his needs, despite allowing for herd expansion with the



effluent discharge permit, and this is something for those purchasing existing operations to look at closely. This is especially important in those areas where groundwater resources have almost been fully allocated.

Design guidelines for dairy shed water usage have been reassessed following the publication of the Farm Dairy Effluent Best Practice Guidelines. The Council now believes that water usage through dairy sheds should be no more than 50 L/cow/day and the rule of thumb for total usage, including drinking water, is now 120 L/cow/day.

4.2 Effluent Discharges

The 2006/07 dairy season was the first time in seven years that all dairy farms in Southland were to be inspected, following the Council decision to dispense with the audit system.

Unfortunately, not all properties received an inspection. Due to an error in the database query that generated the list of active consents, consents that were being processed or renewed at the time the list was generated were not included in the inspection list.

By the end of June 2007, all inspected properties had been assessed as compliant with the conditions of their consent.

Of the 844 inspections that were carried out:

- 331(39%) inspections achieved a “1” rating;
- 305 (36%) inspections achieved a “2” rating;
- 134 (16%) inspections achieved a “5” rating;
- 2 inspections were over the consent limit with regard to stock numbers, which is a “7” rating; and
- 69 (8%) re-inspections were given a “10” rating.



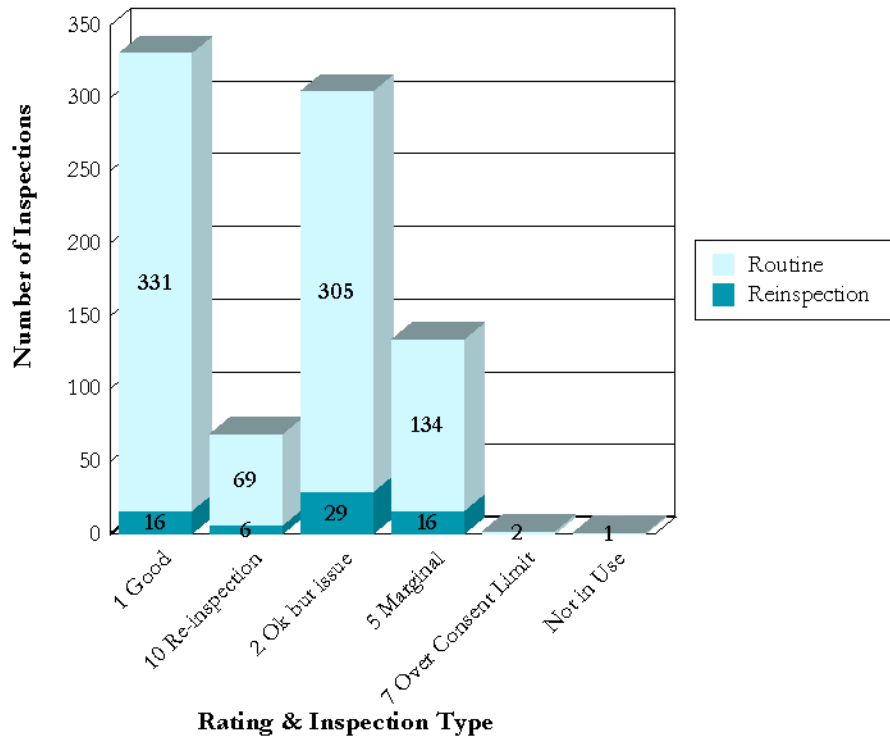


Figure 13 – Rating and inspection type

There are a variety of reasons for a dairy farm receiving a failure score of 10, the most common being pond overflow, over-application of dairy shed effluent (DSE) onto pasture and discharge of DSE to a waterway via a tile drain.



Figure 14 – Effects from over-application of DSE reduced by vegetated buffer zone, note opposite bank does not have this ability



4.3 Helicopter Inspections

Due to a successful programme of aerial inspections in the Waikato region, it was decided to trial this technique in the Southland programme for dairy farms with herd numbers in excess of 600 cows.

A portion of the total properties to be inspected were identified and inspected. Initial indications were that this method was very successful and as a result, all of the second inspections were done in this manner.

As there were too many properties to do in one day, Southland was divided into four quadrants, with one quadrant done each day. Staff involved in the inspections were evaluating the following factors:

- pond/sump;
- irrigator;
- silage stack;
- waterways.

The results were as follows:

- 140 (72%) farms complied with the four criteria;
- 54 follow-up inspections resulted in one of these properties being put forward for enforcement action.

Aerial inspections concluded on Monday, 26 March 2007, with a total of 194 dairy farms inspected.



Figure 15 – Over-application of dairy effluent from a stalled irrigator discovered during helicopter inspections



4.4 Groundwater & Surface Water Quality Monitoring

The Council has concerns about possible cumulative adverse effects on groundwater and surface water quality, as a result of effluent discharges to land. In response to these concerns, sampling requirements have been imposed on new and renewed dairy discharge permits over recent years. In addition, a small number of older consents still require monitoring of discharges to water of treated effluent.

As reported in previous annual Compliance Monitoring Reports, the return of results from those who have “self monitored” has been low. Because of this, from the 2006/07 season onwards the Council has determined that Environment Southland shall collect all samples at the consent holder’s cost. Because of the large number of sampling visits, the majority are undertaken by contractors, with analysis of samples carried out at a contracted IANZ accredited laboratory.

Some consent holders who formerly collected their own samples have expressed displeasure at the increased cost, but some of those who used to have Environment Southland collect their samples anyway are pleased that costs have decreased with the economies of scale that resulted (i.e. travel and staff costs are generally spread across more properties per day, and our laboratory costs are discounted). Many farmers are also relieved to find that the sampler is usually not a warranted enforcement officer anymore!

Surface Water Quality Monitoring

As of the end of the 2006/07 dairy season, 265 dairy effluent disposal consents required surface water monitoring (Figure 16). This is a significant increase on the 178 consents at the end of the 2005/06 season, largely due to the large number of conversions, and expiring consents requiring renewal over the past year.

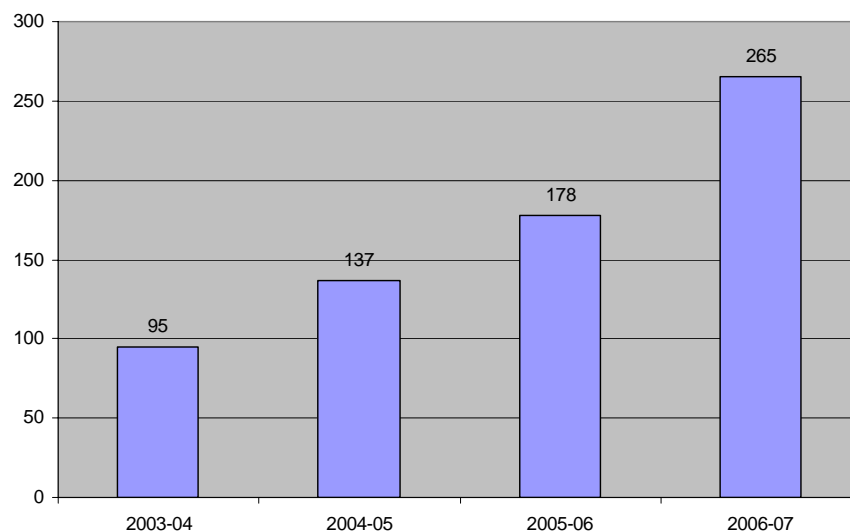


Figure 16 – Number of dairy consents requiring surface water monitoring by season



Each consent specifies the frequency of sampling (generally six-monthly, three-monthly or September, February and May) and location of samples (specified points, outfall of drain or upstream and downstream of waterway most likely to be affected). The tests to be performed are also variable and specified in the consent.



Figure 17 – Sampling a tile drain outfall

A total of 538 surface water monitoring inspections occurred this season. Eighteen of these were to confirm a status of “not in use” – usually by telephone, at no cost. Samples were collected on 413 visits, resulting in over 1,600 sample bottles being filled! The remaining 107 visits were “no sample” events. This is because the sampling conditions in the consent could not be met, usually because the specified waterway or drain was not flowing, or a specified rainfall or cow number was not reached. This is considered to comply with the consent in the same way as a self-report of a “no sample possible” used to.

Results are interpreted with reference to national standards and guidelines, trends over time for the property concerned, soil and weather conditions, and other relevant factors (for example presence of waterfowl). Samples are then graded as either “good”, “marginal” or “unsatisfactory” (Figure 18).



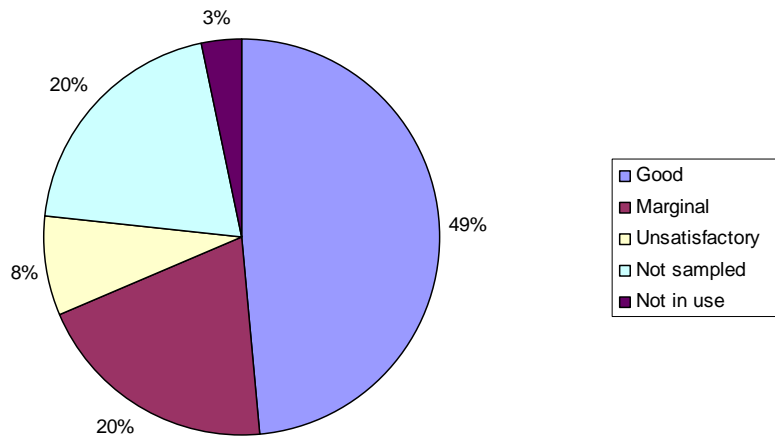


Figure 18 – 2006/07 dairy season surface water monitoring grades

A comparison of surface water monitoring grades over the last five dairy seasons (Figure 19) indicates that the proportion of “good” ratings is increasing slightly, relative to “marginal” or “unsatisfactory”. This indicates that attention to best practice effluent disposal is improving and that, hopefully, the environmental education message is getting through.

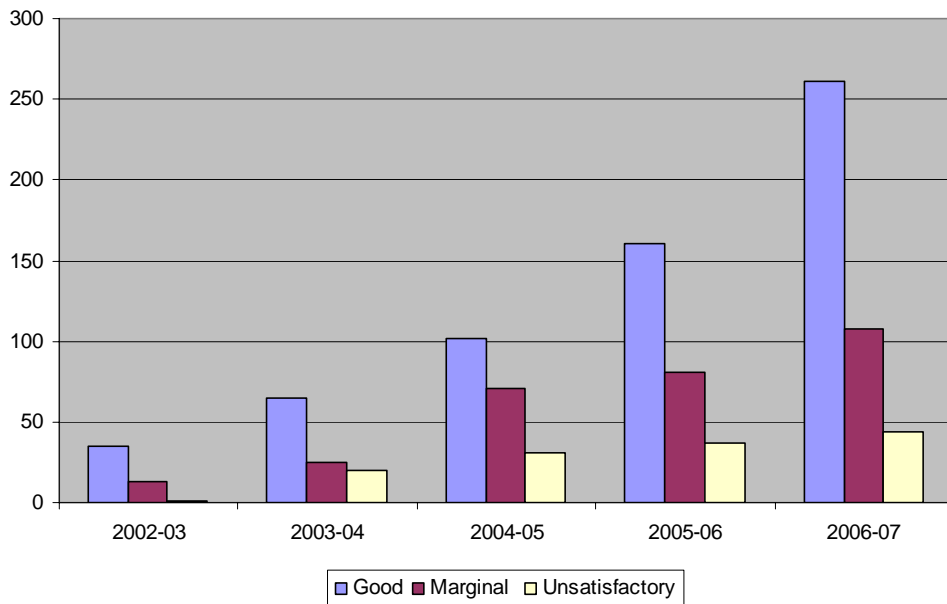


Figure 19 – Surface water monitoring grades by season

Interestingly, in recent seasons most of the “unsatisfactory” ratings have been in conjunction with field observations of conspicuously contaminated discharges. This season, only about half of the 44 presented as “green streams”, with the others being chronic low-level discharges that were often accompanied by field notes of excessive algal growth. In most cases, these



have resulted in a written warning and advice this year, although a small number proceeded to some form of enforcement action.



Figure 20 – Taking prompt action to mitigate a contaminated discharge



Figure 21 – When it all goes wrong. Drain with chronic elevated nutrients entering an open waterway that is running 'green' from a tile discharge upstream





Figure 22 – Faulty anti-siphon valve and stationary irrigator in a gully



Figure 23 – A green tile discharge

In the past, the September sampling round has tended to reveal the highest proportion of unsatisfactory results, with one in four properties visited in September 2005 presenting with a visibly contaminated discharge.

There are a number of likely contributing factors. Staff often change farms in the winter and are not familiar with the effluent disposal and land drainage systems of their new workplace when milking starts in spring. They are also often busy with calving and hampered by saturated soils and a lack of effluent storage. These are all issues that should be recognised and addressed by farm management, in advance.



September 2006 showed an improvement over previous years, with one in seven sample sets graded “unsatisfactory” and a further one in four as “marginal”. This still leaves only approximately 60% of sites grading as “good” at this high-risk time.

It was pleasing to see some properties that have had effluent discharge to waterway problems in the past operating low application rate systems, in conjunction with sufficient storage to avoid irrigating at high risk times. None of these properties showed any evidence of waterway contamination this season.



Figure 24 – A low application-rate effluent disposal system

The three scatter charts that follow (Figures 25, 26 and 27) illustrate the distribution of results over the course of the past season for three analytes commonly specified by dairy discharge consents for testing. The value shown is the absolute amount of change between a downstream and an upstream sample, collected at about the same time at either end of the effluent disposal area, for a number of farms. Positive values indicate an increase in contaminant levels and, hence, a decline in water quality as the water passes through the farm. Negative values generally indicate an improvement in water quality, although in waterways with negligible flow this should be interpreted with caution. The clusters of values around the zero line reflect the fact that, for the majority of sites, there is no significant change in water quality between the upstream and downstream samples.



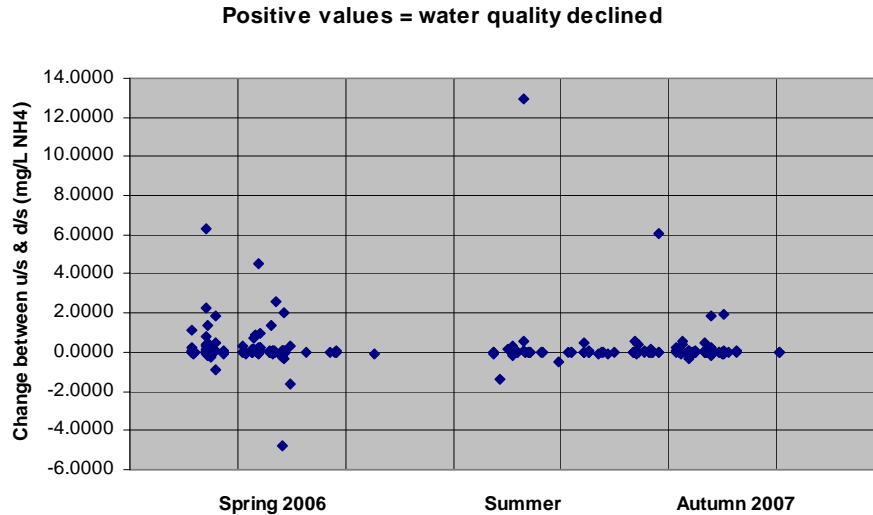


Figure 25 – Ammoniacal Nitrogen value changes between upstream and downstream sites over the course of the 2006/07 year

Ammoniacal nitrogen is not commonly found in significant amounts in water, as it is readily taken up by plants or oxidised to nitrate nitrogen. It is, however, the primary nitrogenous metabolite excreted by mammals, so is a reliable indicator of animal impacts on nutrient loading of a watercourse. The average change was an increase of 0.18 mg/L this season, with a range between -4.78 mg/L and +12.97 mg/L – NH³ N.

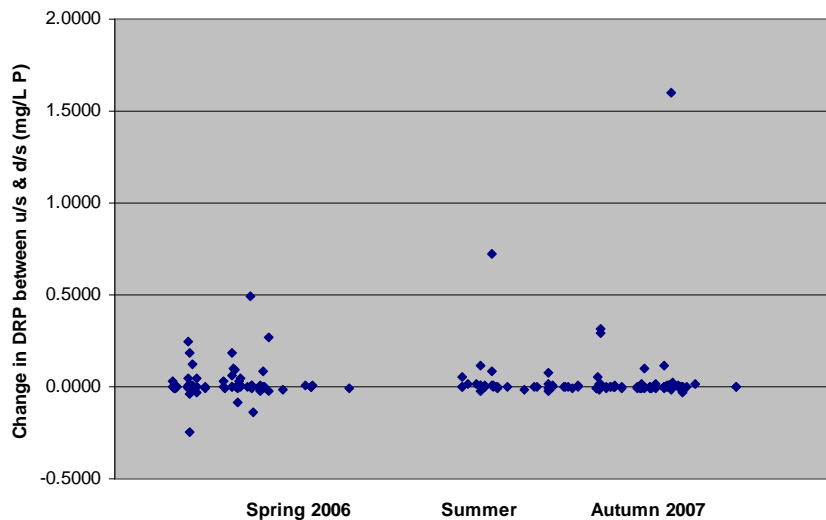


Figure 26 – Dissolved Reactive Phosphorus value changes between upstream and downstream sites over the course of the 2006/07 year

Dissolved Reactive Phosphorus (DRP) is another good indicator of farm-related impact on a watercourse. Phosphorus (commonly known as potash) makes its way to watercourses not only as an ingredient of animal excretions, but also by leaching following application of fertiliser. High levels of nutrients impact negatively on waterways by contributing to excessive plant and algal growth. The range of the change in DRP values this season was between -0.250 mg/L and +1.602 mg/L-P, with an average change of +0.022 mg/L – P.



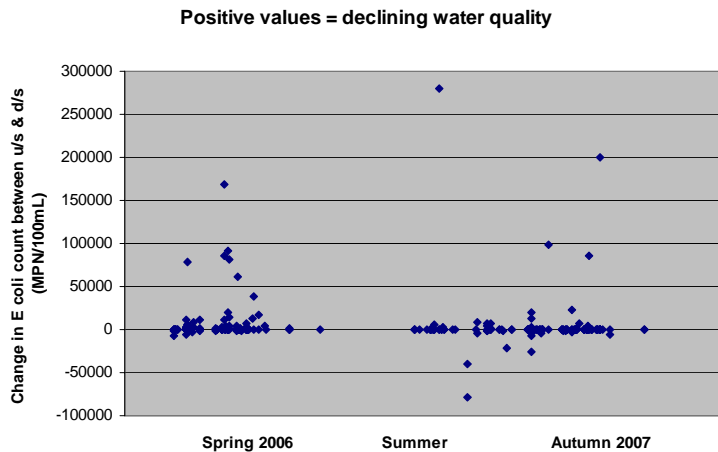


Figure 27 – *E. coli* bacteria count changes between upstream and downstream sites over the course of the 2006/07 year

E. coli is a bacterium specific to the gut of warm-blooded animals, and is used as an indicator of risk of faecal contamination, as it is easier to test for than many specific pathogens. The range of change in bacterial count was quite large, from -78,000 to +279,560 MPN/100 mL. The average change was an increase at the downstream site of 2,413 MPN/100 mL (normalised by exclusion of extreme values), or 4,549 MPN/100 mL (considering all data).

