

# Winery Wastewater Monitoring Report 2011-12

(Clr Jerram) (Report prepared by Brenda Pottinger)

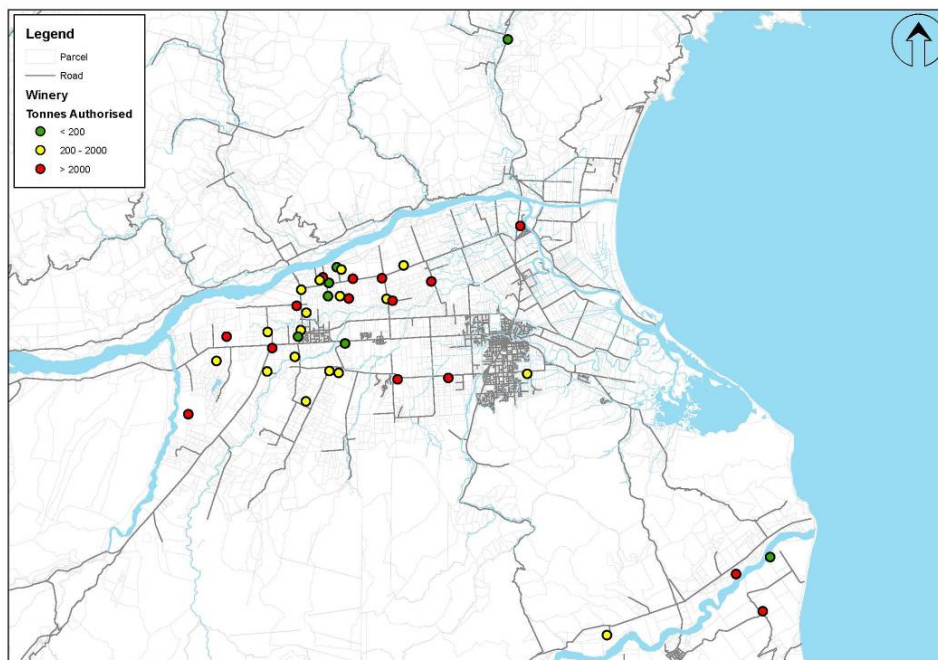
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## Purpose

1. The purpose of this report is to inform the Council of the Compliance Group's ongoing monitoring programme of the discharge of winery wastewater to land for the period 1 July 2011 - 30 June 2012.

## Where Monitoring was Undertaken

2. Monitoring occurred at 39 wineries in the Wairau/Awatere Rural zones (Figure 1) and where wastewater was discharged to land during the harvest and non-harvest periods. Thirty-four wineries are located in the Wairau Plains, one is located north of Blenheim and four are located in the Awatere area.
3. In addition, six wineries that discharge winery wastewater in Riverlands and Cloudy Bay industrial zones were monitored.



**Figure 1:** Map of wineries in Marlborough and locations of where monitoring occurred in the Wairau/Awatere Rural zones. Different colour dots represent the small (green), medium (yellow) and large (red) wineries.

## How Monitoring was Undertaken

4. The Winery Wastewater Project falls within the Compliance Group's new Land Use (Healthy Lands) Programme. To develop a more proactive approach with industry, pre-vintage site visits were made to all wineries to meet the key staff responsible for the wastewater system and to set out the Council's expectations for the seasons monitoring programme.
5. For those wineries that discharge wastewater to land, 19 (49%) are monitored by permitted activities under the Wairau/Awatere Resource Management Plan rules, 13 (33%) are monitored by resource consent conditions, 5 (13%) are monitored under a Certificate of Compliance, while 2 (5%) do not discharge wastewater to land.
6. For the six wineries in the Industrial zones that discharge directly to trade waste, the waterways that receive stormwater from these sites were checked twice each week during and immediately after the vintage period to monitor for unauthorised wastewater discharges into the stormwater. No issues were observed for these wineries so they are not discussed further in this report.

