



Idaho State Department of Agriculture



Ground Water Program Annual Report

For 2010





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Special thanks go to private well owners who have given permission and access to their property to conduct monitoring activities. We greatly appreciate their participation. ISDA monitoring activities involve the testing of privately owned domestic wells. The ISDA Ground Water Program monitoring network would not exist if not for their assistance.

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Abstract

The Idaho State Department of Agriculture (ISDA) Ground Water Program implements monitoring and protection activities related to agriculture across the state of Idaho. The goal of this program is to evaluate ground water quality in areas that may be impacted by agriculture and determine appropriate measures to prevent future ground water degradation. Evaluation efforts focus on the establishment of adequate ground water monitoring projects in areas susceptible to water quality problems to determine the extent, degree, and sources of contamination in agricultural areas. ISDA then implements educational, voluntary, and regulatory efforts as well as technical assistance to state, federal, local, and private entities to help correct problems that are contributing to ground water quality problems.

In 2010, the ISDA Ground Water Program monitored 24 ground water projects. Seventeen of these projects were regional projects, two were local pesticide projects, and five were Pesticide Management Plan related projects. Water quality findings from these 24 active projects indicate impacts to ground water from pesticides. The majority of detections are low in concentration and below health based standards.

Pesticide testing of regional, local, and discretionary type projects resulted in numerous detections in ground water; however, the majority of the detections were less than 20% of drinking water or health-based standards. In 2010, 127 out of 213 wells sampled had 334 positive pesticide detections in 160 sampling events. In 2010, six wells out of the 213 wells tested for pesticides had levels that exceeded 20% of a drinking water or health-based standard, requiring additional response activities. The wells that had detections greater than 20% are located in Fremont, Owyhee, Nez Perce, and Idaho Counties.

ISDA Ground Water Program staff initiates, participates in, or provides technical assistance for many ground water protection activities throughout Idaho every year. In 2010, the Ground Water Program facilitated or participated in 11 educational workshops and public outreach meetings across the state.

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Introduction

Scope

The purpose of this document is to report on Idaho State Department of Agriculture (ISDA) Ground Water Program activities regarding monitoring and protection of Idaho ground water in agricultural areas of the state. The report provides a general overview of the ISDA Ground Water Monitoring Program and a more detailed synopsis of ground water monitoring efforts in 2010. Monitoring from prior years and trend analysis over multiple years of monitoring is addressed in other ISDA Ground Water Program reports. These reports can be found on ISDA's website at www.agri.idaho.gov/Categories/Environment/water/gwReports.php.

Ground Water Monitoring Program Overview

ISDA's ground water quality monitoring effort is multifaceted to provide data and information to ISDA programs and for compliance with other Idaho plans, laws, and rules. ISDA conducts ground water monitoring activities that fall within distinct categories to fulfill a variety of needs and requirements. The general categories with a brief explanation are listed in the following subsections.

Regional Ground Water Monitoring

The ISDA regional monitoring projects are located in areas where there is a moderate to high concern that ground water quality is susceptible to degradation from agricultural practices. The sampling design relies on a stratified random sampling framework. To determine new regional monitoring projects, ISDA utilizes data and information from the Idaho Department of Water Resources (IDWR) Statewide Ground Water Monitoring Network and other agency reports. Also, products created from the Idaho Department of Environmental Quality (IDEQ) led Ground Water Monitoring Technical Committee have been used to help determine new regional monitoring project locations

The establishment of a coordinated regional ground water quality monitoring effort is important for the overall protection of ground water quality in Idaho. The basis for developing a regional monitoring effort can be found in numerous documents including the: Ground Water Quality Protection Act of 1989, Idaho Ground Water Quality Plan, Agricultural Ground Water Quality Protection Program for Idaho; 2008 Idaho Ground Water Protection Interagency Cooperative Agreement; and the Pesticide Laws, Rules, and Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Cooperative Agreement with the U.S. Environmental Protection Agency (EPA).

Local Ground Water Monitoring

Local ground water monitoring involves data collection in areas that are less than ten square miles. Local monitoring most effectively addresses determination of sources of contamination. ISDA conducts local monitoring activities related to pesticides. Local monitoring is often in response to isolated pesticide detections or enforcement complaints.

EPA Funded Discretionary Ground Water Monitoring

Annual funding from EPA Region 10 is available for special ground water and pesticide monitoring projects. The funding can be used for additional monitoring at new sites or wells or additional pesticide parameters can be added. Recent past projects have included testing ground water wells within the Boise City limits, added pesticides that have never been tested before in Idaho, and testing existing wells for carbamates.

Protection Activities Overview

Ground water quality protection related to agriculture has been a focus in Idaho. The Idaho State Legislature passed the Ground Water Act (1989) and the Ground Water Quality Plan (1992) for overall guidance and protection of ground water. The Agricultural Ground Water Quality Protection Program for Idaho was passed by the Idaho Legislature, and signed by Governor Batt in 1995 and printed in 1996. ISDA is the lead agency in implementing the Agricultural Ground Water Quality Protection Program for Idaho (1996) through the Agricultural Ground Water Coordination Committee which meets quarterly. These plans and efforts are implemented in coordination with the Idaho Agricultural Pollution Abatement Plan (APAP) and various cooperating agencies.

The goal of the Agricultural Ground Water Quality Protection Program for Idaho (1996) is to protect the state's ground water and interconnected surface water from contamination originating from agricultural activities. The purpose of the program is to describe the management approaches to prevent ground water contamination and to respond to the occurrence(s) of such ground water contamination. Some of the objectives of the program are to: identify agricultural sources of ground water contamination, identify and describe the management approaches, identify and describe implementation strategies, and identify roles and responsibilities of agencies involved in the protection of ground water quality.

These potential agricultural contaminant sources and their impacts are, in part, addressed through education, BMPs, and potential regulations. Pollutant sources such as pesticides are currently being addressed through regulations. Nonpoint source issues related to ground water protection, such as general agriculture and pesticide use, are to be addressed through education and projects where voluntary BMPs are being implemented. Coordination with agricultural groups, pesticide applicators, and local groups is important. Coordination with agencies such as the Idaho Soil Conservation Commission (ISCC), Idaho Soil Conservation Districts (SCDs), and the Natural Resources Conservation Service (NRCS) is also important. Rule development may be necessary when education and BMPs does not work.

Regional Ground Water Quality Projects

Site Selection

ISDA regional project locations are based on review of data from a variety of sources including the: IDWR Statewide Ambient Ground Water Program, IDEQ Public Water Supply Database, and USGS ground water quality database. ISDA evaluates these data sources in addition to site recommendations from other agency water quality professionals for new regional project locations. ISDA Ground Water Program staff meet regularly to determine the need for new regional projects and to consider continuation or discontinuation of existing projects based on available data and

funding availability. ISDA Ground Water Program staff discusses this information with other state and federal water quality professionals at the Agricultural Ground Water Quality Coordination Committee during quarterly meetings each year. Current regional project locations are situated in areas known to have concerns for nitrate and/or pesticides in ground water.

Design

The sampling design relies on a stratified random sampling framework. To determine the regional strata (aquifers), ISDA utilizes data and information from the IDWR Statewide Ground Water Monitoring Network. Also, products created from the Idaho Ground Water Monitoring Technical Committee have been used recently to determine new ISDA regional strata. Homogenous aquifer areas are delineated and considered strata and then the areas become part of numerous ISDA ground water monitoring projects. Under the stratified random sampling regime, sections are randomly selected and one well is randomly selected per section. The statistical element to be tested is a qualifying well (Table 1). A qualifying well is a well that: has a confirmed well log, has a confirmed owner and location, can be easily accessed, and can be sampled at an outdoor faucet that does not have any filters, surge tanks, chlorination devices, or water softening devices between the well and faucet. A statistical unit is a section of land (Table 1). A statistical population can be obtained within sections that are within the boundaries of each regional ground water strata (Table 1). A statistical frame consists of maps of sections of land within each regional ground water strata (Table 1). A statistical probability analysis then is completed on preexisting water quality data to determine the number of wells needed to be monitored to provide an overall high probability of defining the true water quality of a given strata.

Table 1. Project design: statistical categories and factors.

Statistical Category	Statistical Factor
Element	A qualifying well
Sampling Unit	A section of land
Population	Sections in each of the regional ground water strata
Frame	Detailed map of sections of land in each of the regional ground water strata

Each regional project was designed to be sampled for five years on an annual basis for nutrients, common ions, and pesticides. Many of the projects have been extended beyond the original five-year plan to better understand the conditions and to evaluate trends in nitrate and pesticide concentrations in ground water. Pesticide results from the first year are evaluated to determine the extent of future pesticide monitoring. If there are limited detections the first year, further monitoring for pesticides occurs during the third and fifth sampling years. Subsequent long term monitoring is addressed in the fifth year of each project. Pesticide sampling at those wells that have pesticides detected at greater than 20 percent (%) of a reference point (health-based standard) commonly is continued in the following year and local project activities may be initiated if follow-up testing result warrant increased attention. All projects require a project monitoring plan to be written prior to formal project sampling. Nitrate and other nutrients are no longer included in the ground water monitoring conducted by ISDA's Ground Water Program.

Standard Operating Procedures

For all projects and monitoring activities, ISDA Ground Water Program staff adheres to established Standard Operating Procedures (SOPs) written by ISDA Ground Water Program staff and kept on file at ISDA. These protocols establish set guidelines for monitoring projects, monitoring wells, quality control and assurance, shipping and handling, laboratory requirements, and other protocols essential to quality work. ISDA staff also follows the ISDA Quality Management Plan (QMP), and Quality Assurance Project Plan (QAPP) which meets EPA standards and concurrence.

Current Project Areas

The ISDA Ground Water Program currently has established regional monitoring activities through a total of 17 distinct projects throughout the state (Figure 1). In 2010, 16 of the 17 regional projects were considered active and thus monitored for pesticides. Projects are named relative to their respective regional part of the state and are assigned distinct project numbers for tracking purposes. Regional projects have been started at a variety of times over the last 14 years and thus are in different stages in terms of duration (Table 2). In 2010, the number of wells sampled per active regional project area ranged from 4 to 18 with a total of 157 wells sampled as part of the overall regional sampling effort (Tables 2 and 3). The Rathdrum Prairie Project (820) was inactive for several years due to the determination of good water quality relative to agrichemicals over the initial five years of monitoring; however, select wells from this project were resampled in 2010 in addition to eight new wells within the project area, to reassess the status of water quality in the area. The Eastern Snake River Plain Project (840) was not sampled in 2010, due to the determination of good water quality relative to agrichemicals over the initial five years of monitoring. Future testing of these projects will be completed to determine if good water quality is being maintained.

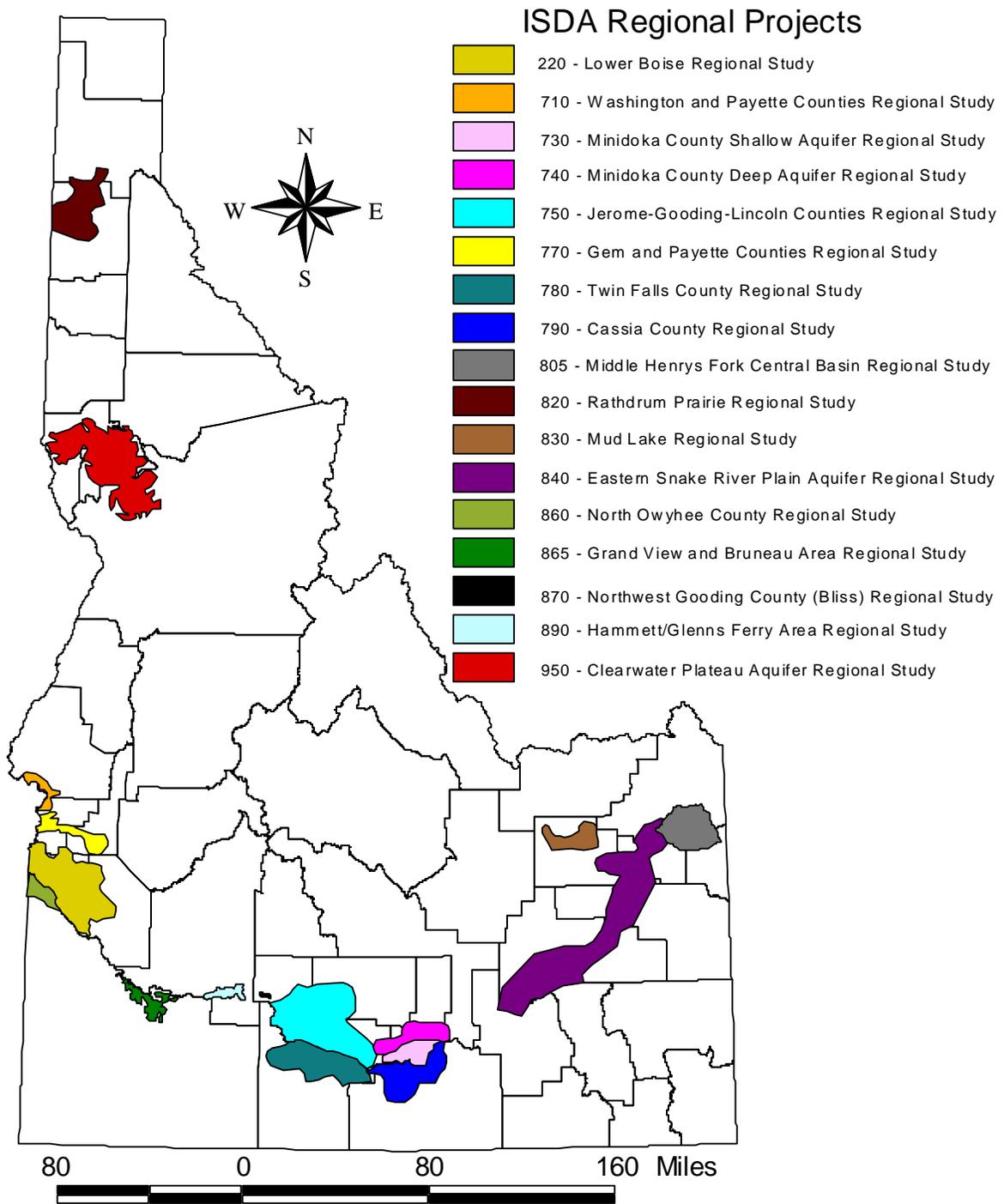


Figure 1. Map of Idaho showing locations of ISDA’s 17 regional project areas. Project 840 was not sampled in 2010.

Table 2. ISDA Regional Project Monitoring Information for 2010.

Project No.	Project Name	Start Year	Status (2010)	Number (No.) of Wells in Project	No. of Wells Tested for Inorganic Compounds (2010)	No. of Wells Tested for Pesticides (2010)
220	Lower Boise Basin Regional Study	2003	active	64	0	11
710	Washington and Payette Counties Regional Study	1996	active	50	0	18
730	Minidoka County Shallow Aquifer Regional Study	1997	active	43	0	14
740	Minidoka County Deep Aquifer Regional Study	1997	active	48	0	5
750	Jerome-Gooding-Lincoln Counties Regional Study	1997	active	74	0	10
770	Payette and Gem Counties Regional Study	1998	active	44	0	8
780	Twin Falls County Regional Study	1998	active	72	0	12
790	Cassia County Regional Study	1998	active	46	0	13
805	Middle Henrys Fork Central Basin Regional Study	2003	active	48	0	7
820	Rathdrum Prairie Regional Study	1998	active	42	0	15*
830	Mud Lake Regional Study	1998	active	31	0	5
840	Eastern Snake Plain Aquifer Regional Study	1998	inactive	64	0	0
860	North Owyhee County Regional Study	1999	active	26	0	9
865	Grand View and Bruneau Areas Regional Study	2006	active	25	0	7
870	Northern Gooding County (Bliss) Regional Study	1999	active	17	0	4
890	Hammett/Glenns Ferry Areas Regional Study	2008	active	20	0	6
950	Clearwater Plateau Aquifer Regional Study	2001	active	69	0	13

*Seven existing wells and eight new wells were sampled for pesticides in 2010.

General Results for Regional Monitoring Projects

A total of 157 wells were tested for various pesticides in 16 regional project areas in 2010 as part of regional monitoring efforts. The 16 regional projects tested for pesticides included: Lower Boise Regional Study (220), Washington and Payette Counties Regional Study (710), Minidoka County Shallow Aquifer Regional Study (730), Minidoka County Deep Aquifer Regional Study (740), Jerome-Gooding-Lincoln Counties Regional Study (750), Payette and Gem Counties Regional Study (770), Twin Falls County Regional Study (780), Cassia County Regional Study (790), Middle Henrys Fork Central Basin Regional Study (805), Rathdrum Prairie Regional Study (820), Mud Lake Regional Study (830), North Owyhee County Regional Study (860), Grand View and Bruneau Areas Regional Study (865), Northwest Gooding County (Bliss) Regional Study (870), Hammett and Glens Ferry Areas Regional Study (890) and the Clearwater Plateau Aquifer Regional Study (950). The pesticide testing involved sampling wells with historic pesticide concentrations. The regional projects tested for pesticides in 2010, the number of wells sampled, and the type of pesticide analysis performed is displayed in Table 4.

Table 4. Summary of 2010 Pesticide Sampling of ISDA Regional Projects.

Project Number and Name	Number of Wells Sampled	Analysis Method UI Analytical Sciences Laboratory
220: Lower Boise Regional Study	11	507, 508, 515.1, 632
710: Washington and Payette Counties Regional Study	18	507, 508, 515.1, 531.1, 632
730: Minidoka County Shallow Aquifer Regional Study	14	507, 508, 515.1, 632
740: Minidoka County Deep Aquifer Regional Study	5	507, 508, 515.1, 632
750: Jerome-Gooding-Lincoln Counties Regional Study	10	507, 508, 515.1, 632
770: Payette and Gem Counties Regional Study	8	
780: Twin Falls County Regional Study	12	507, 508, 515.1, 632
790: Cassia County Regional Study	13	507, 508, 515.1, 632
805: Middle Henrys Fork Central Basin Regional Study	7	507, 508, 515.1, 632
820: Rathdrum Prairie Regional Study	15*	
830: Mud Lake Regional Study	5	507, 508, 515.1, 632
860: North Owyhee County Regional Study	9	507, 508, 515.1, 632
865: Grand View and Bruneau Areas Regional Study	7	507, 508, 515.1, 632
870: Northern Gooding County (Bliss) Regional Study	4	507, 508, 515.1, 632
890: Hammett and Glens Ferry Areas Regional Study	6	
950: Clearwater Plateau Aquifer Regional Study	13	507, 508, 515.1, 632

*Eight wells were new to the project in 2010.

There were 206 positive pesticide detections in 126 wells, during 159 sampling events, during the 2010 regional project pesticide sampling (Table 5). This is an increase of 97 detections, and 21 more wells than in 2009. Twenty four different pesticide active or breakdown ingredients were detected (Table 5). Four metabolites or breakdown products were detected and those are 1,2,3-Trichloropropane, Aldicarb Sulfone, Desethyl Atrazine, and Deisopropyl Atrazine (Table 5), which is three more than what was detected in 2009.

Table 5. Summary of Pesticide Detections from ISDA Regional Projects in 2010.

Pesticide	Number of Detections	Range (µg/L)	Mean (µg/L)	Median (µg/L)	Reference Point (µg/L)	County with Detection
1,2,3-Trichloropropane	3	0.21	0.853	0.068	40 (HAL) ²	Ada (3)
2,4-DCBA	6	0.32	0.257	0.215	91 (RfD)	Owyhee (2) Payette (1) Washington (3)
Aldicarb Sulfone	1	0.15	---	---	7 (HAL) ²	Ada (1)
Atrazine	76	1.075 (0.025 – 1.10)	0.103	0.045	3 (MCL) ¹	Ada (2) Canyon (1) Cassia (9) Elmore (3) Fremont(1) Jefferson(1) Jerome(1) Lincoln(1) Minidoka(8) Nez Perce(5) Owyhee(7) Payette(11) Twin Falls (7) Washington (19)
Bentazon	3	0.88 (0.072 – 1.6)	1.206	1.3	200 (HAL) ²	Elmore (1) Owyhee (1) Washington (1)
Bromacil	18	1.27 (0.053 – 1.3)	0.273	0.175	70 (HAL)	Ada (1) Elmore (3) Gooding (1) Nez Perce (2) Owyhee (1) Twin Falls (2) Washington (8)
Carbofuran	2	0.02 (0.24 - 0.26)	0.25	0.25	40 (MCL)	Payette (1) Washington (1)
Chloromethane	3	0.11 (0.51- 0.62)	0.57	0.59	30 (HAL)	Payette (1) Washington (2)
DCPA (Dacthal)	30	30 (0.054 – 28)	5.63	2.0	70 (HAL)	Ada (3) Canyon (3) Cassia (1) Gooding (2) Owyhee (17) Washington (4)
Deisopropyl Atrazine	12	0.056 (0.025 – 0.081)	0.043	0.044	....³	Minidoka (2) Nez Perce (3) Payette (6) Washington (1)
Desethyl Atrazine	121	1.975 (0.025 - 2.0)	0.129	0.064	....³	Ada (6) Canyon (4) Cassia (9) Elmore (6) Fremont (2)

						Gooding (7) Jefferson (1) Jerome (2) Lincoln (1) Minidoka (14) Nez Perce (7) Owyhee (10) Payette (14) Twin Falls (11) Washington (27)
Dinoseb	1	0.71	---	---	7 (MCL)	Owyhee (1)
Diuron	11	0.332 (0.038 - 0.37)	0.107	0.061	28 (FQPA DWLOC) ⁴	Ada (1) Cassia (1) Elmore (1) Minidoka (2) Nez Perce (6)
Hexazinone	6	0.046 (0.051 - 0.097)	0.076	0.077	400 (HAL)	Cassia (1) Jefferson (1) Minidoka (3) Washington (1)
Linuron	1	0.075	---	---		Owyhee (1)
Metolachlor	1	0.1	---	---	700 (HAL)	Cassia
Metribuzin	13	0.48 (0.03 - 0.51)	0.108	0.04	70 (HAL)	Ada (4) Elmore (1) Fremont (1) Gooding (1) Jefferson (2) Owyhee (1) Twin Falls (1) Washington (1)
Norflurazon	1	0.083	---	---		Elmore (1)
Oxamyl	2	0.0510 (0.079 - 0.13)	0.11	0.11	200 (MCL)	Elmore (1) Fremont (1)
Prometon	1	0.2	---	---	400 (HAL)	Minidoka (1)
Simazine	11	0.155 (0.025 - 0.18)	0.049	0.031	4 (MCL)	Cassia (3) Minidoka (5) Owyhee (2) Payette (1)
Terbacil	2	0.351	0.245	0.245	90 (RfD)	Ada (2)
Tebuthiuron	2	0.7 (0.06 - 0.76)	0.41	0.41	200 (MCL)	Fremont (1) Washington (1)
Triallate	5	0.79 (0.2 - 0.99)	0.676	0.88	0.45 (FQPA DWLOC)	Fremont (2) Idaho (3)

¹MCL – EPA Maximum Contaminant Level.

²HAL – EPA Lifetime Health Advisory.

³Breakdown product of Atrazine. No reference point available, MCL for Atrazine of 3 µg/L is used.

⁴FQPA DWLOC – Food Quality Protection Act Drinking Water Level of Concern

ISDA regulates pesticide use and handling under Title 22 Chapter 34, Pesticides and Chemigation, Idaho Code. ISDA is the lead agency for implementing the Idaho Pesticide Management Plan (PMP) for Ground Water Protection and the Rules Governing Pesticide Management Plans for Ground Water Protection (PMP Rule). ISDA has the authority to implement pesticide programs

through a cooperative working agreement with the EPA, Idaho state laws and department rules. 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 6.

The PMP Rule breaks the pesticide detections into the following detection levels:

Level 1: Detection above the 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 greater than 100% of the Reference Point.

Table 6. Sources for Pesticide Reference Points.

