



**Idaho State Department of Agriculture**



## **Ground Water Program Annual Report**

**For 2008**





# Idaho State Department of Agriculture



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### Authors

Gary Bahr  
Ground Water Program

[gary.bahr@agri.idaho.gov](mailto:gary.bahr@agri.idaho.gov)

Kathryn Dallas Elliott  
Ground Water Program

[kathryn.dallas@agri.idaho.gov](mailto:kathryn.dallas@agri.idaho.gov)

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Idaho State Department of Agriculture  
2270 Old Penitentiary Road  
Boise, Idaho 83712  
208-332-8500

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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. Over 90 percent of ISDA monitoring activities can be attributed to 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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Finally, we would like to express appreciation to a number of private groups who have participated in educational workshops, conferences, and meetings to help protect overall ground water quality in the state. These groups include the: Idaho Water Users Association, Idaho Crop Producers Association, Far West Agribusiness Association, Idaho Farm Bureau, Syngenta, Idaho Potato Association, Idaho Dairy Association, and Idaho Cattleman's Association.

## **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 2008, the ISDA Ground Water Program implemented 30 distinct monitoring projects. Fourteen of these projects were regional projects, eight were dairy or confined animal feeding operation (CAFO) projects, two were local nitrate or pesticide projects, four were Pesticide Management Plan related projects, and two were Environmental Protection Agency (EPA) funded, discretionary pesticide monitoring projects. Water quality findings from these 30 active projects indicated a varying degree of impacts to ground water with nitrate being the most common constituent of concern.

Nitrate monitoring from these projects indicate many well locations across the state have significant nitrate impacts with many exceeding the EPA Maximum Contaminant Level (MCL) of 10 milligrams per liter (mg/L). Forty-eight wells or 8 percent of 630 regional project wells sampled by the ISDA Ground Water Program in 2008, exceed the EPA MCL for nitrate. Thirteen of the 14 active regional projects have mean nitrate concentrations above 2 mg/L, suggesting some anthropogenic impacts. Similarly, dairy and CAFO project monitoring data indicate all eight active projects have mean concentrations above 2 mg/L in 2008.

Pesticide testing of regional, local, and discretionary type projects resulted in numerous detections in ground water. However, most detections are less than 20 percent of drinking water or health-based standards. Four wells out of the 179 wells tested for pesticides in 2008, had levels that exceeded 20 percent of a drinking water or health-based standard, requiring additional response activities. These sites are located in Fremont, Owyhee, Nez Perce, and Idaho Counties.

ISDA Ground Water Program staff participated, initiated, or provided technical assistance in many ground water protection activities. The Ground Water Program facilitated or participated in 16 educational workshops and outreach meetings across the state and provided technical assistance to five Idaho Soil Conservation Districts with implementation of field projects to help improve Idaho ground water quality in high priority areas. The Idaho CAFO siting team was led by ISDA Water Program staff in 2008 (through September) and conducted 13 site assessments for new or expanding CAFOs, with all 13 receiving a 'low risk' determination.

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# Introduction

## Scope

The purpose of this document is to report on 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 these activities and a more detailed synopsis of ground water monitoring findings and ground water projects in 2008. Monitoring from prior years and trend analysis over multiple years of monitoring is addressed in other ISDA Ground Water Program reports.

## 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 testing 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 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 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; Dairy Water Quality Laws, Rules, and Memorandum of Understanding (MOU); Beef CAFO Laws, Rules, and MOU; and the Pesticide Laws, Rules, and Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Cooperative Agreement with EPA.

### *Local 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 and other potential agricultural contaminants (i.e., nitrate, bacteria). Local monitoring is often in response to one or more of the following situations: isolated pesticide detections, isolated nitrate detections above the maximum contaminant level (MCL), dairy and beef CAFO detections for nitrate above the MCL at animal agriculture locations, and enforcement complaints.

### *Dairy and CAFO Monitoring*

ISDA is monitoring ground water nitrate concentrations at all dairies in Idaho. Monitoring at beef CAFOs is developing based on ground water protection priorities, enforcement, and response to complaints. Monitoring at dairy CAFOs is implemented jointly by the Dairy Bureau and the Division of Agricultural Resources Water Quality Program. ISDA's Dairy Bureau implements the Rules Governing Dairy Waste, IDAPA 02.04.14 (Dairy Waste Management Program). Under these rules, dairy operations are to prevent ground water contamination and also be in compliance with the Idaho Ground Water Rule of 1997 (IDAPA 58.01.11).

As part of this regulatory responsibility, ISDA is working with dairies to ensure compliance of waste systems for the protection of ground water quality. ISDA has developed a tiered approach for monitoring nitrate concentrations at dairy wells and to assess the source of nitrate in ground water at dairies. Once a determination of nitrate source is complete, then operational changes can be addressed to prevent further contamination.

### *Best Management Practice (BMP) Effectiveness Monitoring*

BMP effectiveness monitoring is the evaluation phase of the BMP feedback loop. The premise of the feedback loop is that nonpoint source pollution control is achieved through implementation of best management practices and effectiveness evaluation. Integrated BMP systems are used to prevent agrichemicals from leaching beyond the root zone. In areas where there are concerns, BMPs approved by the state will be implemented on the ground on a site specific basis and then evaluated through monitoring. These BMPs will be modified as needed to achieve water quality standards.

Water quality monitoring is performed to evaluate the effectiveness of BMPs in protecting water quality and to demonstrate compliance with nonpoint source water quality standards. One method of evaluation is to compare analytical results from representative ground water quality monitoring locations to the ground water quality criteria. Other techniques that may be used in conjunction with ground water monitoring include soil testing, vacuum lysimetry, and related techniques which can provide additional data for the evaluation of BMPs.

### 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 potentially regulations. Some pollutant sources such as pesticides, dairies, beef CAFOs, and swine and poultry facilities are currently being addressed through regulations. Nonpoint source issues related to ground water protection, such as general agriculture and fertilizer use, are to be addressed through projects where voluntary best management practices (BMPs) are being implemented. An area of focus is related to aquifers that have been impacted by nitrate. These areas have been designated by the Idaho Department of Environmental Quality (IDEQ) as Nitrate Priority Areas. ISDA is leading the effort with the Idaho Soil Conservation Commission (ISCC), Idaho Soil Conservation Districts (SCDs), and the Natural Resources Conservation Service (NRCS) to develop agricultural implementation projects within the Nitrate Priority Areas. The SCDs and supporting agencies are developing projects through Clean Water Act 319 grants, NRCS programs, DEQ Source Water Protection grants, and ISCC funds. These are cooperative projects where the ISDA, ISCC, and landowners are providing matching funds and support. ISDA is providing BMP effectiveness monitoring.

## **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, USGS ground water quality database, ISDA Dairy Ground Water Quality Database, and Farm Bureau ground water testing data. 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 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

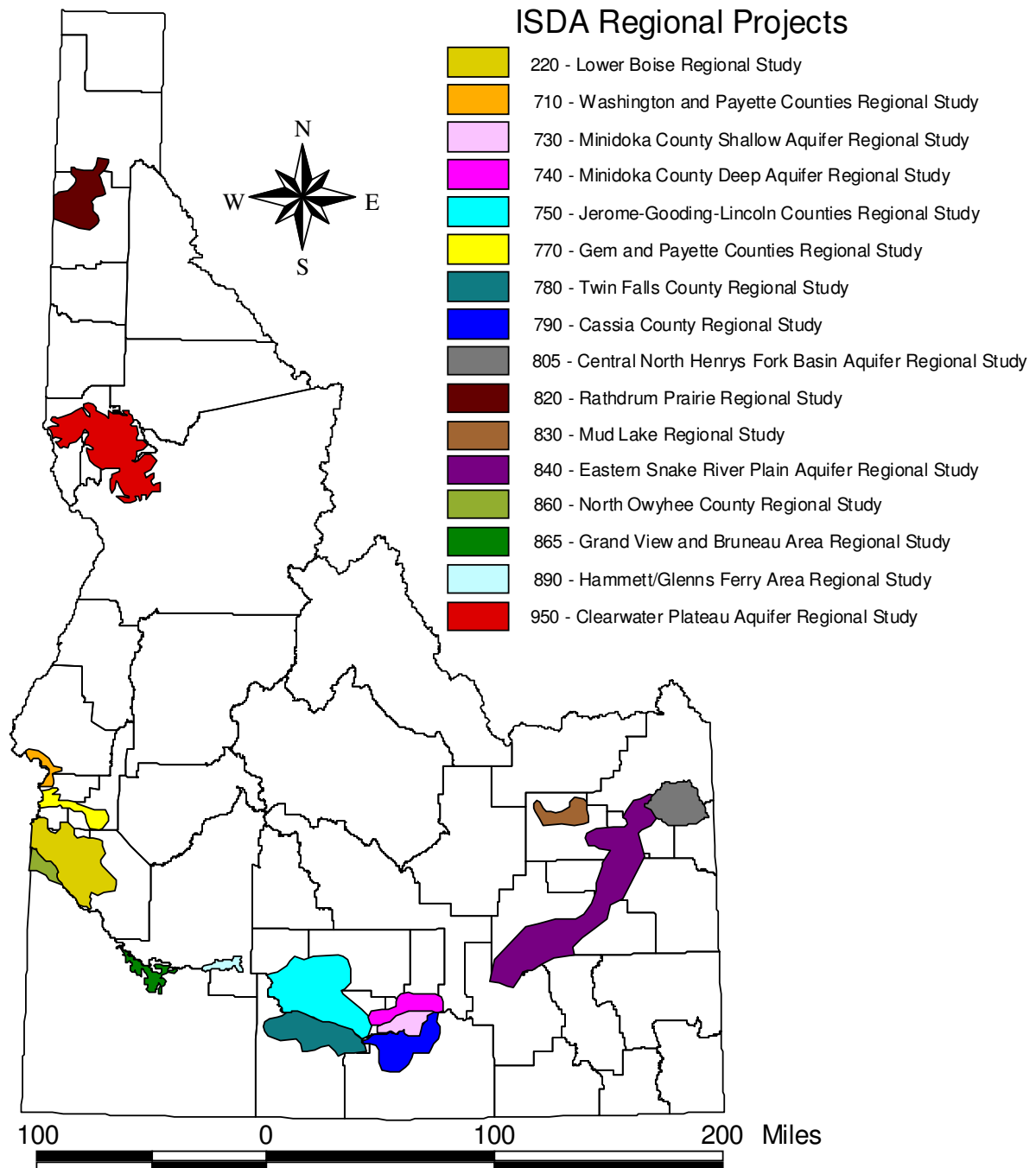
Each regional project is designed to be sampled for five years on an annual basis for nutrients, common ions, and pesticides. Pesticide results from the first year are evaluated to determine the extent of future pesticide monitoring. If there are limited detections the first year, further monitoring 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.

### 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 16 distinct projects in the state (Figure 1). Of the 16 projects, 14 are active and all 14 active projects were monitored in 2008. 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 13 years and thus are in different stages in terms of duration (Table 2). The number of wells sampled per active regional project area range from 20 to 72 with a total of 630 wells sampled in 2008 as part of the overall regional sampling effort (Tables 2 and 3). The Eastern Snake River Plain Project (840) and Rathdrum Prairie Project (820) were not sampled in 2008 due to good water quality relative to agrichemicals that was determined 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 16 regional project areas. Projects 820 and 840 were not sampled in 2008.

**Table 2.** ISDA regional project general monitoring information for 2008.

<b>Project No.</b>	<b>Project Name</b>	<b>Start Year</b>	<b>Status (2008)</b>	<b>Inorganics Testing (All wells-2008)</b>	<b>Pesticide Testing (2008)</b>	<b>Wells Monitored (2008)</b>
220	Lower Boise Basin Regional Study	2003	active	nitrate, nitrite, ammonia, chloride sulfate, bromide, fluoride, orthophosphorus	2 wells (Discretionary project)	57
710	Washington and Payette Counties Regional Study	1996	active	nitrate, nitrite, ammonia, chloride sulfate, bromide, fluoride, orthophosphorus	3 wells (Discretionary Project)	51
730	Minidoka County Shallow Aquifer Regional Study	1997	active	nitrate, nitrite, chloride sulfate, bromide, fluoride, orthophosphorus	42 wells (1 well sampled twice - once for regional monitoring and once as part of the Discretionary Project)	42
740	Minidoka County Deep Aquifer Regional Study	1997	active	nitrate, nitrite, chloride sulfate, bromide, fluoride, orthophosphorus	45 wells	45
750	Jerome-Gooding-Lincoln Counties Regional Study	1997	active	nitrate, nitrite, chloride sulfate, bromide, fluoride, orthophosphorus	none	71
770	Gem and Payette Counties Regional Study	1998	active	nitrate, nitrite, ammonia, chloride sulfate, bromide, fluoride, orthophosphorus	1 well (Discretionary Project)	40
780	Twin Falls County Regional Study	1998	active	nitrate, nitrite, chloride sulfate, bromide, fluoride, orthophosphorus	2 wells (Discretionary project)	72
790	Cassia County Regional Study	1998	active	nitrate, nitrite, chloride sulfate, bromide, fluoride, orthophosphorus	1 well (Discretionary project)	45
805	Central Henry's Fork Basin Aquifer Regional Study	2003	active	nitrate, nitrite, chloride sulfate, bromide, fluoride, orthophosphorus	3 wells (as part of the PMP project)	45
820	Rathdrum Prairie Regional Study	1998	<b>inactive</b>	none	none	0
830	Mud Lake Regional Study	1998	active	nitrate, nitrite, chloride sulfate, bromide, fluoride, orthophosphorus	none	29
840	Eastern Snake Plain Aquifer Regional Study	1998	<b>inactive</b>	none	none	0
860	North Owyhee County Regional Study	1999	active	nitrate, nitrite, ammonia, chloride sulfate, bromide, fluoride, orthophosphorus	1 well (Discretionary project)	24
865	Grand View and Bruneau Area Regional Study	2006	active	nitrate, nitrite, ammonia, chloride sulfate, bromide, fluoride, orthophosphorus	1 well (sampled twice – once for follow up and once for Discretionary Project)	25
890	Hammett/Glenns Ferry Area Regional Study	2008	active	nitrate, nitrite, ammonia, chloride sulfate, bromide, fluoride, orthophosphorus	20 wells	20
950	Clearwater Plateau Aquifer Regional Study	2001	active	nitrate, nitrite, ammonia, chloride sulfate, bromide, fluoride, orthophosphorus	3 wells (1 for follow up and 2 as part of the PMP project)	65

## Water Quality Findings

### *Nitrate*

Many of the projects established were developed in response to nitrate problem areas known or believed to exist in the state. As a result, many of the projects have served to better define the extent, possible sources, and overall severity of the problems in terms of median or mean levels, and MCL exceedances. In addition, many of the projects have been extended well beyond the original five-year plan to better understand the problem and to evaluate trends in nitrate concentrations in ground water. The focus of this annual report addresses only 2008 data and observed statistics and does not present an evaluation of trends. However, numerous ISDA project reports have been written, in part, addressing nitrate trends in Idaho ground water. These reports are available on the ISDA Water Program website at:

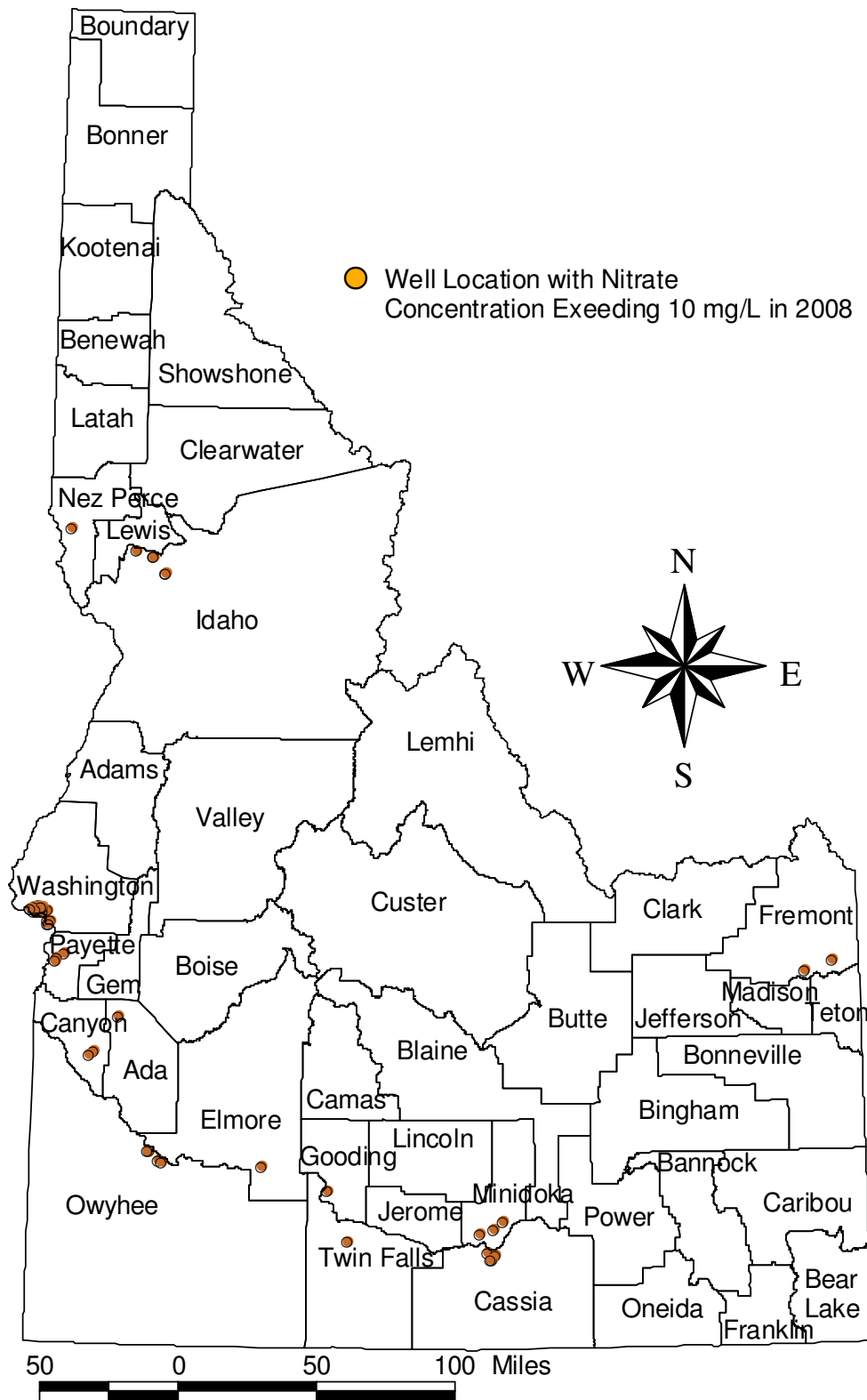
<http://www.agri.idaho.gov/Categories/Environment/water/gwReports.php> .

Descriptive statistics of ISDA regional projects indicate that many areas in the state have elevated nitrate concentrations in ground water. Numerous wells tested during regional monitoring efforts are found to be above background nitrate concentrations of 2 mg/L, suggesting some anthropogenic influences on ground water quality (Neely, 2004). All mean ground water nitrate concentrations per project, with the exception of the Owyhee Regional Study, exceed the 2 mg/L level (Table 3). Median ground water nitrate concentrations per project equal or exceed the 2 mg/L level in 7 of the 14 active regional projects (Table 3). Wells located in the Washington and Payette Counties Regional Study have the highest mean and median values, 8.82 mg/L and 7.1 mg/L, respectively. Other projects having comparatively high mean and/or median concentrations in ground water include the Cassia County Regional Study (mean - 5.76 mg/L, median - 5.0 mg/L), the Central Henry's Fork Basin Regional Aquifer Study (mean - 4.78 mg/L, median - 4.35 mg/L), Minidoka County Shallow Regional Study (mean - 4.66 mg/L, median - 3.65 mg/L), Twin Falls County Regional Study (mean - 4.08 mg/L, median - 3.9 mg/L), Minidoka County Deep Regional Study (mean - 3.97 mg/L, median - 3.9 mg/L), and the Grand View and Bruneau Regional Study (mean - 8.93 mg/L) (Table 3).

Of the 630 wells tested for nitrate in 2008, 22% or 138 wells had nitrate concentrations between 5 to 10 mg/L and 8% or 48 wells in the regional network exceeded the EPA MCL of 10 mg/L for nitrate (Table 3 and Figure 2). Eleven of the 14 active regional projects had one or more wells with nitrate levels above the EPA MCL. The Minidoka County Deep Aquifer Study, Mud Lake Regional Study, and the North Owyhee County Study were the three regional projects to have no wells with nitrate above the EPA MCL in 2008 (Table 3). The projects having the most wells exceeding the MCL include the (1) Washington and Payette Counties Regional Study (41%), (2) Grand View and Bruneau Area Regional Study (16%) and (3) Clearwater Plateau Aquifer Regional Study (8%) (Table 3). The highest single well detection for ground water nitrate (100 mg/L) was recorded from a well west of Grand View in Owyhee County.

**Table 3.** Descriptive Statistics of Ground Water Nitrate Concentrations from Regional Monitoring.

Project No.	Project Name	Nitrate Findings (2008)					
		Wells Monitored	Mean (mg/L)	Median (mg/L)	Maximum (mg/L)	Wells from 5 mg/L to 10 mg/L	Wells exceeding the MCL (10mg/L)
220	Lower Boise Basin Regional Study	57	3.1	1.9	14	10 (18%)	3 (5%)
710	Washington and Payette Counties Regional Study	51	8.9	7.2	40	10 (20 %)	21 (41%)
730	Minidoka County Shallow Aquifer Regional Study	42	4.4	3.7	21	12 (28.5%)	3 (7%)
740	Minidoka County Deep Aquifer Regional Study	45	4.0	3.9	8.8	18 (40%)	0 (0%)
750	Jerome-Gooding-Lincoln Counties Regional Study	70	2.3	1.9	13	6 (8.5%)	1 (1%)
770	Gem and Payette Counties Regional Study	40	2.8	1.9	15	5 (12%)	3 (7%)
780	Twin Falls County Regional Study	72	4.1	3.9	14	21 (30%)	1 (1%)
790	Cassia County Regional Study	45	5.8	5.0	17	20 (44%)	3 (7%)
805	Central Henry's Fork Basin Aquifer Regional Study	45	4.8	4.4	39	17 (38%)	2 (4%)
820	Rathdrum Prairie Regional Study	0	-	-	-	-	-
830	Mud Lake Regional Study	29	2.4	2.0	9.5	2 (7%)	0 (0%)
840	Eastern Snake Plain Aquifer Regional Study	0	-	-	-	-	-
860	North Owyhee County Regional Study	24	1.9	0.03	10	5 (21%)	0 (0%)
865	Grand View and Bruneau Area Regional Study	25	8.9	1.3	100	4 (16%)	4 (16%)
890	Hammett/Glenns Ferry Area Regional Study	20	4.0	0.4	49	2 (10%)	1 (5%)
950	Clearwater Plateau Aquifer Regional Study	65	3.4	1.5	38	7 (11%)	5 (8%)
<b>All Active Regional Projects Combined</b>		<b>630</b>	<b>4.3</b>	<b>2.8</b>	<b>(average max.) 28</b>	<b>138 (22%)</b>	<b>48 (8%)</b>



**Figure 2.** Map showing nitrate detections in ground water from 2008 that exceeded the EPA MCL of 10mg/L. Detections are from regional monitoring projects only.

