



## Regional and Local Pesticide and Ground Water Monitoring Results, 2018 Executive Summary

ISDA Technical Summary #57

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### Introduction and Background

The Idaho State Department of Agriculture (ISDA) Ground Water Program implements the Idaho Pesticide Management Plan (PMP) (2001), and the Rules Governing Pesticide Management Plans for Ground Water Protection (IDAPA 02.03.01) (Idaho PMP Rule). The Idaho PMP Rule requires the ISDA to conduct monitoring and response actions associated with pesticide detections in Idaho ground water and to help prevent further contamination that may result in exceeding drinking water standards. In 2018 ISDA staff collected samples from 245 wells from major aquifers throughout Idaho. These wells are primarily used for domestic drinking water. ISDA submitted ground water samples to be tested for more than 100 pesticides or their breakdown components at the Idaho Food Quality Assurance Laboratory (IFQAL), Twin Falls, ID. The testing methods at IFQAL allow pesticides to be detected at low levels; these pesticides detected in drinking water do not indicate a health risk until reference points are exceeded. A sub-set of select wells was also tested for 82 Volatile Organic Compounds (VOC). No well monitored in 2018 exceeded a drinking water standard or reference level.

Detections of pesticides are compared against reference points to determine response and recommendations. In order to be protective of the water resources, there are response levels in the Idaho PMP Rule that occur at various percentages of a reference point, such as 20% of a drinking water standard. Most of the response requirements at the lower levels are to monitor and educate, with increasing needs to identify potential pesticide sources. The first and second response levels are at pesticide concentrations where there are expectations of the water being acceptable for drinking water without health risks. However, at the third and fourth response levels there is a greater concern that the water is no longer drinkable and the pesticide concentrations could lead to human health issues.

The Idaho PMP Rule divides pesticide detections into the following response levels:

**Level 1:** Detection above the laboratory detection limit to less than 20% of the reference point.

**Level 2:** Detection at 20% to less than 50% of the reference point.

**Level 3:** Detection at 50% to less than 100% of the reference point.

**Level 4:** Detection at or greater than 100% of the reference point.

There were measurable detections of pesticides in 106 of the 245 monitored wells. On average, at wells with pesticides detected, the concentrations were at 3% of the reference point, falling into the Level 1 response category. Over 98% of the wells tested fall into or below the Level 1 response category of the Idaho PMP Rule, which are at levels protective of human health. Five wells, and three different pesticides, were found with pesticide concentrations above the Level 1 response category. One well had detectable pesticide concentrations that were greater than half the recommended levels (Level 3 category) for the measured Triallate concentrations. There were 4 detections at the Level 2 category. Two of Level 2 category detections were for Desethyl atrazine concentrations near Ashton, ID, and Lewiston, ID. One well with measured concentrations of the herbicide Triallate near Ashton, ID was at 31% of the reference point or a Level 2 response category. There were decreases in 2018 in most of these wells/pesticides since

2017. All of these wells are discussed in more detail below and in Annual Technical Summaries. In 2018, there was a new detection of Dinoseb at 27% of the drinking water standard, long-term monitoring will confirm the persistence and magnitude. Other wells near these locations do not have these pesticide concentrations, indicating that these are isolated problems. In the Dacthal restriction area, monitoring results found no wells in 2018 where Dacthal was identified above 20% of the reference point. No well monitored in 2018 exceeded a drinking water standard or reference level.

