File Note

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Canterbury Survey of Pesticides in Groundwater 2018-2019

Summary

Pesticide use across Canterbury has caused low levels of these manmade agrichemicals to reach groundwater. Of the many possible chemicals applied both currently and historically, a handful can be detected in groundwater samples using very sensitive laboratory analytical techniques. None of the concentrations measured in a 2018-2019 survey exceed drinking-water standards or freshwater quality guidelines.

Most of what we found in the groundwater are triazine herbicides such as terbuthylazine, atrazine, hexazinone and simazine. These are in widespread use in New Zealand for weed-control and traces can be found in groundwater across the region. Looking at past data, we are generally finding lower concentrations of these herbicides in groundwater in 2019, but more wells where terbuthylazine is present, even accounting for changes in the analytical limit of detection.

Traces of the banned organochlorine insecticide, DDT and its breakdown products were found at two sites we tested, likely coming from the legacy use of this persistent chemical.

Why did we conduct this survey?

Environment Canterbury is responsible for monitoring the state of water quality in Canterbury. As part of this monitoring, we have conducted several region-wide surveys of pesticides in groundwater since the late 1980s. The previous regional survey of pesticides in groundwater was in 2008. Based on that survey, we concluded that on a regional scale, pesticides were present in Canterbury groundwater only at very low concentrations, with no evidence of change over time. We recommended another region-wide survey after ten years, hence the survey in 2018.

Note that we also take part in a national survey of pesticides in groundwater run by ESR every four years. The latest national survey was in 2018, the same year as our regional survey. We sampled six Canterbury wells for the national survey, and we have included those results in this file note.

What are pesticides?

Pesticides are used for controlling unwanted insects, fungi and plant growth. The Ministry for Primary Industries register[1] contains over 1500 agrichemical products registered for use in New Zealand as herbicides, fungicides and insecticides, with over 250 manmade chemicals as active ingredients.

Many pesticides are classed as hazardous chemicals in New Zealand because at high doses they are toxic to humans and animals and they need to be handled carefully. Pesticides can cause health effects in drinking water or harm to aquatic ecosystems in rivers, lakes and streams.

Pesticides are usually applied by spraying onto the land where they remain for a while in the soil. Some pesticides are soluble and can make their way via runoff into surface water or percolate down into the groundwater. Pesticides can also be persistent and remain in the environment for many years after they are applied. There are pesticides used in the past that are now banned in New Zealand because they are considered persistent organic pollutants, such as dieldrin and DDT.

What did we do for the survey?

Between October 2018 and March 2019, we collected water samples from 77 wells across the Canterbury region for pesticide testing. Seventy-one samples were collected for Environment Canterbury's regional pesticide survey. These were analysed by Hill Laboratories for 207 different pesticides (see Attachment 1). The remaining six samples were collected for ESR's national survey and were analysed by AsureQuality laboratory. They were tested for a similar suite of pesticides to the regional survey samples, but the suite also included glyphosate, which was not tested in the regional survey.

Our pesticide survey was targeted both in timing and location to give a good chance of finding pesticides, so the results give us a worst-case picture of pesticide concentrations in groundwater. Most of the wells were sampled in summer, because this is when we have found the highest pesticide concentrations in the past. The wells sampled were a subset of our quarterly groundwater monitoring programme wells, targeting relatively shallow wells ranging from 3 to 36 m deep. The wells were all located in areas where contaminants from the land surface migrate easily into groundwater and are not diluted by seepage of cleaner water from alpine rivers. We also intentionally picked some wells where pesticides have been detected in the past for both the regional and national survey.

What did we find?

Results were very similar to what has been found in past surveys. Ninety-five percent of the pesticides tested were not found in any of the 77 groundwater samples. We did find very low

[1] ACVM register - veterinary medicines, agricultural chemicals and vertebrate toxic agents, sourced at https://eatsafe.nzfsa.govt.nz/web/public/acvm-register

concentrations of between one and three different pesticides in about one third of the groundwater samples. The results are summarised on a map in Figure 1.