## ***Pesticides***

A total of 109 wells were tested for various pesticides in five regional project areas in 2008 as part of annual regional monitoring efforts. Three regional projects had pesticide testing completed for all wells in the project (730, 740 and 890). Two regional projects (865 and 950) had partial pesticide testing completed. The partial pesticide testing involved sampling one well in both projects with historic, elevated pesticide concentrations. Table 4 presents the regional projects tested for pesticides in 2008, the number of wells sampled, and the type of pesticide analysis performed.

**Table 4.** Summary of 2008 Pesticide Sampling of ISDA Regional Projects.

<b>Project Number and Name</b>	<b>Number of Wells Sampled</b>	<b>Analysis (EPA Method Number)</b>
730: Minidoka County Shallow Aquifer Regional Study	42	507, 508, 515.2, 632
740: Minidoka County Deep Aquifer Regional Study	45	507, 508, 515.2, 632
865: Grand View and Bruneau Area Regional Study	1	507, 508, 515.2, 632
890: Hammett/Glenns Ferry Area Regional Project	20	507, 508, 515.2, 632
950: Clearwater Plateau Aquifer Regional Study	1	507, 508, 515.2, 632

There were 32 positive pesticide detections in 21 wells during the 2008 regional project pesticide sampling, as seen on Table 5. Thirteen different types of pesticides were detected (including two metabolites) (Table 5).

ISDA regulates pesticide use and handling under Title 22 Chapter 34, Pesticides and Chemigation, Idaho Code. ISDA is the lead agency in developing 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). Where no MCL exists, the ISDA will use EPA Health Advisories Levels (HAL) first, if they exist, and then an EPA Reference Dose (RfD) number.

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

Level 1: Detection above the detection limit to less than 20% of Reference Point.

Level 2: Detection at 20% to less than 50% of Reference Point.

Level 3: Detection at 50% to less than 100% of Reference Point.

Level 4: Detection greater than 100% of Reference Point.

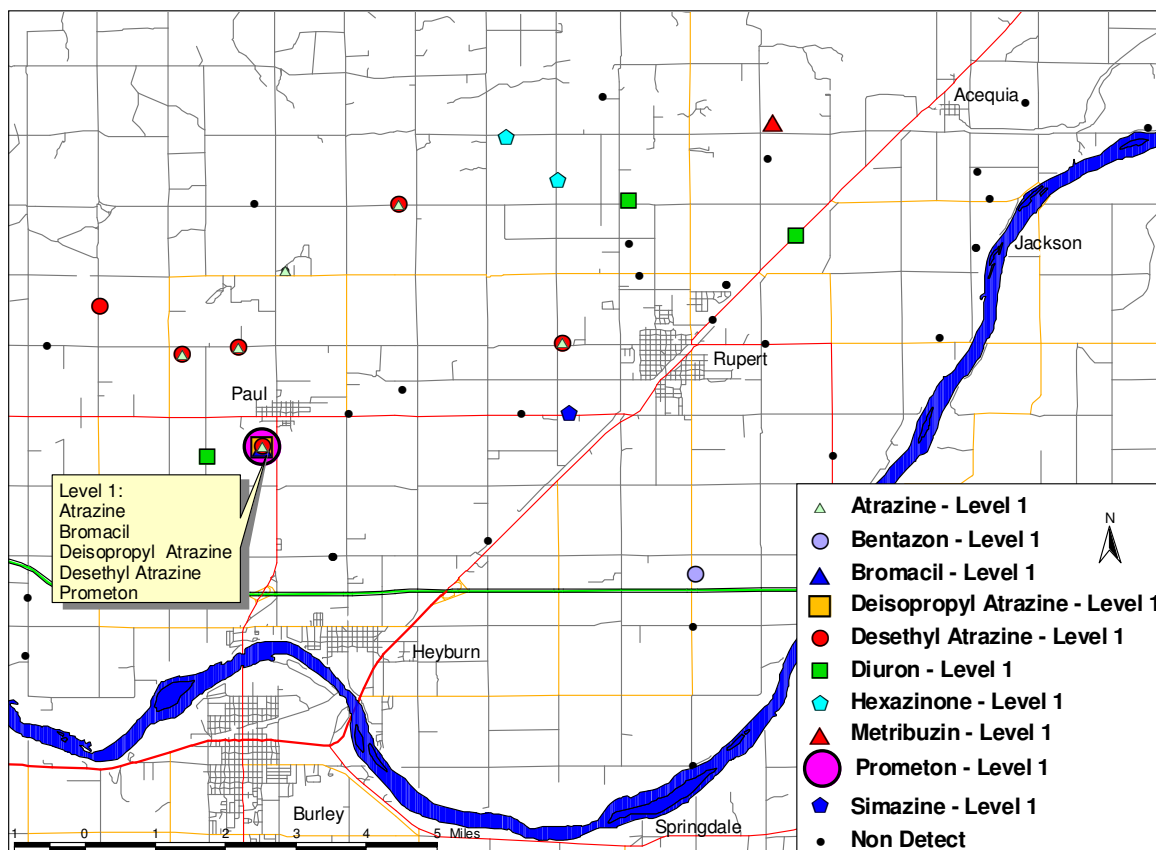
**Table 5.** Summary of Pesticide Detections from ISDA Regional Study Areas in 2008.

Pesticide	Number of Detections	Range (µg/L)	Mean (µ g/L)	Median (µg/L)	Reference Point (µg/L)	County with Detection
Atrazine	9	0.03 - 0.19	0.069	0.04	3 (MCL) <sup>1</sup>	Elmore (1) Minidoka (8)
Bentazon	1	0.22	---	---	200 (HAL) <sup>2</sup>	Minidoka (1)
Bromacil	1	0.08	---	---	90 (HAL)	Minidoka
Deisopropyl Atrazine	1	0.08	---	---	.... <sup>3</sup>	Minidoka
Desethyl Atrazine	9	0.03 - 0.24	0.063	0.04	.... <sup>3</sup>	Elmore (1) Minidoka (8)
Dicamba	1	0.28	---	---	4000 (HAL)	Owyhee
Dinoseb	1	0.77	---	---	7 (MCL)	Owyhee
Diuron	3	0.07 - 0.11	0.09	0.09	21 (RfD) <sup>4</sup>	Minidoka (3)
Hexazinone	2	0.06 - 0.07	0.065	0.065	400 (HAL)	Minidoka (2)
Metribuzin	1	0.05	---	---	200 (HAL)	Minidoka
Prometon	1	0.22	---	---	100 (HAL)	Minidoka
Simazine	1	0.13	---	---	4 (MCL)	Minidoka
Triallate	1	0.61	---	---	0.45 (FQPA DWLOC) <sup>5</sup>	Lewis

<sup>1</sup> MCL – EPA Maximum Contaminant Level.<sup>2</sup> HAL – EPA Lifetime Health Advisory Level.<sup>3</sup> Breakdown product of Atrazine. No reference point available, MCL for Atrazine of 3 µg/L is used.<sup>4</sup> RfD – EPA Reference Dose.<sup>5</sup> FQPA DWLOC – Food Quality Protection Act Drinking Water Level of Concern.

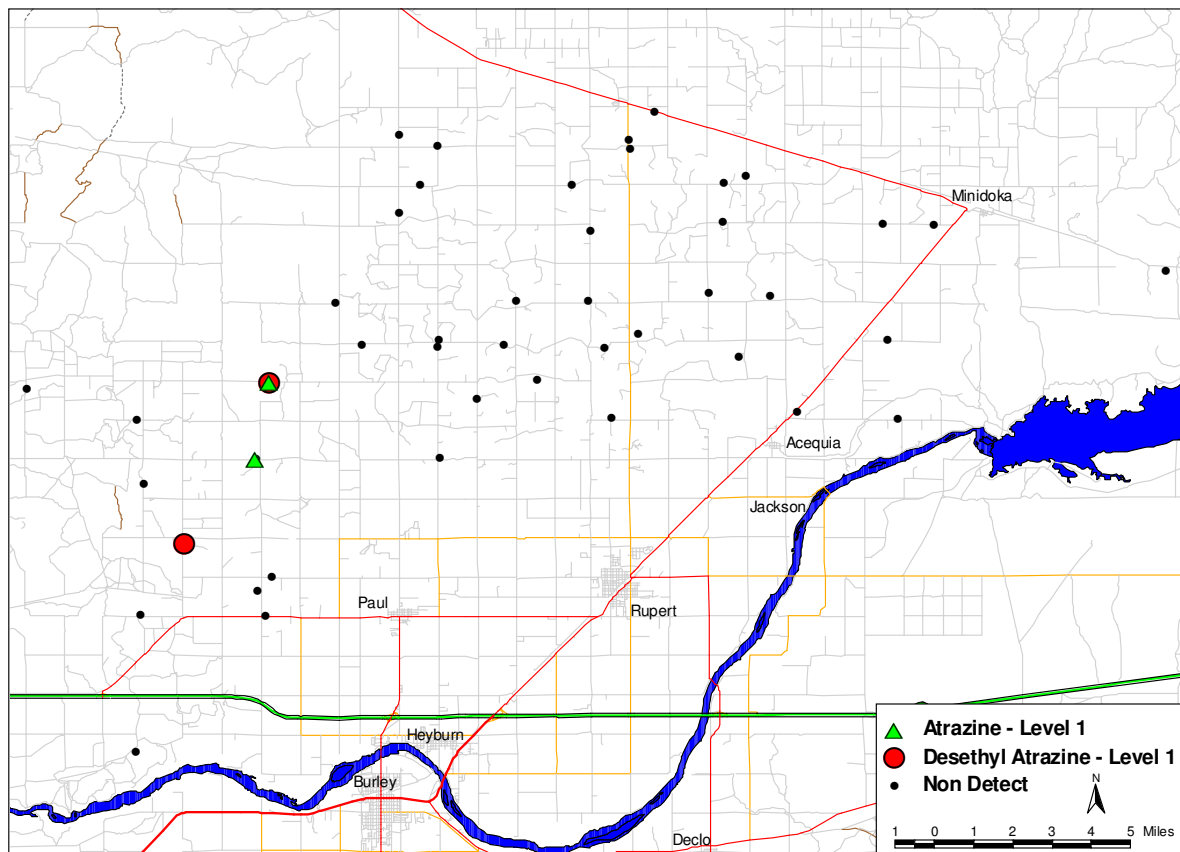


Figure 3 shows the pesticide detections for the Minidoka County Shallow Aquifer Regional Study (Project 730). A total of 42 wells were sampled for pesticides; 15 wells had one or more pesticides detected within the ground water. Ten different pesticides were detected in the study area. Atrazine and desethyl atrazine, a breakdown product of the pesticide atrazine, were the most commonly detected pesticides, with six detections each. The next most commonly detected pesticide was diuron with detections in three wells, followed by hexazinone with two detections, while deisopropyl atrazine (another breakdown product of atrazine), bentazon, bromacil, prometon, metribuzin and simazine were each detected in one well. All detections were within the Level 1 category established by the Idaho PMP Rule and were below any health standards set by the EPA or the State of Idaho.



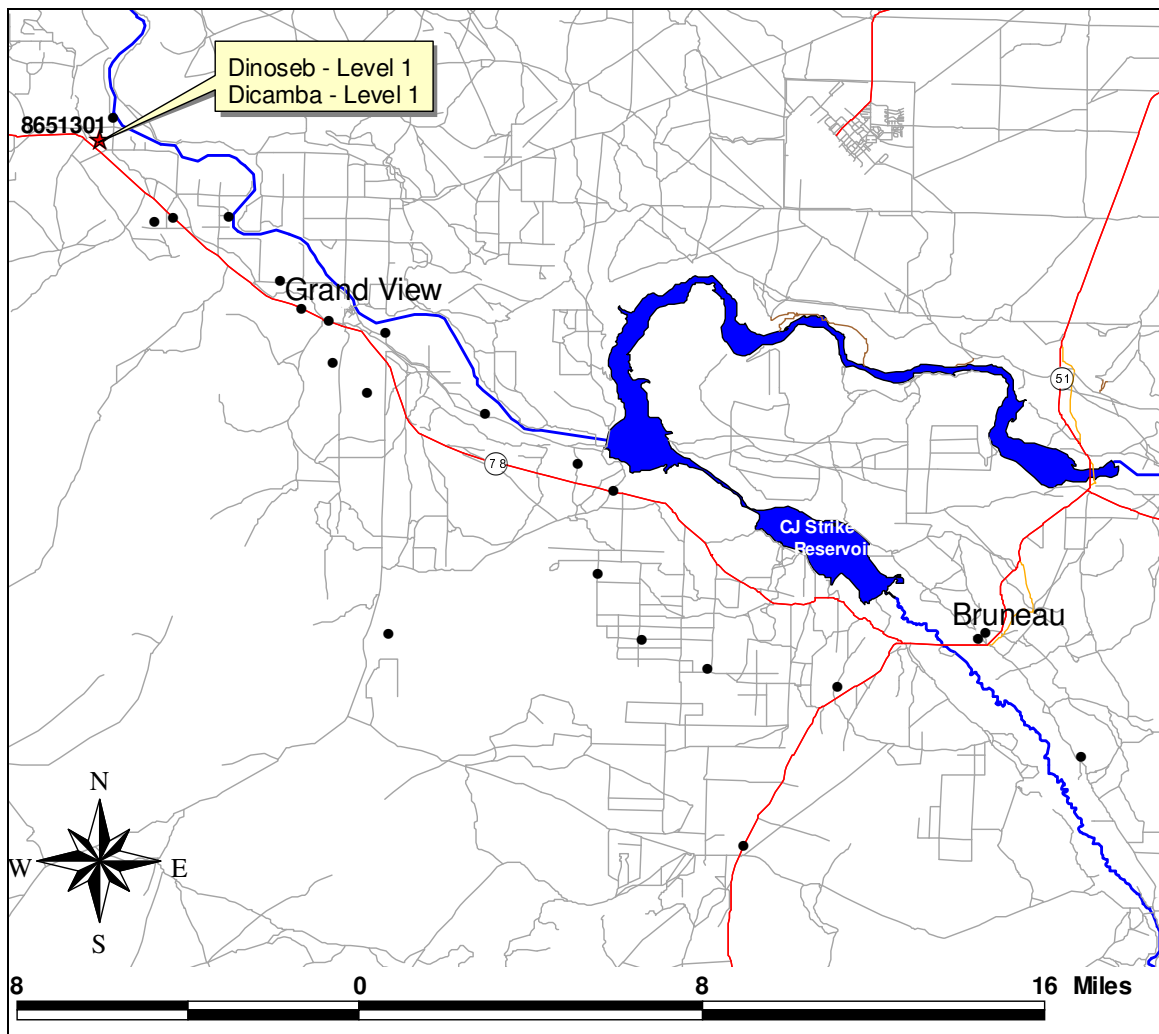
**Figure 3.** Pesticide results from ISDA 2008 sampling of the Minidoka County Shallow Aquifer Regional Study.

Figure 4 shows the pesticide detections for the Minidoka County Deep Aquifer Regional Study (Project 740). A total of 45 wells were sampled for pesticides; three wells had one or more pesticides detected within the ground water. Only two pesticides were detected. Atrazine and desethyl atrazine, a breakdown product of the pesticide atrazine, were each detected in two wells. All detections were within the Level 1 category established by the Idaho PMP Rule and were below any health standards set by the EPA or the State of Idaho.



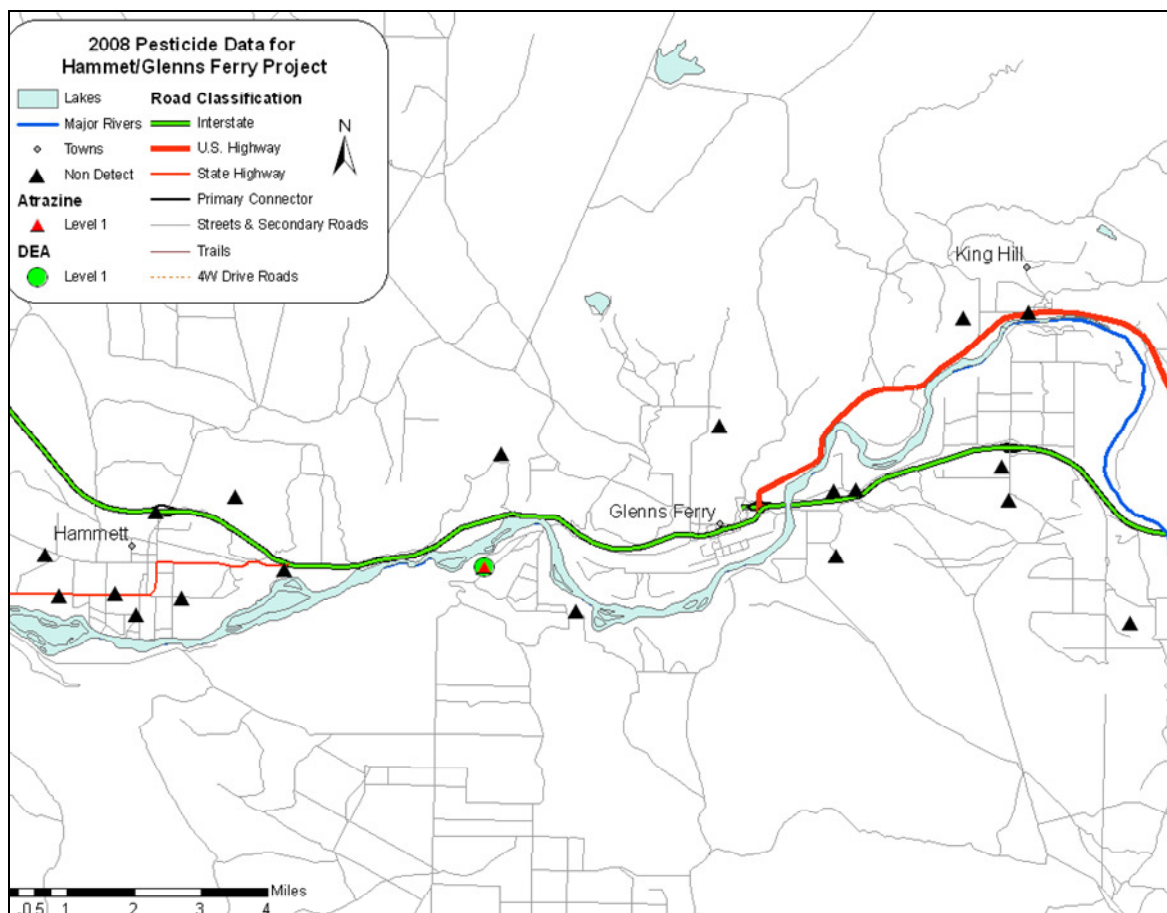
**Figure 4.** Pesticide results from ISDA 2008 sampling of the Minidoka County Deep Aquifer Regional Study.

Figure 5 shows the pesticide detections for the Grand View and Bruneau Area Regional Study (Project 865). Only one well (well 8651301) was sampled for pesticides as follow-up due to historic, elevated detections of dinoseb and dicamba. Both dinoseb and dicamba were detected. The two detections were below any health standards set by the EPA or the State of Idaho and were within the Level 1 category established by the Idaho PMP Rule.



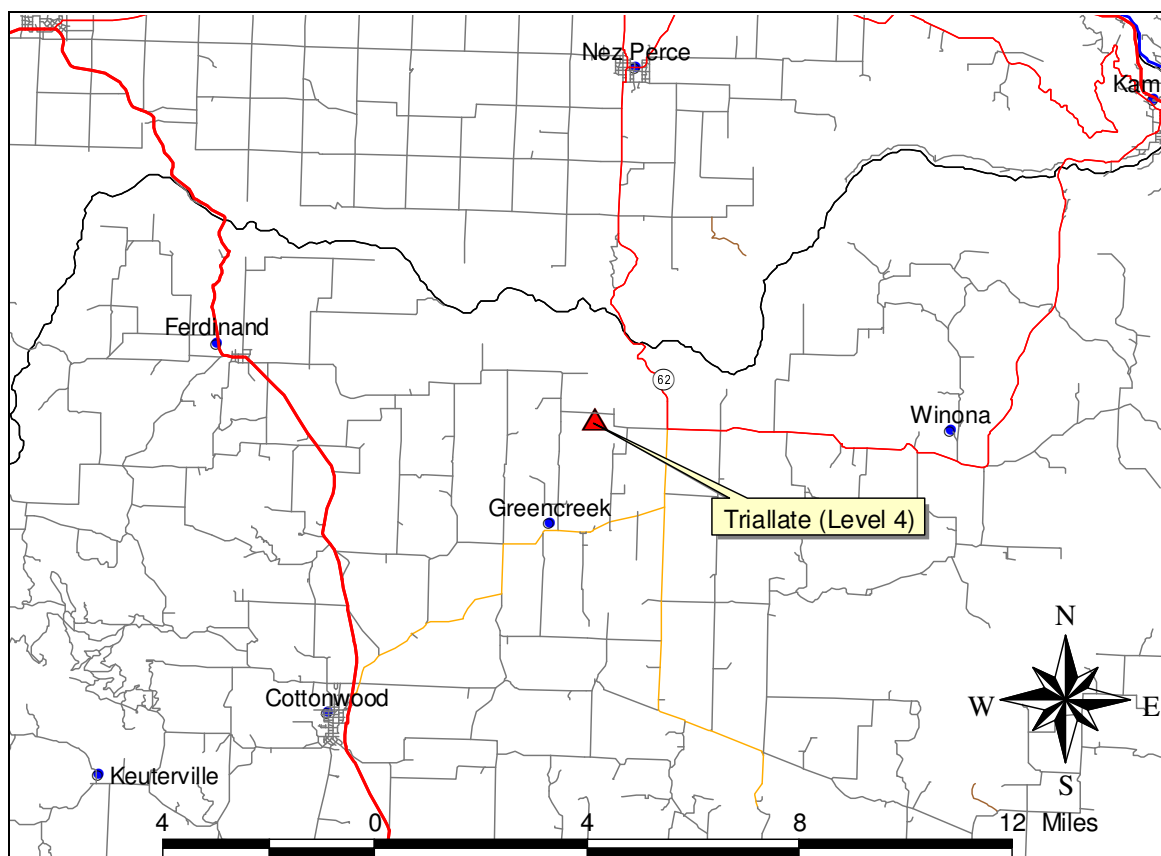
**Figure 5.** Pesticide results from ISDA 2008 sampling of the Grand View and Bruneau Area Regional Study. The black dots represent wells that are part of this regional study; however they were not sampled in 2008.