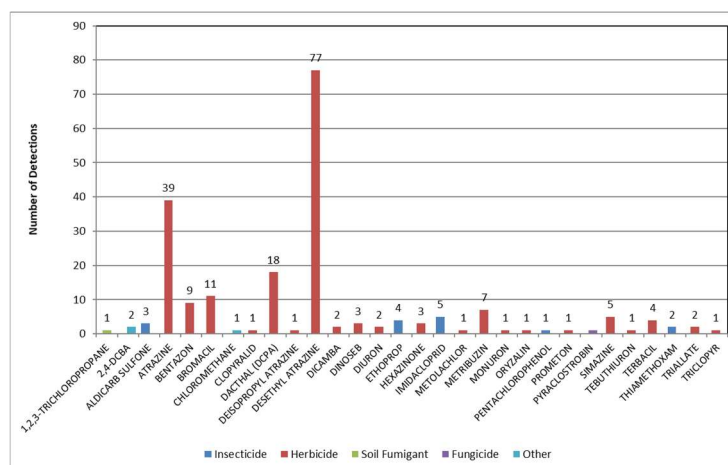
In eastern Idaho, the project developed and initiated in 2015 was incorporated into a long-term project to monitor for Methyl bromide and its breakdown components and the potential ground water impacts at wells near locations within the Pale Cyst Nematode Eradication Program Area. There were no measured pesticides or their breakdown products associated with the nematode eradication program in these wells.

New projects were developed in the American Falls/Blackfoot area, the Grace area and the Preston area. No significant pesticides were detected in any of these three new projects. Monitoring will continue to develop long-term baseline monitoring.

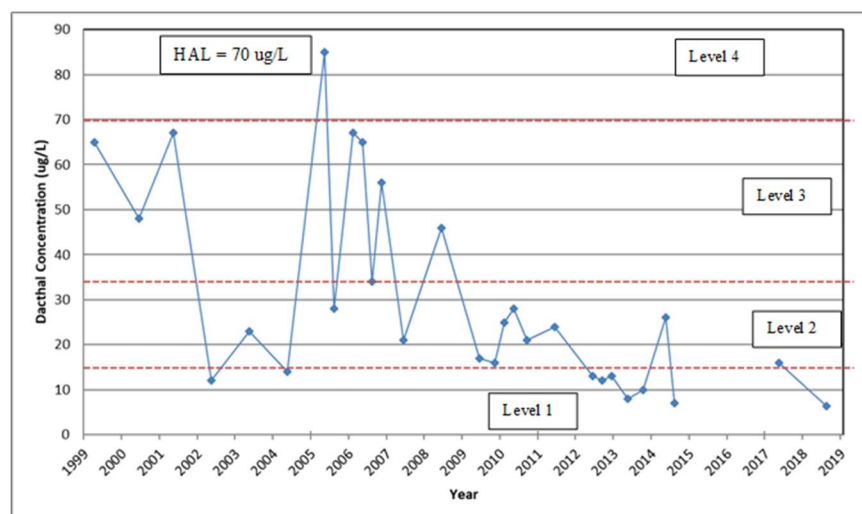
Detailed analyses of the 2018 results are available in the *Regional and Local Pesticide and Ground Water Monitoring Results, 2018: Technical Summary #58*.

## Water Quality Findings

Monitoring of 245 wells occurred in the following counties: : Ada, Bingham, Bonneville, Canyon, Caribou, Cassia, Elmore, Franklin, Fremont, Gem, Gooding, Idaho, Jefferson, Jerome, Kootenai, Latah, Lewis, Lincoln, Madison, Minidoka, Nez Perce, Owyhee, Payette, Twin Falls, and Washington. There were 31 different pesticides, metabolites/breakdown products, or VOCs detected in 2018 (Table 1). Atrazine (and its breakdown products) is the most commonly identified pesticide in the ground waters of Idaho. The vast majority of these detections are within the Level 1 response. The Atrazine concentrations are examined individually, along with the summed product of Atrazine and the breakdown products, Desethyl atrazine and Deisopropyl atrazine (Table 1). Frequent detections of pesticides occur from sampling domestic wells, especially in vulnerable aquifer areas. Of the 245 monitored wells, there were no measurable detections of pesticide residues in 139 wells, low-level detections in 106 wells and 5 wells with pesticide concentrations at levels of concern. One well was identified as having an herbicide, Triallate, concentration within the Level 3 Category and is described below and in the Annual Technical Summaries, along with a section on monitoring near and around the Dacthal Restriction Area.

