Idaho State Department of Agriculture

Ground Water Program Annual Report

For 2004

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Special thanks goes 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, and Gooding Soil Conservation District.

Thanks to the various ISDA staff outside the water program who contribute daily to the efforts of our program. Staff 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 2004 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.

The report cover photo was taken by Gary Bahr in Lewis County near Nez Perce, Idaho.

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 2004, the ISDA Ground Water Program implemented 20 distinct monitoring projects. Twelve of these projects were regional based projects, five 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 20 active projects indicated a varying degree of impacts to ground water with nitrate being the most common constituent of concern. Several pesticide detections also were found with levels that may require future monitoring, assessment, and possibly regulatory actions.

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 four wells or nine percent of 614 regional wells sampled by the ISDA Ground Water Program in 2004 exceed the EPA MCL. All of the 12 active regional projects show mean and median values above 2 mg/L suggesting some anthropogenic impacts. Dairy and CAFO project monitoring show greater impacts in terms of concentrations and percentages for three of the five projects in 2004.

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 2004 had levels that exceeded 20 percent of a health standard requiring additional response activities. These sites are located in Fremont, Owyhee, Nez Perce, and Franklin Counties.

ISDA Ground Water Program staff participated, initiated, or provided technical assistance in many ground water protection activities. Staff initiated negotiated rule making in 1993 for implementation of Idaho's Pesticide Management Plan (PMP) process, which were subsequently passed by the 2005 Idaho Legislature. The Ground Water Program facilitated or participated in more than a dozen educational workshops across the state and provided technical assistance to four Idaho Soil Conservation Districts with implementation of field projects to help improve Idaho ground water quality in high priority areas. ISDA Ground Water Program staff also actively participated in providing assistance with the writing of ground water protection plans related to Idaho Department of Environmental Quality (DEQ) established nitrate priority areas across the state. The Idaho CAFO siting team lead by ISDA conducted 10 site assessments for new or expanding CAFOs with seven low risk determinations and three moderate risk determinations.

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Introduction

Scope

This report constitutes the first 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 2004. The ISDA Ground Water Program Annual Report for 2004 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 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.

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). Twelve of the 14 projects were actively monitored in 2004. 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 ranges from 30 to 72 with a total of 614 wells sampled in 2004 as part of the overall regional sampling effort. Two projects (Eastern Snake River Plain and Rathdrum Prairie) were not sampled in 2004 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.