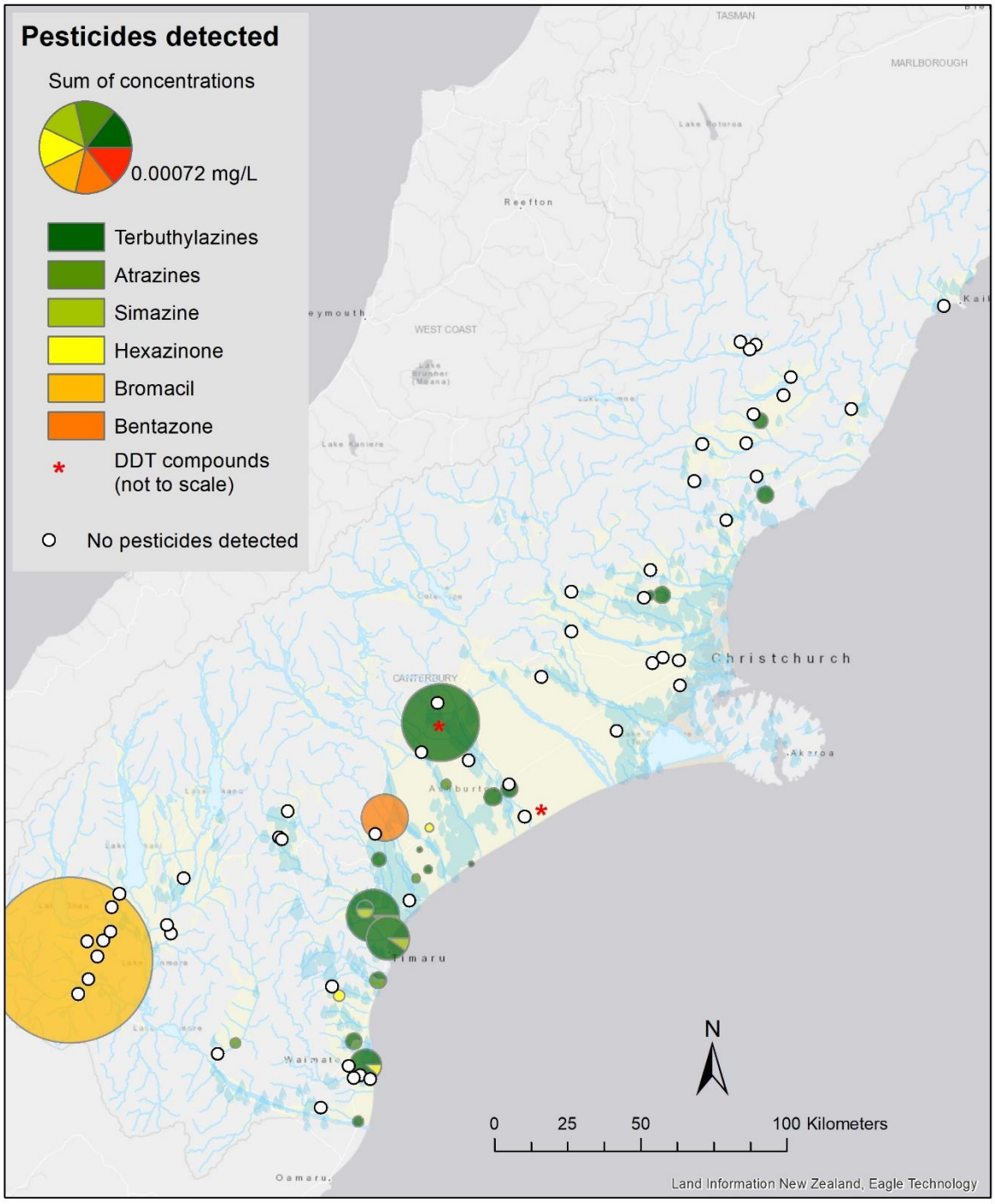

Figure 1: **Locations where pesticides were detected in Canterbury groundwater in summer 2018-2019. The symbols are scaled by the sum of the concentrations of pesticides measured in each sample, except DDT concentrations which were too low to be visible at this scale.**

In this survey, as in the past surveys, South Canterbury had more wells where pesticides were found in groundwater than North Canterbury (Figure 1). We do not have data on pesticide usage to know whether we see more detections because of higher pesticide use in South Canterbury. Other factors such as depth to groundwater, soil and sediment composition, climate (soil temperature) and the timing and application method could all contribute to the potential for groundwater contamination by these chemicals.