Pesticide	Reference Point (µg/L)	Citation
1,2,3-Trichloropropane		
2,4-DCBA	91 RfD	
Aldicarb Sulfone	7 (HAL) ²	
Atrazine	3 (MCL) ¹	EPA 2009 Edition of the Drinking Water Standards and Health Advisories
Bentazon	200 (HAL) ²	EPA 2009 Edition of the Drinking Water Standards and Health Advisories
Bromacil	70 (HAL)	EPA 2009 Edition of the Drinking Water Standards and Health Advisories
Carbofuran	40 (MCL)	EPA 2009 Edition of the Drinking Water Standards and Health Advisories
Chloromethane	30 (HAL)	EPA 2009 Edition of the Drinking Water Standards and Health Advisories
DCPA (Dacthal)	70 (HAL)	EPA 2009 Edition of the Drinking Water Standards and Health Advisories
Deisopropyl Atrazine ³	....⁴	....
Desethyl Atrazine ³	....⁴	....
Dinoseb	7 (MCL)	EPA 2009 Edition of the Drinking Water Standards and Health Advisories
Diuron	28 (FQPA DWLOC) ⁵	EPA Reregistration Eligibility Decision for Diuron, 2003

Hexazinone	400 (HAL)	EPA 2009 Edition of the Drinking Water Standards and Health Advisories
Linuron		
Metolachlor	700 (HAL)	EPA 2009 Edition of the Drinking Water Standards and Health Advisories
Metribuzin	70 (HAL)	EPA 2009 Edition of the Drinking Water Standards and Health Advisories
Oxamyl	200 (MCL)	EPA 2009 Edition of the Drinking Water Standards and Health Advisories
Norflurazon		
Prometon	400 (HAL)	EPA 2009 Edition of the Drinking Water Standards and Health Advisories
Simazine	4 (MCL)	EPA 2009 Edition of the Drinking Water Standards and Health Advisories
Tebuthiuron	500 (HAL)	EPA 2009 Edition of the Drinking Water Standards and Health Advisories
Terbacil		
Triallate	0.45 (FQPA DWLOC)	EPA Reregistration Eligibility Decision for Triallate, 2001

¹MCL – EPA Maximum Contaminant Level.

²HAL – EPA Lifetime Health Advisory.

³Breakdown product of Atrazine.

⁴No reference point available, MCL for Atrazine of 3 µg/L is used.

⁵FQPA DWLOC – Food Quality Protection Act Drinking Water Level of Concern

Regional Pesticide Monitoring Results by Project

Lower Boise Regional Study

In 2010, 11 wells from the Lower Boise Regional Study (Project 220) were sampled for pesticides (Figure 2). Ten out of the 11 wells sampled for pesticides tested positive for one or more pesticide active ingredient (Figure 2 and Table 7). Two wells tested positive for two or more pesticide active ingredients. Three herbicide active ingredients or breakdown products were detected in the study area. desethyl atrazine, a breakdown product of the herbicide atrazine, was detected most frequently with detections in eight wells, DCPA was detected in three wells and atrazine was detected in two wells. 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 were below any health standards set by the EPA or the state of Idaho.

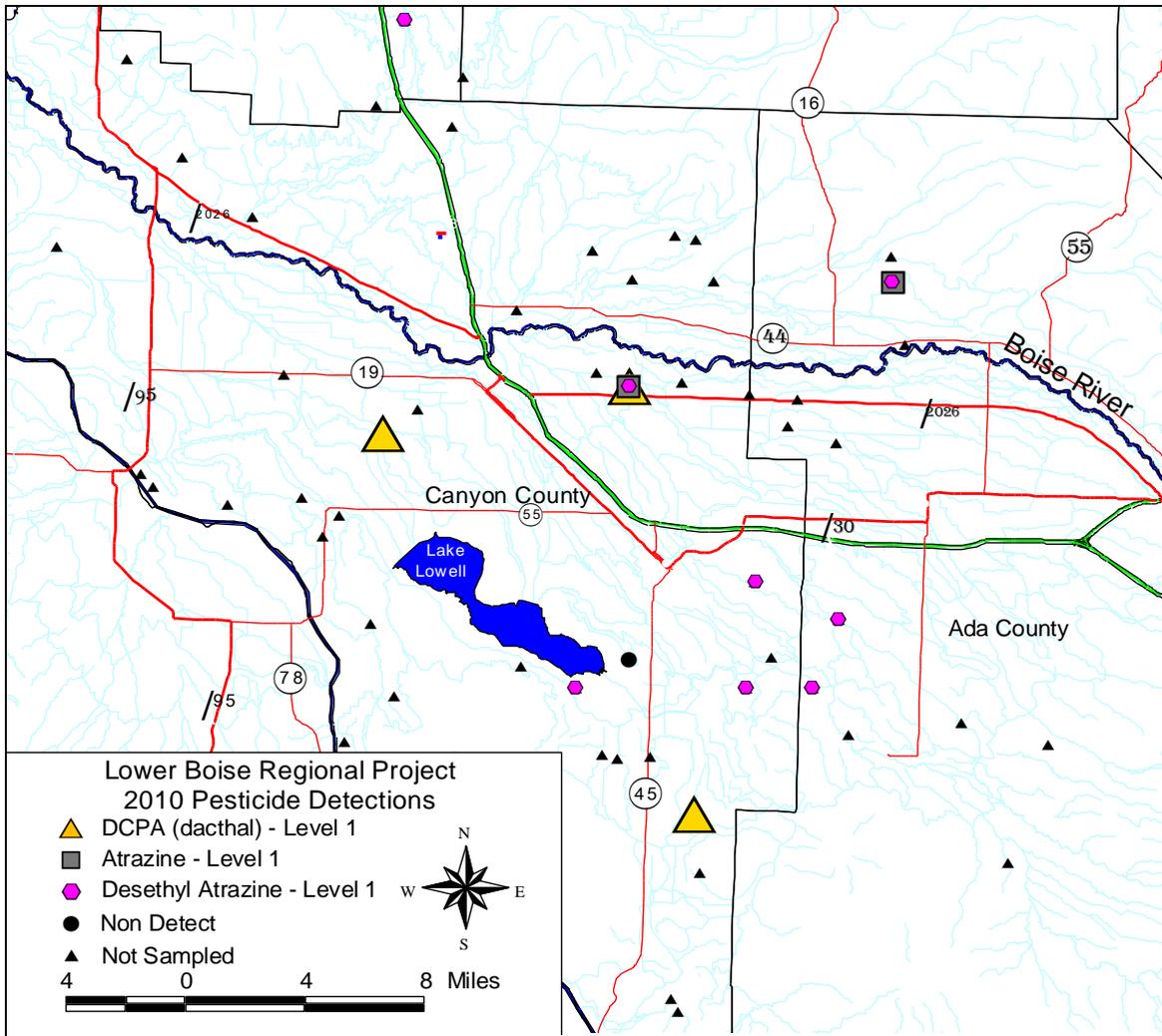


Figure 2. Pesticide results from ISDA 2010 sampling of the Lower Boise Regional Study.

Table 7. Summary of 2010 Pesticide Results from the Lower Boise Regional Study.

Pesticide	No. of Detections (% of wells sampled with detection)	Range ($\mu\text{g/L}$) (Min. – Max.)	Reference Point ($\mu\text{g/L}$)
Atrazine	2 (18.2%)	0.02 (0.04 – 0.06)	3 (MCL) ¹
DCPA (Dacthal)	3 (27.3%)	3.41 (0.59 – 4.0)	70 (HAL) ²
Desethyl Atrazine	8 (72.7%)	0.16 (0.03 – 0.19)	....³

¹MCL – EPA Maximum Contaminant Level.

²HAL – EPA Lifetime Health Advisory.

³Breakdown product of Atrazine. No reference point available, MCL for Atrazine of 3 $\mu\text{g/L}$ is used.

Washington and Payette Counties Regional Study

A total of 18 wells from the Washington and Payette Counties Regional Study (Project 710) were sampled for pesticides in April, 2010 (Figure 3). Fourteen of the 18 wells sampled had one or more

pesticides detected (Figure 3). Five of the 14 wells with detections had detections of three or more pesticide active ingredients. Eight different pesticide active ingredients or breakdown products were detected in the study area (Figure 3 and Table 8). Atrazine and desethyl atrazine, a breakdown product of the active ingredient atrazine, were the most commonly detected pesticides with 10 and 14 detections, respectively. Bromacil, Chloromethane, and DCPA were each detected in two wells. Carbofuran, hexazinone and tebuthiuron were each detected once. 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 were below any health standards set by the EPA or the state of Idaho.

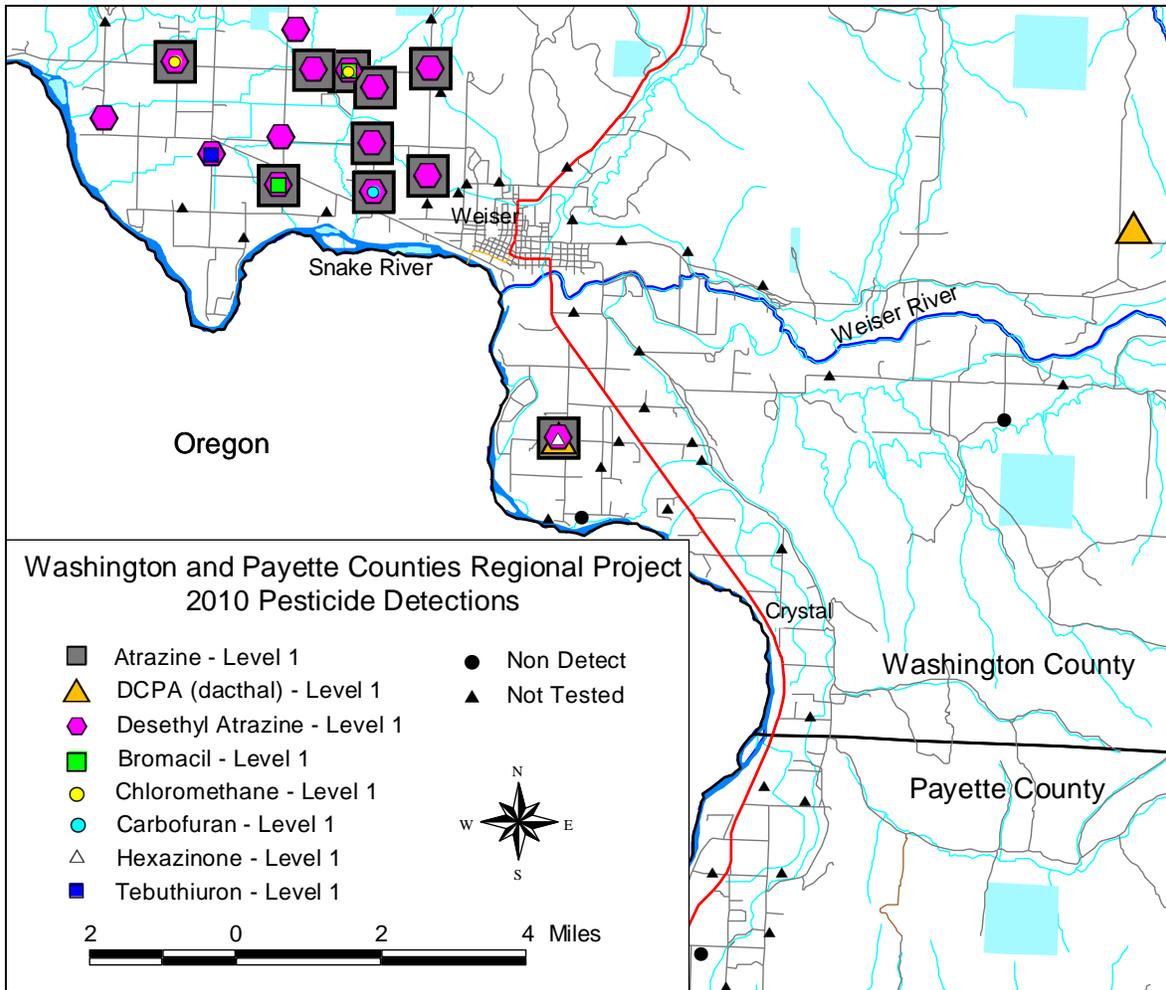


Figure 3. Pesticide results from 2010 sampling of the Washington and Payette Counties Regional Study.

Table 8. Summary of 2010 Pesticide Results from the Washington and Payette Counties Regional Study.

Pesticide	No. of Detections (% of wells sampled with detection)	Range (µg/L) (Min. – Max.)	Reference Point (µg/L)
Atrazine	10 (55.5%)	0.09 (0.03 - 0.12)	3 (MCL) ¹
Bromacil	2 (11.1%)	0.036 (0.06 - 0.42)	70 (HAL) ²
Carbofuran	1 (5.5%)	0.24	40 (MCL)
Chloromethane	2 (11.1%)	0.03 (0.59 - 0.62)	30 (HAL)
DCPA (Dacthal)	2 (11.1%)	2.51 (0.39 - 2.9)	70 (HAL)
Desethyl Atrazine	14 (77.8%)	0.23 (0.03 - 0.26)	....³
Hexazinone	1 (5.5%)	0.07	400 (HAL)
Tebuthiuron	1 (5.5%)	0.06	500 (HAL)

¹MCL – EPA Maximum Contaminant Level.

²HAL - EPA Lifetime Health Advisory.

³Breakdown product of Atrazine. No reference point available, MCL for Atrazine of 3 µg/L is used.

Minidoka County Shallow Aquifer Regional Study

A total of 14 wells from the Minidoka County Shallow Aquifer Regional Study (Project 730) were sampled for pesticides in 2010 (Figure 4). Thirteen of the 14 wells sampled had positive detection for one or more pesticide active ingredients. Four of the 13 wells with positive detections had three or more detections (Figure 4). A total of seven pesticide active ingredients or breakdown products were detected in the study area (Figure 4 and Table 9). The herbicide active ingredient atrazine and one of its breakdown products, desethyl atrazine, were the most commonly detected pesticides, with five and 10 detections, respectively. simazine and hexazinone were detected in four and three wells, respectively; while diuron and deisopropyl atrazine (another breakdown product of atrazine) were each detected twice and prometon was detected once (Figure 4 and Table 9). 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 were below any health standards set by the EPA or the state of Idaho.

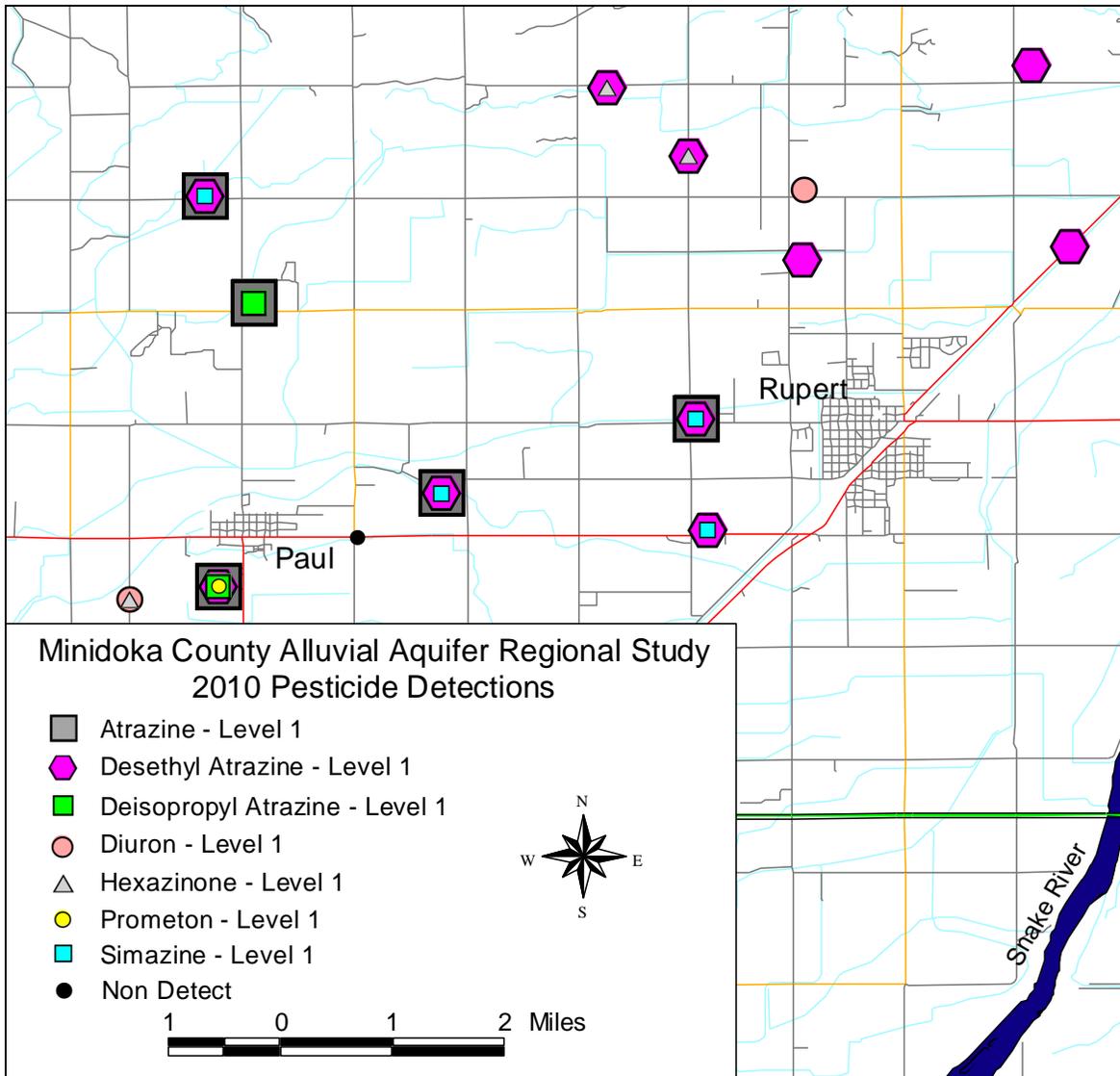


Figure 4. Pesticide results from ISDA 2010 sampling of the Minidoka County Shallow Aquifer Regional Study.

Table 9. Summary of 2010 Pesticide Results from the Minidoka County Shallow Aquifer Regional Study.

Pesticide	No. of Detections (% of wells sampled with detection)	Range (µg/L) (Min. – Max.)	Reference Point (µg/L)
Atrazine	5 (35.7%)	0.09 (0.03 - 0.12)	3 (MCL) ¹
Deisopropyl Atrazine	2 (14.3%)	0.01 (0.04 - 0.05)	....²
Desethyl Atrazine	10 (71.4%)	0.12 (0.03 - 0.15)	....
Diuron	2 (14.3%)	0.07 (0.09 - 0.16)	28 (FQPA DWLOC) ³
Hexazinone	3 (21.4%)	0.03 (0.05 - 0.08)	400 (HAL) ⁴
Prometon	1 (7.1%)	0.2	400 (HAL)
Simazine	4 (28.6%)	0.15 (0.03 - 0.18)	4 (MCL)

¹MCL – EPA Maximum Contaminant Level.

²Breakdown product of Atrazine. No reference point available, MCL for Atrazine of 3 µg/L is used.

³FQPA DWLOC– Food Quality Protection Act Drinking Water Level of Concern.

⁴HAL – EPA Lifetime Health Advisory

Minidoka County Deep Aquifer Regional Study

A total of five wells from the Minidoka County Deep Aquifer Regional Study (Project 740) were sampled for pesticides in 2010 (Figure 5). The five wells were chosen for sampling in 2010 due to previous detections of pesticides. Four out of the five wells sampled had one or more pesticide active ingredients or breakdown products detected (Figure 5 and Table 10). Three pesticides were detected; atrazine, desethyl atrazine, a breakdown product of the active ingredient atrazine, and simazine. Desethyl atrazine was detected most often with detections in four wells, atrazine had the next highest number of detections with detections in three wells, and simazine was detected in one well (Figure 5 and Table 10). 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 were below any health standards set by the EPA or the state of Idaho.

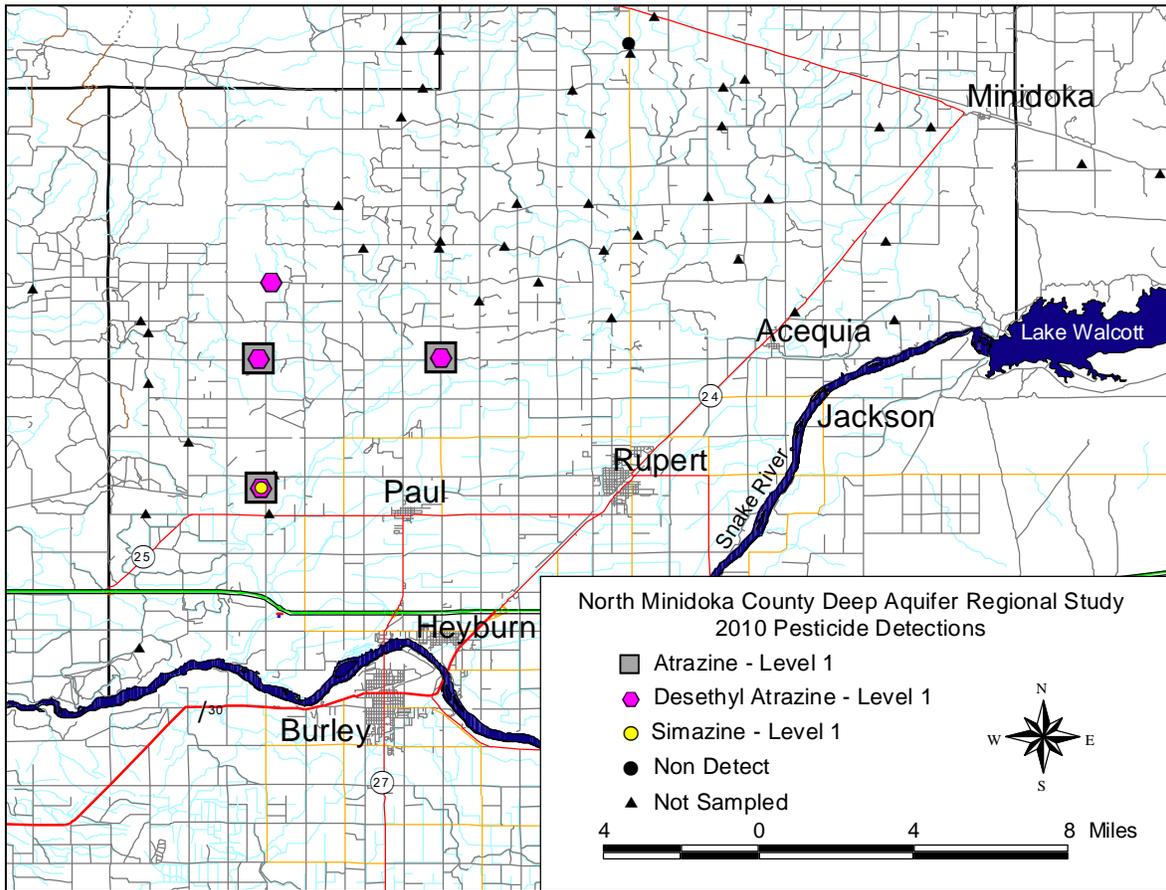


Figure 5. Pesticide results from ISDA 2010 sampling of the Minidoka County Deep Aquifer Regional Study.

Table 10. Summary of 2010 Pesticide Results from the Minidoka County Deep Aquifer Regional Study.

Pesticide	No. of Detections (% of wells sampled with detection)	Range (µg/L) (Min. – Max.)	Reference Point (µg/L)
Atrazine	3 (60%)	0 (0.03 – 0.03)	3 (MCL) ¹
Desethyl Atrazine	4 (80%)	0.01 (0.03 – 0.04)	....²
Simazine	1 (20%)	0.04	4 (MCL)

¹MCL – EPA Maximum Contaminant Level.

²Breakdown product of Atrazine. No reference point available, MCL for Atrazine of 3 µg/L is used.

Gooding, Jerome and Lincoln Counties Regional Study

A total of ten wells from the Gooding, Jerome and Lincoln Counties Regional Study (Project 750) were sampled for pesticides in 2010 (Figure 6). All ten wells had positive detections of one pesticide active ingredient or breakdown product (Figure 6 and Table 11). Three of the ten wells had detections of two pesticide active ingredients or breakdown products. Four active ingredients or breakdown products were detected in the study area in 2010. Atrazine and desethyl atrazine, a breakdown product of atrazine, were detected in two and nine wells, respectively, while bromacil and DCPA were each detected once (Figure 6 and Table 11). 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 were below any health standards set by the EPA or the state of Idaho.