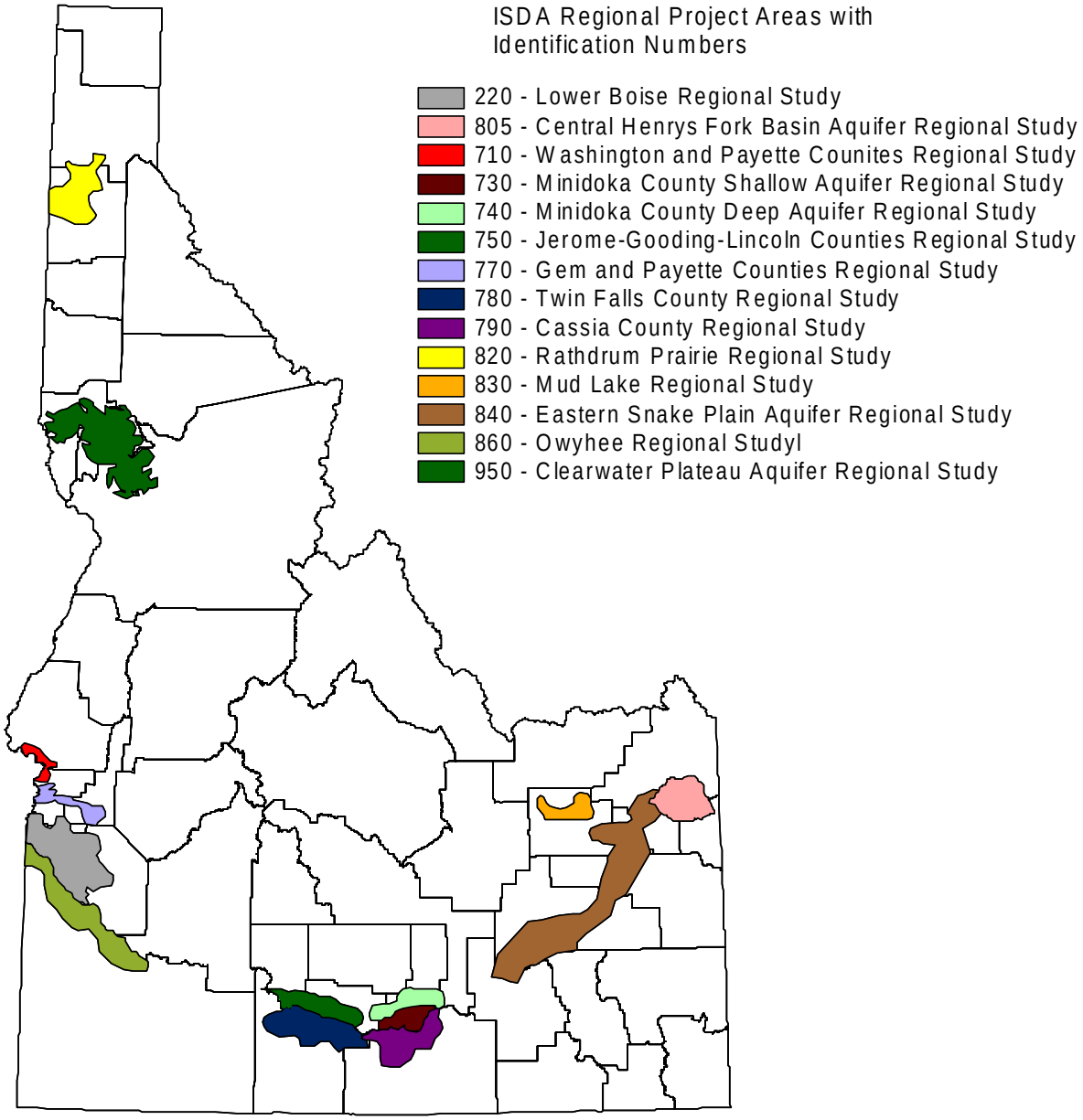

Figure 1. Map showing locations of 14 regional project areas.

Table 2. ISDA regional project general information for 2004.

Project No.	Project Name	Start Year	Status (2004)	Inorganics Tested (All Wells)	Pesticide Testing (2004)	Isotope Testing (2004)	Wells Monitored (2004)
220	Lower Boise Regional Study	2003	active	nitrate, nitrite, ammonia, chloride sulfate, bromide, fluoride, orthophosphorus	none	11	63
710	Washington and Payette Counties Regional Study	1996	active	nitrate, nitrite, ammonia, chloride sulfate, bromide, fluoride, orthophosphorus	all wells	28	51
730	Minidoka County Shallow Aquifer Regional Study	1997	active	nitrate, nitrite, ammonia, chloride sulfate, bromide, fluoride, orthophosphorus	all wells	13	44
740	Minidoka County Deep Aquifer Regional Study	1997	active	nitrate, nitrite, ammonia, chloride sulfate, bromide, fluoride, orthophosphorus	all wells	18	48
750	Jerome-Gooding-Lincoln Counties Regional Study	1997	active	nitrate, nitrite, ammonia, chloride sulfate, bromide, fluoride, orthophosphorus	none	2	73
770	Gem and Payette Counties Regional Study	1998	active	nitrate, nitrite, ammonia, chloride sulfate, bromide, fluoride, orthophosphorus	none	7	41
780	Twin Falls County Regional Study	1998	active	nitrate, nitrite, ammonia, chloride sulfate, bromide, fluoride, orthophosphorus	none	26	72
790	Cassia County Regional Study	1998	active	nitrate, nitrite, ammonia, chloride sulfate, bromide, fluoride, orthophosphorus	none	20	46
805	Central Henrys Fork Basin Aquifer Regional Study	2003	active	nitrate, nitrite, ammonia, chloride sulfate, bromide, fluoride, orthophosphorus	follow-up (1 well)	17	44
820	Rathdrum Prairie Regional Study	1998	inactive	nitrate, nitrite, ammonia, chloride sulfate, bromide, fluoride, orthophosphorus	none	0	0
830	Mud Lake Regional Study	1998	active	nitrate, nitrite, ammonia, chloride sulfate, bromide, fluoride, orthophosphorus	none	4	30
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 (2 wells)	6	33
950	Clearwater Plateau Aquifer Regional Study	2001	active	nitrate, nitrite, ammonia, chloride sulfate, bromide, fluoride, orthophosphorus	all wells	6	69