Apart from an obvious direct discharge of dairy shed effluent in the summer, the graphs above clearly show that most incidents (of significant water quality degradation as a waterway passes through a property) occur during spring and autumn, when soils are often at field capacity. Of 301 sample pairs considered here, 174 (58%) showed a decline in water quality with regard to *E. coli* levels and 127 showed either an improvement, or no significant change.

The other main group of surface water sites are those where a tile or drain outfall is sampled, rather than upstream and downstream on the same waterway. These are more difficult to interpret and results tend to be highly variable. A sample of 15 of these sites was randomly selected from last season's results. Analysis of the data indicates that *E. coli* counts for these ranged between 51 and 200,000 MPN/100 mL, with a normalised average of 4,838 MPN/100 mL. DRP values ranged between 0.006 and 1.200 mg/L-P, with an average of 0.251 mg/L-P. Ammoniacal Nitrogen values ranged between 0.017 and 3.400 mg/L – NH³ N, with an average of 0.736 mg/L. As tiles tend not to flow for variable periods between rainfall events in most areas, they can accumulate contaminants, particularly bacteria. Unless a specific tile discharge is flowing green, or shows a history of high values over multiple samples, they tend to be of limited value in assessing any effects of dairy shed effluent discharge to land on water quality.



Groundwater Quality Monitoring

Groundwater quality monitoring involves sampling from a specified bore, or bores either downslope of the effluent disposal field or at the dairy shed, depending on the specific consent condition. Only one site is usually sampled per farm and there are usually only three standard analytes (*E coli*, nitrate nitrogen and electrical conductivity), so cost to the consent holder per monitoring visit tends to be much lower than for surface water monitoring. However, due to the expense and difficulty of establishing a ring of monitoring bores around each farm, it is not appropriate in most cases to conclude that elevations of contaminant levels are attributable to the exercise of any given discharge permit. For this reason, the grade of “unsatisfactory” is very rarely considered for a groundwater result.

At the end of the 2006/07 dairy season, 159 dairy discharge consents were part of the groundwater quality monitoring programme, up from 142 for the 2005/06 season. As with surface water monitoring, past reporting compliance has been poor, so Environment Southland arranged for collection of all samples this season. In most cases they are sampled twice per year in November and April. There were no occasions recorded where a sample could not be collected. In total, 287 samples were analysed, of which 218 were graded as “good” and 69 as “marginal” (Figure 28) when interpreted with reference to relevant standards and previous samples from the same site.

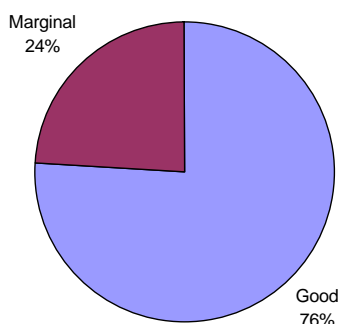


Figure 28 – Dairy consent bore monitoring results 2006/07

Of the 218 “good” grades, 49 (or 17% of the total samples) showed no evidence of any change in groundwater quality over the last few seasons’ data. These were generally from deep bores, accessing confined aquifers. This type of bore is favoured for dairy purposes as the consistent water quality and availability assures compliance with Fonterra standards and continuity of supply, but is of limited value for assessing effects of discharge to land.

Of the “marginal” samples, most were from very shallow bores where the groundwater is likely to be affected by surface activities. Some with very high bacterial counts were clearly the result of direct contamination, and these consent holders have been advised to check their well-head protection.



Further investigation of these sites often reveals disused bores or wells that have not been sealed, resulting in contamination of the groundwater from runoff, or directly from animal droppings or dead animals.

As in previous years, a small number of bores sampled revealed nitrate nitrogen levels approaching or in excess of, the NZ Drinking Water Standard of 11.3 mg/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”. A joint investigation by the Compliance and Environmental Information divisions has been instigated this year, to determine the extent of nitrate contamination in the affected aquifers and identify any likely causes. This investigation is currently in progress.

To protect the groundwater resource, Environment Southland recommends that all farm bores should have an impervious seal at ground-level and a capped up-stand, at least 300 mm high. Since 2004, all new bores have required a resource consent to ensure these standards are met. Bores should also be fenced to exclude stock. Disused wells or bores should be capped, or filled with clean gravel. Anyone with questions about a bore on their property may call Environment Southland for free advice.



5.0 Structures in Waterways

5.1 Freshwater Structures

A total of 55 structure inspections were carried out during the 2006/07 year, mainly around lakes Manapouri and Te Anau.

Out of 15 inspections on Lake Te Anau, one structure was found to be in an unsatisfactory condition and another found to be consented to two separate parties. The consent holder with the structure in poor condition has been notified and a follow-up inspection will be necessary. The situation with the two consent holders controlling the same structure has now been resolved, with one surrendering their consent.

Forty structures were inspected around Manapouri and of these, 38 were noted as being in good condition. However, two were noted as being in an unsatisfactory condition, two required some repair work, one did not have the proper identification displayed, one had unconsented signage and another had an unconsented, locked, gate (refer photo). Letters were sent to the consent holders regarding these concerns.



Figure 29 – Locked gate on structure at Manapouri

5.2 Coastal Structures

Coastal structures around the south coast of Southland have been and are in the process of being inspected. On-site inspections have been made and photographs taken.



Inspections of the consented structures to date, has shown that five are in a good state of repair, one does not have the proper identification, four are in need of some repair work and one is in an unsatisfactory state.

During the inspections it was noted that a significant number of structures (such as wharves, etc) did not have resource consent. Some of these were also in poor condition. It is anticipated that, when timeframes and resources allow, additional follow-up inspections will occur.

5.3 Whitebait Structures

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

A 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 region (including Fiordland). Environment Southland's policy restricts the number of structures allowed for whitebaiting.

The following is a breakdown of the number of consents for whitebait structures per river:

- Maitara - 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 the coastal marine area. There are, however, nine consents that are for land use, as they are above the coastal marine area. Whitebait structure inspections were carried out on the Maitara, Titiroa, Waikawa, Aparima and Pourakino rivers in southern Southland, and the Hollyford and Awarua rivers on the West Coast, during the 2006 whitebait season.

Inspections were also undertaken on the Waiau and Oreti rivers. There is no provision for whitebait structures on these rivers and the inspections were related to reported incidents of illegal structures and navigational hazards from whitebaiting activities.

Compliance with consent requirements has not improved when comparing results to the 2005 season (Figure 30).



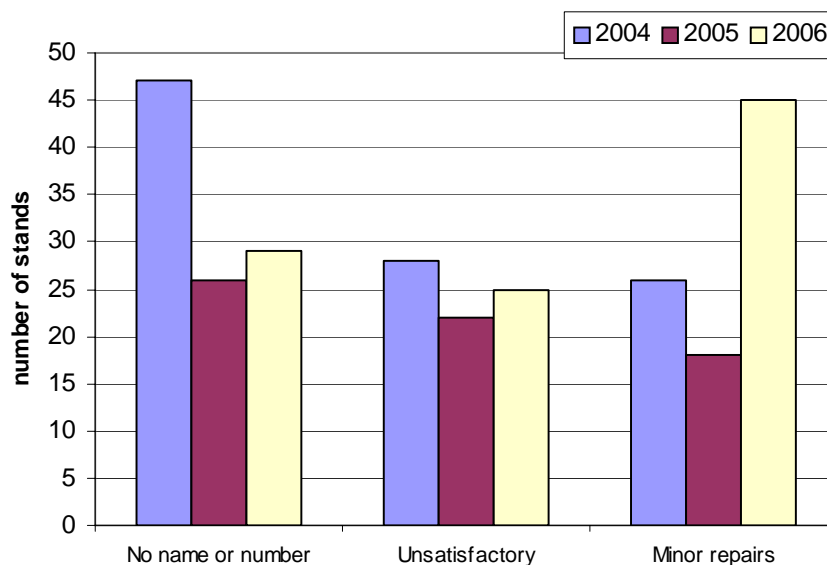


Figure 30 – Compliance with consent requirements

The number of structures that did not display the proper identification requirements was higher than the 2005 season, as were the structures found in an unsatisfactory condition and those in need of minor repairs. 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.

Also of concern was the number of structures (45) that did not meet the measurements of the submitted plan on file. 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, pulley nets not being removed and navigational hazards.

Ten unconsented structures were located, one of which required enforcement action to have it removed. The other nine are being removed by Council staff.

A total of two Abatement Notices were issued for non-compliance. One was for an unauthorised structure and the other for a structure in a state of disrepair. This is a significant improvement, as 12 Abatement Notices were issued to whitebaiters for non-compliance during the 2005 season.

The use of pulley system nets has continued to create debate and discussion. A number of incidents were dealt with by staff during the 2006 season. Some people regard them as innovative and others regard them as an illegal structure, as they are moored to the bed of the river and are not helpful to either navigation or the fishery. Environment Southland staff have tried to ensure that pulley system nets with moorings remain within the inside third of the river and are removed at the end of each day's fishing. It is being interpreted that they are not a permanent structure and, therefore, do not require consent if they are removed at the end of the day's fishing. This has



been met with mixed success. Some operators have a Danforth type anchor to allow for easy removal of the system, which is acceptable if easy removal can be demonstrated, while others have had a more permanent mooring, which is not easily removed.



6.0 Truckwashes

A total of 21 consented truckwashes and four that have permitted activity status, were inspected during the 2006/07 year. Compliance was generally good at all but two of the sites.

On one site an irrigator was found to be applying truckwash wastewater at an unacceptable rate and a discharge into a small drain was located. Some time was spent with the manager of this yard, advising him to speed up the irrigator and highlighting the importance of managing the system correctly. A warning was also issued.

A discharge of truckwash contaminants to a waterway was detected at another site and a decision has yet to be reached on the course of action to be taken. This operator has had a previous issue of a similar nature. A pot sprayer (Figure 31) had not been moved regularly enough and contaminants had entered a waterway, via overland flow and a drain. The owner has since placed a series of pot sprayers on a section of hill, away from the lower-lying areas.



Figure 31 – Pot sprayer discharging truckwash waste

Notified Incidents

As the result of a public report, staff found a truckwash operator was allowing truckwash contaminants to spill over from a wash area and enter a stormwater drain and, subsequently, the Otepunui Creek. This incident is still under investigation.

Several incident reports were received regarding one operator not shifting his irrigator enough and another warning was issued.



7.0 Coastal Marine Area

7.1 Commercial Surface Water Activities – Fiordland

This financial year has seen some important developments regarding management and monitoring of the coastal marine area.

The Regional Coastal Plan for Southland became operative (in part) on 12 April 2007 and in June, a new position of Compliance Officer – Coastal was created, to oversee all aspects of compliance monitoring of the new plan.



Figure 32 – MV *Affinity* steams out the Patea Passage, Doubtful Sound

The charter vessel MV *Affinity* was granted resource consent by the Environment Court on 25 June 2007, subject to drafting conditions, to operate in Doubtful Sound. She had been operating during the winter months under an existing user right clause while consent conditions were under appeal. We look forward to receiving logs of her activities from next season.

There are three operations currently relying on existing user rights to continue operating in Fiordland – Fiordland Wilderness Experiences, Adventure Kayak and Cruise and Real Journeys Discovery Cruises. All other operations in the Fiordland internal waters that involve a vessel of less than 1000 GRT being offered for hire or reward should now have a resource consent under Rule 16.2.1 of the Regional Coastal Plan.

The only exceptions allowed under the Regional Coastal Plan are commercial fishing vessels and those cases (generally the so-called “syndicate” boats) where a charge is only made towards the recovery of reasonable expenses incurred.

Research activities on Fiordland waters have been assessed against the permitted activity conditions of Rule 16.2.2 and some have been formally advised to seek consent before carrying out further research.



Ongoing aerial monitoring and reviews of advertising media are carried out to identify any operators attempting to operate commercially in Fiordland in contravention of the plan. This season more than 12 suspected non-compliant operations have been investigated. Mostly, they have been deemed to be non-commercial, or have been advised to cease advertising until a resource consent is obtained. At least one is facing enforcement action.

A meeting held in Te Anau in December 2006 was well attended by commercial surface water activity consent holders, particularly those who operate around Doubtful Sound. The main item discussed was the importance of supplying accurate and complete activity reports on time, as required by all but the earliest of consents. As a result, the standard and timeliness of reporting compliance has improved noticeably this season. However, four operators who failed to get the message have been charged for failing to supply data.



Figure 33 – MV *Charmaine Karol* at Deep Cove, a consented day-trip operation

Of the internal waters of Fiordland controlled by the Regional Coastal Plan, only two can be readily accessed for convenient day or overnight tourism. These are Milford Sound (with its airstrip and the famous Milford Road (SH94)) and the Doubtful Sound area (by launch across Lake Manapouri, then by road over the Wilmot Pass). These areas are considered separately from the rest of the fiords by the plan, and in this report.

Policy 16.2.4 of the plan allows for no restriction of allocation of commercial activity in Milford Sound. However levels of activity need to be monitored to assess any potential effects for future policy consideration and to establish baseline activity information. Although there are no restrictions on numbers, commercial surface water activities in Milford Sound still require a resource consent. Figure 34 illustrates the activity in Milford Sound as reported by consent holders in 2006.



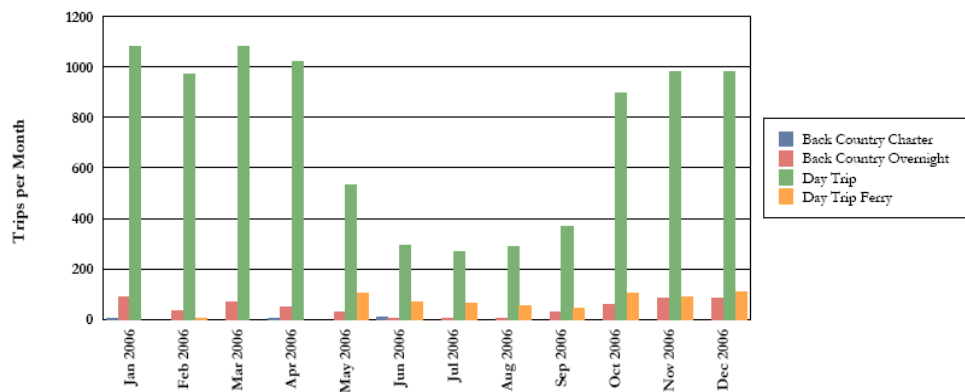


Figure 34 – Consented Commercial Surface Water Activity in Milford Sound by month

The “day-trip – ferry” designation, added this year, is for the shuttle-type operations between Sandfly Point (the Milford Track) and Freshwater Basin harbour and to and from the Underwater Observatory in Harrison’s Cove. It will also include kayak operation support-vessel movements, when they are reported. Prior to May 2006, these shuttle trips were included in the day trip category, along with the more standard scenic cruises, which accounts for the apparent slight decrease in overall “day trip” activities towards the end of the year, despite an improvement in reporting overall.

All four of the scenic launch operators in Milford Sound are now consented and reporting all of their activities, so next year’s report should provide a clear indication of actual usage.

Because of staffing changes this year, some data is not yet entered onto our reporting system from activity logs received between April and July 2007. Also, as in past years, the staggered quarterly reporting period means that some logs are yet to be received for the latter part of the season. However, all logs of activities before 1 January 2007 that have been received are in our database, so the graphs in this report cover the 2006 calendar year, from 1 January 2006 to 31 December 2006, rather than the July-June financial year.

In contrast to Milford Sound, the Regional Coastal Plan addresses the potential for loss of remoteness and wilderness values in the Doubtful Sound region by specifying allowed levels of the two classes of activity in the various areas in Rule 16.2.1. Day trips are limited to five per day in total and are prohibited altogether in western Crooked Arm, First Arm and Bradshaw Sound. Back-country (that is, overnight or longer) trips are limited to an average of three per day in Hall Arm (with no anchoring allowed overnight there) and western Crooked Arm, and an average of four per day in Bradshaw Sound, and two per day in First Arm. These allocations are distributed amongst the various resource consents.



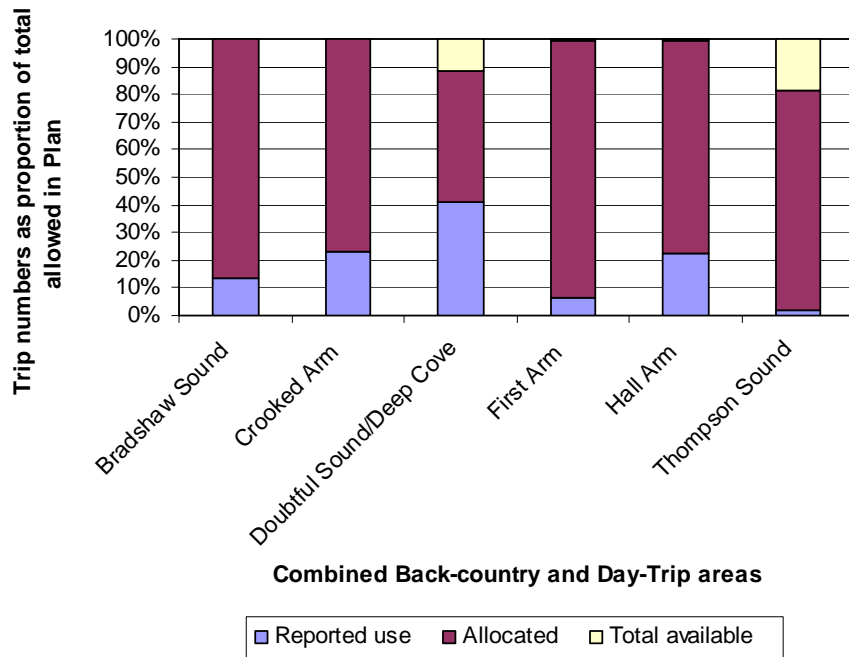


Figure 35 – Usage and allocation of activity levels allowed for in Regional Coastal Plan for the Doubtful Sound area (2006)

Council records show that commercial day trip activity is fully allocated, apart from one day in each of the months May, July, August and October. Compliance has been excellent, with no exceedances identified this year.

Commercial back-country activity is now also almost fully allocated, as Figure 35 shows. There is no restriction on allocation of commercial back-country activities in Doubtful Sound, Thompson Sound or Deep Cove, to allow for access to facilities.

The blue portions of the graph in Figure 35 indicate reported use of the various areas for both day-trip and back-country activities combined. Across the whole year, it is apparent that actual activity levels are well below the levels allocated, particularly in Thompson Sound and First Arm, which are both used at less than 10% of allowances. However, at certain times of the year, some areas e.g, Bradshaw Sound, approach their maxima and certain consent holders consistently make use of their allocation.