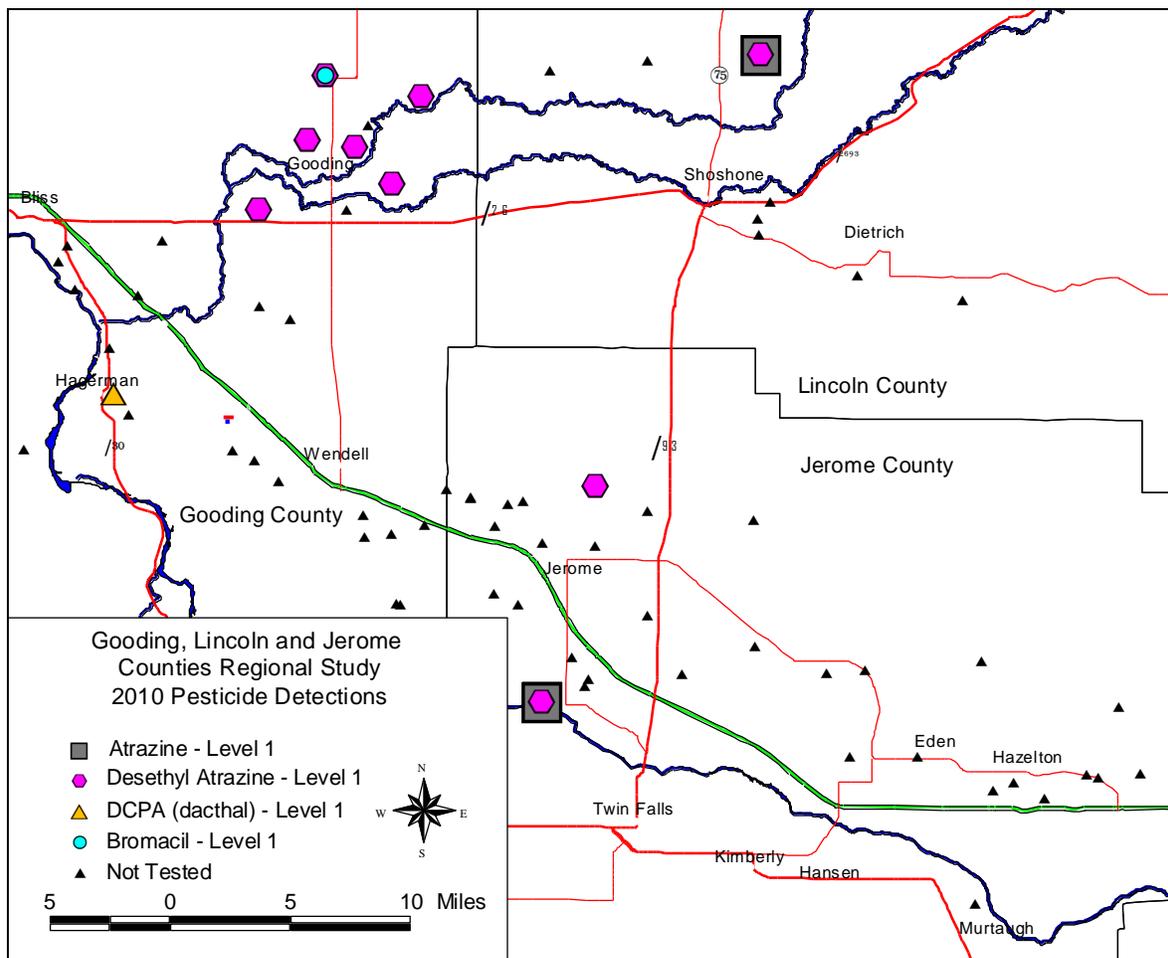


Figure 6. Pesticide results from ISDA 2010 sampling of the Gooding, Lincoln and Jerome Counties Regional Study.

Table 11. 2010 Pesticide Results from the Gooding, Lincoln and Jerome Counties Regional Study.

Pesticide	No. of Detections (% of wells sampled with detection)	Range (µg/L) (Min. – Max.)	Reference Point (µg/L)
Atrazine	2 (20%)	0 (0.03 – 0.03)	3 (MCL) ¹
Bromacil	1 (10%)	0.05	70 (HAL) ²
DCPA (Dacthal)	1 (10%)	1.7	70 (HAL)
Desethyl Atrazine	9 (90%)	0.03 (0.03 - 0.06)	....³

¹MCL – EPA Maximum Contaminant Level

²HAL – EPA Lifetime Health Advisory.

³Breakdown product of Atrazine. No reference point available, MCL for Atrazine of 3 µg/L is used.

Payette and Gem Counties Regional Project

A total of 14 wells from the Payette and Gem Counties Regional Study (Project 770) were tested for pesticides as a partial sampling of the project area (Figure 7). Three of the 14 wells sampled are also part of the Fruitland Atrazine PMP project due to historic elevated detections of atrazine and/or its breakdown products. Eight wells had a positive detection of one or more pesticide active ingredients or breakdown products (Figure 7 and Table 12), including the three PMP wells north of Fruitland. Five pesticide active ingredients or breakdown products were detected in 2010, including atrazine, desethyl atrazine (a breakdown product of atrazine), deisopropyl atrazine (a breakdown product of atrazine), chloromethane and carbofuran. Desethyl atrazine was the most commonly detected with seven detections (Figure 7 and Table 12). Atrazine was the next most commonly detected pesticide with five detections followed by deisopropyl atrazine with two detections. Carbofuran and chloromethane were each detected in only one well. All detections were below any health standards set by the EPA or the state of Idaho and 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.

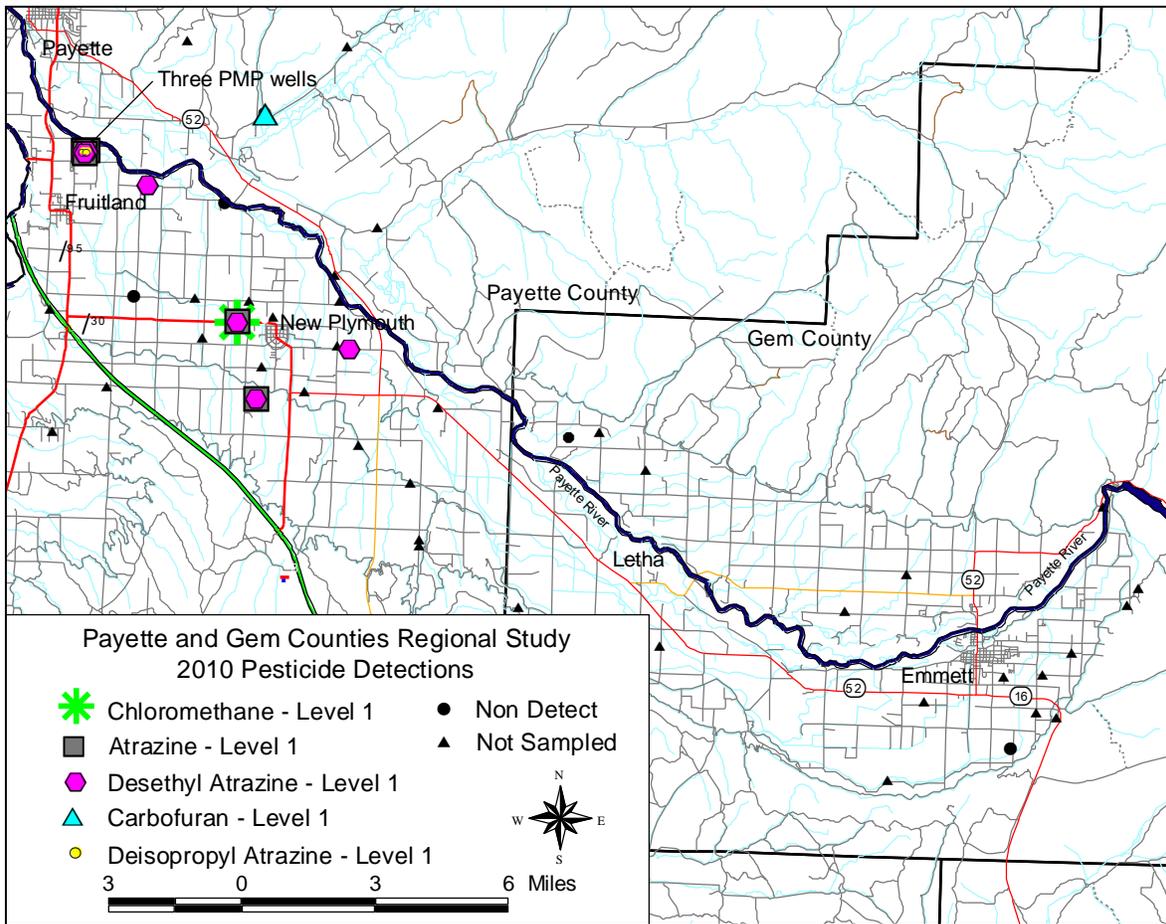


Figure 7. Pesticide results from ISDA 2010 sampling of the Payette and Gem Counties Regional Study.

Table 12. Summary of 2010 Pesticide Results from the Payette and Gem Counties Regional Study.

Pesticide	No. of Detections (% of wells sampled with detection)	Range (µg/L) (Min. – Max.)	Reference Point (µg/L)
Atrazine	5 (35.7%)	0.16 (0.03 – 0.19)	3 (MCL) ¹
Carbofuran	1 (7.1%)	0.26	40 (MCL)
Chloromethane	1 (7.1%)	0.51	30 (HAL) ²
Desethyl Atrazine	7 (50%)	0.32 (0.03 – 0.35)	....³
Deisopropyl Atrazine	2 (14.3%)	0.02 (0.03 – 0.05)	....³

¹MCL – EPA Maximum Contaminant Level.

²HAL– EPA Lifetime Health Advisory.

³Breakdown product of Atrazine. No reference point available, MCL for Atrazine of 3 µg/L is used.

Twin Falls County Regional Project

A total of 12 wells from the Twin Falls County Regional Study (Project 780) were tested for pesticides as a partial sampling of the project area and follow-up to detections from the monitoring conducted in 2006 (Figure 8). Eleven wells had a positive detection of one or more pesticide active

ingredient(s) or breakdown product(s) (Figure 8 and Table 13). Four pesticide active ingredients or breakdown products were detected in 2010, including atrazine, desethyl atrazine (a breakdown product of atrazine) and bromacil and metribuzin. Desethyl atrazine, a breakdown product of atrazine, was the most commonly detected with 11 detections (Figure 8 and Table 13). Atrazine was the next most commonly detected pesticide with seven detections followed by bromacil with two detections. Metribuzin was detected in only one well. All detections were below any health standards set by the EPA or the state of Idaho and 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.

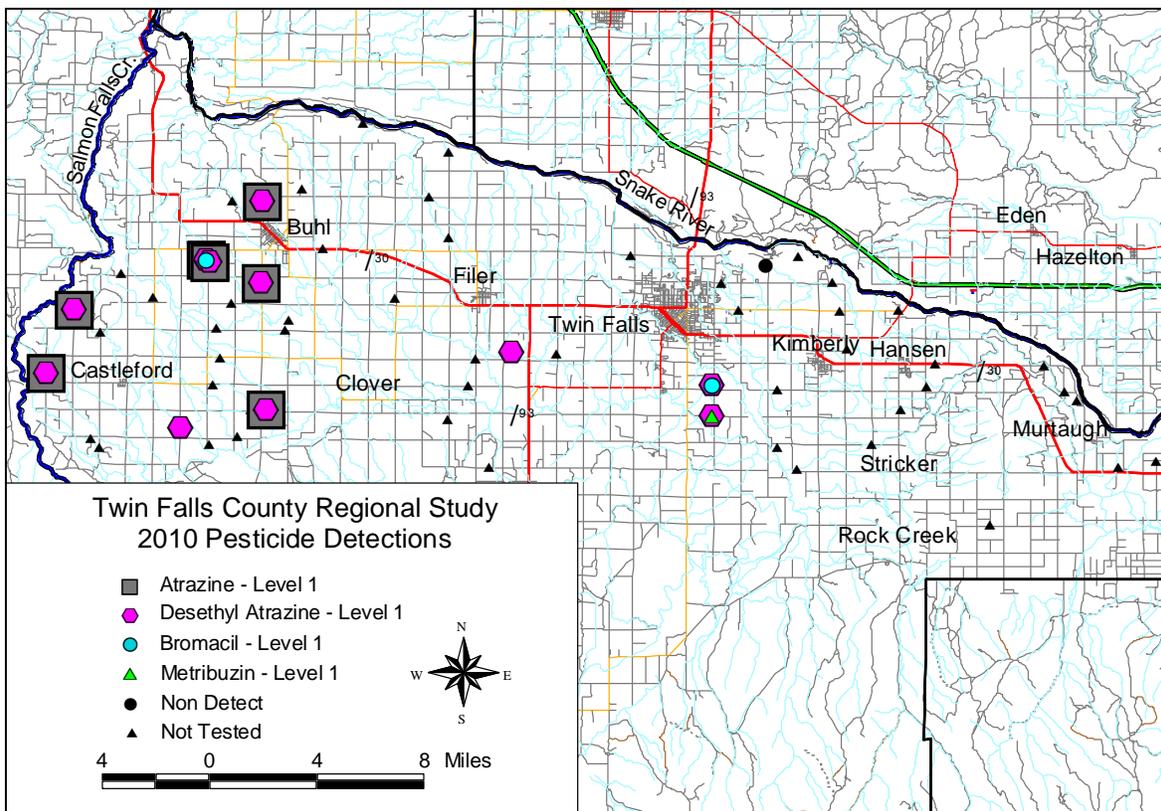


Figure 8. Pesticide results from ISDA 2010 sampling of the Twin Falls County Regional Study.

Table 13. Summary of 2010 Pesticide Results from the Twin Falls County Regional Study.

Pesticide	No. of Detections (% of wells sampled with detection)	Range ($\mu\text{g/L}$) (Min. – Max.)	Reference Point ($\mu\text{g/L}$)
Atrazine	7 (58.3%)	0.08 (0.03 – 0.11)	3 (MCL) ¹
Bromacil	2 (16.7%)	0.03 (0.21 – 0.24)	90 (HAL) ²
Desethyl Atrazine	11 (91.7%)	0.17 (0.03 – 0.2)	....³
Metribuzin	1 (8.3%)	0.03	70 (HAL)

¹MCL – EPA Maximum Contaminant Level.

²HAL– EPA Lifetime Health Advisory.

³Breakdown product of Atrazine. No reference point available, MCL for Atrazine of 3 $\mu\text{g/L}$ is used.

Cassia County Regional Study

A total of 13 wells from the Cassia County Regional Study (Project 790) were tested for pesticides as a partial sampling of the project area and follow-up to detections from the monitoring conducted in 2009 (Figure 9). Eleven of the 13 wells had a positive detection of one or more pesticide active ingredient or breakdown product (Figure 9 and Table 14). Three of the 11 wells with positive detections had detections of three or more compounds. The pesticides detected were atrazine, desethyl atrazine (a breakdown product of atrazine), DCPA (dacthal), diuron, hexazinone, metolachlor, and simazine. Atrazine and desethyl atrazine were the most commonly detected compounds with nine detections each, followed by simazine with three detections. DCPA (dacthal), diuron, hexazinone, and metolachlor were each detected once (Figure 9 and Table 14). All detections were below any health standards set by the EPA or the state of Idaho and 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.

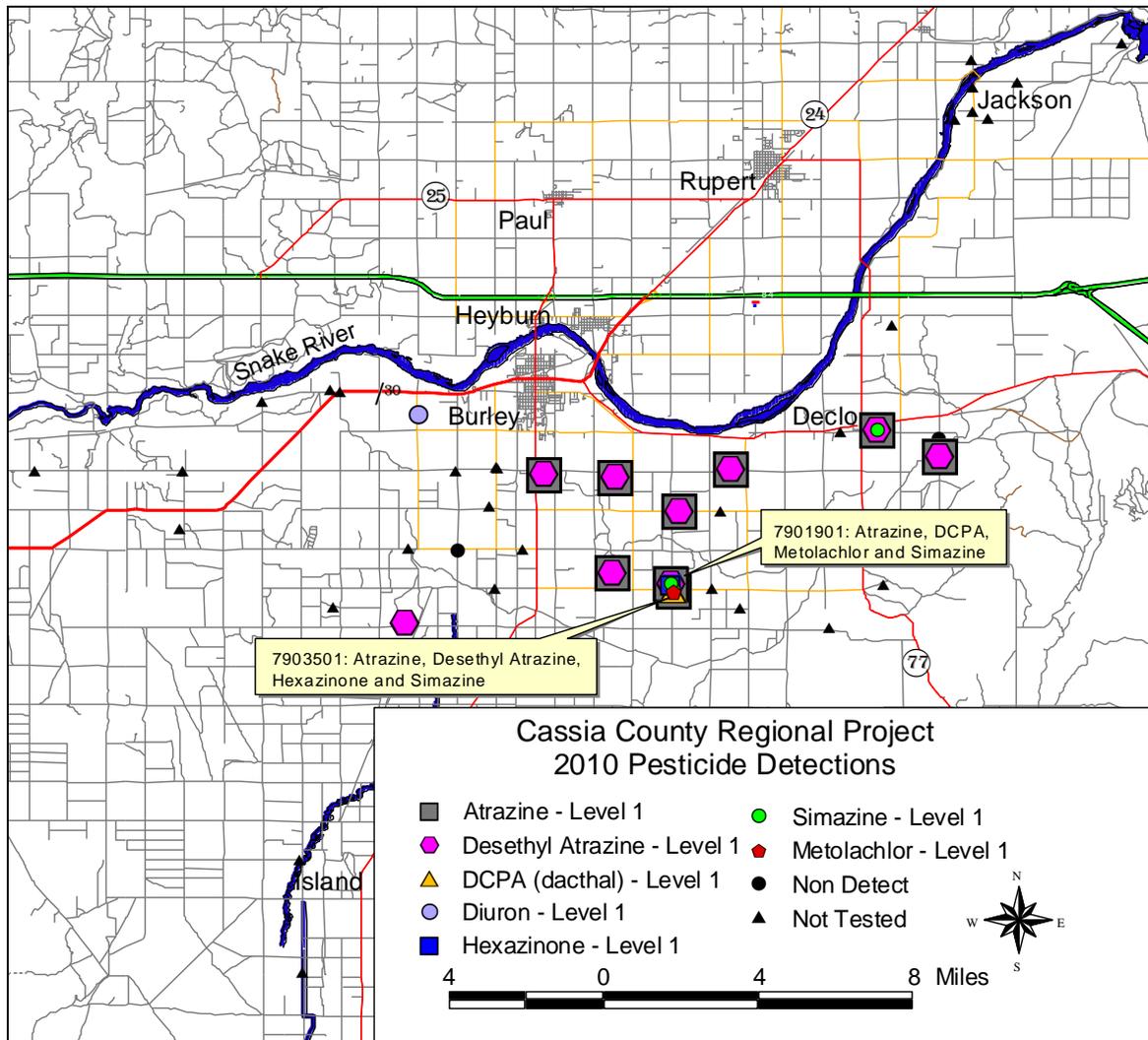


Figure 9. Pesticide results from ISDA 2010 sampling of the Cassia County Regional Study.

Table 14. Summary of 2010 Pesticide Results from the Cassia County Regional Study.

Pesticide	No. of Detections (% of wells sampled with detection)	Range (µg/L) (Min. – Max.)	Reference Point (µg/L)
Atrazine	9 (69.2%)	0.08 (0.04 - 0.12)	3 (MCL) ¹
DCPA (Dacthal)	1 (7.7%)	0.05	70 (HAL) ²
Desethyl Atrazine	9 (69.2%)	0.14 (0.03 - 0.17)	....³
Diuron	1 (7.7%)	0.1	28 (FQPA DWLOC) ⁴
Hexazinone	1 (7.7%)	0.1	400 (HAL)
Metolachlor	1 (7.7%)	0.1	700 (HAL)
Simazine	3 (23.1%)	0.05 (0.03 - 0.08)	4 (MCL)

¹MCL – EPA Maximum Contaminant Level.

²HAL – EPA Lifetime Health Advisory.

³Breakdown product of Atrazine. No reference point available, MCL for Atrazine of 3 µg/L is used

⁴Food Quality Protection Act Drinking Water Level of Concern.

Middle Henrys Fork Central Basin Regional Study

In 2010, eleven wells from the Middle Henrys Fork Central Basin Regional Study (Project 805) were sampled for pesticide active ingredients (Figure 10), including four wells that are also part of the Fremont County Triallate PMP project. Five wells out the eleven wells sampled had positive detections of one or more pesticide active ingredients or a breakdown product (Figure 10 and Table 15). Six pesticide active ingredients or breakdown products were detected, including: atrazine, desethyl atrazine (a breakdown product of atrazine), metribuzin, oxamyl, tebuthiuron and triallate (Figure 10 and Table 15). Each compound was detected once. All detections were below any health standards set by the EPA or the state of Idaho. The triallate detection was a Level 3 detection (between 50% and 100% of the reference point). The remaining 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.

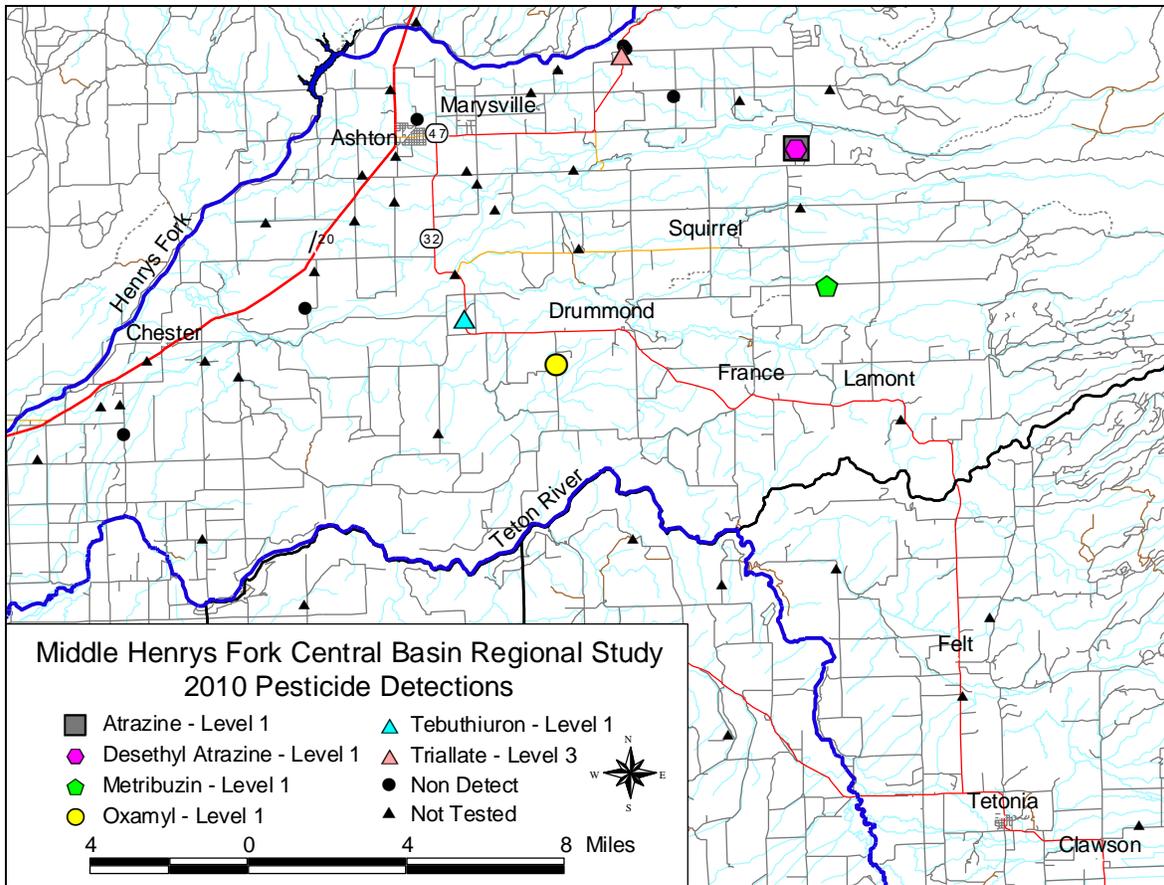


Figure 10. Pesticide results from 2010 sampling of the Middle Henrys Fork Central Basin Regional Study.

Table 15. Summary of 2010 Pesticide Results from the Middle Henrys Fork Central Basin Regional Study.

Pesticide	No. of Detections (% of wells sampled with detection)	Range (µg/L) (Min. – Max.)	Reference Point (µg/L)
Atrazine	1 (14.3%)	0.04	3 (MCL) ¹
Desethyl Atrazine	1 (14.3%)	0.11	....²
Metribuzin	1 (14.3%)	0.51	70 (HAL) ³
Oxamyl	1 (14.3%)	0.08	200 (MCL)
Tebuthiuron	1 (14.3%)	0.76	500 (HAL)
Triallate	1 (14.3%)	0.41	0.45 (FQPA DWLOC) ⁴

¹MCL – EPA Maximum Contaminant Level.

²Breakdown product of Atrazine. No reference point available, MCL for Atrazine of 3 µg/L is used.

³HAL – EPA Lifetime Health Advisory.

⁴Food Quality Protection Act Drinking Water Level of Concern.

Rathdrum Prairie Regional Study

A total of 15 wells from the Rathdrum Prairie Regional Study (Project 820) were sampled for pesticides in 2010 (Figure 11). Eight of the 15 wells were new wells randomly selected and added to the project in 2010. No pesticides were detected in any of the wells sampled (Figure 11).

