Idaho State Department Of Agriculture
Division Of Agricultural Resources

Regional and Local Pesticide and Ground Water Monitoring Results, 2012

ISDA Technical Summary #50

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Introduction

The Idaho State Department of Agriculture (ISDA) Ground Water Program has been implementing 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 state to conduct monitoring, and response actions associated with pesticide detections in Idaho ground water and to prevent contamination that may result in drinking water exceedances. Regional and local pesticide ground water monitoring has been conducted throughout numerous aquifers in Idaho. Monitoring of over two hundred wells occurred in 2012 for the following counties: Washington, Payette, Gem, Canyon, Owyhee, Ada, Elmore, Gooding, Jerome, Lincoln, Twin Falls, Cassia, Minidoka, Jefferson, Fremont, Idaho, Lewis, Nez Perce, and Kootenai.

The goal of the monitoring efforts has been to statistically determine the potential impacts to ground water and to conduct response monitoring in areas where there have been frequent and elevated detections. The response monitoring to implement the PMP rule has been accomplished to develop a better understanding of impacts from registered active ingredients that have been detected in Ada, Elmore, Fremont, Idaho, Nez Perce, Owyhee, and Payette Counties.

The samples collected from all wells were tested for 96 pesticides at the University of Idaho Analytical Sciences Laboratory (UIASL) and some wells were tested for Volatile Organic Compounds (VOCs) at the Idaho Bureau of Laboratory (IBOL). ISDA has worked with the UIASL to create a specialized list of analytes that are registered for use in Idaho and have potential to reach ground water.

Numerous pesticides have been detected. Response processes have been implemented primarily consisting of educational outreach. The information may be used to make regulatory and/or voluntary changes related to applications of pesticides. Reports, educational fact sheets, and education and training workshops with pesticide applicators have been completed.

Background

The Division of Agricultural Resources Ground Water Program is responsible for a variety of programs, laws, and rules for protection of ground water from pesticides. ISDA has a cooperative agreement with EPA to implement the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). Additionally, the Idaho Pesticide Management Plan (PMP), and the Rules Governing Pesticide Management Plans for Ground Water Protection (IDAPA 02.03.01) (Idaho PMP Rule) require the state to respond to pesticide detections in Idaho ground water.

The state response as outlined in these two documents is based on four distinct levels established by pesticide detection concentrations as they relate to a percentage of a reference point. A reference point is based on a health standard, such as a maximum contaminant level (MCL), lifetime health advisory level (HAL), or reference dose (RfD). The PMP Rule divides the pesticide detections into the following 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.

ISDA response actions increase and become more comprehensive as the detection level increases. The majority of the detections are lower in concentration. Most efforts are related to education and promoting Best Management Practices (BMPs) related to proper pesticide use, storage, disposal, and protection of ground water quality. This report describes the results for monitoring and trends through 2012.

Regional and Local Pesticide Monitoring Results by Project

Regional and local pesticide ground water monitoring has been conducted throughout numerous aquifers in Idaho. Monitoring of one-hundred and seventy-one (171) wells occurred in the following counties in 2012: Washington, Payette, Gem, Canyon, Owyhee, Ada, Elmore, Gooding, Jerome, Lincoln, Twin Falls, Cassia, Minidoka, Jefferson, Fremont, Idaho, Lewis, Nez Perce, and Kootenai (Table 1). The pesticides detected for 2012 are provided Table 2. There were 18 pesticides detected. The majority of the detections were in the Level 1 category.

Table 1. Summary of 2012 Pesticide Sampling of ISDA Regional Projects.

Project Number and Name	Number of Wells Sampled (171 total wells)
220: Lower Boise Regional Study	5 [1]
310: Owyhee County Local Study	6 [1, 2], 18 [3]
320: Ashton Area Local Study	1 [1]
330: Nez Perce County Local Study	4 [1]
340: Fruitland Area Local Study	5 [1]
360: Idaho County Local Study	3 [1]
530/760: Eagle Area Local Study	6 [1, 2]
710: Washington and Payette Counties Regional Study	7 [1]
730: Minidoka County Shallow Aquifer Regional Study	15 [1]
740: Minidoka County Deep Aquifer Regional Study	5 [1]
750: Jerome-Gooding-Lincoln Counties Regional Study	14 [1]
770: Payette and Gem Counties Regional Study	4 [1]
780: Twin Falls County Regional Study	13 [1]
790: Cassia County Regional Study	20 [1]
805: Middle Henrys Fork Central Basin Regional Study	5 [1]
810: Elmore Area Local Study	4 [1]
820: Rathdrum Prairie Regional Study	10 [1]

830: Mud Lake Regional Study	5 [1]
860: North Owyhee County Regional Study	4 [1]
865: Grand View and Bruneau Areas Regional Study	4 [1]
870: Northern Gooding County (Bliss) Regional Study	4 [1]
890: Hammett and Glenns Ferry Areas Regional Study	5 [1]
950: Clearwater Plateau Aquifer Regional Study	13 [1]

[1] Chlorinated Acid Pesticides (18), Organochlorine Pesticides (10), Organophosphate and nitrogen pesticides (47), Phenylurea pesticides (10), Carbamate pesticides (10). University of Idaho Analytical Sciences Laboratory (ASL).
[2] Volatile Organic Compounds, EPA 532.2, Idaho Bureau of Laboratories.
[3] Quarterly monitoring was conducted in June, September, December 2012

Water Quality Findings

A total of 171 wells were tested for various pesticides in regional and local project areas in 2012. Ninety six (96) wells out of the 171 wells sampled had positive detections. The most frequently detected pesticides were: Desethyl Atrazine (67), Atrazine (57), DCPA (34), Bromacil (16), Metribuzin (12), Bentazon (7), Hexazinone (6), 1,2,3-Trichloropropane (6), Terbacil (4), Simazine (3), Diuron (3), Methiocarb (2), Picloram (2), Metolachlor (1), Pentachlorophenol (1), Prometon (1), Tebuthiuron (1), and Triallate (1) (Table 2).

Table 2. Summary of Pesticide Detections from ISDA Regional Projects in 2012.