Here is a side-by-side summary of what we found in the past two 10-yearly surveys:

In 2018 - 2019	***For comparison in 2008***
51 sites out of 77 had no detected pesticides	83 sites out of 97 had no detected pesticides
26 sites (34%) had low, but measurable, concentrations of one or more pesticides	14 sites (14%) had low, but measurable, concentrations of one or more pesticides
11 different pesticides were detected (out of 207 tested) including 7 parent pesticides and 4 isomers or metabolites (i.e. breakdown products). We found: • *Acid herbicides*: bentazone; • *Triazine herbicides*: atrazine, hexazinone, simazine and terbuthylazine; • *Organonitro herbicide*: bromacil, and • *Organochlorine insecticide*: DDT	12 different pesticides were detected (out of 133 tested) including 10 parent pesticides and 2 isomers or metabolites. We found: • *Acid herbicides*: mecoprop, 2,4,5-TP and MCPB; • *Triazine herbicides*: atrazine, simazine and terbuthylazine; • *Organonitro fungicide/paraciticide*: thiobendazole • *Organochlorine fungicides:* chlorothalonil and hexachlorobenzene • *Organochlorine insecticide*: dieldrin
No glyphosate or breakdown products were found in the 6 national survey samples.	
The highest concentration was 0.0020 mg/L **bromacil** (herbicide) from a 17 m deep well in Omarama	The highest concentration was 0.0014 mg/L **dieldrin** (insecticide) from an 8.5 m deep disused well in Makikihi
Samples from 18 wells had measurable concentrations of either **terbuthylazine** or desethyl-terbuthylamine (DET) weedkiller with a maximum combined concentration of 0.000525 mg/L (Detection level = 0.000005 mg/L)	Samples from 2 wells had measurable concentrations of either **terbuthylazine** or desethyl-terbuthylamine (DET) weedkiller with a maximum concentration of 0.00021 mg/L (Detection level = 0.000010 mg/L)
Of the 44 measured concentrations above analytical detection levels, none exceeded Maximum Acceptable Values for drinking-water	Of the 19 measured concentrations above analytical detection levels, only the one dieldrin concentration exceeded Maximum Acceptable Values for drinking-water

What does it mean?

The increased number of sites with pesticide detections in 2018 – 2019 could partly be due to the analytical techniques becoming more sensitive over the past 10 years, so lower concentrations of pesticides can be detected. As an example, the detection limit for terbuthylazine and several other pesticides has halved between the two surveys. However, 17 sites (22% of those tested) in 2018-2019 had concentrations above those that would have been detected at 2008 analytical detection levels. Therefore, this is still an increase in the proportion of sites where pesticides were found, compared with 10 years ago.

More detections do not necessarily mean that contamination is getting worse. We think we found more detections this time because we were targeting the 2018-2019 survey to wells where pesticides are most likely to be present. Pesticides are more often detected in shallower wells. In 2008 the median depth of the wells was 15 m, compared 10 m in 2018-2019.

Concentrations of pesticides in groundwater have generally decreased over time. Looking even further back to the 1990s, the concentrations of most of the triazine herbicides were higher in some of these historical samples. Figure 2 compares concentrations of triazine herbicides from our water quality database going back to 1993. From these data it appears that the 2008 survey was unusual in the low number of sites with triazine herbicides detected.