Figure 6 shows the pesticide detections for the Hammett/Glenns Ferry Area Regional Study (Project 890). A total of 20 wells were sampled for pesticides; one well had one or more pesticides detected within the ground water. Atrazine and desethyl atrazine, a breakdown product of the pesticide atrazine, were each detected in 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 established by the Idaho PMP Rule.



**Figure 6.** Pesticide results from ISDA 2008 sampling of the Hammett/Glenns Ferry Area Regional Study.

Figure 7 shows the sampling results from the partial pesticide testing conducted in the Clearwater Plateau Aquifer Regional Study (Project 950). Only one well, approximately 2 miles north/northeast of Greencreek, Idaho, was sampled as a follow up to an elevated detection of triallate in 2007. In 2008, triallate was detected at a concentration of  $0.61\mu\text{g/L}$ , which is above the Food Quality Protection Act Drinking Water Level of Concern (FQPA DWLOC) of  $0.45\mu\text{g/L}$ .



**Figure 7.** Pesticide results from ISDA 2008 sampling of the Clearwater Plateau Aquifer Regional Study.

## 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, USGS ground water quality database, ISDA Dairy Ground Water Quality Database, and Farm Bureau ground water testing data. To develop new projects, ISDA evaluates these data sources and recommendations from other agencies. ISDA Ground Water Program staff meet on a regular basis to 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 respond to complaints or concerns regarding potential local agricultural contamination of ground water and conduct onsite initial assessments to determine if future monitoring work is needed. ISDA Ground Water Program staff discusses this information with other state and federal water quality professionals at the Agricultural Ground Water Quality Protection Committee during quarterly meetings each year as well as the IDEQ chaired Ground Water Monitoring Technical Committee.

### 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

Although ISDA Ground Water Program staff sample a number of projects that fit the criteria of less than 10 square miles, only those not related to beef CAFOs or dairies are presented in this section. Beef CAFO and dairy related projects are presented in the Dairy and Confined Animal Feeding Operation Water Quality Projects section of this document. In 2008, staff implemented two local monitoring projects that meet this criterion. One project is located northwest of Eagle, Idaho (Eagle Local Project) and the other is located south of Mountain Home, Idaho (Elmore County Project).

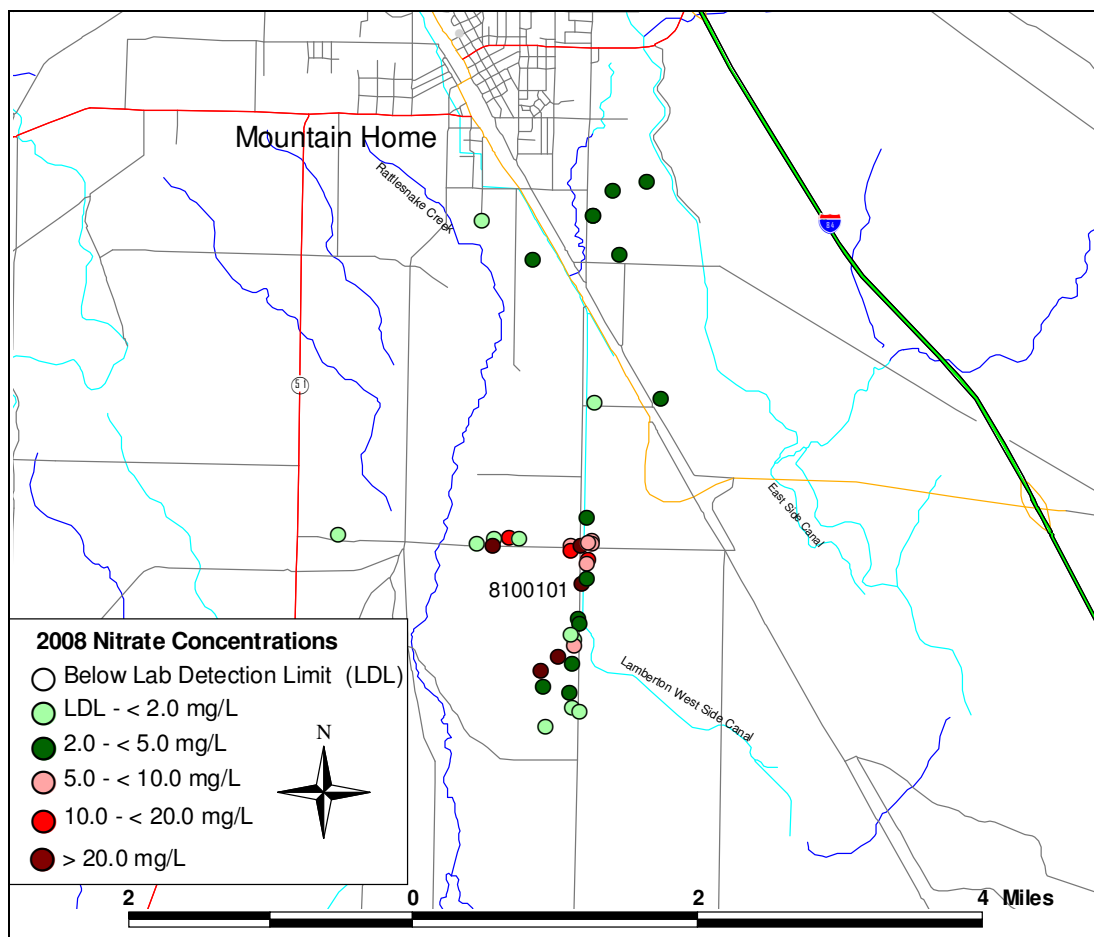
### Water Quality Findings

#### ***Nitrate***

##### Elmore County Project

Thirty-nine wells were analyzed for nitrate in the ISDA Elmore County Local Project, located approximately 3 miles south of downtown Mountain Home (Figure 8). Every well tested had nitrate detections greater than the laboratory detection limit of 0.05 mg/L. Eight wells, or 20.5% of the wells sampled, were over the EPA MCL for nitrate. Most of the wells with nitrate concentrations above the MCL were located near the intersection of S. 18th E. and Hamilton Roads (Figure 8). Fourteen wells, or 35.9%, had nitrate concentrations ranging from 2 mg/L to less

than 5 mg/L. The maximum detection was 31 mg/L. The median concentration was 3.6 mg/L, while the mean concentration was 7.6 mg/L (Table 6).



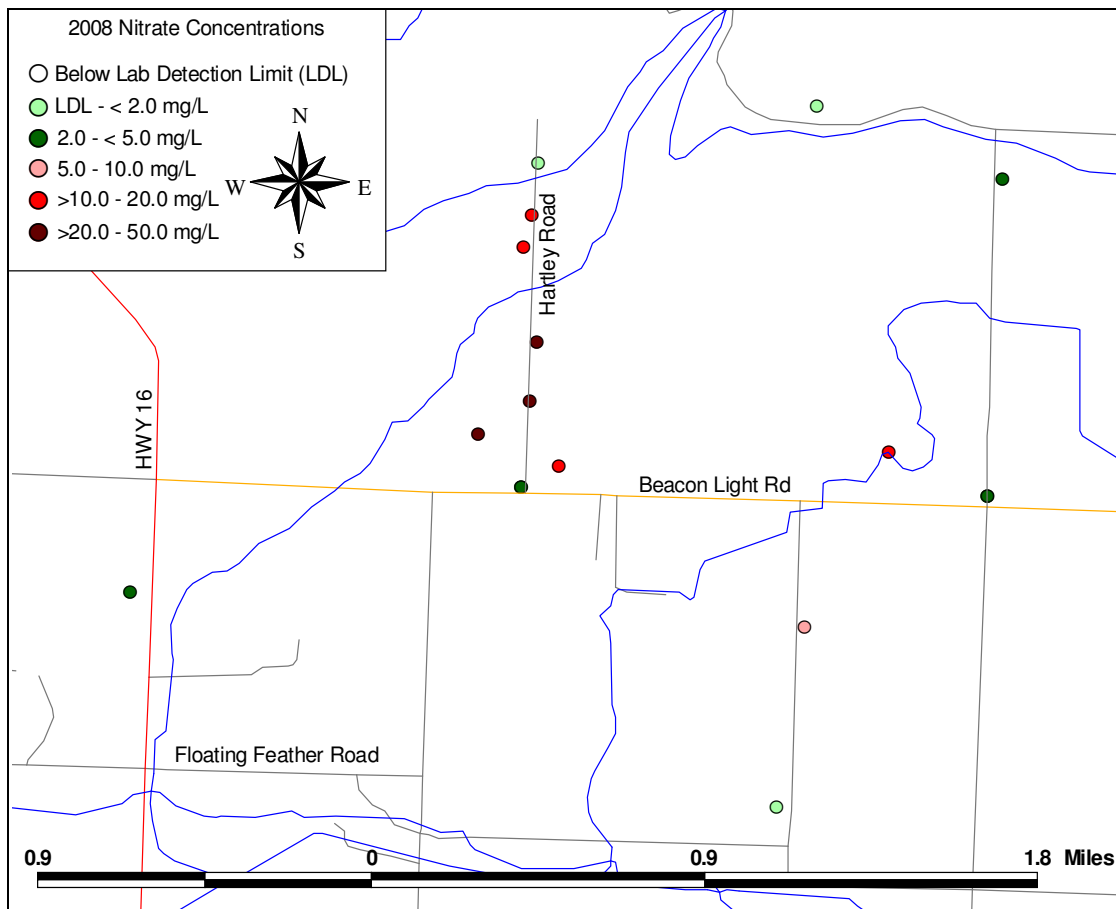
**Figure 8.** Nitrate results from ISDA 2008 sampling of the Elmore County Local Project.

**Table 6.** Summary of 2008 Nitrate Results from the Elmore County Local Project.

Concentration Range (mg/L)	Number of Wells
Below Lab Detection Limit (LDL)	0
LDL to < 2.0	11(28.2%)
2.0 to < 5.0	14 (35.9%)
5.0 to 10.0	6 (15.4%)
> 10.0	8 (20.5%)
Median Value (mg/L)	3.6
Mean Value (mg/L)	7.6
Maximum Value (mg/L)	31

### Eagle Local Project

In 2008, 15 wells were analyzed for nitrate in the Eagle Local Project, located approximately 3 miles northwest of Eagle along Beacon Light Road (Figure 9). All wells tested had nitrate concentrations that were greater than the laboratory detection limit of 0.05 mg/L. Seven wells, or approximately 47% of the wells sampled, had concentrations that exceeded the EPA MCL for nitrate of 10 mg/L (Figure 9). The maximum detection was 45 mg/L. The median value was 5 mg/L, while the mean value was 12.7 mg/L (Table 7).



**Figure 9.** Nitrate results from ISDA 2008 sampling of the Eagle Local Project.



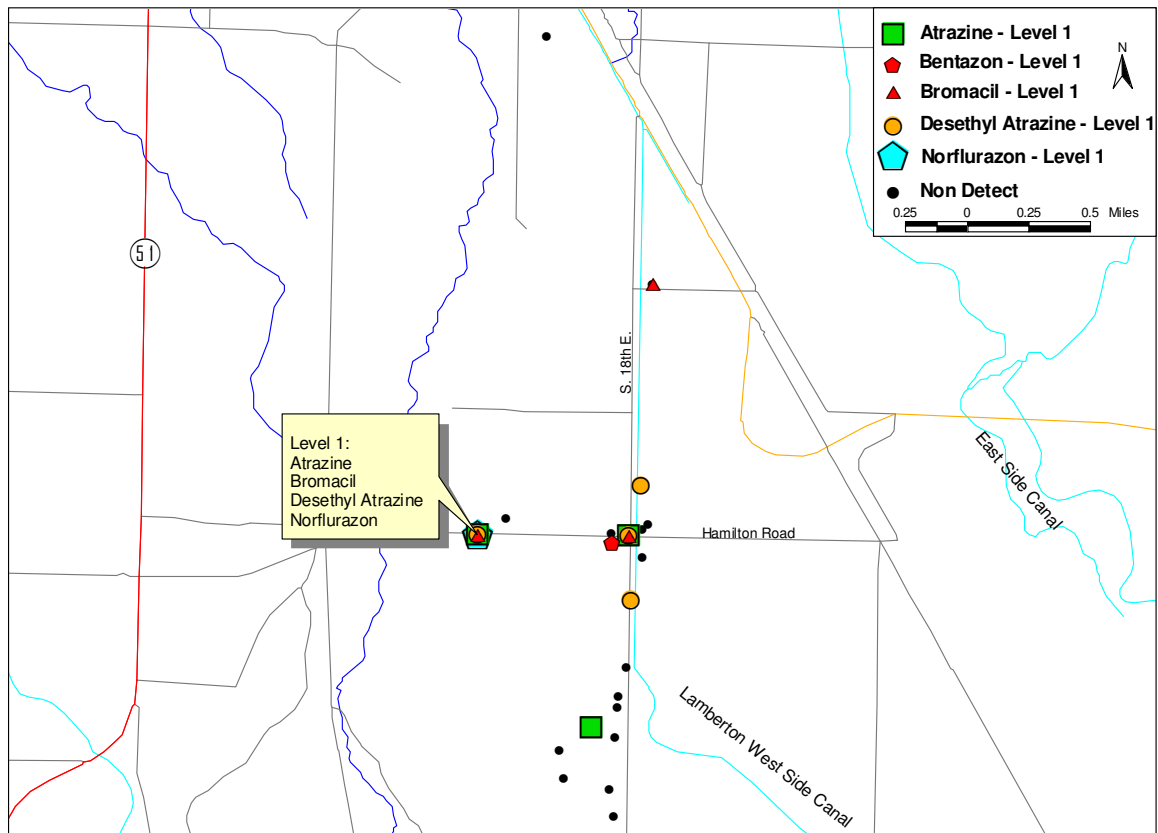
**Table 7.** Summary of 2008 nitrate concentrations from the Eagle Local Project

Concentration Range (mg/L)	Number of Wells
Below Lab Detection Limit (LDL) (0.05)	0
LDL to < 2.0	3 (20%)
2.0 to < 5.0	4 (26.7%)
5.0 to 10.0	1 (6.6%)
> 10.0 to 20.0	4 (26.7%)
> 20.0 - 50.0	3 (20.0%)
Median Value (mg/L)	5
Mean Value (mg/L)	12.7
Maximum Value (mg/L)	45

### ***Pesticides***

#### Elmore County Local Project

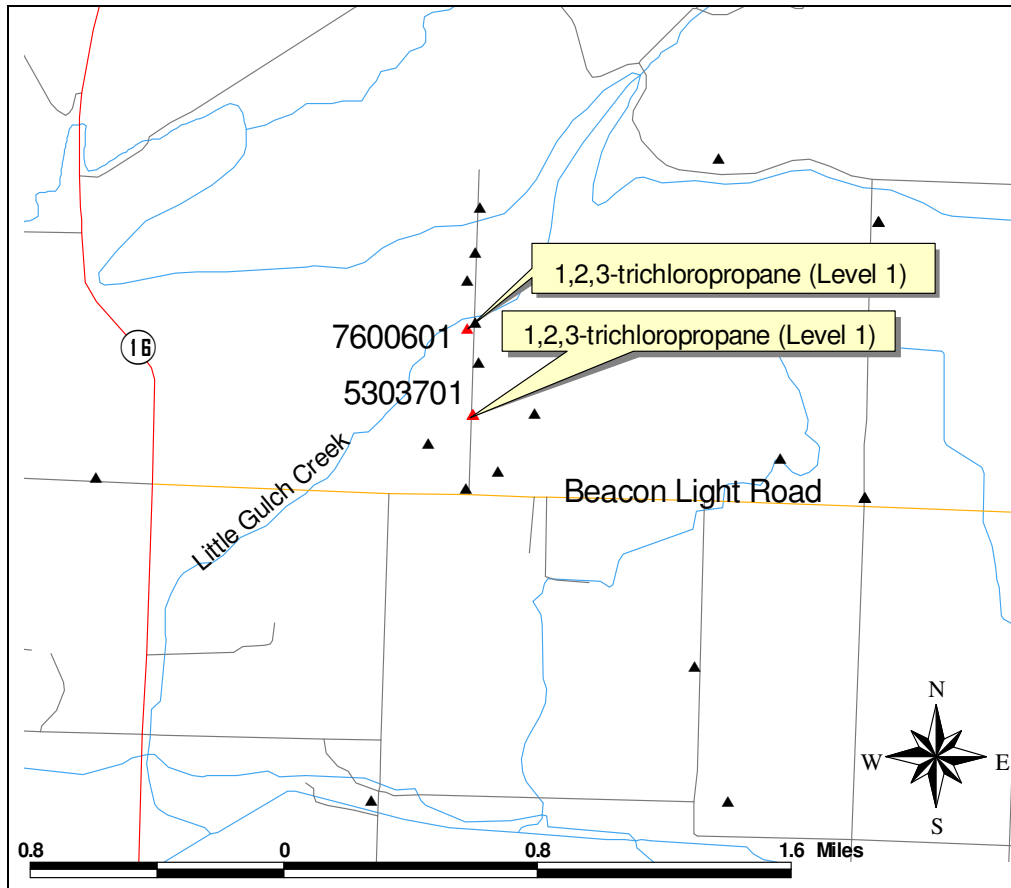
A total of 21 wells were sampled for pesticides in the Elmore County Local Project in 2008. The majority of the wells are located along South 18<sup>th</sup> East Street and Hamilton Road (Figure 10). Seven wells had one or more pesticides detected within the ground water. Five pesticides were detected in one or more wells. Desethyl atrazine, a breakdown product of the pesticide atrazine, was most commonly detected with detections in four wells. The next most commonly detected pesticides were atrazine and bromacil with three detections each, followed by bentazon and norflurazon 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 established by the Idaho PMP Rule.



**Figure 10.** Pesticide results from ISDA 2008 sampling of the Elmore County Local Project.

### Eagle Local Project

Two wells (7300601 and 5303701), both located along Hartley Road off of Beacon Light Road, were sampled for volatile organic compounds (VOCs) in the Eagle Local Project (Figure 11), due to historical elevated detections. The VOC 1,2,3-trichloropropane was detected in both wells, at 2.4 µg/L and at 1.4 µg/L. The EPA Lifetime Health Advisory Level for 1,2,3-trichloropropane is 40 µg/L. Both detections were within the Level 1 category established by the Idaho PMP Rule and below any health standards set by the EPA.



**Figure 11.** Pesticide results from ISDA 2008 sampling of the Eagle Local Project.

## **Dairy and Confined Animal Feeding Operation (CAFO) Water Quality Projects**

ISDA is monitoring ground water nitrate concentrations at all dairies in Idaho. Monitoring at beef CAFOs is based on ground water protection priorities, enforcement, and response to complaints. ISDA's Dairy Bureau, within the Animal Industries Division, implements the Rules Governing Dairy Waste, IDAPA 02.04.14 (Dairy Waste Management Program). Under these rules, dairy operations are to prevent ground water contamination and also be in compliance with the Idaho Ground Water Rule of 1997 (IDAPA 16.01.11).

As part of this regulatory responsibility, ISDA is working with dairies to ensure compliance of waste systems for the protection of ground water quality. ISDA has developed a tiered approach for monitoring nitrate concentrations at dairy wells and to assess the source of nitrate in ground water at dairies. Once a determination of nitrate source is complete, then operational changes can be addressed to prevent further contamination.

### Site Selection

Beef CAFO and dairy project locations are based on review of nitrate data, complaints, requests by other agencies, and assessments conducted by the ISDA Ground Water Program and inspectors.

Ground Water Program and Animal Industries Division personnel meet regularly to discuss locations that are a priority for monitoring and evaluation.

### Design

ISDA Ground Water Program staff relies almost entirely upon sampling of privately owned domestic wells to evaluate beef CAFO and dairy related projects. Monitoring wells are installed for those projects where deemed necessary and funding is available. Since most beef CAFO and dairy projects are typically less than 10 square miles, ISDA staff selects wells that are available and meet the requirements needed for an upgradient – downgradient type study. In many cases, all wells within the area of concern are sampled. When wells are abundant and project areas are larger, selection is made taking into account many factors such as well placement, well depth, well log information, and proximity to the area of concern. All projects require a monitoring plan be written prior to sampling.

### Standard Operating Procedures

Established protocols written by ISDA Ground Water Program staff are adhered to for all CAFO projects. These protocols meet EPA standards and establish set guidelines for creating monitoring projects, sampling wells, quality control and assurance, shipping and handling, laboratory requirements, and other protocols essential to quality work.

### Water Quality Findings

#### *Nitrate*

The ISDA Water Program sampled 175 wells related to dairy and beef CAFO projects in 2008 (Table 8). Exceedances of the EPA Maximum Contaminant Level (MCL) of 10 mg/L for nitrate varied between projects from 0% to 76%. Project locations, number of wells sampled, and nitrate statistics are listed in the table that follows. Constituents tested generally consist of (but are not limited to): nitrate, ammonia, chloride, sulfate, total coliform, E. coli, and N-15 isotopes. However, only nitrate data is presented in this report.