Pesticide	Number of Detections	Maximum Detection, Range (µg/L)	Reference Point (µg/L)	County with Detection and Number
Atrazine	57	0.70 (0.025 – 0.7)	3 (MCL)[1]	Ada (6), Canyon (3), Cassia (11), Elmore (4), Fremont (1), Jefferson (1), Jerome (1), Lincoln (1), Minidoka (7), Nez Perce (2), Owyhee (5) Payette (7), Twin Falls (7), Washington (3)
Bentazon	7	1.1 (0.2 – 1.1)	200 (HAL)[2]	Ada (1), Cassia (1), Owyhee (1), Payette (4)
Bromacil	16	1.7 (0.064 – 1.7)	70 (HAL)	Ada (1), Elmore (1), Gooding (1), Minidoka (1), Owyhee (3), Twin Falls (4), Washington (4)
DCPA (Dacthal)	34	15 (0.08 – 15)	70 (HAL)	Ada (4), Gooding (1), Idaho (2), Owyhee (22), Payette (3), Washington (2)
Desethyl Atrazine[3]	67	0.025 (0.025 - 1)	….	Ada (7), Canyon (3), Cassia (12), Elmore (4), Fremont (1), Gooding (3), Jefferson (1), Jerome (1), Minidoka (8), Nez Perce (2), Owyhee (6), Payette (7), Twin Falls (9), Washington (3)
Diuron	3	0.24 (0.025 - 0.24)	21 (HAL)[4]	Elmore (1), Minidoka (1), Nez Perce (1)
Hexazinone	6	0.13 (0.05-0.13)	400 (HAL)	Cassia (3), Minidoka (1), Twin Falls (1), Washington (1)
Methiocarb	2	0.05 (0.05)	3.5 (HAL)[4]	Fremont (2)
Metolachlor	1	0.05	700 (HAL)	Minidoka (1)
Metribuzin	12	0.12 (0.025 – 0.12)	70 (HAL)	Ada (5), Cassia (1), Fremont (1), Elmore (1), Jefferson (3), Owyhee (1)
Pentachlorophenol	1	0.13	1 (MCL)	Idaho (1)
Picloram	2	0.18 (0.15 – 0.18)	500 (MCL)	Nez Perce (1), Owyhee (1)

Prometon	1	0.05	400 (HAL)	Minidoka (1)
Simazine	3	0.095 (0.047 – 0.095)	4 (MCL)	Cassia (2), Minidoka (1)
Tebuthiuron	1	0.05	500 (HAL)	Washington (1)
Terbacil	4	0.3 (0.05 – 0.3)	90 (HAL)	Ada (4)
Triallate	1	0.86	0.45 (FQPA DWLOC)[5]	Idaho (1)
1,2,3-Trichloropropane	6	1.6 (0.05 – 1.6)	2.8 (HAL)[4]	Ada (6)

[1]MCL – EPA Maximum Contaminant Level, 2012 Edition of the Drinking Water Standards and Health Advisories
[2]HAL – EPA Lifetime Health Advisory, 2012 Edition of the Drinking Water Standards and Health Advisories
[3]Breakdown product of Atrazine, no reference point available, MCL for Atrazine of 3 µg/L is used.
[4]HAL – EPA Lifetime Health Advisory, calculated from EPA RfD listed in 2012 Edition of the Drinking Water Standards and Health Advisories
[5]FQPA DWLOC – Food Quality Protection Act Drinking Water Level of Concern value listed in EPA RED document

There were 224 positive detections of 18 pesticides in the 96 wells sampled. Eighteen (18) different types of pesticides were detected including two metabolites (Table 2). The number of pesticides detected per well were: 45 wells had one detection, 29 wells had two detections, 22 wells had three detections, 7 wells had four detections, 3 wells had five detections, and 2 wells had six detections.

The Idaho PMP Rule outlines processes to protect ground water from pesticides and defines pesticide detections based on the concentration of the detection compared to a reference point. The reference point refers to health based concentrations. Idaho has adopted the EPA's MCLs in the Idaho Ground Water Quality Rule (1997). A MCL is defined by EPA as the highest level of a contaminant that is allowed in drinking water and are an enforceable standard (EPA, 2006). Where no MCL exists, the ISDA will use EPA Lifetime Health Advisories (HAL), if they exist. A Health Advisory is defined by EPA as an estimate of acceptable drinking water levels for a chemical substance based on health effects information and is not a legally enforceable standard. The Lifetime Health Advisory (HAL) is the concentration of a chemical in drinking water that is not expected to cause any adverse noncarcinogenic effects for a lifetime of exposure (based on a 70kg-adult consuming 2 liters of water per day) (EPA, 2006). If a HAL does not exist, then an EPA Reference Dose (RfD) number is used. The EPA defines a RfD as an estimate (with uncertainty spanning perhaps an order of magnitude) of daily oral exposure to the human population that is likely to be without an appreciable risk of deleterious effects during a lifetime (EPA, 2006). Reference points can be found in numerous documents. The reference points used by ISDA to implement the PMP Rule and referred to throughout this document are found in the sources cited in Table 2.

The PMP Rule breaks the pesticide detections into detection levels as a percent of Reference Points. The majority of the detections were found in Level 1 (Table 3). Level 2 detections were found for Atrazine, Dacthal (DCPA), and 1,2,3-Trichloropropane (Table 3). Level 3 detections were found for 1,2,3-Trichloropropane (Table 3). Level 4 detections were found for Triallate (Table 3).

Table 3. Pesticide detected relative to concentration levels as a percent of Reference Points.

Ground Water Pesticide Concentration Level	Pesticides
Level 4 (> 100% of Reference Point)	Triallate
Level 3 (50% to < 100% of Reference Point)	1,2,3-Trichloropropane
Level 2 (20 to < 50% of Reference Point)	Atrazine, Dacthal (DCPA), 1,2,3-Trichloropropane
Level 1 (< 20% of Reference Point)	Atrazine, Bentazon, Bromacil, DCPA (Dacthal), Desethyl Atrazine, Diuron, Hexazinone, Methiocarb, Metolachlor, Metribuzin, Pentachlorophenol, Picloram, Prometon, Simazine, Tebuthiuron, Terbacil, Triallate, 1,2,3-Trichloropropane

Pesticide Monitoring Results by Project

Elmore County Local Project

A total of four wells were sampled for pesticides in the Elmore County Local Project. All four wells had three pesticide detections per well. All detections were below any health standards set by the EPA and were within the Level 1 category. The pesticides detected were Atrazine, Bromacil, and Desethyl Atrazine, Diuron, and Metribuzin (Table 4).

Table 4. Summary of 2012 Pesticide Results from the Elmore County Local Project.