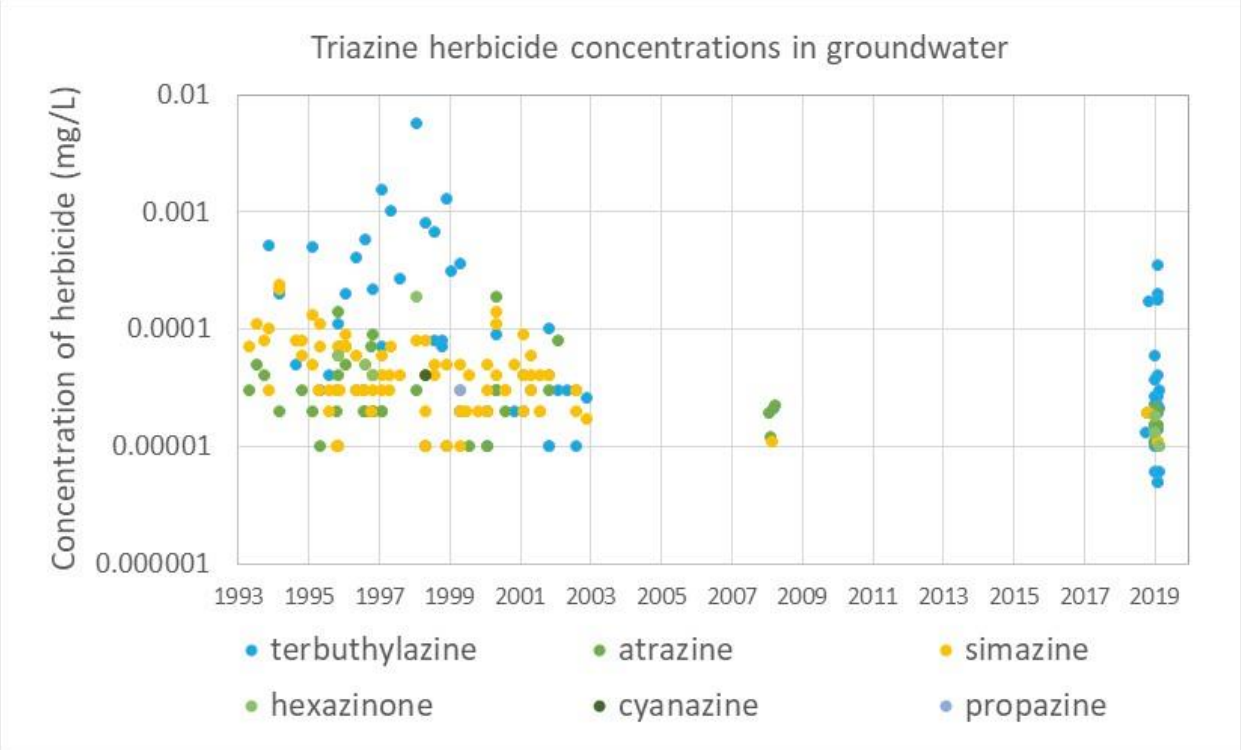

Figure 2: **Time series of triazine pesticide concentrations measured in Canterbury wells. Note that the y-axis is a logarithmic scale. These data from Environment Canterbury's water quality database intentionally exclude a well at a fertiliser storage depot with past high levels of pesticide contamination.**

None of the concentrations we measured in groundwater in 2018/2019 pose a risk to human health, according to the Drinking-Water Standards for New Zealand[2] (4th column of Table 1). The highest concentrations we measured in groundwater were generally 100 to 200 times lower than the drinking-water limit, except for terbuthylazines, which were still 15 times lower than the acceptable value.

Some groundwater discharges to springs, rivers and lakes in Canterbury, so we also compare the concentrations to Australian and New Zealand water quality trigger values for surface water (for protection of aquatic species)[3] (last column of Table 1). The available guidance shows no risk to aquatic ecosystems from pesticides in groundwater at the concentrations we measured.

Table 1: Summary of the concentrations of pesticides detected in Canterbury groundwater from the 2018 – 2019 regional survey (all concentrations in mg/L) and comparison to drinking-water and environmental standards

Pesticide name	Number of sites with pesticide detected	Concentration range	Maximum Acceptable Value for drinking-water	Default trigger for 99% species protection
Herbicides				
terbuthylazine *(+desethyl terbuthylazine)*	18	<0.000005 to 0.000525	0.008	Not set
atrazine *(+desethyl atrazine + desisopropyl atrazine)*	6	<0.00001 to 0.000021	0.002	0.0007
hexazinone	3	<0.000005 to 0.000018	0.4	Not set
simazine	3	<0.000010 to 0.000019	0.002	0.0002
bromacil	1	<0.000010 to 0.0020	0.4	Not set
bentazone	1	<0.00004 to 0.00022	None set	Not set
Insecticides				
4,4'-DDT *(+4,4'-DDE)*	2	<0.0000005 to 0.0000043	0.001	0.000006

Acknowledgements

Dave Evans, Ross Cressy, Tom Johns and Hamish Carrad collected all the samples for the survey. Shaun Thomsen and Sarah Giles helped with loading data into our water quality database. Thank you to Mark Trewartha and Carl Hanson for reviewing this file note.