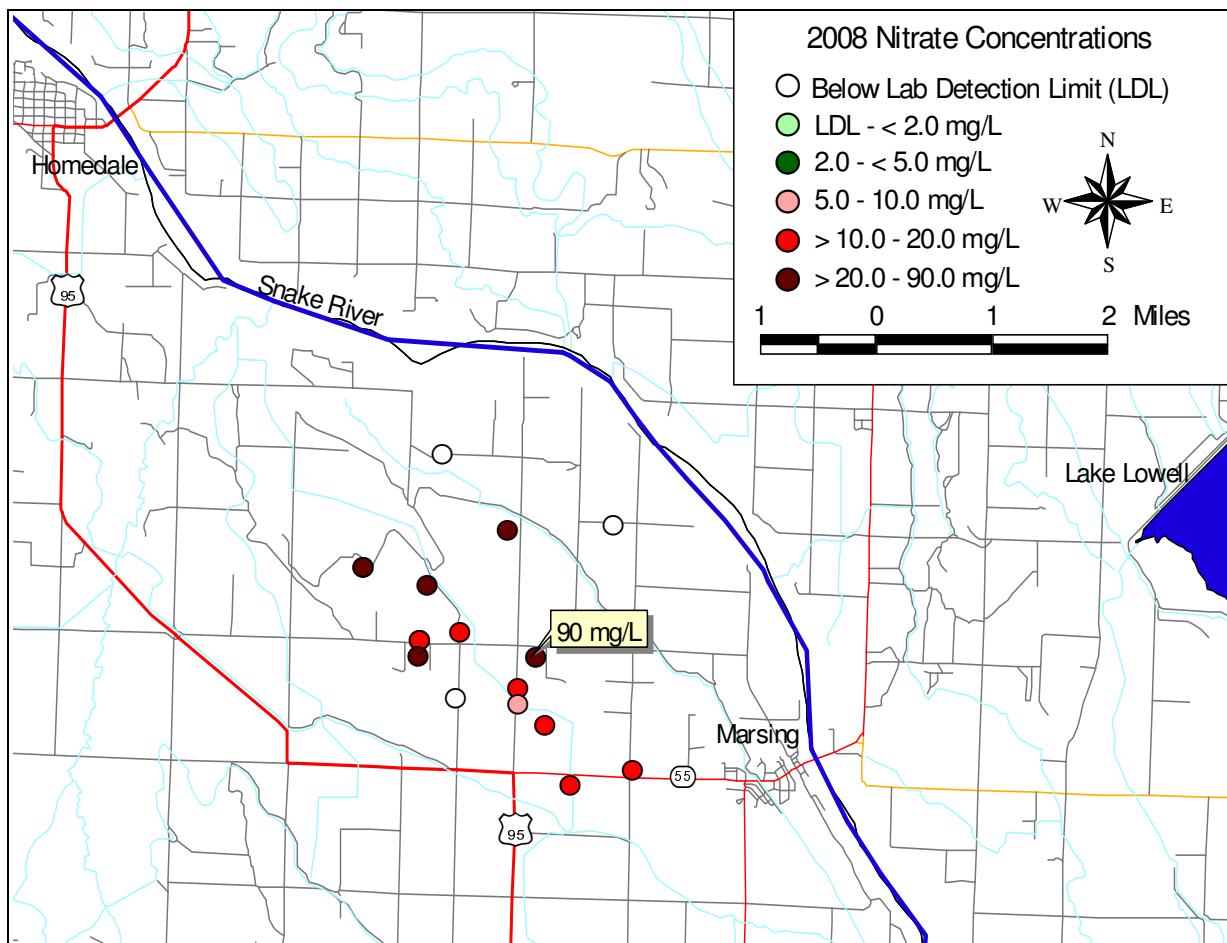
**Table 8.** Distribution of 2008 sampling for dairy and beef CAFO related projects.

Project Name	Sample Month	# Wells Sampled	# Wells over 10 mg/L Nitrate	Mean Nitrate (mg/L)	Median Nitrate (mg/L)	Max Nitrate (mg/L)	County	Geographic Location
Marsing	April/October	17	13 (76%)	22.9	13.0	90.0	Owyhee	NW of Marsing
Sunnyside	April	22	15 (68%)	16.8	17.5	33.0	Washington	South of Weiser
Grace	June	16	5 (31%)	7.9	3.6	32.0	Caribou	SE of Pocatello
Bliss	July	16 (14 wells and 2 springs)	4 (25%)	6.5	6.3	11.0	Gooding	NW of Bliss
Dry Lakes	June	7	3 (43%)	11.8	9.7	33.0	Canyon	South of Lake Lowell
Cassia	July	53	19 (36%)	8.7	7.6	22.0	Cassia	South of Burley
Buhl	July	32	0 (0%)	5.3	5.5	9.3	Twin Falls	South of Buhl
Purple Sage	December	12	1 (8%)	4.4	3.6	18.0	Canyon	North of Middleton
<b>Total</b>	-	175	58 (33%)	10.5	8.3	90.0	-	-

### Marsing

The Marsing area monitoring project began in 1999 as a result of concerns of high nitrate concentrations detected west of Marsing, Idaho. Sixteen wells, seven domestic/dairy wells and nine monitoring wells, were sampled in April 2008 for a variety of constituents, with a focus on nitrate (refer to Figure 12 for 2008 results). Well logs indicate static water levels generally less than 60 feet below ground level with ground water flow direction approximately north/northwest. Well logs show a shallow aquifer system of sands and gravels overlying a deeper system of black sand with a blue clay layer separating the two aquifers.

In April 2008, 13 wells (76%) exceeded the EPA MCL of 10 mg/L for nitrate (Figure 12). The mean nitrate concentration was 22.9 mg/L and the maximum nitrate concentration in a well was 90.0 mg/L.



**Figure 12.** Nitrate results for ISDA 2008 sampling of the Marsing project. One well (monitoring well 850MW09) is not shown on the map as no location information was available for this well. The nitrate concentration at 850MW09 in 2008 was 11 mg/L.

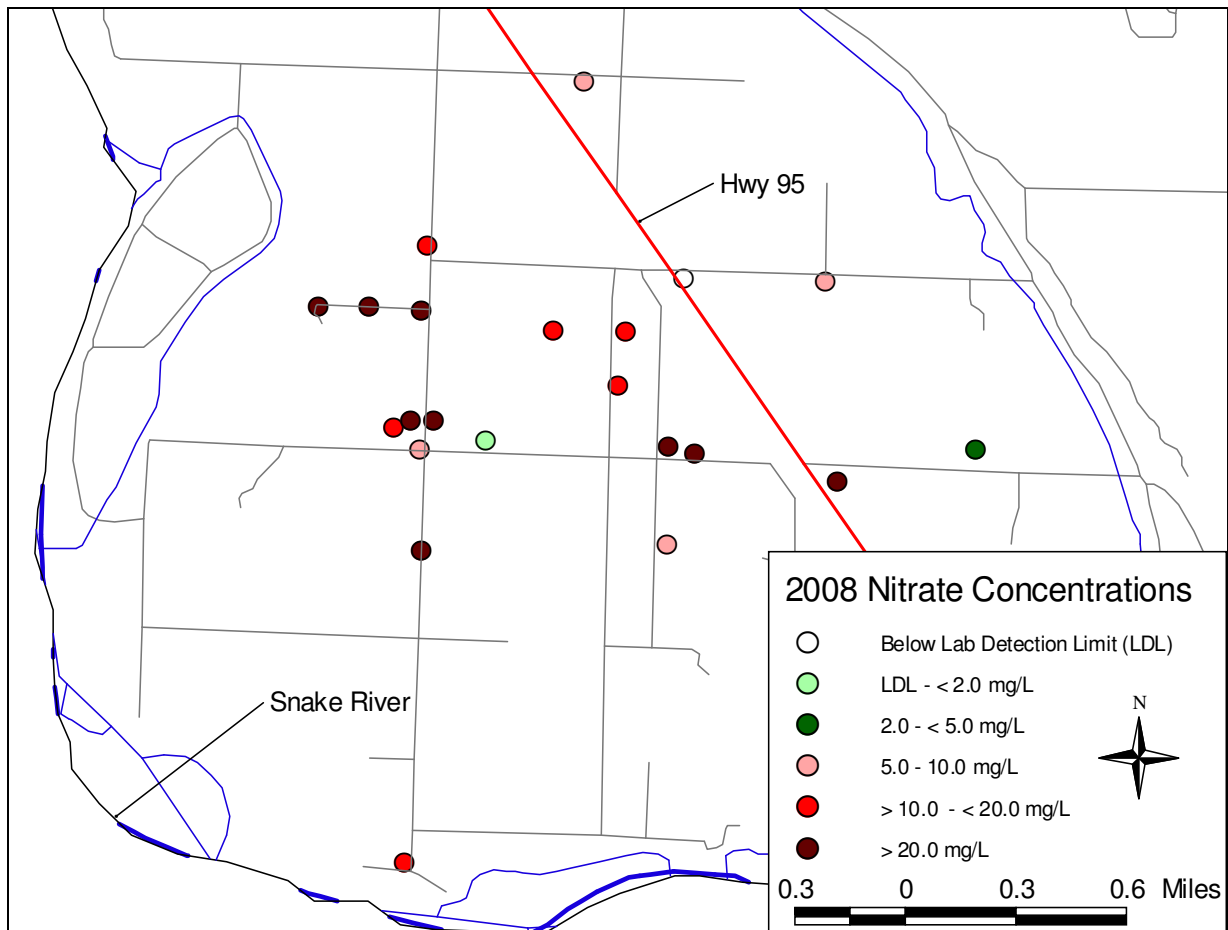
### Sunnyside

The Sunnyside monitoring project began in November 2002 as a result of citizen concerns of possible ground water contamination in the area surrounding a confined animal feeding operation (CAFO) and onion disposal site.

ISDA conducted follow-up water testing in the Sunnyside area in April 2003. An additional four wells east of Highway 95 were sampled; these included two domestic wells, a dairy farm well, and a well supplying water to a head start school. Laboratory results indicated a majority of wells (69%) in the project area had nitrate concentrations that exceeded the EPA MCL of 10 mg/L for nitrate. In addition, a majority of wells (80%) had  $\delta^{15}\text{N}$  isotope values that suggested an animal or human waste source of nitrate.

In 2008, 22 wells were sampled as part of the Sunnyside project. Fifteen wells (68%) had nitrate concentrations that exceeded the MCL of 10 mg/L for nitrate. Of those 15 wells that exceeded the

MCL, nine (60%) were over 20 mg/L, which is more that double the MCL. The mean and median concentrations were 16.8 and 17.5, respectively. The maximum detection in 2008 was 33 mg/L.



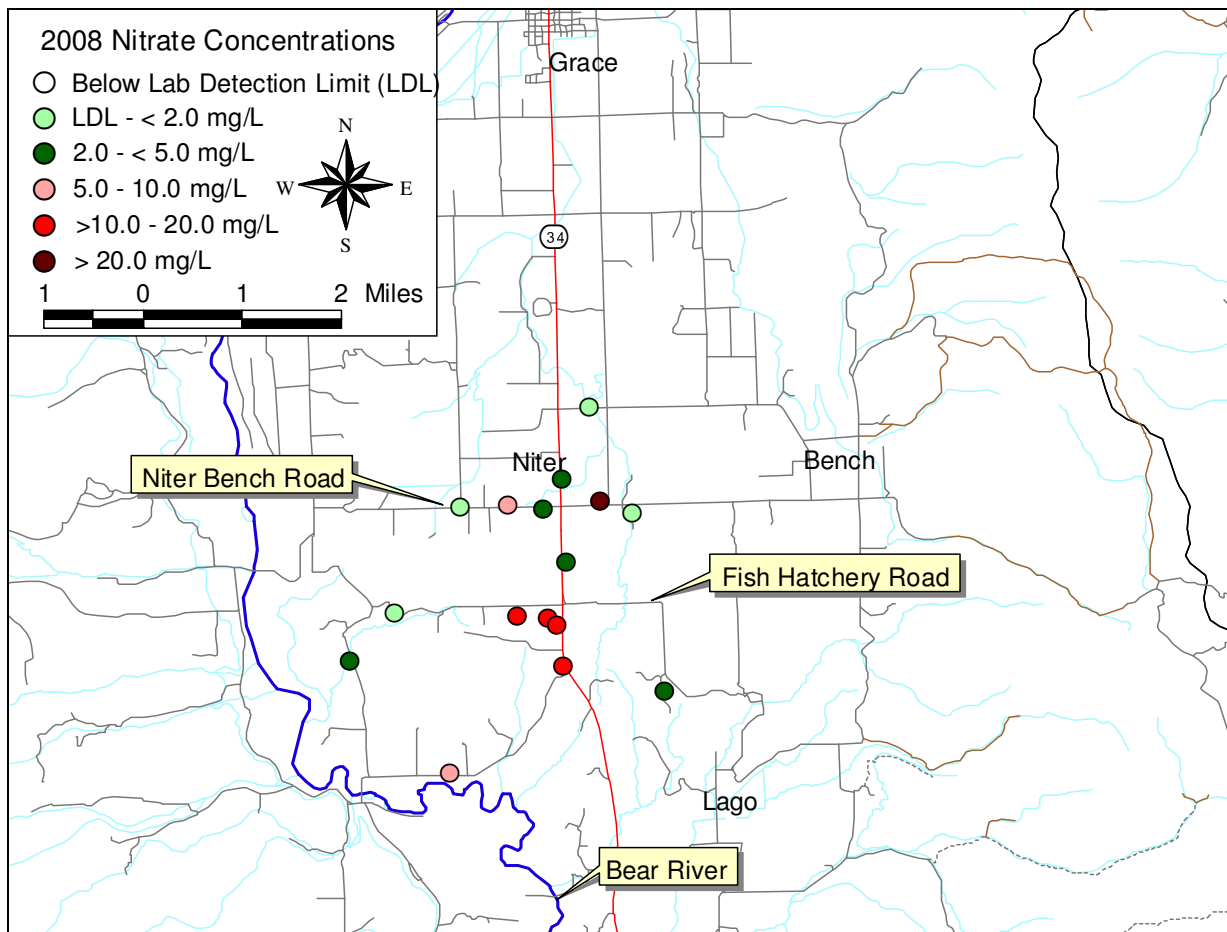
**Figure 13.** Nitrate results from ISDA 2008 sampling of the Sunnyside project.

### Grace Local Project

The Grace monitoring project is located in southeastern Idaho south of Grace. The project started in June 2007 as a result of citizen concerns of elevated nitrate concentrations in ground water potentially due to crop production, an existing dairy, a closed dairy, and a mink farm. Seven wells were initially sampled in 2007 for a variety of constituents, with a focus on nitrate. Follow-up testing occurred in June 2008, with an expansion of the project to 16 total wells (Figure 14). The project area is 5 miles south of Grace, Idaho, with ground water flow south/southwest towards the Bear River.

Well logs indicate static water levels range from approximately 30-90 feet below ground level. Typically, well logs show top soil and a thin clay layer overlying deep basalts with occasional sand interbeds. Domestic wells are generally completed and cased open hole in the basalt aquifer.

In 2008, five wells exceeded the EPA MCL of 10 mg/L for nitrate (Figure 14). The highest nitrate concentration was 32 mg/L. Another well had a nitrate detection at 19 mg/L and three were found to be at 14 mg/L. The mean nitrate concentration was 7.9 mg/L and the median was 3.6 mg/L.



**Figure 14.** Nitrate results from ISDA 2008 sampling of the Grace project.

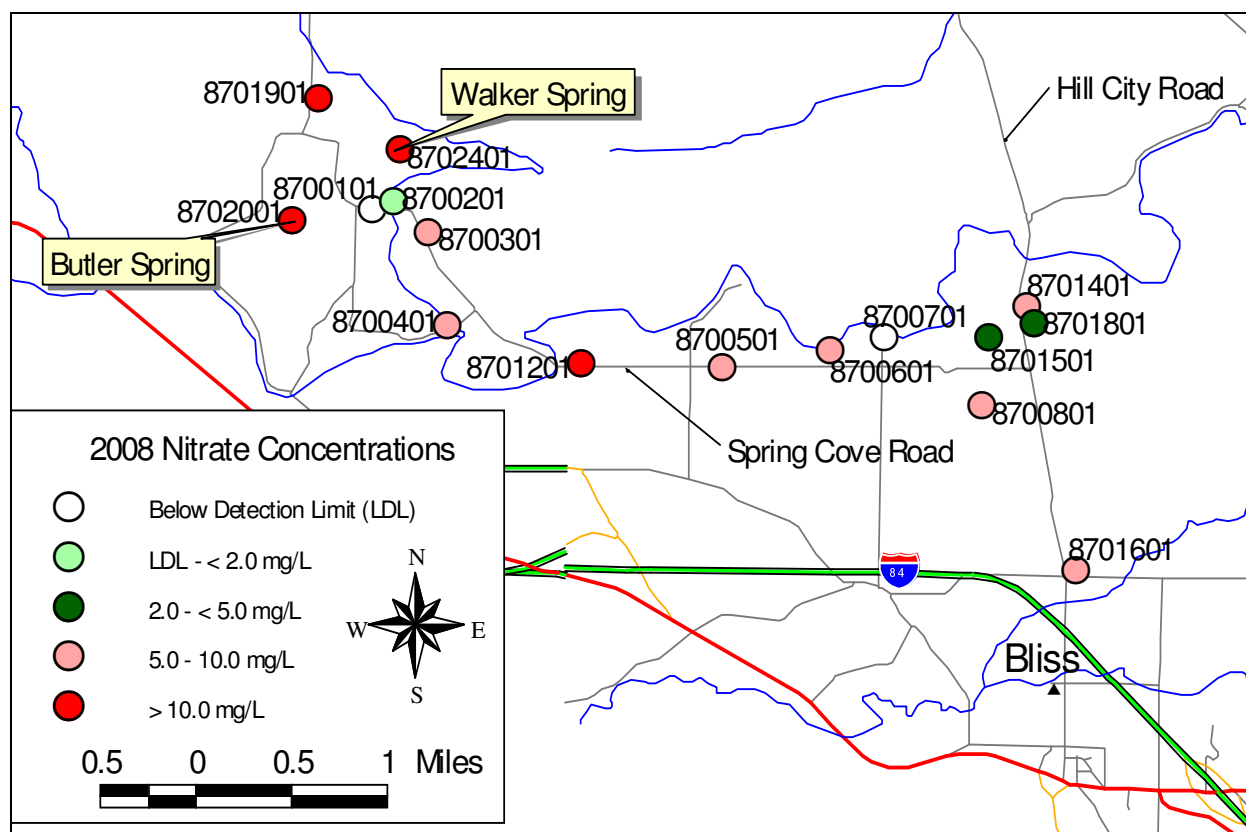
### Bliss Local Project

Ground water monitoring of domestic wells (annually) and two springs, Butler and Walker Spring (monthly), over a 9-year period, indicates that nitrate has contaminated a shallow aquifer northwest of Bliss, Idaho (Figure 15). In 2008, the EPA MCL of 10 mg/L for nitrate was exceeded in two of the 14 domestic wells. Results from the monthly sampling of the two springs, suggests that the MCL for nitrate was exceeded four times at Butler Spring and eight times at Walker Spring. The mean and median nitrate values from monthly sampling at Butler Spring in 2008 were 9.9 mg/L. The mean and median nitrate values from monthly sampling at Walker Spring in 2008 were 11.9 mg/L and 12.5 mg/L, respectively. The 2008 mean and median nitrate concentrations for domestic wells was 5.4 mg/L and 6 mg/L, respectively.



Nitrogen isotope test results in Butler Spring suggest a fertilizer or mixed source of contamination; however, one sample in January 2006 suggested an animal or human waste source.  $\delta^{15}\text{N}$  values at Walker Spring suggest an organic or mixed source of nitrates. Nitrogen isotope values in domestic wells from July 2005 and July 2006 suggest a commercial fertilizer or mixed source of nitrate contamination.

The Gooding Soil Conservation District, in cooperation with ISDA, secured an EPA Non-point Source Management §319 Grant and a Source Water Protection Grant through IDEQ. This grant will allow improvement in nutrient and irrigation water management throughout the Bliss Nitrate Priority Area. Implementation of the grants has started and included the installation of dedicated monitoring wells to further evaluate the ground water. The monitoring wells have been sampled on a monthly basis; however those results are not presented in this report.



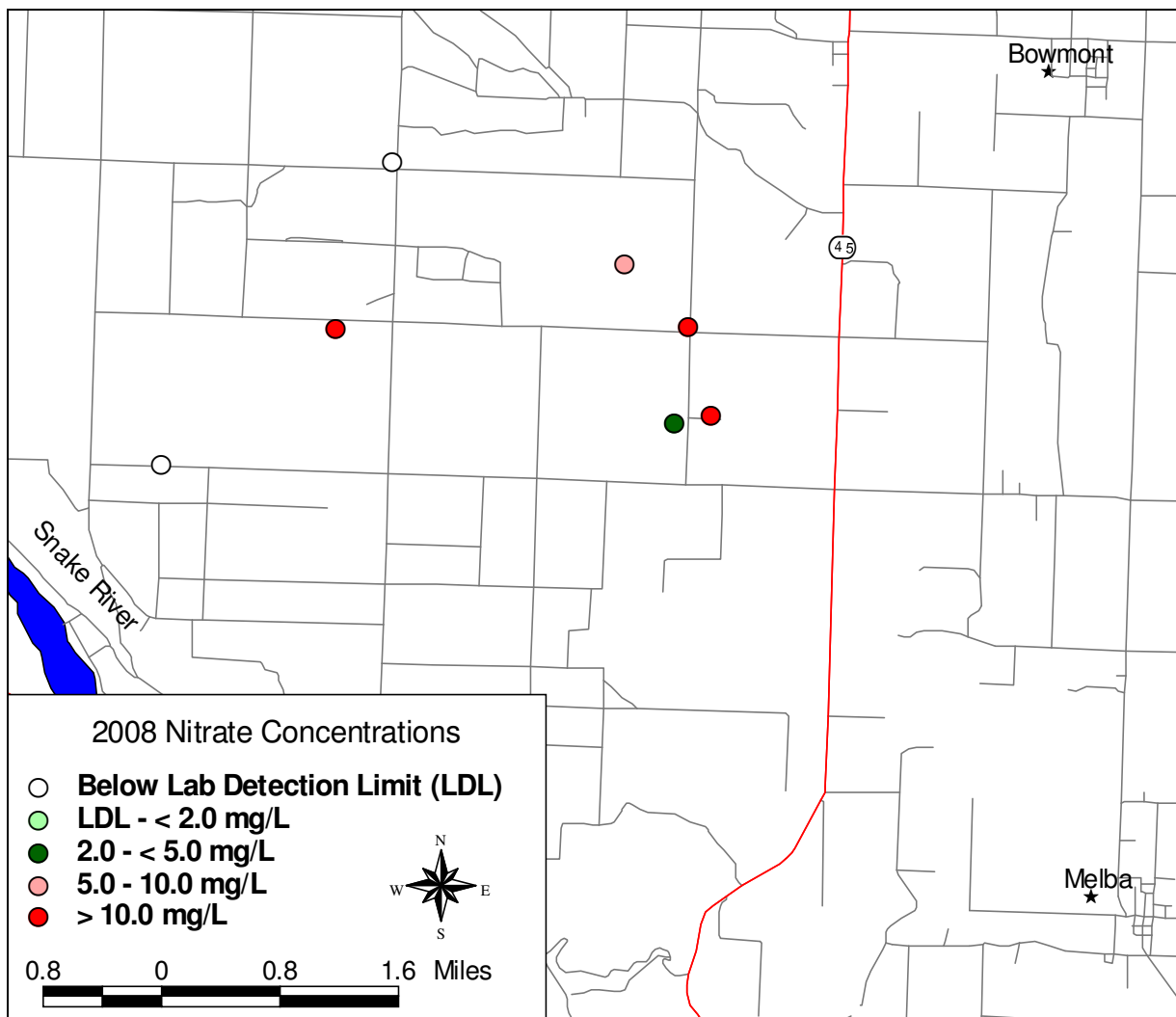
**Figure15.** Nitrate results for ISDA 2008 sampling of the Bliss project.