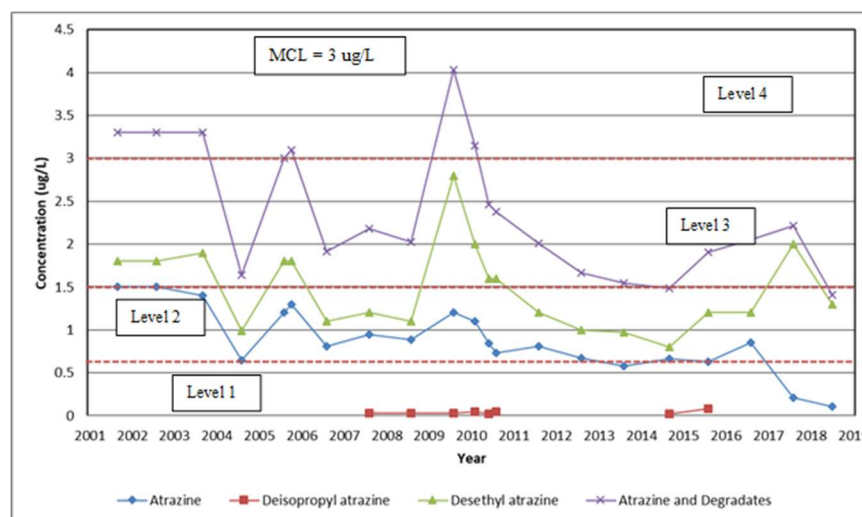


### Dacthal Restricted area project



had measured Dacthal concentrations greater than 80  $\mu\text{g/L}$  (which is approximately 80 parts per billion [ppb]), which was greater than the 70  $\mu\text{g/L}$  reference point. Of the 29 wells tested across the State for Dacthal, 16 wells had measurable detections, while the remaining wells did not have measureable Dacthal concentrations.

### Nez Perce County Atrazine sub-project



There were 34 wells tested for Dacthal in 2018. This was a directed effort to determine if there were changes from the historic range. Therefore, wells with prior ISDA detections were tested. All the wells monitored and tested for Dacthal had concentrations within their individual historic detection range. No wells were identified as having concentrations above a Level 1 response in 2018. Dacthal monitoring data for this well are not available for 2015 and 2016. Historically this well

The Nez Perce County Atrazine sub-project area is located south of Lewiston and Lewiston Orchards along Waha Road. The project was initiated in response to an elevated detection of Atrazine in a well from the Clearwater Plateau Regional Project. Multiple wells were sampled in this area in 2018; wells up and down gradient were not identified with pesticide concentrations near those found in well 9501901. Atrazine and its breakdown products are known to persist in ground water significantly longer than in surface

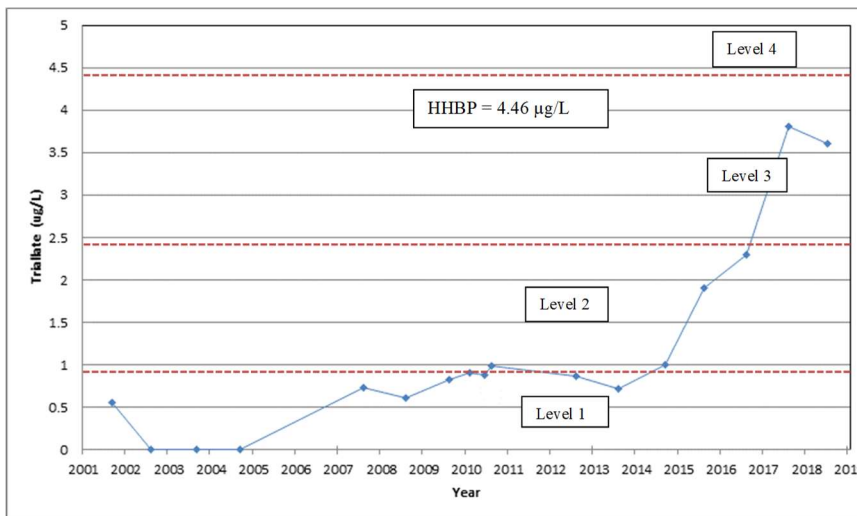
water, which may account for some of these long-term concentrations. There is annual monitoring of this well, but the surrounding well data suggest that these concentrations are from an isolated source that remains unidentified. At this time the water quality does not exceed the drinking water standard, if concentrations continue to increase there is concern that this water may no longer be a suitable drinking water source and an alternate drinking water source or treatment option should be identified.