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 2004 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 Ground 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 with 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). Mean nitrate concentrations per project and 7 of 12 median nitrate concentrations exceed the 2 mg/L level (Table 3). Wells located in the Washington and Payette Regional Study have the highest median and mean values, 8.6 mg/L and 6.4 mg/L, respectively. The Cassia County Regional Study is next with a mean value of 5.7 mg/L and a median of 5.3 mg/L (Table 3). All other regional projects have mean and median values less than 5mg/l.

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

Project No.	Project Name	Nitrate Findings (2004)					
		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	63	3.1	1.9	14	11(17%)	3 (5%)
710	Washington and Payette Counties Regional Study	51	8.6	6.4	41	6 (16 %)	21 (41%)
730	Minidoka County Shallow Aquifer Regional Study	44	4.2	3.2	28	12 (28%)	2 (5%)
740	Minidoka County Deep Aquifer Regional Study	48	3.7	3.0	8.3	14 (30%)	0
750	Jerome-Gooding-Lincoln Counties Regional Study	73	2.1	1.8	15	3 (4%)	1 (1%)
770	Gem and Payette Counties Regional Study	41	2.8	1.2	16	8 (20%)	3 (7%)
780	Twin Falls County Regional Study	72	4.1	3.9	12	21 (30%)	2(3%)
790	Cassia County Regional Study	46	5.7	5.3	16	16 (36%)	7 (16%)
805	Central Henrys Fork Basin Aquifer Regional Study	44	4.5	3.7	24	13 (30%)	4 (9%)
820	Rathdrum Prairie Regional Study	0	-	-	-	-	-
830	Mud Lake Regional Study	30	2.5	2.5	9.2	4 (13%)	0
840	Eastern Snake Plain Aquifer Regional Study	0	-	-	-	-	-
860	Owyhee Regional Study	33	3.1	0.02	27	2 (6%)	5 (15%)
950	Clearwater Plateau Aquifer Regional Study	69	3.4	1.4	41	9 (13%)	6 (9%)
All Active Regional Projects Combined		**614**	**4**	**2.9**	**41**	**119 (19%)**	**54 (9%)**

Of the 614 wells tested, 28 % percent exceed 5 mg/L and 9 % or 54 wells in the regional network exceeded the EPA MCL of 10 mg/L (Table 3 and Figure 2). The projects having the most wells

exceeding the MCL include Washington and Payette Regional Study (41%), Cassia County Regional Study (16%), Owyhee Regional Study (15%), and Central Henrys Fork Basin Aquifer Regional Study (Table 3). Only two projects, the Minidoka County Regional Study and Mud Lake Regional Study, recorded no wells with nitrate above the MCL (Table 3).