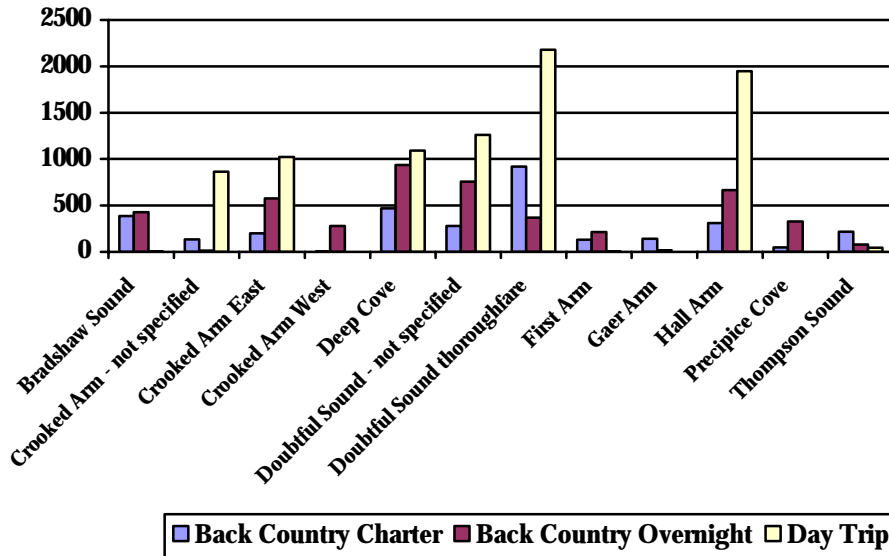


Figure 36 – Distribution of all reported activity in Doubtful Sound (2002-2007)

Figure 36 includes all reported activity in Doubtful Sound since our records began in 2002 and, when compared with Figure 37, indicates that there has been little if any, change in activity levels over time for the various categories of trips. Reporting compliance in Doubtful Sound continues to be very good, which lends credibility to the data.

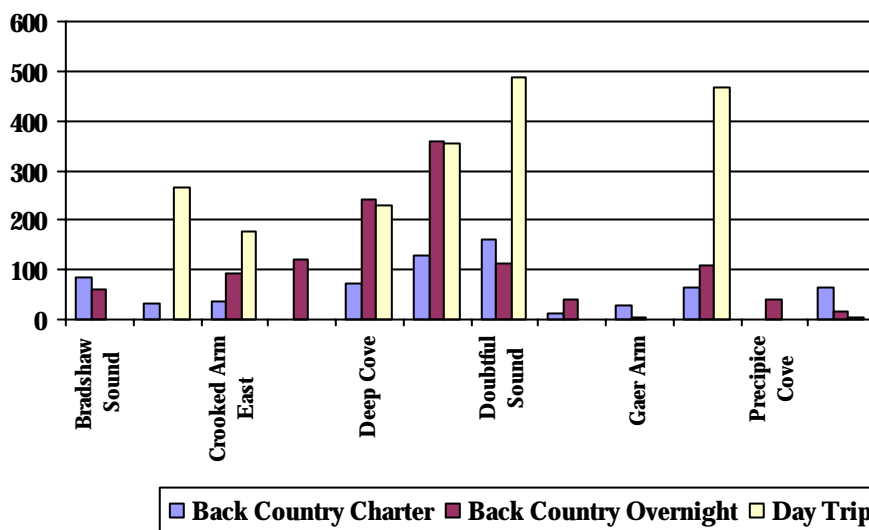


Figure 37 – Activity in Doubtful Sound area, as reported for the 2006 calendar year (number of departures that included some activity per area)

In some cases, trading of allocation appears to occur, where a consent holder conducts some activity under the provisions of another holder's resource consent. This makes administration more challenging, but is acceptable in terms of the management goals.



Bouquet

A pleasing development since the 2004/05 report is the installation of a shore-based sewage and wastewater treatment facility at Deep Cove. In the past, human waste has been retained on board each vessel, for discharge to water untreated. The facility has had some teething problems, but as infrastructure continues to improve in Deep Cove, more of the operators should make use of it. An account of the performance of the treatment system is expected in next year's report.

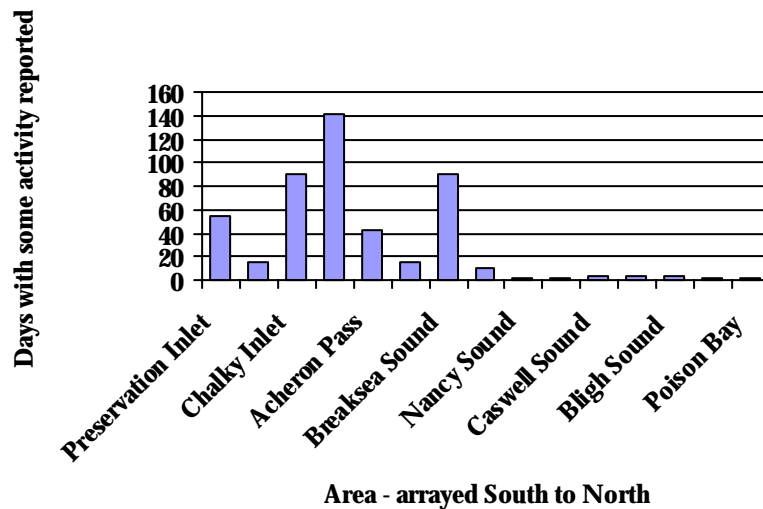


Figure 38 – Activity in other Fiordland internal waters for the 2006 calendar year

Figure 38 illustrates levels of activity, as reported by consent holders, for those parts of the internal waters of Fiordland that are outside of the Doubtful or Milford Sound areas. The data has been presented from south to north and clearly shows that usage of the fiords south of Doubtful Sound is much higher than those between Thompson Sound and Milford Sound. A review of logs indicates that a significant proportion of this activity is between March and May. This period coincides with the Easter break, and the “roar” of the deer. Trophy hunting is a popular ancillary activity to commercial surface water trips at this time of year.

The Regional Coastal Plan does not specify allocated levels of activity allowed in these areas. However, Policy 16.2.8 is to protect the remote and wilderness values in the fiords, inlets and arms of Fiordland, apart from Milford Sound. Some existing operators have anecdotally reported a feeling of the loss of these values over time as activity increases, particularly in transit areas such as the Acheron Passage and at anchorages in the southern fiords. The information provided to the Council in activity logs, in conjunction with surveillance and general environmental monitoring operations, will allow for the informed assessment of any impacts on these values to aid future management of the resource.



8.0 Major Industries

8.1 New Zealand Aluminium Smelters Limited

Monitoring

New Zealand Aluminium Smelters has a number of current discharge consents and coastal permits:

- discharge and coastal permit 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 contaminants to land at the smelter's landfill site.

All consents were monitored throughout the year, with full compliance achieved.

One of the contaminants extensively monitored as a part of the consent monitoring programme, is the level of fluoride discharged via the main stack. This is measured at several different points from the main stack, on several environmental receptors that include:

- grazed pastures on a series of monitoring farms;
- ungrazed grasses at Bluff, Greenhills, the Awarua Plains and on the Tiwai peninsula;
- pine needles at various sites around Awarua Bay; and
- specialised pump equipment measuring general atmospheric deposition at several sites in the Awarua area.

All monitoring lacks specificity as the fluoride measured is not site specific, but it provides a good indication of environmental impacts.

The environmental receptors provide cumulative information about the fluoride and are based on the ability of the vegetation to take up the fluoride, while the atmospheric deposition measurement utilises specialised pumps to filter fixed volumes of air and assess the fluoride levels on a monthly basis.

All monitoring results continued to be well within consent limits. This was demonstrated in the annual summary of the atmospheric deposition monitoring results.



Table 2 – Fluoride Deposition 2006

<i>Site</i>	<i>Units</i>	<i>Guideline</i>	<i>2006 Average</i>	<i>Maximum for any one month</i>	<i>Minimum for any one month</i>
Buddle Road	g/m ³	0.9	0.07	0.14	<0.05
Gibson's Farm	g/m ³	0.9	0.05	0.09	<0.05
Bluff	g/m ³	0.9	<0.05	0.09	<0.05
Awarua Bay Road	g/m ³	0.9	0.05	0.09	<0.05
Marshall Road	g/m ³	0.9	<0.05	0.05	<0.05

Complaints and Self-reported Incidents

NZAS reported two incidents in 2006:

- on 19 June 2006, the level of dust being emitted from one of the unloaders exceeded the Environment Southland-NZAS code of practice for the discharge to air at the NZAS wharf, as reported by a staff member. The affected line was isolated and the problem was found to be linked to a series of broken bags, designed to retain any fugitive dust from escaping to the atmosphere. The bags were replaced and the unloader line returned to service;
- in September 2006, NZAS reported an oil spill from a pin hole leak in a heavy fuel oil pipe. The oil was contained by the permanent oil traps and temporary booms that were installed once the spill was discovered. No oil residue was found to have entered Bluff Harbour. The contaminated soil was removed and transferred to a bioremediation area and the waste oil was removed for recycling/processing.

Both incidents were responded to in a prompt and effective manner, minimising the impact to the environment.

Issues

The monitoring bores downstream of the Haysom's dross and NZAS MRP dross landfill continued to show elevated levels of nitrogen, fluoride, vanadium and boron. While these do not exceed any direct consent conditions, they do highlight concerns with the waste. NZAS is investigating the possible recycling of the MRP dross. The MRP dross still contains a percentage of aluminium that can be recovered from the by-product



Table 3 – NZAS – Performance Summary

<i>Issue</i>	<i>Score</i>	<i>Comments</i>
Provision of data/results	Excellent	Data is provided on time at monthly, quarterly and annual intervals
Compliance with consent conditions	Excellent	There were no significant non-compliance issues.
Responsiveness to issues e.g. drought	Excellent	Responses to incidents or other issues are well thought through, implemented and reported
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 possibly impact on the environment.

8.2 Alliance Group – Maitara Plant

Monitoring

Alliance Group – Maitara plant currently holds the following resource discharge consents that require monitoring:

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

The wastewater discharge consent was granted in 2004, allowing the discharge of treated wastewater to the Maitara River to continue. It also contains a series of conditions requiring investigations by plant management into system improvements and sets out a series of programmed upgrades. These upgrades have been largely completed.

To date, the wastewater has been characterised to identify what needs to be done to minimise its impact following disposal to the river. Working backwards, the source of each contaminant stream within the plant was identified and a plan to minimise or reuse it was formulated. Reducing contaminants at the source has helped to improve the overall efficiency of the treatment system.

Improvements, such as the removal of the “green streams” from the wastewater system, have reduced the volume of contaminants (including nutrients) being received by the treatment system. This has proven to be a very effective preliminary step in the reduction of phosphorus from the effluent. This, together with the new alkaline dissolved air floatation system added onto the existing treatment system, has significantly reduced the volume of phosphorus being released to the river.



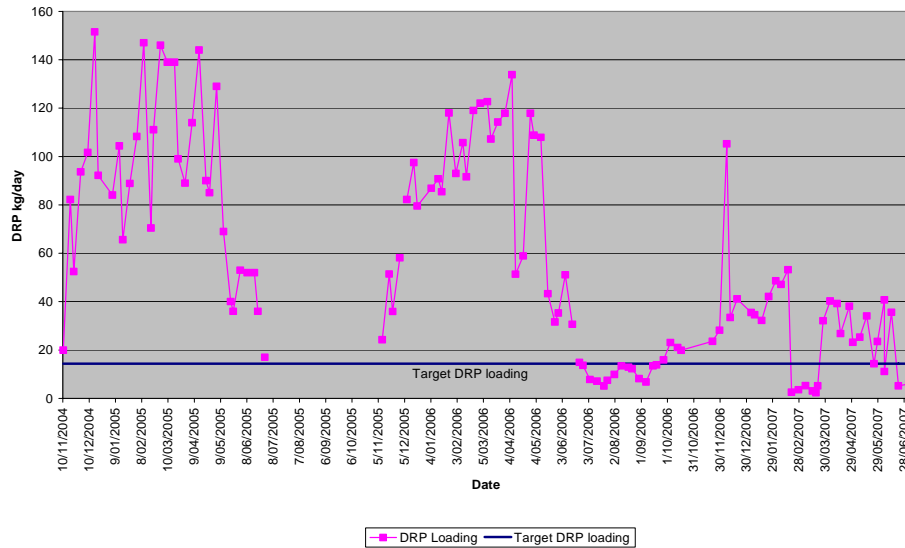


Figure 39 – EFF DRP 2004-07

Figure 39 highlights the improvements that have been made reducing the quantity of dissolved reactive phosphorus to the river, from a median in the order of 107 kg/day, towards the target of 14.4 kg/day. Further “green stream” separation and tweaking of the alkaline dissolved air floatation system is scheduled for the 2006 “off season”. It is anticipated that these improvements will enable the Alliance Group – Mataura plant to meet the 14.4 kg/day target, once it becomes a consent limit in December 2007. Preliminary investigations suggest that the reduction in phosphorus in the discharge has resulted in a reduction in the periphyton growth on the riverbed. However this will have to be confirmed by monitoring.

Last year it was discovered that the carbonaceous BOD₅ concentration in the effluent exceeded the consent limit on a number of occasions. The subsequent investigation identified a serious problem with the quality of the cBOD₅ results, as provided by the company’s contracted laboratory. An alternative service provider has been contracted and the number of non-compliant events has been noticeably reduced, but not eliminated. It appears that changes made to the redirection of the “green streams” have complicated the quest to find the source of the problem, but investigations are continuing and the company expects to have resolved this issue by early in the 2007/08 season.



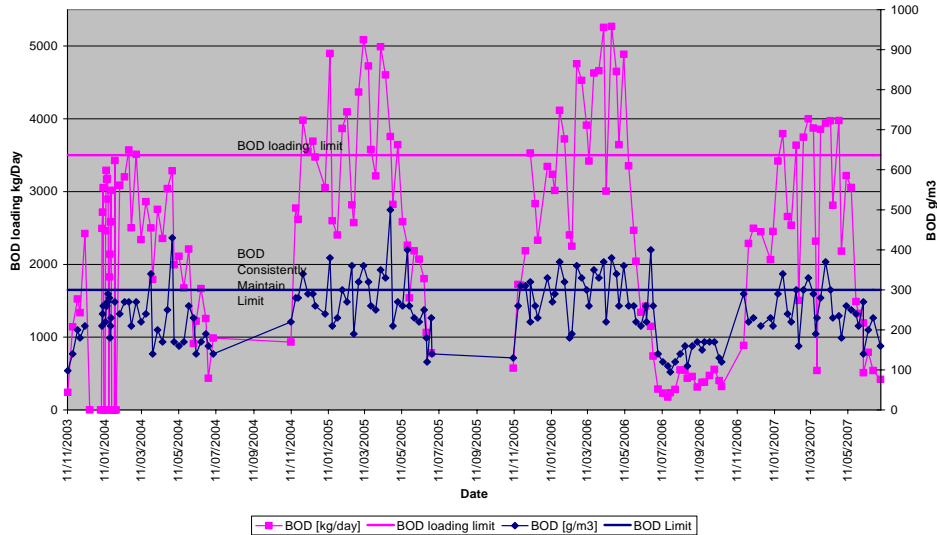


Figure 40 – BOD 2003-07

Effluent solids removed from the treatment process are taken offsite and applied to land for disposal. This provides good soil conditioning and fertiliser to the land, but the company needs to ensure that it is applied at a rate that does not exceed the nitrogen limit in the consent. This year the application rate to land was compliant, but analysis of the sludge revealed that the nitrogen concentration was elevated, resulting in an exceedance in terms of the nitrogen limit. The quality of the sludge is highly variable over the course of the season, therefore it has been proposed that the application rate and/or the sludge quality assessment, be reviewed prior to the application of sludge in the new season.

Full compliance was reported for all other consents.

Complaints and self-reported incidents

Three odour complaints were received from members of the public. These were attended by Compliance staff, but were not able to be confirmed.

Issues

The consent to discharge wastewater to the Matura River was granted in December 2004. Three years were given to upgrade and improve the effluent quality of the wastewater being discharged to the Matura River. Very good progress has been made towards achieving consent requirements. The main issue for the Alliance Group – Matura plant this year is to continue to improve the quality of the effluent to enable full compliance with the more stringent monitoring conditions which come into force in December 2007.



Table 4 – Alliance Group Limited Mataura Plant – Performance Summary

<i>Issue</i>	<i>Score</i>	<i>Comments</i>
Provision of data/results	Excellent	Data provided as required.
Compliance with consent conditions	Good	Problems experienced with effluent BOD ₅ concentrations and BOD loadings.
Responsiveness to issues	Very Good	The two self notified environmental issues were addressed promptly by the company.
Keeping Environment Southland informed of intentions, changes, etc	Very Good	Communication with Environment Southland has been good with Alliance regularly advising of any consent issues as they arise.

8.3 Alliance Group – Lorneville Plant

Monitoring

Alliance Group – Lorneville plant currently holds the following resource discharge consents that require monitoring:

- discharge wastewater to the Makarewa River;
- discharge wastewater to land;
- discharge contaminants to air from the meat plant;
- discharge leachate from two closed landfills; and
- discharge to land via a contingency short term storage pond.

Alliance Group Lorneville utilises a total of 34 hectares of anaerobic/aerobic ponds to biologically treat the meat waste effluent before it is discharged to the Makarewa River. The current resource consent was renewed in 2001. Compliance with this consent has been reasonable. The only issue was with low dissolved oxygen concentrations on five days during February and March.

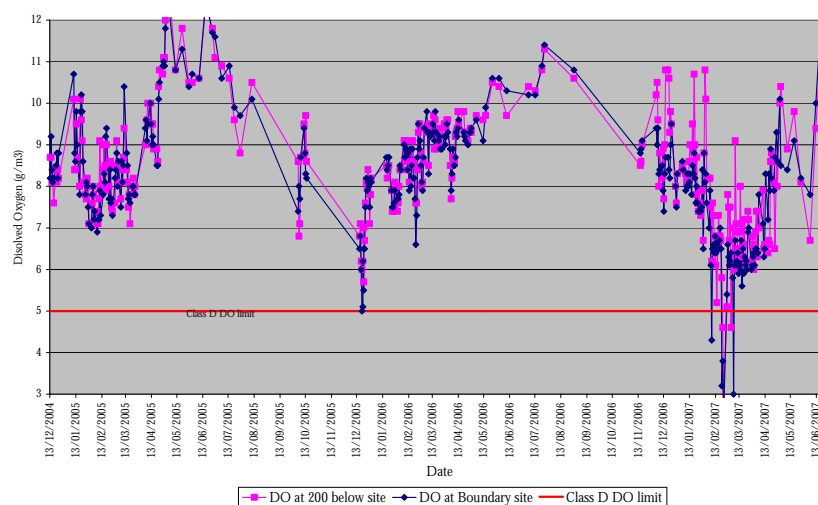


Figure 41 – Concentration in Makarewa River at the upstream (Boundary) and downstream sites



The flow in the Makarewa River during this period was significantly lower than has been recorded over the previous two years. These low flows tend to highlight the issue of reduced dissolved oxygen in the river. The low volume of water available to dilute and assimilate the effluent during these periods requires the volumes of effluent being discharged to be reduced. Alliance Group – Lorneville plant's management of the system has improved dramatically over recent years and this year was no exception. Environment Southland was immediately advised of the situation and the actions taken by the plant staff to resolve the issue.