Pesticide	No. of Detections (% of wells sampled with detection)	Range (µg/L) (Min. – Max.)	Reference Point (µg/L)
Atrazine	3 (75%)	0.025 (0.025 – 0.05)	3 (MCL)[1]
Bromacil	4 (100%)	1.56 (0.14 – 1.7)	90 (HAL)[2]
Desethyl Atrazine	3 (75%)	0.269 (0.033 – 0.27)	105 (HHBP)[3]
Diuron	1 (25%)	0.24	21 (HAL)[4]
Metribuzin	1 (25%)	0.04	70 (HAL)[2]

[1]MCL – EPA Maximum Contaminant Level.
[2]HAL – EPA Lifetime Health Advisory.
[3]HHBP – EPA Human Health Benchmark for Pesticide, Chronic Lifetime value.
[4]HAL – EPA Lifetime Health Advisory, calculated.

Eagle Local Project

Six wells in the Eagle Local study were sampled for pesticides and Volatile Organic Compounds (VOCs). The VOCs were tested due to historic detections of 1,2-Dichloropropane (1,2-DCP) and 1,2,3-Trichloropropane (1,2,3-TCP), which are breakdown products from an old formulation of a soil fumigant used in the area. The VOC 1,2,3-TCP was detected in all six wells (Table 5). The EPA Lifetime Health Advisory Level for 1,2,3-TCP is 40 µg/L (Table 5). Desethyl Atrazine was detected in all six wells, Atrazine in five wells, Metribuzin in five wells, Terbacil in four wells, DCPA (dacthal) in four wells, and Bromacil in one well. All detections were within the Level 1 category (a detection above the detection limit to less than 20% of the reference point) established by the Idaho PMP Rule and below any health standards set by the EPA.

Table 5. Summary of 2012 Pesticide Results from the Eagle Local Project.

Pesticide	No. of Detections (% of wells sampled with detection)	Range (µg/L) (Min. – Max.)	Reference Point (µg/L)
1,2,3-Trichloropropane	6 (%)	1.55 (0.05 - 1.60)	2.8 (HAL) [1]
Atrazine	5 (%)	0.0 (0.025)	3 (MCL) [2]
Bromacil	1 (%)	0.064	90 (HAL) [3]
DCPA (Dacthal)	4 (%)	0.14 (0.08 – 0.22)	70 (HAL)
Desethyl Atrazine [4]	6 (%)	0.011 (0.045 – 0.056)	…[4]
Metribuzin	5 (%)	0.026 (0.025 – 0.051)	70 (HAL)
Terbacil	4 (%)	0.25 (0.05 – 0.3)	90 (HAL)

[1]HAL – EPA Lifetime Health Advisory, calculated from EPA RfD listed in 2012 Edition of the Drinking Water Standards and Health Advisories
[2]MCL – EPA Maximum Contaminant Level.
[3]HAL – EPA Lifetime Health Advisory.
[4]Breakdown product of Atrazine. No reference point available, MCL for Atrazine of 3 µg/L is used.

Ashton Local Project

The elevated concentrations of Triallate in one well east of Ashton led to the development of the Fremont County Local Project. Also, there has been another well with elevated Atrazine and Desethyl Atrazine that has continued to be sampled. A variety of wells in the area have been selected in order to characterize the extent of elevated Triallate and Atrazine concentrations in the ground water.

Five wells were sampled for pesticides in 2012 and four wells had positive detections (Table 6). All detections were below any health standards and were within the Level 1 category. Methiocarb was detected in two of the five wells sampled. Atrazine, Desethyl Atrazine, and Metribuzin were detected once each. For the second year in a row, Triallate was not detected in the well that has had the elevated Triallate for a number of years. A summary of the pesticide detections from the 2012 monitoring effort is presented in Table 6.

Table 6. Summary of 2012 Pesticide Results from the Fremont County Local Project.

Pesticide	No. of Detections (% of wells sampled with detection)	Range (µg/L)	Reference Point (µg/L)
Atrazine	1 (%)	0.14	3 (MCL) [1]
Desethyl Atrazine	1 (%)	0.23	…[2]
Methiocarb	2 (%)	0.0 (0.05)	3.5 (HAL) [3]
Metribuzin	1 (%)	0.12	70 (HAL) [4]

[1]MCL – EPA Maximum Contaminant Level.
[2]Breakdown product of Atrazine. No reference point available, MCL for Atrazine of 3 µg/L is used.
[3]HAL – EPA Lifetime Health Advisory, calculated from EPA RfD listed in 2012 Edition of the Drinking Water Standards and Health Advisories
[4]HAL – EPA Lifetime Health Advisory, 2012 Edition of the Drinking Water Standards and Health Advisories

The trend for Triallate in well 8052801 is displayed in Figure 1. Triallate is a commonly used herbicide for grain crops in eastern Idaho. Triallate has been nondetect in 2011 and 2012 after being elevated a few times over the drinking water reference point of 0.45 µg/L since the first sampling in 1998. Without an

established MCL, HAL, or RfD for Triallate; then the Food Quality Protection Act (FQPA) Drinking Water Level of Concern (DWLOC) value of 0.45 µg/L is utilized.

