Idaho State Department of Agriculture

Ground Water Program Annual Report

For 2005

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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.

We would like to express great appreciation to the various Idaho Soil Conservation District people who contributed to our efforts. The list of participating districts is many, but we would like to give special recognition to those who are actively involved with specific ground water quality projects including the: Weiser River Soil Conservation District, Yellowstone Soil Conservation District, Lewis Soil Conservation District, Gooding Soil Conservation District, and West Cassia Soil and Water Conservation District.

Thanks to the various ISDA staff outside the water program who contribute daily to the efforts of our program. Staff persons from the ISDA Animal Industries Division and Agricultural Resources Division provide the bulk of these efforts.

ISDA Ground Water Program staff would like to acknowledge various federal, state, and local agencies and entities that have provided assistance throughout 2005 including the: University of Idaho Analytical Sciences Laboratory, Idaho Health and Welfare Laboratory, Idaho Department of Environmental Quality, Idaho Department of Water Resources, Idaho Department of Health and Welfare, Idaho Soil Conservation Commission, Idaho Association of Soil Conservation Districts, Natural Resources Conservation Commission, Environmental Protection Agency, University of Idaho, Boise State University, United States Geological Survey, Bureau of Reclamation, and a variety of County Planning and Zoning Commissions who assist in State CAFO siting activities.

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 focus of these activities is to evaluate ground water quality in areas that may be impacted by agriculture and determine appropriate measures to prevent future detrimental land use practices. 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 2005, the ISDA Ground Water Program implemented 27 distinct monitoring projects. Thirteen of these projects were regional based projects, 12 were dairy or confined animal feeding operation (CAFO) related projects, two were local projects, and one was an Environmental Protection Agency (EPA) funded special pesticide monitoring project. Water quality findings from these 27 active projects indicated a varying degree of impacts to ground water with nitrate being the most common constituent of concern. Four pesticide detections across the state were found at levels that initiated the formation of more intense local-scale projects as result of the new Rules Governing Pesticide Management Plans for Ground Water Protection (IDAPA 02.03.01).

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). Fifty three wells or eight percent of 635 regional wells sampled by the ISDA Ground Water Program in 2005 exceed the EPA MCL. All but one of the thirteen active regional projects show mean nitrate concentrations above 2 mg/L suggesting some anthropogenic impacts. Similarly, dairy and CAFO project monitoring show all but one of the twelve active projects having mean concentrations above 2 mg/L in 2005. Ground water testing by the ISDA Dairy Bureau of 688 dairies in 2005 indicates 41 (6.1%) locations exceed the MCL for nitrate.

Pesticide testing of regional, local, and discretionary type projects indicates numerous detections in ground water. However, most detections are less than 20 percent of drinking water or health standard concentrations. Four sites tested in 2005 show levels that exceeded 20 percent of a health standard requiring additional response activities. These sites are located in Fremont, Owyhee, Nez Perce, and Payette 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 thirteen educational workshops 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 lead by ISDA conducted 19 site assessments for new or expanding CAFOs with 15 low risk determinations and four moderate risk determinations.

TABLE OF CONTENTS

Introduction

Scope

This report constitutes the second annual report written by Idaho State Department of Agriculture (ISDA) Ground Water Program staff. The focus of the report is 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 2005. The ISDA Ground Water Program Annual Report for 2005 provides the foundation for future annual reports to be completed by ISDA Ground Water Program staff.

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; State Interagency Ground Memorandum of Understanding; 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, dairy

and beef CAFO detections for nitrate above the maximum contaminant level 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. The dairy program is implemented jointly by the Dairy Bureau and the Division of Agricultural Resources Water Quality Bureau. 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.

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 pesticides from leaching beyond the root zone. In areas where there is a pesticide concern, 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. There are concerns related to both point and nonpoint source pollution impacts. 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 to be 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 to be 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 the implementation of projects where 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 (DEQ) as Nitrate Priority Areas. ISDA is leading the effort with the SCC, 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, and SCC funds. These are cooperative projects where the ISDA, SCC, 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 discuss this information with other state and federal water quality professionals at the Agricultural Ground Water Quality Protection 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

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 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).

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

A statistical probability analysis is then 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.

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. Pesticide sampling would occur during the second and fourth years at those wells that have pesticides detected at greater than twenty percent of a reference point. Subsequent long term monitoring is addressed in the fourth and fifth years of each project. 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 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 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 is implementing regional monitoring activities through 14 distinct projects in the state (Figure1). Thirteen of the 14 projects were actively monitored in 2005. Projects are named relative to their respective regional part of the state and been assigned distinct project numbers for tracking purposes. Regional projects have been started at a variety of times over the last ten years and thus are in different stages in terms of duration (Table 2). The number of wells sampled per active project area range from 28 to 72 with a total of 635 wells sampled in 2005 as part

of the overall regional sampling effort. The Eastern Snake River Plain Project was not sampled in 2005 due to good water quality 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.

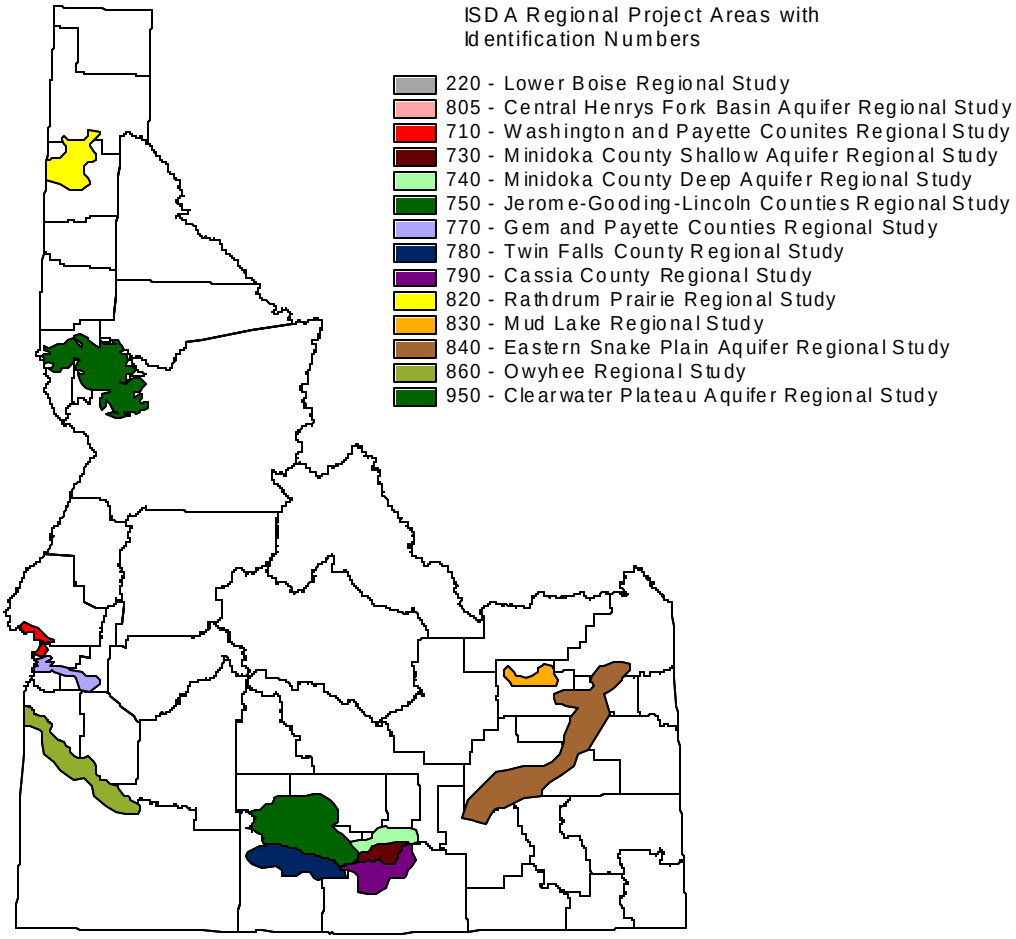

Figure 1. Map showing locations of 14 regional project areas.

Table 2. ISDA regional project general information for 2005.

Project No.	Project Name	Start Year	Status (2005)	Inorganics Testing (All Wells)	Pestcide Testing (2005)	Isotope Testing (2005)	Wells Monitored (2005)
220	Lower Boise Regional Study	2003	active	nitrate, nitrite, ammonia, chloride sulfate, bromide,	none	12	61

				fluoride, orthophosphorus			
710	Washington and Payette Counties Regional Study	1996	active	nitrate, nitrite, ammonia, chloride sulfate, bromide, fluoride, orthophosphorus	none	29	52
730	Minidoka County Shallow Aquifer Regional Study	1997	active	nitrate, nitrite, ammonia, chloride sulfate, bromide, fluoride, orthophosphorus	none	14	42
740	Minidoka County Deep Aquifer Regional Study	1997	active	nitrate, nitrite, ammonia, chloride sulfate, bromide, fluoride, orthophosphorus	none	13	47
750	Jerome-Gooding-Lincoln Counties Regional Study	1997	active	nitrate, nitrite, ammonia, chloride sulfate, bromide, fluoride, orthophosphorus	none	3	69
770	Gem and Payette Counties Regional Study	1998	active	nitrate, nitrite, ammonia, chloride sulfate, bromide, fluoride, orthophosphorus	all wells	10	40
780	Twin Falls County Regional Study	1998	active	nitrate, nitrite, ammonia, chloride sulfate, bromide, fluoride, orthophosphorus	none	23	72
790	Cassia County Regional Study	1998	active	nitrate, nitrite, ammonia, chloride sulfate, bromide, fluoride, orthophosphorus	none	21	43
805	Central Henrys Fork Basin Aquifer Regional Study	2003	active	nitrate, nitrite, ammonia, chloride sulfate, bromide, fluoride, orthophosphorus	follow-up (2 wells)	16	45
820	Rathdrum Prairie Regional Study	1998	active	nitrate, nitrite, ammonia, chloride sulfate, bromide, fluoride, orthophosphorus	none	0	31
830	Mud Lake Regional Study	1998	active	nitrate, nitrite, ammonia, chloride sulfate, bromide, fluoride, orthophosphorus	none	4	28
840	Eastern Snake Plain Aquifer Regional Study	1998	inactive	nitrate, nitrite, ammonia, chloride sulfate, bromide, fluoride, orthophosphorus	none	0	0
860	Owyhee Regional Study	1999	active	nitrate, nitrite, ammonia, chloride sulfate, bromide, fluoride, orthophosphorus	follow-up (1 well)	6	34
950	Clearwater Plateau Aquifer Regional Study	2001	active	nitrate, nitrite, ammonia, chloride sulfate, bromide, fluoride, orthophosphorus	follow-up (2 wells)	15	71

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 2005 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/indexwater.php.

Descriptive statistics of ISDA regional projects indicate many areas in the state have elevated nitrate concentrations in ground water. Mean and median nitrate concentrations of wells tested during regional monitoring are found to be above background nitrate concentration of 2 mg/L suggesting some anthropogenic influences on ground water quality (Neely, 2004). All but one mean nitrate concentration per project exceed the 2 mg/L level (Table 3). Wells located in the Washington and Payette Regional Study have the highest median and mean values, 7.8 mg/L and 8.9 mg/L, respectively. The Cassia County Regional Study is next with a mean value of 5.6 mg/L and a median of 4.1 mg/L (Table 3).

Table 3. Descriptive statistics of ground water nitrate concentrations from regional monitoring.

		Nitrate Findings (2005)					
Project No.	**Project Name**	**Wells Monitored**	**Mean (mg/L)**	**Median (mg/L)**	**High (mg/L)**	**Wells from 5 mg/L to 10 mg/L**	**Wells exceeding MCL (10mg/L)**
220	Lower Boise Regional Study	61	3.2	2.0	13	7 (11%)	4 (7%)
710	Washington and Payette Counties Regional Study	52	8.9	7.8	31	8 (15 %)	23 (44%)
730	Minidoka County Shallow Aquifer Regional Study	42	4.1	3.8	12	14 (33%)	1 (2%)
740	Minidoka County Deep Aquifer Regional Study	47	3.6	2.8	8.38	14 (30%)	0
750	Jerome-Gooding-Lincoln Counties Regional Study	69	2.1	1.7	13	1 (1%)	1 (1%)
770	Gem and Payette Counties Regional Study	40	2.7	1.2	16	7 (18%)	3 (8%)
780	Twin Falls County Regional Study	72	4.1	3.9	11	17 (24%)	1 (4%)
790	Cassia County Regional Study	43	5.6	4.1	17	12 (28%)	7 (16%)
805	Central Henrys Fork Basin Aquifer Regional Study	45	4.5	3.5	30	14 (31%)	2 (4%)
820	Rathdrum Prairie Regional Study	31	0.55	0.22	3.0	0	0
830	Mud Lake Regional Study	28	2.4	2.4	8.8	3 (11%)	0
840	Eastern Snake Plain Aquifer Regional Study	0	-	-	-	-	-
860	Owyhee Regional Study	34	2.6	0.02	17	1 (3%)	5 (15%)
950	Clearwater Plateau Aquifer Regional Study	71	3.8	1.4	39	8 (11%)	6 (8%)
All Active Regional Projects Combined		**635**	**3.8**	**2.4**	**39**	**106 (17%)**	**53 (8%)**

Of the 635 wells tested, 17% have nitrate concentrations between 5 to 10 mg/L and 8% or 53 wells in the regional network exceeded the EPA MCL of 10 mg/L for nitrate (Table 3 and Figure 2). Ten projects had one or more wells with nitrate levels above the EPA MCL. The projects having the most wells exceeding the MCL include the (1) Washington and Payette Regional Study (44%), (2) Cassia County Regional Study (16%), and (3) Owyhee Regional Study (15%) (Table 3). Three projects, the Minidoka County Deep Aquifer Regional Study, Mud Lake Regional Study, and Rathdrum Prairie Regional Study recorded no wells with nitrate above the EPA MCL (Table 3).