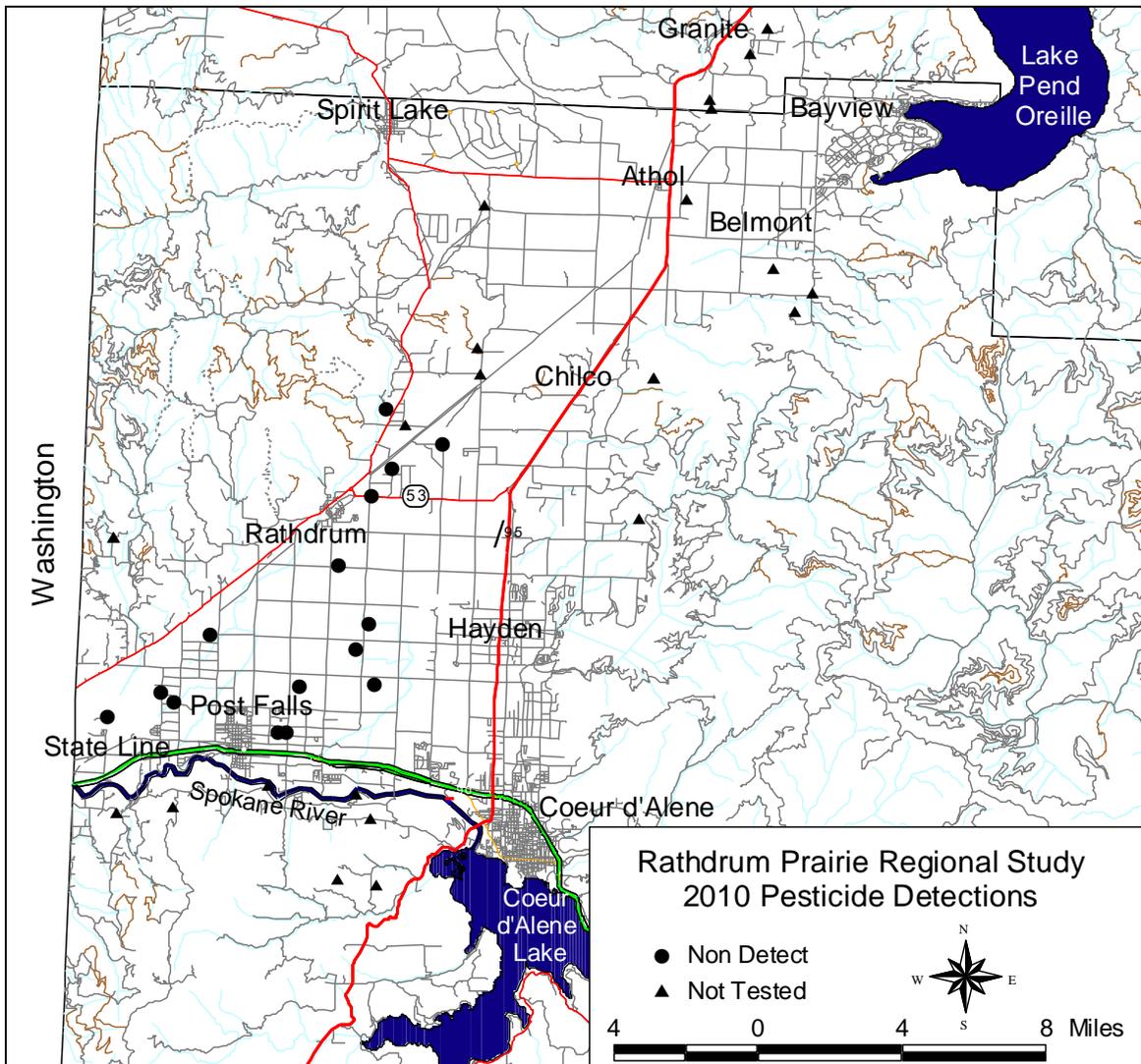


Figure 11. Pesticide results from 2010 sampling of the Rathdrum Prairie Regional Study.

Mud Lake Regional Study

Five wells from the Mud Lake Regional Study (Project 830) were sampled for pesticide active ingredients in 2010 (Figure 12). Three of the five wells sampled had positive detections of one or more pesticide active ingredient or breakdown product. Metribuzin was detected most frequently with detections in two wells near Hamer, ID. Atrazine, desethyl atrazine (a breakdown product of atrazine), and hexazinone were each detected once and all three compounds were detected in the same well (Figure 12 and Table 16). All detections were below any health standards set by the EPA or the state of Idaho and 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.

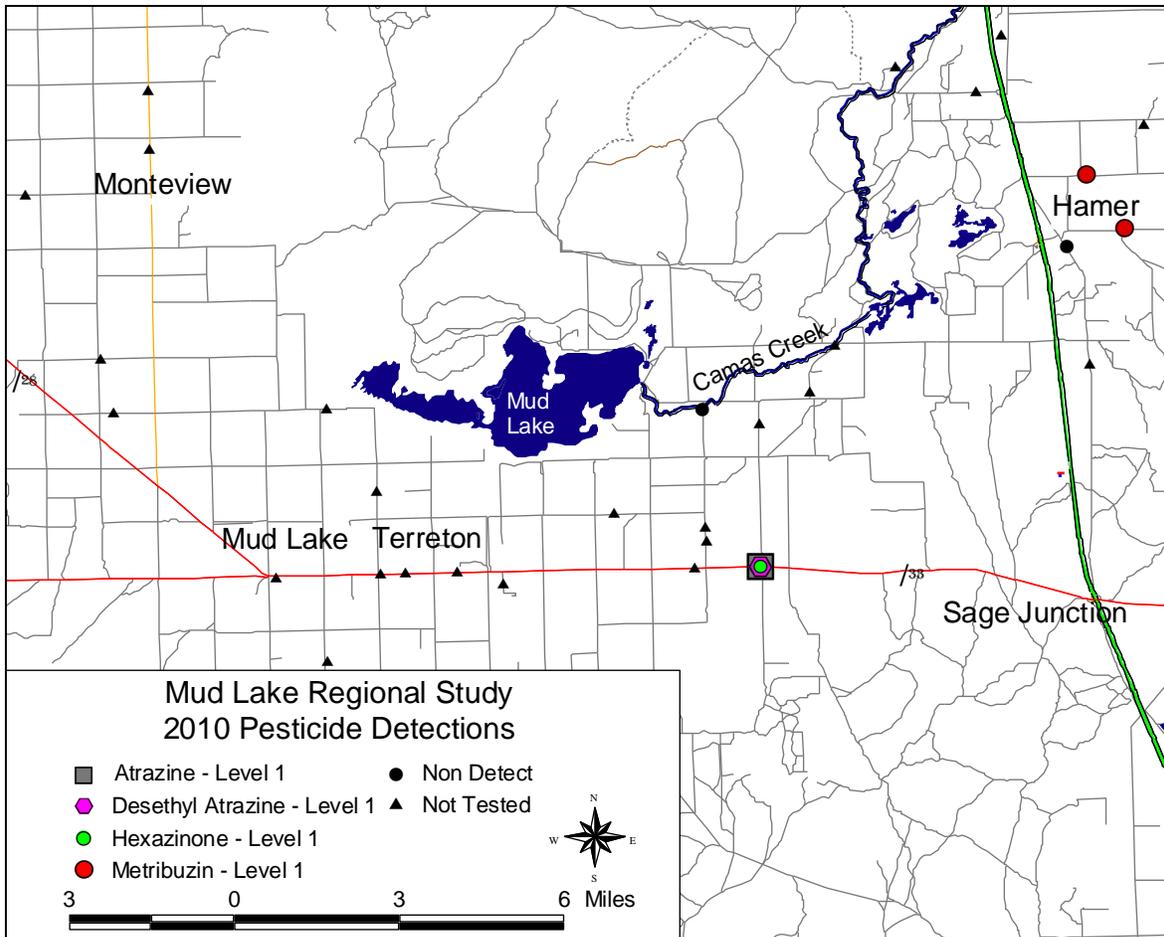


Figure 12. Pesticide results from ISDA 2010 sampling of the Mud Lake Regional Study.

Table 16. Summary of 2010 Pesticide Results from the Mud Lake Regional Study.

Pesticide	No. of Detections (% of wells sampled with detection)	Range (µg/L) (Min. – Max.)	Reference Point (µg/L)
Atrazine	1 (20%)	0.12	3 (MCL) ¹
Desethyl Atrazine	1 (20%)	0.15	....²
Hexazinone	1 (20%)	0.09	400 (HAL) ³
Metribuzin	2 (40%)	0.01 (0.04 – 0.05)	200 (HAL)

¹MCL –EPA Maximum Contaminant Level.

²Breakdown product of Atrazine. No reference point available, MCL for Atrazine of 3 µg/L is used.

³HAL – EPA Lifetime Health Advisory.

North Owyhee County Regional Study

Eleven wells from the North Owyhee County Regional Study (Project 860) were sampled for pesticides in 2010 (Figure 13), which includes two wells southwest of Homedale that are also sampled as a part of the Owyhee County DCPA PMP project. The eleven wells were selected due to previous detections of pesticides. Nine wells had positive detections of one or more pesticide active ingredients. DCPA (dacthal) was detected in all nine wells with positive detections and

bentazon and simazine were each detected once (Figure 13 and Table 17). The two PMP wells, located southwest of Homedale, had Level 2 category (a detection of 20% to less than 50% of the reference point) detections of DCPA. All other detections were below any health standards set by the EPA or the state of Idaho and 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.

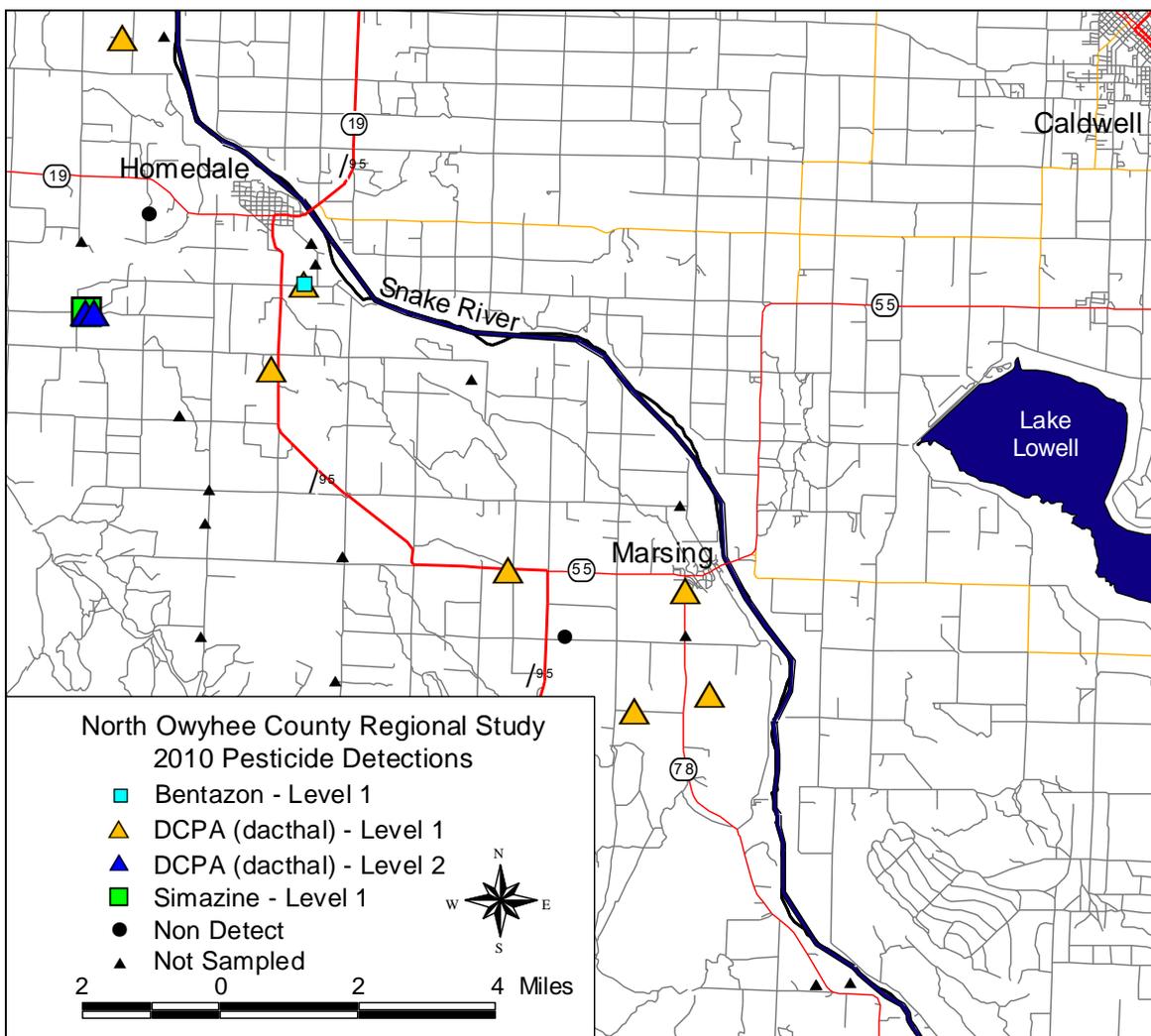


Figure 13. Pesticide results from 2010 sampling of the North Owyhee County Regional Study.

Table 17. Summary of 2010 Pesticide Results from the North Owyhee County Regional Study.

Pesticide	No. of Detections (% of wells sampled with detection)	Range (µg/L) (Min. – Max.)	Reference Point (µg/L)
Bentazon	1 (11.1%)	1.6	200 (HAL) ¹
DCPA (Dacthal)	9 (81.8%)	27.72 (0.28 – 28)	70 (HAL)
Simazine	1 (11.1%)	0.03	4 (MCL) ²

¹HAL – EPA Lifetime Health Advisory.

²MCL – EPA Maximum Contaminant Level.

Grand View and Bruneau Areas Regional Study

In 2010, seven wells from the Grand View and Bruneau Areas Regional Study (Project 865) were sampled for pesticides (Figure 14). The seven wells were chosen due to previous pesticide detections. All seven wells had positive detections of one or more pesticide active ingredients or breakdown products. Atrazine and desethyl atrazine (a breakdown product of atrazine) were detected in five and six wells, respectively; five wells had positive detections of both atrazine and desethyl atrazine (Figure 14 and Table 18). Dinoseb, DCPA (dacthal) and metribuzin were each detected once. All detections were below any health standards set by the EPA or the state of Idaho and 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.

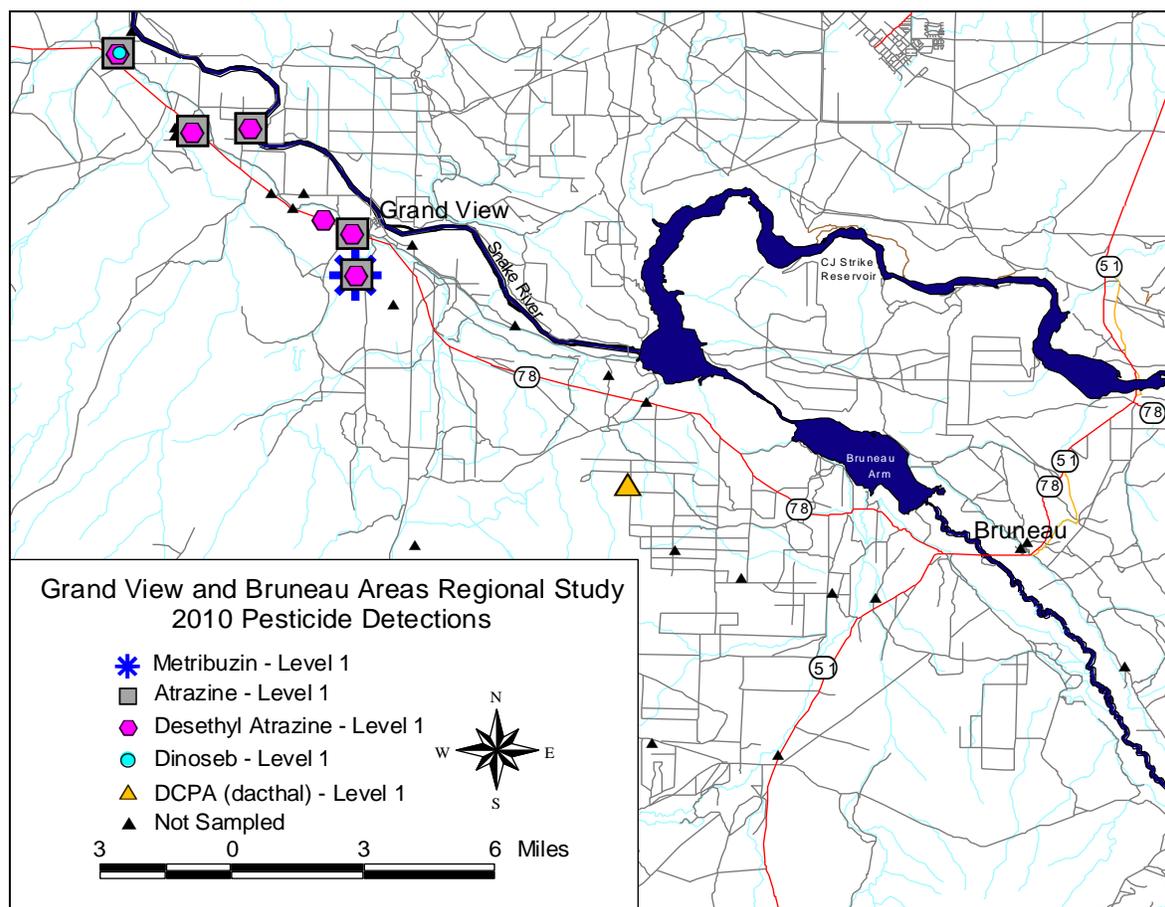


Figure 14. Pesticide results from 2010 sampling of the Grand View and Bruneau Areas Regional Study.

Table 18. Summary of 2010 Pesticide Results from the Grand View and Bruneau Areas Regional Study.

Pesticide	No. of Detections (% of wells sampled with detection)	Range ($\mu\text{g/L}$) (Min. – Max.)	Reference Point ($\mu\text{g/L}$)
Atrazine	5 (71.4%)	0.18 (0.03 – 0.21)	3 (MCL) ¹
DCPA (dacthal)	1 (14.3%)	0.53	70 (HAL) ²
Desethyl Atrazine	6 (85.7%)	0.23 (0.03 – 0.26)	....³
Dinoseb	1 (14.3%)	0.71	7 (MCL)
Metribuzin	1 (14.3%)	0.22	200 (HAL)

¹MCL – EPA Maximum Contaminant Level.

²HAL – EPA Lifetime Health Advisory.

³Breakdown product of Atrazine. No reference point available, MCL for Atrazine of 3 µg/L is used.

Northwest Gooding County (Bliss) Regional Study

Four wells from the Northwest Gooding County (Bliss) Regional Study (Project 870) were sampled for pesticides in 2010 (Figure 15). The four wells sampled were selected due to previous pesticide detections. Two out of the four wells tested had a positive detection of one or more pesticide active ingredients. The three pesticide active ingredients detected were DCPA (dacthal), metribuzin and desethyl atrazine, a breakdown product of atrazine (Figure 15 and Table 19). All detections were below any health standards set by the EPA or the state of Idaho and 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.

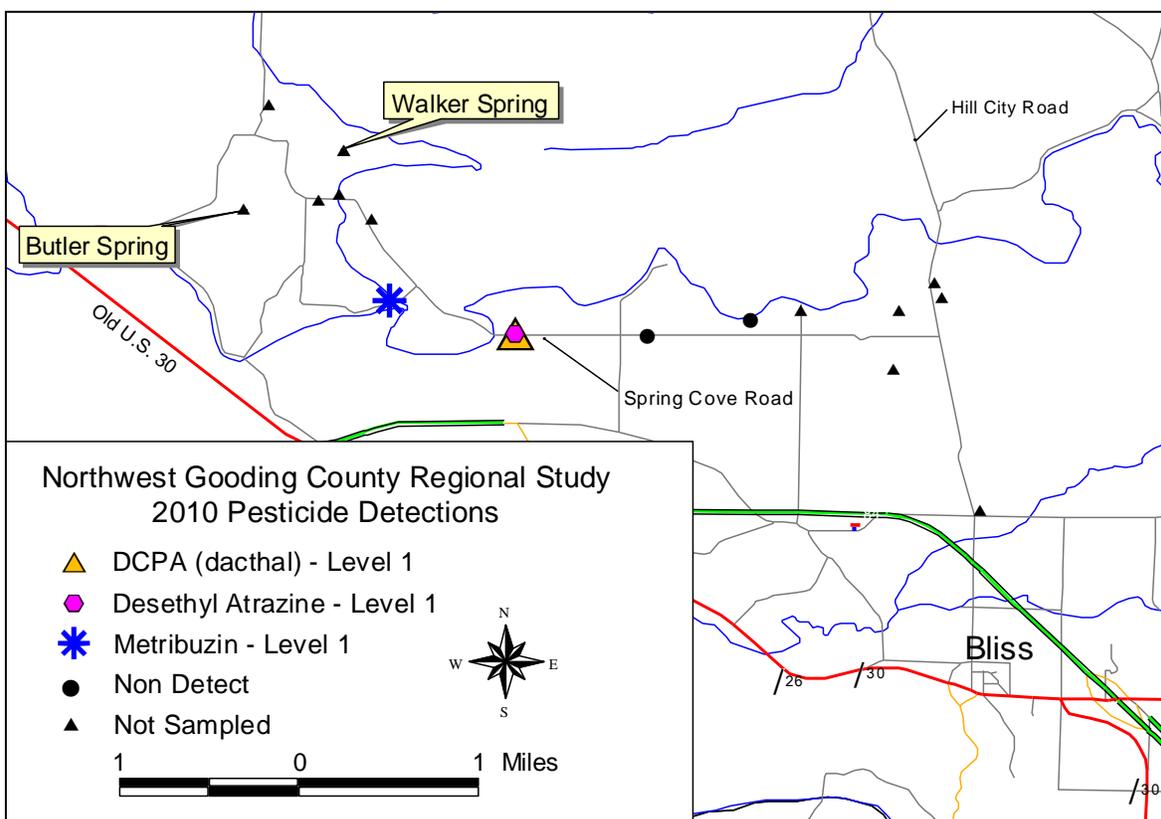


Figure 15. Pesticide results from 2010 sampling of the Northwest Gooding County (Bliss) Regional Study.

Table 19. Summary of 2010 Pesticide Results from the Northwest Gooding County (Bliss) Regional Study.

Pesticide	No. of Detections (% of wells sampled with detection)	Range (µg/L) (Min. – Max.)	Reference Point (µg/L)
DCPA (Dacthal)	1 (25%)	0.51	70 (HAL) ¹
Desethyl Atrazine	1 (25%)	0.03	....²
Metribuzin	1 (25%)	0.04	200 (HAL)

¹HAL – EPA Lifetime Health Advisory.

²Breakdown product of Atrazine. No reference point available, MCL for Atrazine of 3 µg/L is used.

Hammett and Glenss Ferry Areas Regional Study

Six wells from the Hammett and Glenss Ferry Areas Regional Study (Project 890) were sampled for pesticides in 2010 (Figure 16). Three of the six wells sampled had a positive detection of one or more pesticide active ingredients or breakdown products. Three pesticide active ingredients were detected including: atrazine, desethyl atrazine (a breakdown product of atrazine), and oxamyl (Figure 16 and Table 20). All detections were below any health standards set by the EPA or the state of Idaho and 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.