### Triallate

There is not a Drinking Water Standard (also known as the Maximum Contaminant Level [MCL]) for Triallate. Historically, ISDA examined Triallate data using the Food Quality Protection Act Drinking Water Level of Comparison (FQPA DWLOC) reference point listed in the 2001 US EPA RED. However, based on the more

recent Human Health Benchmarks for Pesticides (HHBP) values, Triallate is listed as having a carcinogenic drinking water level recommendation between 0.446 and 44.6 µg/L depending on the acceptable carcinogenic risk level between  $10^{-6}$  and  $10^{-4}$ . The reference level is based on its carcinogenic properties; each state can determine their acceptable risk factor between  $10^{-6}$  and  $10^{-4}$ . Idaho has proposed a  $10^{-5}$  risk factor for carcinogens. The  $10^{-5}$  risk factor would lead to a HHBP reference level of 4.46 µg/L. This reference point, however, is a recommended level and not a drinking water standards/MCL.

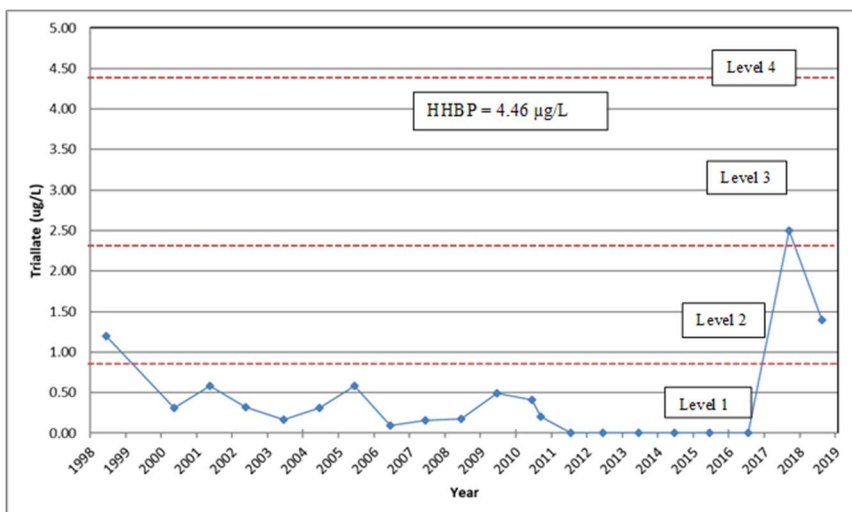
### *Greencreek Triallate sub-project*



Wells in the Greencreek Triallate sub-project are a sub-set of the Clearwater Plateau Regional Project south of Lewiston, Idaho and are specific to concerns surrounding well 9501401. Four wells north of Greencreek, ID and were sampled for pesticides in 2018 as part of the sub-project. The Triallate concentration in well 9501401 was at a Level 3 detection, which is elevated, but below the reference point. Triallate is listed by the US EPA as a potential carcinogen. The identified concentrations indicate that Triallate

is increasing. Wells sampled nearby did not have any detections of Triallate. However, only recommended levels are being exceeded, no drinking water standards are being exceeded.

### *Ashton Area Local Project*



The time series data for Triallate in well 3200101 are displayed from 1998 through 2018. Triallate is a commonly used herbicide for grain crops in eastern Idaho. Triallate had not been detected between 2011 and 2016 after being elevated since the first sampling in 1998. It is suspected that the snowpack in the Henry's Fork Subbasin during the winter of 2016/2017 and subsequent melt and infiltration led to mobilization of Triallate in the soil column. Long-term monitoring is required to determine if this increase is a short-

term or a long-term concern.