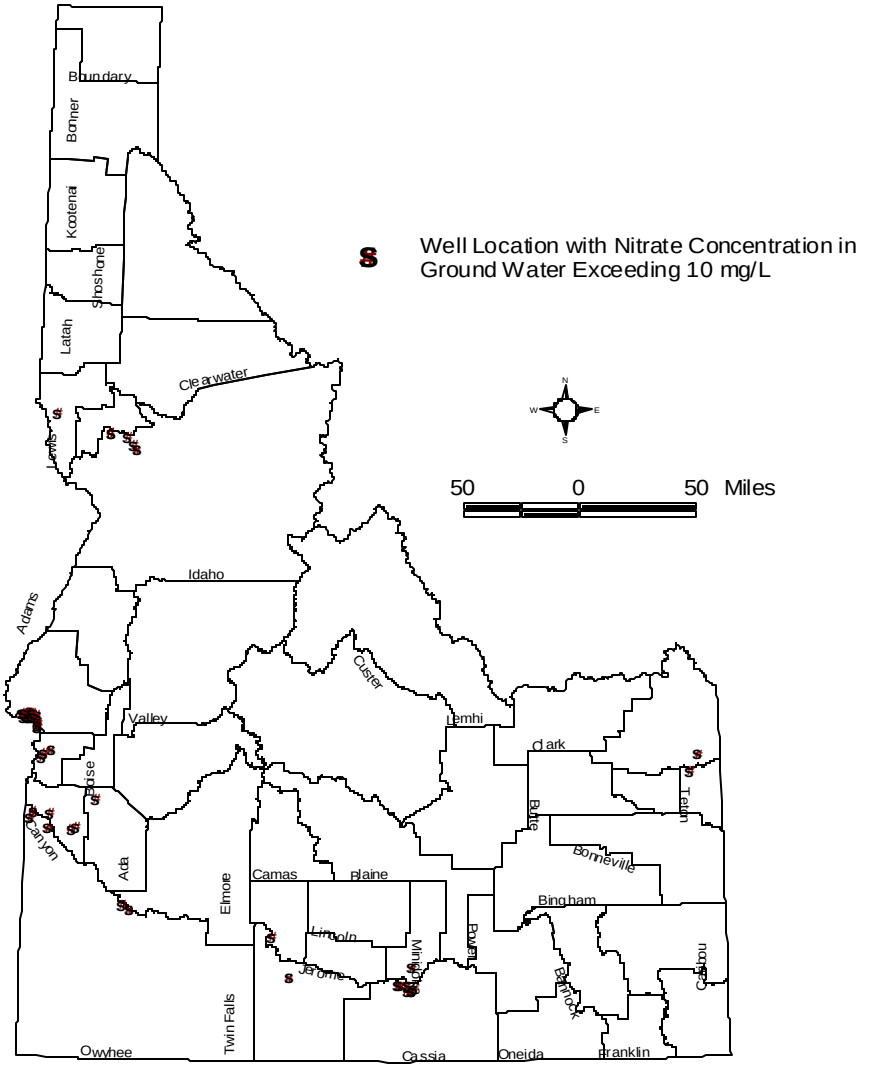

Figure 2. Map showing nitrate detections in ground water from 2005 that exceeded the EPA MCL of 10mg/L. Detections are from regional monitoring projects only.

Nitrogen Isotopes

Overview

ISDA Water Program staff have collected nitrogen isotope samples since 2000 to help gain a better understanding of contaminant sources per project. Nitrogen isotope tests serve as a useful indicator of

source(s) and combined with other onsite information can be useful in determining the sources(s). The ratio of the common nitrogen isotope ^{14}N to its less abundant counterpart ^{15}N relative to a known standard (denoted $d^{15}N$) can be useful in determining sources of NO_3-N. Thus, values are recorded in del notation with units expresses in per mil ($^0/_{00}$) (e.g., per thousand). Common sources of NO_3-N in ground water are applied commercial fertilizers, animal or human waste, precipitation, and organic nitrogen within the soil. Each of these NO_3-N source categories has a potentially distinguishable nitrogen isotopic signature. Typical $d^{15}N$ ranges for fertilizer is –5 per mil ($^0/_{00}$) to +5 per mil ($^0/_{00}$), while typical waste sources have ranges greater than $10^0/_{00}$ (Kendall and McDonnell, 1998). Nitrogen isotope values between $5^0/_{00}$ and $10^0/_{00}$ are generally believed to indicate an organic or combination of sources (Kendall and McDonnell, 1998).

Findings

A total of 166 different regional wells were sampled for nitrogen isotope testing in 2005. Sites selected for testing included those with nitrate levels exceeding 5 mg/L in 2004. Based on the 166 wells tested, overall results suggested that 16% of the wells tested contained nitrate from a fertilizer source, 70% from a combination of sources or purely organic source, and 14% from animal or human waste (Table 4). Some of the regional project areas in which nitrogen isotope results suggested more of a fertilizer source included: (1) Lower Boise Regional Study (42% of wells tested), Clearwater Plateau Aquifer Regional Study (40% of wells tested), and Jerome-Gooding-Lincoln Counties Regional Study (36% of wells tested). Others project areas with isotope results suggesting animal or human waste sources included Minidoka County Shallow Aquifer Regional Study (36% of wells tested) and the Owyhee Regional Study (33% of wells tested). Overall isotope results suggest a combination of sources to be the most likely causes of elevated nitrate in the majority of wells.

Table 4. Nitrogen isotope findings from regional project wells.

Project No.	Project	Fertilizer (%)	Organic or Mixed Source (%)	Animal or Human Waste (%)	Total Wells Tested
220	Lower Boise Regional Study	42%	58%	0%	12
710	Washington and Payette Counties Regional Study	10%	69%	21%	29
730	Minidoka County Shallow Aquifer Regional Study	7%	57%	36%	14
740	Minidoka County Deep Aquifer Regional Study	15%	85%	0%	13
750	Jerome-Gooding-Lincoln Counties Regional Study	33%	67%	0%	3
770	Gem and Payette Counties Regional Study	0%	80%	20%	10
780	Twin Falls County Regional Study	4%	83%	13%	23
790	Cassia County Regional Study	28%	67%	5%	21
805	Central Henrys Fork Basin Aquifer Regional Study	0%	86%	14%	16
820	Rathdrum Prairie Regional Study	-	-	-	0
830	Mud Lake Regional Study	25%	75%	0%	4
840	Eastern Snake Plain Aquifer Regional Study	-	-	-	0
860	Owyhee Regional Study	0%	67%	33%	6
950	Clearwater Plateau Aquifer Regional Study	40%	53%	7%	15
	Overall	**16%**	**70%**	**14%**	**166**

Pesticides

Complete pesticide sampling, in which all wells within a project are tested for pesticides, was conducted in 2005 throughout one regional project. Partial pesticide sampling, in which a select number of wells within the project were analyzed for pesticides, was conducted in three regional project areas.

Table 5 presents the regional projects tested for pesticides in 2005, the number of wells sampled, and the type of pesticide analysis performed. A total of 44 wells were tested for various pesticides in the regional project areas in 2005. There were 31 positive detection in the 2005 regional project pesticide sampling as seen on Table 6. Ten different types of pesticides were detected.

Table 5. Summary of pesticide sampling in ISDA regional projects.

Project Number and Name	Pesticide Testing	Number of Wells Sampled	Analysis (EPA Method Number)
770 Payette and Gem County	Complete	40	507/508, 515.2, 632
805 North Henrys	Partial	1	507/508, 515.2, 632
860 North Owyhee County	Partial	2	507/508, 515.2, 632
950 Clearwater	Partial	1	507/508, 515.2, 632

Table 6. Summary of pesticide detections from ISDA regional project areas.

Pesticide	Detections	Range (µg/L)	Mean (µg/L)	Median (µg/L)	Reference Point (µg/L)	County of Detection
Atrazine	7	0.025 - 1.2	0.24	0.026	3 (MCL)[1]	Gem (1) Nez Perce (1) Payette (5)
Bentazon	1	0.043	------	------	200 (HAL)[2]	Payette
Bromacil	1	0.059	------	------	90 (HAL)	Nez Perce
Dacthal (DCPA)	9	0.15 - 85	11.66	3.4	70 (HAL)	Owyhee (2) Payette (7)
Desethyl Atrazine	8	0.027 - 1.8	0.42	0.039	------[3]	Gem (1) Nez Perce (1) Payette (6)
Diuron	1	0.22	------	------	10 (HAL)	Nez Perce
Malathion	1	0.73	------	------	140 (RfD)[4]	Payette
Picloram	1	0.75	------	------	500 (MCL)	Nez Perce
Terbacil	1	0.09	------	------	90 (RfD)	Payette
Triallate	1	0.58	------	------	0.45 (FQPA)[5]	Fremont

[1]MCL – EPA Maximum Contaminant Level
[2]HAL – EPA Health Advisory Level
[3]Breakdown product of Atrazine
[4]RfD – EPA Reference Dose
[5]FQPA – Food Quality Protection Act

One dacthal (DCPA) detection in Owyhee County exceeded the EPA health advisory level (HAL) of 70 µg/L. A local Pesticide Management Plan (PMP) monitoring project was established based on this result. The details of the PMP monitoring project are presented later in the annual report in the Discretionary Project section. The triallate detection in Fremont County exceeded the Food Quality Protection Act (FQPA) reference point of 0.45 µg/L. A local PMP monitoring project was also established based on this result, with details presented later in the Discretionary Project section.

The most frequently detected pesticide in the regional projects was dacthal (DCPA), which was detected in nine wells. Desethyl atrazine (DEA) was the second most frequently detected chemical with eight detections. Atrazine was detected in seven wells, while the remaining pesticides were detected in one well each (Table 6).

Figure 3 shows the pesticide detections for the Payette and Gem County regional project. A total of 40 wells were sampled for pesticides. Desethyl atrazine, a breakdown product of the pesticide atrazine, was detected in 7 wells. Atrazine was detected in 6 wells, dacthal (DCPA) was detected in 7 wells, bentazon was detected in 1 well, malathion was detected in 1 well, and terbacil was detected in 1 well. All detections were below any health standards set by the EPA or the state of Idaho. All detections were within the Level 1 category established by the Idaho PMP except for a Level 2 detection of DEA located north of Fruitland. A local PMP monitoring project was established based on this result. The details of the PMP monitoring project are presented later in the Discretionary Project section.

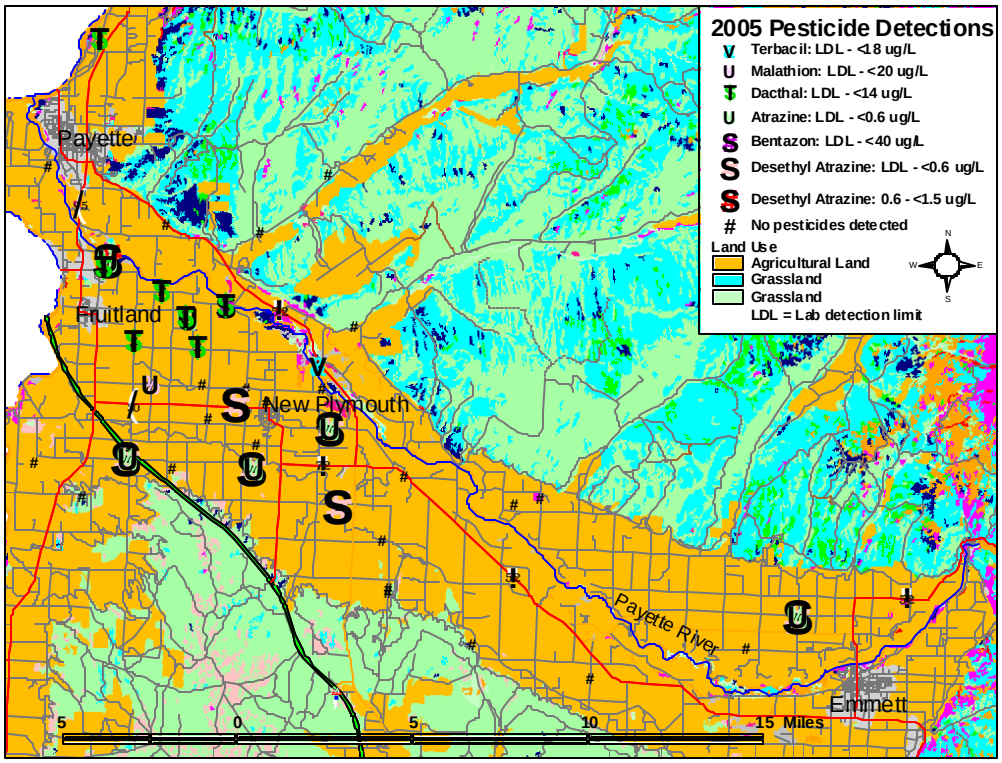

Figure 3. Pesticide results from ISDA 2005 sampling of Project 770: Payette and Gem Counties Regional Monitoring Project.

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 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 as with other Ground Water Program monitoring activities. Since local projects are typically less than 10 square miles, selection of wells for sampling is generally less stringent than for regional projects. All wells within the area of concern are sampled in many cases. 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 follows the ISDA QMP and QAPP which meet EPA standards and concurrence.

Project areas

Although ISDA Ground Water Program staff samples 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 2005, staff implemented two local monitoring projects that meet this criterion. One project is located northwest of Eagle, Idaho and the other is located south of Mountain Home, Idaho.

Water Quality Findings

Nitrate

Elmore County Project

There were 27 wells analyzed for nitrate in the ISDA local project 810, located approximately three miles south of downtown Mountain Home (Figure 4). There were seven wells (or 26% of wells tested) with concentrations over the EPA's MCL of 10 mg/L for nitrate, and were mainly located near the intersection of S. 18th E. and Hamilton Roads (Figure 4).