The resource consent allowing the land disposal of the effluent has been exercised this year and again, management of this system has been very good. This is a credit to the staff operating the system and the organisation for providing the resources to allow this to happen.

Odour issues are very difficult to measure or quantify. The air discharge consent requires the odour emissions from the wastewater treatment system to be measured on one day during each season. Samples of the air above the anaerobic and aerobic ponds are drawn from a wind tunnel placed 50 mm above the surface of the ponds and stored in 90 litre Mylar bags for analysis at a later date.



Figure 42 – The wind tunnel used to collect the surface odour emissions





Figure 43 – The location of the wind tunnel with respect to the aerators

The odour threshold is established using a number of individual panellists. The test is conducted in a small laboratory, where the panellists are presented with a range of at least five dilutions of the sampled air. This is done using an Olfactometer, which offers three odour ports – two without the sampled air and one with a dilution of the sampled air. Each panellist determines the lowest dilution rate at which the odour is detected. This is repeated and, following statistical analysis, the threshold is determined. To allow for the variability of the panellists, each individual is calibrated and selected on their ability to detect odours within a given range. The Olfactometer is designed and operated in accordance with Australian and New Zealand standards, but the measurement is purely a theoretical assessment of the odour and has greatest value when compared with historical measurements.

Recent reports indicated that the level of odour emitted from the anaerobic pond had increased in 2005/06. However, the results this year returned to the historical norm, indicating that the previous two years results were out of character for the pond. The aerobic pond, immediately after the anaerobic pond, was significantly lower than all previous results. This suggests that the level of odour was higher than some of the earlier years, but there are a number of variables that may influence these results and the number of odour complaints does not correlate with these results.

The quality of the leachate from the closed landfills was somewhat variable, but compliant with consent conditions.

The contingency short term storage pond consent was not exercised this year.

Complaints and self-reported incidents

Four complaints regarding odour issues were received by Environment Southland, in the area of Alliance Group – Lorneville plant. On investigation of the complaints, three were not confirmed, nor a source identified, and one was confirmed to have originated from the Alliance Group – Lorneville plant's ponds, but this was not classified as objectionable.



Two further complaints were received by Alliance Group – Lorneville plant directly. These were investigated by Alliance Group – Lorneville plant staff, but no odours were detected.

Issues

One of the main upcoming issues is the concentration and loading of the nutrients being discharged to the Makarewa River. Typically, the nutrient limiting the growth of nuisance weed and periphyton (algal growths) is phosphorus and, therefore, the quantity of this nutrient needs to be restricted. The current Alliance Group – Lorneville plant consent does not limit the amount of phosphorus being discharged. The quantities being discharged are likely to be reviewed in future consent renewals.

Table 5 – Alliance Group Limited – Lorneville Plant – Performance Summary

<i>Issue</i>	<i>Score</i>	<i>Comments</i>
Provision of data/results	Excellent	Data provided rapidly in accordance with the consent.
Compliance with consent conditions.	Excellent	Good management of the treatment system has resulted in few exceedances.
Responsiveness to issues	Excellent	Francis Wise responded to complaints and undertook joint inspections promptly and effectively.
Keeping Environment Southland informed of intentions, changes etc.	Very good – Excellent	Ongoing discussion re various options through the consent process.

8.4 Alliance Group – Makarewa Plant

Monitoring

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

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

Originally, the Alliance Group – Makarewa plant processed a range of animals. As a result of reorganisation, the plant operates as a double shift venison slaughter and further processing plant. Waste generated from the slaughter and low temperature rendering plant is treated in a series of four anaerobic ponds and two aerobic lagoons. The significant size of the aerobic ponds provides considerable buffering capacity, limiting the need to discharge during periods of low river flows. This means that, although the plant produces effluent year round, with good management effluent can be



discharged during periods when the river flow is sufficient to assimilate the impact of the discharge.

This year, the discharge was fully compliant with cBOD₅ and TSS requirements. The only non-compliance was a minor issue with the ammonia nitrogen loading levels, but at no time did they exceed the maximum loading limit.

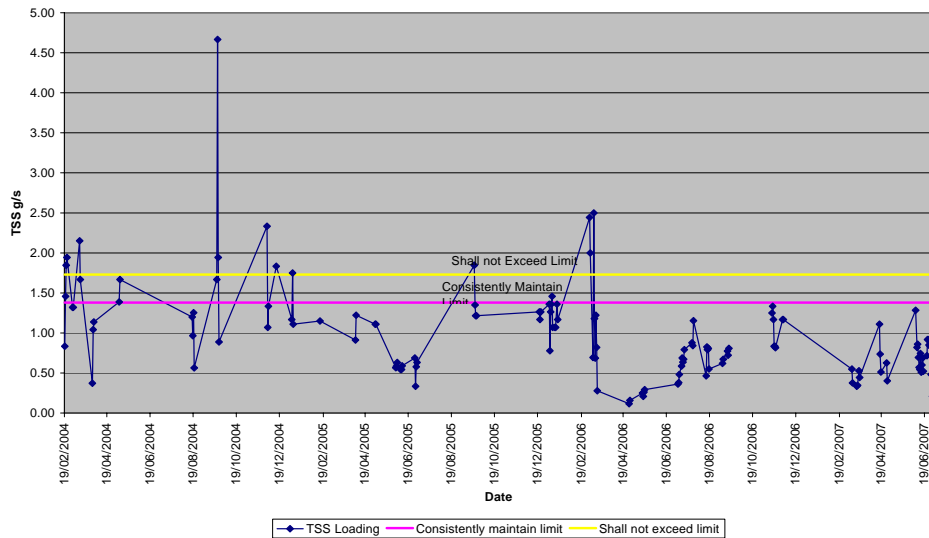


Figure 44 – Total suspended solids loading of the Alliance - Makarewa plant discharge

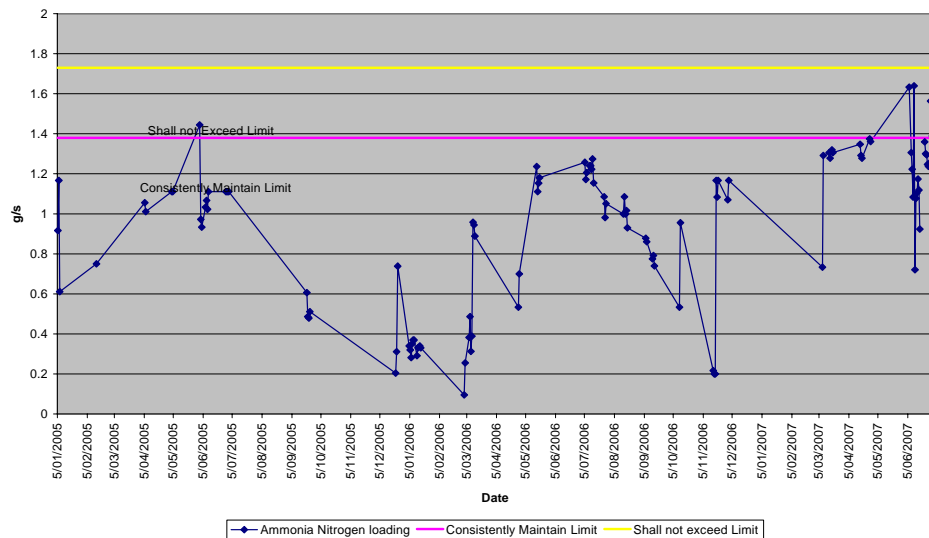


Figure 45 – Ammonia-Nitrogen loading of the Alliance - Makarewa plant discharge

Problems were experienced last year with the multi-cyclones, resulting in the emission standards being exceeded. A considerable amount of work has been conducted to remedy the problems and a further, unscheduled, particulate monitoring report was completed. The report demonstrated that the repair



had been successful and the boilers were found to be fully compliant with the consent.

The discharge of effluent to land was not exercised at the plant this year.

Alliance Group – Makarewa plant 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

Two odour complaints were received in the area of the Alliance Group – Makarewa plant. On one occasion the complainant indicated that the odour did not warrant investigation and only wanted the odour incident to be recorded, but as the source of the odour could not be confirmed, it was not able to be linked to Alliance Group’s Makarewa plant. The other complaint was received on 26 September 2006. It was confirmed to originate from Alliance Group – Makarewa plant and was classified as objectionable. This was linked to the rendering of slink skin waste.

Issues

Originally designed to kill significantly greater stock numbers, the volume of wastewater produced is relatively low compared with the volumes discharged during the peak years. As a result there is significant storage capacity to hold effluent during periods of low river flows and only discharge during higher flows. The main non-compliance issue is the odours emitted from the plant. The rendering plant receives product from a variety of sources and can operate throughout the year.

During peak periods, such as the slink skin season, odour needs to be carefully managed by plant staff.

General

Applications have been received from Alliance Group – Makarewa plant to renew the waste and cooling water discharge consents to the Makarewa River.



Table 6 – Alliance Group Limited Makarewa Plant – Performance Summary

<i>Issue</i>	<i>Score</i>	<i>Comments</i>
Provision of data/results	Excellent	Monitoring results are reported as required by the consent.
Compliance with consent conditions	Good	The particulate emissions from the boilers were non compliant and there have been a small number of odour complaints. The number of these has declined in the past year.
Responsiveness to issues	Excellent	Unable to deal to particulate emissions immediately but committed to repair multi-cyclones during off season. Discharge volumes are adjusted as soon as laboratory results are available to ensure that effluent discharge conditions are met.
Keeping Environment Southland informed of intentions, changes etc	Excellent	Alliance staff from Lorneville manage the Makarewa site and keep Environment Southland up to date.

8.5 Ballance Agri-Nutrients

Monitoring

Ballance Agri-Nutrients fertiliser manufacturing plant has two current resource consents to:

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

Compliance with both consents has been excellent this year, with very few non-compliances reported. The only breach was a minor exceedance in the fluoride concentration in the ungrazed grass at the “east airstrip” site, where the average results were influenced for a number of months by one very high result reported in May 2006.

In 2004, Ballance Agri-Nutrients embarked on a major stormwater upgrade programme. Phase 1 of this was completed in 2005 and significantly reduced the volume of contaminants and stormwater being discharged to the Mokotua Stream, through improved stormwater capture and the recycling of the stormwater back into the manufacturing process.

Phase 2 is the neutralisation of low pH stormwater. This involves the bunding of the acid tank area, and bunding and re-diversion of the stormwater from the acid loading areas. This was to be completed this year but, due to a series of HASNO regulations, the project has been delayed until



Ballance Agri-Nutrients is able to organise an appropriate, approved means of storing the sodium hydroxide used to raise the pH of the stormwater originating from this area. Once this work is complete, Ballance Agri-Nutrients hopes to be able to reduce its lime usage almost to zero, to limit the risk of suspended material being discharged in the stormwater.

Complaints and self-reported incidents

Environment Southland has not received any reported incidents from the Balance Agri-Nutrients fertiliser site.

General

A new consent for the discharge of stormwater was granted. No submissions were received in opposition to the consent within the statutory timeframes and the new consent was granted in June 2007 for a period of 25 years.

Table 7 – Balance Agri-Nutrients– Performance Summary

<i>Issue</i>	<i>Score</i>	<i>Comments</i>
Provision of data/results	Excellent	Data is always provided as required and considered commentary included as appropriate.
Compliance with consent conditions	Excellent	This year there was only one minor breach of the consent conditions.
Responsiveness to issues	Excellent	Staff have responded to all issues as they arise.
Keeping Environment Southland informed of intentions, changes etc	Excellent	Balance has consulted regularly with Environment Southland during the stormwater upgrade and the consent renewal process.

8.6 Blue Sky Meats

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 commenced operating a single chain meat processing plant on its present site in 1987. This has progressively been modified and upgraded to now process a range of products, operating up to seven days per week on a two shift killing cycle during the peak season.

Formal compliance with the relevant consents has been good over the years, however, there has been concern with some of the increased levels of



contaminants being found immediately downstream of the Blue Sky Meats' property.

Liquid waste from the processing plant passes through a screen system to remove coarse material and is then stored in a pond with nominal two day retention before irrigation via a Briggs 25 irrigator. No reports of direct discharge to the tributary to the Waihopai River have been received, but routine monitoring has identified some significant increases in contaminants, especially *E. coli* bacteria in the tributary, downstream of the disposal areas consented to receive effluent from Blue Sky Meats.

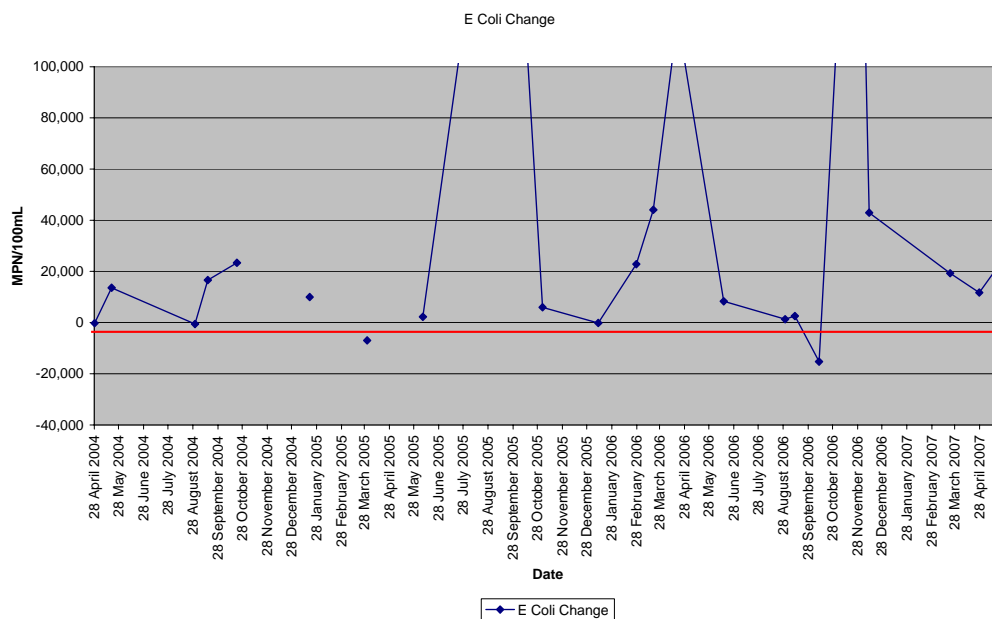


Figure 46 – Change in *E. coli* levels between sites located upstream and downstream of Blue Sky Meats effluent application areas

Water quality in streams flowing through intensively farmed and tile drained land varies depending on a number of factors, such as weather. Adequate management of the disposal of waste to land can minimise the potential for this method of waste disposal to impact on surface and groundwater.

The significance of some of the increases and the frequency of the increases observed in Figure 46 are of concern and raise questions about the effectiveness of the effluent disposal system at this site. There has been discussion about the impact of domestic sewage via septic tanks from some dwellings in the area. However, it is improbable that this will account for the water quality issues observed in the tributary.

Only one incident has been reported, involving a stationary effluent irrigator over-applying effluent to land. Although some overland flow of effluent was found, no direct discharge to water was found.

Blue Sky Meats has a consent to operate a rendering plant but, to date, a rendering plant is not operating at this site.



Table 8 – Blue Sky Meats – Performance Summary

<i>Issue</i>	<i>Score</i>	<i>Comments</i>
Provision of data/results	Good	The provision of data has been good
Compliance with consent conditions	Marginal	There have been a number of occasions when a deterioration in water quality downstream of the plant has been identified
Responsiveness to issues	Marginal	Staff have not always addressed water quality issues identified
Keeping Environment Southland informed of intentions, changes etc.	Good	There have been few changes therefore little to communication required

8.7 Prime Range Meats Limited

Monitoring

The Prime Range Meats Limited processing plant currently holds the following resource discharge consents to:

- discharge up to 1,500 m³/day of treated wastewater to the Waikiwi Stream, approximately 500 metres downstream of the West Plains Road bridge; and
- discharge contaminants to the air from a meat works and rendering plant, including a wastewater treatment system.

Prime Range Meats Limited, and its predecessor Southland Butchers By-Products, has operated for a number of years at its current site on the banks of the Waikiwi Stream. Initially few, if any, controls were imposed on the effluent quality. This has changed over the years and, however, is likely to continue to do so. Prime Range Meats Limited (and its predecessor) has made many changes over that period but, since 1999, has struggled to consistently meet the conditions of the current consent. The level of compliance has improved since 1999, but in 2006/07 there have still been instances of non-compliance.



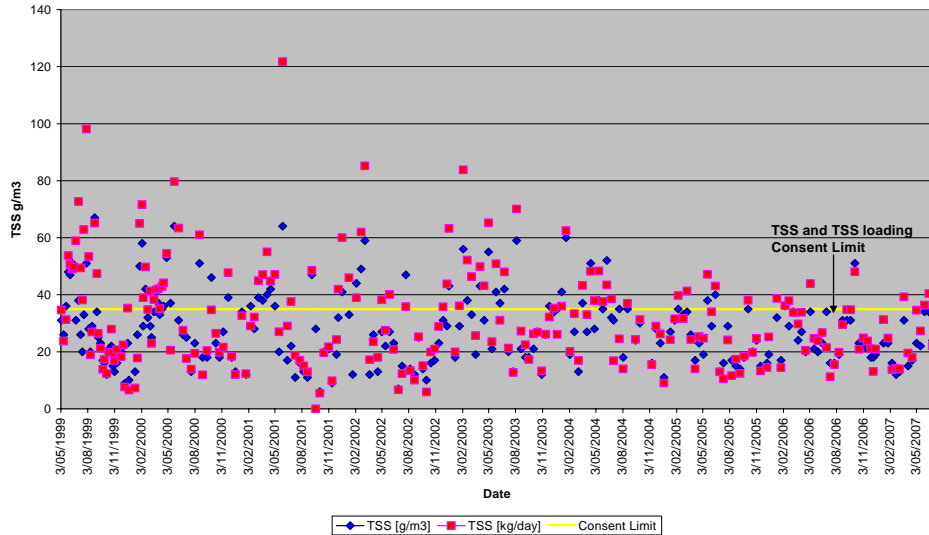


Figure 47 – Total suspended solids concentration in the Prime Range Meats Ltd discharge

Complaints and self-reported incidents

This year, 19 complaints were received in the area of the Prime Range Meats Limited plant. Ten were confirmed to have originated from the plant, with four of these assessed as objectionable. Warning letters were issued for the initial confirmed objectionable incidents and, as these incidents continued, infringement notices were issued for the last two incidents.

Consent Issues

Increased nutrient concentrations in Southland rivers are a problem, as they promote nuisance weed and algal growth on the riverbed. Companies discharging to rivers need to control the inputs of their discharges if they wish to continue to discharge to rivers in future. Prime Range Meats Limited’s discharge consent is up for renewal in 2008 and is likely to have controls set on the level of nutrients being discharged to the river. This has been signalled to the company and investigative work by the company is progressing. Past results suggest that some major changes will be required to reduce the concentrations of nitrogen and phosphorus being discharged to the Waikiwi Stream.