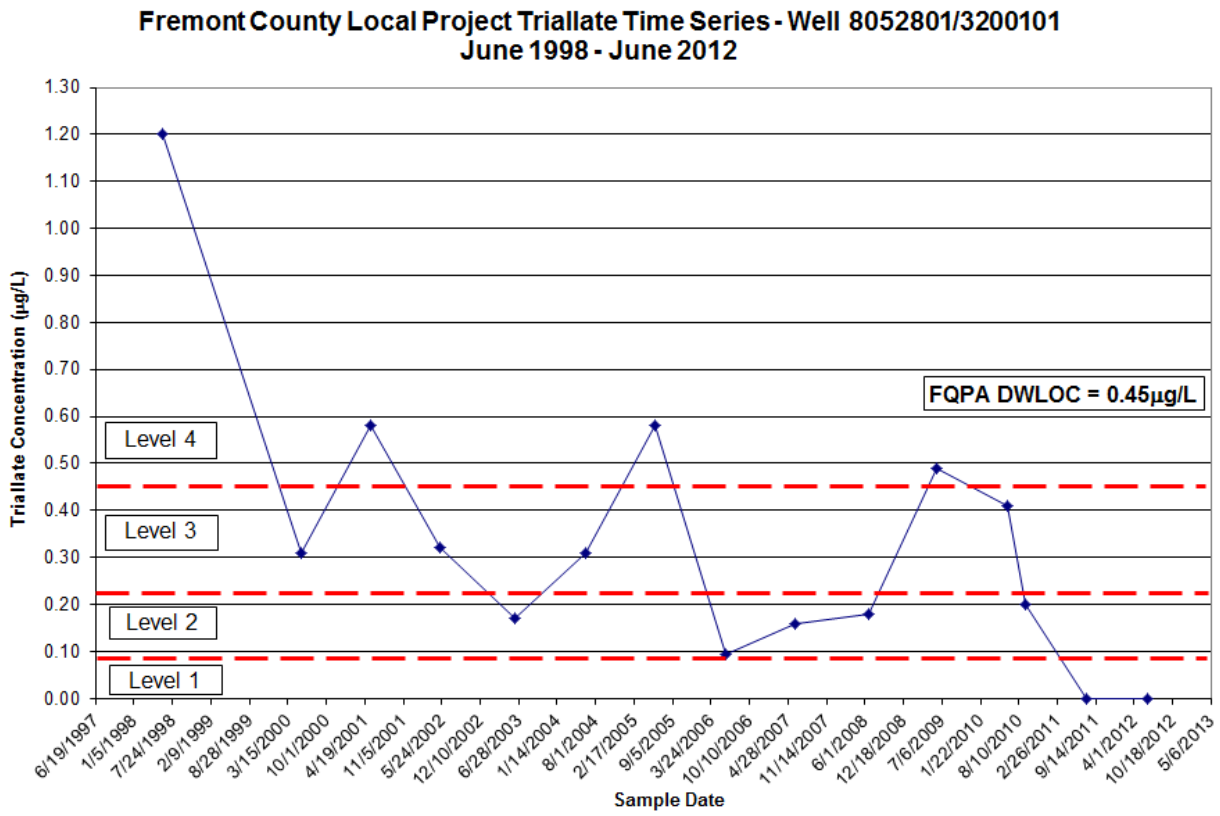

Figure 1. Time series trend for Triallate in well east of Ashton, Idaho.

Atrazine, Desethyl Atrazine, and Deisopropyl Atrazine were first detected in 2003 in well 8053501 east of Ashton (Figure 2). The original detections were lower in concentration and considered Level 1 detections. In 2006 the concentrations detected were a Level 3 Atrazine and Level 2 Desethyl Atrazine detection. The combined concentrations were Level 4 concentrations. The concentrations were found to be lower in 2007 and were Level 1 detections. The concentrations have been Level 1 since 2007. The trend for Atrazine and Desethyl Atrazine is displayed in Figure 2. Other pesticides have been detected in well 8053501 including Monuron and 2,4-D.

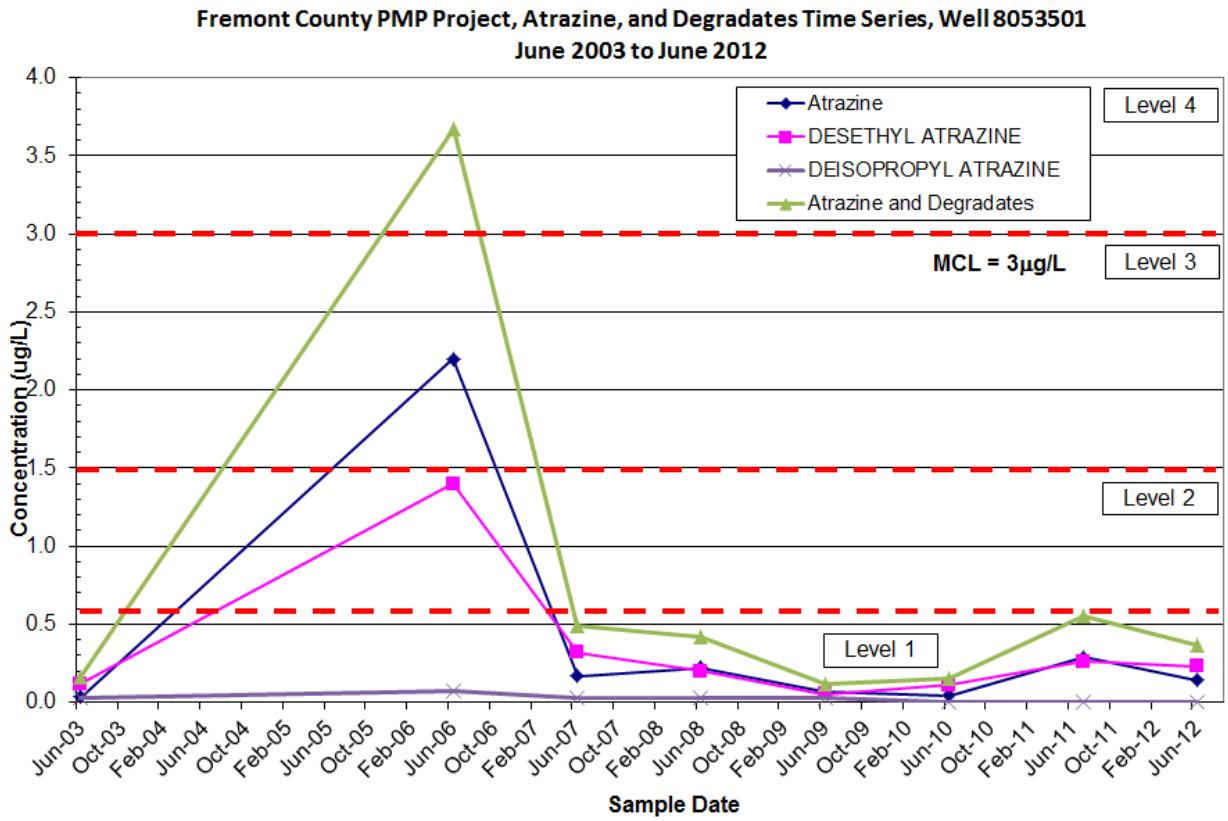

Figure 2. Time series trend for Atrazine, Desethyl Atrazine, Deisopropyl Atrazine and combined concentrations in a well east of Ashton, Idaho.

Fruitland Local Project

A total of five wells were sampled for pesticides in 2012. Previous elevated detections of Atrazine and Desethyl Atrazine have been of concern. The three wells studied over time continue to have Atrazine and Desethyl Atrazine detections at low concentrations within the Level 1 category (Table 7). There were also detections of Bentazon and DCPA (Dacthal) in two of the wells (Table 7). All pesticide detections in the follow up sampling were below any health standards set by EPA or the state of Idaho.