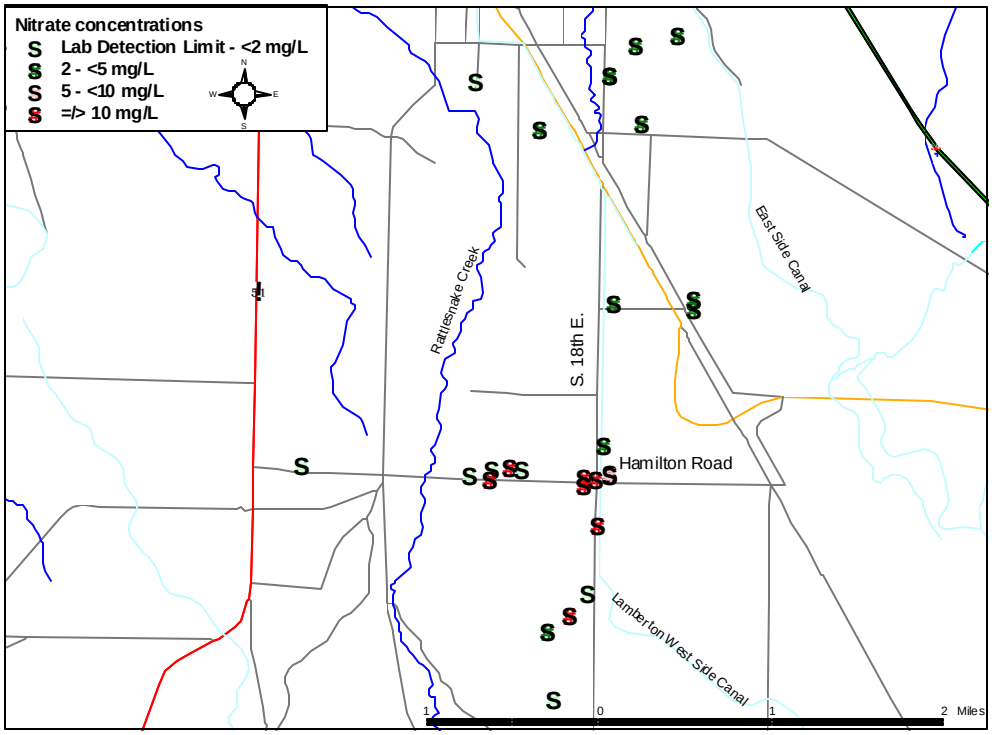

Figure 4. Nitrate results from ISDA 2005 sampling of Project 810: Elmore County Local Project.

Table 7 presents statistics for the 27 wells sampled for the Elmore County local project. All wells tested had nitrate detections that were greater than the laboratory detection limit of 0.033 mg/L. Seven wells, or 26% of the wells sampled, were over the EPA MCL for nitrate. Eleven wells, or 41%, had nitrate concentrations ranging from 2 mg/L to less than 5 mg/L. The maximum detection was 36 mg/L. The median concentration was 4 mg/L, while the mean concentration was 7.4 mg/L. Sampling of this project will continue on a yearly basis.

Table 7. Summary of nitrate concentrations from Project 810.

Concentration Range (mg/L)	2004 (27 wells)
<LDL (0.033)	0
LDL to <2.0	7 (26%)
2.0 to <5.0	11 (41%)
5.0 to <10	2 (7%)
>10	7 (26%)
Median Value (mg/L)	4
Mean Value (mg/L)	7.4
Maximum Value (mg/L)	36

Eagle Local Project

There were 18 wells analyzed for nitrate in the Eagle Local Project located approximately three miles northwest of Eagle along Beacon Light Road (Figure 5). There were eight wells (or 44% of wells tested) with concentrations over the EPA's MCL of 10 mg/L for nitrate (Figure 5).

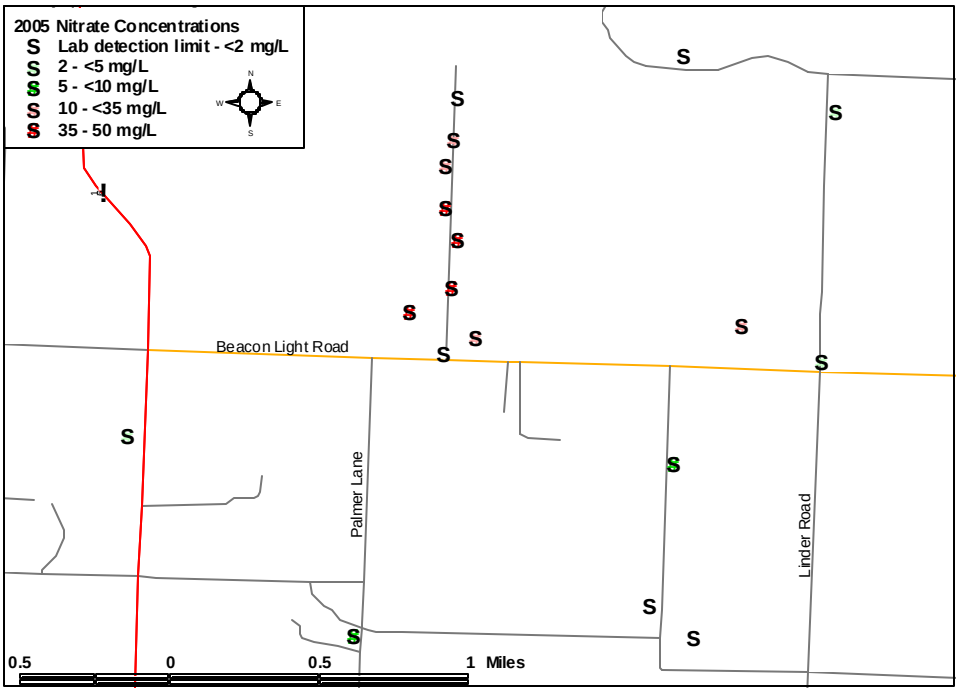

Figure 5. Nitrate results from ISDA 2005 sampling of Project 530: Eagle Local Project.

Table 8 presents statistics for the 18 wells sampled for the Eagle local project. All wells tested had nitrate detections that were greater than the laboratory detection limit of 0.033 mg/L. Eight wells, or 44% of the wells sampled, were over the EPA MCL for nitrate. The maximum detection was 48 mg/L. The median value was 7.1 mg/L, while the mean value was 14.6 mg/L. Sampling of this project will continue on a yearly basis indefinitely.

Table 8. Summary of nitrate concentrations from Project 530.

Concentration Range (mg/L)	2004 (18 wells)
<LDL (0.033)	0
LDL to <2.0	5 (28%)
2.0 to <5.0	3 (17%)
5.0 to <10	2 (11%)
>10	8 (44%)
Median Value (mg/L)	7.1
Mean Value (mg/L)	14.6
Maximum Value (mg/L)	48

Nitrogen Isotopes

Elmore County Local Project

Wells with high nitrate detections within the Elmore County local project area were chosen for $d^{15}N$ analysis. In 2005, thirteen wells in the Elmore County local project area were tested for $d^{15}N$. Data from the lab have been received for six wells, data from seven wells are still pending. Of the six wells that ISDA has isotope values for, four wells have $d^{15}N$ values between $-5^{0}/_{00}$ and $5^{0}/_{00}$, which suggests a fertilizer source (Figure 6 and Table 9). Two wells had $d^{15}N$ values between $5^{0}/_{00}$ and $10^{0}/_{00}$, which suggests a combination of sources or organic source of nitrate.

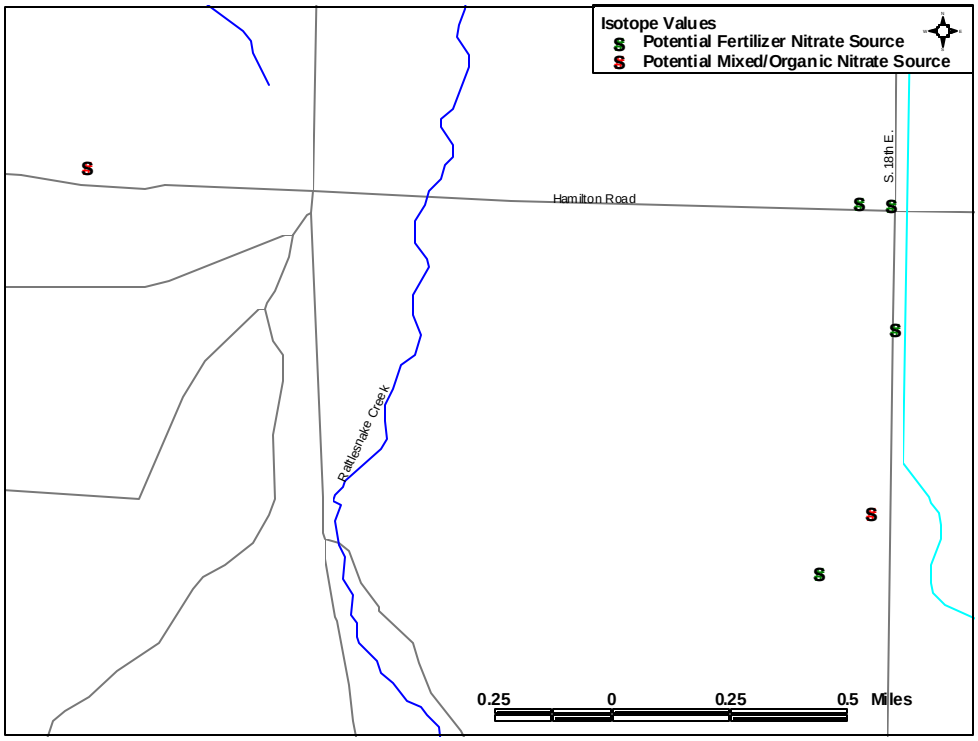

Figure 6. 2005 $d^{15}N$ results for the Elmore County local project.

Table 9. Summary of $d^{15}N$ results for Elmore County local project.

Well ID	$d^{15}N$ ($^{0}/_{00}$)	NO_3-N (mg/L)	Potential NO_3-N Source
8100101	3.60	22	Fertilizer
8100201	6.17	1.6	Mixed/Organic
8100301	1.26	31	Fertilizer
8100401	4.25	11	Fertilizer
8100501	Pending from lab	13	Pending from lab
8100601	3.41	36	Fertilizer
8100801	Pending from lab	1.2	Pending from lab
8100901	Pending from lab	17	Pending from lab

8101001	9.11	1.4	Mixed/Organic
8101601	Pending from lab	2.7	Pending from lab
8101801	Pending from lab	6.9	Pending from lab
8101901	Pending from lab	5.1	Pending from lab
8102601	Pending from lab	12	Pending from lab

Eagle Local Project

Wells with high nitrate detections within the Eagle local project area were chosen for $d^{15}N$ analysis. In 2005, seven wells in the Eagle local project area were tested for $d^{15}N$. Five wells had $d^{15}N$ values between $5^{0}/_{00}$ and $10^{0}/_{00}$, which suggests a combination of sources or organic source of nitrate (Figure 7 and Table 10). Two wells $d^{15}N$ values between $-5^{0}/_{00}$ and $5^{0}/_{00}$, which suggests a fertilizer NO_3-N source.

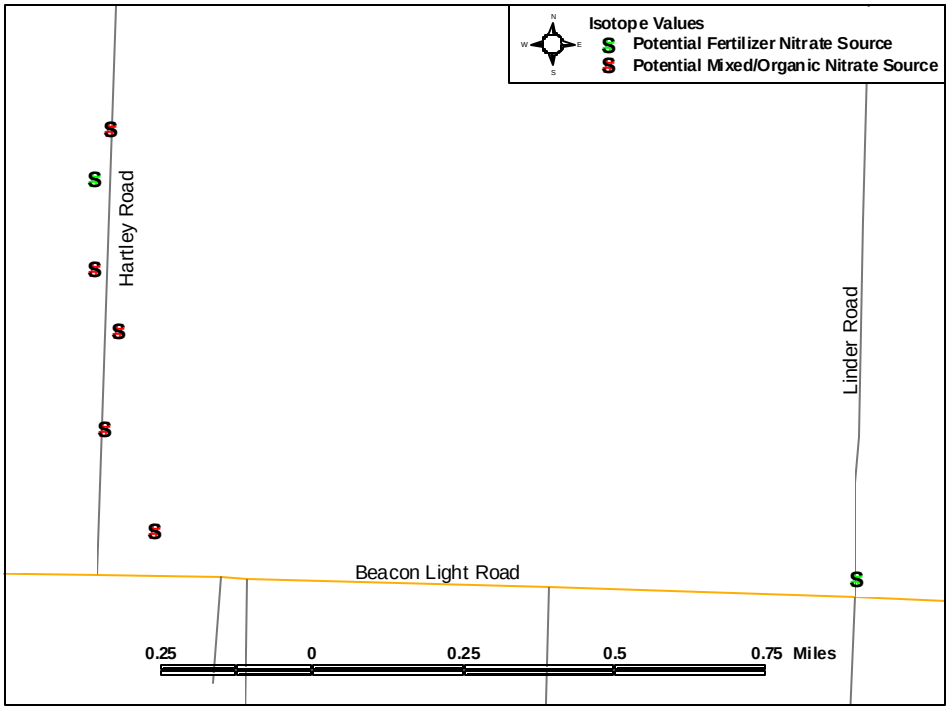

Figure 7. 2005 $d^{15}N$ results for the Eagle local project.

Table 10. Summary of $d^{15}N$ results for Eagle local project.

Well ID	$d^{15}N$ ($^{0}/_{00}$)	NO_3-N (mg/L)	Potential NO_3-N Source
5302001	4.86	13	Fertilizer
5302401	4.59	19	Fertilizer
5302501	5.65	17	Mixed/Organic

5302701	7.29	38	Mixed/Organic
5303301	6.58	20	Mixed/Organic
5303701	5.26	37	Mixed/Organic
7600601	6.87	48	Mixed/Organic

Pesticides

Complete pesticide sampling, in which all wells within a project are tested for pesticides, was conducted in 2005 throughout one local project. Partial pesticide sampling, in which a select number of wells within the project were analyzed for pesticides, was conducted in one local project area.

Table 11 presents the local projects tested for pesticides in 2005, the number of wells sampled, and the type of pesticide analysis performed. A total of 29 wells were tested for various pesticides in the local project areas in 2005.