[2] Drinking-water Standards for New Zealand 2005 (revised 2018). Wellington: Ministry of Health. https://www.health.govt.nz/publication/drinking-water-standards-new-zealand-2005-revised-2018

[3] Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Government of Australia and New Zealand Ministry for the Environment. https://www.waterquality.gov.au/anz-guidelines/guideline-values/default/water-quality-toxicants/search

Attachment 1: Analytical tests and detection levels (Hill Laboratory)

Pesticide	Laboratory detection level (mg/L)
Acid Herbicides	
Acifluorfen	<0.000040
Bentazone	<0.000040
Bromoxynil	<0.000040
Clopyralid	<0.000060
2,4-D	<0.000040
2,4-DB	<0.000040
Dicamba	<0.000040
Dichlorprop	<0.000040
Fluazifop	<0.000040
Fluroxypyr	<0.000040
Haloxyfop	<0.000040
MCPA	<0.000040
MCPB	<0.000040
Mecoprop	<0.000040
Oryzalin (Trace)	<0.00400
Oryzalin (Ultratrace)	<0.00006
2,3,4,6-Tetrachlorophenol	<0.000040
2,4,5-TP	<0.000040
2,4,5-T	<0.000040
Pentachlorophenol	<0.000040
Picloram	<0.000060
Quizalofop	<0.000040
Triclopyr	<0.000040
Multiresidue pesticides	
Acetochlor	<0.000010
Alachlor	<0.000005
Aldrin	<0.0000005
Atrazine	<0.000010
Atrazine-desethyl	<0.000010
Atrazine-desisopropyl	<0.000020
Azaconazole	<0.000005
Azinphos-methyl	<0.000020
Benalaxyl	<0.000005
Bendiocarb	<0.000010
Benodanil	<0.000020
alpha-BHC	<0.0000005
beta-BHC	<0.0000005
delta-BHC	<0.0000005
Lindane	<0.0000005
Bifenthrin	<0.0000050

Pesticide	Laboratory detection level (mg/L)
Bitertanol	<0.000020
Bromacil	<0.000010
Bromophos-ethyl	<0.000010
Bromopropylate	<0.000010
Bupirimate	<0.000010
Buprofezin	<0.000010
Butachlor	<0.000010
Captafol	<0.000050
Captan	<0.000020
Carbaryl	<0.000010
Carbofenothion	<0.000010
Carbofuran	<0.000010
Carboxin	<0.00001
cis-Chlordane	<0.0000005
trans-Chlordane	<0.0000005
Chlorfenvinphos	<0.000015
Chlorfluazuron	<0.000010
Chlorothalonil	<0.000010
Chlorpropham	<0.000020
Chlorpyrifos	<0.000010
Chlorpyrifos-methyl	<0.000010
Chlortoluron	<0.000020
Chlozolinate	<0.000010
Coumaphos	<0.000020
Cyanazine	<0.000010
Cyfluthrin	<0.000013
Cyhalothrin	<0.000010
Cypermethrin	<0.000030
Cyproconazole	<0.000020
Cyprodinil	<0.000010
2,4'-DDD	<0.0000005
4,4'-DDD	<0.0000005
2,4'-DDE	<0.0000005
4,4'-DDE	<0.0000005
2,4'-DDT	<0.0000005
4,4'-DDT	<0.0000005
Deltamethrin	<0.000010
Demeton-S-methyl	<0.000020
Diazinon	<0.000005
Dichlobenil	<0.000010
Dichlofenthion	<0.000010
Dichlofluanid	<0.000010
Dichloran	<0.000030

Pesticide	Laboratory detection level (mg/L)
Dichlorvos	<0.000020
Dicofol	<0.000050
Dicrotophos	<0.000010
Dieldrin	<0.0000005
Difenoconazole	<0.000020
Dimethoate	<0.000020
Dinocap	<0.000120
Diphenylamine	<0.000020
Disulfoton	<0.000010
Diuron	<0.000010
Endosulfan I	<0.0000005
Endosulfan II	<0.0000005
Endosulfan sulphate	<0.0000005
Endrin	<0.0000005
Endrin aldehyde	<0.0000005
Endrin ketone	<0.0000005
EPN	<0.000010
Esfenvalerate	<0.000015
Ethion	<0.000010
Etrimfos	<0.000010
Famphur	<0.000010
Fenamiphos	<0.000010
Fenarimol	<0.000010
Fenitrothion	<0.000010
Fenpropathrin	<0.000010
Fenpropimorph	<0.000010
Fensulfothion	<0.000010
Fenthion	<0.000010
Fenvalerate	<0.000015
Fluazifop-butyl	<0.000010
Fluometuron	<0.000010
Flusilazole	<0.000010
Fluvalinate	<0.000010
Folpet	<0.000020
Furalaxyl	<0.000005
Haloxyfop-methyl	<0.000010
Heptachlor	<0.0000005
Heptachlor epoxide	<0.0000005
Hexachlorobenzene	<0.0000005
Hexaconazole	<0.000010
Hexazinone	<0.000005
Hexythiazox	<0.000050
Imazalil	<0.000050