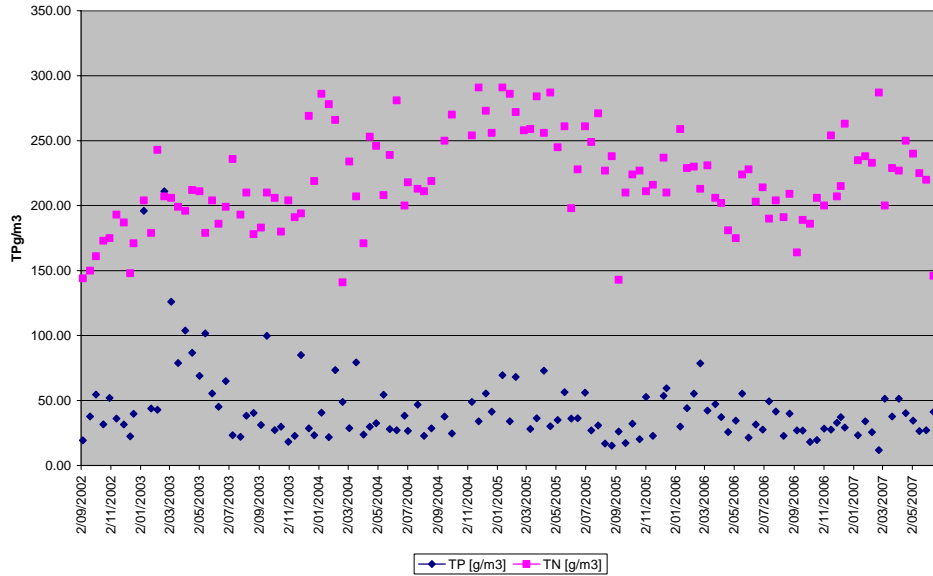


Figure 48 – Total phosphorus concentration at site upstream and downstream of Prime Range Meats Ltd discharge

Figure 48 shows a slight decrease in the level of total phosphorus in the discharge since 2002, but little change in total nitrogen.

Table 9 – Prime Range Meats – Performance Summary

<i>Issue</i>	<i>Score</i>	<i>Comments</i>
Provision of data/results	Poor	Boiler performance and macroinvertebrate reports incomplete. Water quality data is provided, but it is not always on time.
Compliance with consent conditions	Poor	The water quality downstream of the discharge point continues to be impacted by non-compliant discharges.
Responsiveness to issues	Poor	Staff have responded to notifications of odour complaints, but have not been so responsive when dealing with written correspondence.
Keeping Environment Southland informed of intentions, changes etc.	Poor	Some information has been shared, but progress is not regularly communicated.

8.8 Dongwha Patinna NZ Limited

Monitoring

Dongwha Patinna NZ Limited currently holds the following resource discharge consents that require monitoring:

- 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; and



- discharge contaminants to the air from fibreboard processing, including the treatment of wastewater.

Compliance monitoring of the air discharge consent was determined by results of monitoring carried out by K2 Limited, environmental consultants. Examination of these results indicates that the plant met the requirements of its consent and, therefore, performance was very good during the 2006/07 year.

Liquid waste from the plant is treated on site and discharged to adjacent farm land owned by the company. This year, there were a small number of glitches. These were all addressed and at no time did the effluent quality exceed the consent limits. No effluent from the plant was discharged to the Maitara River this year.

The plant has a significant area of sealed yards and rainfall on these areas is classified as stormwater.

Stormwater on this site has the opportunity to collect contaminants that are washed into the stormwater system during the early stages of any rainfall event. Stormwater systems at Dongwha Patinna New Zealand Limited have been set up to retain the “first flush” water for further treatment and only discharge the remaining, relatively clear, water to the river. The river tends to be slightly discoloured during periods of heavy rainfall. Therefore, monitoring of the stormwater discharge and the Maitara River has detected no significant impact on the river and the company is regarded as being compliant with this consent.

Air monitoring took the form of particulate monitoring, formaldehyde and volatile organic compound (VOC) monitoring. All monitoring was found to be compliant with the consent conditions, with the only item for discussion being a slightly elevated level of formaldehyde recorded in May 2007, coming from the west drier cyclone. This was an instantaneous reading and remained compliant with the consent limit.

The VOC monitoring is a new condition, required to be monitored two yearly. The methodology captures a wide range of compounds and is 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.



Table 2.1.3: VOC Emission Monitoring Results

Components	Drier:		Press Vent 1*
	East g/hr	West g/hr	
Acetaldehyde	24	40	1
Propionaldehyde	BD [†]	BD	BD
Methyl Ethyl Ketone	BD	BD	BD
Methyl Isobutyl Ketone	BD	BD	BD
Benzene	35	13	0.31
1-Butanol	BD	2.9	BD
2-Ethyl-1-hexanol	21	4	0.4
Toluene	104	134	0.1
Chlorobenzene	BD	BD	BD
Ethylbenzene	BD	0.6	BD
1,4-Xylene	BD	BD	BD
1,2-Xylene	BD	BD	BD
1,2-Dichlorobenzene	BD	BD	0.3
1,3-Dichlorobenzene	0.72	BD	BD
1,4-Dichlorobenzene	BD	BD	BD
Styrene	1.9	0.14	0.02
Alpha-Pinene	287	230	3.2
Beta-Pinene	233	297	6.2
Camphene	5.7	4.7	0.51
Phenol	28	110	46 [^]

* Only one press vent was operating at the time of sampling.

[†]BD indicates that even though the compound gave a small spike when initially screened, when analysed further the compound was found to be below detection limits.

[^] indicates the average of both Press Vents, as Phenol sampling was completed on the 5 – 6 December 2006 when both Press Vents were operating.

Figure 49 – VOC emission monitoring results (taken from Dongwha Patinna NZ Ltd Environmental Assessment Review, Second Quarter 2007 and Annual Report for Year to 30 June 2007)

Complaints and self-reported incidents

Environment Southland received four reports of environmental incidents, while Dongwha Patinna NZ Limited received 17 (including the four received by Environment Southland).

These related to:

- noise (11 out of the 17);
- one odour incident (no odour was able to be found by Environment Southland staff); and
- three particulate matter/smoke incidents.

Typically, the smoke issues related to occasions when the plant was starting up after a period of maintenance. Smoke is allowed to be discharged for up to two hours after lighting the energy centre from cold.



One incident, however, related to blue smoke being emitted from the stack. The source of the smoke is being investigated and photos have been sent to an Environment Southland consultant for comment.

General

The volume of water abstracted from the Mataura River increased this year. This increase did not exceed the consent conditions. There were a number of reasons for this increase, including the discovery of a leak in the closed loop cooling water system, located inside the energy centre, and the need to control an ongoing smouldering fire in the centre of the energy centre fuel pile.

Table 10 – Dongwha Patinna – Performance Summary

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

8.9 Fonterra, Edendale

Monitoring

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

- 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 Edendale property named Mararua Farm;
- discharge factory wastewater onto land, that land being approximately 147 ha of the Fonterra Edendale 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 Edendale property named Inglemere Farm;
- discharge treated dairy processing wastewater, cleaning water, condensate, stormwater and denitrification and demineralisation water to the Mataura River; and
- discharge contaminants and odour to the air from a dairy factory and ancillary operations.



Compliance with Fonterra's air discharge consent is generally good. One condition states that the three boilers are limited to a maximum combined instantaneous discharge rate of 144 tonnes per hour. With its current data system, it is difficult to work out the instantaneous rate. Fonterra is undertaking work on its data management system to enable more accurate reporting on this condition.

The sulphur content of coal is tested once a week during the processing season (September to November), to ensure that consent limits are being met. New consent limits were set in November 2006, allowing a 12 month rolling average of no more than 0.47% sulphur and a maximum of 0.6% sulphur. Data from the period 1 July to 31 December 2006 period shows that Fonterra is under this limit, with a rolling average of 0.41% sulphur content.

The calculated carbon dioxide emission loads generated by site operations for the 2006/07 season was 178,000 tonnes. This is an increase of 8.3%, up 13,500 tonnes from the 2005/06 season.

Compliance with the stormwater discharge to the river and the irrigation to land continue to be good, causing no new concerns.

Complaints and self-reported incidents

The number of incidents reported to Environment Southland relating to Fonterra's operation during the 2006/07 year has reduced significantly, compared to the 2005/06 year. The number and nature of incidents reported by members of the community are summarised below:

<i>Number of Incidents</i>	<i>Nature of incidents reported by the public</i>
1	Soot fallout from boilers
6	Odour from pond system
1	Report of irrigation occurring with stock
8	Total number of complaints received

The odour complaints were received at the start of the season. The odour problems began when the plant started operating after the winter shutdown period. One of the ponds had a new liner fitted as it was holed during the previous season. The ponds were allowed to sit idle while this work was being completed, resulting in them becoming anoxic. When the aerators were started up, biological activity was stimulated but it took weeks for the biological activity to increase to a level where it could handle the effluent load.

No further odour complaints were reported or detected by staff once the biological activity within the ponds stabilised.

Fonterra self reported three incidents, in addition to those listed above. One of these was relating to noise, which is not within Environment Southland's



jurisdiction, but was recorded anyway. In addition to the self reported incidents, Fonterra operates a system of Environmental Non-Conformance Reports (ENCRs). This involves Fonterra Edendale's Environmental Officer entering the incident into its national ENCR database and co-ordinating any remediating actions, as well as reporting to Environment Southland.

The following ENCRs were reported during the 2006/07 year:

- *September 2006, exceeded groundwater Nitrates limit of monitoring bores* – monitoring revealed contamination of groundwater from increasing background levels, above the irrigation area. Change to irrigation practice and regional survey work with Environment Southland.
- *October 2006, process water from cheese department accumulating beside SH1* - transfer line to the wastewater treatment plant failed, resulting in water accumulating on State Highway 1. This was repaired and reinstated when the problem was detected.
- *November 2006, high TP in wastewater discharge to river* – internal and external tests showed a high variation in results. This resulted in Fonterra developing a standard operating practice to avoid future incidents of the same, or similar, nature. The volume of wastewater discharged has also been reduced, to compensate for any future variation between internal and external results.
- *January 2007, elevated air emissions from No 3 boiler baghouse* – 14 bags failed simultaneously, resulting in elevated emissions. The bags were replaced and the by-pass damper door access was hard-welded shut.
- *April 2007, total Phosphorus discharged from site stormwater exceeded the consent limit of 6.6kg/day* – the analysis of a composite sample reported a concentration of 2.3 g/m³. Based on this result, there would have been a mass discharge of 14.7 kg/day. The sample was re-analysed, with the reported concentration reducing to 1.6 g/m³, which would have resulted in a theoretical mass discharge of 10.2 kg/day. When compared to the average mass discharge (being <1 kg/day), this result seems unlikely. Fonterra has requested a report from the laboratory it uses for this incident. It has yet to receive this and it will be made available to Environment Southland.



Table 11 – Fonterra, Edendale – Performance Summary

<i>Issue</i>	<i>Score</i>	<i>Comments</i>
Provision of data/results	Very Good	The provision of monitoring data has improved from previous years.
Compliance with consent conditions	Very Good	Few issues arising over this year.
Responsiveness to issues	Good	Staff have responded to issues raised by Environment Southland, but have not always notified problems to Environment Southland in a timely manner.
Keeping Environment Southland informed of intentions, changes, etc	Good	Staff have kept Environment Southland informed with progress on the boiler issue upgrades and developments.



9.0 Miscellaneous Commercial Operations

9.1 Slink Skins

There are six slink skin consents in Southland. Five have discharge permits to land and four of these were inspected last year.

“Southland Skins” obtained their consent in August 2006 and was in the appeal period during September inspections.

No problems were encountered during the inspections.



Figure 50 – Tile extension at Trevor Newton’s site at Waikana



9.2 White Hill Wind Farm

Project White Hill is Meridian Energy's second wind farm development and is located approximately 6 km south-east of Mossburn. White Hill is the first wind farm to use two-megawatt turbines, of which there are 29 at White Hill.

There are four consents held by Meridian Energy for the White Hill site. All four consents dealt with the construction phase of the project and performance has been satisfactory. There was excellent co-operation between all consent authorities and contractors during the various construction phases. The final finishing touches, such as hydro-seeding, have had to be delayed until spring 2007 to ensure germination on spoil areas. Hares and, to a lesser extent rabbits, were using the spoil areas and grazing by these animals was impacting on the revegetation process. Official construction ended on 24 August 2007.



Figure 51 – Turbines, with Eyre Mountains in the background

9.3 New Zealand Growing Media Limited

New Zealand Growing Media Limited has four current discharge consents to:

- divert and discharge groundwater and stormwater at Tanner Road near Browns;
- discharge contaminants to the air from a peat bog and ancillary works at Tanner Road near Browns;
- divert groundwater and discharge groundwater and stormwater from a peat harvesting operation at Allen's Bog near Browns; and



- discharge contaminants to air from a peat harvesting operation at Allen's Bog near Browns.

New Zealand Growing Media Limited (formerly Ravensdown Growing Media) harvests, sells and distributes a high grade sphagnum peat moss from two sites (Tanner Road and Allen's Bog), to a range of customers, including the mushroom industry.

Tanner Road stormwater and runoff from the site is stored in a series of settling ponds, to reduce the volume of settleable material discharged to tributaries of the Otapiri and Makarewa Rivers. Monitoring of the discharges and receiving waters indicate that the operation is having little impact on the water quality in the area.

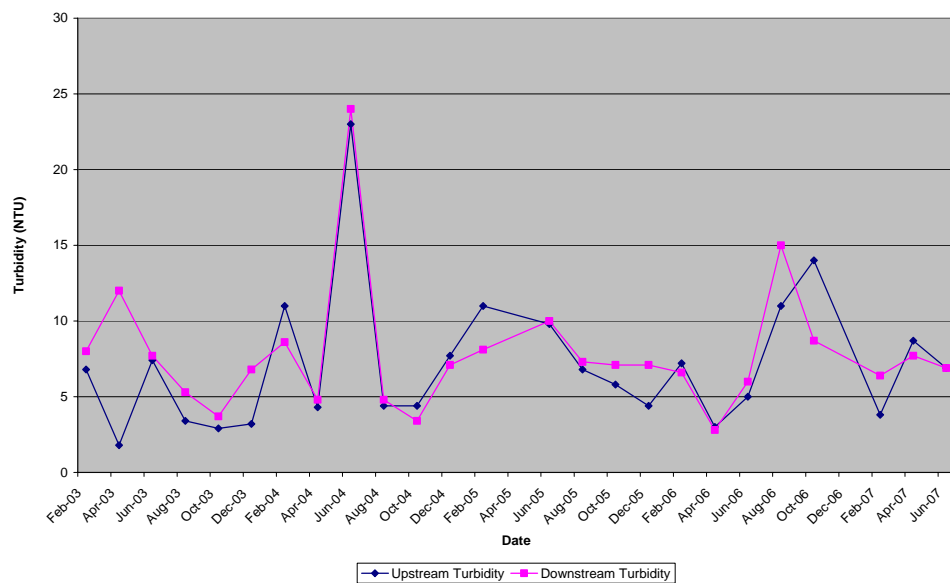


Figure 52 – Turbidity in the receiving waters upstream and downstream of New Zealand Growing Media Limited

Sphagnum peat moss, when dry, is very light and initially caused some concerns with neighbours in the area. Deposit gauges were used to capture wind blown material at three sites, in order to quantify the fugitive dust and peat from the site. This method of monitoring has limited application, as it can be influenced by a variety of environmental factors, including the presence of trees. Results from the deposit gauge located at the south-west site provided reasonable information and it appears that, as the shelter trees have become established, wind turbulence is influencing the gauges, causing some elevated results.



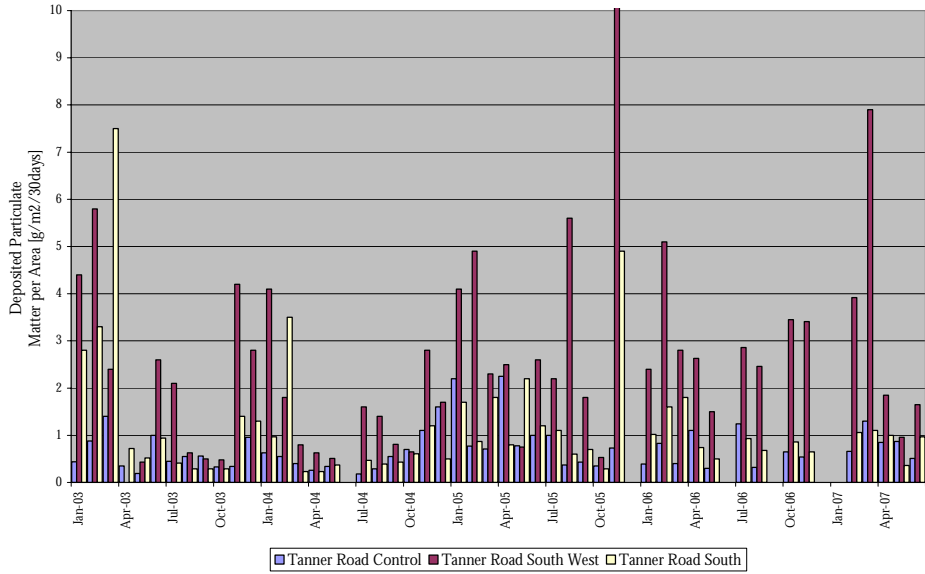


Figure 53 – Wind blown matter detected at three monitoring sites on the boundary of New Zealand Growing Media Limited’s property

9.4 Piggeries

There are presently four piggeries operating in Southland. Inspections were undertaken on 25 and 26 June 2007. One operator was experiencing minor problems with effluent disposal due to heavy rain. No off-site effects were evident at the time of inspection.



Figure 54 – Well-kept Southland pigs



10.0 Mining/Quarrying

Fourteen major mining companies were inspected during the 2006/07 year throughout Southland (Figure 55). The activities inspected included one for rock, two for peat, three for lime and four for both gold and coal/lignite.

All sites have consents for discharges to water and have monitoring conditions on them. The frequency of monitoring ranges from monthly to annually. There were no significant non-compliances noted during the inspections.



Figure 55 – Mining operations in Southland

General

Some significant changes have been happening in the mining scene throughout Southland, during the past year. Solid Energy is winding down its operation at Ohai and has taken over the Newvale and Goodwin mines near Waimumu. The Newvale and Goodwin mines had been in a family partnership for many years. Solid Energy has also brought large tracts of land throughout the Matakana/Gore area. Straith Industries at Ohai has sold to a new company called Takitimu Coal. Takitimu Coal is planning to upscale extraction at its Ohai and Nightcaps sites.



11.0 Sewage Treatment Plants

11.1 Invercargill City Council – Invercargill Sewage Treatment Plant

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

- 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; and
- discharge a deodorising agent to the air to mask odours from the sludge ponds at the sewage treatment plant.