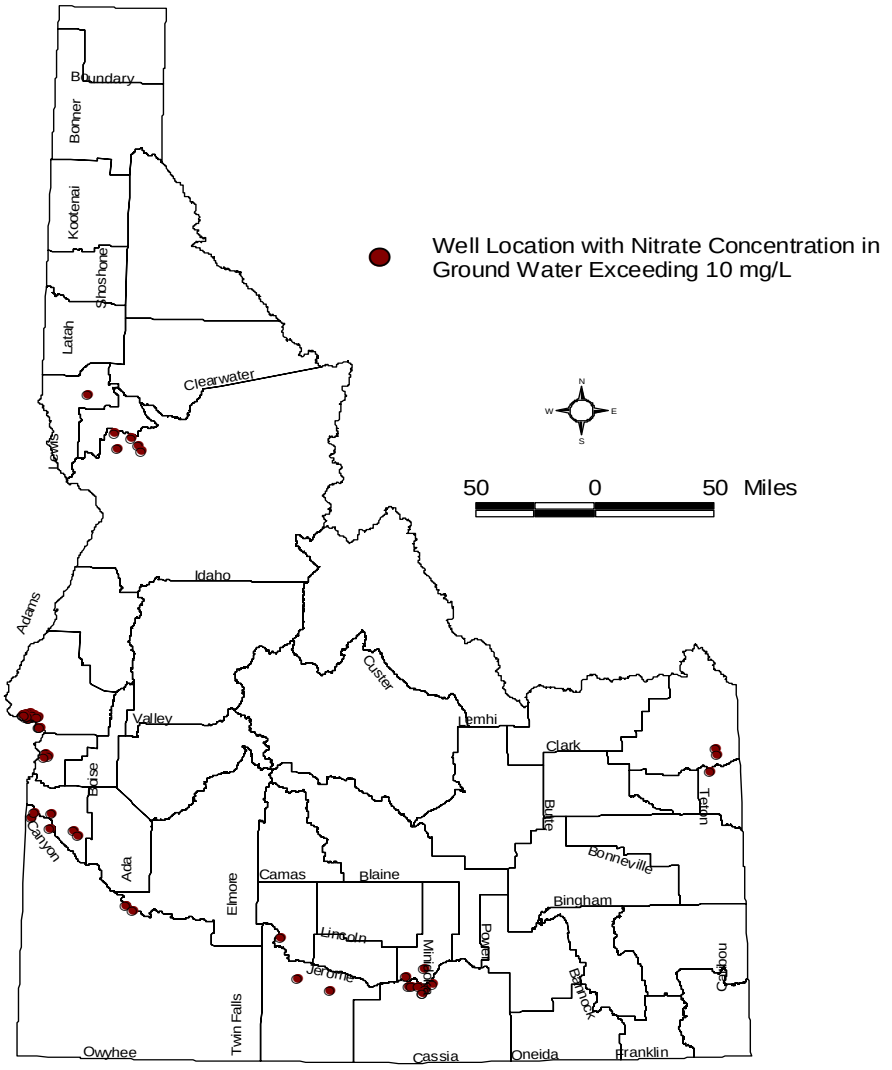

Figure 2. Map showing nitrate detections in ground water from 2004 that exceeded the EPA MCL of 10mg/L. Detections are from regional monitoring projects only.

Nitrogen Isotopes

Overview

ISDA Ground 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 $\delta^{15}N$), 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 $\delta^{15}N$ 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 158 different regional wells were sampled for nitrogen isotope testing in 2004. Sites selected for testing included those with nitrate levels exceeding 5 mg/L in 2003. Based on the 158 wells tested, overall results suggested that 17 % of the wells tested contained nitrate from a fertilizer source, 73 % from a combination of sources or purely organic source, and 10 % 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: Minidoka County Deep Aquifer Regional Study (50 % of wells tested), Clearwater Plateau Aquifer Regional Study (33% of wells tested), and Cassia County Regional Study (30% of wells tested). Others project areas with isotope results suggesting animal or human waste included Gem and Payette Counties Regional Study (43% of wells tested) and Minidoka County Shallow Aquifer Regional Study (23% 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	9%	91%	0%	11
710	Washington and Payette Counties Regional Study	4%	75%	21%	28
730	Minidoka County Shallow Aquifer Regional Study	15%	62%	23%	13
740	Minidoka County Deep Aquifer Regional Study	50%	50%	0%	18
750	Jerome-Gooding-Lincoln Counties Regional Study	0%	100%	0%	2
770	Gem and Payette Counties Regional Study	0%	57%	43%	7
780	Twin Falls County Regional Study	15%	85%	0%	26
790	Cassia County Regional Study	30%	70%	0%	20
805	Central Henrys Fork Basin Aquifer Regional Study	0%	88%	12%	17
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	17%	66%	17%	6
950	Clearwater Plateau Aquifer Regional Study	33%	67%	0%	6
	Overall	**17%**	**73%**	**10%**	**158**