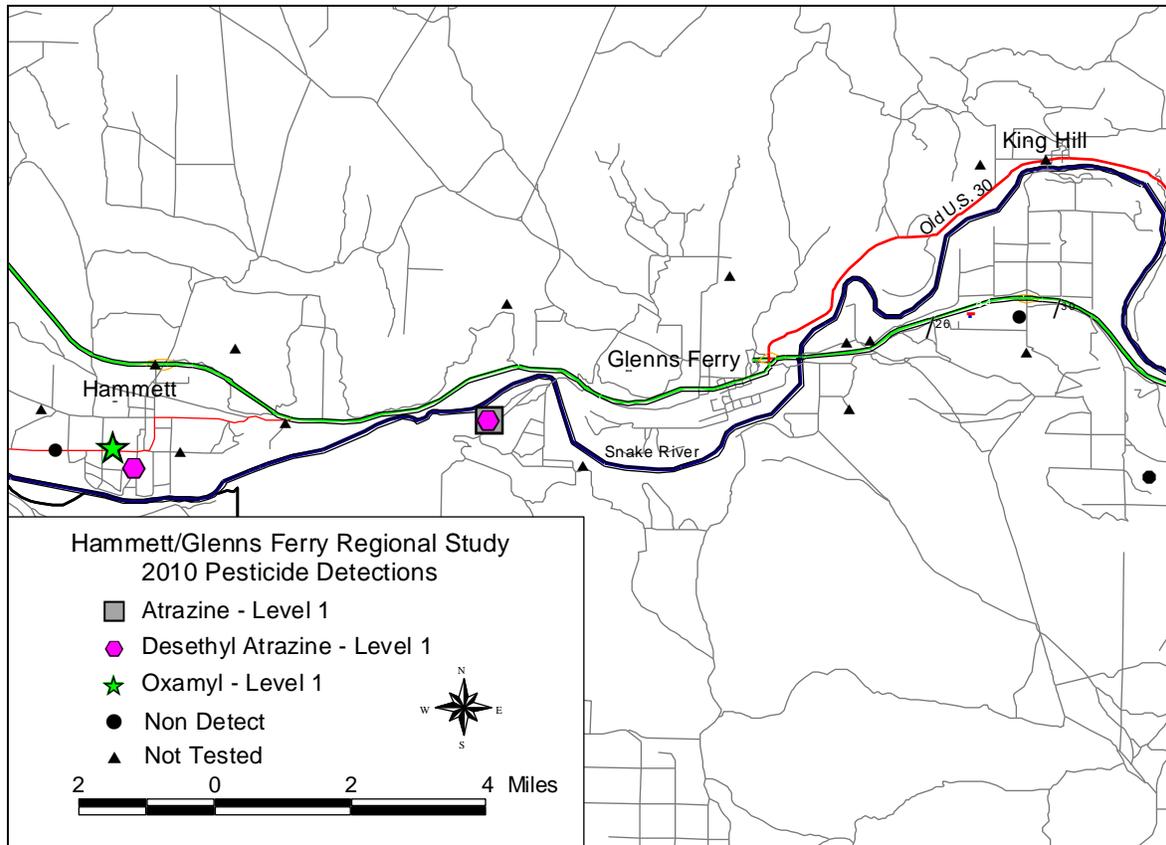


Figure 16. Pesticide results from 2010 sampling of the Hammett and Glenss Ferry Areas Regional Study.

Table 20. Summary of 2010 Pesticide Results from the Hammett and Glenss Ferry Areas Regional Study.

Pesticide	No. of Detections (% of wells sampled with detection)	Range (µg/L) (Min. – Max.)	Reference Point (µg/L)
Atrazine	1 (16.7%)	0.21	3 (MCL) ¹
Desethyl Atrazine	2 (33.3%)	0.19 (0.03 – 0.22)	... ²
Oxamyl	1 (16.7%)	0.13	200 (MCL)

¹MCL – EPA Maximum Contaminant Level.

²Breakdown product of Atrazine. No reference point available, MCL for Atrazine of 3 µg/L is used.

Clearwater Plateau Aquifer Regional Study

In 2010, 16 wells from the Clearwater Plateau Aquifer Regional Study (Project 950) were sampled for pesticides (Figure 17). The 16 wells sampled in 2010 included three wells that are part of PMP projects due to historic elevated detections of one or more pesticide active ingredient or breakdown product; the three wells include a well approximately 2 miles north/northeast of Greencreek and two wells south of Lewiston Orchards (Figure 17). The well near Greencreek has had historical elevated detections of triallate. The two wells south of Lewiston Orchards are part of the Nez Perce County Atrazine PMP projects due to historic elevated detections of atrazine and its breakdown products.

Three of the 16 wells sampled had positive detections of one or more pesticide active ingredient or breakdown product (Figure 17 and Table 21). Triallate was detected in the well near Greencreek at a Level 4 concentration (a detection that exceeds the Food Quality Protection Act Standard Drinking Water Level of Concern (FQPA DWLOC) of 0.45 µg/L). The two wells near Lewiston Orchards each had positive detections of three or more pesticide active ingredients or breakdown products. One of the two wells had detections of the following: atrazine at a Level 2, desethyl atrazine (a breakdown product of atrazine) at a Level 3, deisopropyl atrazine (a breakdown product of atrazine) at a Level 1, and diuron at a Level 1 (Figure 17). The collective concentrations of atrazine and its breakdown products results in a Level 3 detection at this well. The other well had Level 1 detections of desethyl atrazine, bromacil and diuron.

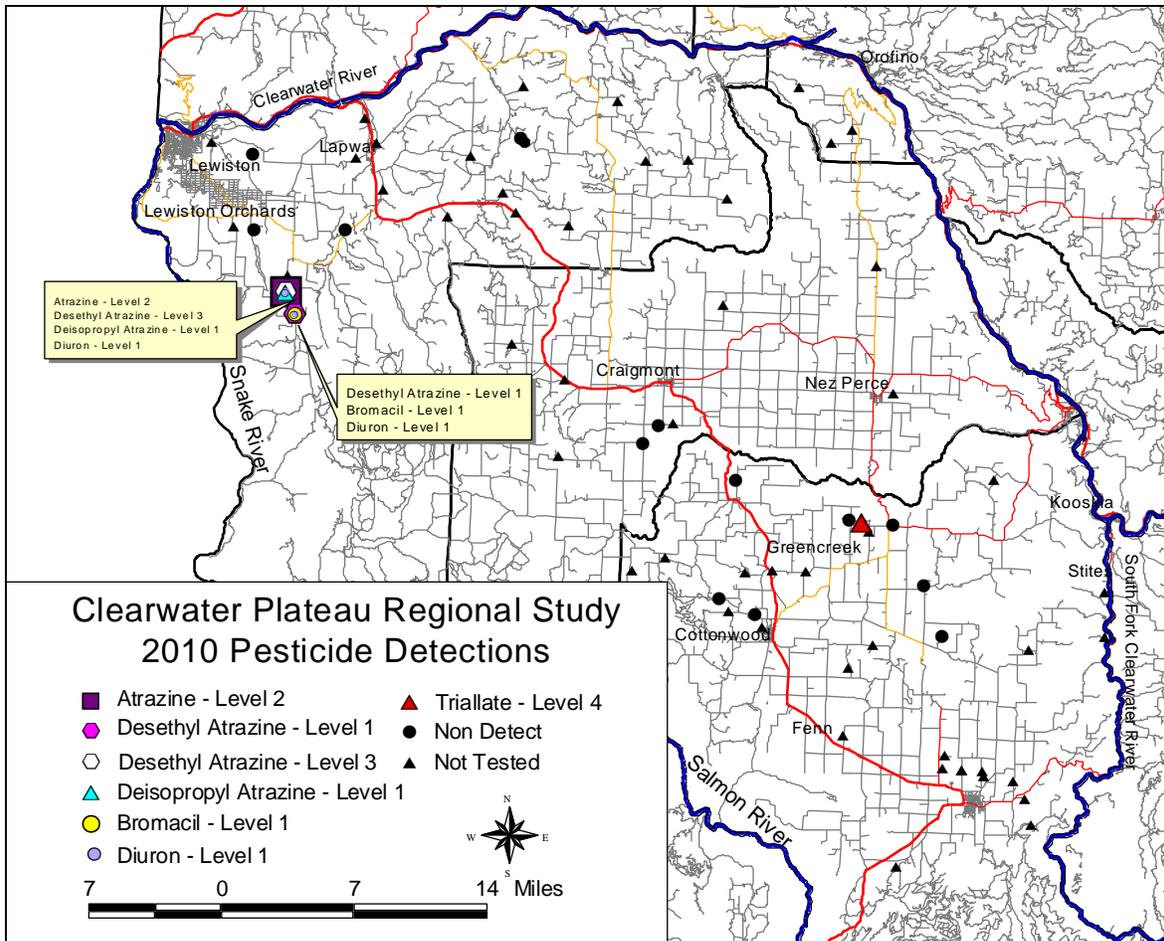


Figure 17. Pesticide results from ISDA 2010 sampling of the Clearwater Plateau Aquifer Regional Study.

Table 21. Summary of 2010 Pesticide Results from the Clearwater Plateau Aquifer Regional Study.

Pesticide	No. of Detections (% of wells sampled with detection)	Range ($\mu\text{g/L}$) (Min. – Max.)	Reference Point ($\mu\text{g/L}$)
Atrazine	1 (6.3%)	0.73	3 (MCL) ¹
Bromacil	1 (6.3%)	0.09	70 (HAL) ²
Deisopropyl Atrazine	1 (7.7%)	0.05	....³
Desethyl Atrazine	2 (12.5%)	1.49 (0.11 - 1.6)	....
Diuron	2 (12.5%)	0.09 (0.05 - 0.14)	200 (HAL)
Triallate	1 (6.3%)	0.99	0.45 (FQPA DWLOC) ⁴

¹MCL –EPA Maximum Contaminant Level.

²HAL – EPA Lifetime Health Advisory.

³Breakdown product of Atrazine. No reference point available, MCL for Atrazine of 3 $\mu\text{g/L}$ is used.

⁴FQPA DWLOC – Food Quality Protection Act, Drinking Water Level of Concern.

Local Ground Water Quality Projects

Site Selection

ISDA selects local project locations based on review of data from a variety of sources including the: IDWR Statewide Ambient Ground Water Program, IDEQ Public Water Supply Database, and USGS ground water quality database. To develop new projects, ISDA evaluates these data sources and recommendations from other agencies. ISDA Ground Water Program staff determine the need for new local projects as well as to consider continuation or discontinuation of existing projects while also considering available funding. ISDA Ground Water Program staff discuss this information with other state and federal water quality professionals at the Agricultural Ground Water Quality Protection Committee, PMP Advisory Committee, and IDEQ chaired Ground Water Monitoring Technical Committee meetings.

Design

ISDA Ground Water Program staff relies almost entirely upon sampling of privately owned domestic wells for local projects. Because local projects are typically less than 10 square miles, selection of wells for sampling is generally less stringent than for regional projects. Most wells within the area of concern may be sampled. When wells are abundant, selection is made by taking into account many factors such as well placement, well depth, well log information, and proximity to area of concern. Monitoring wells are installed where deemed needed and funding is available. All projects require a project monitoring plan to be written prior to formal project sampling.

Standard Operating Procedures

For all projects and monitoring activities, ISDA Ground Water Program staff follows established protocols kept on file at ISDA. These protocols establish guidelines for establishing monitoring projects, monitoring wells, quality control and assurance, shipping and handling, laboratory requirements, and other protocols essential to quality work. ISDA staff also follow the ISDA QMP and QAPP, which meet EPA standards and concurrence.

Project Areas

In 2010, staff sampled two local monitoring projects that meet the size criterion for a local project. One project is located northwest of Eagle, Idaho (Eagle Local Project) and the other is located south of Mountain Home, Idaho (Elmore County Project). Both projects were sampled for pesticides only.

Local Pesticide Monitoring Results by Project

Elmore County Local Project

A total of five wells were sampled for pesticides in the Elmore County Local Project in 2010. The majority of the wells are located along South 18th East Street and Hamilton Road (Figure 18). All five wells had one or more pesticides detected within the ground water. Seven pesticide active ingredient or breakdown products were detected in one or more wells. Bromacil and desethyl atrazine, a breakdown product of the pesticide atrazine, were the most commonly detected with detections in three and four wells, respectively. Atrazine was detected in two wells; bentazon,

diuron, norflurazon and metribuzin were each detected once (Figure 18 and Table 22). All detections were below any health standards set by the EPA or the state of Idaho and 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.

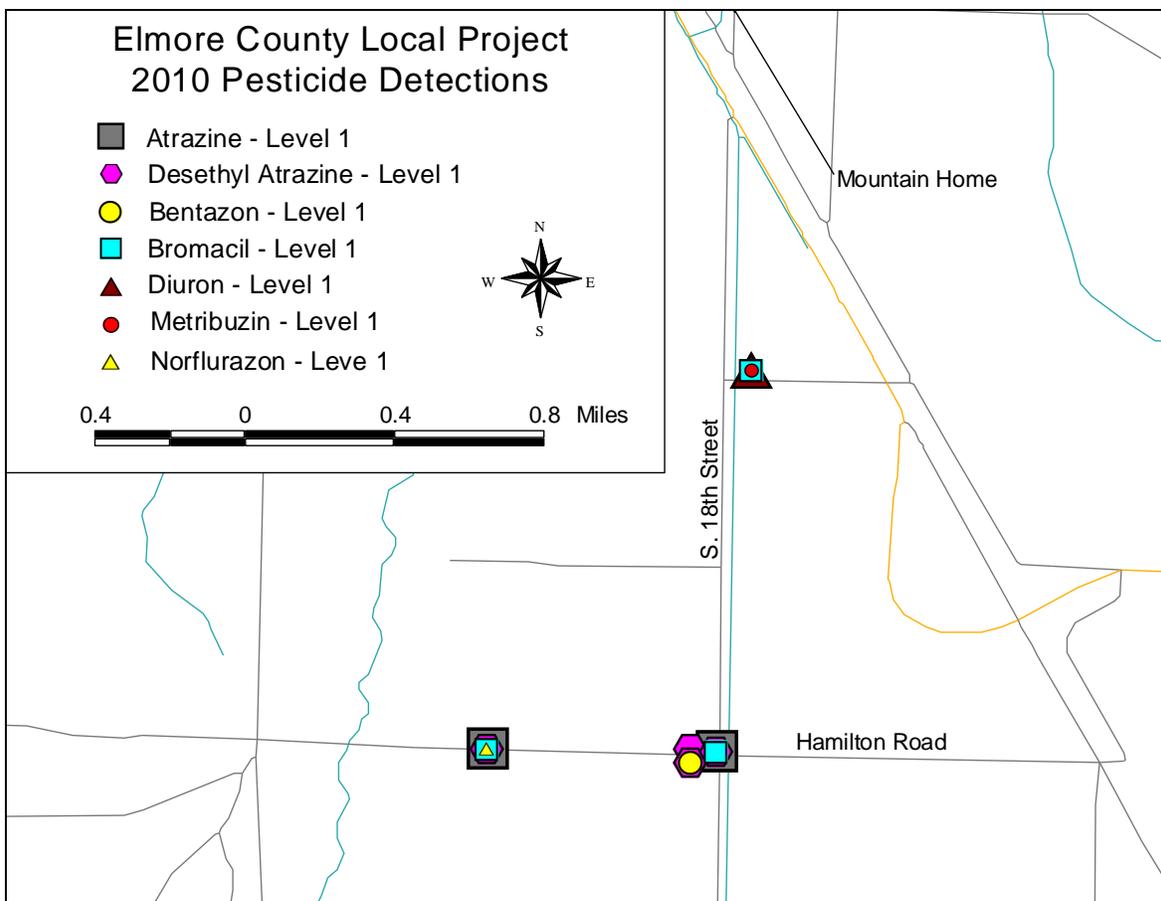


Figure 18. Pesticide results from 2010 sampling of the Elmore County Local Project.

Table 22. Summary of 2010 Pesticide Results from the Elmore County Local Project.

Pesticide	No. of Detections (% of wells sampled with detection)	Range ($\mu\text{g/L}$) (Min. – Max.)	Reference Point ($\mu\text{g/L}$)
Atrazine	2 (40%)	0.02 (0.04 – 0.06)	3 (MCL) ¹
Bentazon	1 (20%)	0.72	200 (HAL) ²
Bromacil	3 (60%)	1.22 (0.08 – 1.3)	90 (HAL)
Desethyl Atrazine	4 (80%)	0.25 (0.04 – 0.29)	... ³
Diuron	1 (20%)	0.37	28 (FQPA DWLOC) ⁴
Metribuzin	1 (20%)	0.03	70 (HAL)
Norflurazon	1 (20%)	0.08	30 (est. HAL) ⁵

¹MCL – EPA Maximum Contaminant Level.

²HAL – EPA Lifetime Health Advisory.

³Breakdown product of Atrazine. No reference point available, MCL for Atrazine of 3 $\mu\text{g/L}$ is used.

⁴FQPA DWLOC – Food Quality Protection Act Drinking Water Level of Concern.

⁵HAL – EPA Office of Pesticide Program’s estimated Lifetime Health Advisory from the Norflurazon R.E.D (EPA, 1996).

Eagle Local Project

In 2010, three wells in the Eagle Local study were sampled for pesticides and volatile organic compounds (VOCs) (Figure 19). The three wells were sampled due to historical detections of pesticides and the VOC 1,2,3-trichloropropane, which is a breakdown product from an old formulation of a soil fumigant. Nine compounds were detected between the three wells. Two wells had detections of seven different compounds. The VOC 1,2,3-trichloropropane was detected in all three wells (Figure 19 Table 23). One of the 1,2,3-trichloropropane was a Level 2 detection (a detection of 20% to less than 50% of the reference point). The EPA Reference Dose (RfD) for 1,2,3-trichloropropane is 4 µg/L (Table 23). Metribuzin, DCPA (dacthal) and desethyl atrazine (a breakdown product of atrazine) were detected in all three wells at Level 1 concentrations (a detection above the detection limit to less than 20% of the reference point). Terbacil was detected twice, while atrazine, bromacil and diuron were each detected once (Figure 19 and Table 23). All detections were below any health standards set by the EPA.

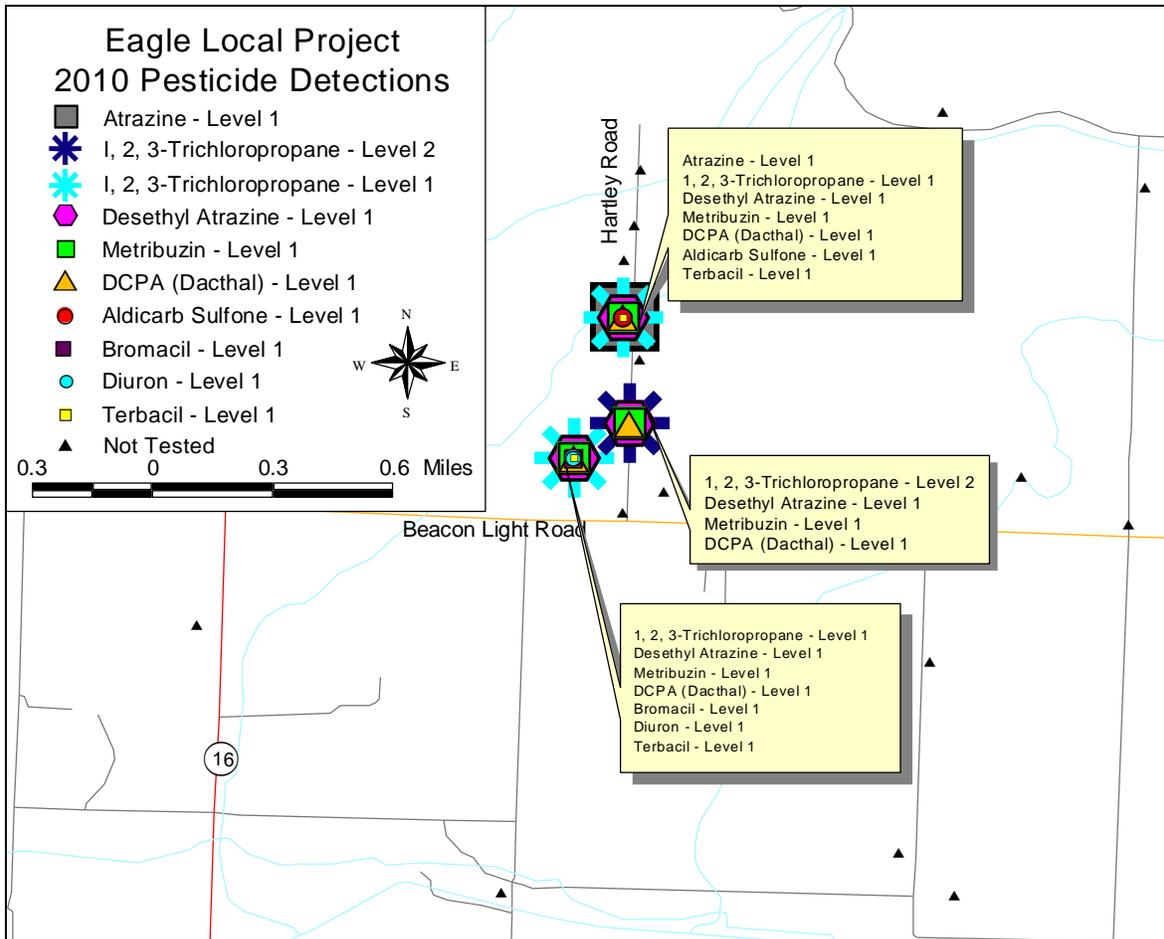


Figure 19. Pesticide results from 2010 sampling of the Eagle Local Project.

Table 23. Summary of 2010 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	3 (100%)	0.21 (0.78 – 0.99)	4 (RfD) ¹
Aldicarb Sulfone	1 (33.33%)	0.15	2 (MCL) ²
Atrazine	1 (33.33%)	0.03	3 (MCL)
Bromacil	1 (33.33%)	0.08	90 (HAL) ³
DCPA (Dacthal)	3 (100%)	0.12 (0.21 – 0.33)	70 (HAL)
Desethyl Atrazine	3 (100%)	0.01 (0.04 – 0.05)	... ⁴
Diuron	1 (33.33%)	0.06	28 (FQPA DWLOC) ⁵
Metribuzin	3 (100%)	0.04 (0.06 – 0.1)	70 (HAL)
Terbacil	2 (66.66%)	0.35 (0.07 – 0.42)	90 (HAL)

*Unless otherwise stated.

¹RfD – EPA Reference Dose (converted to µg/kg/day).

²HAL – EPA Lifetime Health Advisory.

³MCL – EPA Maximum Contaminant Level.

⁴Breakdown product of Atrazine. No reference point available, MCL for Atrazine of 3 µg/L is used.

⁵FQPA DWLOC– Food Quality Protection Act Drinking Water Level of Concern.

Pesticide Management Plan Projects

Overview

In response to elevated pesticide detections from the 2005 regional project area monitoring efforts, Pesticide Management Plan (PMP) monitoring projects were established. Additional wells surrounding the original elevated pesticide detection were sampled to determine the extent of the pesticide contamination. The projects were designed to gain a better understanding of the pesticide plume in the ground water and the relative contaminant contributions from potential pollutant sources. The information will be used to implement the Rules Governing Pesticide Management Plans for Ground Water Protection (IDAPA 02.03.01). Currently, ISDA has four active PMP projects which include the following: Owyhee County DCPA (Dacthal) PMP Project (310), Fremont County Triallate PMP Project (320), Nez Perce County Atrazine PMP Project (330), and the Fruitland Atrazine PMP Project (340). An additional PMP project, the Greencreek Triallate PMP Project (380), is in the early stages of development and only included one well at the time of this report. Historically, the PMP projects were sampled for both inorganic compounds (including nitrate) and pesticides on an annual basis. In 2010, all four PMP projects were sampled for pesticides only.

Pesticide Management Plan Project Results by Project

Owyhee County

A PMP project designed to monitor 13 wells in Owyhee County, southwest of Homedale, Idaho was created in response to an elevated detection of DCPA (dacthal) in a well (well ID 3100101) originally part of the North Owyhee County Regional Project. In 2010, five of the 13 wells in the Owyhee County Dacthal PMP Project were analyzed for pesticides (Figure 20). Three wells, or 60% of wells sampled, had positive detections of one or more pesticide active ingredient or breakdown product. Five different pesticide active ingredients or breakdown products were detected (Table 24). DCPA (dacthal) was detected in three of the five wells samples. The other

two wells had no pesticides detected in the ground water. Of the three wells with DCPA (dacthal) detections, two wells, including well 3100101, had a Level 2 DCPA (dacthal) detections (a detection at 20% to less than 50% of the reference point); the remaining well had Level 1 detections (a detection above the detection limit to less than 20% of the reference point) (Figure 20). One of the wells with a Level 2 DCPA (dacthal) detection also had a Level 1 simazine detection (Figure 20). The well with a Level 1 DCPA (dacthal) detection had additional pesticides detected; including Level 1 detections of atrazine, desethyl atrazine and tetrahydrofuran (Figure 20). The pesticide detections from the five wells that were sampled are presented in Table 24. All pesticide detections in the follow up sampling were below any health standards set by EPA or the state of Idaho.

