



Groundwater Quality - Monitoring Summary 2015

Key Points

- Every 4 years MDC participates in the National Groundwater Pesticide Survey which provides a national context for Marlborough measurements.
- In case the national survey does not detect an issue because of timing or local conditions, MDC samples for pesticide levels each year at the same 4 wells.
- For the 2010 and 2014 surveys there were no pesticides detected at any of the wells sampled.
- Marlborough has very low levels of pesticides detected compared to the rest of New Zealand.
- This is thought to reflect a combination of the crop types, leaching rates and aquifer dilution.

Why do we monitor pesticides?

Pesticides are commonly used chemicals in agricultural production systems, in rural settlements and towns. If they are used in accordance with good practice and do not leach to groundwater or rivers then it is unlikely there will be environmental or health problems.

Because these chemicals can potentially affect natural ecosystems or human drinking water supplies in very small concentrations or persist long after they were applied; surveys of their presence are carried out to understand the local risk factors. This is done at a local and national scale.

Pesticides are man made chemicals composed chiefly of carbon and their presence is a sure sign of land use impacts. Levels are measured only in groundwater because they are unlikely to persist for long in rivers.

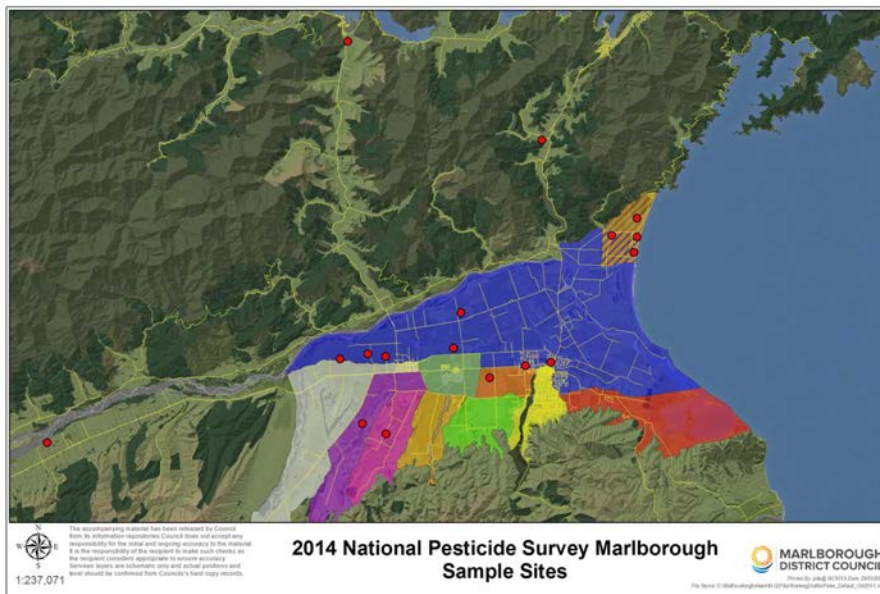
Where and how we monitor pesticides in groundwater

Once every 4 years since the early 1990s, a national survey of pesticide levels in groundwater has been coordinated by the Crown Research Institute ESR in collaboration with most New Zealand regional councils.

The information gained from these surveys has provided a national picture of the presence of pesticides in groundwater over time, which aquifers are most affected and identified those pesticides that pose the greatest risk.

Figure 1: Pesticide Survey Sample Sites

MDC has participated in all surveys since 1994 and the results show that except for some isolated sites, Marlborough has some of the lowest pesticide levels in water resources of any region in the country.



To complement the national survey, MDC conducts a smaller survey of 4 sites each year in case local factors mean the national survey is not representative.

The location of the wells sampled as part of the 2014 national survey conducted in Spring 2014 are shown in Figure 1. Pesticides have the potential to cause issues at very low concentrations. The analytical costs of their measurement is high compared to the tests used for other parameters, so MDC is limited in how many samples it can take.

Are there any trends in pesticides over time?

As part of the 1994 national survey there were 4 wells in Marlborough where pesticides were detected. Several of the wells sampled were near known contaminated sites however.

Between 1998 and 2006 the wells surveyed were more representative of general land use and there was a pattern of generally decreasing pesticide levels. For the 2010 and 2014 surveys there were no pesticides detected at any of the wells sampled.

From a national perspective and taking into account all 7 national surveys, pesticide levels across the country are very low with most concentrations being less than 1% of the maximum allowable value of the drinking water standard.

Similar percentages of wells with detectable pesticides have been measured over the past 3 surveys (Table 1). Complicating interpretation of patterns are improvements in laboratory detection limits meaning the same pesticide can be detected at lower concentrations. This is illustrated in the table.

Year	1990	1994	1998	2002	2006	2010	2014
# of wells	82	116	95	133	163	162	165
DL = 0.1 ppb	7%	14%	11%	9%	8%	7%	10%
DL = 0.01 ppb			35%	21%	19%	24%	17%

Table 1: Percentage of Pesticides Detected Nationally

Being detected does not mean the concentration is harmful to human health or ecosystems. This only happens when the concentration exceeds the maximum allowable value.

Another limitation of any pesticide survey is that it will only measure pesticides that are tested for. Because there are literally thousands of pesticides, surveys are designed to identify the most commonly used varieties in towns or on farms in New Zealand.

During the local Marlborough survey the compounds analysed for are even more selective based on knowledge of historic land uses. For instance pip fruit in the Rapaura area or cropping east of Hammerichs Road.

What pesticides are most commonly detected in other parts of NZ?

The most common pesticide detected was Triazine which is a herbicide. Its characteristics are that it tends to leach to groundwater and does not degrade quickly. It is detected long after it has been used.

Another herbicide that has come under scrutiny recently is Glyphosate which is the active ingredient in the commonly used herbicide Roundup. The current series of laboratory tests does not include Glyphosate.

Dieldrin is an organochlorine type pesticide that was used to treat stock from the 1950s until the mid 1960s. Studies of one of the many thousands of sheepdips in the Waikato show Dieldrin has moved only a very short distance and still exists in high enough concentrations to cause problems.

Marlborough is known to have many sheep dip sites, but little information exists on their current state or risk.

What is Marlborough District Council doing:

MDC will continue to participate in the national survey as well as carry out its own annual survey to provide a long term picture of trends.

A long set of observations is essential to encapsulate the life of the most persistent chemicals used locally that may still be in transit from where they were applied to the soil, through to the groundwater table. One such chemical is Dieldrin.

There is no substitute for taking samples as the presence of high concentrations cannot be modelled or remotely sensed at this stage.

The same sites will be sampled so that any changes in the presence of pesticides due to migration or new applications of pesticide is detected.

What can you do?

All pesticides originate from landuse activities and not only by farmers, but also on small holdings and in urban areas like Blenheim.

If Marlborough residents follow the directions when applying pesticides, and also think about what the fate of pesticides might be if they were to leach, then this can avoid contamination.

Specific decision support tools exist to guide which pesticides are best suited to a particular hydrological environment. More importantly they will tell you which chemicals should not be used.