7. Resource consents for discharge of wastewater to land are assessed and conditions are imposed based on the individual wastewater systems and local environments, therefore, conditions vary for each winery. However, most wineries have similar conditions that deal with the following:
  - wastewater volume;
  - nitrogen loading to the land;
  - annual wastewater sampling (pH, biological oxygen demand, total nitrogen, total phosphorus, sodium, calcium, magnesium, potassium, sodium adsorption ratio);
  - annual soil sampling (soil pH, electrical conductivity, cation exchange capacity, sodium, potassium, calcium, magnesium, total phosphorus and total nitrogen);
  - discharge rate;
  - odours;
  - buffer zones;
  - annual reporting to identify adverse environmental effects; and
  - record keeping.
8. The permitted standards for discharge of wastewater monitored under the Wairau/Atwatare Resource Management Plan include:
  - annual wastewater sampling (biological oxygen demand, faecal coliforms, pH);
  - odour;
  - nitrogen loading to the land;
  - discharge rate;
  - buffer zones to boundaries and waterbodies; and
  - no discharges into surface waterbodies.
9. Collectively these indicators enable the Council to determine compliance and to assist the Council with building a history of site management.
10. A traffic light system is being used for determining whether a winery operation is in compliance with its consent conditions or permitted activity standards. Those conditions assessed as **green** are compliant and no action is required; conditions assessed as **amber** means some corrective actions are needed; and conditions assessed as **red** are non-compliant, i.e. significant remedial actions are required. The **amber** status enables them to undertake whatever actions to reach compliance status without having a non-compliant status assigned for relatively minor breaches. The feedback from wineries is that this is a positive and welcome approach to monitoring.

## Monitoring Results

11. Thirty-five wineries submitted information (e.g. wastewater and/or soil sample results) and data (e.g. wastewater volumes, discharge dates, disposal area sizes) to assess compliance, while two wineries did not provide all required information. Two wineries do not discharge wastewater to land, therefore, no information or data was required. For those that did provide information, follow up with many wineries was needed to clarify the information and/or data provided.
12. Fourteen (36%) wineries were fully compliant with all conditions and were therefore assessed as **green**.
13. Twenty-one wineries (54%) were assessed as **amber** because one or two conditions or standards were not met (e.g. wastewater results for faecal coliform, pH or biological oxygen demand were not within allowable limits, discharge rates exceeding 10mm/day). Although all of these wineries provided records for the volumes of wastewater discharged, most did not keep clear and accurate daily records for volumes discharged. As such, discharge rates were estimations and they were therefore assessed as **amber**. Some of these wineries had ponding issues during the inspection.

14. The main issue observed during inspections involved ponding in the disposal fields of three wineries (Figure 2). Ponding can occur because irrigation rates are too high, wastewater is applied to soils that have reached field capacity (i.e. irrigating during high rainfall events), the disposal area is too small for the volume of wastewater discharged, or poor management of the wastewater system and disposal fields. Over-irrigation can lead to leaching of excess water to groundwater, and with it salts (e.g. sodium [Na<sup>+</sup>] and potassium [K<sup>+</sup>]), organic carbons (e.g. sugar and ethanol) and nutrients (e.g. nitrogen and phosphorous) not used by soil microorganisms or held by the soil matrix. Of particular importance is the potential for Na<sup>+</sup> and K<sup>+</sup> to accumulate in the soil profile, which may result in altered soil structure or poor plant growth. These potentially negative effects require more intensive research and understanding. More comprehensive monitoring is also required with specific wineries to determine the causes of ponding to ensure adverse environmental effects are prevented or remediated.
15. Short term corrective actions undertaken by the three wineries to address ponding included: ceasing discharge for the rest of vintage to allow a rest period for the soil; using an alternative disposal area for discharge; holding excess wastewater in storage until the consented daily volumes could be met; reducing the volumes of wastewater applied and/or improved management of the wastewater and irrigation systems. Actions taken should help to avert the potential for wastewater entering underground aquifers, overloading of soil and altering of soil structure. More long term actions may include soil remediation (soil ripping and planting of different pasture species to improve uptake of wastewater), alterations to the wastewater and irrigation systems for more optimal volumes discharged, or retiring disposal areas and moving to land that is more appropriate for discharge.