Pesticides

Complete pesticide sampling, in which all wells within a project are tested for pesticides, was conducted in 2004 throughout four regional projects (Figure 3). Partial pesticide sampling was conducted in two regional project areas in which a select number of wells within the project were

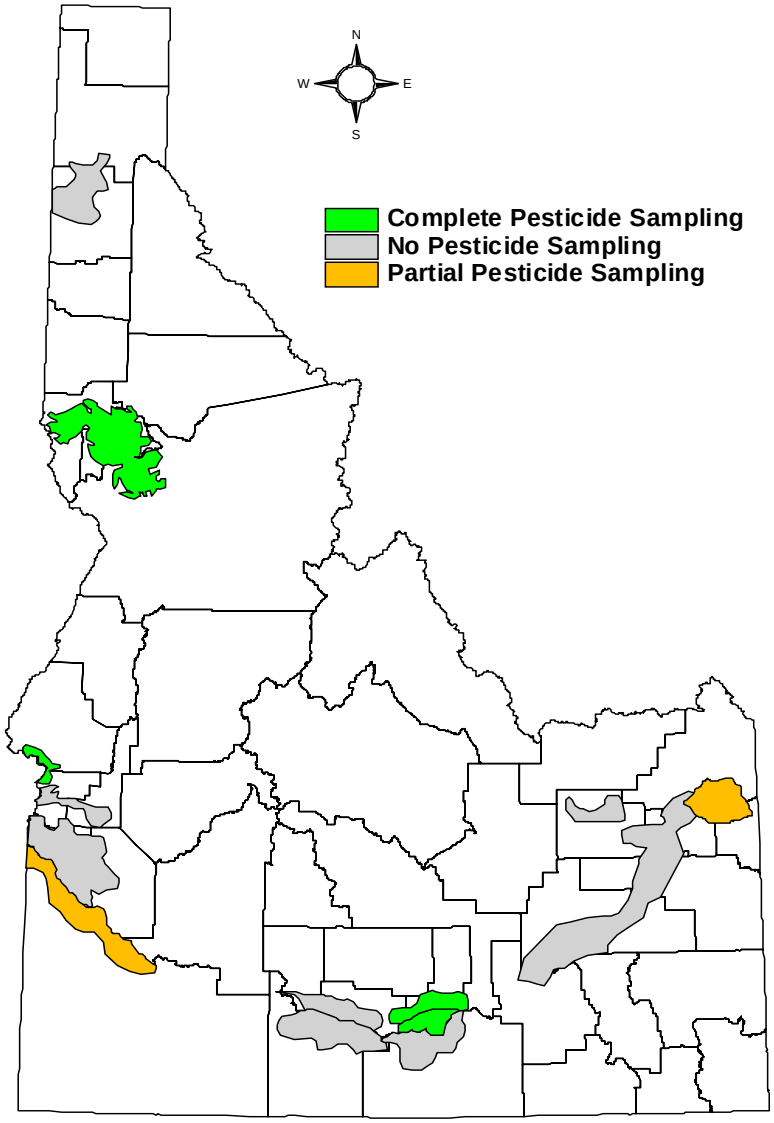

Figure 3. ISDA regional project pesticide testing for 2004.

analyzed for pesticides (Figure 3). The wells that were selected for the partial pesticide sampling projects were chosen due to historical pesticide detections in the wells.

Table 5 presents the regional projects tested for pesticides in 2004, the number of wells sampled, and the type of pesticide analysis performed. A total of 211 wells were tested for various pesticides in the regional project areas in 2004. There were 87 positive detections in the 2004 regional project pesticide sampling. Seventeen different types of pesticides were detected, as seen on Table 6. None of the detections exceeded reference points. Atrazine desethyl, which is a breakdown product of the pesticide atrazine, was the most frequently detected chemical (28 detections). Atrazine was the second most frequently detected chemical (19 detections).