## Conclusions

Of the 245 monitored wells in 2018, there were no measurable detections of pesticide residues in 139 wells, there were low-level detections in 101 wells, and 5 wells had pesticide concentrations at concerning levels. Testing of regional, local and PMP projects resulted in detections of pesticides in ground water throughout Idaho. Frequent detections of pesticides occur from sampling domestic wells, especially in vulnerable aquifer areas. As previously discussed, Triallate was the only pesticides detected over 50% of a health-based reference point. Atrazine-breakdown products, Triallate and Dinoseb were detected above 20% of a reference point. ISDA is responding to those situations with education, use inspections, promotion of management techniques, and locally intensive monitoring.

There were 31 different pesticides, metabolites/breakdown products, or VOCs detected in 2018. Most were detected at low concentrations. Several pesticides appear to have increasing concentrations, such as Atrazine, in multiple wells across the state, but long-term monitoring is required to determine the magnitude and longevity of those increases. However, several wells identified in 2017 with significant increases had concentrations decreases in 2018. Statewide response processes have been implemented, primarily consisting of educational outreach and continued monitoring. There are concerns in certain areas where multiple low level pesticides are detected in individual wells. Some wells also have detections of multiple active ingredients and breakdown products that may have similar, but unknown human health toxicological effects in their combination. Except for the five wells with pesticide concentrations at levels of concern, pesticide concentrations are significantly below drinking water standards and recommendations. These pesticide detection data may be used to make regulatory and/or voluntary changes related to applications of pesticides.

Currently, there are no indications that appropriate and widespread application of pesticides are leading to contamination of the aquifers or impacting beneficial uses. However, there are widespread detections of pesticides in both shallow and deep wells throughout the State of Idaho. Additionally, data from 2017/2018 suggest that there may be residual reservoirs of pesticides in the soil column. It is unknown to what extent or magnitude might be in these potential pesticide reservoirs and what their effects might be on the ground water quality. Long-term monitoring is required to ensure that the current application and management practices are effective.

## Recommendations

ISDA will respond to the pesticide detections from this project in accordance with the response section of IDAPA 02.03.01 Rules Governing Pesticide Management Plans for Ground Water Protection. ISDA will continue to follow-up and conduct monitoring in 2019. ISDA personnel will continue to educate the pesticide applicators on the importance of adhering to label requirements and to apply all pesticides according to federal and state laws. ISDA personnel will continue to educate home and well owners. ISDA shares our data with the Idaho Department of Environmental Quality (DEQ), US EPA, our cooperators and inspectors. ISDA will continue to monitor ground water and aquifers throughout the State of Idaho.

## Acknowledgments

ISDA Water Program staff would like to thank the homeowners in the Project areas who allowed us to access and sample their wells. Without their participation and cooperation, these Projects would not be possible. Prevention is the key to protecting Idaho's aquifers and maintaining pesticide registrations and uses in Idaho. We would also like to recognize the United States Environmental Protection Agency and our various grant supporters, without whose contribution, these reports would not be possible.

A very special thank you goes to the ISDA Field Staff and to IFQAL staff, all of whom went above and beyond to work with the ISDA Division of Agricultural Resources staff to meet project goals. The author would like to thank Elizabeth Palmateer, Sherman Takatori and Doug Chan of ISDA for editorial review of this document.