### Dry Lakes Project

The Dry Lakes monitoring project began in April 2005 as a result of high nitrate concentrations detected in ground water at dairy wells northwest of Melba and south of Lake Lowell near Nampa, Idaho. Seven wells were sampled in the spring of 2005 with a follow-up sampling of ten wells in the summer of 2006. Well logs indicate static water levels range from approximately 80-250 feet

below ground level. Typically, well logs show top soil overlying deep basalts. Domestic wells are generally completed open hole in the basalt aquifer.

In 2008, seven domestic wells were sampled as part of the Dry Lakes project. Three wells (43%) had nitrate concentrations that exceeded the MCL of 10 mg/L for nitrate. The mean and median concentrations were 11.8 and 9.7 mg/L, respectively. The maximum concentration detected in 2008 was 33 mg/L.

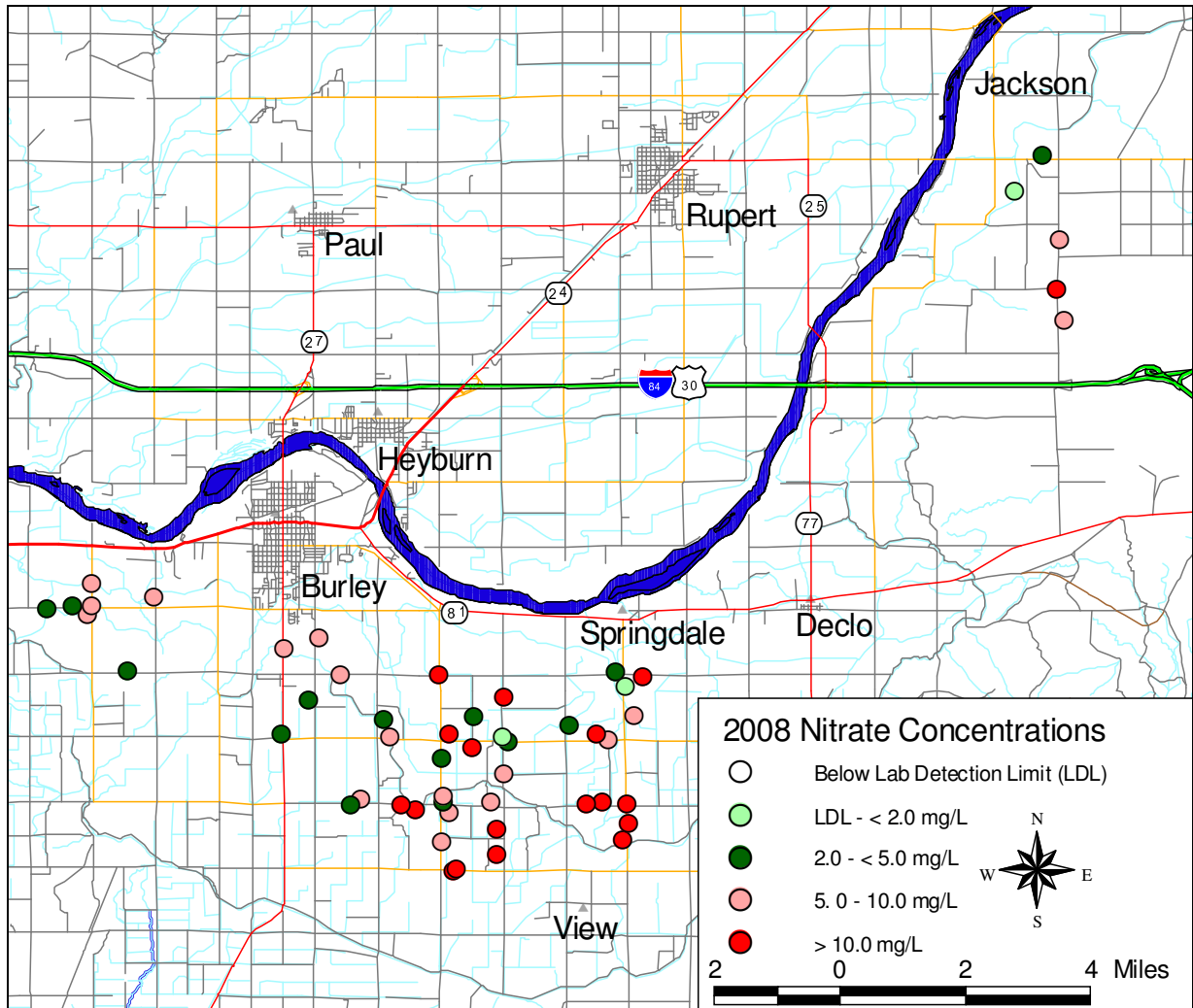


**Figure 16.** Nitrate results from ISDA 2008 sampling of the Dry Lakes project.

### Cassia

The ISDA Cassia County dairy monitoring project began in 2000 as a result of previous monitoring by the ISDA Dairy Bureau. Eleven dairy wells in the area exceeded the MCL of 10 mg/L for nitrate. To establish this project, ISDA selected adjacent domestic wells in the area for testing and re-tested the dairy wells.

In 2008, 53 wells were sampled as part of the Cassia Dairy project. Nineteen wells (36%) had nitrate concentrations that exceeded the MCL of 10 mg/L for nitrate. The mean and median concentrations were 8.7 and 7.6 mg/L, respectively. The maximum concentration detected in 2008 was 22 mg/l.



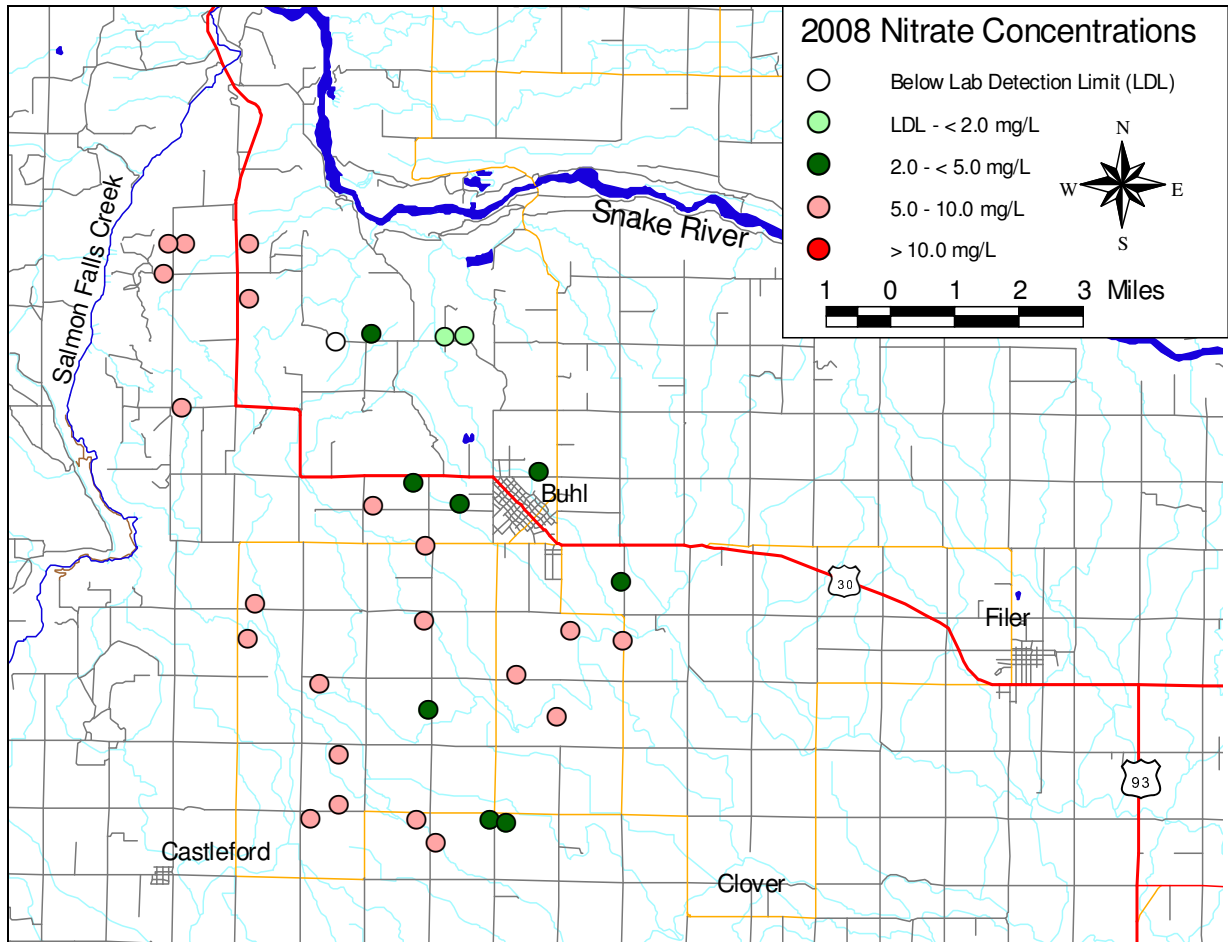
**Figure 17.** Nitrate results from ISDA 2008 sampling of the Cassia Project.

### Buhl

The Buhl area monitoring project began in 2001 as a result of seven detections in Twin Falls County exceeding the Environmental Protection Agency (EPA) Maximum Contaminant Level (MCL) of 10 mg/L for nitrate from ISDA Dairy Bureau testing (Bahr, et. al, 2000). Five of the seven detections exceeding the MCL were at dairies located in the general vicinity of the city of Buhl, Idaho. To establish this project, ISDA selected adjacent domestic wells in the area for testing and re-tested the dairy wells. One, out of 31 dairy wells re-sampled in 2001 as part of Buhl project, exceeded the EPA MCL of 10 mg/L for nitrate. Two out of 25 and zero out of 27 dairy

wells sampled in 2002 and 2003, respectively, exceeded the MCL for nitrate.

In 2008, 32 wells were sampled as part of the Buhl project. None of the wells sampled in 2008 exceeded the MCL of 10 mg/L for nitrate (Figure 18). The mean nitrate concentration was 5.3 mg/L and the maximum nitrate concentration in a well was 9.3 mg/L.



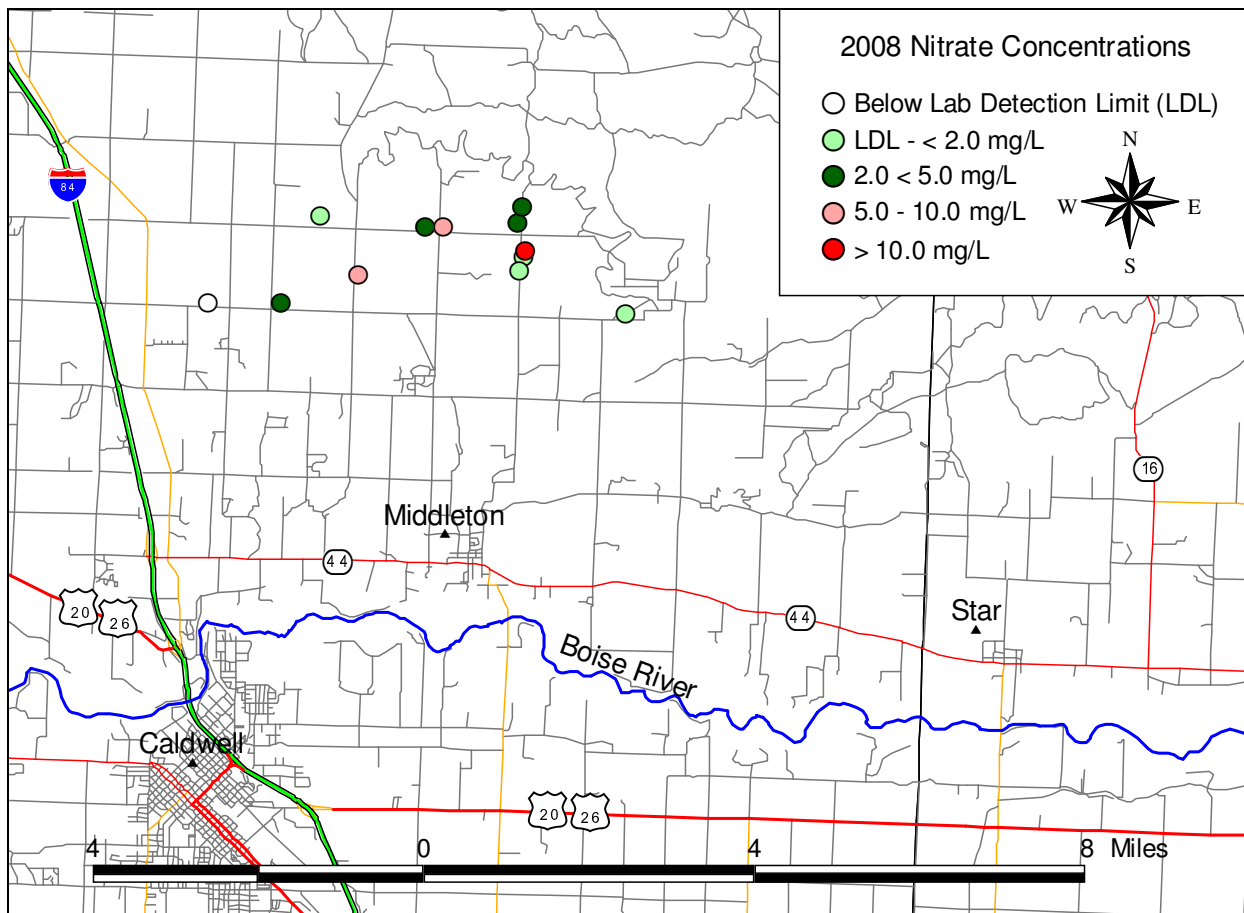
**Figure 18.** Nitrate results from ISDA 2008 sampling of the Buhl Project.

### Purple Sage

The Purple Sage monitoring project began in 2005 as a result of high nitrate concentrations detected in a public water well near a golf course north/northwest of Middleton, Idaho. ISDA established a project area in the agricultural area northeast of the neighborhood near the golf course while IDEQ sampled wells near the public drinking water well located in a rural subdivision. The site is an approximately 4.5 mile wide by 5.5 mile long area of agricultural, commercial, and residential land northwest of Middleton, Idaho (Figure 19). Water sampling events occurred in the fall and tests were completed for nutrients and common ions.

Twelve domestic wells were sampled in the fall of 2008. Sampling of dairy owned wells was

eliminated by the ISDA Water Program staff at the request of ISDA management. One well had a nitrate concentration of 18 mg/L, exceeding the MCL (Figure 19). Mean nitrate concentration in 2008 was 4.4 mg/L, and the median nitrate concentration was 3.6 mg/L.



**Figure 19.** Nitrate results from ISDA 2008 sampling of the Purple Sage project.

## Confined Animal Feeding Operation State Siting Team

On July 1, 2001, the "Site Advisory Suitability Determination Act" became law creating a confined animal feeding operation (CAFO) site advisory team comprised of members from the Idaho State Department of Agriculture, Department of Water Resources, and the Department of Environmental Quality. The rules governing the CAFO site advisory team are followed to provide "suitability determinations" on proposed livestock operations based on environmental risk. The suitability determination is provided to the county for their consideration when deliberating conditional use or livestock confinement operation permits.

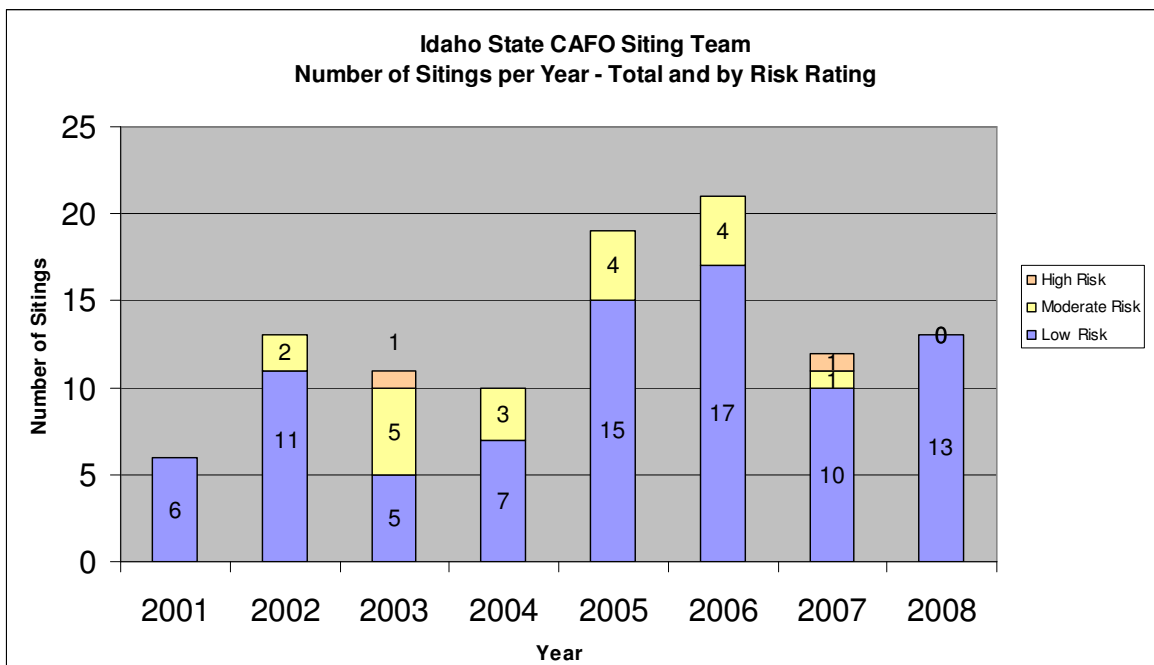
IDAPA 02.04.18 states that a board of county commissioners may request the formation of a CAFO site advisory team to provide a site suitability determination for all proposed CAFO sites. The team then develops and submits to the county a site suitability determination that contains three parts:

1. Risk Category: A determination of an environmental risk category: high, moderate, low, or insufficient information to make a determination.
2. Description of Factors: A description of the factors that contribute to the environmental risks.
3. Mitigation: Any possible mitigation of the environmental risks.

Risk Category is determined through the combination of a point-based scoring system and professional judgment. The score sheet is divided into two sections consisting of environmental questions followed by a section of proposed management questions. Points are tallied in both sections and the final score, along with professional judgment, is used to assign a Risk Category. It is then the responsibility of the consultant and the county to ensure proper mitigation of environmental risk beyond that required by state and local regulations.

The Idaho State CAFO Siting Team conducted 13 site assessments in 2008 (through September) and 105 total assessments since 2001 (Figure 20 and Table 9). A majority of suitability ratings since 2001 have been low risk (79%), approximately a fifth have been moderate risk (19%), and two sites were high risk (2%) (Table 9). Forty-nine (47%) of the 105 assessments were conducted for proposed new facilities and 55 (52%) were conducted for proposed expansions. The number of sitings increased each year from 2004 through 2006, with more than 20 assessments requested in 2006. This trend reversed with a decrease in the number of CAFO sitings to 14 in 2007 and 13 in 2008 (through September) (Table 10).

Twelve counties have requested suitability determinations since 2001 (Table 9). Over two-thirds of the 105 CAFO sitings since 2001 (through September 2008) have come from four counties: Jerome - 28 (27%), Gooding - 20 (19%), Cassia - 13 (12.4%), and Twin Falls - 14 (14.3%). Four counties requested suitability determinations in 2008 (Table 10). Approximately 62% of the 13 CAFO sitings in 2008 came from two counties: 4 (31%) in Gooding and 4 (31%) in Twin Falls.



**Figure 20.** Idaho State CAFO Siting Team Assessments per Year.

**Table 9.** CAFO Suitability Assessments by County (2001 through September 2008).

<b>County</b>	<b>Total</b>	<b>Low Risk</b>	<b>Moderate Risk</b>	<b>High Risk</b>
Jerome	28	22	6	0
Gooding	20	18	2	0
Cassia	13	10	3	0
Twin Falls	14	13	0	1
Minidoka	6	5	1	0
Elmore	5	3	2	0
Owyhee	5	1	3	1
Canyon	3	3	0	0
Lincoln	5	4	1	0
Payette	3	1	2	0
Ada	2	2	0	0
Jefferson	1	1	0	0
<b>Total</b>	<b>105</b>	<b>83</b>	<b>20</b>	<b>2</b>

**Table 10.** CAFO Suitability Assessments by County in 2008 (through September).

<b>County</b>	<b>Total</b>	<b>Low Risk</b>	<b>Moderate Risk</b>	<b>High Risk</b>
Gooding	4	4	0	0
Jerome	3	3	0	0
Lincoln	2	2	0	0
Twin Falls	4	4	0	0
<b>Total</b>	<b>13</b>	<b>13</b>	<b>0</b>	<b>0</b>

## Pesticide Management Plan Projects

### Overview

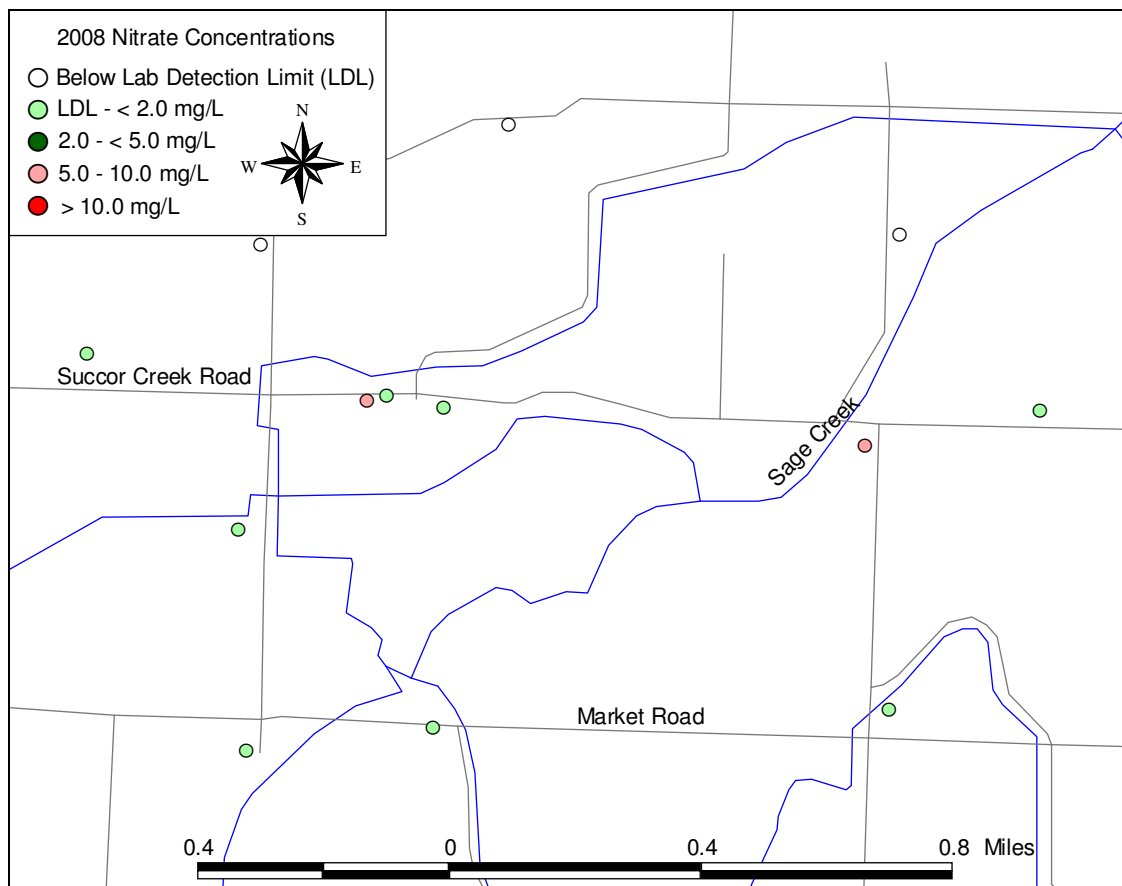
In response to elevated pesticide detections from the 2005 regional project area monitoring efforts, Pesticide Management Plan (PMP) monitoring projects were established. Additional wells surrounding the original elevated pesticide detection were sampled to determine the extent of the pesticide contamination. 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).