Table 11. Summary of pesticide sampling in ISDA local projects.

Project Number and Name	Pesticide Testing	Number of Wells Sampled	Analysis (EPA Method Number)
810 Elmore County	Complete	27	507/508, 515.2, 632
530/760 Eagle	Partial	2	VOC

There were 37 positive detections from local project pesticide sampling in 2005, as seen on Table 12. Ten different types of pesticides were detected. Desethyl Atrazine was detected the most frequently, showing up in 15 wells in the local projects. Atrazine was detected in 7 wells, bromacil was detected in 5 wells, bentazon was detected in 3 wells, and 1,2,3-trichloropropane was detected in 2 wells. The remaining pesticides were detected in one well each.

Table 12. Summary of pesticide detections from ISDA local project areas.

Pesticide	Detections	Range (µg/L)	Mean (µg/L)	Median (µg/L)	Reference Point (µg/L)	County of Detection
1,2,3-Trichloropropane	2	3.1 - 6.8	4.95	4.95	40 (HAL)[1]	Ada
1,2-Dichloropropane	1	0.55	-----	-----	5 (MCL)[2]	Ada
Atrazine	7	0.031 - 0.093	0.057	0.053	3 (MCL)	Elmore
Bentazon	3	0.26 - 0.65	0.43	0.38	200 (HAL)	Elmore
Bromacil	5	0.22 - 0.96	0.44	0.35	90 (HAL)	Elmore
Dacthal (DCPA)	1	3.65	-----	-----	70 (HAL)	Ada
Desethyl Atrazine	15	0.029 - 0.41	0.11	0.087	------[3]	Elmore
Diruon	1	0.11	-----	-----	10 (HAL)	Elmore
Metribuzin	1	0.12	-----	-----	200 (HAL)	Elmore
Simazine	1	0.07	-----	-----	4 (MCL)	Elmore

[1]HAL – EPA Health Advisory Level

[2]MCL – EPA Maximum Contaminant Level

[3]Breakdown product of Atrazine

Elmore County Project

Figure 8 presents the pesticide detections for the Elmore county local project, located approximately three miles south of downtown Mountain Home. A total of 27 wells were sampled for pesticides. Desethyl atrazine, a breakdown product of the pesticide atrazine, was detected in 15 wells. Atrazine was detected in 7 wells, bromacil was detected in 5 wells, bentazon was detected in 3 wells, and the following pesticides were found in one well each: diuron, metribuzin, and simazine. All detections were below any health standards set by the EPA or the state of Idaho. All detections were within the Level 1 category established by the Idaho PMP.

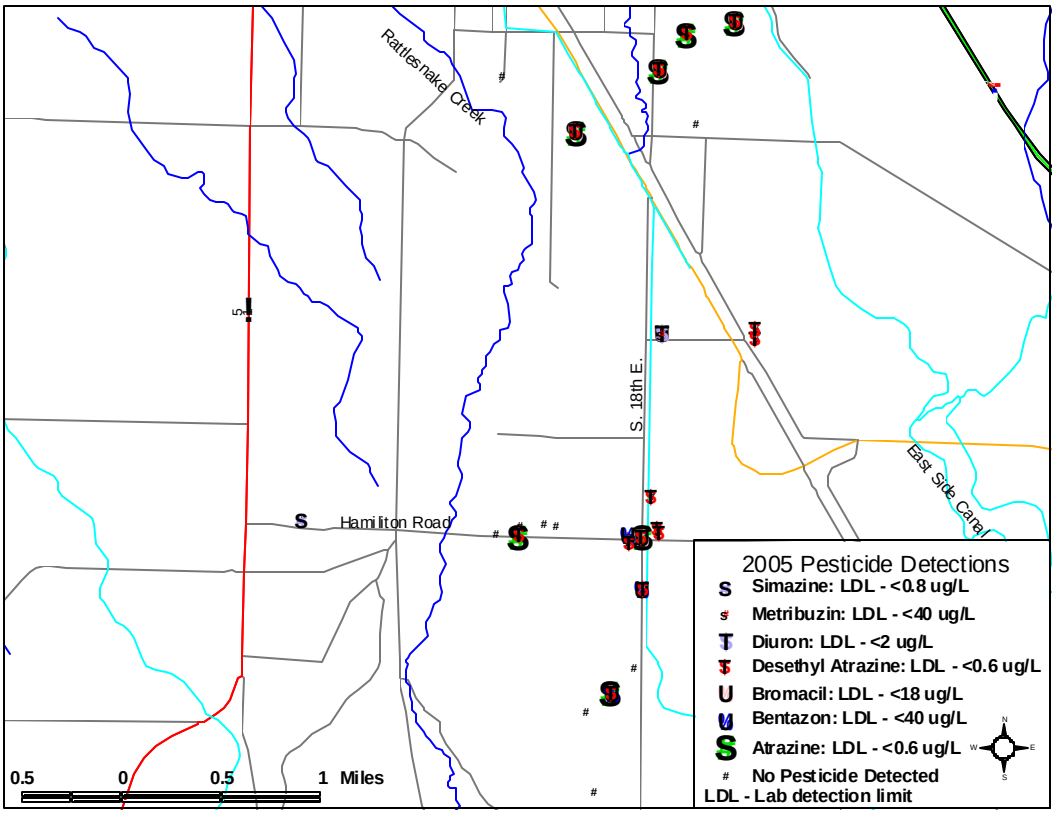

Figure 8. Pesticide results from ISDA 2005 sampling of Project 810: Elmore County Local Monitoring Project.

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 developing based on ground water protection priorities, enforcement, and response to complaints. 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.

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 needed 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 273 wells related to dairy and beef CAFO projects in 2005. Exceedance of the EPA health standard of 10 mg/L for nitrate varied between projects from 0% to 58%. Project locations, number of wells sampled, and nitrate statistics are listed in Table 13. Constituents tested for generally consist of (but are not limited to): nitrate, ammonia, chloride, sulfate, total coliform, E. coli., and N-15 isotopes.

Table 13. Distribution of 2005 sampling for dairy and beef CAFO related projects

Project Name	Sample Month	Wells Tested	Wells Above Nitrate MCL	Mean Nitrate	Median Nitrate	Max. Nitrate	County	Geographic Location
Happy Valley	April	10	0	6.2	6.3	9.1	Canyon	SE of Nampa
Dry Lakes	April	7	3	10.1	6.2	28.4	Canyon	S.of Lake Lowell
Marsing	April	16	8	13.5	12.5	39.1	Owyhee	NWof Marsing

Sunnyside	April - May	36	21	14.0	12.5	34	Wash.	S of Weiser
Bliss	June	17	1	4.0	4.1	10.1	Gooding	NW of Bliss
Oakley	July	17	0	1.3	1.0	4.75	Cassia	N of Oakley
SW Jerome	July	11	0	3.6	2.7	9.21	Jerome	SW of Jerome
Cassia	Aug.	52	13	8.0	7.4	23.0	Cassia	S of Burley
Buhl	Sept.	35	0	5.3	5.4	9.2	Twin Falls	S of Buhl
Purple Sage	Oct.	21	4	6.3	4.4	22.7	Canyon	N of Middleton
Marsing	Nov.	15	7	17.4	12.5	78.4	Owyhee	NWof Marsing
Sunnyside	Nov.	36	20	15.0	14.0	48	Wash.	S of Weiser

Additionally, approximately 700 dairies are tested annually for nitrate by the ISDA Dairy Bureau (Table 14). Nitrate concentration statistics have remained fairly constant from 2002 through 2005 with approximately 5-6% of the dairies above the health standard, a mean value of approximately 3 mg/L, and an approximate median value of 2 mg/L.

Table 14. Dairy nitrate data summary, 2002-2005.

Nitrate Concentrations (mg/L) & Statistics	**2002** **Number and percent of wells**	**2003** **Number and percent of wells**	**2004** **Number and percent of wells)**	**2005** **# of Wells (% of wells)**
0.0 to 2.0	323 (50%)	347 (49.3%)	375 (52.8%)	337 (50.5%)
2.0 to 5.0	175 (27%)	200 (28.4%)	187 (26.3%)	186 (27.8%)
5.0 to 10.0	113 (17%)	119 (16.9%)	111 (15.6%)	104 (15.6%)
> 10.0	40 (6%)	38 (5.4%)	37 (5.2%)	41 (6.1%)
Total	651 (100%)	704 (100%)	710 (100%)	668 (100%)
Mean (mg/L)	3.4	3.3	3.2	3.4
Median (mg/L)	2.0	2.0	1.8	2.0
Maximum (mg/L)	41.5	28.7	33.3	50.2

The ISDA CAFO Water Program implemented 5 new projects in 2005: three in Canyon County (Happy Valley, Dry Lakes, and Purple Sage), 1 in Cassia County (Oakley), and 1 in Jerome County (SW Jerome). Results are summarized and presented in the following sections for three of the new projects implemented in 2005.

Happy Valley Project

The Happy Valley monitoring project occurred in April 2005 as a result of concerns of possible ground and surface water contamination in the area surrounding a dairy approximately 2 miles southeast of Nampa, Idaho. Ten wells and four surface water sites were sampled for a variety of constituents, with a focus on nitrate (Figure 9). Well logs indicate static water levels range from 5-20 feet below ground level. Domestic wells are either cased open hole in a basalt sequence or screened in a lower sand and gravel layer.

In April 2005, no wells exceeded the EPA drinking water standard of 10 mg/L for nitrate; the maximum nitrate concentration in a well was 9.1 mg/L (Table 15). One surface water sample, directly downstream of a packing plant, had a nitrate concentration of 19.7 mg/L.

Table 15. Nitrate concentration distribution and statistics for Happy Valley Project, April 2005.

Concentration Range (mg/L)	Number of wells
0.0 to 5.0	2 (20%)
5.0 to 10.0	8 (80%)
> 10.0	0 (0%)
Statistics	Concentration (mg/L)
Mean	6.2
Median	6.3
Maximum	9.1

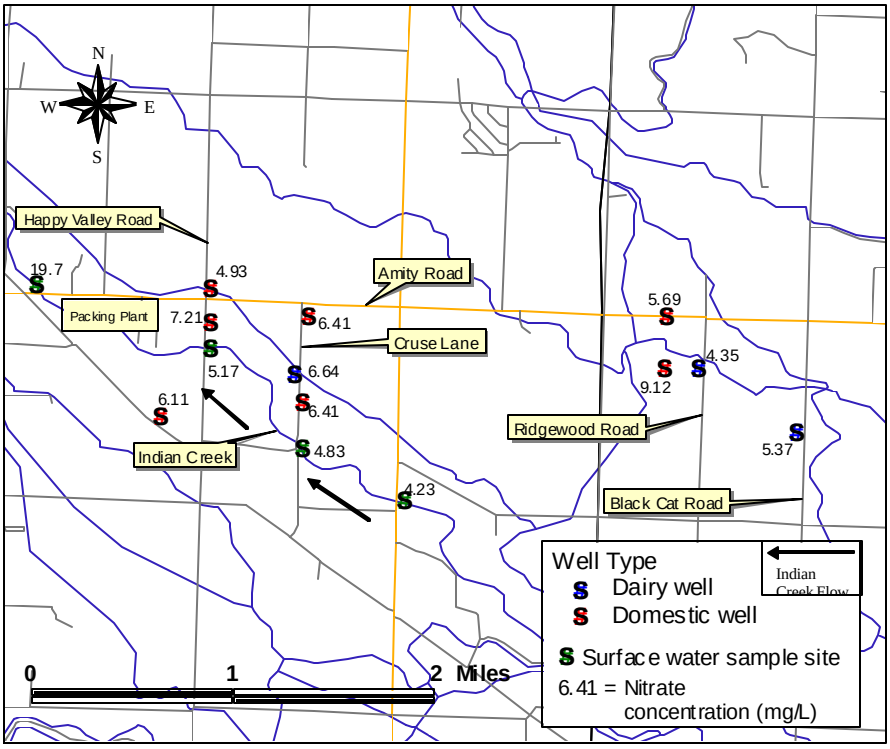

Figure 9. Happy Valley nitrate concentrations, April 2005.

Southwest Jerome Project

The Southwest Jerome monitoring project occurred in July 2005 as a result of concerns of possible ground and surface water contamination in an area approximately 1-2 miles southwest of Jerome, Idaho. Eleven wells and one surface water site were sampled for a variety of constituents, with a focus on nitrate (Figure 10).

In July 2005, no wells exceeded the EPA drinking water standard of 10 mg/L for nitrate; the maximum nitrate concentration in a well was 9.2 mg/L (Table 16). One surface water canal sample had a nitrate concentration of 0.13 mg/L.

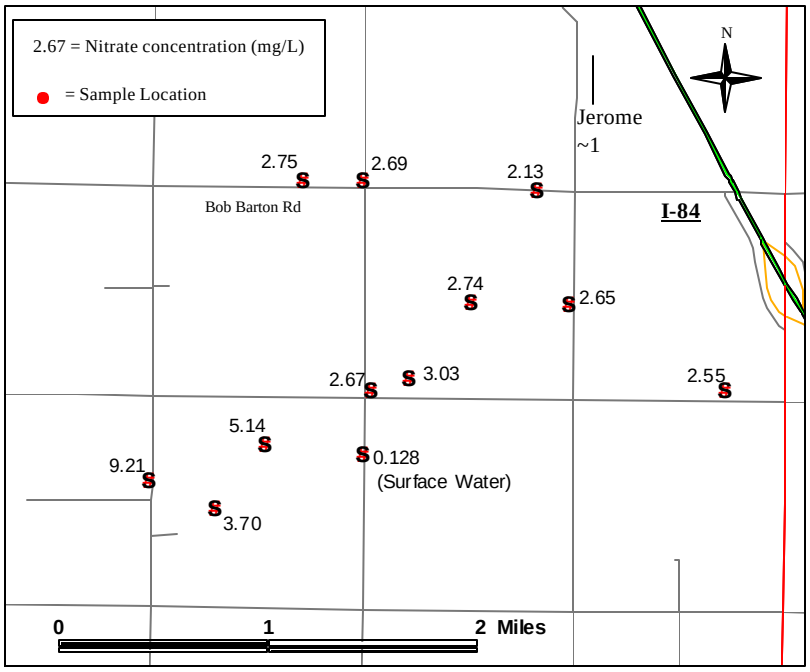

Figure 10. Southwest Jerome Nitrate Concentrations, July 2005.