Pesticide	Laboratory detection level (mg/L)
Indoxacarb	<0.000010
Iodofenphos	<0.000010
IPBC (3-Iodo-2-propynyl-n-butylcarbamate)	<0.000050
Isazophos	<0.000010
Isofenphos	<0.0000050
Kresoxim-methyl	<0.000005
Leptophos	<0.000010
Linuron	<0.000010
Malathion	<0.000010
Metalaxyl	<0.000010
Methacrifos	<0.000010
Methidathion	<0.000010
Methiocarb	<0.000010
Methoxychlor	<0.0000005
Metolachlor	<0.000005
Metribuzin	<0.000010
Mevinphos	<0.000020
Molinate	<0.000020
Myclobutanil	<0.000010
Naled	<0.000050
Nitrofen	<0.000020
Nitrothal-isopropyl	<0.000010
Norflurazon	<0.000020
Oxadiazon	<0.000010
Oxychlordane	<0.0000050
Oxyfluorfen	<0.000005
Paclobutrazol	<0.000010
Parathion-ethyl	<0.000010
Parathion-methyl	<0.000010
Penconazole	<0.000010
Pendimethalin	<0.000010
Permethrin	<0.000005
Phorate	<0.000020
Phosmet	<0.000010
Phosphamidon	<0.000010
Pirimicarb	<0.000010
Pirimiphos-methyl	<0.000010
Prochloraz	<0.000050
Procymidone	<0.000010
Prometryn	<0.000005
Propachlor	<0.000010
Propanil	<0.000020
Propazine	<0.000005

Pesticide	Laboratory detection level (mg/L)
Propetamphos	<0.000010
Propham	<0.000010
Propiconazole	<0.000010
Prothiofos	<0.000010
Pyrazophos	<0.000010
Pyrifenox	<0.000015
Pyrimethanil	<0.000010
Pyriproxyfen	<0.000010
Quintozene	<0.000020
Quizalofop-ethyl	<0.000010
Simazine	<0.000010
Simetryn	<0.000010
Sulfentrazone	<0.000050
Sulfotep	<0.000010
TCMTB	<0.000020
Tebuconazole	<0.000010
Tebufenpyrad	<0.0000050
Terbacil	<0.000010
Terbufos	<0.000010
Terbumeton	<0.000010
Terbuthylazine	<0.000005
Terbuthylazine-desethyl	<0.000010
Terbutryn	<0.000010
Tetrachlorvinphos	<0.000010
Thiabendazole (Trace)	<0.00110
Thiabendazole (Ultratrace)	<0.00005
Thiobencarb	<0.000010
Thiometon	<0.000020
Tolylfluanid	<0.000005
Total Chlordane	<0.0000020
Triadimefon	<0.000010
Triazophos	<0.000010
Trifluralin	<0.000010
Vinclozolin	<0.000010
Organic LCMS pesticides	
Aldicarb	<0.006
Aldicarb sulfone	<0.003
Aldicarb sulfoxide	<0.007
Carbendazim	<0.003000
Isoproturon	<0.003
Oxamyl	<0.001
Primisulfuron-methyl	<0.003