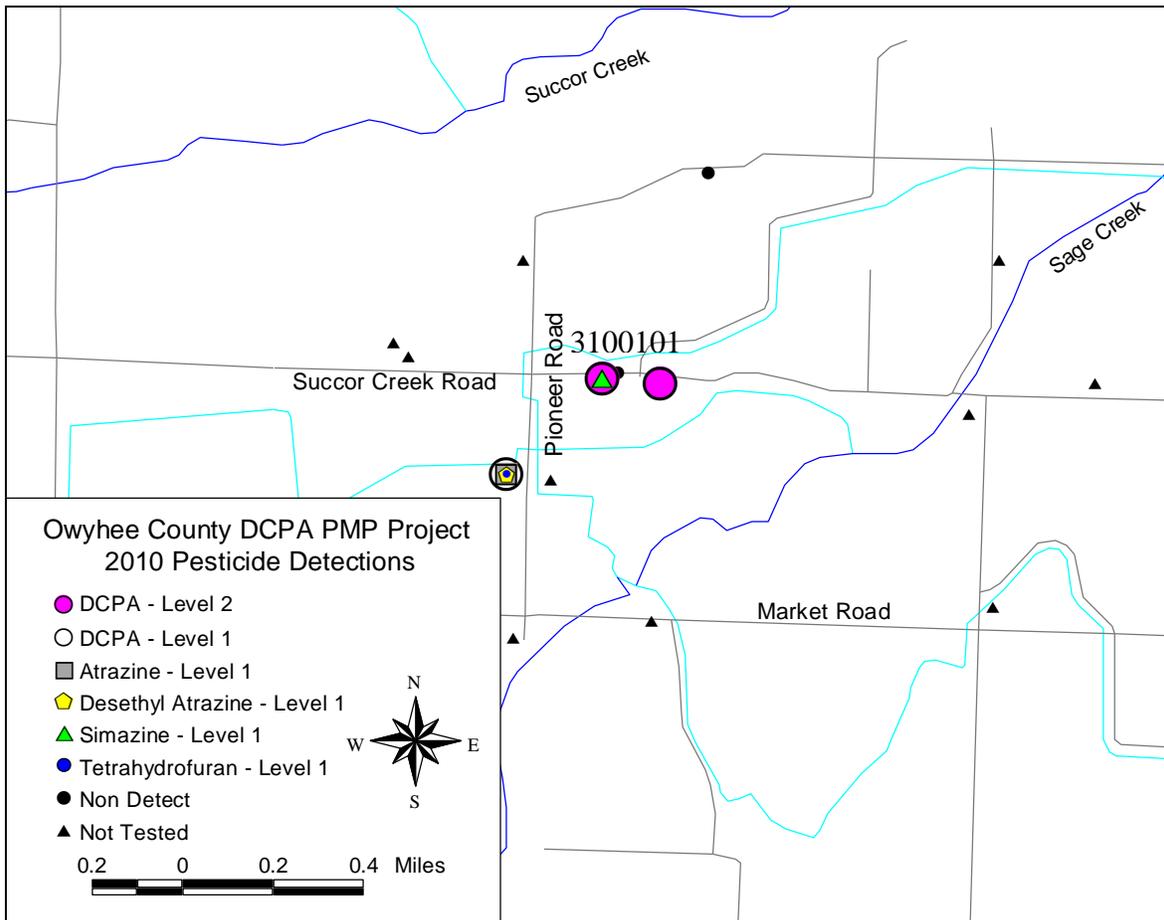


Figure 20. Pesticide results from the 2010 sampling of the Owyhee County DCPA (Dacthal) PMP Project.

Table 24. Summary of 2010 Pesticide Results from the Owyhee County DCPA (Dacthal) PMP Project.

Pesticide	No. of Detections (% of wells sampled with detection)	Range (µg/L) (Min. – Max.)	Reference Point (µg/L)
Atrazine	1 (20%)	0.03	3 (MCL) ¹
DCPA (dacthal)	3 (60%)	25.1 (2.9– 28)	70 (HAL)
Desethyl Atrazine	1 (20%)	0.04	--- ³
Simazine	1 (20%)	0.03	4 (MCL)
Tetrahydrofuran	1 (20%)	8.0	50, 154 ⁴

¹MCL – EPA Maximum Contaminant Level.

²HAL – EPA Lifetime Health Advisory.

³Breakdown product of Atrazine. No reference point available, MCL for Atrazine of 3 µg/L is used.

⁴No EPA standard. The Wisconsin Department of Natural Resources Drinking Water Guideline is 50 µg/L, the New Hampshire Department of Environmental Services Drinking Water Guideline is 154 µg/L.

Well 3100101 has had historical elevated detections of DCPA. Due to the concentration detected in this well in 1999, follow-up sampling was conducted which resulted in the development of a PMP response monitoring project. The concentration of DCPA in well 3100101 has been tracked over the past 11 years (Figure 21). DCPA was detected at a Level 3 in 1999 and remained a Level 3 until 2001. In 2002, the concentration decreased resulting in a Level 1 detection. The concentration increased to a Level 2 in 2003 and 2004. The 2005 monitoring resulted in a Level 4 detection (a detection that exceeds the reference point). The large increase in concentration between April 2004 and April 2005 prompted quarterly monitoring for a year, to identify potential seasonal changes that might be missed by annual sampling. The quarterly monitoring and 2007 detection seemed to indicate a decreasing trend with potential seasonal variability. In 2008, the DCPA concentration in 3100101 increased up to a Level 3. The last annual monitoring effort, conducted in May 2010, resulted in a concentration of 28 µg/L, which was an increase in concentration from quarterly monitoring results of 25 µg/L in February 2010 and 16 µg/L in September of 2009 (Figure 21). A DCPA PMP Rule, which restricts the use of DCPA within a four-square mile area southwest of Homedale, Idaho was passed by the Idaho Legislature in the spring of 2007. Tracking the trend in well 3100101 and other wells nearby will be important in determining if the management approach is working to protect ground water in this area. Quarterly monitoring of four of five of these wells was conducted as part of the EPA FY10 Discretionary Project and is discussed in the following section of this report.

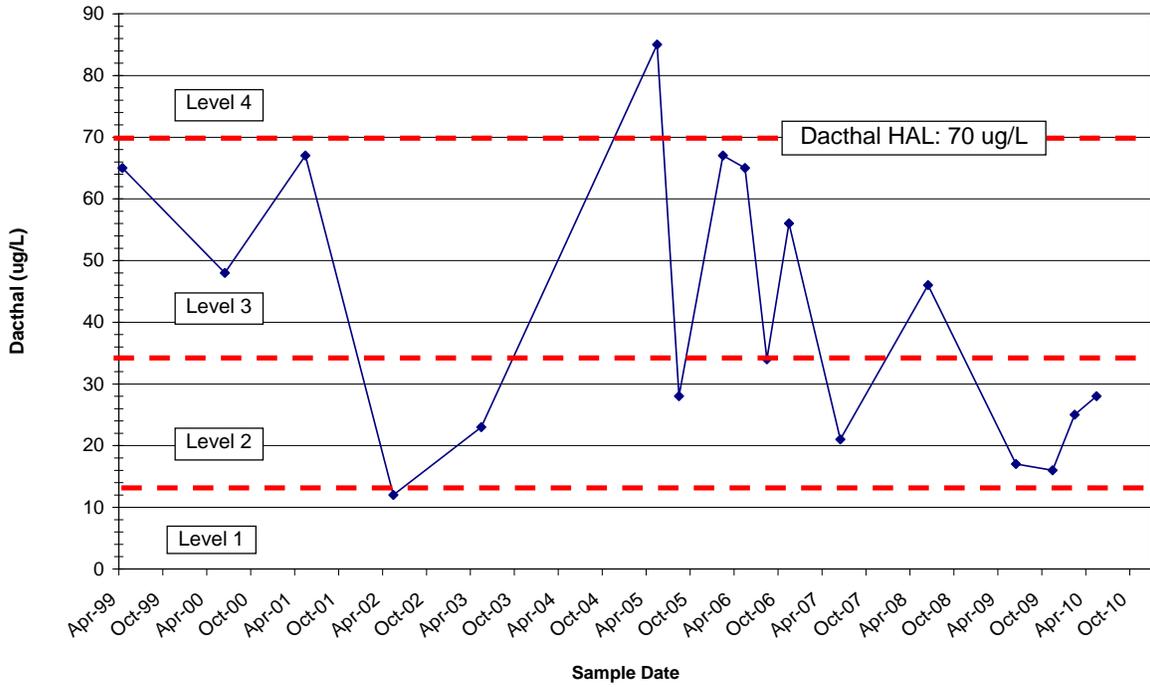


Figure 21. Time-series plot of DCPA concentrations detected in well ID 3100101.

Fremont County

The elevated concentrations of triallate in well 3200101 led to the development of Fremont County Triallate PMP Project. Wells nearby well 3200101 were selected and sampled annually, in order to characterize the extent of elevated triallate concentrations in the ground water. Five wells from the Fremont County Triallate PMP Project (Figure 22) were sampled for pesticides in 2010. Only one of the five wells sampled had a positive detection of at least one pesticide. Triallate was the only pesticide active ingredient positively detected. The well that initiated the project with an elevated detection of triallate (well ID 3200101) had a Level 3 triallate detection in 2010 (a detection of 50% to 100% the reference point) (Figures 22 and 23). A summary of the pesticide detection from the 2010 monitoring effort is presented in Table 25.

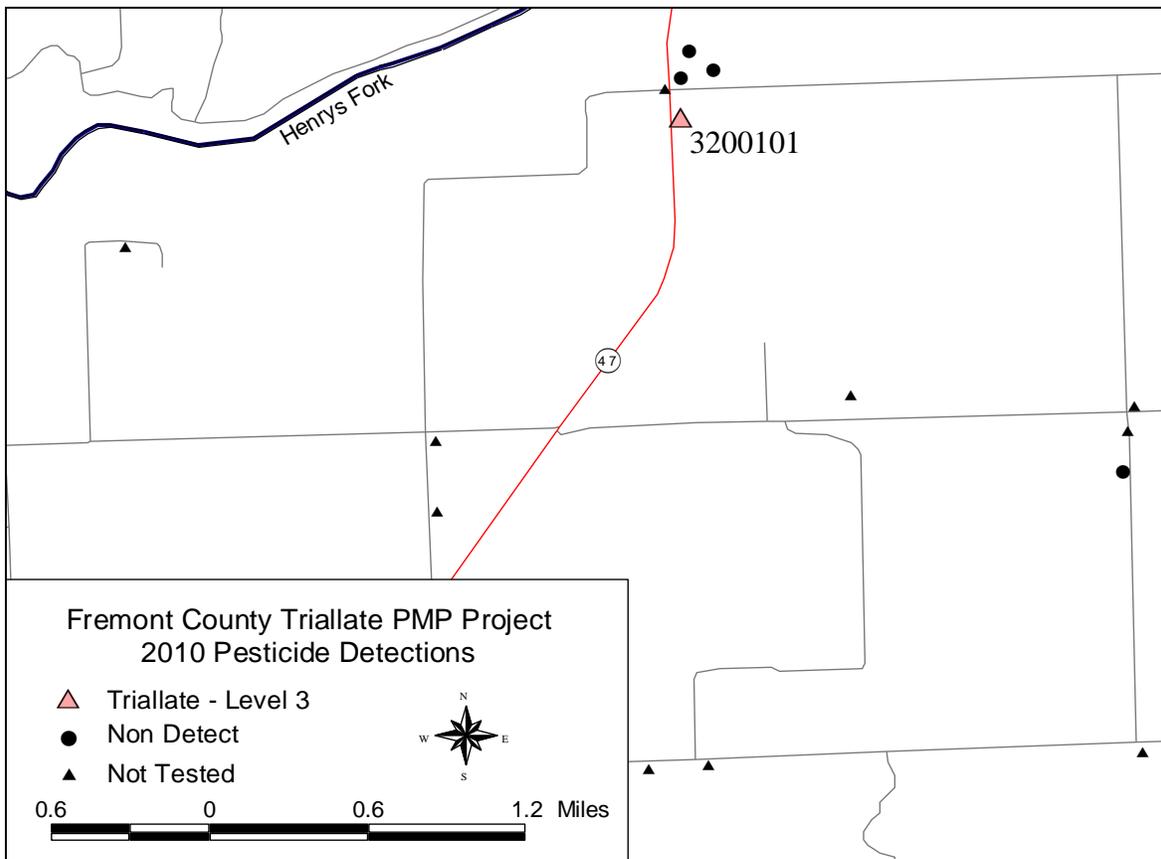


Figure 22. Pesticide results from 2010 sampling of the Fremont County Triallate PMP Project.

Table 25. Summary of 2010 Pesticide Results from the Fremont County Triallate PMP Project.

Pesticide	No. of Detections (% of wells sampled with detection)	Range (µg/L)	Reference Point (µg/L)
Triallate	1 (20%)	0.41	0.45 (FQPA DWLOC) ¹

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

The triallate concentrations in well 3200101 continue to be a concern as they have been equal to or above 20% of the reference point of 0.45 µg/L since 2003, when the Middle Henrys Fork Central Basin Regional Project was initiated and well 3201010 was first sampled. The triallate concentrations in Well 3200101 increased from a Level 2 in 2003, to a Level 3 in 2004 and to a Level 4 in 2005. In 2006, the concentration decreased down to a Level 2 detection. Since 2006, the triallate concentration gradually increased each year back to a Level 4 in 2009; increasing from a 0.09 µg/L in 2006 to 0.49 µg/L in 2009 (Figure 23). From 2009 to 2010 there was a slight decrease in concentration, dropping the detection to a Level 3 category (Figure 23).

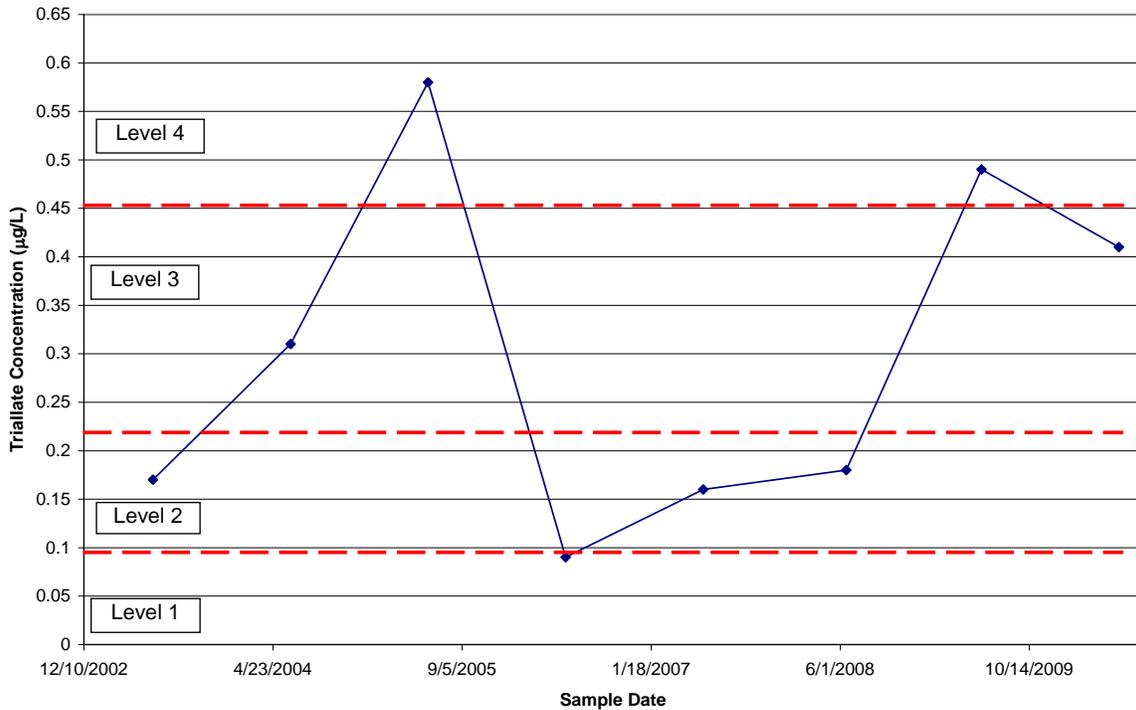


Figure 23. Time-series plot of triallate concentrations detected in well 3200101.

Nez Perce County

The Nez Perce County Atrazine PMP project is located in Nez Perce County southwest of Lewiston and Lewiston Orchards along Waha Road (Figure 24). The project was initiated in response to an elevated detection of atrazine in a well from the Clearwater Plateau Regional Study (well ID 3300101) in 2001 (Figure 24). Only two wells (including well 3300101) from the Nez Perce County Atrazine PMP Project were sampled for pesticides in 2010. The results of the 2010 sampling are shown in Figure 24 and Table 26. A total of four pesticide active ingredients or breakdown products were detected. The well with the historic elevated detections of atrazine (well ID 3300101) had positive detections of all four pesticide active ingredients or breakdown products, including a Level 2 detection (a detection at 20% to less than 50% of the reference point) of atrazine and a Level 3 detection (a detection at 50% to less than 100% of the reference point) of desethyl atrazine (a breakdown product of atrazine) (Figure 24). The other well (3300201) had Level 1 detections (a detection above the detection limit to less than 20% of a reference point) of both desethyl atrazine and diuron (Figure 24). The pesticide detections from the two wells are presented in Table 26. All pesticide detections in the follow up sampling were below any health standards set by EPA or the state of Idaho.

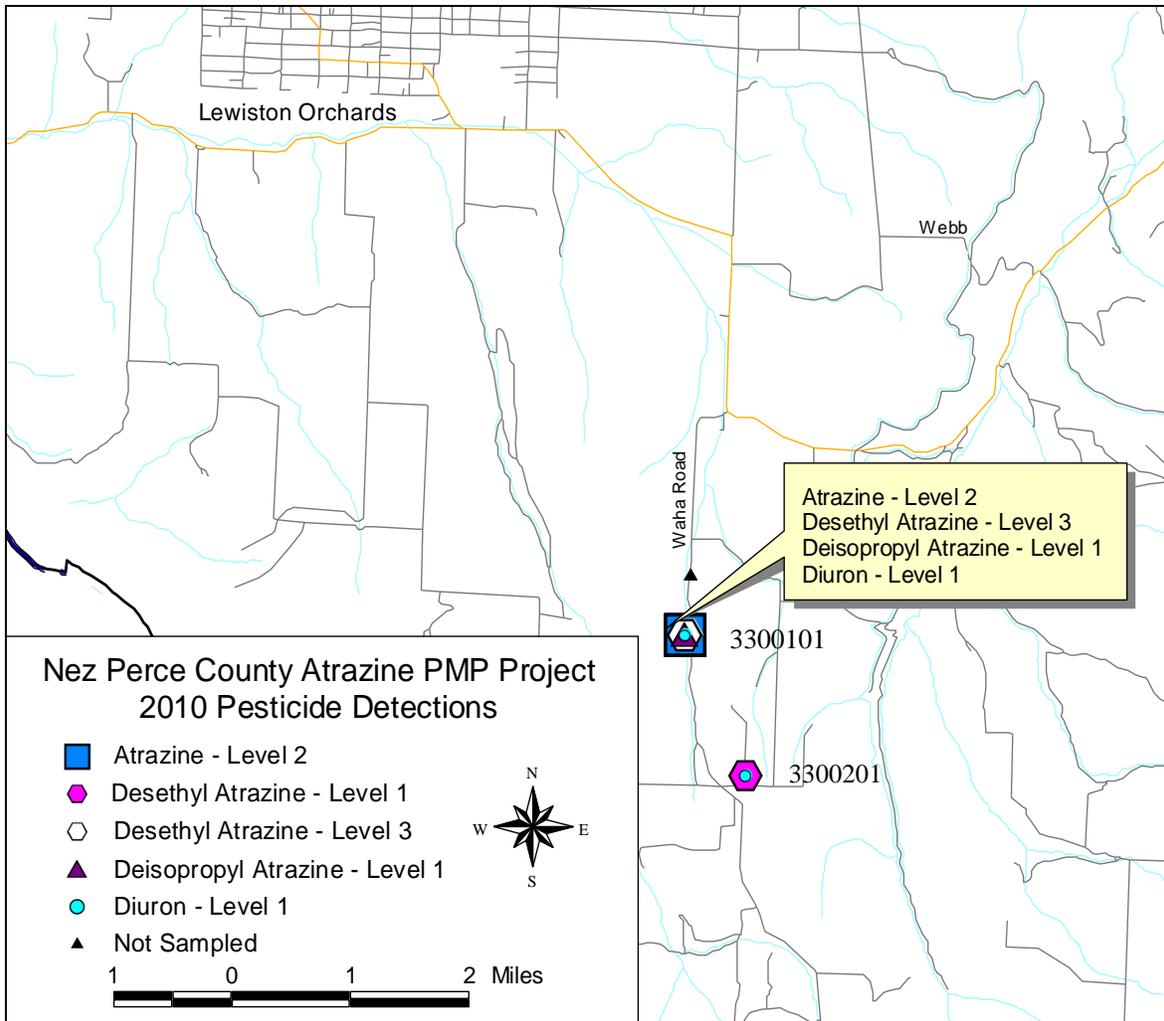


Figure 24. Pesticide results from 2010 sampling of Nez Perce County Atrazine PMP Project.

Table 26. Summary of 2010 Pesticide Results from the Nez Perce County Atrazine PMP Project.

Pesticide	No. of Detections (% of wells sampled with detection)	Range (µg/L) (Min. – Max.)	Reference Point (µg/L)
Atrazine	1 (50%)	0.73	3 (MCL) ¹
Bromacil	1 (50%)	0.09	70 (HAL) ²
Desethyl Atrazine	2 (100%)	1.49 (0.11 – 1.6)	....³
Deisopropyl Atrazine	1 (50%)	0.05	....
Diuron	2 (100%)	0.09 (0.05 – 0.14)	28 (FQPA DWLOC) ⁴

¹MCL – EPA Maximum Contaminant Level.

²HAL – EPA Lifetime Health Advisory.

³Breakdown product of Atrazine. No reference point available, MCL for Atrazine of 3 µg/L is used.

⁴FQPA DWLOC– Food Quality Protection Act Drinking Water Level of Concern.

The atrazine and desethyl atrazine concentrations in well 3300101 have been tracked over time to determine if the concentrations were increasing, decreasing or remaining stable. Since 2001, the concentrations have changed between Level 2 and Level 3 detections for both atrazine and

desethyl atrazine. The changes in concentration of atrazine and desethyl atrazine have been relatively similar, with the exception of 2009, when the desethyl atrazine concentration more than doubled and increased to a Level 3, while the atrazine concentration remained at a Level 2 (Figure 25).

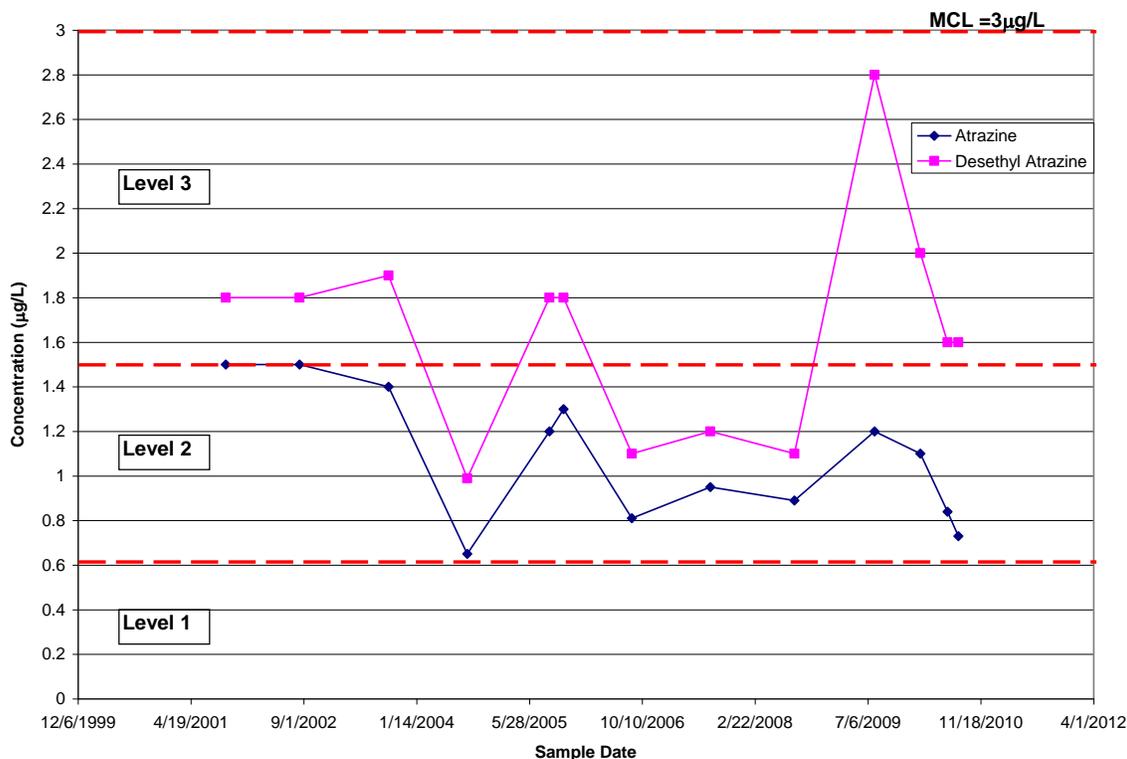


Figure 25. Time-series plot of atrazine and desethyl atrazine concentrations detected in well 3300101.