**Figure 2:** a) Example of ponding in disposal area - irrigation to this block was ceased immediately and no further wastewater was applied for the remainder of vintage.  
b) Disposal block with no further ponding after irrigation ceased.

16. Four wineries (10%) had a number of conditions assessed as **red** because allowable annual and daily discharge volumes and discharge rates were breached, only one of two soil samples was taken, or wastewater sample results were not provided. All other conditions were met and assessed as green. These breaches are not considered significant enough to warrant enforcement actions. Instead, for the 2012/2013 season, the Compliance Group is taking an educative approach with wineries so there is greater understanding of the consent condition and plan rule requirements for discharging wastewater to land.
17. All wineries have responded positively to the requirement to undertake corrective actions identified and have demonstrated a willingness to undertake improvements to their operations.
18. The Compliance Group is taking a more proactive and constructive partnership approach to monitoring the discharge of winery wastewater, with education and relationship building being key objectives of the programme. Consequently, good cooperation is received from the industry. The emphasis is on continuous improvement to ensure environmental impacts are minimised or averted and compliance costs to both the Council and wine companies are minimised.

## Relationship with Industry and Future Monitoring Activities

19. Industry has responded positively to the new evaluation system as it allows wineries the opportunity to remediate inadvertent breaches and improve operations of the wastewater systems. It also allows the Compliance Group the opportunity to educate where needed. It is anticipated that the increased contact with wineries will lead to greater understanding of the requirements for the discharge of wastewater to land, which should result in more wineries being fully compliant. More importantly, environmental impacts will be identified and remediation actions can be implemented early.
20. Based on the information provided for the Council's compliance reports for the 2011/2012 season, the Compliance Group considers that wineries need to be more familiar with the permitted activities standards and resource consent conditions for discharging wastewater to land. In addition, better record keeping is required by many of the wineries as daily volumes applied for the annual reporting period are poorly documented. As such, daily discharge volumes are often an estimation or cannot be determined, particularly during the non vintage period.
21. The 2012/2013 season will focus on greater education about the criteria required for consent conditions and plan rule standards. This is to ensure accurate data is captured, particularly daily discharge volumes for the non vintage and vintage periods. The Compliance Group's expectation for the 2012/2013 report is that wineries are to provide the required information for consent conditions and plan rule standards. Where this information is not provided, wineries will be assessed as red and the Compliance Group may undertake enforcement action(s), which could include an abatement notice, formal warning, infringement or prosecution.
22. In addition to the annual inspections during peak harvest, site visits will be made to wastewater disposal areas approximately every four months to monitor the receiving environment. Field observations made will help the wineries and the Compliance Group identify whether winery wastewater is having adverse effects on the soil or plant species to which the wastewater is discharged to (e.g. soil cracking, slime on soil surface, ponding, odour, plant poor growth or death). Regular contact with winery staff will help facilitate improvements to areas that may have historical issues (e.g. ponding) and reinforce the importance of managing the discharge of wastewater to land.
23. A review of wastewater and soil sampling results collected to date for all wineries is planned. It is envisioned that information gained from this review, along with observations made in the disposal areas, will be used to:
  - Identify links between the discharge of wastewater and adverse effects in the disposal field, e.g. the discharge of wastewater high in Na<sup>+</sup> and K<sup>+</sup> may be linked to alterations in soil structure (ponding, cracking, and odour). This would compliment the review, *Winery Wastewater Irrigation: Effects on Soil Structure*, undertaken by Colin Gray, Council's Soil Scientist, presented to the Committee at the 22 July 2011 meeting.
  - Strategically monitor areas receiving winery wastewater under the Compliance Group's new Land Use (Healthy Lands) Programme.
  - Provide input into resource consent conditions and the new plan rules specific for winery wastewater discharges to land.

### **RECOMMENDED**

**That the information be received.**

Record No. 1448085