Attachment 2: Details of wells included in the pesticide survey

Well number	Sample date	Locality	Depth (m)	Use
HURUNUI WAIAU				
BU24/0002	20/03/2019	Hanmer Springs	4.5	Domestic/stockwater
BV24/0023	13/03/2019	Balmoral Forest	23.92	Monitoring
BV24/0028	13/03/2019	Waikari	18.4	Domestic/stockwater
BV24/0069	13/03/2019	Masons Flat	4.8	Domestic
M33/0214	13/03/2019	HAWARDEN	35	Irrigation
M34/0688	7/03/2019	WAIPARA	27.65	Irrigation
N32/0088	20/03/2019	Hanmer Springs	5.2	Domestic
N32/0140	18/03/2019	ROTHERHAM	5.4	Domestic
N32/0204	20/03/2019	Hanmer Springs	7.3	Domestic
N32/0492	18/03/2019	WAIAU	6	Monitoring
N33/0064	7/03/2019	OMIHI STUD 1	9.1	Stockwater
N33/0206	18/03/2019	CULVERDEN	9	Domestic/stockwater
N33/0212	18/03/2019	CULVERDEN	5	Monitoring
N33/0249	28/11/2018	Spotswood Parnassus	10	Domestic
LOWER WAITAKI SOUTH COASTAL CANTERBURY				
CA17/0007	29/01/2019	WAIMATE	5.115	Monitoring
CA17/0008	29/01/2019	WAIMATE	6.19	Monitoring
CA18/0020	23/01/2019	WAIMATE	23.89	Monitoring
J39/0111	23/01/2019	Blue Cliffs	11	Stockwater
J40/0163	29/01/2019	IKAWAI	4.6	Stockwater
J40/0217	25/01/2019	WILLOWBRIDGE	8	Domestic
J40/0286	25/01/2019	STUDHOLME	7	Domestic
J40/0333	25/01/2019	HOOK	8	Other
J40/0469	28/01/2019	WILLOWBRIDGE	11.71	Domestic
J40/1024	28/01/2019	MORVEN	11	Monitoring
J41/0018	28/01/2019	GLENAVY	7.9	Other
UPPER WAITAKI				
BZ15/5017	12/02/2019	CLEARBURN	36	Monitoring
BZ15/5018	12/02/2019	CLEARBURN	35	Monitoring
BZ15/5019	12/02/2019	CLEARBURN	11	Monitoring
BZ16/0073	12/02/2019	MACKENZIE BASIN	11	Monitoring
CA15/5005	13/02/2019	QUAILBURN ROAD	20	Monitoring
CA15/5007	12/02/2019	PINE TREES	23	Monitoring
CA15/5008	3/04/2019	OMARAMA	28.5	Monitoring
CA15/5009	13/02/2019	OMARAMA	16.7	Monitoring
H38/0004	12/02/2019	TWIZEL	11.1	Domestic
H38/0229	12/02/2019	MACKENZIE BASIN	10.41	Monitoring
I38/0084	13/02/2019	MACKENZIE BASIN	12	Monitoring
I38/0092	13/02/2019	SIMONS HILL STATION	6	Monitoring
WAIMAKARIRI				
L35/1195	24/01/2019	OXFORD	22	Domestic

Well number	Sample date	Locality	Depth (m)	Use
M34/5557	24/01/2019	Loburn	12	Irrigation
M35/5869	24/01/2019	CUST	20.5	Domestic/stockwater
M35/6295	21/01/2019	SPRINGBANK	12.2	Domestic/stockwater
KAIKOURA				
O31/0280	28/11/2018	PUKETA, KAIKOURA	10.22	Domestic
CHRISTCHURCH WEST MELTON				
M35/5119	21/01/2019	YALDHURST	30	Irrigation
M35/9064	22/01/2019	Yaldhurst	30	Domestic
SELWYN WAIHORA				
L35/0596	1/02/2019	SHEFFIELD	17.2	Domestic
L36/0224	26/02/2019	KILLINCHY	10.6	Monitoring
M36/4227	22/01/2019	PREBBLETON	12	Irrigation
ORARI TEMUKA OPIHI PAREORA				
J37/0012	25/02/2019	ARUNDEL	6.7	Domestic
J37/0013	27/02/2019	Ashwick Flat	6	Domestic
J37/0045	25/02/2019	WOODBURY	13	Domestic
J37/0073	27/02/2019	ASHWICK FLATS	10.15	Domestic
J37/0087	27/02/2019	ASHWICK FLAT	8.3	Domestic
J38/0004	25/02/2019	Geraldine	4.85	Domestic
J38/0169	27/02/2019	LEVELS	5.4	Stockwater
J39/0135	25/01/2019	PAREORA	10.5	Small Community Supply
K38/0148	26/02/2019	Rangitata	9.14	Domestic/stockwater
K38/0240	26/02/2019	TEMUKA	7.7	Domestic
K38/0404	26/02/2019	Orton	7.3	Domestic
K38/1017	26/02/2019	Clandeboye, Temuka	12	Stockwater
ASHBURTON				
BY20/0148	7/03/2019	Ealing	20.45	Monitoring
K36/0033	5/03/2019	SPRINGBURN	8.23	Domestic
K36/0118	5/03/2019	MAYFIELD	11.3	Domestic
K36/0172	5/03/2019	BUSHSIDE	10	Stockwater
K37/0147	6/03/2019	ASHBURTON	9.75	Monitoring
K37/0216	6/03/2019	LISMORE	9.5	Domestic/stockwater
K37/0833	5/03/2019	WESTERFIELD	10	Monitoring
K38/2200	6/03/2019	LOWCLIFFE	6	Domestic/stockwater
L37/0130	21/02/2019	Wakanui	18	Domestic
L37/0297	21/02/2019	Seafield	25	Monitoring
L37/0439	26/02/2019	ASHBURTON	9.14	Monitoring
L37/0914	26/02/2019	NETHERBY	20	Domestic