Table 16. Nitrate concentration distribution and statistics in all wells sampled, SW Jerome Project, July 2005.

Concentration Range (mg/L)	Number of wells
0.0 to 5.0	9 (82%)
5.0 to 10.0	2 (18%)
> 10.0	0 (0%)
Statistics	Concentration (mg/L)
Mean	3.6
Median	2.7
Maximum	9.2

Purple Sage Project

The Purple Sage monitoring project occurred in October 2005 as a result of concerns of possible ground water contamination in the area upgradient of a golf course northwest of Middleton, Idaho. Twenty-one wells were sampled for a variety of constituents, with a focus on nitrate (Figure 11).

In October 2005, four wells exceeded the EPA drinking water standard of 10 mg/L for nitrate; the maximum nitrate concentration in a well was 22.7 mg/L (Table 17). The nitrate concentration in one dairy well was 14.7 mg/L and the concentration of the nearest domestic well directly downgradient of that dairy was 22.7 mg/L. Dairy Bureau samples indicate ground water nitrate concentrations in the dairy well with 14.7 mg/L nitrate has exceeded 15 mg/L since 2001, with a concentration of 15.9 mg/L in 2005.

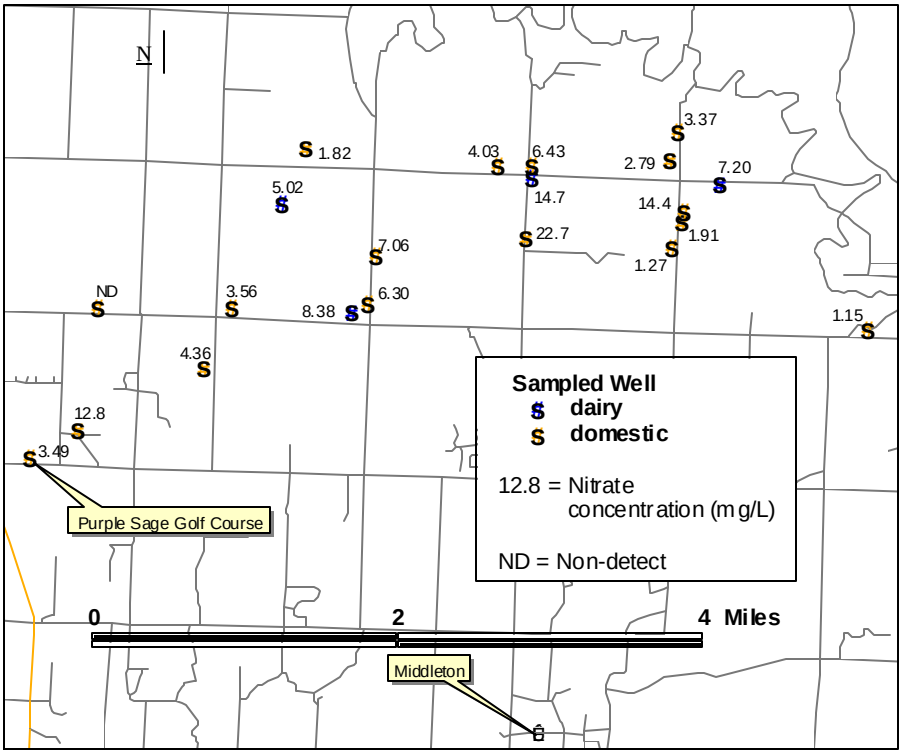

Figure 11. Purple Sage Nitrate Concentrations, October 2005.

Table 17. Nitrate concentration distribution and statistics in all wells sampled, Purple Sage Project, October 2005.

Concentration Range (mg/L)	Number of wells
0.0 to 5.0	11 (52%)
5.0 to 10.0	6 (29%)
> 10.0	4 (19%)
Statistics	Concentration (mg/L)
Mean	6.3
Median	4.4
Maximum	22.7

Pesticides

Partial pesticide sampling, in which a select number of wells within the project were analyzed for pesticides, was conducted in three dairy project areas located in Twin Falls, Gooding, and Cassia Counties in 2005. Table 18 presents the dairy projects tested for pesticides in 2005, the number of wells sampled, and the type of pesticide analysis performed. A total of 62 wells were tested for various pesticides in the local project areas in 2005. There were 73 positive detections from the testing as illustrated on Table 19. Eight different types of pesticides were detected.

Table 18. Summary of pesticide sampling in ISDA dairy projects.

Project Number and Name	Pesticide Testing	Number of Wells Sampled	Analysis (EPA Method Number)
870 NW Gooding	Complete	17	507/508, 515.2, 632
930 Cassia Dairy	Partial	27	507/508, 515.2, 632
960 Buhl	Partial	18	507/508, 515.2, 632

Table 19. Summary of pesticide detections from ISDA dairy project areas.

Pesticide	Detections	Range (µg/L)	Mean (µg/L)	Median (µg/L)	Reference Point (µg/L)	County of Detection
Atrazine	25	0.036 - 0.37	0.095	0.064	3 (MCL)[1]	Cassia (15) Gooding (2) Twin Falls (8)
Bromacil	1	0.12	-----	-----	90 (HAL)[2]	Twin Falls
Dacthal (DCPA)	2	0.66 - 2.6	1.63	1.63	70 (HAL)	Cassia (1) Gooding (1)
Desethyl Atrazine	31	0.025 - 0.25	0.076	0.057	------[3]	Cassia (15) Gooding (2) Twin Falls (14)
Diuron	5	0.027 - 0.17	0.073	0.065	10 (HAL)	Cassia (3) Gooding (1) Twin Falls (1)
Hexazinone	2	0.063 - 0.12	0.092	0.092	400 (HAL)	Cassia
Simazine	6	0.026 - 0.066	0.043	0.045	4 (MCL)	Cassia
Stirofos	1	0.063	-----	-----	210 (RfD)[4]	Twin Falls

[1]MCL – EPA Maximum Contaminant Level
[2]HAL – EPA Health Advisory Level
[3]Breakdown product of Atrazine
[4]RfD – EPA Reference Dose

Cassia Dairy Project

Figure 12 presents the pesticide detections for the Cassia Dairy project. A total of 27 wells were sampled for pesticides. Atrazine and desethyl atrazine, a breakdown product of the pesticide atrazine, was detected in 15 wells each. Simazine was detected in 6 wells, diuron was detected in 3 wells, and dacthal (DCPA) and hexazinone were detected in 1 well each. All detections were below any health standards set by the EPA or the state of Idaho. All detections were within the Level 1 category established by the Idaho PMP.

Buhl Dairy Project

Figure 13 presents the pesticide detections for the Buhl Dairy project. A total of 18 wells were sampled for pesticides. Desethyl atrazine, a breakdown product of the pesticide atrazine, was detected in 14 wells. Atrazine was detected in 8 wells, bromacil, diuron, and stirofos were detected in 1 well each. All detections were below any health standards set by the EPA or the state of Idaho. All detections were within the Level 1 category established by the Idaho PMP.

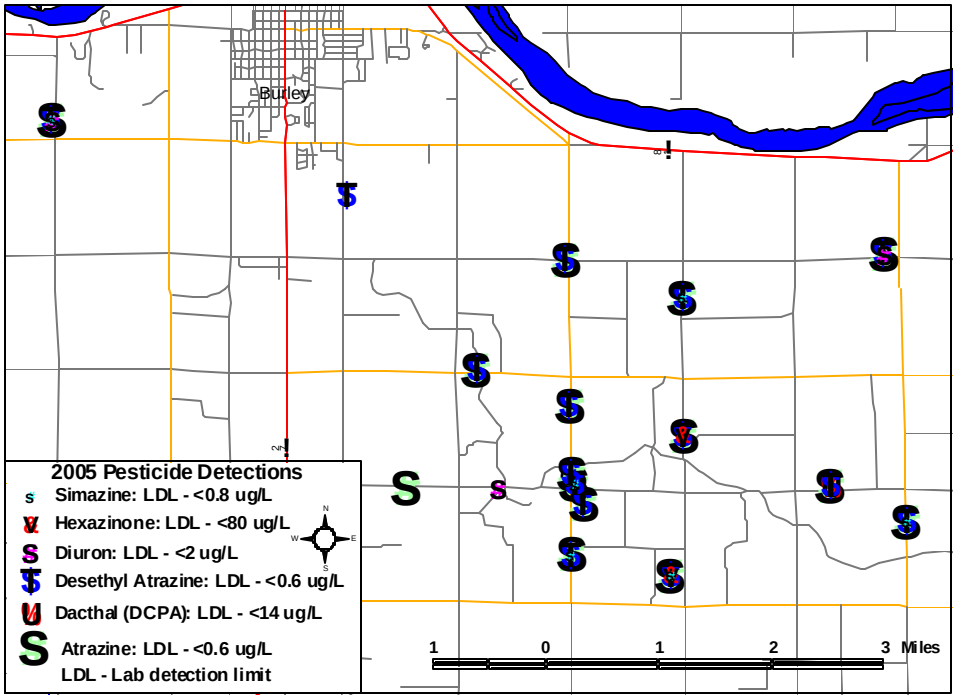

Figure 12. Pesticide results from ISDA 2005 sampling of Project 930: Cassia Dairy Monitoring Project.

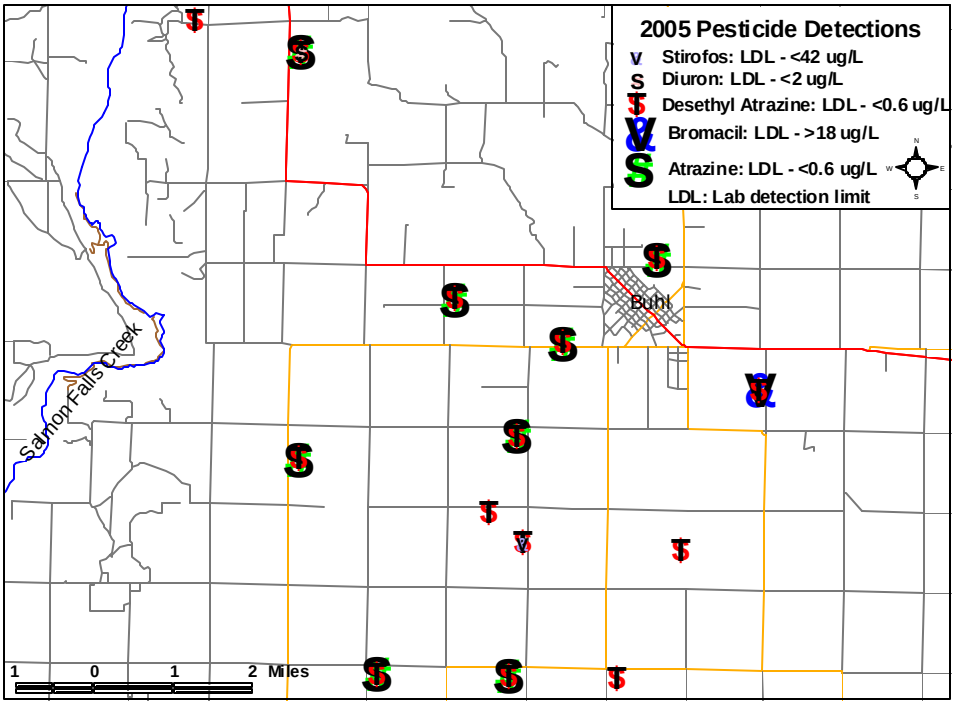

Figure 13. Pesticide results from ISDA 2005 sampling of Project 960: Buhl Dairy Monitoring Project.

Bliss Dairy Project

Figure 14 presents the pesticide detections for the Bliss Dairy project. A total of 18 wells were sampled for pesticides. Atrazine and desethyl atrazine, a breakdown product of the pesticide atrazine, was detected in two wells. Diuron and dacthal was detected in one well each, separately. All detections were below any health standards set by the EPA or the state of Idaho. All detections were within the Level 1 category established by the Idaho PMP.

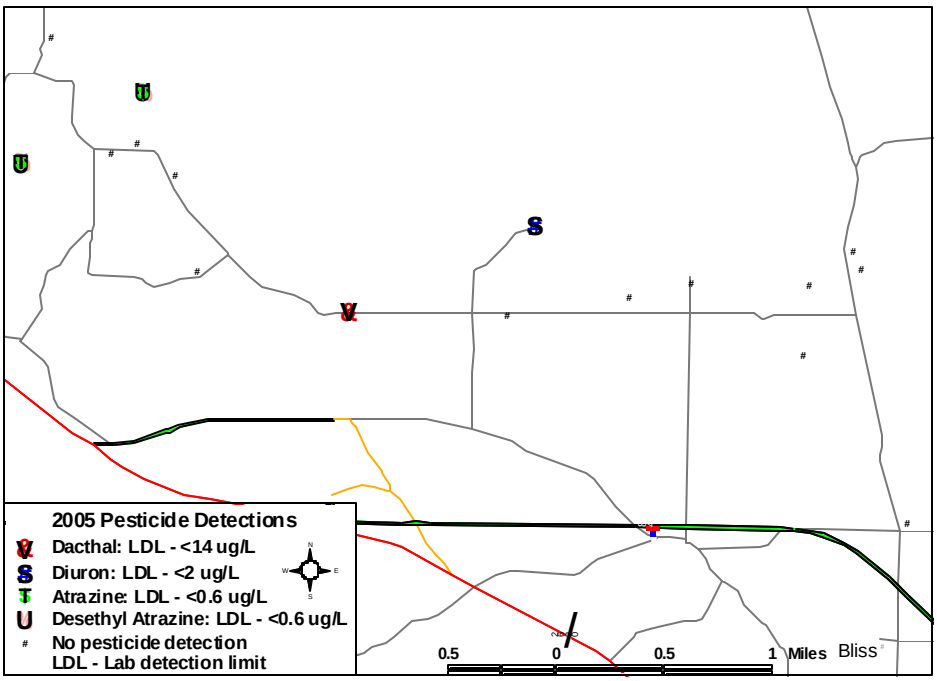

Figure 14. Pesticide results from ISDA 2005 sampling of Project 870: Bliss Dairy Monitoring Project.