## Water Quality Findings

### *Nitrate*

#### Owyhee County

In 2008, 13 wells were analyzed for nitrate in the ISDA Owyhee County Dacthal PMP Project (Project 310) located approximately 2 miles south of Homedale along Succor Creek Road (Figure 21). None of the wells exceeded the MCL for nitrate (Figure 21 and Table 11) in 2008. The high nitrate detection was 9.1 mg/L. The median value was 0.2 mg/L, and the mean value was 1.5 mg/L (Table 11).



**Figure 21.** Nitrate results from ISDA 2008 sampling of the Owyhee County Dacthal PMP Project.

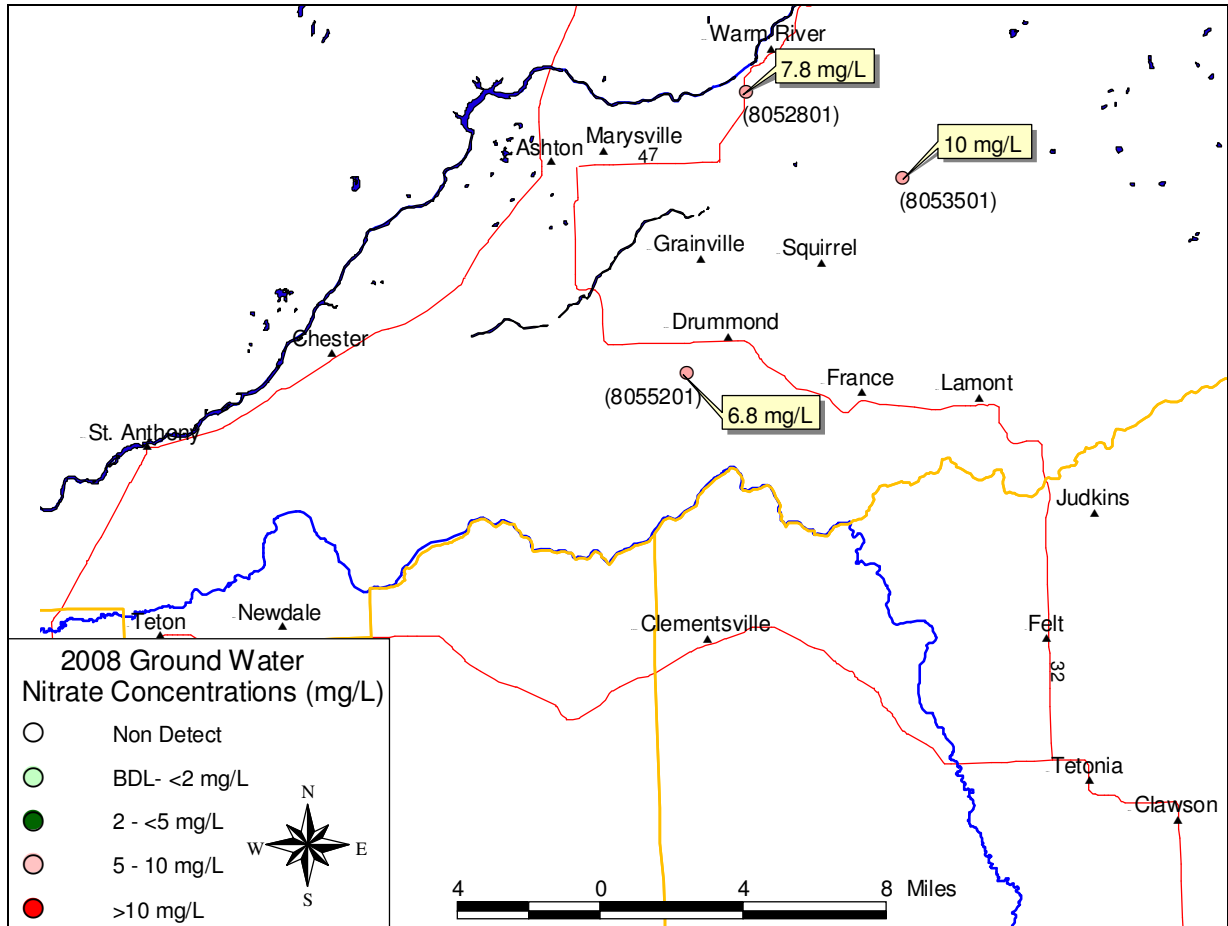


**Table 11.** Summary of 2008 Nitrate Results from the Owyhee County Dacthal PMP Project.

Concentration Range (mg/L)	Number of Wells
< Lab Detection Limit (LDL) (0.05)	3 (23%)
LDL to < 2.0	8 (62%)
2.0 to < 5.0	0 (0%)
5.0 to 10	2 (15%)
>10	0 (0%)
Mean Value (mg/L)	1.5
Median Value (mg/L)	0.2
Maximum Value (mg/L)	9.1

#### Fremont County

The three wells (8052801, 8053501, and 8055201) analyzed for pesticides as part of the ISDA Fremont County Triallate PMP Project (Project 320) located approximately 6 miles northeast of Ashton (Figure 22) were also analyzed for nitrate. The nitrate results for these three wells (along with the other 42 wells part of the North Henry's Fork Central Basin Regional Study) is include in the nitrate summary for the regional projects in Table 3 on page 8. None of the wells had a nitrate concentration that exceeded the EPA's MCL of 10 mg/L. The maximum detection was 10 mg/L. The median value was 7.8 mg/L, while the mean value was 8.2 mg/L (Table 12).



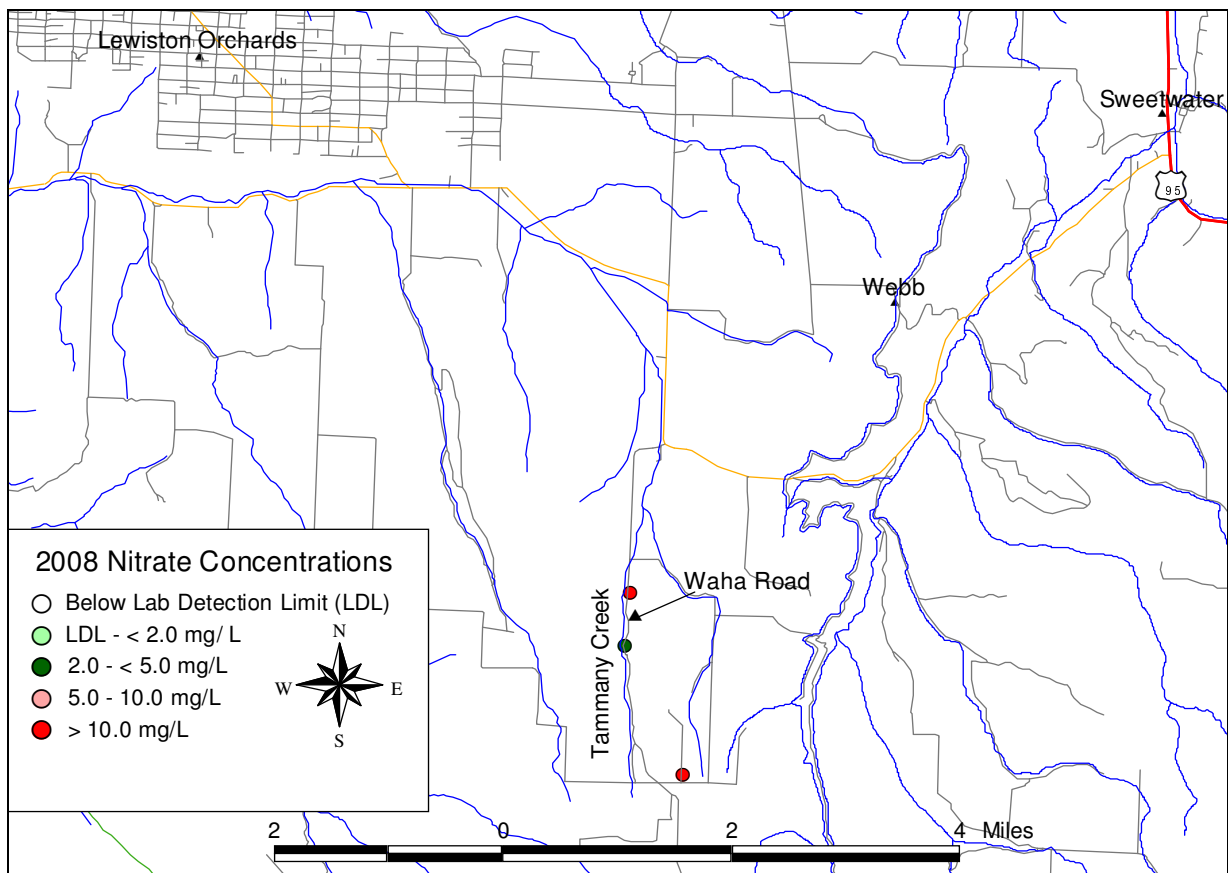
**Figure 22.** Nitrate results from 2008 sampling of Fremont County Triallate PMP Project.

**Table 12.** Summary of 2008 Nitrate Results from Fremont County Triallate PMP Project.

Concentration Range (mg/L)	Number of Wells (3 wells)
< Lab Detection Limit (LDL) (0.05)	0 (0%)
LDL to < 2.0	0 (0%)
2.0 to < 5.0	0 (0%)
5.0 to 10.0	3 (100%)
>10	0 (0%)
Mean Value (mg/L)	8.2
Median Value (mg/L)	7.8
Maximum Value (mg/L)	10

### Nez Perce County

The three wells (3300601, 9501901, and 9505401) analyzed for pesticides as part of the ISDA Nez Perce County Atrazine and Desethyl Atrazine PMP Project (Project 330) located approximately six miles south of Lewiston (Figure 23) were also analyzed for nitrate. Two of the three wells (9501901 and 9505201) are part of the Clearwater Plateau Aquifer Regional Study and the results from those two wells are also included in the nitrate summary for regional projects on page 8 (Table 3). Two of the three wells (3300601 and 9505401) had a nitrate concentration that exceeded the EPA's MCL of 10 mg/L. The maximum detection was 12 mg/L. The median value was 11 mg/L, while the mean value was 9.0 mg/L (Table 13).



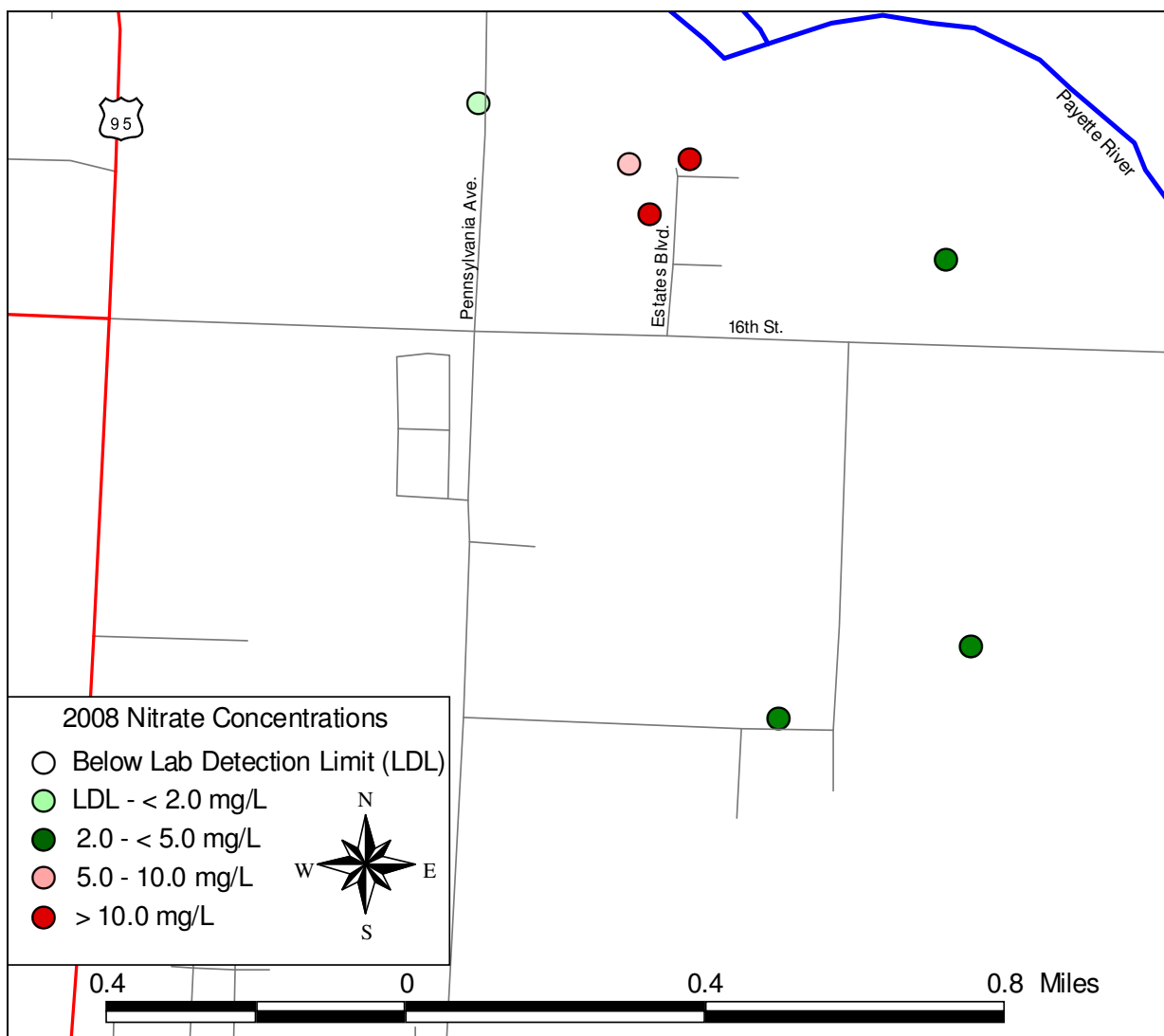
**Figure 23.** Nitrate results for 2008 ISDA monitoring of the Nez Perce County Atrazine and Desethyl Atrazine PMP Project.

**Table 13.** Summary of 2008 Nitrate Results from the Nez Perce County Atrazine and Desethyl Atrazine PMP Project.

<b>Concentration Range (mg/L)</b>	<b>Number of Wells (3 wells)</b>
< Lab Detection Limit (LDL) (0.05)	0 (0%)
LDL to < 2.0	0 (0%)
2.0 to < 5.0	1 (33.3%)
5.0 to 10	0 (0%)
>10	2 (66.7%)
Mean Value (mg/L)	9.0
Median Value (mg/L)	11.0
Maximum Value (mg/L)	12.0

#### Payette County

Seven wells were analyzed for nitrate in the ISDA Payette County Atrazine and Desethyl Atrazine PMP Project located in Fruitland (Figure 24). Two wells, or 29% of the wells sampled, had nitrate concentrations exceeding the EPA MCL (Figure 24 and Table 14). The maximum detection was 12 mg/L. The median value was 4.9 mg/L, while the mean value was 6.5 mg/L (Table 14).



**Figure 24.** Nitrate results from ISDA 2008 sampling of the Payette County Atrazine and Desethyl Atrazine PMP Project.

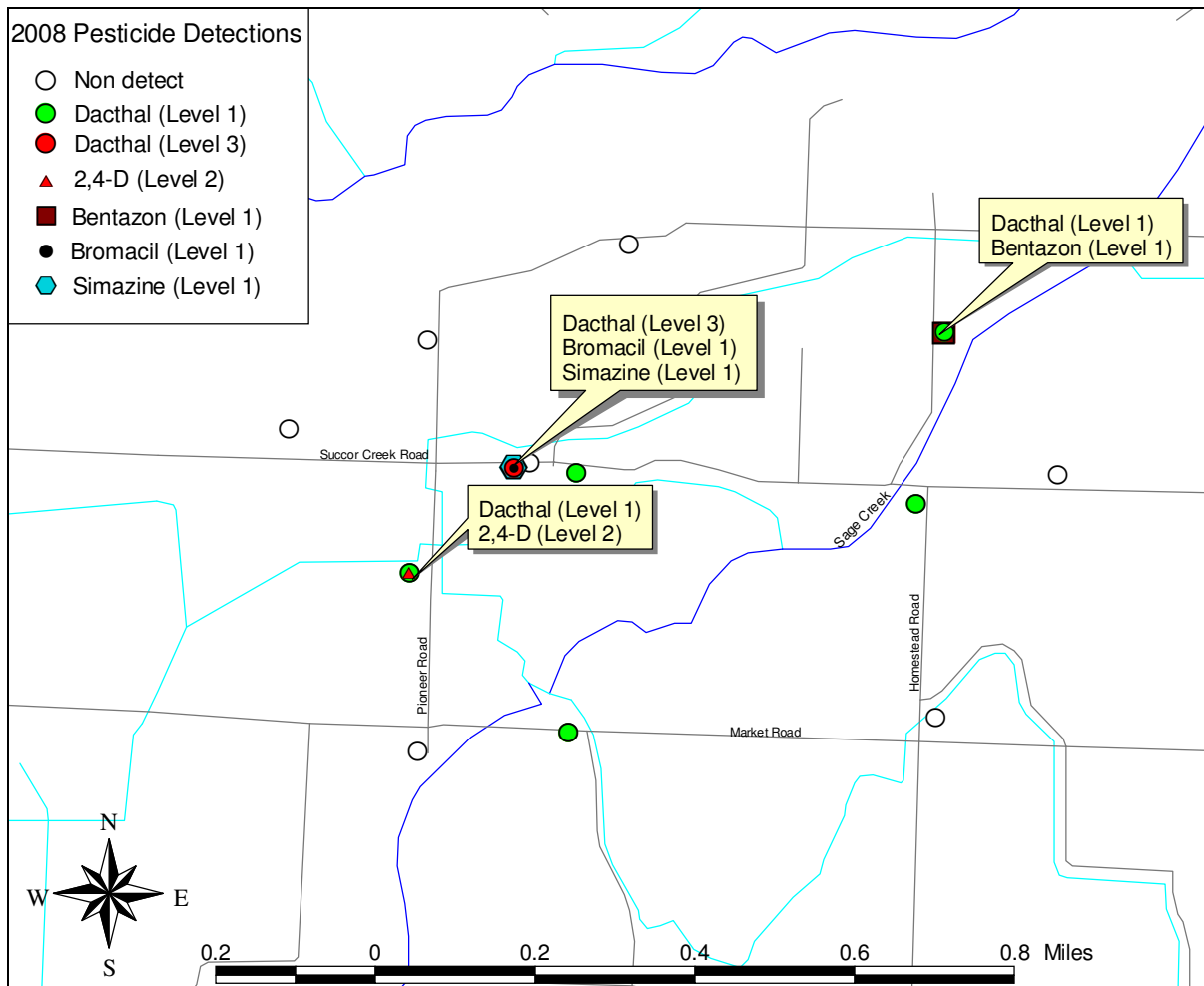
**Table 14.** Summary of 2008 Nitrate Results from the Payette County Atrazine and Desethyl Atrazine PMP Project.

Concentration Range (mg/L)	Number of Wells
< Lab Detection Limit (LDL) (0.05)	0 (0%)
LDL to < 2.0	1 (14%)
2.0 to < 5.0	3 (43%)
5.0 to 10	1 (14%)
>10	2 (29%)
Mean Value (mg/L)	6.5
Median Value (mg/L)	4.9
Maximum Value (mg/L)	12

## Pesticides

### Owyhee County

In 2008, 13 wells were analyzed for dacthal, along with other pesticides, in the ISDA Owyhee County Dacthal PMP project located approximately 2 miles south of Homedale along Succor Creek Road (Figure 25). The results from the 2008 monitoring are shown in Figure 25. Six wells, or 46% of wells sampled, had dacthal detections. The other seven wells had no pesticides detected in the ground water. Of the six wells with dacthal detections, one well had a Level 3 dacthal detection, while the other five wells had Level 1 dacthal detections. The well with the Level 3 dacthal detection (3100101) also had Level 1 simazine and bromacil detections. Two of the five wells with Level 1 dacthal detections had additional pesticides detected; one well also had a Level 2 2,4-D detection and the other also had a Level 1 bentazon detection. The pesticide detections from the 13 wells that were sampled are presented in Table 15. All pesticide detections in the follow up sampling were below any health standards set by EPA or the State of Idaho.