**Table 1. Summary of Pesticide Detections from ISDA Regional Projects in 2018.**

Pesticide	Number of Detections	Maximum (µg/L)	Average (µg/L)	Minimum Detection Limit (µg/L)	Reference Point (µg/L) and Source	County with Detection and Number
1,2,3-Trichloropropane	1	0.630	0.630	100	100 -- DWEL	Ada (1)
1,2-Dichloropropane	1	0.580	0.580	5	5 -- MCL	Canyon (1)
Atrazine	38	0.280	0.080	3	3 -- MCL	Ada (1), Canyon (2), Cassia (13), Elmore (2), Franklin (1), Fremont (1), Gooding (1), Jefferson (1), Minidoka (3), Nez Perce (2), Owyhee (2), Payette (2), Twin Falls (5), Washington (2)
Atrazine (sum of products) *	71	1.41	0.141	---	---**	---
Bentazon	9	1.300	0.369	200	200 -- MCL	Cassia (1), Elmore (1), Minidoka (1), Nez Perce (1), Owyhee (1), Payette (2), Washington (2), Elmore (3), Minidoka (3), Owyhee (1), Twin Falls (3), Washington (2)
Boscalid	1	0.230	0.230	1400	1400 -- HHBP	Caribou (1)
Bromacil	12	5.600	0.757	3500	3500 -- DWEL	Elmore (3), Minidoka (3), Owyhee (1), Twin Falls (3), Washington (2)
Bromoxynil	1	0.055	0.055	3.11	3.11 -- HHBP	Minidoka (1)
Clopyralid	1	1.000	1.000	960	960 -- HHBP	Fremont (1)
Cycloate	1	1.200	1.200	30	30 -- HHBP	Minidoka (1)
Dacthal (DCPA)	15	10.000	2.705	70	70 -- HAL	Ada (1), Canyon (3), Owyhee (9), Payette (2)
Desethyl Atrazine	65	1.300	0.107	3	---**	Ada (4), Canyon (4), Cassia (13), Elmore (5), Franklin (1), Fremont (1), Gooding (3), Jefferson (1), Jerome (2), Minidoka (5), Nez Perce (1), Owyhee (6), Payette (2), Twin Falls (8), Washington (9)
Dicamba	1	1.700	1.700	4000	4000 -- HAL	Owyhee (1)
Dinoseb	2	1.900	1.060	7	7 -- MCL	Owyhee (1), Washington (1)
Diuron	3	0.170	0.104	100	100 -- DWEL	Elmore (1), Minidoka (1), Nez Perce (1)
Epte	1	2.800	2.800	300	300 -- HHBP	Minidoka (1)
Hexazinone	6	7.000	1.218	400	400 -- HAL	Ada (1), Cassia (3), Jefferson (1), Minidoka (1)
Imidacloprid	3	0.045	0.040	360	360 -- HHBP	Cassia (1), Minidoka (2)
Metolachlor	2	0.260	0.255	700	700 -- HAL	Minidoka (1), Washington (1)
Metribuzin	4	3.400	0.908	70	70 -- HAL	Jefferson (1), Minidoka (1), Owyhee (1), Washington (1)
Monuron	1	0.025	0.025	NA	NA --	Fremont (1)
Norflurazon	1	0.054	0.054	96	96 -- HHBP	Elmore (1)
Oxamyl	1	0.140	0.140	200	200 -- MCL	Minidoka (1)
Pentachlorophenol	1	0.120	0.120	1	1 -- MCL	Idaho (1)
Picloram	1	0.170	0.170	500	500 -- MCL	Owyhee (1)
Prometon	3	0.820	0.370	400	400 -- HAL	Franklin (1), Idaho (1), Minidoka (1)
Simazine	6	0.088	0.053	4	4 -- MCL	Cassia (3), Minidoka (3)
Tebuthiuron	1	0.094	0.094	500	500 -- HAL	Fremont (1)
Terbacil	2	0.200	0.195	90	90 -- HAL	Ada (2)
Thiamethoxam	1	0.120	0.120	77	77 -- HHBP	Owyhee (1)
Triallate	2	3.600	2.500	4.46	4.46 -- HHBP	Fremont (1), Idaho (1)
Triclopyr	1	0.190	0.190	300	300 -- HHBP	Fremont (1)

\*Summation of Atrazine, Desethyl atrazine and Deisopropyl atrazine. All three are not always detected together.

\*\*Breakdown product(s) of Atrazine. No reference point available, Atrazine MCL of 3 µg/L is used.

MCL – EPA Maximum Contaminant Level, 2018 Edition of the Drinking Water Standards and Health Advisories

HAL – EPA Lifetime Health Advisory, 2018 Edition of the Drinking Water Standards and Health Advisories

DWEL – EPA Drinking Water Equivalent Level, 2018 Edition of the Drinking Water Standards and Health Advisories

HHBP – Human Health Benchmarks for Pesticides

µg/L or microgram per liter is approximately equivalent to parts per billion

For additional information about this program or projects, please contact Curtis Cooper, Idaho State Department of Agriculture at (208) 332-8597 or email at [WaterQuality@isda.idaho.gov](mailto:WaterQuality@isda.idaho.gov)