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. The monitoring grant allowed for testing of approximately 56 wells and focused on testing in agricultural areas of historic elevated pesticide detections as they relate to the Idaho Pesticide Management Plan (PMP).

ISDA is the lead agency in developing the Idaho Pesticide Management Plan for Ground Water Protection and the recently passed Rules Governing Pesticide Management Plans for Ground Water Protection. The Idaho PMP 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.

Figure 15 shows the locations of the Level 2, 3, and 4 pesticide detections from the regional pesticide monitoring results in Idaho.

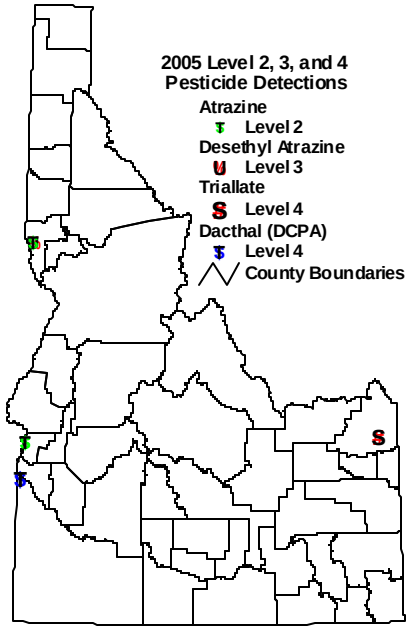

Figure 15. Level 2, 3, and 4 pesticide detections from ISDA ground water monitoring in 2005.

In response to the detections shown in Figure 15, four PMP monitoring projects were established. Additional wells surrounding the original 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 make regulatory and/or voluntary practice changes on land contributing to the contamination and to implement the Pesticide Management Plans for Ground Water Protection Rule (IDAPA 02.03.01).

Discretionary grants are implemented by fiscal year, so the grant awarded and discussed in this report covers fiscal year 2006 (July 1, 2005 through June 30, 2006). Typically, ISDA also conducts nitrate testing at each site using general operating funds. Nitrate findings also are presented in the following subsections. As with all other projects, ISDA Ground Water Program staff adheres to all SOPs relevant to these types of projects.

Water Quality Findings

Nitrate

Owyhee County

There were 14 wells analyzed for NO_3-N in the ISDA PMP project located approximately two miles south of Homedale along Succor Creek Road (Figure 16). There was one well (or 7% of wells tested) with a concentration over the EPA's MCL of 10 mg/L for NO_3-N (Figure 13).

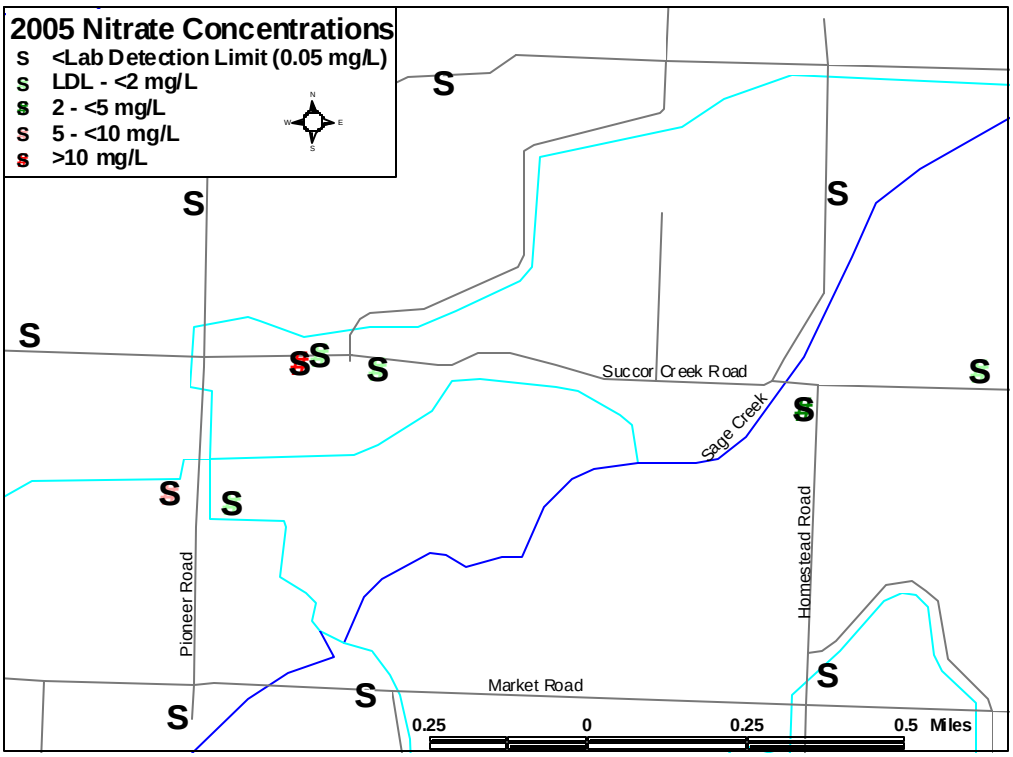

Figure 16. Nitrate results from ISDA 2005 sampling of Project 310: Owyhee County Dacthal PMP project.

Table 20 presents statistics for the 14 wells sampled for the Owyhee County PMP project. One well, or 7% of the wells sampled, was over the EPA MCL for nitrate. Seven wells, or 50% of the wells sampled, had nitrate detections below the laboratory detection limit of 0.05 mg/L. The maximum detection was 21 mg/L. The median value was 0.13 mg/L, while the mean value was 2.38 mg/L.

Table 20. Summary of nitrate concentrations from Project 310.

Concentration Range (mg/L)	2005 (14 wells)
<LDL (0.05)	7 (50%)
LDL to <2.0	4 (29%)
2.0 to <5.0	1 (7%)
5.0 to <10	1 (7%)
>10	1 (7%)
Median Value (mg/L)	0.13
Mean Value (mg/L)	2.38
Maximum Value (mg/L)	21

Fremont County

There were 15 wells analyzed for NO_3-N in the ISDA PMP project located in Fremont County, approximately four miles east of Ashton (Figure 17). There was one well (or 7% of wells tested) with a concentration over the EPA's MCL of 10 mg/L for NO_3-N (Figure 14).

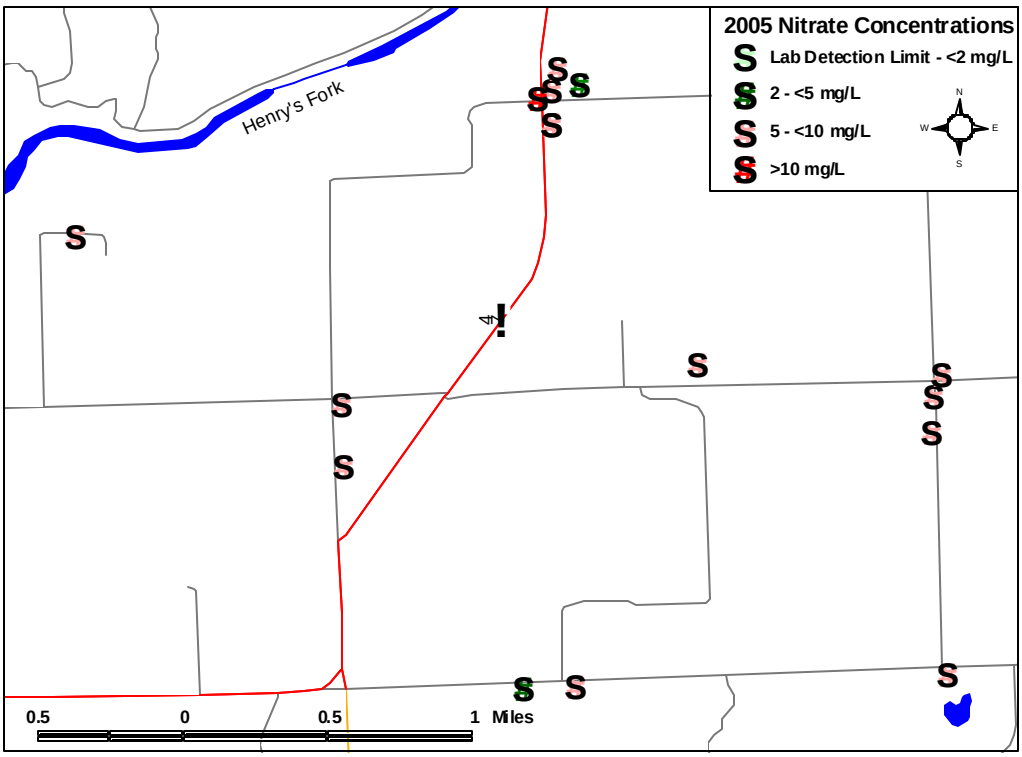

Figure 17. Nitrate results from ISDA 2005 sampling of Project 320: Fremont County Triallate PMP response.

Table 21 presents statistics for the 15 wells sampled for the Fremont County PMP project. All 15 wells had nitrate concentrations over 2 mg/L. One well, or 7% of the wells sampled, was over the EPA MCL for nitrate. The majority of the wells (12 wells or 80%) had nitrate detections between 5

and 10 mg/L. The maximum detection was 11 mg/L. The median value was 7.8 mg/L, while the mean value was 7.4 mg/L.

Table 21. Summary of nitrate concentrations from Project 320.

Concentration Range (mg/L)	2005 (15 wells)
<LDL (0.05)	0
LDL to <2.0	0
2.0 to <5.0	2 (13%)
5.0 to <10	12 (80%)
>10	1 (7%)
Median Value (mg/L)	7.8
Mean Value (mg/L)	7.4
Maximum Value (mg/L)	11

Nez Perce County

There were 10 wells analyzed for NO_3-N in the ISDA PMP project located in Nez Perce County, approximately 7.5 miles southeast of Lewiston (Figure 18). There were three wells (or 30% of wells tested) with a concentration over the EPA's MCL of 10 mg/L for NO_3-N (Figure 15).

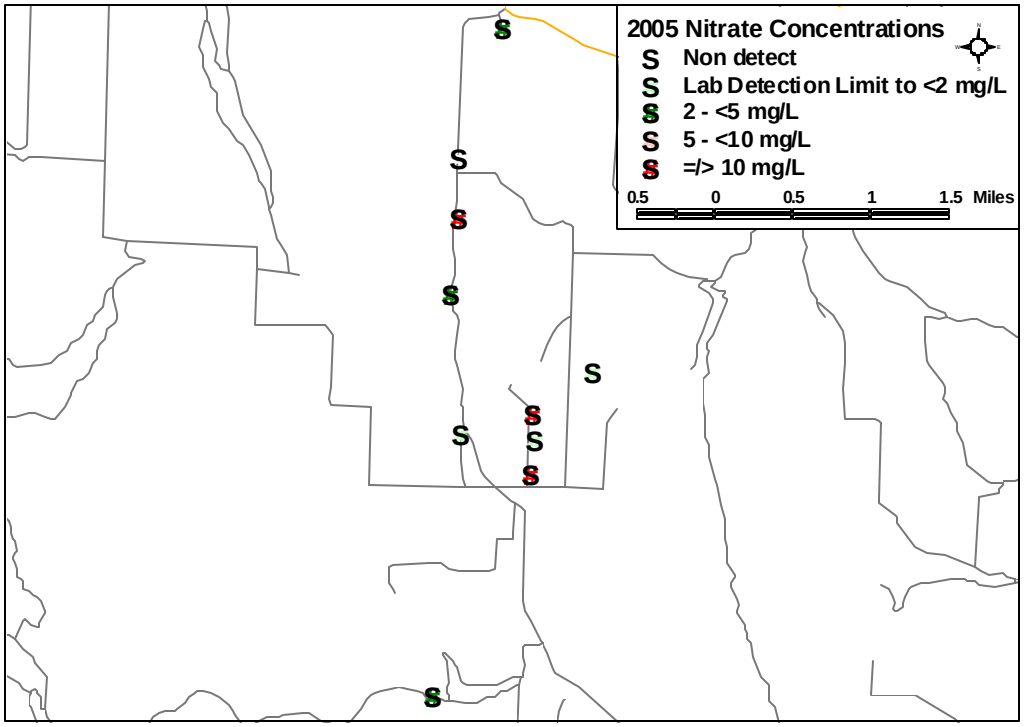

Figure 18. Nitrate results from ISDA 2005 sampling of Project 330: Nez Perce County Atrazine and DEA PMP response.

Table 22 presents statistics for the 10 wells sampled for the Nez Perce County PMP project. Three wells, or 30% of the wells sampled, had nitrate concentrations over the EPA MCL for nitrate. The

maximum detection was 13 mg/L. The median value was 3.4 mg/L, while the mean value was 4.7 mg/L.

Table 22. Summary of nitrate concentrations from Nez Perce County PMP project.

Concentration Range (mg/L)	2005 (10 wells)
<LDL (0.05)	1 (10%)
LDL to <2.0	3 (30%)
2.0 to <5.0	3 (30%)
5.0 to <10	0
≥10	3 (30%)
Median Value (mg/L)	3.4
Mean Value (mg/L)	4.7
Maximum Value (mg/L)	13

Payette County

There were 17 wells analyzed for NO_3-N in the ISDA PMP project located in Payette County (Figure 19). There were two wells (or 11.8% of wells tested) with a concentration over the EPA's MCL of 10 mg/L for NO_3-N (Figure 19).