Compliance with these consents has been poor this year. New consents were granted in 2003, with the understanding that the inclusion of new maturation/tertiary ponds would result in significant improvements to the effluent quality. Initially there was a marked improvement in the bacterial quality of the effluent, but the effluent quality has continually failed to meet the conditions set in the consent. This is mirrored with the total suspended solids (TSS) results that have continually failed to meet the consent condition. The effluent quality, in terms of carbonaceous biochemical oxygen demand (cBOD₅), appears to have improved most recently, but there have still been periods of consent breaches.

Environment Southland has highlighted this as a serious problem that needs immediate attention from senior management and councillors at ICC. The bacteriological quality still fails to meet consent requirements.

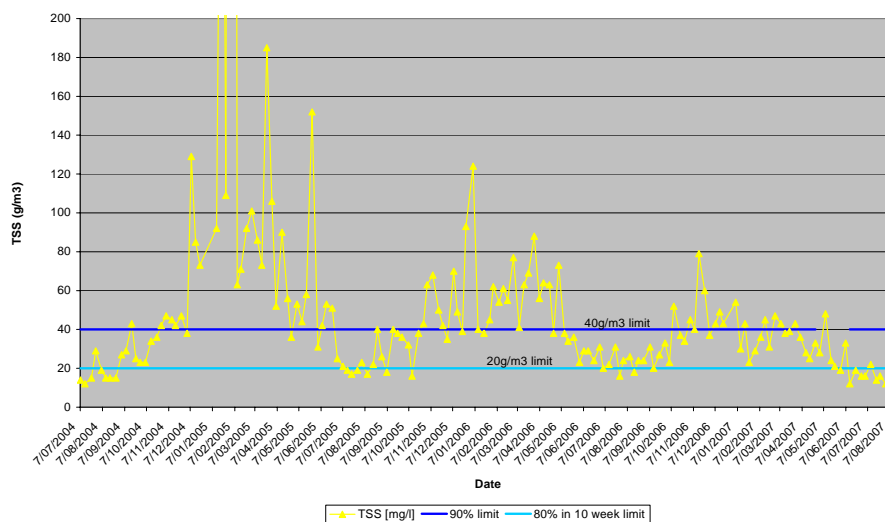


Figure 56 – Total suspended solids concentration in the treated sewage



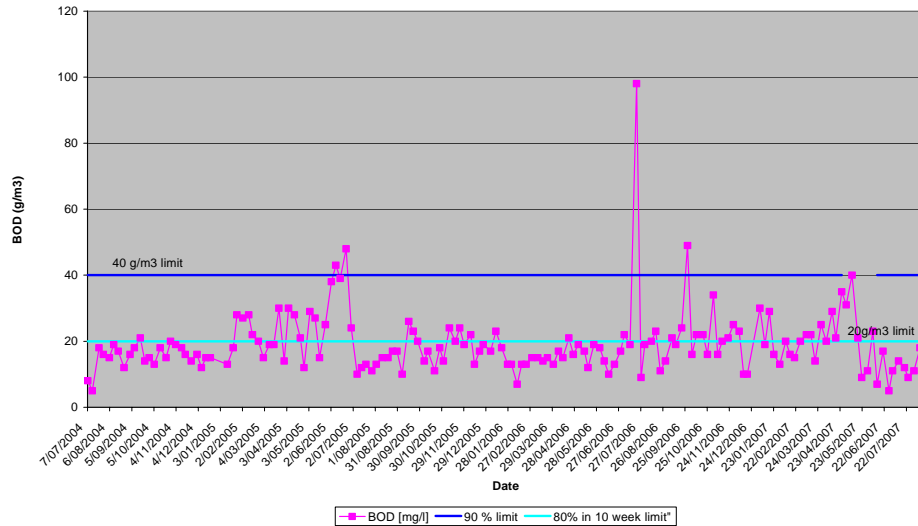


Figure 57 – Biochemical oxygen demand concentration in the treated sewage

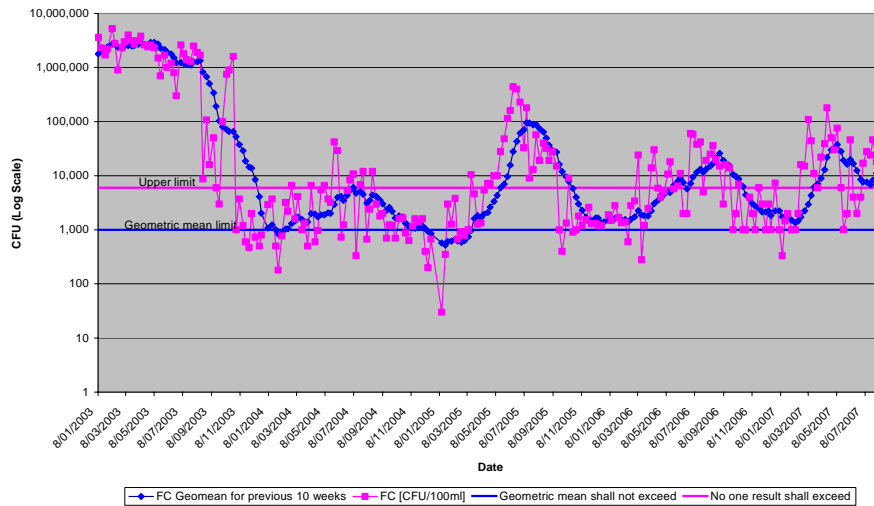


Figure 58 – Faecal coliform levels in the treated sewage

The air discharge consent requires that:

There shall be no discharge of odour beyond the boundaries of the site that is noxious, offensive or objectionable to such an extent that it has an adverse effect on the environment beyond the boundaries of the site.

This year Environment Southland staff attended numerous odour complaints in the area of the treatment plant. Each was thoroughly investigated by assessing the:

- intensity of the odour;
- duration of the odour;
- offensiveness of the odour;
- location of the odour effect; and
- frequency of the odour.



A number of the incidents were confirmed to have originated from the ICC wastewater treatment plant and a proportion of these were assessed as objectionable or offensive. The incidents section of this report describes three Infringement Notices that were issued to the ICC for three separate incidents. A prosecution was being considered but was postponed, subject to significant expenditure by the ICC and operational improvements.

As a result of the enforcement action taken and the significant pressure put on the ICC by the community at a public meeting, the ICC has committed \$1,670,000 to improve the wastewater treatment system. This money is intended to address the issue of odours. Operational improvements may also have a positive effect on discharge levels.

11.2 Milford Sound Sewage

Wherever people congregate there is a need to offer modern conveniences and Milford is no exception. A significant number of tourists visit Milford and, consequently, there is a need to deal with the sewage generated by tourists, the staff servicing this industry and the rain water that infiltrates the system. The Milford Development Authority has a coastal permit to operate a plant to treat and sterilize this effluent, before it is discharged to Deep Water Basin in the Sound.

As Milford is part of the Fiordland National Park, there is an expectation that the treatment system will produce an effluent that has minimal impact on the environment. The laboratory results of samples collected at the outfall indicate that the concentration of carbonaceous BOD₅, total suspended solids and faecal coliform were all reasonable and fully compliant with the consent.

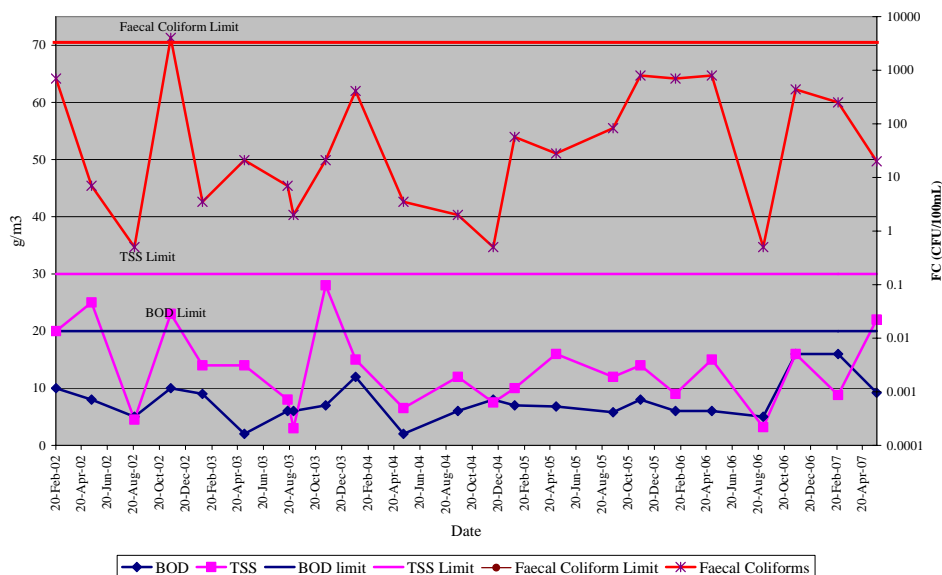


Figure 59 – Biochemical oxygen demand, total suspended solids and faecal coliform levels in the treated sewage



Treated sewage is discharged at a point immediately north of Deepwater Basin. The Cleddau and Arthur Rivers both enter the Sound at this point also.

Monitoring of the discharge occurs 600 m north, and 600 m south of the discharge and 1 km from the discharge at a control site. The monitoring results suggest that the discharge has been having little impact on the quality of the water in Milford Sound.

11.3 Gore District Council – Matura Sewage Treatment

The Matura township has a population of 1,740 (2001 Census) and is currently served by a single oxidation pond, located to the south-west of the township. The pond was designed to receive effluent from a population equivalent of 4,000 people, based on water usage of approximately 500 L/person/day. The volume of sewage received in the pond is in the order of 2,000 m³, the volume of effluent that would be expected from a population of 4,000 people. This indicates that there is a considerable infiltration of water into the system from other sources, including spring and stormwater. This infiltration dilutes the organic loading on the system, keeping the carbonaceous BOD₅ and total suspended solids results low and within the conditions of this consent.

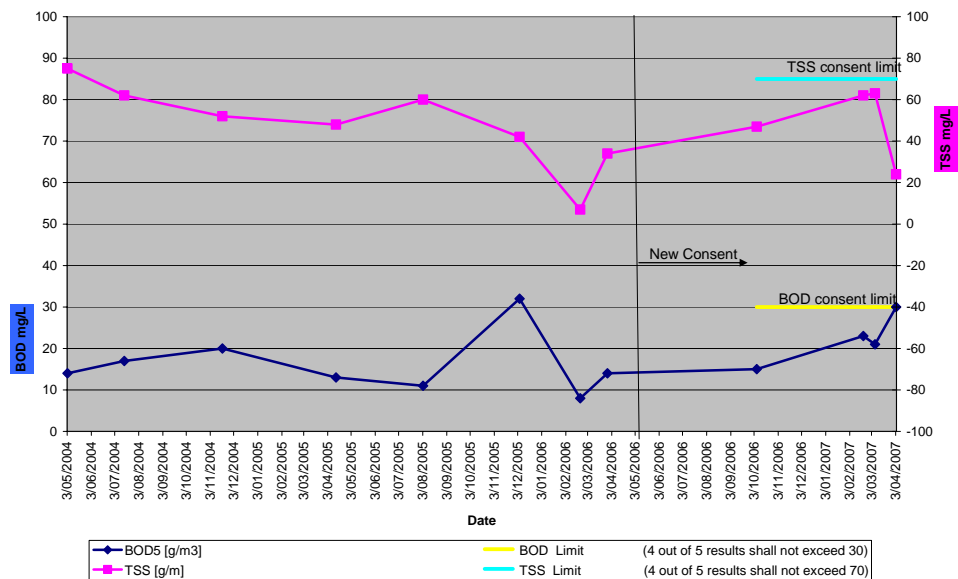


Figure 60 – Biochemical oxygen demand and total suspended solids concentration in the treated sewage

The concentration of nitrogen and phosphorus in the discharge has been variable over recent years, but regularly resulted in a slight increase in nitrogen and phosphorus downstream of the discharge.



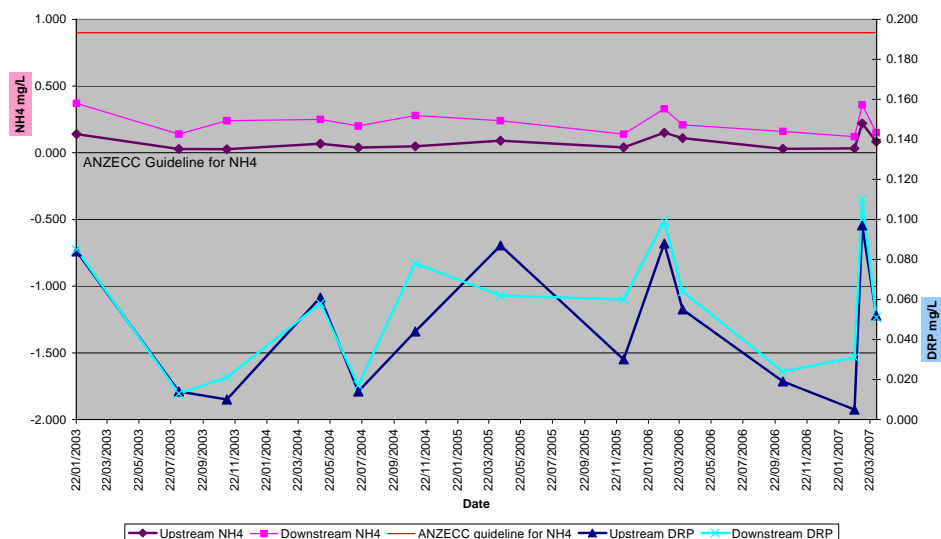


Figure 61 – Ammonia nitrogen and dissolved reactive phosphorus concentration upstream and downstream of the sewage discharge

The consequence of nutrient enrichment in any water body, is the growth of nuisance weed and periphyton on the riverbed. These growths impact on the naturally occurring macroinvertebrate communities in the river.

To get an assessment on whether macroinvertebrate communities are being impacted, the number and type of invertebrates are sampled and an index is calculated. This scoring system measures the impact of the effluent on the river water, but can be influenced by factors other than pollution, for example the substrate. Hence, the sampling sites are carefully selected to be as similar as possible, to remove influences other than the effluent discharge.

While the increase in nutrients was not large, the results of this year’s macroinvertebrate survey showed that the discharge was having an adverse impact on the local benthic macroinvertebrate community.

Table 12 – Macroinvertebrate study

Taxon	MCI Score	Upstream						Downstream					
		1	2	3	4	5	Average	1	2	3	4	5	Average
<i>Deleatidium.sp</i>	8	84	49	23	34	49	48	12	22	4	21	12	14
Elimidae	6	12	15	17	18	25	17	35	40	20	39	27	32
Cladocera	5						nil	35	85	123	150	41	80
Chironomidae	2	31	18	20	19	15	21	54	38	15	32	26	33
Oligochaeta	1	16	3	16	8	7	10	71	48	32	42	52	49
QMCI Score							5.4						4.0

This survey revealed that the benthic communities at the upstream and downstream sites were dominated by different communities (refer Table 12, above). At the upstream site, *Deleatidium.sp* mayflies were dominant, while Cladocerans were the dominant invertebrate at the downstream site. The



number of Choronomideae and Oligochaeta (midges and worms) were higher at the downstream site. The statistical significances of these variances are summarised in Table 13, below. The QMCI was lower at the downstream site, with the scores being indicative of 'probable moderate pollution' at the downstream site, compared with 'doubtful quality' at the upstream site (Boothroyd and Stark 2000).

Table 13 – Variances of main invertebrate matrices measured (statistically significant results are shown in bold)

	<i>F_{1,8}</i>	<i>p-value</i>	<i>Interpretation</i>
Number of Taxa	0.21	0.66	
Number of invertebrates (per m ²)	24.33	0.001	Higher downstream
Number of Ephemeroptera (per m ²)	11.6	0.01	Lower downstream
Number of Trichoptera (per m ²)	1.45	0.26	
Number of Oligochaeta (per m ²)	26.44	0.001	Higher downstream
QMCI Score	21.91	0.002	Lower downstream

Should future results continue to indicate adverse effects on the macroinvertebrate community, a close look at system loading may be indicated.

11.4 Southland District Council – Winton Sewage Treatment

Winton is a township within the Southland province which 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.

In December 2003, Environment Southland issued a new consent to discharge treated effluent, on the understanding that additional treatment would be implemented. Once granted, the Southland District Council contracted the design and construction of the 1.4 ha wetland. A six cell wetland was formed to treat the oxidation pond effluent, before being discharged to the Winton Stream. Construction was largely complete when the wetland was commissioned, in July 2006. Wetlands are a biological treatment system, requiring time for the flora and fauna to establish and reach full capacity. Consequently, there has been little significant improvement in the effluent quality, but this should begin to improve over the next year.



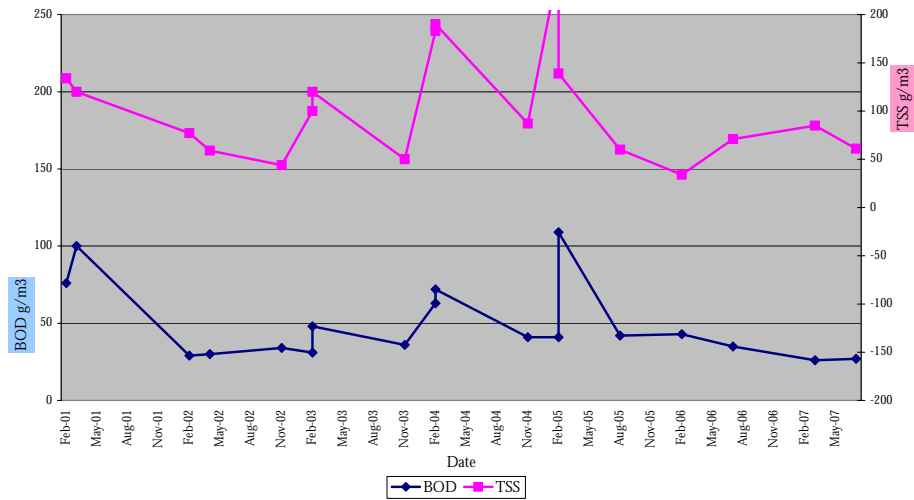


Figure 62 – Biochemical oxygen demand and total suspended solids concentration in the sewage discharge

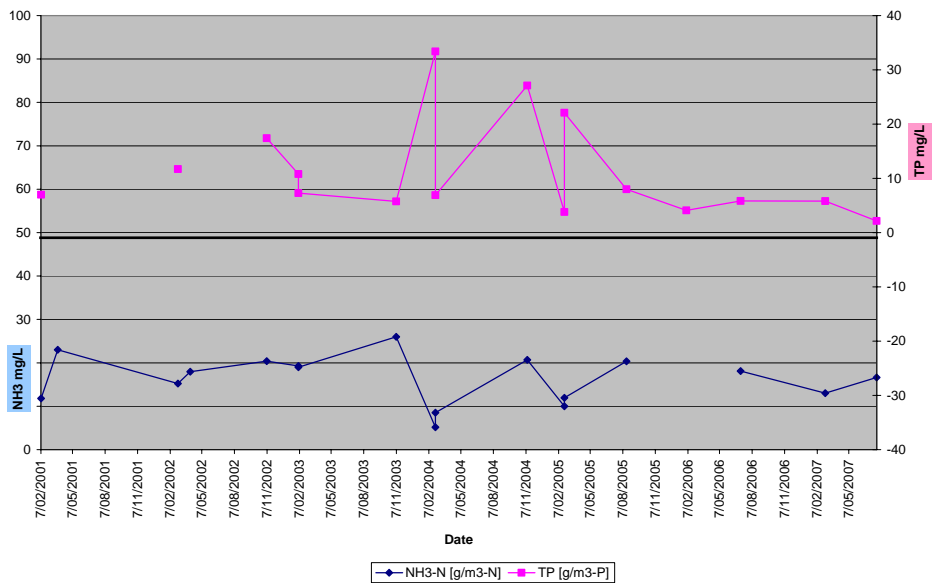


Figure 63 – Ammonia nitrogen and total phosphorus concentration in the sewage discharge

Sample analysis suggests the level of ammonia nitrogen and dissolved reactive phosphorus in the effluent has stabilised during the last year, however, the levels present still have the potential to have a significant impact on the water quality in the Winton Stream.