Table 7. Summary of 2012 Pesticide Results from sampling five wells for the Fruitland Local Project.

Pesticide	No. of Detections (% of wells sampled with detection)	Range (µg/L) (Min. – Max.)	Reference Point (µg/L)
Atrazine	3 (60%)	0.075 (0.025 – 0.1)	3 (MCL) [1]
Bentazon	2 (40%)	0.2	200 (HAL) [2]
DCPA (Dacthal)	2 (40%)	1.49 (0.21 – 1.7)	70 (HAL) [2]
Desethyl Atrazine	3 (60%)	0.067 (0.053 – 0.12)	….[3]

[1]MCL – EPA Maximum Contaminant Level.
[2]HAL – EPA Lifetime Health Advisory. 2012 Edition of the Drinking Water Standards and Health Advisories
[3]Breakdown product of Atrazine. No reference point available, MCL for Atrazine of 3 µg/L is used.

The Atrazine and Desethyl Atrazine concentrations in wells 3400101, 3400501 and 3400801 have been tracked over time to determine if the concentration trend (Figures 3 and 4). Atrazine and Desethyl Atrazine concentrations in all three wells have decreased into the Level 1 category in 2008 and 2009 (Figures 3 and 4). In general, a similar pattern of degradation and decrease in concentration has been observed for the three wells.

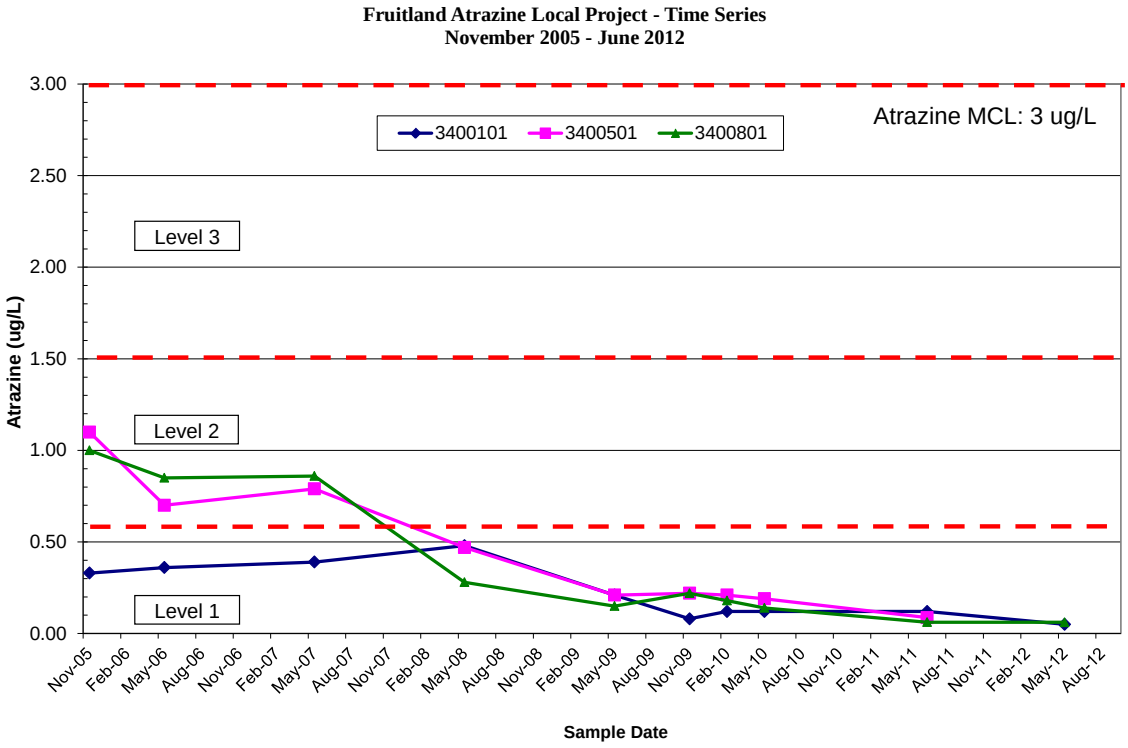

Figure 3. Time series trend for Atrazine in three wells sampled over time near Fruitland, Idaho.

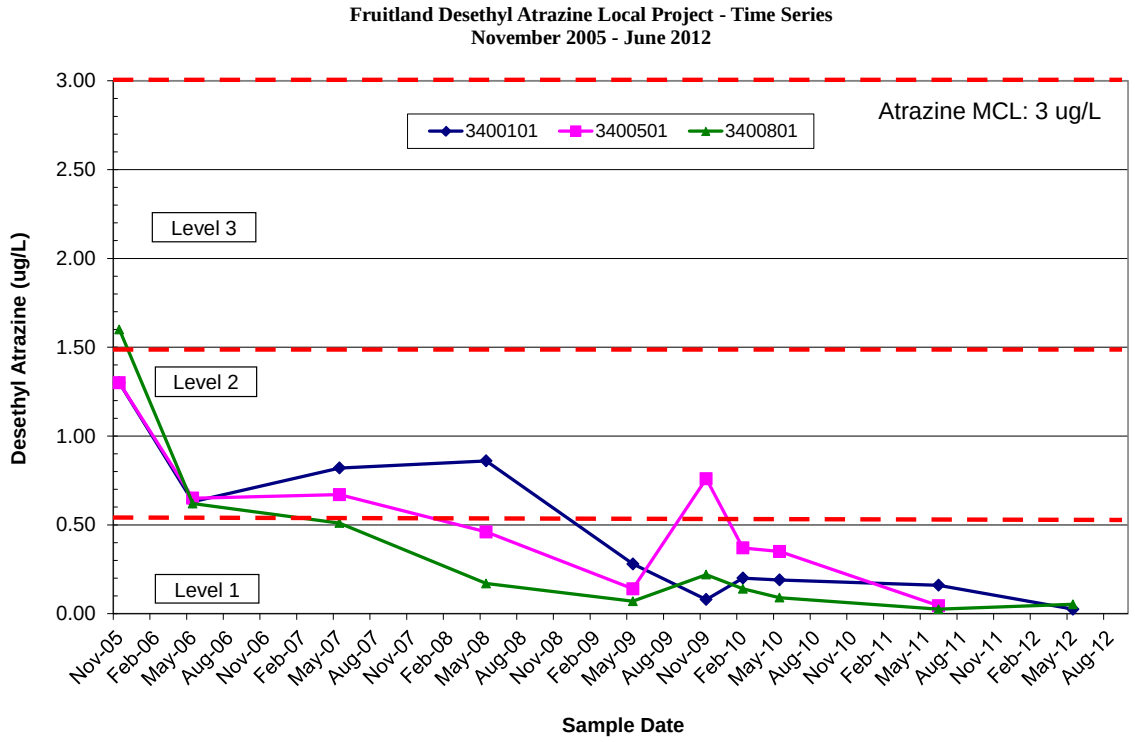

Figure 4. Time series trend for Desethyl Atrazine in three wells sampled over time near Fruitland, Idaho.