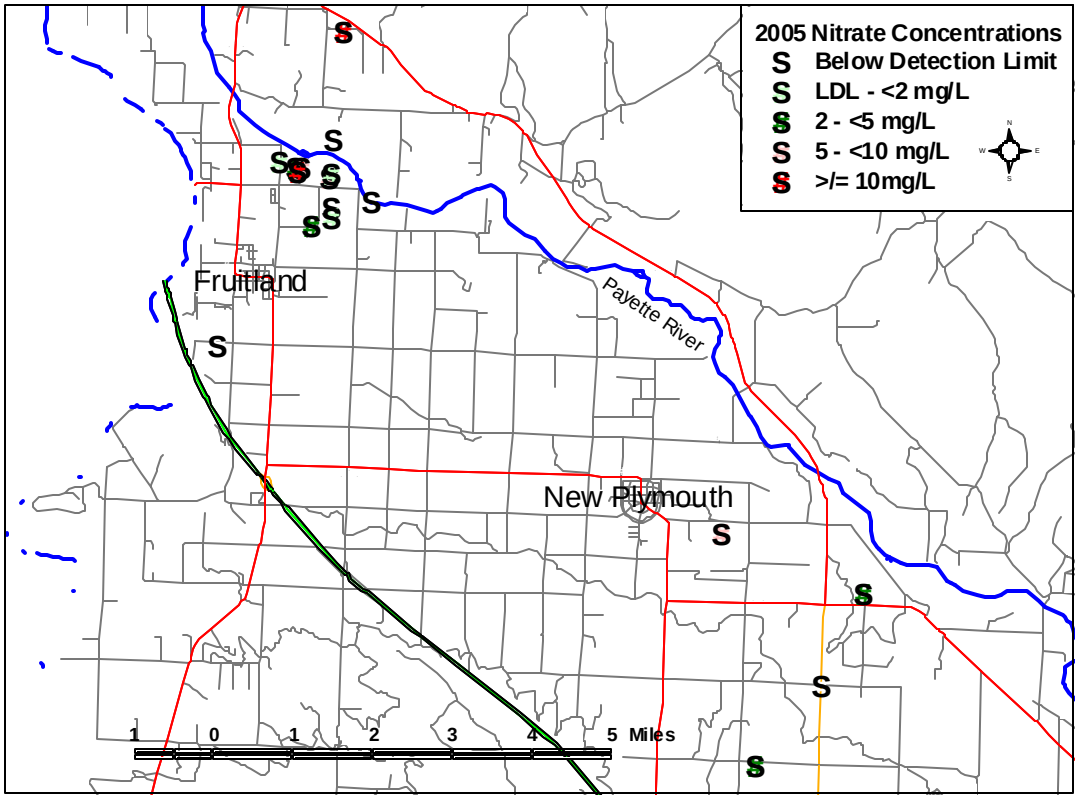

Figure 19. Nitrate results from ISDA 2005 sampling of Project 340: Payette County Atrazine and DEA PMP response.

Table 23 presents statistics for the 17 wells sampled for the Payette County PMP project. Two wells, or 11.8% of the wells sampled, had nitrate concentrations over the EPA MCL. The maximum detection was 15 mg/L. The median value was 2.1 mg/L, while the mean value was 3.8 mg/L.

Table 23. Summary of nitrate concentrations from Project 340.

Concentration Range (mg/L)	2005 (17 wells)
<LDL (0.05)	5 (29.5%)
LDL to <2.0	3 (17.6%)
2.0 to <5.0	4 (23.5%)
5.0 to <10	3 (17.6%)
≥10	2 (11.8%)
Median Value (mg/L)	2.1
Mean Value (mg/L)	3.8
Maximum Value (mg/L)	15

Pesticides

Owyhee County

Figure 20 shows the pesticide results from the follow up sampling for the Level 4 dacthal detection in Owyhee County (Project 310). A total of 14 wells were sampled in August for pesticides and nutrients. The well with the original Level 4 detection dropped to a Level 2 detection in the follow up sampling in August. Four wells had no detection of dacthal, and two wells had dacthal concentrations below the lab detection limit. The remaining seven wells had Level 1 concentrations of dacthal, ranging from 0.10 to 13 µg/L.

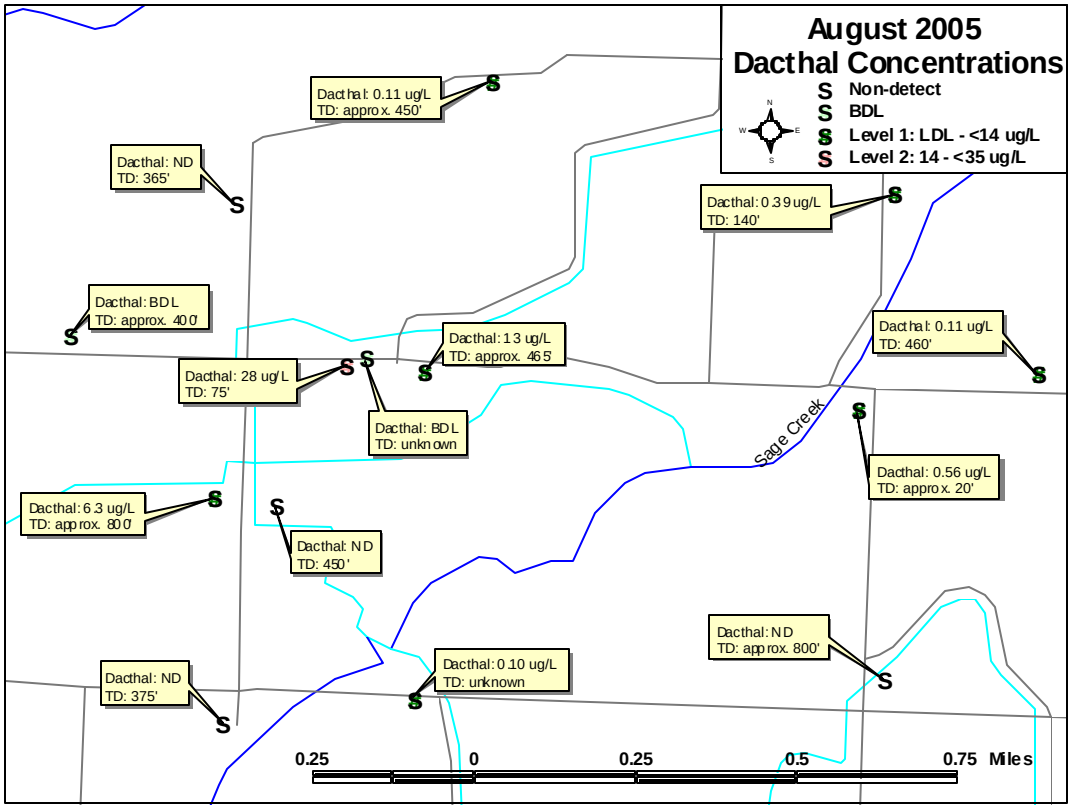

Figure 20. Pesticide results and well depth from ISDA 2005 sampling of Project 310: Owyhee County Dacthal Response PMP Monitoring Project (TD = total well depth).

Table 24 presents summary statistics for the 14 wells sampled for the Owyhee County Dacthal follow up monitoring. In addition to dacthal (DCPA), three other pesticides were detected in the ground water. Atrazine, desethyl atrazine, and simazine were each found in one well. All detections were below any health standards set by the EPA or the state of Idaho. All detections were within the Level 1 category established by the Idaho PMP, except for the one Level 2 dacthal detection.

Table 24. Summary of pesticide detections from Project 310.

Pesticide	Detections above LDL[1]	Range (µg/L)	Mean (µg/L)	Median (µg/L)	Reference Point (µg/L)
Atrazine	1	0.05	-----	-----	3 (MCL)[2]
Dacthal (DCPA)	8	0.098 - 28	6.071	0.48	70 (HAL)[3]
Desethyl Atrazine	1	0.07	-----	-----	-----[4]
Simazine	1	0.02	-----	-----	4 (MCL)

[1]LDL – Laboratory Detection Limit
[2]MCL – EPA Maximum Contaminant Level
[3]HAL – EPA Health Advisory Level
[4]Breakdown product of Atrazine

Fremont County

Figure 21 shows the pesticide results from the follow up sampling for the Level 4 triallate detection in Fremont County (Project 320). A total of 15 wells were sampled in 2005 for pesticides and nutrients.

The well with the original Level 4 triallate detection dropped to a concentration below the detection limit in the follow up sampling in October. An additional well had a concentration of triallate below the detection limit, and the remaining 13 wells had no detections of triallate. One well had Level 1 detections of atrazine and desethyl atrazine. All pesticide detections in the follow up sampling were below any health standards set by EPA or the state of Idaho. Except for the initial Level 4 detection of triallate, all pesticide detections were within the Level 1 category.

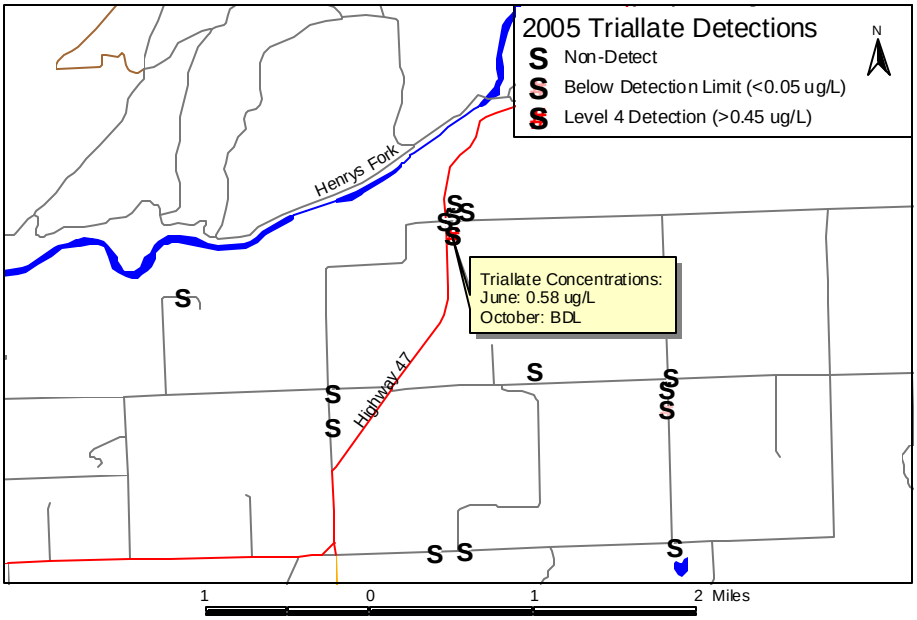

Figure 21. Pesticide results from ISDA 2005 sampling of Project 320: Fremont County Triallate Response PMP Monitoring Project.

Nez Perce County

Figure 22 shows the pesticide results from the follow up sampling for the Level 2 atrazine and Level 3 desethyl atrazine (DEA) detections in Nez Perce County (Project 330). A total of 10 wells were sampled in 2005 for pesticides and nutrients. The well that initiated the investigation had a Level 2 atrazine detection and a Level 3 DEA detection in the follow-up testing, consistant with the initial testing. One well had Level 1 detections of atrazine and DEA. Another well had a Level 1 detection of DEA. The remaining seven wells had no detections of atrazine or DEA above the lab detection limit. All pesticide detections in the follow up sampling were below any health standards set by EPA or the state of Idaho.

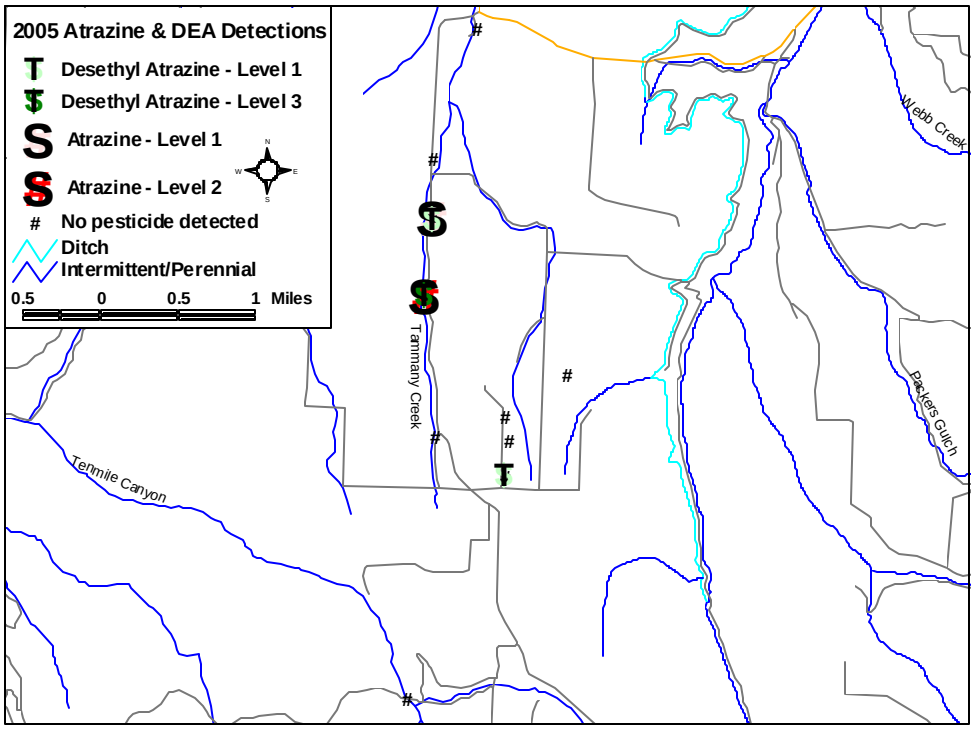

Figure 22. Pesticide results from ISDA 2005 sampling of Project 330: Nez Perce County Atrazine and Desethyl Atrazine Response PMP Monitoring Project.

Table 25 presents summary statistics for the 10 wells sampled for the Nez Perce County Atrazine and DEA follow up monitoring. In addition to atrazine and DEA, three other pesticides were detected in the ground water. Bromacil, diuron, and picloram were each found in one well. All detections were below any health standards set by the EPA or the state of Idaho. All detections were within the Level 1 category established by the Idaho PMP, except for the Level 2 atrazine and Level 3 DEA detections.