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

Project Number and Name	Pesticide Testing	Number of Wells Sampled	Analysis (EPA Method Number)
710 Washington and Payette County	Complete	50	507, 515.1
730 Minidoka Perched Alluvial Aquifer	Complete	42	507, 515.1
740 Minidoka Deep Aquifer	Complete	48	507, 515.1
950 Clearwater Plateau Aquifer	Complete	68	507, 515.1
805 Central Henry's Fork Basin Aquifer	Partial	1	507, 515.1
860 Northern Owyhee Aquifer	Partial	2	515.1

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

Pesticide	Detections	Range (µg/L)	Mean (µg/L)	Reference Point (µg/L)	County of Detection
2,4-D	1	0.8	-------	70 (MCL)[1]	Washington
2,4,6-Trichlorophenol	1	0.08	-------	10 (DWEL)[2]	Washington
Atrazine	19	0.03 - 0.65	0.08	3 (MCL)	Minidoka (9) Nez Perce (1) Washington (9)
Bromacil	4	0.05 - 0.08	0.07	90 (HAL)[3]	Nez Perce (1) Washington (3)
Dacthal (DCPA)	7	0.08 - 14	4.1	70 (HAL)	Owyhee (2) Washington (5)
Desethyl Atrazine	28	0.02 - 0.99	0.1	-4	Minidoka (14) Nez Perce (2) Washington (12)
Desisopropyl Atrazine	1	0.16	-------	-4	Minidoka
Dicamba	1	0.11	-------	200 (HAL)	Washington
Diuron	6	0.03 - 0.55	0.24	10 (HAL)	Cassia (1) Minidoka (3) Nez Perce (2)
Hexazinone	4	0.09 - 0.18	0.12	400 (HAL)	Washington (1) Minidoka (3)
Metalochlor	1	0.57	-------	100 (HAL)	Nez Perce
Metribuzin	3	0.05 - 1	0.39	200 (HAL)	Fremont (1) Nez Perce (1) Washington (1)
Picloram	2	0.13 - 0.5	0.32	500 (MCL)	Lewis (1) Nez Perce (1)
Prometon	2	0.06 - 0.29	0.17	100 (HAL)	Minidoka
Simazine	5	0.02 - 0.21	0.07	4 (MCL)	Minidoka
Tebuthiuron	1	0.07	-------	500 (HAL)	Washington
Triallate	1	0.31	-------	0.45 (FQPA)[5]	Fremont

[1]MCL – EPA Maximum Contaminant Level
[2]DWEL – EPA Drinking Water Equivalent Level
[3]HAL – EPA Health Advisory Level
[4]Breakdown products of Atrazine
[5]FQPA – EPA Food Quality Protection Act

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 recently passed *Rules Governing Pesticide Management Plans for*

Ground Water Protection. 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 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.

Most regional project pesticide detections fell within the Level 1 detection range, except for a Level 3 detection of triallate in southeast Idaho, and Level 2 detections of atrazine and desethyl atrazine in the Clearwater Plateau area.

Figure 4 shows the pesticide detections in southeast Idaho, including the Level 3 triallate detection. The EPA Food Quality Protection Act (FQPA) sets a standard of 0.45 µg/L for triallate. The concentration of the triallate detection in southeast Idaho was 0.31 µg/L. The other pesticide detection in southeast Idaho was a Level 1 metribuzin detection.