Owyhee Local Project

The local project located in northwest Owyhee Country is designed to evaluate wells and Dacthal (DCPA) over time as a part of the Dacthal (DCPA) PMP that was established in 2007. DCPA was prohibited from use in an area south of Homedale near well ID 8601101. Wells southwest of Homedale have been sampled in response to an elevated detection of DCPA in a well (well ID 8601101) originally part of the North Owyhee County Regional Project. A total of ten wells in the area were sampled in June 2012. Six of those ten were sampled quarterly since June 2012.

Nine of the ten wells had DCPA detections with a high concentration of 15 µg/L in well 8601101, which is a Level 2 detection (Table 8). The pesticides Atrazine, Bentazon, Bromacil, Desethyl Atrazine, and Picloram were all detected once each at the Level 1 concentration (Table 8). Quarterly monitoring occurred in six wells in June, September, and December 2012 and March 2013. Results are displayed in Tables 9, 10, and 11. The trend for DCPA in well 8601101 is displayed in Figure 5. The concentration of DCPA has decreased from over 80 µg/L in 2005 to consistently less than 30 µg/L since 2009. Quarterly monitoring in 2012 showed the concentrations to be in the Level 1 category and in March 2012 DCPA was found to be 27 µg/L, which is in the Level 2 category (Figure 5). Tracking the trend in well 8601101 and other wells nearby will be important in determining if the management approach is working to protect ground water in this area.

Table 8. Summary of 2012, June Regional Project Pesticide Results from the Owyhee County Regional Project. Ten wells were sampled near Homedale and Marsing, Idaho.

Pesticide	No. of Detections (% of wells sampled with detection)	Range (µg/L) (Min. – Max.)	Reference Point (µg/L)
Atrazine	1 (10%)	0.025	3 (MCL) [1]
Bentazon	1 (10%)	0.52	200 (HAL) [2]
Bromacil	1 (10%)	0.24	70 (HAL) [2]
DCPA (dacthal)	9 (90%)	14.92 (0.08 – 15)	70 (HAL) [2]
Desethyl Atrazine	1 (10%)	0.028	---[3]
Picloram	1 (10%)	0.150	500 (HAL) [2]

[1]MCL – EPA Maximum Contaminant Level.
[2]HAL – EPA Lifetime Health Advisory.
[3]Breakdown product of Atrazine. No reference point available, MCL for Atrazine of 3 µg/L is used.

Table 9. Summary of September 2012 Quarterly Pesticide Results from the Owyhee County DCPA (Dacthal) PMP Project. Six wells were sampled near Homedale and Marsing, Idaho.

Pesticide	No. of Detections (% of wells sampled with detection)	Range (µg/L) (Min. – Max.)	Reference Point (µg/L)
Bromacil	1 (16%)	0.24	70 (HAL) [1]
DCPA (dacthal)	6 (100%)	9.7 (5.3 – 15)	70 (HAL) [1]

[1]HAL – EPA Lifetime Health Advisory.

Table 10. Summary of December 2012 Quarterly Pesticide Results from the Owyhee County DCPA (Dacthal) PMP Project. Six wells were sampled near Homedale and Marsing, Idaho.

Pesticide	No. of Detections (% of wells sampled with detection)	Range (µg/L) (Min. – Max.)	Reference Point (µg/L)
Bromacil	1 (16%)	0.110	70 (HAL) [1]
DCPA (dacthal)	6 (100%)	12.23 (0.17 – 13)	70 (HAL) [1]
Desethyl Atrazine	1 (16%)	0.025)	---[3]

[2]HAL – EPA Lifetime Health Advisory.
[3]Breakdown product of Atrazine. No reference point available, MCL for Atrazine of 3 µg/L is used.

Table 11. Summary of March 2013 Quarterly Pesticide Results from the Owyhee County DCPA (Dacthal) PMP Project. Six wells were sampled near Homedale and Marsing, Idaho.

Pesticide	No. of Detections (% of wells sampled with detection)	Range (µg/L) (Min. – Max.)	Reference Point (µg/L)
Bromacil	1 (16%)	0.05	70 (HAL) [1]
DCPA (dacthal)	5 (83%)	24.1 (2.9 – 27)	70 (HAL) [1]
Desethyl Atrazine	1 (16%)	0.025	---[2]
Simazine	1 (16%)	0.025	4 (MCL) [3]

[2]HAL – EPA Lifetime Health Advisory.
[2]Breakdown product of Atrazine. No reference point available, MCL for Atrazine of 3 µg/L is used.
[3]MCL – EPA Maximum Contaminant Level.