**Figure 25.** Pesticide results from the ISDA 2008 sampling of the Owyhee County Dacthal PMP Project.

**Table 15.** Summary of 2008 Pesticide Results from the Owyhee County Dacthal PMP Project.

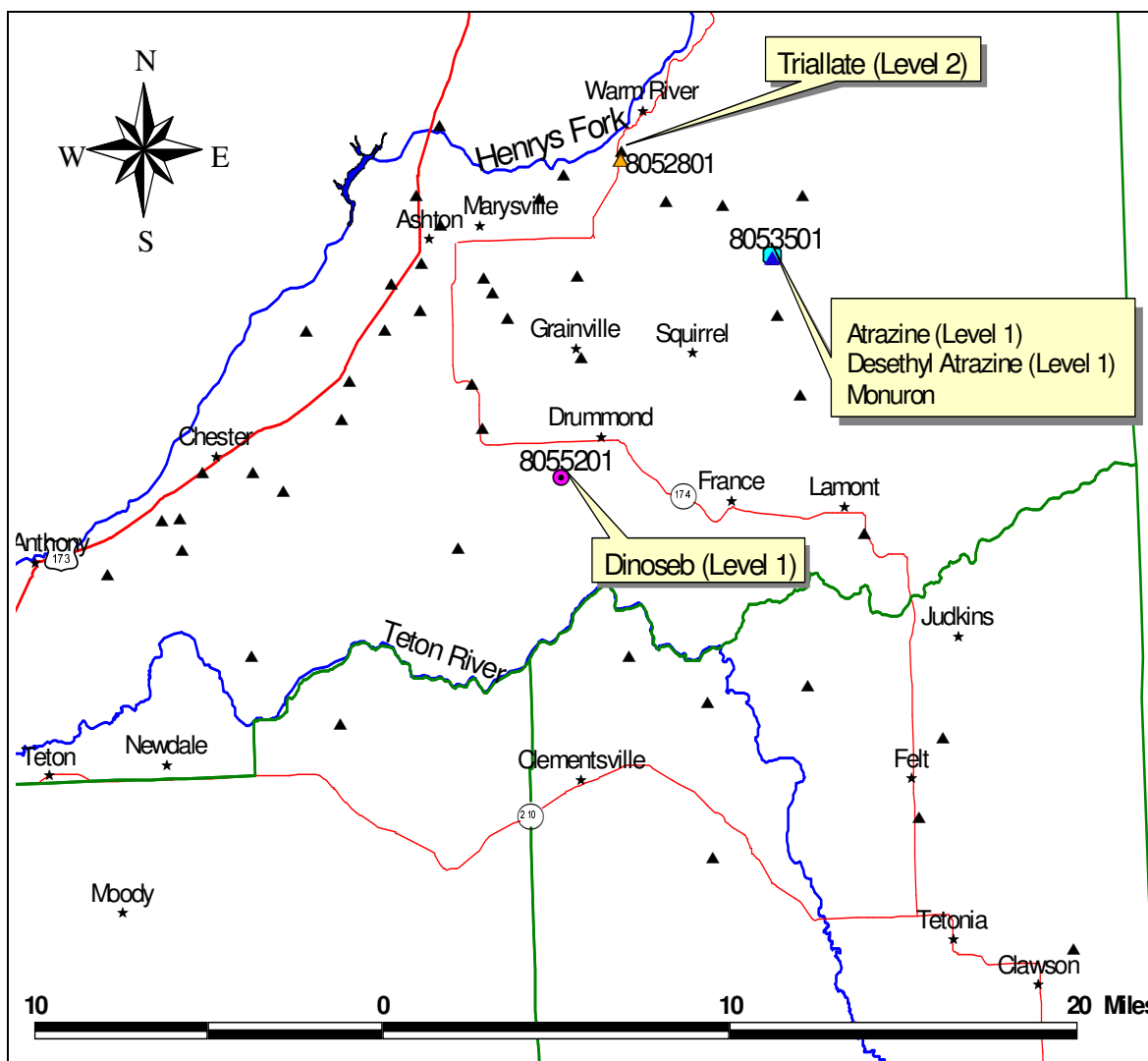
<b>Pesticide</b>	<b>No. of Detections (12 wells)</b>	<b>Range (µg/L)</b>	<b>Reference Point (µg/L)</b>
Dacthal (DCPA)	6 (50%)	0.08 - 46	70 (HAL) <sup>1</sup>
2,4-D	1 (8.3%)	22	70 (MCL) <sup>2</sup>
Bromacil	1 (8.3%)	0.1	90 (HAL)
Bentazon	1 (8.3%)	0.93	200 (HAL)
Simazine	1 (8.3%)	0.03	4 (MCL)

<sup>1</sup> HAL – EPA Lifetime Health Advisory Level

<sup>2</sup> MCL – EPA Maximum Contaminant Level

### Fremont County

Three wells were sampled in Fremont County in 2008 as part of the Fremont County Triallate PMP Project. The project was started due to an elevated triallate detection in a well (8052801). At least one pesticide was detected in each well. A total of five pesticides were detected (including the detection of desethyl atrazine (DEA), a breakdown product of atrazine). The results of the 2008 sampling are shown in Figure 26. The well that initiated the project with an elevated detection of triallate (well 8052801) had a Level 2 triallate detection in 2008. This well has been at a Level 2 detection level for triallate since the June 2006 sampling event. Another well (well 8053501) had Level 1 atrazine, DEA, and monuron detections, while the third well (well 8055201) had a Level 1 dinoseb detection. The pesticide detections from the three wells that were sampled are presented in Table 16. 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 ISDA 2008 sampling of the Fremont County Triallate PMP Project.

**Table 16.** Summary of 2008 Pesticide Results from the Fremont County Triallate PMP Project.

Pesticide	No. of Detections (3 wells)	Range ( $\mu\text{g/L}$ )	Reference Point ( $\mu\text{g/L}$ )
Atrazine	1 (33.3%)	0.22	3 (MCL) <sup>1</sup>
Desethyl Atrazine	1 (33.3%)	0.2	.... <sup>2</sup>
Dinoseb	1 (33.3%)	0.56	7 (MCL)
Monuron	1 (33.3%)	0.03	.... <sup>3</sup>
Triallate	1 (33.3%)	0.18	0.45 (FQPA DWLOC) <sup>4</sup>

<sup>1</sup>MCL – EPA Maximum Contaminant Level.

<sup>2</sup>Breakdown product of Atrazine. No reference point available, MCL for Atrazine of 3  $\mu\text{g/L}$  is used.

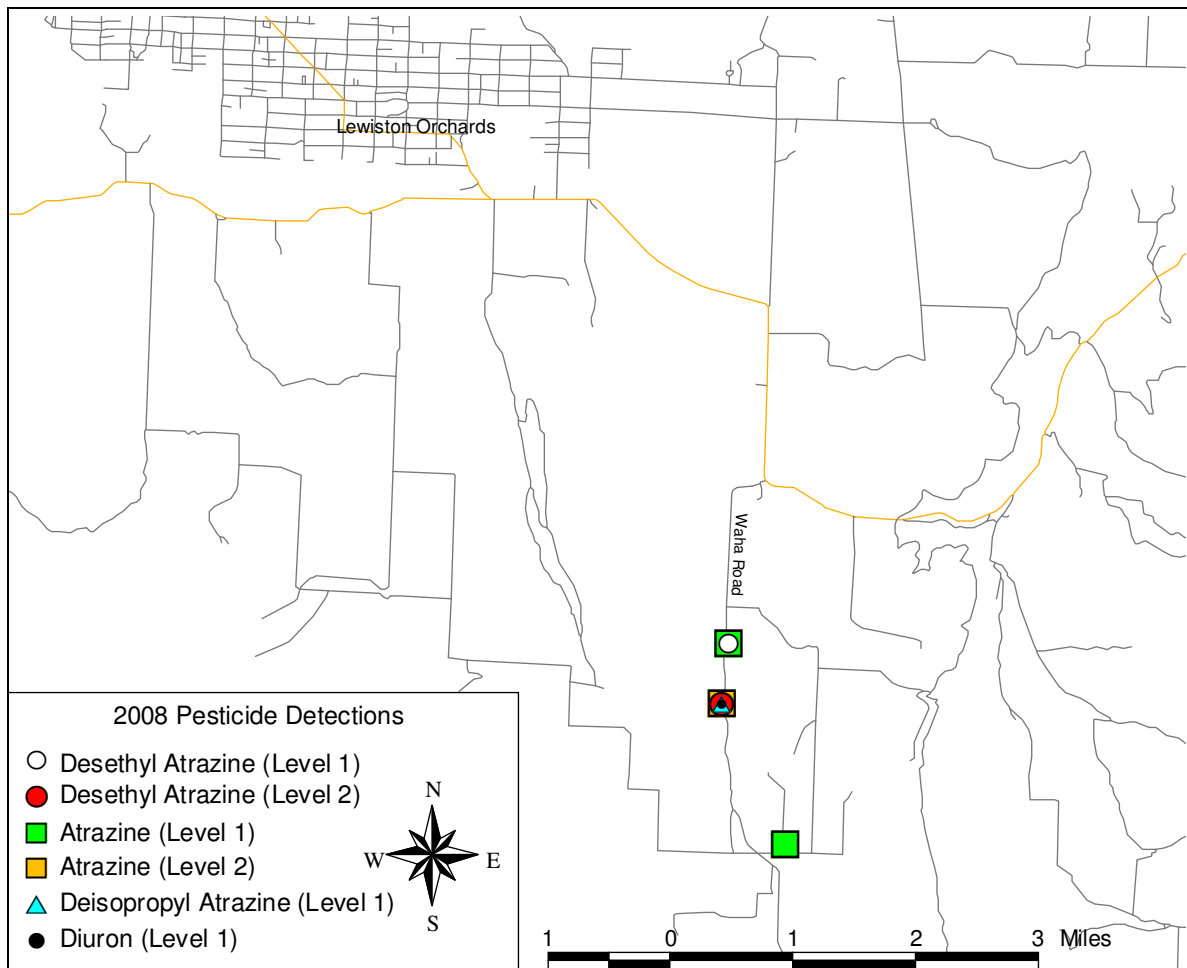
<sup>3</sup>No reference point available, insufficient data.

<sup>4</sup>FQPA DWLOC – Food Quality Protection Act Drinking Water Level of Concern.



## Nez Perce County

Three wells were sampled in Nez Perce County during August 2008 to follow up on an elevated atrazine and DEA detection. The results of the 2008 sampling are shown in Figure 27. One well had Level 2 atrazine and DEA detections and a Level 1 DIA detection. One well had Level 1 atrazine and DEA detections, and another well had a Level 1 DEA detection. The pesticide detections from the three wells are presented in Table 17. All pesticide detections in the follow up sampling were below any health standards set by EPA or the State of Idaho.



**Figure 27.** Pesticide results from ISDA 2008 sampling of Nez Perce County Atrazine PMP Project.

**Table 17.** Summary of Pesticide Results from the Nez Perce County Atrazine PMP Project.

<b>Pesticide</b>	<b>No. of Detections (3 wells)</b>	<b>Range (µg/L)</b>	<b>Reference Point (µg/L)</b>
Atrazine	2 (66.6%)	0.06 - 0.89	3 (MCL) <sup>1</sup>
Desethyl Atrazine	3 (100%)	0.04 - 1.1	.... <sup>2</sup>
Deisopropyl Atrazine	1 (33.3%)	0.03	.... <sup>2</sup>
Diuron	1 (33/3%)	0.14	21 RfD <sup>3</sup>

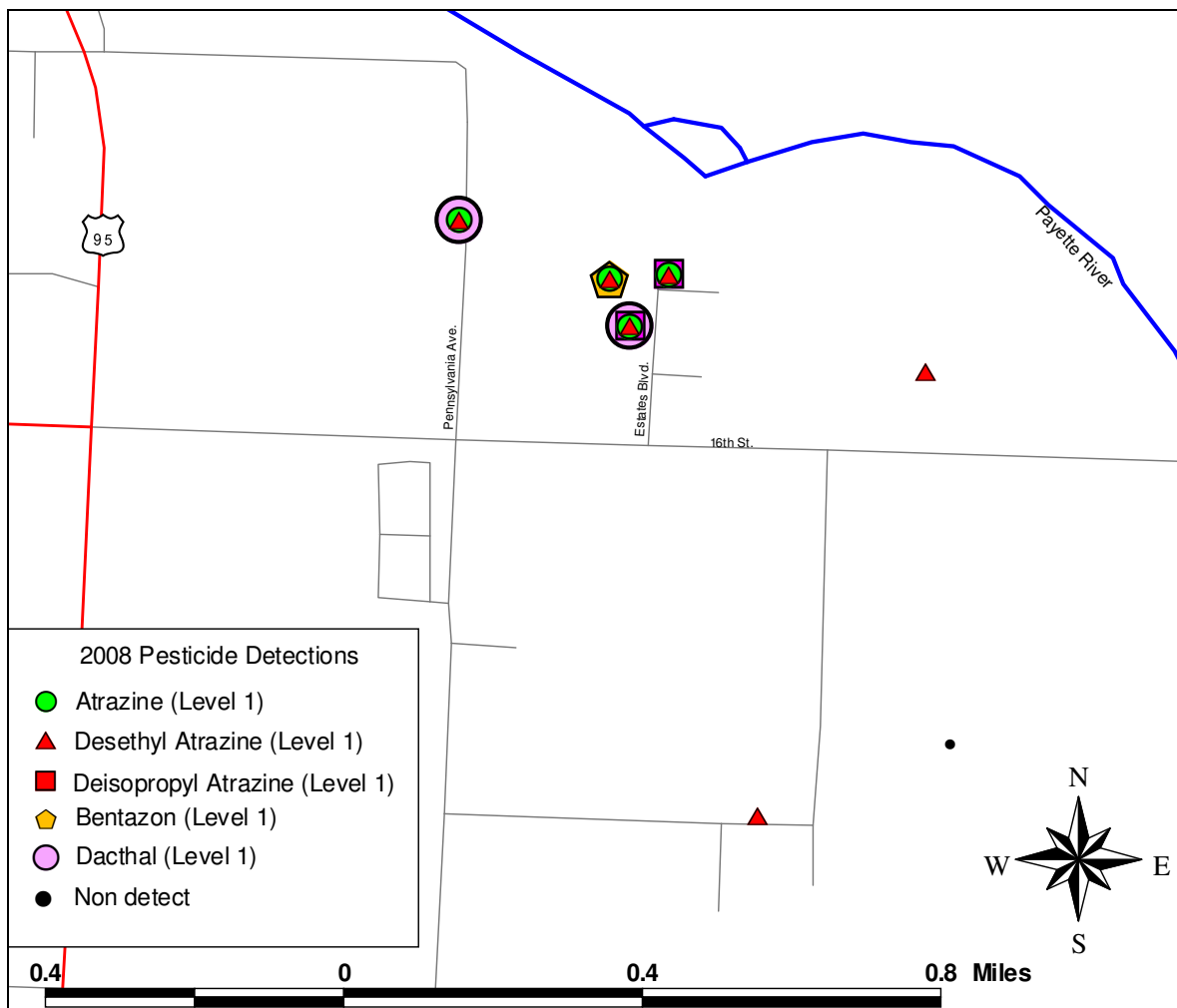
<sup>1</sup>MCL – EPA Maximum Contaminant Level.

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

<sup>3</sup>RfD– EPA Reference Dose.

### Payette County

Figure 28 shows the pesticide results from the follow up sampling in 2008 for the Fruitland Atrazine and Desethyl Atrazine (DEA) PMP Project. A total of seven wells near the initial DEA detection were sampled for pesticides. Six wells had Level 1 DEA detections. Four wells had Level 1 atrazine detections and two wells had Level 1 deisopropyl atrazine (DIA) detections. Two wells had Level 1 dacthal detections and one had a Level 1 bentazon detection. One well had no detections of any pesticides. The pesticide detections from the seven wells that were sampled are presented in Table 18. All pesticide detections in the follow up sampling were below any health standards set by EPA or the State of Idaho.



**Figure 28.** Pesticide results from ISDA 2008 sampling of the Payette County Atrazine PMP Project.

**Table 18.** Summary of 2008 Pesticide Results from the Payette County Atrazine PMP Project.

Pesticide	No. of Detections (7 wells)	Range (µg/L)	Reference Point (µg/L)
Atrazine	4 (57.1%)	0.03 - 0.47	3 (MCL) <sup>1</sup>
Bentazon	1 (14.3%)	0.67	200 (HAL) <sup>2</sup>
Dacthal	2 (28.5%)	0.34 - 0.62	70 (HAL)
Desethyl Atrazine	6 (85.7%)	0.03 - 0.46	.... <sup>3</sup>
Deisopropyl Atrazine	2 (28.5%)	0.03 - 0.05	.... <sup>3</sup>

<sup>1</sup>MCL – EPA Maximum Contaminant Level

<sup>2</sup>HAL – EPA Health Advisory Level

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

## 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 the spring of 2008, eight additional wells in Boise were sampled as part of the 2007/20008 discretionary monitoring grant project, the Boise Urban Discretionary Project, with the focus on city park irrigation wells across the city of Boise. ISDA sampled 16 privately owned wells in the Boise urban area in November 2007 as part of the Boise Urban Discretionary Project. Data from all 24 wells sampled as part of the Boise Urban Project is presented in this report even though some wells were sampled in the fall of 2007.

The 2008/2009 monitoring grant allowed for testing of approximately 13 wells in the fall of 2008 for 13 new pesticides. New pesticides have been registered in Idaho during the past few years that ISDA is not currently analyzing for in ground water. ISDA has worked with the University of Idaho Analytical Sciences Laboratory to develop methods for 13 pesticides that have not previously been analyzed for by ISDA's ground water monitoring program.

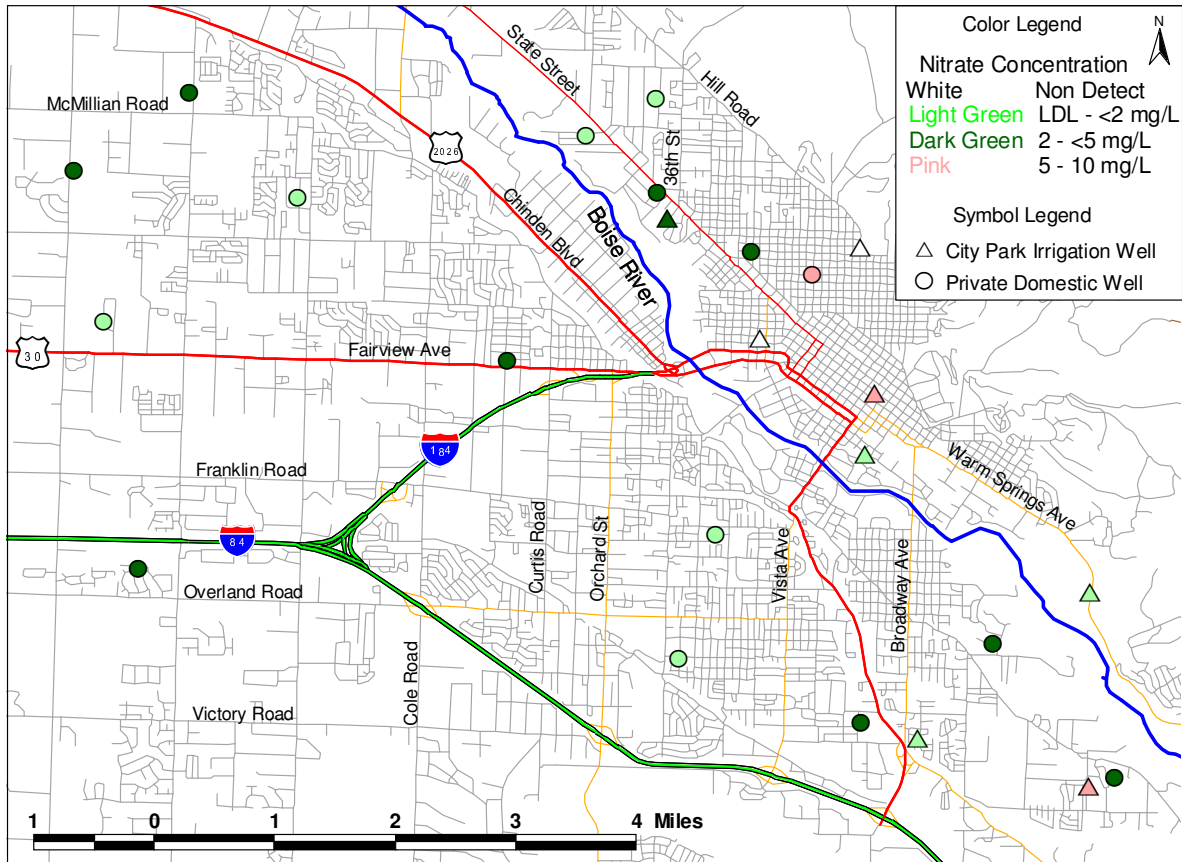
The primary goal of this project is to provide the ISDA Water Program with ground water monitoring data for 13 pesticides that ISDA has not analyzed for in agricultural land use areas. The data will be used to gain a better understanding of the 13 pesticides and if they are leaching to ground water. In addition, the data will be used to evaluate the need to add these extra pesticides to ISDA's ground water pesticide monitoring program. The information will be used to make regulatory and/or voluntary practice changes on land contributing to the contamination and to implement IDAPA 02.03.01 Rules Governing Pesticide Management Plans for Ground Water Protection.

## Water Quality Findings

### Nitrate

#### 2007/2008 Discretionary Project: Boise Urban Discretionary Project

A total of 24 wells analyzed for nitrate in the city of Boise (Figure 29) in 2007 (fall) and 2008 (spring). No wells exceeded the EPA's MCL of 10 mg/L for nitrate (Figure 29). Two city park irrigation wells had no detection of nitrate.



**Figure 29.** Nitrate results from ISDA 2007/2008 sampling of Project 350: Boise Urban Discretionary Project.

Table 19 presents statistics for the 24 wells sampled (2007/2008) for the Boise Urban Discretionary Project. Ten wells, or 37% of the wells sampled, had nitrate detections between the laboratory detection limit (0.05 mg/L) and less than 2 mg/L. Eleven wells, or 41% of the wells sampled, had nitrate concentrations between 2 mg/L and less than 5 mg/L. Four wells, 15% of the wells sampled, had nitrate concentrations between 5 and 10 mg/L. The maximum detection was 7.9 mg/L. The median value was 2.1 mg/L, while the mean value was 2.6 mg/L.