This has been clearly demonstrated during periods of low river flows, when the pond discharge has caused the concentration of ammonia nitrogen to exceed the Australia and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC) trigger levels. These exceedances have the potential to be toxic to some aquatic organisms.



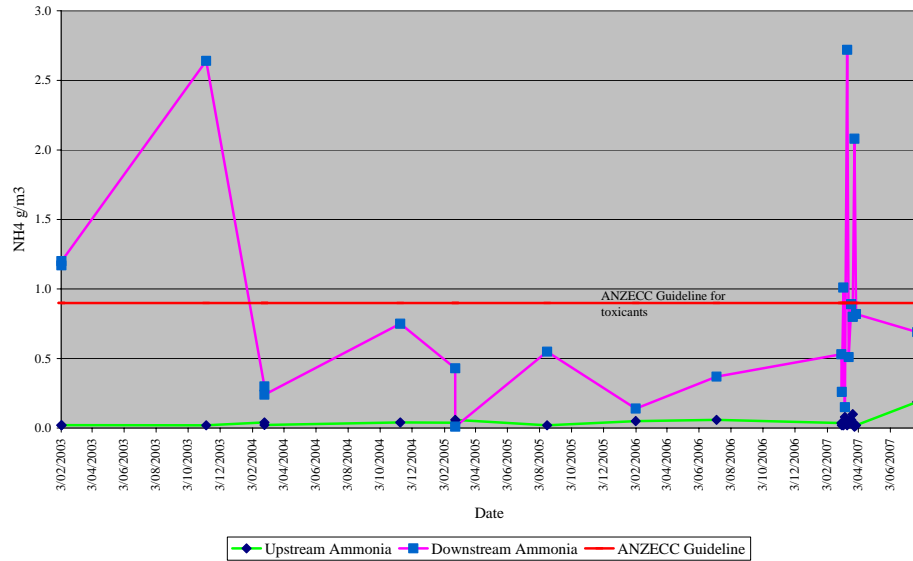


Figure 64 – Ammonia nitrogen concentration upstream and downstream of the sewage discharge

Samples analysed during low flow events have also shown increased levels of dissolved reactive phosphorus downstream of the discharge. The levels found are likely to increase the growth of nuisance weed and periphyton on the streambed which, in turn, is likely to impact on the natural macroinvertebrate communities in the river. Unfortunately, conclusive information was not available at the time this report was prepared, but, if the macroinvertebrate study does support the in-stream ammonia nitrogen results, further action will be required to improve the effluent quality entering the Winton Stream.

Winton Stream DRP

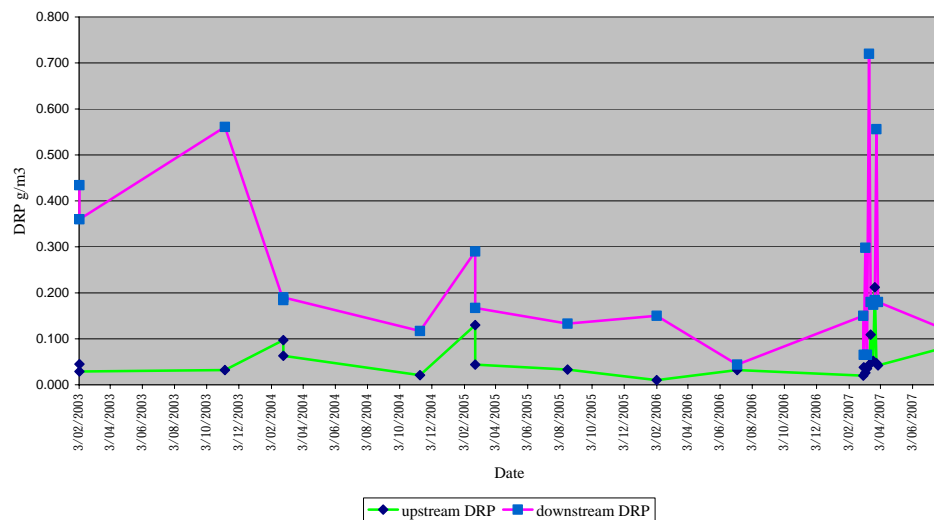


Figure 65 – Dissolved reactive phosphorus upstream and downstream of sewage discharge



12.0 Landfills

12.1 A B Lime Limited Landfill

This year, A B Lime Limited continued to operate a relatively clean and efficient operation. Waste tonnage remained reasonably consistent, with 55,700 tonnes received. This was made up of a slightly lower volume of general waste, but an increased volume of special waste.

As a part of the consent process, A B Lime Limited is required to thoroughly check all new cells prior to the receipt of any waste to ensure that each area is sealed to a standard which will contain the waste and any contaminants. This year the A B Lime contractor discovered a small area of compacted clay which marginally failed the permeability requirements. A repeat permeability test was conducted 1.5 m away from the failed permeability site. This was found to be fully compliant. Further investigation of the site discovered that an additional thickness of 40 to 120 mm of clay was laid in this area. This, together with the the Geosynthetic Clay Liner (GCL) and High Density Polyethylene (HDPE) liners applied on top of the clay, was accepted to be sufficient to provide the necessary protection to allow the cell to be able to receive waste.

To further improve the efficiency of the operation at the landfill site, A B Lime Limited investigated the use of an alternative daily cover. Currently, 150 mm of clay is used each day to cover the waste. The current source of clay cover material is diminishing, therefore a proprietary pulp paper and polymer product has been trialled as an alternative. The product is sprayed on to the waste from two different angles, to ensure complete coverage and minimise the risk of “shadowing”, or voids.



Figure 66 - Contractor applying the alternative daily cover to the landfill waste



The product dries quickly through natural evaporation, effectively sealing off the waste from birds, flies, rodents and prevents it being blown about by wind.



Figure 67 - An example of the coverage of the alternative daily cover on the landfill waste

The product is unsuitable for use during rainfall and, therefore, clay will still need to be used from time-to-time. This system appears to be a good alternative to the traditional use of clay.

Monitoring

Routine monitoring has continued on the groundwater levels, groundwater quality, surface water quality and landfill gas production.

The background, or baseline, ground and surface water quality data suggests that historical land use in this area has had an effect on water quality. The water quality at the test monitoring sites has been relatively stable, with no significant changes apparent. This suggests that the operation of the landfill is not having an impact on water quality.

Historically, A B Lime Limited has experienced problems with one of its gas monitoring bores. Methane gas was being formed very early on in the life of the landfill and this discovery resulted in an investigation that revealed the bore was situated in an area where coal fines had been deposited, prior to the establishment of the landfill. It was these that were interfering with the results. Subsequently, the bore was decommissioned and a new bore established well away from the interference of the coal fines. The new bore remains slightly variable, but is consistently compliant with consent limits.



Complaints

There have been three reported odour complaints. All three were related to the release of landfill gases. One was due to the excavation of old refuse, which was stopped and the other two were received during still, calm, cold weather conditions. The source of these odours was traced and sealed off.

The odour was primarily due to the lack of sealing around the gas flare and the refuse edge against the liner. A B Lime has added additional layers of clay and HDPE to seal the landfill gas wells at the surface and clay around the refuse/liner contact.

12.2 Closed Landfills in Southland

Conventionally, solid waste has been disposed of by burial to land. Often the sites selected have been poorly located, designed and managed and, therefore, a number of issues have been raised with respect to the many tip/dump sites scattered around Southland. Many of these sites have been controlled by means of resource consents, but many have not. Consequently, Environment Southland is embarking on a programme to determine what information is available about historical dump sites, assess the risk associated with them and establish a consistent approach to dealing with them, throughout Southland.

All three territorial authorities have landfill/dump sites that have received all sorts of wastes, in varying quantities. Of greatest concern is how well the leachate from the waste is contained and whether the leachate has the potential to impact on ground, or surface waters.

Historically, the amount of hazardous waste generated in New Zealand has been relatively low, but the nature of the chemicals used in the early to middle 20th century was potentially very hazardous to the environment. When used correctly, the risk can be minimised but, given that there were few controls on how they were disposed of, there are a number of issues that need to be investigated.

Now that the disposal of solid waste in Southland is strictly controlled and limited to one site (A B Lime Limited landfill), Environment Southland has set up a project to investigate all known tip sites so that the risks associated with them can be dealt with in a consistent manner.

Each site's risk will be calculated and this will be used to establish each site's priority for investigation. Those with a high degree of risk need to be contained and controlled, to minimise the risk of any contaminants entering the natural environment. Some Councils have already done a lot of work in this area, however, it is important that this approach is consistent across the whole of Southland.

Most of the old sites have been covered, revegetated and, because of the time that has elapsed, are likely to pose little threat to the environment in the



short-term. However, many of these sites may still have some significant potential contaminants below the ground surface that need to be assessed. It is intended that the initial stages of this project will be completed in a relatively short time-frame, but no specific time-frame can be set for dealing with these sites until the extent of possible issues is quantified.

12.3 Cleanfills

A total of 18 cleanfill sites were inspected during the 2006/07 year. Compliance has improved significantly, when compared to the 2005 inspections, where a total of seven Abatement Notices and two Infringement Notices were issued for non-compliance. No major issues were noted during the 2006/07 inspections.

One major incident concerning a cleanfill site is currently under investigation, due to a reported incident where putrescible material was being disposed of without authorisation (Figure 68). A search warrant was executed and subsequently, an Abatement Notice to cease the dumping of unauthorised materials was issued. The perpetrator was then required to provide evidence documenting the actions taken, volumes removed and the site to where the material has been moved, and to provide a plan outlining when the site will be remediated.



Figure 68 – Putrescible material, disposed of without authorisation at a cleanfill site



13.0 Regional Pest Management Strategy – Pest Plant and Animal Compliance

Urban Gorse and Broom

Inspections have shown the following results:

<i>Area</i>	<i>Properties Inspected</i>	<i>Notice of Direction posted</i>	<i>Notice of Direction Complied with</i>	<i>Default action required (carried out)</i>	<i>Time Extensions granted/ Work in progress (by property owners)</i>
South Invercargill	101	68	61	(7)	0
Bluff	100	78	78	0	0
Lumsden	45	16	16	0	0
Riverton	42	26	26	0	0
Gore	30	15	15	0	0
Te Anau	23	5	5	0	0
Manapouri	32	16	16	0	0
Mataura	14	3	3	0	0
Ohai	24	17	11	(6)	0
Nightcaps	34	26	11	(15)	0

Contractors were used to complete default work, where this action was required. The cost of this work was recovered from the party that defaulted.

The first year of this programme has resulted in staff completing more urban areas than were planned. This is a significant achievement and has resulted in a noticeable improvement within urban areas.

Ragwort

Ragwort compliance was not as good as it could have been. A recent meeting with the Southland District Council revealed that the contractors employed to control pest plants on roadsides had not adequately planned their spray programme. Council staff have been assured this will not happen again.

A significant change in ragwort compliance has seen the decision that mowing of ragwort around flowering time will not be accepted as adequate control. The Regional Pest Management Strategy requires plants to be destroyed and mowing does not achieve this result. Therefore, it will not be accepted as a control measure.

More effort will be focussed on compliance in the coming season.



Nodding Thistle

All properties were inspected for compliance with Regional Pest Management Strategy rules. No enforcement action was required as landowners appear to be taking an active approach to the control of this weed.

Default Action

A call for registrations of interest resulted in a contractor list being developed. The list will accompany any Notices of Direction that are issued.

A publicity programme highlighting pest plant compliance will be undertaken at various times during the year, depending on the plant species of interest at that time. The purpose of the publicity will be to make landowners aware of their responsibilities, provide information on where to obtain advice and outline the consequences of non-compliance.

Pest Animals

No pest animal compliance issues required enforcement action during 2006/07.

Incident Response

Incidents (or complaints) from members of the public were responded to by staff and resolved. Resolution required a Notice of Direction to be issued in some cases. All of these situations were completed.

A number of complaints were received about one property at Lochiel. This property will be singled out for particular attention this year, to ensure that pest plants are dealt with promptly and effectively.



14.0 Incidents

Incidents comprise of three components:

- issues located by Environment Southland staff during monitoring;
- self-reporting by the responsible party;
- complaints by any third party.

14.2 Incidents

Complaints are generally made by members of the public, but may be put forward from territorial authorities and government departments.

Response types

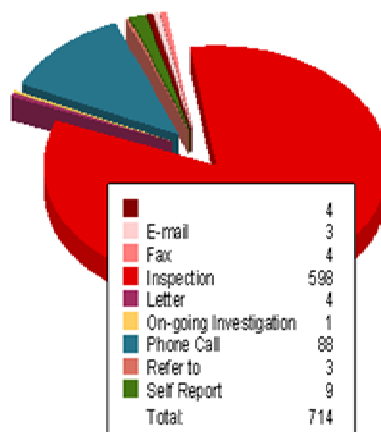


Figure 70 - Incidents Response Breakdown

This year, there were 714 reported incidents (up by 41% from last year), of which 83% required an inspection to ascertain environmental effects and the amount of remediation needed to solve any ongoing problems. A telephone call can be made to deal with minor issues to ensure compliance and 12% of incidents were dealt with in this way.



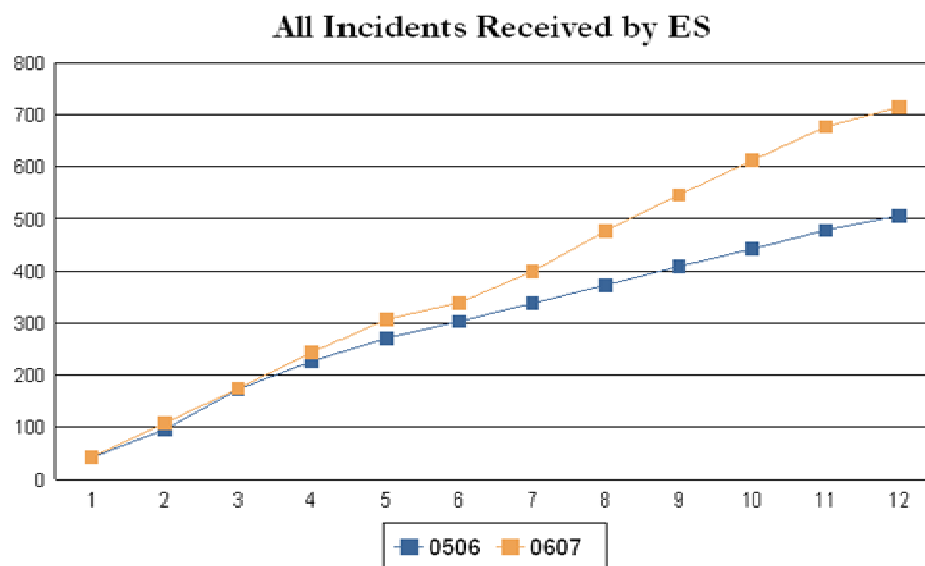


Figure 71 - All incidents received by Environment Southland



Figure 72 - Blue discharge into Otepunui Creek

Table 14 - Incidents composition for 2006/07

<i>Environment Southland Incidents 2006/07</i>				
	<i>Number of Incidents</i>	<i>% of Overall Incidents</i>	<i>Number Completed on Time</i>	<i>% Completed on Time</i>
Air	283	39%	267	94%
Coastal	21	2%	20	95%
Land	113	15%	100	88%
Water	297	41%	283	95%
Total	714	100%	670	94%



The vast majority of reported incidents are related to air and water, with odour, discharges to water and stock in water the most common incident. Air incidents accounted for 13% of all responses, with the Clifton area featuring prominently this past year.



Figure 73 - Discharge to Kingswell Creek

When reporting incidents, people have the option of remaining anonymous, or being recorded and apprised later of all outcomes resulting from the complaint. In the last year, 13% of people chose the option of anonymity.

The Compliance Division operates a 24 hour pollution response service. All complaints received after normal business hours are taken by an answering service and urgent complaints forwarded to the pollution duty officer. Council policy is to respond to all after hours complaints within one hour of receipt.

14.3 Major Incidents

Major complaints are incidents that require an individual entry in our filing system. They are regarded as significant and are assigned an individual job number. This allows for all costs and correspondence to be collated in one place, to allow for:

- cost recovery;
- abatement notice;
- infringement notice;
- prosecution.

There were 97 major incidents in the 2007 year, which is an increase on last year of 67%. Of these, 47 (48%) concerned dairy shed effluent (DSE) discharges to waterways. Discharges of DSE to waterways via drainage tiles, are the most common major complaint. This is often caused by an over-application of DSE to land.



Table 15 – Comparison with Previous Years

<i>Year Ending</i>	<i>Major Incidents</i>	<i>Prosecutions</i>	<i>Infringements</i>
1997	72	5	-
1998	68	4	-
1999	35	5	-
2000	42	4	-
2001	55	7	11
2002	66	10	12
2003	42	5	11
2004	26	3	4
2005	46	2	22
2006	58	8	32
2007	97	4	33



Figure 75 - Dairy effluent discharge to a waterway





Figure 76 - Sewage fungus caused by silage leachate discharge

14.4 Cost Recovery

The Compliance Division attempts to recover costs from incident investigations, wherever possible. Costs are recovered when the perpetrator of an incident is located.

For consent holders, the costs incurred are an additional monitoring charge to the amount levied annually and can be recovered under Section 36(3) of the Resource Management Act 1991.

For non-consent holders, the costs incurred are recoverable under Section 150 of the Local Government Act 2002, as set out in the Council's Long-term Council Community Plan.

During the 2006/07 financial year, a total of 61 incidents resulted in costs being recovered. The amount recovered equated to \$48,260.78.



15.0 Infringement Notices

Infringement Notices are an instant fine for situations where an offence requires a penalty, but is not considered serious enough to warrant prosecution.

The decision to issue an Infringement Notice is made through an Infringement Panel. Penalties are prescribed in the Resource Management (Infringement Offences) Regulations 1999, based on the Resource Management Act section contravened.