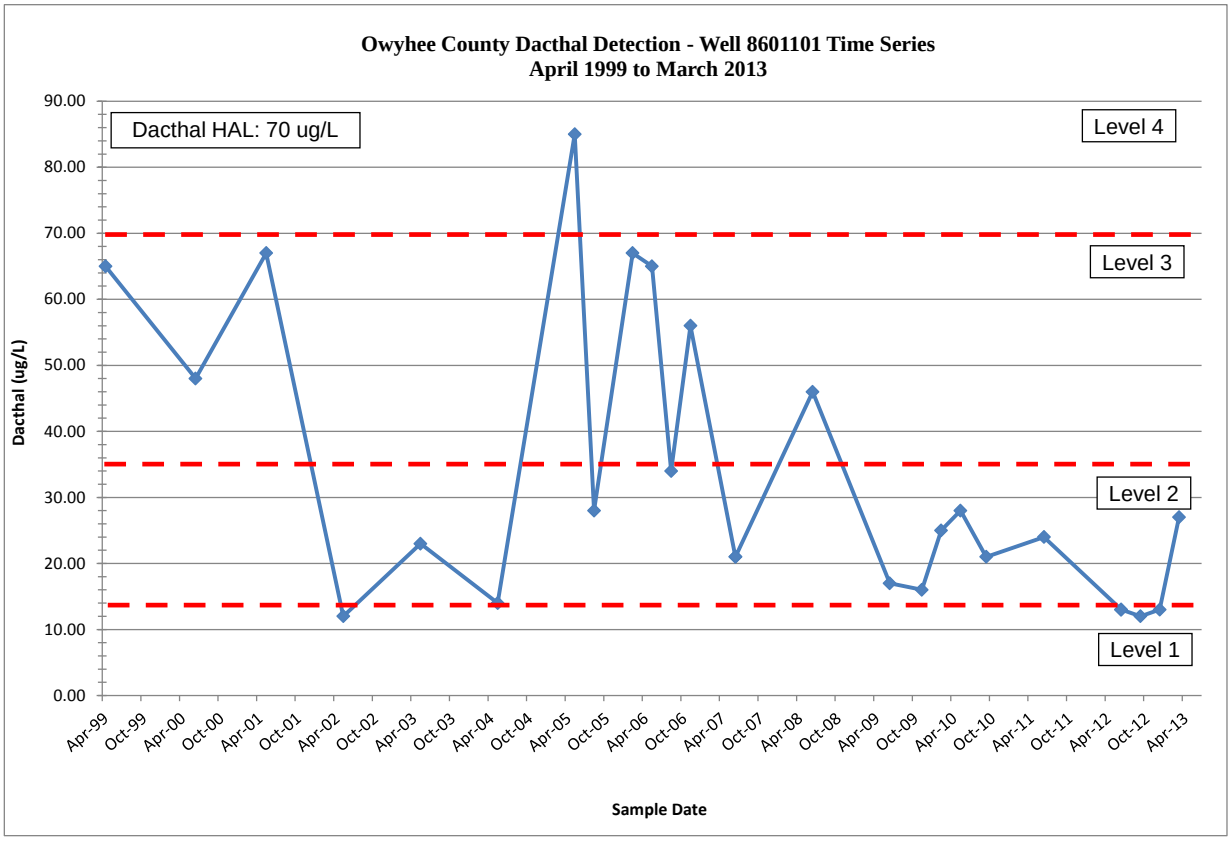

Figure 5. Trend for Dacthal (DCPA) concentrations in well 8601101 southwest of Homedale, Idaho.

Nez Perce County Local Project

The Nez Perce County local project is located in Nez Perce County 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 Study in 2001. Four wells were sampled in 2012 including well 3100101 which has had elevated Atrazine and Desethyl Atrazine.

Atrazine and Desethyl Atrazine were detected in two wells and the concentrations were below the individual reference points for these pesticides (Table 12). The other pesticides detected were Diuron and Picloram and those detections were below reference points (Table 12).

Table 12. Summary of 2011 Pesticide Results from the Nez Perce County Atrazine PMP Project. Five wells were sampled south of Lewiston, Idaho.

Pesticide	No. of Detections (% of wells sampled with detection)	Range (µg/L) (Min. – Max.)	Reference Point (µg/L)
Atrazine	2 (40%)	0.32 (0.035 – 0.67)	3 (MCL)[1]
Desethyl Atrazine	2 (40%)	0.904 (0.096 – 1.0)	….[3]
Diuron	1 (20%)	0.025	21 (HAL)[4]
Picloram	1 (20%)	0.18	….

[1]MCL – EPA Maximum Contaminant Level.
[2]HAL – EPA Lifetime Health Advisory.
[3]Breakdown product of Atrazine. No reference point available, MCL for Atrazine of 3 µg/L is used.
[4]FQPA DWLOC– Food Quality Protection Act Drinking Water Level of Concern.

Atrazine and Desethyl Atrazine have similar toxicological effects and when found in the same well the detections can be additive to determine health risk. The combined concentration of these pesticides should be below 3 µg/L to be under the reference point. Individually the pesticides are Level 2 detections, and combined they are a Level 3 concentration (Figure 6). The concentrations were in the Level 3 and Level 4 categories respectively as recently as 2009 (Figure 6).

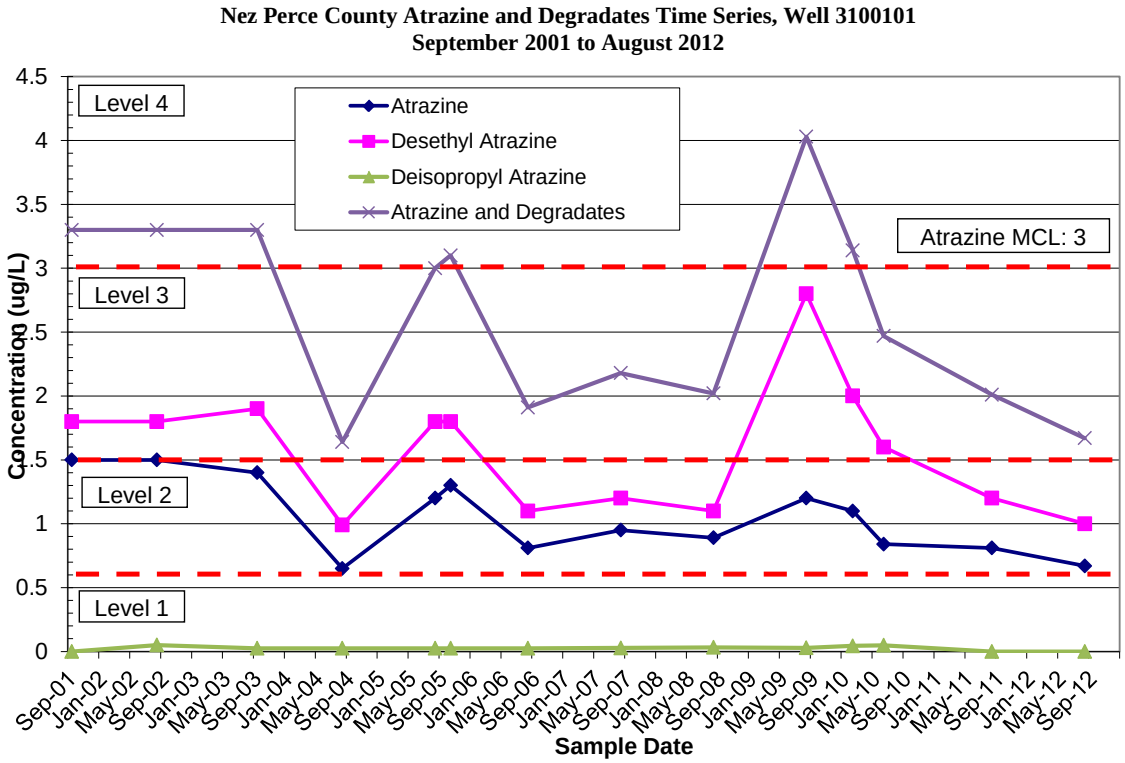

Figure 6. Time-series plot of Atrazine and Desethyl Atrazine concentrations detected in well 3300101.