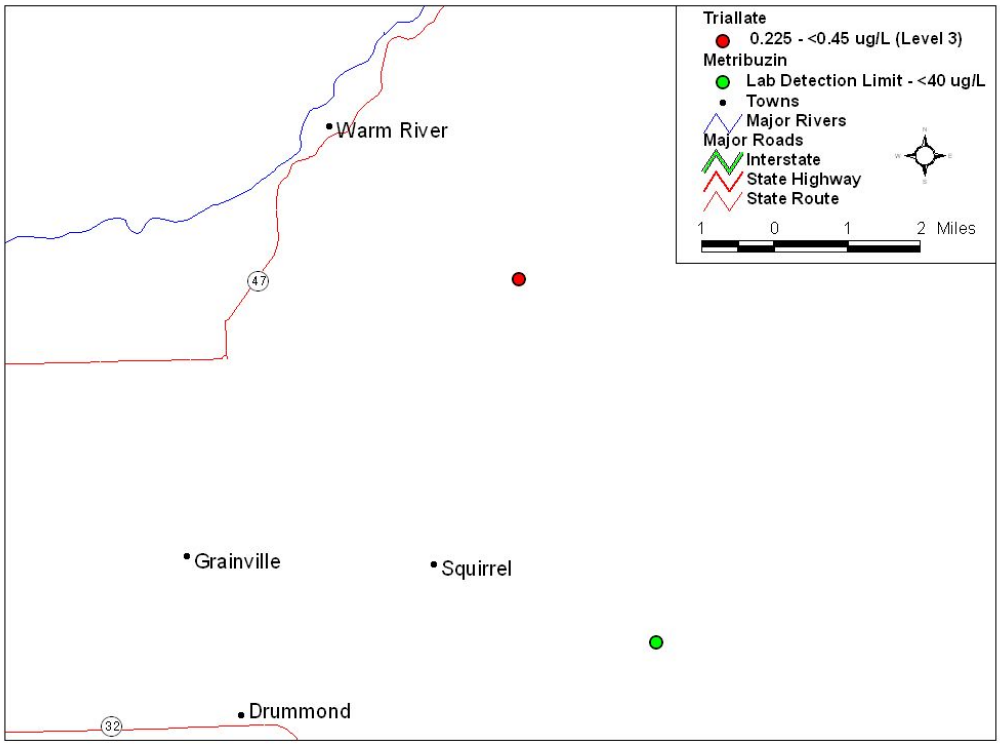

Figure 4. ISDA pesticide detections in Southeast Idaho for 2004.

Figure 5 shows the pesticide detections in the Clearwater Plateau area, including the Level 2 atrazine detection located south of Lapwai. There are two detections of desethyl atrazine (DEA), which is a

breakdown product of atrazine. There is no EPA health standard for DEA; however, ISDA uses the MCL for the parent product atrazine of 3 µg/L as the health reference point for DEA. The well with the Level 2 atrazine detection south of Lapwai also had a Level 2 DEA detection. Other Northern Idaho Level 1 category pesticide detections in 2004 included diuron, bromacil, picloram, metribuzin, and metalochlor.