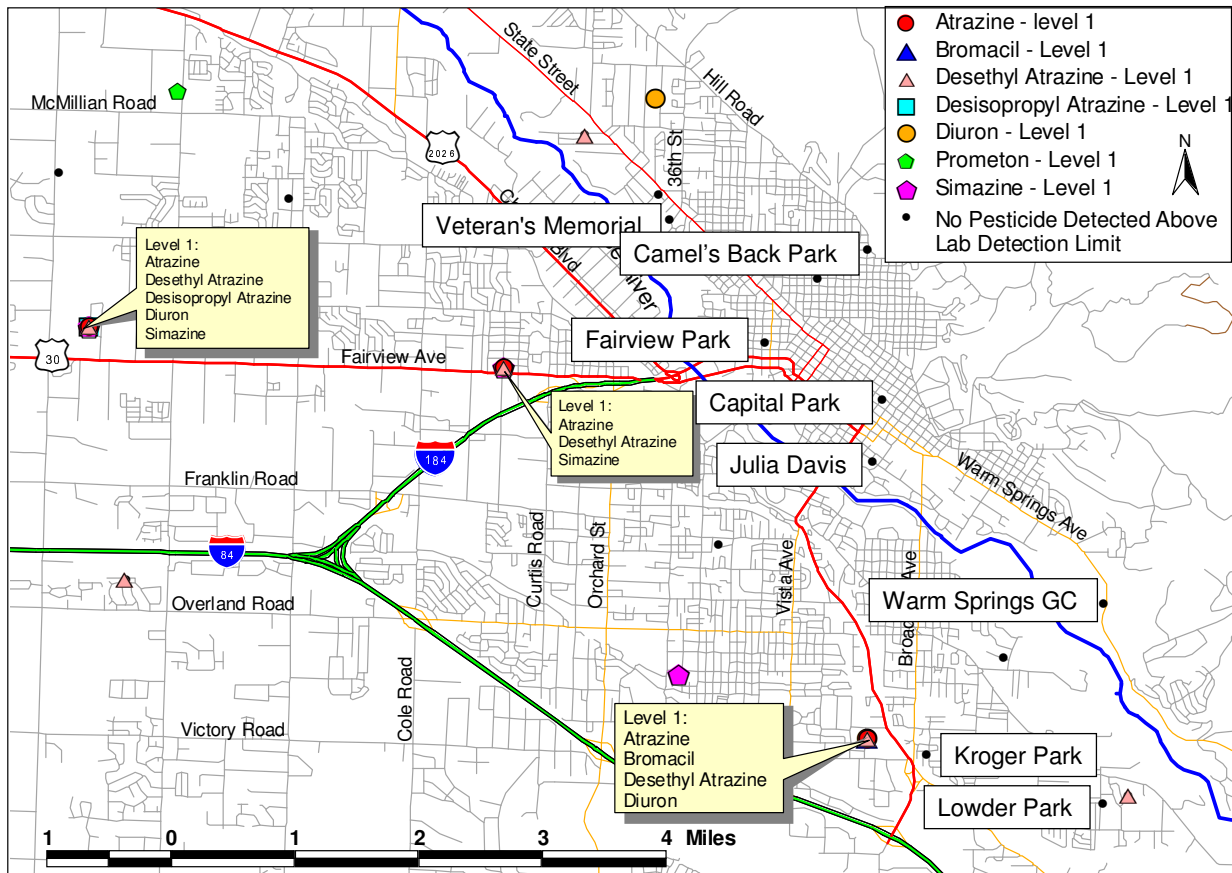
**Table 19.** Summary of 2007/2008 Nitrate Results from the Boise Urban Discretionary Project.

Concentration Range (mg/L)	Number of Wells (24 wells)
Below Lab Detection Limit (LDL)	2 (8%)
LDL - < 2.0	9 (38%)
2.0 - < 5.0 mg/L	10 (42%)
5.0 - 10 mg/L	3 (13%)
> 10.0 mg/L	0 (0%)
Mean (mg/L)	2.5
Median (mg/L)	2.1
Maximum (mg/L)	7.9

### ***Pesticides***

#### 2007/2008 Discretionary Project: Boise Urban Discretionary Project

A total of 24 wells were sampled for pesticides in the city of Boise (Figure 30) in the fall of 2007 and spring of 2008. Seven pesticides were detected in the ground water above the lab detection limit (LDL) in a total of nine wells, or 37.5% of the wells sampled. The most commonly detected pesticide was desethyl atrazine, a breakdown product of atrazine, which was found in six wells. Atrazine, diuron, and simazine were each detected in three wells. Prometon, bromacil and deisopropyl atrazine were each detected once. No pesticides were detected above the LDL in any of the city irrigation wells (park wells or the city golf course well). The results of the pesticide analysis from the 2007/2008 sampling in the city of Boise are presented in Table 20. All detections were below any Idaho or EPA health standards. All detections were within the Level 1 category established by the Idaho PMP Rule.



**Figure 30.** Pesticide results from ISDA 2007/2008 sampling of the Boise Urban Discretionary Project.

**Table 20.** Summary of Pesticide Results from the Boise Urban Discretionary Project.

Pesticide	No. of Detections (24 wells)	Range (µg/L)	Reference Point (µg/L)
Atrazine	3	0.06 - 0.08	3 (MCL) <sup>1</sup>
Bromacil	1	0.39	90 (HAL) <sup>2</sup>
Deisopropyl Atrazine	1	0.03	.... <sup>3</sup>
Desethyl Atrazine	6	0.04 - 0.09	.... <sup>3</sup>
Diuron	3	0.05 - 0.17	21 (RfD) <sup>4</sup>
Prometon	1	0.3	100 (HAL) <sup>2</sup>
Simazine	3	0.03 - 0.06	4 (MCL) <sup>1</sup>

<sup>1</sup>MCL – EPA Maximum Contaminant Level

<sup>2</sup>HAL – EPA Lifetime Health Advisory Level

<sup>3</sup>Breakdown product of Atrazine, MCL of 3 mg/L for atrazine is used.

<sup>4</sup>RfD – EPA Reference Dose

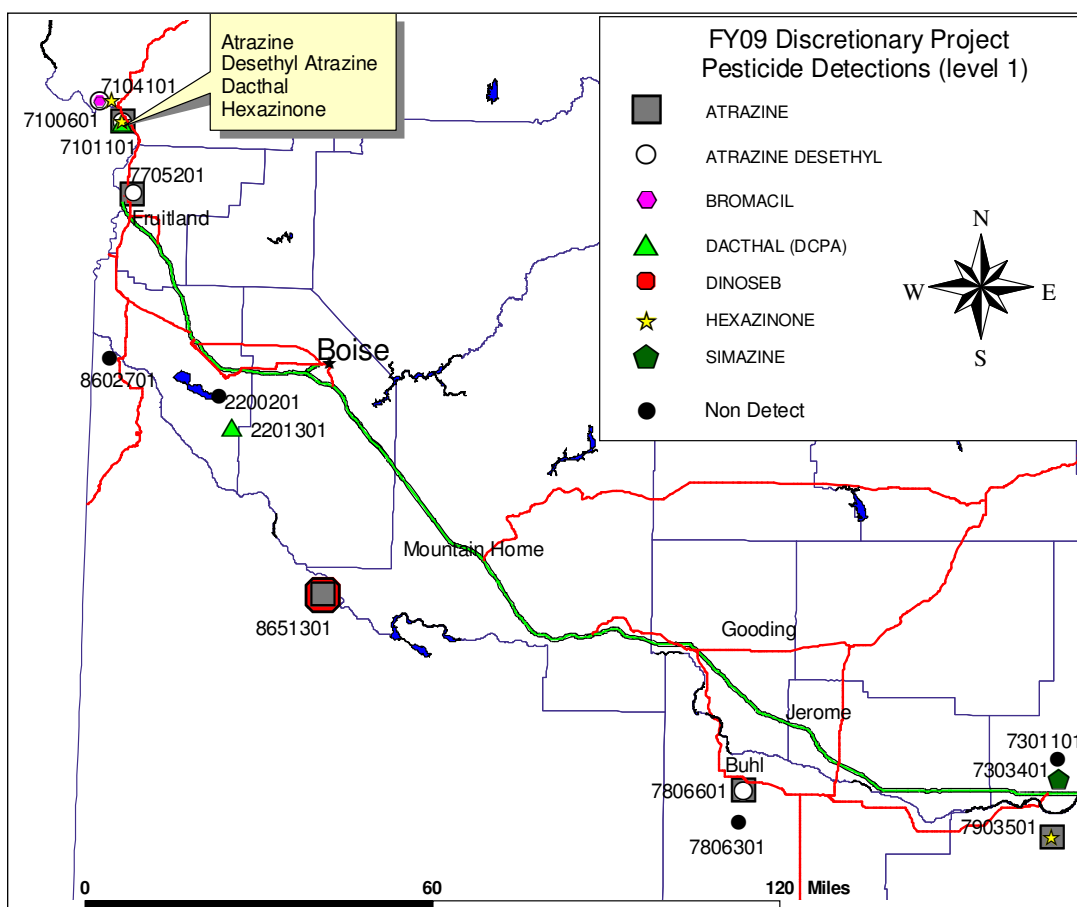
2008/2009 Discretionary Project: Statewide Ground Water Monitoring for 13 New Pesticides Discretionary Project

ISDA sampled 13 wells with previous pesticide detections for 13 new pesticides (Table 21) throughout southern Idaho (Figure 31) in the fall of 2008. New methodologies for these 13 pesticides were established through the Boise Urban Discretionary Project, making it possible to test for these compounds in wells with previous pesticide detections. None of the 13 new pesticides were detected. Seven pesticides were detected in nine wells and were all Level 1 detections (Figure 31 and Table 22). All detections were below any Idaho or EPA health standards.



**Table 21.** Pesticides Added to ISDA's Analytical Screen.

<b>Pesticide</b>	<b>Use</b>	<b>Crops</b>	<b>Common Trade Name</b>
Acephate	Insecticide	Beans	Avatar, Cheminova, Executioner, Orthene
Azoxystrobin	Fungicide	Alfalfa, barley, beans, corn, onions, potatoes, sugar beets, triticale	Abound, Amistar, Cruiser Extreme, Dynasty, Heritage, Quadris
Chlorsulfuron	Herbicide	Barley, triticale, wheat	Chisum, Cimarron, Telar, Finesse, Glean, Landmark, Report, Throttle
Clopyralid	Herbicide	Corn, barley, wheat	Accent, Commando, Curtail, Cutback, Redeem, Surestart
Cyfluthrin	Insecticide	Alfalfa, beans, corn, peas, potatoes	Aztec, Baythroid, Defcon, Leverage, Power Force Multi-Insect Killer RTS, Renounce, Tombstone
Cypermethrin	Insecticide	Non-crop areas, onions	Cypermethrin, Demon, Holster, Prevail, Up-Cyde
Glyphosate	Herbicide	Corn, barley, beans, non-crop areas	Fireball, Halex, Roundup, Sequence, Touchdown, Traxion
Imazapyr	Herbicide	Field corn, non-crop areas	Imazuron E Pro, Lightning, Lineage, Sahara, SSI Maxim Arsenal, Topsite
Imidacloprid	Insecticide	Barley, beans, peas, potatoes, corn, wheat	Admire, Agri Star Impulse, Agri Star Macho, Advise, Nitro, Alenza, Alias, Areca, Attendant, Aura, Brigadier, Concur, Couraze, Dyna-Shield, Gaucho, Hawk-I N/O 2L, Imida E AG, Imidamax 4F, Imigold, Lada, Mana Alias, Marathon, Midash, Montana, Nitro Shield, Nuprid, Pasada, Prey, Provado, Quali-Pro Imidacloprid, Raxil, Senator, Sherpa, Torrent, Widow
Iprodione	Fungicide	Beans, potatoes, onions	Iprodione 4L AG, Nevado, Rovral
Oryzalin	Herbicide	Grapes, berries, orchards	Surflan
Propiconazole	Herbicide	Corn, wheat, barley, onions	Bumper, Concert, Propiconazole E AG, Propimax EC, Quilt, Stratego, Tilt
Trifluralin	Herbicide	Wheat, alfalfa, barley, dry beans, onions	Agri Star Trifluralin, Agrisolutions Trust, American Brand Herbicide Granules Containing Treflan, Buckle, Treflan, Triap, Triflurex, Trust



**Figure 31.** Pesticide results from ISDA 2008 sampling of the Statewide Ground Water Monitoring for 13 New Pesticides Discretionary Project.

**Table 22.** Summary of Pesticide Results from the Statewide Ground Water Monitoring for 13 New Pesticides Discretionary Project.

Pesticide	No. of Detections (13 wells)	Range (µg/L)	Reference Point (µg/L)
Atrazine	5	0.04 – 0.09	3 (MCL) <sup>1</sup>
Bromacil	1	0.32	90 (HAL) <sup>2</sup>
Dacthal	3	0.2 – 1.3	70 (HAL) <sup>2</sup>
Desethyl Atrazine	4	0.04 – 0.07	.... <sup>3</sup>
Dinoseb	1	1.3	7 (MCL) <sup>1</sup>
Hexazinone	3	0.05 – 0.15	400 (HAL) <sup>2</sup>
Simazine	1	0.16	4 (MCL) <sup>1</sup>

<sup>1</sup>MCL – EPA Maximum Contaminant Level

<sup>2</sup>HAL – EPA Lifetime Health Advisory Level

<sup>3</sup>Breakdown product of Atrazine, MCL of 3 mg/L for atrazine is used.

## **Ground Water Quality Protection Activities**

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 education materials, and facilitation of educational workshops.

The main objective of the I & E Subcommittee is to coordinate a common educational strategy through multiple state and federal agencies. The subcommittee meets regularly and reports its activities to the Agriculture Ground Water Coordination Committee. The I & E subcommittee met once in 2008. That meeting was held in September. During this meeting, the committee outlined several activities it would like to accomplish, including updating the I & E plan and the Idaho Home\*A\*Syst Project (HAS) materials, creating a water quality and pesticide newsletter. The committee was instrumental in identifying potential workshops and commodity school meetings for educational outreach efforts around the state.

Ground water quality protection activities in 2008 included: finishing the draft of the overall I & E Statewide Implementation Plan, updating the HAS materials, disseminating fact sheets and brochures, promoting HAS through workshops and participating in several pesticide recertification workshops and other outreach efforts. The pesticide recertification workshops were designed specifically for pesticide applicators and growers (Table 23). 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 and the recent (pending) DCPA (Dacthal) legislation. ISDA plans on conducting additional workshops in 2009, with the goal of surpassing the attendance number in 2008.

**Table 23.** The 2008 pesticide recertification education workshops and outreach efforts.

<b>Pesticides and Water Quality Education - Workshops and Other Outreach Efforts</b>			
<b>Date</b>	<b>Location</b>	<b>Event Name</b>	<b>Attendance</b>
1/7/08	Jackpot, NV	Far West Agribusiness Association Conference	250
1/8/08	Jackpot, NV	Far West Agribusiness Association Conference	91
1/17/08	Hailey	Blaine County Recertification Workshop	21
1/18/08	Boise	Idaho Horticulture Expo	61
1/29/08	Caldwell	Western Idaho Ag Expo	32
3/7/08	Lewiston	North Idaho Pesticide Applicator Training	17
4/7/08	Nampa	DEQ GW/SWP* Workshop	5
4/8/08	Twin Falls	DEQ GW/SWP Workshop	10
6/7/08	Ashton	Ashton GWQ** Open House	150
8/11/08	Boise	CCAI workgroup lunch	20
8/15/ - 8/24/08	Garden City	Western Idaho Fair - Ag. Pavilion	--
8/26/ - 8/31/08	Filer	Twin Falls County Fair – Ag. Pavilion	--
12/9/08	Caldwell	Canyon County SCD Seminar	32
12/10/08	Marsing	Owyhee County Grower Appreciation Meeting	19
12/16/08	Mt. Home	Elmore County Pesticide Recertification Workshop	43
12/17/08	Lewiston	Lewiston Soil and Water Workshop	11
<b>Total Attendance for Water Quality Education in 2008</b>			<b>762</b>

\*GW/SWP = Ground Water/ Source Water Protection

\*\* GWQ = Ground Water Quality

-- = Unable to determine

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.

Once ISDA determines that BMPs will be needed to mitigate ground water contamination, it relies on its partnership with the Idaho Soil Conservation Commission (ISCC) and the local Soil and Water Conservation District (SCD) to implement its Best Management Practices Strategy. This strategy includes research, development and application of BMPs, development of area-wide and

site specific water quality management plans, and identification of funding sources for BMPs. In 2008, ISDA assisted the Weiser River SCD, the Gooding SCD, the Lewis SCD, the Yellowstone SCD and the West Cassia SCD with the implementation of their EPA Clean Water Act 319 Grants or DEQ Source Water Protection grants.

The Weiser River SCD 319 project is focused on agricultural practices within the number 3 Nitrate Priority Area (NPA) in the state. The project includes implementation of alternative irrigation systems, development of nutrient management plans, and an extensive BMP effectiveness evaluation program.

The Gooding SCD 319 project is located in an IDEQ designated nitrate priority area. The Bliss ground water improvement project encompasses the 6,800 acre Bliss NPA. In 2008, the Gooding SCD conducted monthly monitoring of the three monitoring wells installed within the NPA in 2007, in order to enhance ground water monitoring of the shallow ground water to better characterize the source(s) of nitrate.

The Lewis SCD 319 project is located on the Camas Prairie and within the nitrate priority area ranked 16th in the state. This nutrient management planning project is being implemented by the ISCC with dry farmers near the cities of Craigmont and Nez Perce.

The Yellowstone SCD 319 project is located in Fremont County near the town of Ashton and is the 13th ranked nitrate priority area in Idaho. The Yellowstone SCD is analyzing soils and developing nutrient recommendations for farmers. Through the efforts of the Yellowstone SCD, farmers have reduced their nitrogen applications up to 11 lbs per acre and still are meeting or exceeding their expected crop yields.

The West Cassia Soil and Water Conservation District 319 project is located in the ninth highest nitrate priority area in the state. The 319 funds are used to provide cost-share assistance to farmers who implement nutrient and irrigation water management BMPs.

ISDA is currently working with various state agencies and the Lower Boise/Canyon County Ground Water Advisory Committee to implement the Lower Boise/Canyon County Ground Water Management Plan. The plan was completed in 2005 and ISDA is working toward implementing BMPs.

ISDA has also assisted IDEQ and others with developing Ground Water Management Plans for the Grand View/Bruneau NPA, the Minidoka NPA and the Ashton-Drummond NPA.

## **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. Approximately 1,033 homeowner result letters and well analysis reports were mailed in 2008.



## 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 objectives, 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>

Information on CAFO siting can also be found on the ISDA website at the following address:

<http://www.agri.idaho.gov/Categories/Environment/cafoSiting/indexsitingTeam.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 2008. The monitoring efforts in 2008 focused on areas in the state that have either showed past impacts from nitrate pollution or to a lesser extent pesticides. ISDA currently has 30 distinct and active ground water projects across the state. Fourteen of these projects were regional based projects, 8 were dairy or confined animal feeding operation (CAFO) related projects, two were local projects, three were Pesticide Management Plan related projects, and two were an EPA funded discretionary pesticide monitoring project. As part of the ISDA Ground Water Program prevention efforts, technical assistance was given to various SCDs that are implementing measures to help improve and protect ground water quality from these chemicals. Thirty educational workshops were conducted across the state to help inform the farming community of ground water quality problems and efforts that can be used to protect overall ground water quality. Additionally, ISDA Ground Water Program staff participated in 14 CAFO siting evaluations.

Results of ground water quality monitoring on a regional scale indicate a number of aquifers across the state have significant nitrate impacts with numerous wells exceeding the EPA MCL of 10 mg/L. Forty-eight wells, or 8% of the 630 regional wells sampled by the ISDA Ground Water Program in 2008, exceed the EPA MCL for nitrate. Thirteen of the 14 active regional projects show mean ground water nitrate concentrations above 2 mg/L suggesting anthropogenic impacts. Wells located in the Washington and Payette Regional Study have the highest mean and median values, 8.82 mg/L and 7.1 mg/L, respectively. Other projects having comparatively high mean and/or median concentrations in ground water are the Cassia County Regional Study (mean - 5.76 mg/L, median - 5.0 mg/L), the Central Henry's Fork Basin Regional Aquifer Study (mean - 4.78 mg/L, median - 4.35 mg/L), Minidoka County Shallow Regional Study (mean - 4.66 mg/L, median - 3.65 mg/L), Twin Falls County Regional Study (mean - 4.08 mg/L, median - 3.9 mg/L), Minidoka County Deep Regional Study (mean - 3.97 mg/L, median - 3.9 mg/L), and the Grand View and Bruneau Regional Study (mean - 8.93 mg/L) (Table 3).

The eight dairy and beef CAFO monitoring projects indicate significant nitrate impacts to ground water. Three of these active dairy or CAFO projects have mean nitrate concentrations that exceed the EPA MCL of 10 mg/L. In addition, dairy and CAFO project monitoring show all eight active projects having mean concentrations above 2 mg/L in 2008.

Testing of regional, local, and discretionary type projects returned detections of pesticides in ground water. However, most detections are less than 20% of health-based standards. Four wells in 2008 had detections of one or more pesticides that exceeded 20% of a health-based standard, requiring additional response activities. The pesticides detected over 20% of a health-based

standard were atrazine and desethyl atrazine in Nez Perce County; dacthal and 2,4-D in Owyhee County; and triallate in Fremont and Idaho Counties.

The Ground Water Program facilitated or participated in 16 of educational workshops across the state and provided technical assistance to SCDs with implementation of field projects to help improve Idaho ground water quality in high priority areas. In addition, ISDA Ground Water Program staff participated in 13 CAFO siting evaluations. All 13 new or expanding CAFO sites were determined to be of low risk as related to environmental or human health considerations.

## References

Gilliom, Robert J., Jack E. Barbash, Charles G. Crawford, Pixie A. Hamilton, Jeffrey D. Martin, Naomi Nakagaki, Lisa H. Nowell, Jonathan C. Scott, Paul E. Stackelberg, Gail P. Thelin, and David M. Wolock, 2006, The quality of our nation's waters—pesticides in the nation's streams and ground water, 1992–2001: U.S. Geological Survey Circular 1291, 172 p.

Idaho State Department of Agriculture Ground Water Program Reports.  
<http://www.agri.idaho.gov/Categories/Environment/water/gwReports.php>

IDAPA 02, Title 03, Chapter 01, July 2005. Pesticide Management Plans for Ground Water Protection Rule. Idaho State Department of Agriculture. 12 pp.

IDAPA 02, Title 04, Chapter 14, April 5 2000. Rules Governing Dairy Waste. 5 pp.

IDAPA 58, Title 01, Chapter 11, March 1997. Ground Water Quality Rule. Idaho Department of Environmental Quality. 15 pp.

Neely, K., 2004. Nitrate overview for the Statewide Ambient Ground Water Quality Monitoring Program 1990-2003. Idaho Department of Water Resources Ground Water Quality Technical Brief, 2 p.