Payette County

A total of three wells, including the well (well ID 3400101) with the initial elevated concentration of desethyl atrazine (a breakdown product of atrazine), were sampled for pesticides in 2010 (Figure 26). All three wells had Level 1 detections (a detection above the detection limit and less than 20% of the reference point) of one or more pesticide active ingredient(s) or breakdown products. Two wells (3400101 and 3400501) had Level 1 detections of atrazine, desethyl atrazine and deisopropyl atrazine detections (both breakdown products of atrazine), while the third well (3400801) had Level 1 detections of atrazine and desethyl atrazine (Figure 26). The monitoring results from the seven wells that were sampled are presented in Table 27. All pesticide detections in the follow up sampling were below any health standards set by EPA or the state of Idaho.

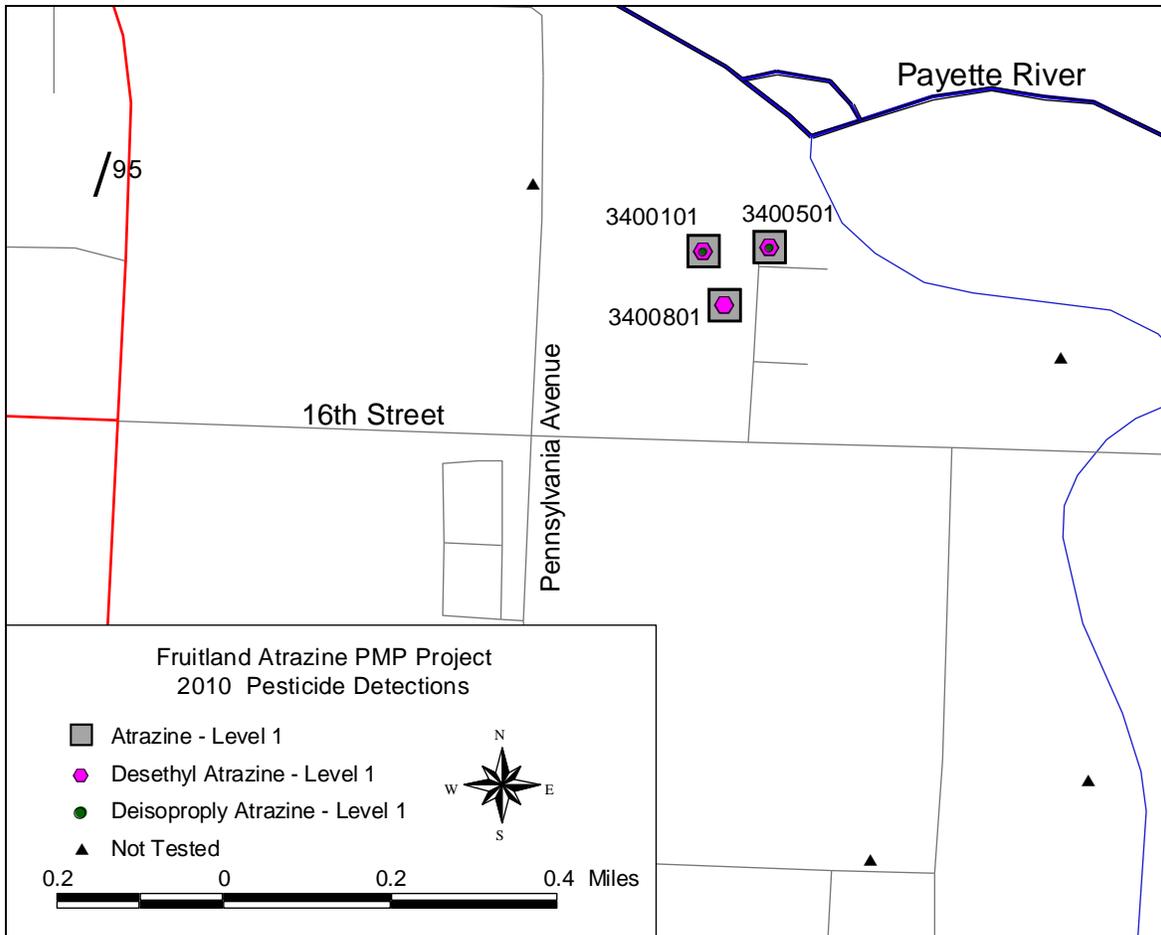


Figure 26. Pesticide results from 2010 sampling of the Fruitland Atrazine PMP Project.

Table 27. Summary of 2010 Pesticide Results from the Fruitland Atrazine PMP Project.

Pesticide	No. of Detections (% of wells sampled with detection)	Range (µg/L) (Min. – Max.)	Reference Point (µg/L)
Atrazine	3 (100%)	0.07(0.12 – 0.19)	3 (MCL) ¹
Desethyl Atrazine	3 (100%)	0.26 (0.09 – 0.35)	....²
Deisopropyl Atrazine	2 (66.6%)	0.02 (0.03 – 0.05)	....

¹MCL – EPA Maximum Contaminant Level.

²Breakdown 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 concentrations were increasing, decreasing or remaining stable. Atrazine concentrations in 3400101 gradually increased from 2005 to 2008 and then decreased in 2010 (Figure 27). The atrazine concentrations in wells 3400501 and 3400801 followed a similar pattern of decreasing from 2005 to 2006, remaining stable or slightly increasing from 2006 to 2007 then decreasing to a Level 1 in 2008 and again in 2010 (Figure 27). All three wells show a decrease in desethyl atrazine from 2005 to 2006. From May 2006 to May 2007, the desethyl atrazine concentration increases in well 3400101, remains stable in well 3400501 and decreases in well 3400801. From May 2007 to May 2008, desethyl atrazine continues to increase

in well 3400101 and decreases to a Level 1 detection in both wells 3400501 and 4300801 (Figure 28). All three wells show a decrease in desethyl atrazine in from May 2008 to May 2010 (Figure 28). Overall, the three wells decreased from Level 3 and Level 2 detections to Level 1 detections for both atrazine and desethyl atrazine (Figures 27 and 28).

Quarterly monitoring of these three wells was conducted as part of the EPA FY10 Discretionary Project and is discussed in the following section of this report.

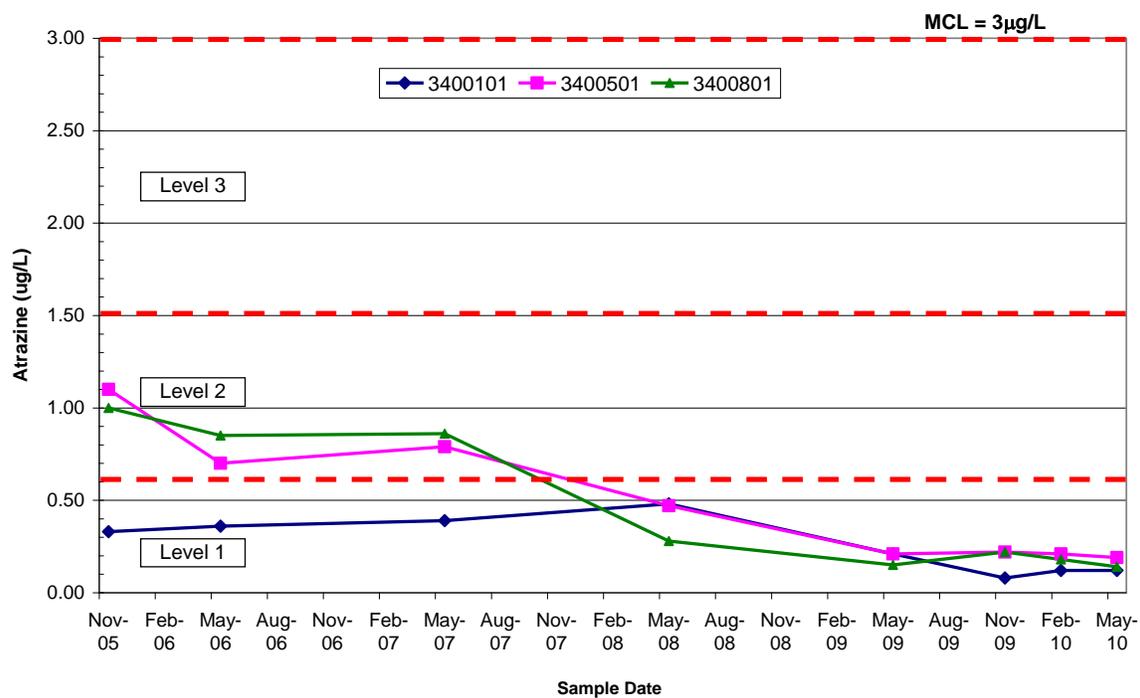


Figure 27. Time-series plot of atrazine concentrations detected in wells 3400101, 3400501, and 3400801.

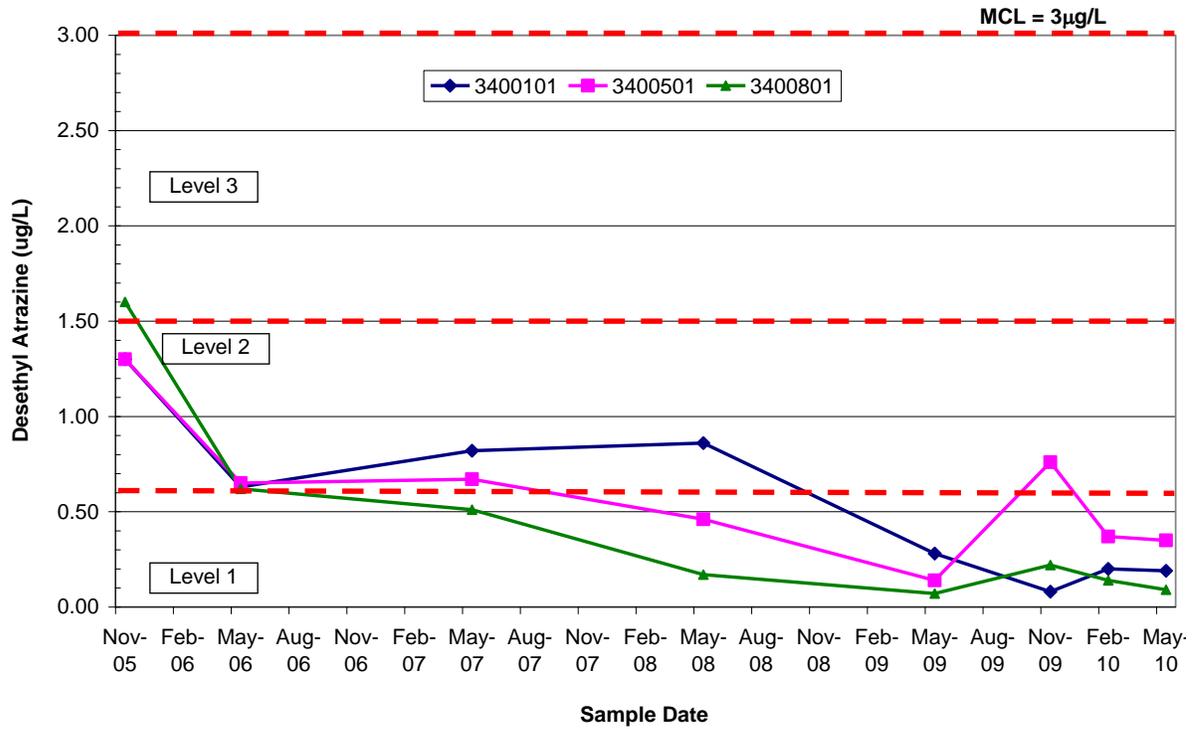


Figure 28. Time-series plot of desethyl atrazine concentrations detected in wells 3400101, 3400501, and 3400801.

Idaho County

One well north of Greencreek (well 3800101) was sampled for pesticides in 2010 (Figure 29) as part of the Greencreek Triallate PMP project. This well is also sampled as part of the Clearwater Plateau Regional Study. The well had a Level 4 detection (a detection above the reference point) of triallate. The monitoring results for this one well are presented in Table 28.

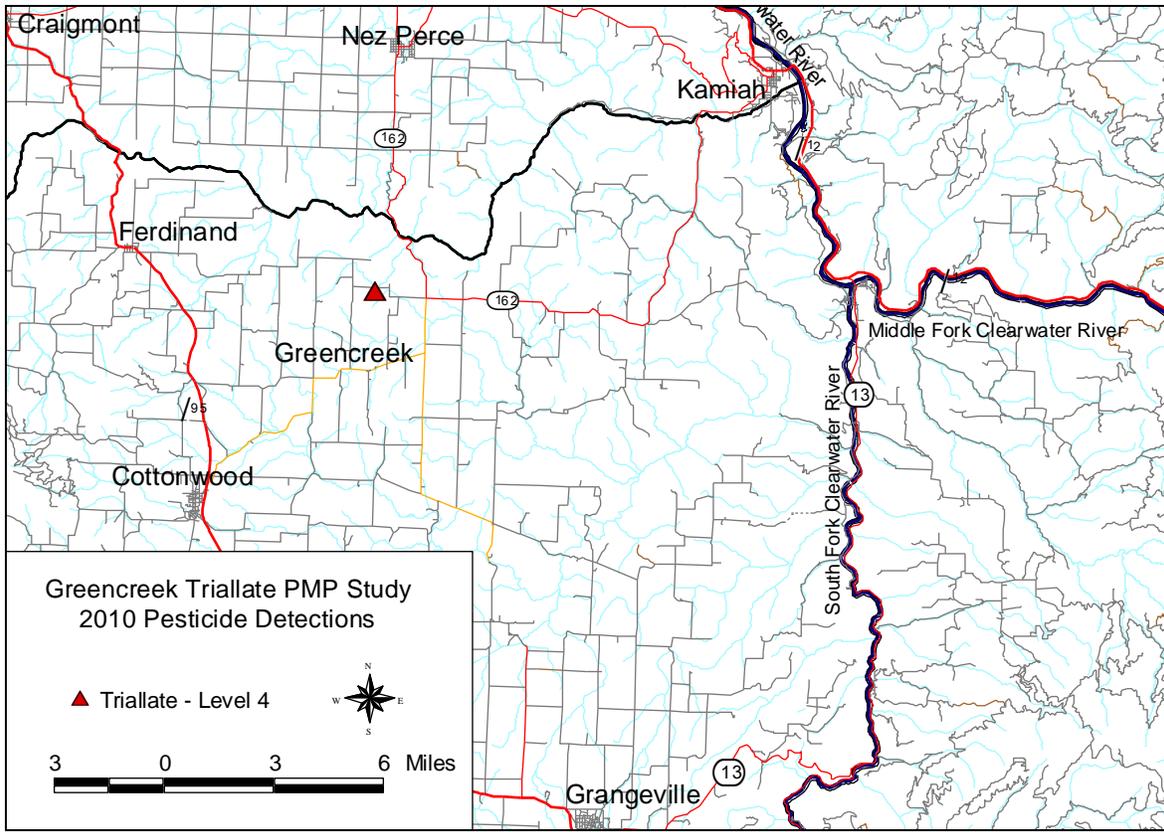


Figure 29. Pesticide results from 2010 sampling of the Greencreek Triallate PMP Project.

Table 28. Summary of 2010 Pesticide Results from the Greencreek Triallate PMP Project.

Pesticide	No. of Detections (% of wells sampled with detection)	Range (µg/L)	Reference Point (µg/L)
Triallate	1 (100%)	0.99	0.45 (FQPA DWLOC) ¹

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

The triallate concentrations in well 3800101 have been tracked over time to determine if the concentrations were increasing, decreasing or remaining stable. Triallate concentrations in 3800101 increased from 2004 to 2007 from non detect to a Level 4 detection, which exceeded the Food Quality Protection Act Drinking Water Level of Concern of 0.45 µg/L. From 2007 to 2008 there was a slight decrease; however the concentration remained at a Level 4. There has been a relatively steady increase in concentration from 2008 to 2010, with only a slight decrease in concentration, identified through quarterly monitoring, between February 2010 and June 2010 (Figure 30).

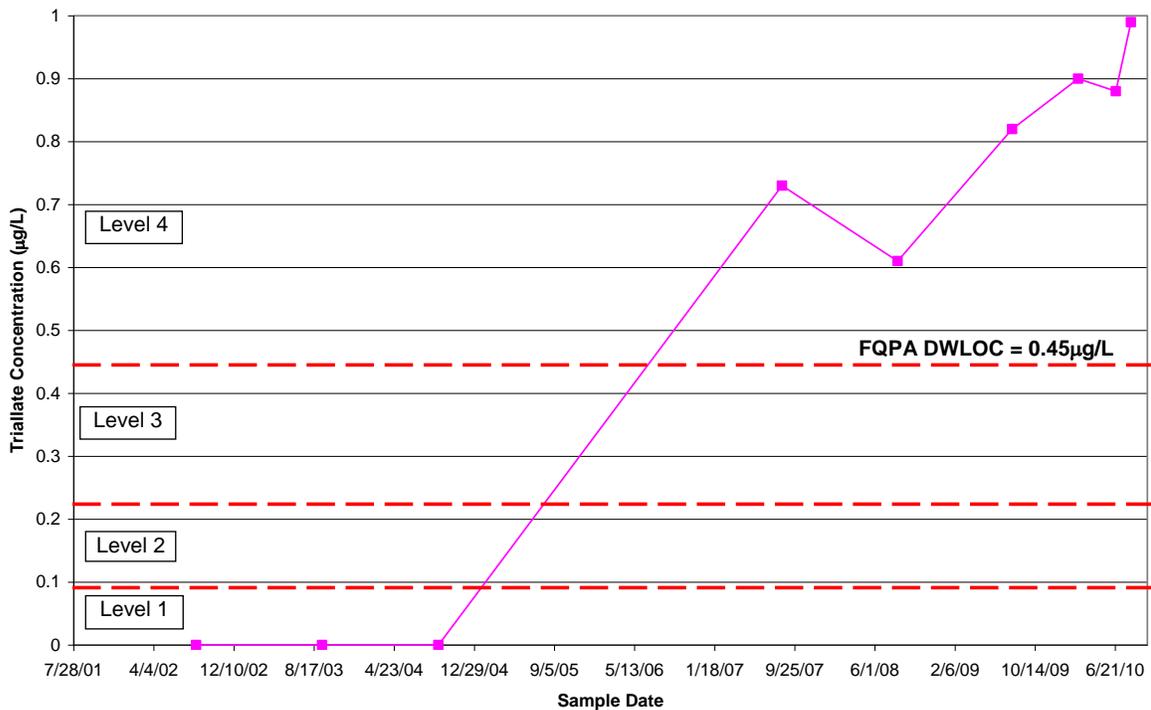


Figure 30. Time-series plot of triallate concentrations detected in wells 3800101.

Discretionary Pesticide Projects

Overview

The ISDA Ground Water Program submits discretionary grant proposals to the EPA each year to acquire funding to complete pesticide related projects and activities. Typically, the Ground Water Program receives one grant each year to conduct additional pesticide related monitoring in the state. In 2009, the Idaho State Department of Agriculture (ISDA) Ground Water Program was awarded a grant by the Environmental Protection Agency (EPA) to test ground water for currently registered pesticides. The goal of the project was to conduct quarterly monitoring of ground water for pesticides in areas where there have been frequent and elevated detections. The grant provided resources to conduct testing of pesticides at privately owned domestic wells in southwest Idaho (Figure 31). The testing was undertaken to develop a better understanding of impacts from registered active ingredients that have been detected in Owyhee, Payette, and Washington Counties. Laboratory results indicated that there are pesticide detections that are of concern and should be evaluated and tracked over time. Some detections were near specific pesticide health standards for drinking water. ISDA is working to implement the Idaho Pesticide Management Plan (PMP) and associated rules to protect ground water. ISDA is also working to educate applicators and land owners on these issues.

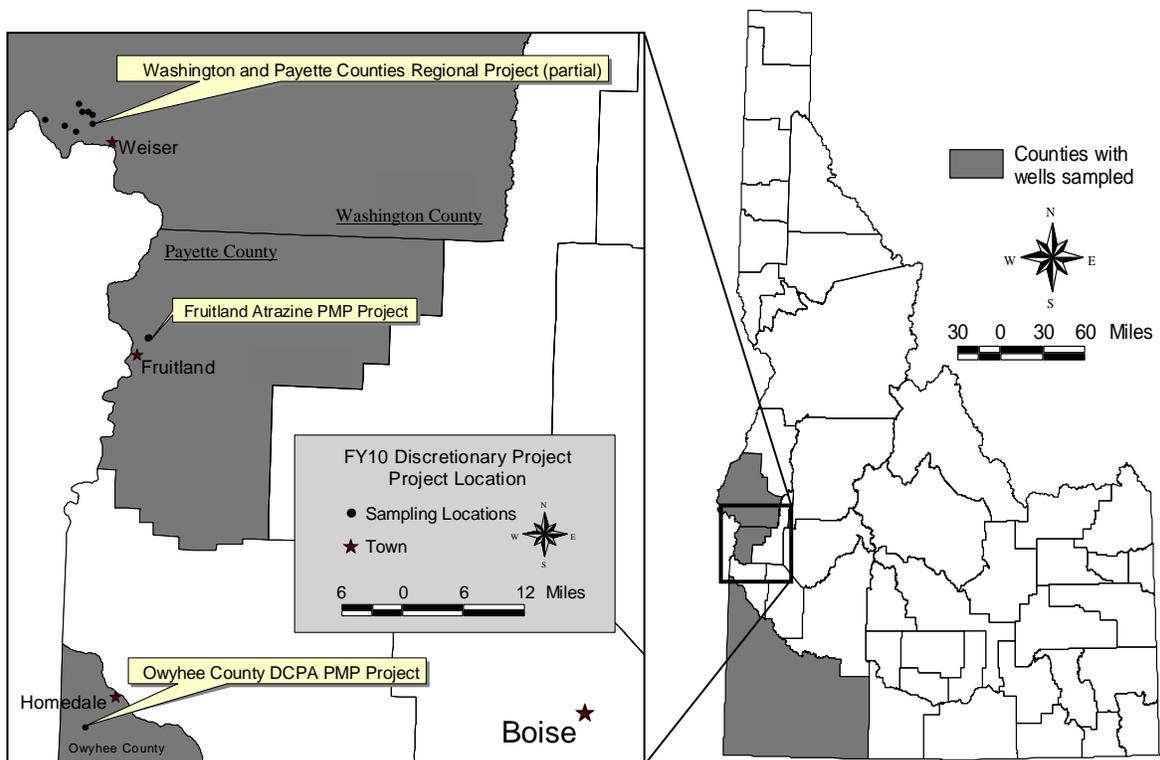


Figure 31. 2009/2010 Quarterly Monitoring Discretionary Project location.

This discretionary project was developed when follow-up samples from two regional wells with recent elevated aldicarb sulfone detections (Level 3 and Level 4) from the Washington and Payette Counties Regional Study, resulted in no positive detections or were ‘non detect’. Due to the aldicarb sulfone concentrations decreasing from Level 3 and 4 detections to non detect over a four month time period, quarterly monitoring was identified as a way to capture potential fluctuations in the pesticide concentrations potentially missed with annual (and even follow up) monitoring. In addition to the two wells with aldicarb sulfone detections, wells from the Washington and Payette Counties Regional Study and select wells from the Owyhee County DCPA PMP project and the Fruitland Atrazine PMP Project were included in this quarterly monitoring effort.

Water Quality Findings

2009/2010 Discretionary Project: Quarterly Ground Water Monitoring for 15 Wells

ISDA sampled a total of 15 wells with previous pesticide detections for 85 pesticides in the fall of 2009 and summer of 2010. Numerous detections occurred, including detections of pesticides that were previously tested for and commonly detected in Idaho's ground water. The pesticides positively detected in the first three quarters of sample collection included 2,4-DCBA, atrazine, bentazon, bromacil, chloromethane, deisopropyl atrazine, desethyl atrazine, DCPA (dacthal), dinoseb, metribuzin, simazine, tebuthiuron, and tetrahydrofuran (Tables 29, 30, and 31). All detections were below any health based reference point (Tables 29, 30, and 31). Sampling results indicate some pesticide impacts have occurred to the shallow aquifers within each area sampled. Results are summarized and presented in the following sections.