Idaho County Local Project

Three wells north of Greencreek were sampled for pesticides in 2012 as part of the Greencreek Triallate Local project. These wells are also sampled as part of the Clearwater Plateau Regional Study. The well with the Triallate detection had a Level 4 detection (a detection above the reference point) of Triallate. Pentachlorophenol was also detected. ISDA has worked with the well owner for a number of years with various topics including having the registrant drill the owner a new well to hopefully provide improved well construction and water quality. The 2012 monitoring results for this one well are presented in Table 13. The other wells sampled did not have any detections

Table 13. Summary of 2010 Pesticide Results from the Greencreek Triallate PMP Project. Two wells were sampled east of Ferdinand, Idaho.

Pesticide	No. of Detections (% of wells sampled with detection)	Range (µg/L)	Reference Point (µg/L)
Pentachlorophenol	1 (50%)	0.13	
Triallate	1 (50%)	0.86	0.45 (FQPA DWLOC)[1]

[1]FQPA DWLOC – Food Quality Protection Act Drinking Water Level of Concern.

The Triallate trend plot since July 2001 is displayed in Figure 7. The concentrations were nondetect for a couple of years after the new well was completed. Since 2004, the concentrations have risen to nearly 1 µg/L (Figure 7).

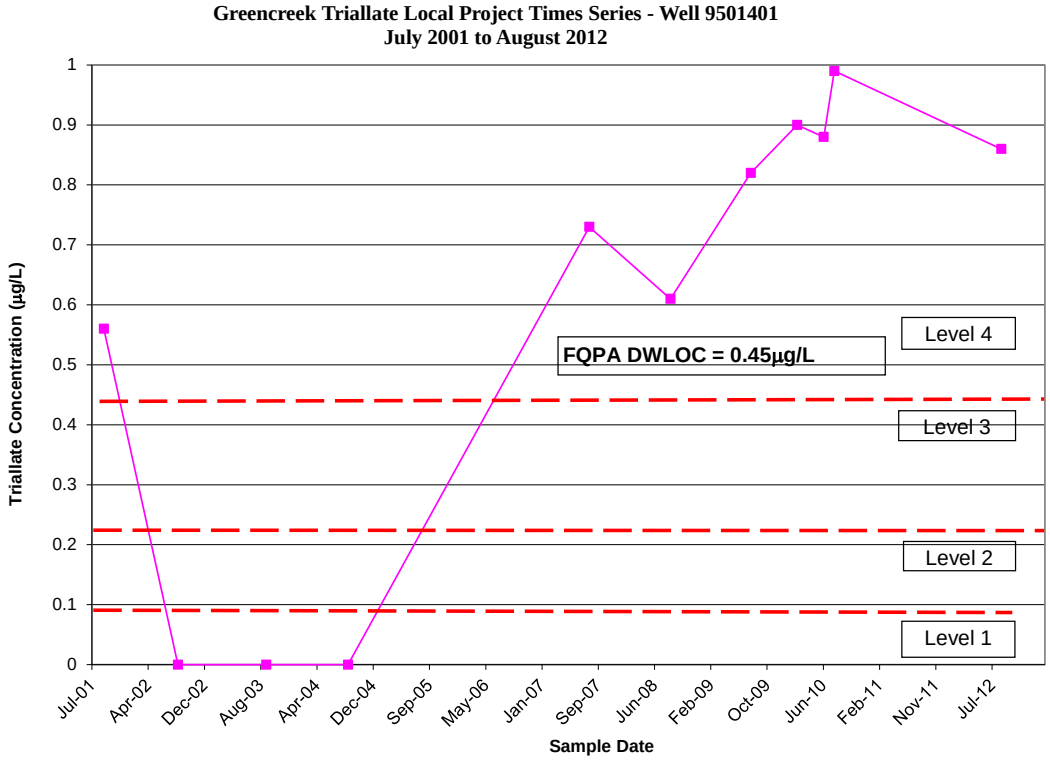

Figure 7. Time-series plot of Atrazine and Desethyl Atrazine concentrations detected in well 3300101.

Summary

The ISDA Ground Water Program implemented a wide variety of ground water monitoring projects and protection activities related to agriculture for the state of Idaho during 2012. There are numerous distinct and active ground water projects ongoing across the state, including regional monitoring projects, local monitoring projects, and Pesticide Management Plan (PMP) response monitoring projects. ISDA follows the Idaho PMP Rule to determine response actions following detections.

Testing of regional, local, PMP, and discretionary type 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. The most frequent detections occur in the shallow alluvial and basalt aquifers in Ada, Cassia, Elmore, Fremont, Idaho, Minidoka, Nez Perce, Owyhee, Payette, and Washington Counties. There were numerous wells with multiple low level detections of pesticides. However, most detections are less than 20% of health-based standards. A majority of wells in 2012 had detections of one or more pesticides. There are some pesticides that continue to be detected over 20% of a health-based reference point. ISDA is responding to those situations with education, use inspections, and promotion of management techniques. There are concerns in certain areas where multiple low level pesticides are detected in individual wells. Some wells also have detections of active ingredients and breakdown products that may have similar, but unknown human health toxicological effects.

ISDA is conducting annual evaluations of pesticides to determine which pesticides are of greatest concern. ISDA utilizes the monitoring data, the pesticide evaluation process, and the Idaho PMP Rule to determine response measures. ISDA utilizes the EPA POINTs data assessment process during the implementation and education planning phases. Water quality and pesticide information was presented at nine educational workshops across the state to help inform the farming community of ground water quality concerns related to pesticides and efforts that can be used to protect overall ground water quality. In addition to the workshops, educational material related to pesticides and water quality was disseminated at two ground water quality open houses. Monitoring results are provided to the various state coordination committees.

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 followup and discretionary monitoring in 2013 and 2014. ISDA may initiate additional quarterly monitoring in certain project areas in 2013.

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 in the area. ISDA staff will present the information to the PMP Advisory Committee, and implement the provisions of the Idaho PMP Rule.

Acknowledgments

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