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Well number	Sample date	Locality	Depth (m)	Use
J38/0242	2/11/2018	PLEASANT POINT	3.3	Monitoring
J40/0256	16/10/2018	WAIMATE	7.95	Irrigation
K39/0033	20/11/2018	WASHDYKE	9.3	Industry
L36/0003	15/10/2018	HORORATA	11.2	Domestic
M35/5918	23/10/2018	WEST MELTON	36	Domestic/stockwater
M35/8567	18/10/2018	CUST	15.2	Monitoring

Attachment 3: Measured pesticide concentrations from 2018-2019 survey

Site	Pesticide	Concentration (mg/L)
K37/0147	4,4'-DDE	0.0000025
L37/0297	4,4'-DDE	0.0000007
K37/0147	4,4'-DDT	0.0000018
J39/0135	Atrazine	0.000021
K38/0404	Atrazine	0.000011
CA17/0008	Atrazine-desethyl	0.000015
J40/0333	Atrazine-desethyl	0.000011
K37/0216	Atrazine-desethyl	0.000015
J38/0169	Atrazine-desisopropyl	0.00002
J37/0012	Bentazone	0.00022
CA15/5009	Bromacil	0.002
BY20/0148	Hexazinone	0.00001
CA18/0020	Hexazinone	0.000018
J40/0286	Hexazinone	0.000013
J38/0169	Simazine	0.000011
J38/0242	Simazine	0.000019
K39/0033	Simazine	0.000019
J38/0169	Terbuthylazine	0.000040
J40/0286	Terbuthylazine	0.000037
J41/0018	Terbuthylazine	0.000006
K36/0033	Terbuthylazine	0.000350
K37/0147	Terbuthylazine	0.000019
K38/0148	Terbuthylazine	0.000005
K38/2200	Terbuthylazine	0.000005
L37/0439	Terbuthylazine	0.000022
M35/6295	Terbuthylazine	0.000010
N33/0064	Terbuthylazine	0.000006
N33/0212	Terbuthylazine	0.000010
J38/0242	Terbuthylazine	0.000019
K39/0033	Terbuthylazine	0.000170
M35/8567	Terbuthylazine	0.000013
J38/0004	Terbuthylazine-desethyl	0.000027
J38/0169	Terbuthylazine-desethyl	0.000199
J39/0135	Terbuthylazine-desethyl	0.000015
J40/0286	Terbuthylazine-desethyl	0.000060
J40/0333	Terbuthylazine-desethyl	0.000023
J41/0018	Terbuthylazine-desethyl	0.000011
K36/0033	Terbuthylazine-desethyl	0.000175
K37/0147	Terbuthylazine-desethyl	0.000021
K38/1017	Terbuthylazine-desethyl	0.000011
L37/0439	Terbuthylazine-desethyl	0.000014
M35/6295	Terbuthylazine-desethyl	0.000027

Site	Pesticide	Concentration (mg/L)
N33/0064	Terbuthylazine-desethyl	0.000030
N33/0212	Terbuthylazine-desethyl	0.000021