There were 33 offences in the 2006/07 financial year. This is 3% up on last year, and 65% of the Infringement Notices were for discharges of dairy shed effluent (DSE) to water.

Miscellaneous

<i>Issued to</i>	<i>Offence</i>	<i>RMA Section</i>	<i>Fine</i>
Murdoch Refrigeration	Breach of Abatement Notice.	Section 338(1)(c)	\$750
D Poulson	Allowed stock unrestricted access to a waterway.	Section 13(1)(b)	\$500
R Finch	Discharged septic tank effluent in a manner that was not permitted, either by way of a resource consent, or via rules in the Regional Effluent Land Application Plan.	Section 15(1)(d)	\$1,000
M Fairbairn	Discharged septic tank effluent in a manner that was not permitted, either by way of a resource consent, or via rules in the Regional Effluent Land Application Plan.	Section 13(1)(d)	\$1,000
ICC (WWTP)	The Invercargill City Council allowed a contaminant, namely objectionable odour, to be discharged into the air from an industrial or trade premise, in a manner that contravened a rule in a regional plan or proposed regional plan, or that was not expressly allowed by a resource consent, or regulations.	Section 15(1)(c)	\$1,000
ICC (WWTP)	The Invercargill City Council allowed a contaminant, namely objectionable odour, to be discharged into the air from an industrial or trade premise, in a manner that contravened a rule in a regional plan or proposed regional	Section 15(1)(c)	\$1,000



<i>Issued to</i>	<i>Offence</i>	<i>RMA Section</i>	<i>Fine</i>
	plan, or that was not expressly allowed by a resource consent, or regulations.		
ICC (WWTP)	The Invercargill City Council allowed a contaminant, namely objectionable odour, to be discharged into the air from an industrial or trade premise in a manner that contravened a rule in a regional plan or proposed regional plan, or that was not expressly allowed by a resource consent, or regulations.	Section 15(1)(c)	\$1,000
Prime Range Meats Limited	Prime Range Meats Limited allowed a contaminant, namely objectionable odour, to be discharged into the air from an industrial or trade premise, in a manner that contravened a rule in a regional plan or proposed regional plan, or that was not expressly allowed by a resource consent, or regulations.	Section 15(1)(c)	\$1,000
B Ford	Allowed a contaminant, namely diesel, to be discharged into or onto land in circumstances which resulted in that contaminant entering water, which discharge was not expressly allowed by a rule in a regional plan or in any relevant proposed regional plan, a resource consent, or regulations.	Section 15(1)(b)	\$750



Figure 77 - Overflowing dairy effluent pond



Dairy Effluent Discharges

<i>Issued to</i>	<i>Offence</i>	<i>RMA Section</i>	<i>Fine</i>
Graeme McGaughey	Allowed a contaminant, namely dairy shed effluent, to be over-applied onto or into land in a manner that was not expressly allowed in a rule in a regional plan, or proposed regional plan, or resource consent.	Section 15(2)	\$300
Shane O'Donnell	Allowed a contaminant, namely dairy shed effluent, to be over-applied onto or into land in a manner that was not expressly allowed in a rule in a regional plan, or proposed regional plan, or resource consent.	Section 15(2)	\$300
Branxholme Cow Co Ltd	Allowed a discharge to occur into the air or into or onto land from any place or any other source in a manner that contravened a rule in a regional plan or proposed regional plan, or that was not expressly allowed by a resource consent or allowed by section 20A.	Section 15(2)(b)	\$300
Peter A Gubb	Allowed a discharge to occur into the air or into or onto land from any place or any other source in a manner that contravened a rule in a regional plan or proposed regional plan, or that was not expressly allowed by a resource consent or allowed by section 20A.	Section 15(2)	\$300
R J & J E Flett	Allowed a contaminant, namely effluent from a wintering pad, to be discharged into or onto land, which was not expressly allowed by a rule in a regional plan or in any relevant proposed regional plan, a resource consent, or regulations.	Section 15(2)	\$300
J C & P A Baynes	Allowed a contaminant, namely dairy shed effluent, to be discharged into or onto land which was not expressly allowed by a rule in a regional plan or in any relevant proposed regional plan, by a resource consent, or by regulations.	Section 15(2)	\$300
R Heaps	Deliberately discharged effluent from more cows than expressly allowed by resource consent 94247, which contravenes Rule 5.4.5 of the Regional Effluent Land Application Plan for Southland	Section 15(2)(b)	\$300





Figure 78 - Ponded dairy shed effluent to land

Dairy Effluent and Silage Leachate Discharges

<i>Issued to</i>	<i>Offence</i>	<i>RMA Section</i>	<i>Fine</i>
G Halder	Breach of the resource consent condition, allowing overland flow, resulting in eventual discharge of a contaminant to water.	Section 15(1)(b)	\$750
Waiānawa Dairy Farm Limited	Allowed a contaminant, namely effluent from an irrigator, to be discharged into or onto land in circumstances which resulted in that contaminant entering water, which discharge was not expressly allowed by a rule in a regional plan or in any relevant proposed regional plan, a resource consent, or regulations.	Section 15(1)(b)	\$750
R J & M E Brunold	Allowed a contaminant, namely silage, to be discharged into or onto land in circumstances which resulted in that contaminant entering water, which discharge was not expressly allowed by a rule in a regional plan or in any relevant proposed regional plan, a resource consent, or regulations.	Section 15(1)(b)	\$750
Greg Roberts	Applied dairy shed effluent to soils apparently at field capacity resulting in overland flow to a waterway (open drains).	Section 15(1)(b)	\$750
Shane McLaren	Allowed a contaminant, namely dairy shed effluent, to be discharged into or onto land in circumstances which resulted in that contaminant entering water, which discharge was not expressly allowed by a	Section 15(1)(b)	\$750



<i>Issued to</i>	<i>Offence</i>	<i>RMA Section</i>	<i>Fine</i>
	rule in a regional plan or in any relevant proposed regional plan, a resource consent, or regulations.		
Dale Dairies	Allowed a contaminant, namely effluent from an irrigator, to be discharged into or onto land in circumstances which resulted in that contaminant entering water, which was not expressly allowed by a rule in a regional plan or in any relevant proposed regional plan, a resource consent, or regulations.	Section 15(1)(b)	\$750
D & S McMillan	Allowed a contaminant, namely effluent from an irrigator, to be discharged into or onto land in circumstances which resulted in that contaminant entering water, which was not expressly allowed by a rule in a regional plan or in any relevant proposed regional plan, a resource consent, or regulations.	Section 15(1)(b)	\$750
N D Falconer	Allowed a contaminant, namely effluent from an irrigator, to be discharged into or onto land in circumstances which resulted in that contaminant entering water, which was not expressly allowed by a rule in a regional plan or in any relevant proposed regional plan, a resource consent, or regulations.	Section 15(1)(b)	\$750
C Brown	Allowed a contaminant, namely effluent from an irrigator, to be discharged into or onto land in circumstances which resulted in that contaminant entering water, which was not expressly allowed by a rule in a regional plan or in any relevant proposed regional plan, a resource consent, or regulations.	Section 15(1)(b)	\$750
Harley Churstain	Allowed a contaminant, namely dairy shed effluent, to be discharged into or onto land in circumstances which resulted in that contaminant entering water, which was not expressly allowed by a rule in a regional plan or in any relevant proposed regional plan, a resource consent, or regulations.	Section 15(1)(b)	\$750
Aaron J Green	Allowed a contaminant, namely effluent from an irrigator, to be discharged into or onto land in circumstances which resulted in that contaminant entering water, which was not expressly allowed by a rule in a regional plan or in any relevant proposed regional plan, a resource consent, or regulations.	Section 15(1)(b)	\$750
R McKenzie	Discharge of dairy shed effluent to land such that it entered a waterway via a tile drain, in contravention of Discharge Permit 203525.	Section 15(1)(b)	\$750



<i>Issued to</i>	<i>Offence</i>	<i>RMA Section</i>	<i>Fine</i>
Ambrose Farms Limited	Discharge of silage leachate to land in such a way that it entered a waterway via a tile drain, in contravention of Discharge Permit 201563.	Section 15(1)(b)	\$750
N Dickson	Allowed a contaminant, namely effluent from an effluent pond, to be discharged into or onto land in circumstances which resulted in that contaminant entering water, which was not expressly allowed by a rule in a regional plan or in any relevant proposed regional plan, a resource consent, or regulations	Section 15(1)(b)	\$750
Andrew Todd	Allowed a contaminant, namely dairy shed effluent, to be discharged into or onto land in circumstances which resulted in that contaminant entering water, which discharge was not expressly allowed by a rule in a regional plan or in any relevant proposed regional plan, a resource consent, or regulations.	Section 15(1)(b)	\$750
Shane Rodgers	Allowed a contaminant, namely effluent from a stationary travelling irrigator, to be discharged into or onto land in circumstances which resulted in that contaminant entering water, which was not expressly allowed by a rule in a regional plan or in any relevant proposed regional plan, a resource consent, or regulations.	Section 15(1)(b)	\$750



16.0 Abatement Notices

Abatement Notices are issued where an individual or company, or both, have engaged in an activity that they do not hold consent for and is not expressly allowed for in a plan or rule. An Abatement Notice will generally require the party to take immediate action to remedy, stop, or mitigate the effects of their actions.

For some non-compliance, multiple Abatement Notices may be issued, especially where an individual and a company are both involved.

Failure to comply with an Abatement Notice can lead to a fine and/or a prosecution.

Abatement Notices were issued for the following activities:

Water quality issues	- 2
Structures	- 5
Dairy effluent discharge	- 3
Miscellaneous	- 4
Silage leachate discharge	- 2
Air	- 2
Bed disturbance	- 4
Commercial surface water activities	- 3
Total Issues	- 25

Table 16 - Water Issues

<i>Issued to</i>	<i>Summary of Offence and Action Required</i>
Brian P Walsh	Location: Redan Stream Offence: Allowed an unauthorised structure to be placed within the Redan Stream without resource consent. Requirements: Remove the unauthorised culvert.
W G Pope	Location: North Makarewa-Frove Bush Road Offence: Contaminated stormwater flowed overland and effected a neighbouring dwelling, contravening Section 15(2) of the RMA, Rule 13 of the Proposed Regional Water Plan for Southland. Requirements: Cease the discharge of contaminated stormwater overland from the crop paddock being utilised by deer.
Thomas J Cruse	Location: 1502 Orepuki-Tuatapere Highway Offence: Unauthorised excavation, bed disturbance, tree removal and contouring of the Arthur Creek without a resource consent as per Section 13(1)(b) of the RMA 1991. Requirements: Cease all unauthorised works on the banks and bed of the Arthur Creek, namely excavation and disturbance of the waterway.
D L Poulson	Location: 390 Wallacetown Lorneville Highway Offence: Unrestricted stock access to the watercourse causing bank degradation, turbid water and disturbance to the bed. Requirements: Cease the disturbance of the banks and bed of McInerney's Creek, a tributary of the Makerewa River.



<i>Issued to</i>	<i>Summary of Offence and Action Required</i>
P G Poole	Location: Waikawa River downstream of Waikawa Road Bridge Offence: Occupying the coastal marine area in contravention of Section 12(1)(b) of the RMA 1991, by having a structure that does not fully match the consented plan on file for that structure. Requirements: Permanently remove the parts of the whitebait structure that are unconsented.
B J Hibbs	Location: Gummies Bush on the Aparima Offence: Contravening Section 12(3)(a) of the RMA by not maintaining a whitebait structure to a prescribed standard as prescribed by consent condition. Requirements: Maintain whitebait structure in good repair, appearance and condition.
B R Taylor	Location: Mataura River and Coastal Marine Area Offence: Erected an unconsented structure occupying the coastal marine area in contravention of Sections 12(1)(b) and 12(2)(a) of the RMA. Requirements: Permanently remove the unauthorised structure.
Lance Shaw & Ruth Dalley	Location: Doubtful Sound. Offence: Unauthorised lock on a gate preventing public access to the coastal marine area in contravention of Sections 12(1)(b) and 12(2)(a) of the RMA 1991. Requirements: Permanently remove the unauthorised lock on the gate from your structure.
Craig A Harpur	Location: Vessel operating under consent 202231 in the internal waters of Fiordland. Offence: Operating a vessel that does not comply with the consent issued. The activity contravenes Sections 15(1), 15A and 15B of the RMA. Requirements: Stop any further surface water activities authorised by consent 202231 until you have fitted effluent tanks as required by condition 6 of your consent.
Department of Marine Science Otago University Dr Steve Dawson	Location: Between Yates and Puysegur Points Offence: Directing and managing the use of a vessel for research purposes within the internal waters of Fiordland without a resource consent, contravening The Regional Coastal Plan for Southland. Requirements: Cease the operation of a vessel for research purposes within the internal waters of Fiordland until a resource consent is obtained.
A G & S M Affleck	Location: 52 Campbell Road, Wendon Offence: Undertaken unauthorised excavation and bed disturbance of the Wendon Stream without a resource consent necessary as per Section 13(1)(b) of the RMA 1991. Requirements: Cease all unauthorised works on the banks and bed of the Wendon Stream.
Glen Mavis Limited	Location: 322 Wendon Creek Road Offence: Allowed livestock to cross at fords on the Wendon Stream, contravening Section 13 of the RMA 1991 and Rule 38 of the Proposed Regional Water Plan for Southland. Requirements: Cease allowing livestock to cross at fords on the Wendon Stream.
Gary Keen	Location: 163 Tiwai Road Offence: Disposed of cattle carcasses within 50 m of a watercourse in breach of Rule 5.5.2 of the Southland Regional Solid Waste Management Plan. Requirements: Remove cattle remains and dispose of them in a manner that complies with the requirements of the Regional Solid Waste Management Plan.



<i>Issued to</i>	<i>Summary of Offence and Action Required</i>
Grant Somers-Edgar	<p>Location: DOC Marginal strip Crown Land Takitimu survey district.</p> <p>Offence: Allowed stock to be grazed in a paddock where they had unrestricted access to the Excelsior Creek causing bank degradation and bed disturbance without resource consent and used mechanical means to disturb the banks and bed of the creek without a resource consent.</p> <p>Requirements: Cease the unauthorised disturbance of the banks and bed of the Excelsior Stream by mechanical methods and by allowing unrestricted access by stock.</p>
Aparima Charter Services Ltd	<p>Location: Waters of Fiordland between Yates and Puysegur Points.</p> <p>Offence: Directing and managing the use of a vessel for Backcountry purposes within the internal waters of Fiordland without a resource consent in contravention of The Regional Coastal Plan for Southland.</p> <p>Requirements: Must cease the operation of the vessel <i>Argus</i> for commercial surface water activity purposes within the internal waters of Fiordland until you have obtained a resource consent.</p>



Figure 79 – Overflowing wintering pad pond





Figure 80 – Cattle crossing at ford on daily basis

Table 17 - Miscellaneous Abatement Notices

<i>Issued to</i>	<i>Summary of Offence and Action Required</i>
R J and J E Flett	<p>Location: 48 Lower Scotts Gap</p> <p>Offence: Effluent has been allowed to overflow onto pasture causing unauthorised ponding in contravention of Rule 5.4.1(b) of the Regional Land Application Plan and in breach of consent condition 8(a).</p> <p>Requirements: Cease the unauthorised discharge and ponding of wintering pad effluent onto land.</p>
R J and M E Brunold	<p>Location: 26 Dahlenburg Road</p> <p>Offence: R J & M E Brunold and/or their agents have allowed the unauthorised discharge of silage pit leachate onto land in circumstances where it appears that it may have also entered water, contravening Section 15(1)9B0 of the RMA and Rule 5.4.4 of the Regional Effluent Land Application Plan.</p> <p>Requirements: Cease the discharge of silage pit contaminants to land in circumstances where it may enter water.</p>
J C Baynes	<p>Location: 256 Jaffray Road</p> <p>Offence: Dairy shed effluent was being applied to an area that was not expressly allowed by resource consent 204061 and was entering water, contravening the Regional Effluent Land Application Plan for Southland and Section 15(1)(b) of the RMA.</p> <p>Requirements: Cease the discharge of dairy shed effluent in unconsented areas.</p>
Wayne Carpenter	<p>Location: 1240 Motu Rimu Road, Woodend</p> <p>Offence: Pond containing nova-flow pipe that is likely to give rise to unauthorised discharge of dairy shed effluent.</p> <p>Requirements: Remove the nova-flow type pipe at the eastern end of the effluent pond to avoid potential unauthorised discharge.</p>
R Heaps	<p>Location: 123 McIlwraith Road, Mataura</p> <p>Offence: Discharging effluent from more cows than was allowed</p>



<i>Issued to</i>	<i>Summary of Offence and Action Required</i>
	by resource consent 94247. Requirements: Cease the unauthorised discharge of dairy shed effluent.
Ceri Lewis Mount Linton Station	Location: Mount Linton Station, Ohai Offence: Adverse effect on the amenity values of neighbouring properties. Requirements: Stop the burning of rubbish or offal at times when this activity will result in an adverse effect on the amenity values of neighbouring properties.
John Alan Gorton and Vicki Ann Gorton	Location: Orion Road East, Makarewa Offence: A hole has been dug which it appears may be used as a production land landfill, or an offal hole within fifty metres of a boundary of the property. Requirements: You must not deposit offal or solid waste into or onto land in contravention of the Regional Solid Waste Management Plan for Southland.
Fulton Hogan	Location: 267 Tramway Road, Invercargill Offence: Discharged contaminants from an industrial trade premise into air that was not expressly allowed by a rule in a regional plan and contravened the National Environmental Standards Relating to Certain Air Pollutants, Dioxins and Other Toxics Regulations 2004. Requirements: Cease unauthorised burning onsite.



17.0 Prosecutions

Table 18 - Dairy Prosecutions

<i>Defendant</i>	<i>Case</i>	<i>Decision</i>
Sandstone Dairy Farms	Charge: Discharge of dairy shed effluent to land in circumstances where it entered a waterway. Pleaded guilty to three charges.	Penalty: \$40,000
Valley Forge Partnership	Charge: Discharge of dairy shed effluent to land in circumstances where it may enter a waterway. Pleaded guilty	Penalty: \$8,000 Council expenses: \$98
Inverlac Farms Ltd	Charge: Discharge of dairy shed effluent to land in circumstances where it entered a waterway. Pleaded guilty	Penalty: \$4,500 Council expenses: \$130
Antara Dairies	Charge: Discharge of dairy shed effluent to land in circumstances where it entered a waterway. Pleaded guilty	Penalty: \$5,500 Council expenses: \$938
Mr Lawson	Charge: Discharge of dairy shed effluent to land in circumstances where it entered a waterway. Pleaded not guilty and elected trial by jury.	Jury found the defendant not guilty.



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
Chl <i>a</i>	Chlorophyll <i>a</i> . The pigment in plant cells which captures light energy for photosynthesis
DAF Unit	Dissolved Air Flotation unit 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
<i>E. coli</i>	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
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
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
NH ₄ -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 than 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 phosphorus whether it is tightly bound to particulate matter or potentially available to plant life



TSS	Total suspended solids
$\mu\text{g}/\text{m}^3$	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