Washington County Detections

Eleven different pesticides were detected west of Weiser in Washington County during the four quarterly monitoring events conducted as part of the FY10 Discretionary project. The 11 pesticides detected, in order of the total number of detections (sum for all four sampling events), include: desethyl atrazine (26), atrazine (14), bromacil (11), tebuthiuron (4), 2,4-DCBA (3), DCPA (dacthal) (3), deisopropyl atrazine (3), bentazon (1), dinoseb (2), metribuzin (2), and chloromethane (1) (Table 29). Atrazine and desethyl atrazine were often found in the same well during the same sampling period. One well had numerous pesticides detected during each sampling event, including seven different pesticides in November 2009, and six pesticides in September 2010 (Figure 32). The outdoor faucet for this well was shut off during the February 2010 sampling event and a sample was not collected. Most wells with positive detections had more than one pesticide detected above the laboratory detection limit. All detections, except one, was within the Level 1 category established by the Idaho PMP Rule and below any Idaho or EPA health standards (Table 29 and Figure 32). The exception to this is the November 2009 testing from well 7100901 where desethyl atrazine was found at 2.00 µg/L, which was a Level 3 detection. The cumulative concentration of atrazine and the breakdown products in the well was 2.41 µg/L in November 2009 with desethyl atrazine at 2.00 µg/L, atrazine at 0.37 µg/L, and deisopropyl atrazine at 0.04 µg/L. This was a combined Level 3 detection.

Table 29. 2009/2010 Discretionary Project Results from Quarterly Monitoring Sampling Events of Select Wells in the Washington and Payette Counties Regional Study.

Pesticide (Active Ingredient or Breakdown Product)	Range (µg/L) (Min. – Max.)	Number of Wells with a Detection per Sample Event				Reference Point (µg/L)
		November 2009	February 2010	May 2010	September 2010	
2,4-DCBA	0.09 (0.13 - 0.22)	0	3	0	0	91 (RfD) ¹
Atrazine	0.34 (0.03 – 0.37)	0	3	5	6	3 (MCL) ²
Bentazon	0.86	1	0	0	1	200 (HAL) ³
Bromacil	0.71 (0.06 – 0.77)	3	3	2	3	90 (HAL)
Chloromethane	0.59	0	0	1	0	30 (HAL)
DCPA (Dacthal)	0.04 (0.08 – 0.12)	1	1	0	1	70 (HAL)
Deisopropyl Atrazine	0.02 (0.04 – 0.06)	2	1	0	0	....⁴
Desethyl Atrazine	1.97 (0.03 – 2)	5	5	8	8	....⁴
Dinoseb	0.5	1	0	0	1	7 (MCL)
Metribuzin	0.5	1	0	0	1	200 (HAL)
Tebuthiuron	0.02 (0.06 – 0.08)	1	1	1	1	500 (HAL)

¹RfD – ISDA PMP Rule Calculated Reference Dose.

²MCL – EPA Maximum Contaminant Level.

³HAL – EPA Lifetime Health Advisory.

⁴Breakdown product of atrazine. No reference point available, MCL for atrazine of 3 µg/L is used.

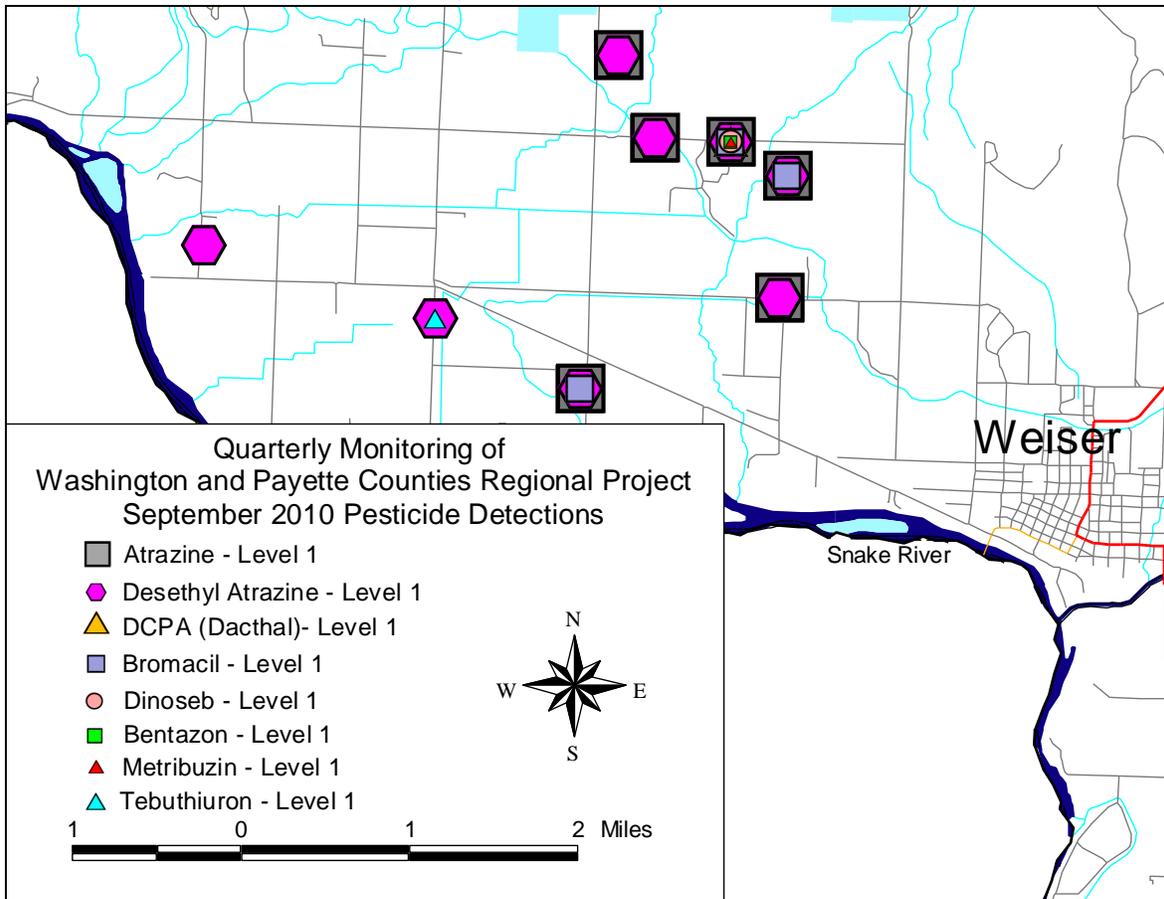


Figure 32. September 2010 pesticide detections from the quarterly monitoring of the Washington and Payette Counties Regional study.

Payette County Quarterly Monitoring Area

Six different pesticides were detected in Payette County, northeast of Fruitland, during the four quarterly monitoring events. The six pesticides detected, in order of the total number of detections (the sum of all four sampling events) include: atrazine (12), desethyl atrazine (12), deisopropyl atrazine (9), bromacil (1), 2,4-DCBA (1) and simazine (1) (Table 30). All three wells sampled had pesticide detections. All wells with positive detections had more than one pesticide detected above the laboratory detection limit. All detections during the four quarters of sampling were below any Idaho or EPA health standards (Table 30 and Figure 33). All of the pesticide detections were at the Level 1 category as established by the Idaho PMP Rule with the exception of a Level 2 desethyl atrazine detection in November 2009 (in well 3400501). Time series plots for atrazine (Figure 27) and desethyl atrazine (Figure 28) indicate that the pesticides concentrations appear stable or have decreased slightly through the quarterly testing period. The cumulative concentration of atrazine and the breakdown products in one well (3400501) was over the Level 2 category for all three quarters (Figure 33).

Table 30. 2009/2010 Discretionary Project Results from the Quarterly Monitoring Sampling Events of Select Wells in the Fruitland Atrazine PMP Project.

Pesticide (Active Ingredient or Breakdown Product)	Range (µg/L) (Min. – Max.)	Number of Wells with a Detection per Sample Event				Reference Point (µg/L)
		November 2009	February 2010	May 2010	August 2010	
2,4-DCBA	0.15	0	1	0	0	91 (RfD) ¹
Atrazine	0.1 (0.12 – 0.22)	3	3	3	3	3 (MCL) ²
Bromacil	0.09	1	0	0	0	90 (HAL) ³
Deisopropyl Atrazine	0.05 (0.03 – 0.08)	3	3	2	1	....⁴
Desethyl Atrazine	0.56 (0.2 – 0.76)	3	3	3	3	....⁴
Simazine	0.04	0	0	0	1	4 (MCL)

¹RfD – ISDA PMP Rule Calculated Reference Dose.

²MCL – EPA Maximum Contaminant Level.

³HAL – EPA Lifetime Health Advisory.

⁴Breakdown product of atrazine. No reference point available, MCL for atrazine of 3 µg/L is used.

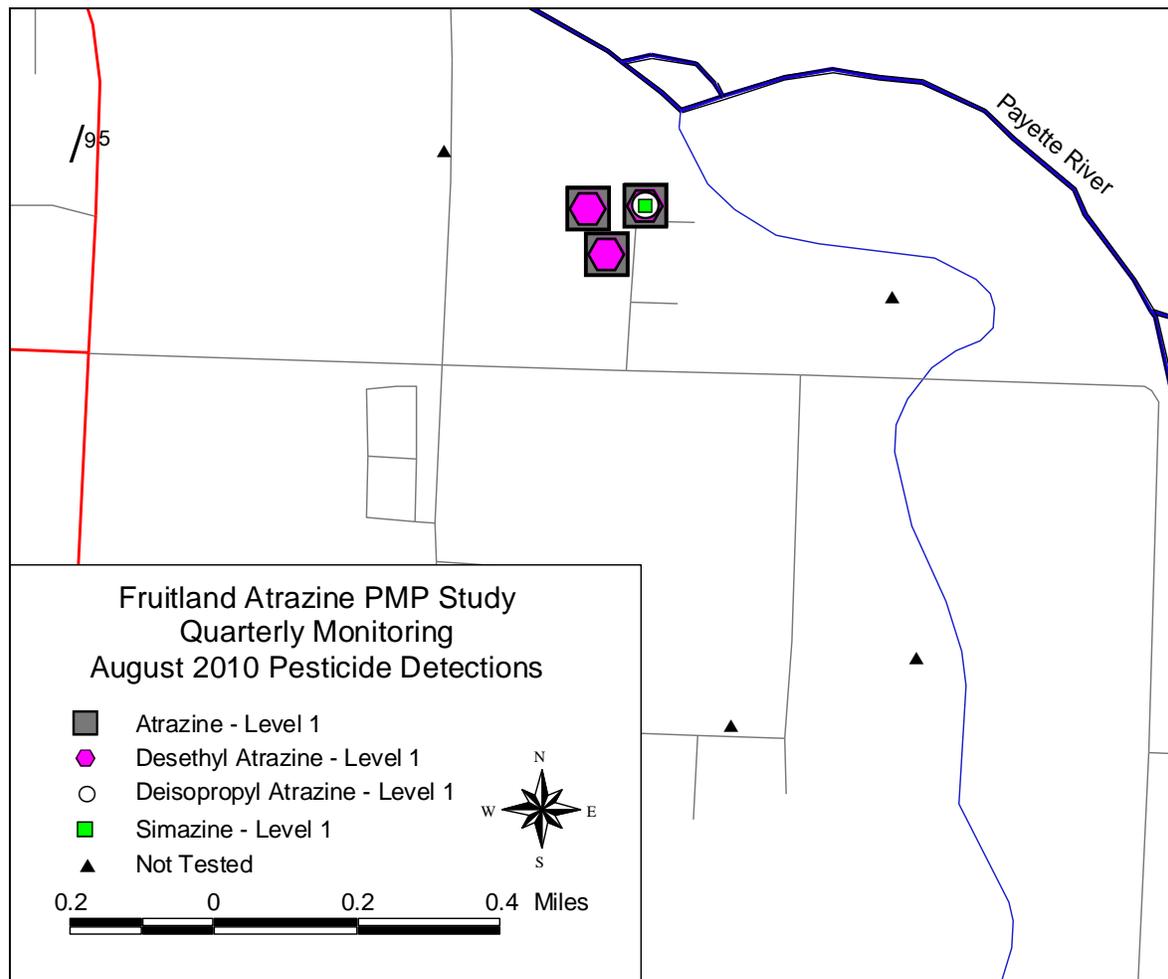


Figure 33. September 2010 pesticide detections from the quarterly monitoring of the Fruitland Atrazine PMP Project.

Northern Owyhee County Regional Project Area

Five different pesticides and one Volatile Organic Compound (VOC) were detected in four wells sampled in Owyhee County, southwest of Homedale, during the first three quarterly monitoring events (Table 31). The five pesticides detected in order of the number of detections include: DCPA (dacthal) (9), 2,4-DCBA (2), desethyl atrazine (2), atrazine (1), bromacil (1), deisopropyl atrazine (1), simazine (1), and tetrahydrofuran (1) (Table 31). Multiple detections in each well was common for all three quarters sampled with the exception of well 3100801, which had no detections in May 2010. As established by the Idaho PMP Rule, there were Level 2 DCPA detections in May 2010 in two of the four wells sampled (Figure 34). One well had detections of DCPA, atrazine, desethyl atrazine, and tetrahydrofuran during the May 2010 sampling event. All detections were below any Idaho or EPA health standards (Table 31 and Figure 34). A time-series plot for DCPA (Figure 21) indicates that DCPA concentrations have decreased to Level 2 values in well 3100101. DCPA was detected in well 3100401 in the first sampling event however was not quantified because it was below the detection limit and was not detected the remaining two sampling rounds. Well 3100801 appeared stable throughout the monitoring period.

Table 31. 2009/2010 Discretionary Project Results from the Quarterly Monitoring Sampling Events of Select Wells in the Owyhee County DCPA PMP Project.

Pesticide (Active Ingredient or Breakdown Product)	Range (µg/L) (Min. – Max.)	Number of Wells with a Detection per Sample Event				Reference Point (µg/L)
		November 2009	February 2010	May 2010	September 2010	
2,4-DCBA	0.07 (0.38 - 0.45)	0	2	0		91 (RfD) ¹
Bromacil	0.06	1	0	0		90 (HAL) ²
DCPA (Dacthal)	27.86 (0.14 – 28)	4	3	3		70 (HAL)
Deisopropyl Atrazine	0.03	1	0	0		....²
Desethyl Atrazine	0.01 (0.04 – 0.05)	0	1	1		....³
Simazine	0.03	0	0	1		4 (MCL) ⁴
Tetrahydrofuran	8.0	0	0	1		50, 154 ⁵

¹RfD – ISDA PMP Rule Calculated Reference Dose.

²HAL – EPA Lifetime Health Advisory.

³Breakdown product of atrazine. No reference point available, MCL for atrazine of 3 µg/L is used.

⁴MCL – EPA Maximum Contaminant Level.

⁵No EPA standard. The Wisconsin Department of Natural Resources Drinking Water Guideline is 50 µg/L, the New Hampshire Department of Environmental Services Drinking Water Guideline is 154 µg/L.

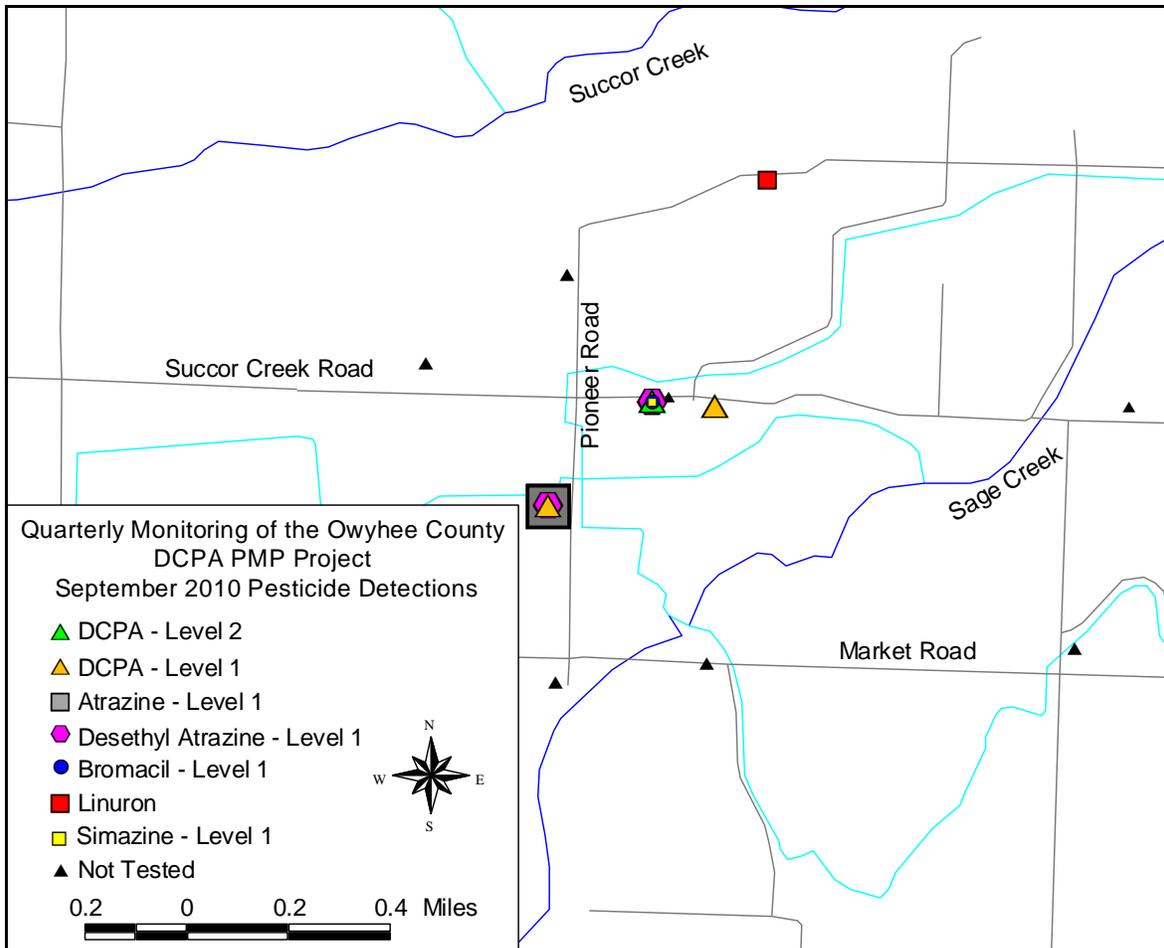


Figure 34. September 2010 pesticide detections from the quarterly monitoring of the Owyhee County DCPA PMP Project.

Ground Water Quality Protection Activities

ISDA has the authority to implement pesticide programs through Idaho state laws, ISDA rules, and a cooperative working agreement with the Environmental Protection Agency. ISDA investigates and responds to ground water resource contamination from pesticides through the implementation of the Rules Governing Pesticide Management Plans for Ground Water Protection IDAPA 02.03.01 (PMP Rule). ISDA coordinates PMP Rule activities with agencies and industries through the PMP Advisory Committee pursuant to the PMP Rule and the Agricultural Ground Water Quality Coordination Committee.

Through a cooperative working agreement with EPA, ISDA invests grant funds to evaluate pesticides of interest, take actions related to pesticides of concern, and demonstrate progress in reducing or maintaining concentrations below reference points. ISDA implements the Three-Tier Approach as outlined in the EPA guidance:

- Evaluate **Pesticides of Interest** to determine whether a human health or environmental reference point is likely to be approached or exceeded in localized areas, and the pesticide should be elevated to a **Pesticide of Concern**.

- Take actions (actively manage beyond the label) to reduce or prevent contamination from **Pesticides of Concern** over time.
- Demonstrate the progress of the management strategy in reducing or maintaining concentrations below reference points.

ISDA enters its progress on implementing the three-tiered approach into the web-based Pesticide of Interest Tracking System (POINTS).

Pesticides of Interest are those that appear in the appended EPA list and any others identified by ISDA (and their metabolites and/or degradates) as having the potential to occur in ground or surface water at concentrations approaching or exceeding a reference point. While any pesticide could contaminate water due to illegal use or improper disposal, the intent of the pesticide management strategy is to manage non-point contamination from legal use. Pesticides of interest can be identified through existing field water quality data from various sources described in the monitoring section of this plan, environmental fate and effects data, modeling, or other predictive tools.

Pesticides of Concern are those (and their metabolites and/or degradates) that ISDA has identified as likely to approach or exceed a human health or environmental reference point in ground water. Designation as a pesticide of concern prioritizes that pesticide for management to ensure concentrations are maintained or reduced below the reference point.

ISDA manages pesticides of concern according to the cooperative work plan with EPA. Because these pesticides are likely to approach or exceed a reference point in Idaho, the goal is to manage 100% of them. The ability to actively manage pesticides of concern will depend largely on the resources available.

Demonstrating progress in reducing contamination from pesticides of concern may be the most difficult measure because it largely depends on the availability of monitoring data. Especially for ground water contamination, it may take many years to show that pesticide management actions are working to reduce the contamination. While the goal is again 100% for this measure, it may take many years to show definitive results.

Even in the absence of detections, ISDA conducts prevention through education and promotion of proper use of pesticides according to label instructions. ISDA will work through meetings, training, seminars, workshops, newsletters, mailings and other means to educate and inform agricultural professionals, other agencies, watershed advisory groups, and soil conservation districts related to the ground water program.

ISDA is the lead agency for implementing policy II-B of the Idaho Ground Water Quality Plan, which was specifically written to prevent ground water contamination from agricultural practices. Prevention activities include implementation of the Information and Education (I & E) Strategy, implementation of the Best Management Practices (BMP) Strategy, and implementation of the Regulatory Strategy when pollution sources cannot be controlled by BMPs. ISDA's strategy for implementing I & E includes coordination of the Information and Education Subcommittee of the Agriculture Ground Water Coordination Committee, development and distribution of educational materials, and facilitation of educational workshops.

Ground water quality protection activities in 2010 included: disseminating pesticide and water quality related fact sheets and brochures and participating in pesticide recertification workshops and other outreach efforts. The pesticide recertification workshops were designed specifically for pesticide applicators and growers (Table 32). Presented material included: pesticide and nitrate ground water quality data, information on proper safety, storage, and handling of pesticides and fertilizers with respect to domestic wells, best management practices for field use of pesticides and fertilizers, and information on the State Pesticide Management Plan (PMP) and the 2008 DCPA (Dacthal) PMP. ISDA plans on conducting additional workshops in the fall/winter of 2011, with the goal of surpassing the attendance number in 2010.

Table 32. The 2010 pesticide recertification education workshops and outreach efforts.

Pesticides and Water Quality Education - Workshops and Other Outreach Efforts			
Date	Location	Event Name	Attendance
1/15/09	Boise	City of Boise - Pest. Recertification Workshop	33
1/29/09	Caldwell	Western Idaho Ag Show	65
2/3/09	Meridian	UICES Living on the Land (Water Quality)	44
2/26/09	Lewiston	North Idaho Pesticide Training	60
Total Attendance for Water Quality Education in 2010			838***

* GWQ = Ground Water Quality

**Estimate. Unable to determine exact number of attendees

***Total based on estimates. Unable to determine exact number of individuals receiving water quality education.

The water program at ISDA has been active in the development of data summaries of monitoring projects and agricultural specific educational materials that are distributed throughout Idaho's agricultural community. Data summaries include information on the quality of ground water and recommendations or BMPs for remediation of contamination concerns identified through the monitoring.

Database

The ISDA Ground Water Program database is used to store all sampling data from ISDA regional, local, and special projects. Projects and data are tracked in the ISDA Ground Water Program database. Information regarding the location of the well, well construction, well owner, and geology are also stored in the database.

The database is used to produce homeowner result letters and well analysis reports. Homeowners that participate in ISDA's ground water monitoring program receive a result letter and well analysis report after data is entered.

ISDA Water Program Website

The ISDA water program maintains a web site for internal and external use to easily access reports, data, and information. The site provides our goals and objections, as well as general water quality information. Project maps, data summaries, and reports are also posted. The site address is: <http://www.agri.idaho.gov/Categories/Environment/water/indexwater.php>

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 in 2010. The monitoring efforts in 2010 focused on areas in the state that have either showed past impacts from pesticides, returning to wells with previous pesticide detections to conduct annual monitoring efforts. ISDA currently has 23 distinct and active ground water projects across the state. Sixteen of these projects were regional monitoring projects, two were local monitoring projects, four were Pesticide Management Plan (PMP) response monitoring projects, and one was an EPA funded discretionary pesticide monitoring projects. ISDA follows the Idaho PMP Rule to determine response actions following detections.

Testing of regional, local, 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 shallow aquifer areas. The most frequent detections occur in the shallow aquifers in Washington, Payette, Minidoka, and Cassia counties. There were numerous wells with multiple low level detections of pesticides. However, most detections are less than 20% of health-based standards. Six wells in 2010 had detections of one or more pesticides that exceeded 20% of a health-based reference point, requiring additional response activities. The pesticides detected over 20% of a health-based reference point were atrazine and desethyl atrazine in Nez Perce County; DCPA (dacthal) in Owyhee County; and triallate in Fremont and Idaho Counties.

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.

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