Table 25. Summary of pesticide detections from Project 330.

Pesticide	Detections above LDL[1]	Range (µg/L)	Mean (µg/L)	Median (µg/L)	Reference Point (µg/L)
Atrazine	2	0.06 - 1.3	0.68	0.68	3 (MCL)[2]
Bromacil	1	0.51	-----	-----	90 (HAL)[3]
Desethyl Atrazine[4]	3	0.06 - 1.8	0.64	0.066	-----
Diuron	1	0.2	-----	-----	10 (HAL)
Picloram	1	0.48	-----	-----	500 (MCL)

[1]LDL – Laboratory Detection Limit
[2]MCL – EPA Maximum Contaminant Level
[3]HAL – EPA Health Advisory Level
[4]Breakdown product of Atrazine

Payette County

Figure 23 shows the pesticide results from the follow up sampling in November 2005 for the Level 2 desethyl atrazine (DEA) detections in Payette County (Project 340). A total of 10 wells near the initial DEA detection were sampled for pesticides and nutrients. One well had a Level 3 DEA detection, two wells had Level 2 DEA detections, and four wells had DEA detections below the lab detection limit. Two wells had Level 2 atrazine detections, three wells had Level 1 atrazine detections, and two wells had atrazine detections below the lab detection limit. The remaining three wells had no detections of atrazine or DEA. All pesticide detections in the follow up sampling were below any health standards set by EPA or the state of Idaho.

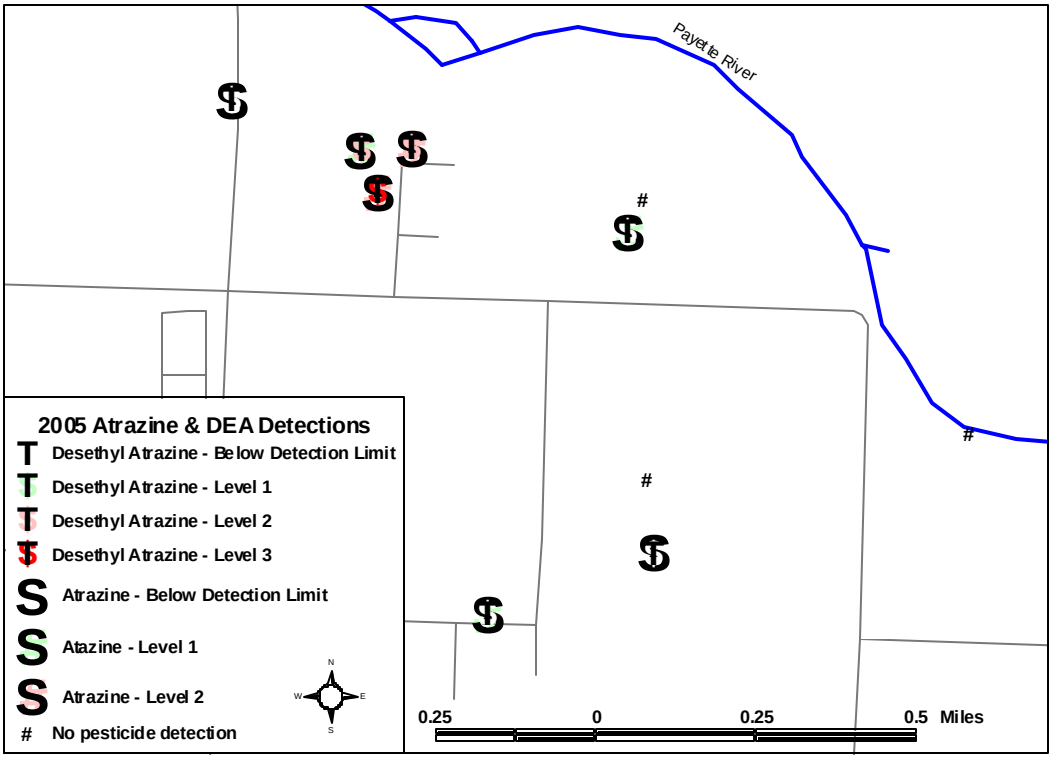

Figure 23. Atrazine and DEA results from ISDA 2005 sampling of Project 340: Payette County Atrazine and Desethyl Atrazine Response PMP Monitoring Project.

In addition to the ten wells sampled around the original Level 2 DEA detection, seven wells located throughout Payette County were sampled for pesticides to fill in some spatial gaps from the regional project in Payette County (refer to Figure 3 in the Regional Project Pesticide section). Out of the 17 wells sampled in Payette County in November, six wells had atrazine detections above the lab detection limit (LDL), four wells had DEA detections above the LDL, three wells had dacthal (DCPA) detections above the LDL, and two wells had deisopropyl atrazine (DIA) detections above the LDL. The pesticides bentazon and bromacil were each detected in one well above the LDL. Table 26 presents the summary information for the pesticide detections.

Table 26. Summary of pesticide detections from Project 340.

Pesticide	Detections above LDL[1]	Range (µg/L)	Mean (µg/L)	Median (µg/L)	Reference Point (µg/L)
Atrazine	6	0.025 - 1.1	0.42	0.20	3 (MCL)[2]
Bentazon	1	0.52	-----	-----	200 (HAL)[3]
Bromacil	1	0.14	-----	-----	90 (HAL)
Dacthal (DCPA)	3	0.095 - 0.65	0.34	0.26	70 (HAL)
Desethyl Atrazine	4	0.04 - 1.6	0.89	0.97	-----[4]
Deisopropyl Atrazine	2	0.034 - 0.048	0.041	0.041	-----[4]

[1]LDL – Laboratory Detection Limit
[2]MCL – EPA Maximum Contaminant Level
[3]HAL – EPA Health Advisory Level
[4]Breakdown product of Atrazine

Confined Animal Feeding Operation State Siting Team

The staff of ISDA's water program serves on the CAFO Site Advisory Team to fulfill the Site Advisory Team Suitability Determination Act. The interagency team consists of engineers from ISDA and water personnel from ISDA, DEQ, and IDWR. Water staff provide hydrogeological expertise and assessment to counties who request assistance in siting CAFOs.

Ninteen site evaluations were completed in 2005 with 15 receiving low risk and 4 receiving moderate risk determinations. Counties where sitings occurred include: Minidoka (4), Gooding (3), Jerome (3), Lincoln (3),Twin Falls (2), Cassia (2), Payette (1) and Owyhee (1).

Ground Water Quality Protection Activities

ISDA is the lead for implementation of policy II-B of the Idaho Ground Water Quality Plan which was specifically written to prevent ground water contamination from unique practices found in agriculture. 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 intent of the I & E Subcommittee is to coordinate a common educational strategy through multiple state and federal agencies. The Subcommittee meets quarterly. Activities in 2005 included implementation of an overall I & E Statewide Implementation Plan and update of the Agricultural Chemical Source Matrix (Appendix A, Idaho Ground Water Quality Plan). In 2005 ISDA was awarded an EPA Clean Water Non-Point Source 319 Grant to revise and print the Idaho Home*A*Syst Project (HAS) materials, and develop a HAS web-site. Once the HAS Project materials are printed they will then be distributed statewide to soil conservation district offices, University of Idaho County Extension offices, and other state and federal agencies. In addition, through the HAS web site farmers can conduct an assessment of their pesticide storage and handling practices and receive a pesticide recertification credit for doing so. Workshops are being planned for 2006-2007 to publicize the HAS materials and the website.

In 2005, ISDA was also very active in facilitation of educational workshops designed specifically for the farmer (Table 27). Presented material included: pesticide and nutrient ground water quality data, information on proper safety, storage, and handling of pesticides and fertilizers with respect to the domestic well, best management practices for in field use of pesticides and fertilizers, and information on the State Pesticide Management Plan. ISDA plans on conducting additional workshops in 2006.

Table 27. Pesticide Recertification Education workshops.

Pesticide Discretionary Project - Workshops				
Location	Attendance	Agenda Highlights	Disseminated Materials	Feedback
Burley	76	• Home*A*Syst-Protecting your drinking water. • Groundwater Protection-Monitoring/PMP Rule	• Pesticides and Water Quality • CROP Program • Idaho PMP • PMP Rule • Home*A*Syst • Understanding Pesticide Label • Region Specific Fact Sheet	Positive
Twin Falls	52			
Emmett	17			
Ashton	41			
St. Anthony	13			
Hailey	18			
Blackfoot	10			
Idaho Falls	8			
Fort Hall	16			
Caldwell	123	• Pesticide/Nitrate Ground-water Monitoring and Protection Program for Agriculture	• Pesticides and Water Quality • CROP Program • Idaho PMP • PMP Rule • Home*A*Syst • Understanding Pesticide Label • Region Specific Fact Sheet	
Nampa	70			
Jackpot, NV Two days	280/78	• Groundwater Monitoring Results and PMP		
Pocatello Two days	55/40	• Pesticides and Water Quality		
Total	897			

ISDA's goal is to be proactive and prevent agricultural pollution. Education is the best activity to comply with that goal. 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 groundwater and recommendations or BMPs for remediating contamination concerns identified through the monitoring.

Once ISDA determines that BMPs will be needed to correct a ground water quality problem it relies on its partnership with the ISCC and the SCDs 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 2005 ISDA assisted the Weiser River SCD, the Gooding SCD, the Lewis SCD, and the Yellowstone SCD, implement their EPA Clean Water Act 319 Grants. Also, in 2005 ISDA assisted the West Cassia Soil and Water Conservation District apply for a EPA Clean Water Act 319 Grant to fund the implementation of nutrient and irrigation water management BMPs.

The Weiser River SCD 319 project is focused on agricultural practices within the number one nitrate priority area in the state. The project includes implementation of alternative irrigation systems, development of nutrient management plans, and an extensive BMP effectiveness evaluation program. ISDA has been instrumental in ground water monitoring and evaluating ground water quality associated with the implementation of the Weiser River SCD's 319 project.

The Gooding SCD 319 project is located in a DEQ designated nitrate priority area. The Bliss ground water improvement project encompasses the 6,800 acre Bliss Nitrate Priority Area and focuses on implementing better nutrient management planning through soils and plant tissue analyses and evaluating irrigation systems for better management. ISDA is monitoring ground water quality in the Bliss area to evaluate the effectiveness of the 319 project.

The Lewis SCD 319 project located on the Camas Prairie and within the number five nitrate priority area 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. ISDA is monitoring ground water quality in association with the 319 project to evaluate the effectiveness of the nutrient management BMPs on dry farms.

The Yellowstone SCD 319 project is located in Fremont County near the town of Ashton and is the number eight 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. ISDA is monitoring ground water quality in the region to evaluate whether the reduction in nitrogen applications will also reduce the nitrate levels in domestic wells.

The West Cassia Soil and Water Conservation District's proposed 319 project is to be implemented in the 3rd highest nitrate priority area in the state. The 319 funds will be used to provide a cost-share to farmers who implement nutrient and irrigation water management BMPs. The ISDA is monitoring ground water quality in the Burley area and will continue to do so to evaluate the effectiveness of the SCDs 319 Project.

Database

The ISDA Ground Water Program database is used to store all sampling data from ISDA regional, local, and special projects. Projects and data is 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 1000 homeowner result letters and well analysis reports were mailed in 2005.

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 website can be accessed at http://www.agri.idaho.gov/Categories/Environment/water/indexwater.php.

Summary

The ISDA Ground Water Program implemented a wide variety of ground water monitoring projects and protection activities related to agriculture for the state of Idaho in 2005. The monitoring efforts in 2005 mainly focused on areas in the state that have either showed past impacts from nitrate pollution or to a lesser extent pesticides. ISDA currently has 27 distinct and active ground water projects across the state. Thirteen of these projects were regional based projects, 12 were dairy or confined animal feeding operation (CAFO) related projects, two were local projects, and one was an EPA funded special 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. 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 19 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. Fifty three wells or eight percent of 635 regional wells sampled by the ISDA Ground Water Program in 2005 exceed the EPA MCL for nitrate. All but one of the 13 active regional projects show mean ground water nitrate concentrations above 2 mg/L suggesting anthropogenic impacts. Overall ground water quality statistics for the Washington and Payette Regional Study have the highest calculated mean and median values, 8.9 mg/L and 7.8 mg/L, respectively. The Cassia County Regional Study is next with a mean value of 5.6 mg/L and a median of 3.5 mg/L.

The 12 Dairy and Beef CAFO monitoring projects indicate significant nitrate impacts to ground water. Five 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 but one of the twelve active projects having mean concentrations above 2 mg/L in 2005. Ground water testing by the ISDA Dairy Bureau of 688 dairies in 2005 indicates 41 (6.1%) locations exceed the MCL for nitrate.

A total of 166 different regional wells were sampled for nitrogen isotope testing in 2005. Sites selected for testing included those having nitrate levels exceeding 5 mg/L in 2004. Based on the 166 wells tested, results suggested that 16% of the wells tested contained nitrate from a fertilizer source, 70% from a combination of sources or purely organic source, and 14% from animal or human waste. Overall, results suggest a combination of sources to be the most likely causes of elevated nitrate in the majority of wells.

Testing of regional, local, and discretionary type projects returned detections of pesticides in ground water. However, most detections are less than 20 percent of health standard concentrations. Four sites tested in 2005 had levels that exceeded 20 percent of a health standard requiring additional response activities. These sites are located in Fremont, Owyhee, Nez Perce, and Payette Counties.

ISDA Ground Water Program staff participated, initiated, or provided technical assistance in many ground water protection activities. Staff initiated negotiated rule making for implementation of Idaho's Pesticide Management Plan (2004), which were subsequently submitted to the 2005 Idaho legislature and passed in 2005. The new rules are entitled "02.03.01 - Rules Governing Pesticide Management Plans for Ground Water Protection". The Ground Water Program facilitated or participated in more 13 educational workshops across the state and provided technical assistance to five 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 19 CAFO siting evaluations. Fifteen new or expanding CAFO sites were determined to be of low risk and four of moderate risk as related to environmental or human health considerations.

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