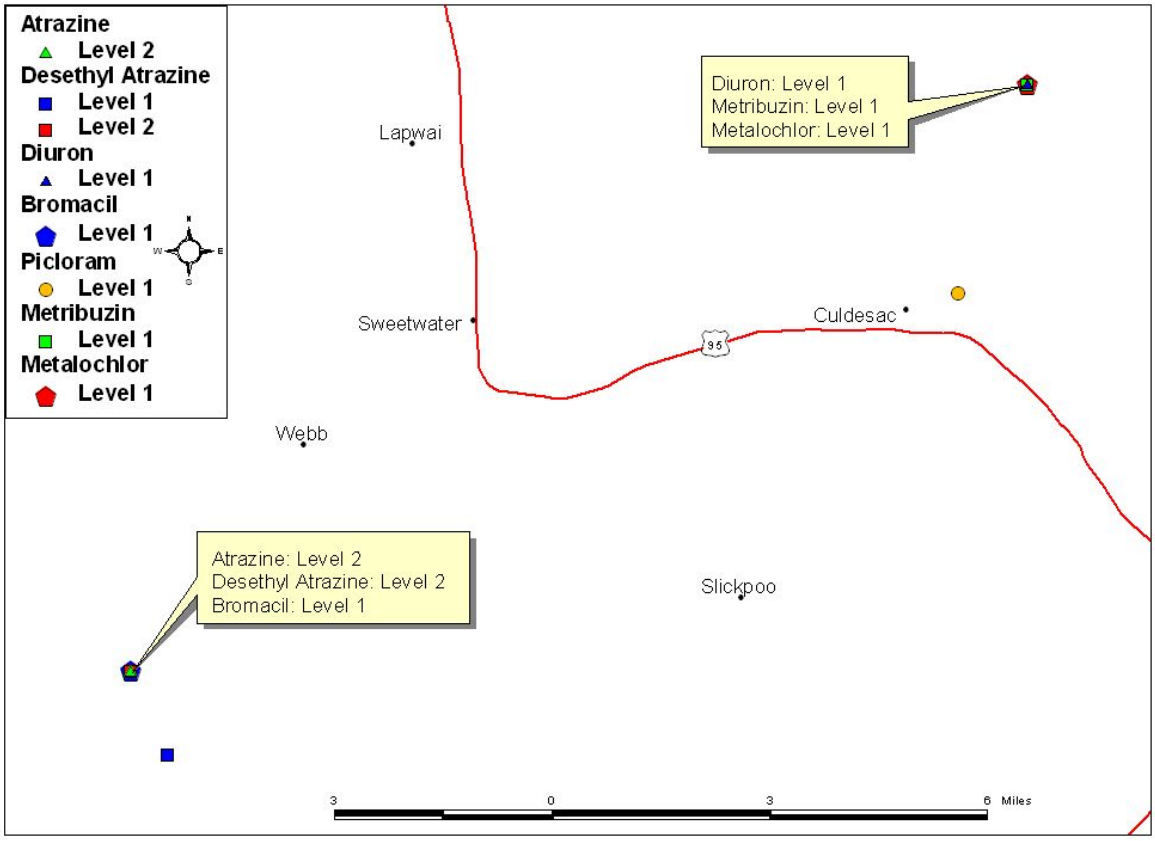

Figure 5. ISDA pesticide detections in Northern Idaho for 2004.

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 follow 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 the ISDA Ground Water Program 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 2004, staff implemented two local monitoring projects that meet this criteria. One project is located northwest of Eagle, Idaho and the other is located south of Mountain Home, Idaho.

Water Quality Findings

Nitrate

Eagle Area, Ada County

There were 17 wells analyzed for NO_3-N in the ISDA local project located near Eagle (Figure 22). There were five wells (or 29% of wells tested) with concentrations over the EPA's MCL of 10 mg/L for NO_3-N, and were all located along Hartley Road (Figure 6).

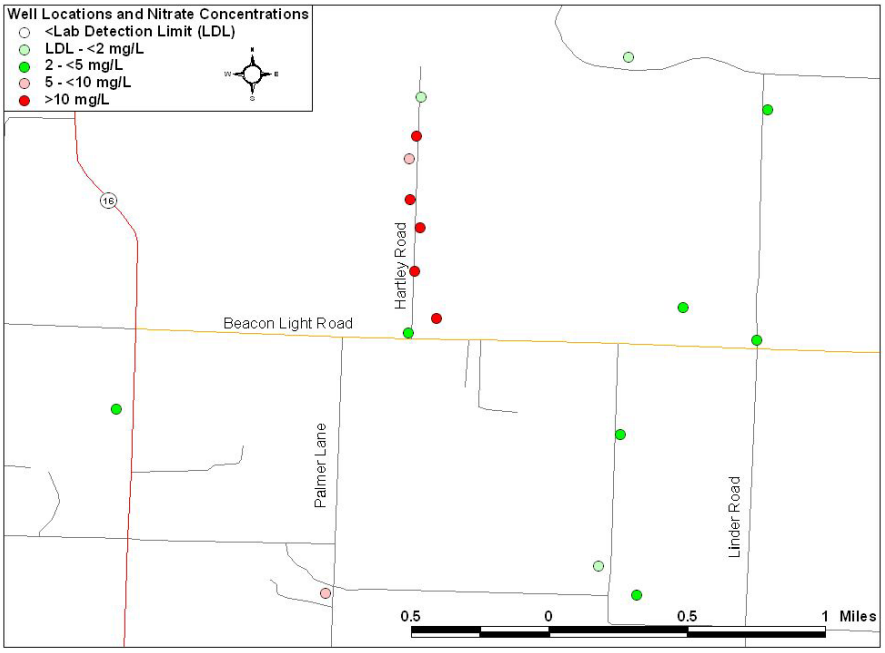

Figure 6. Well locations and 2004 nitrate concentrations for ISDA Eagle local project.

Table 7 presents statistics for the 17 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. Five wells, or 29% of the wells sampled, were over the EPA MCL for nitrate. The majority of the wells (seven wells or 41%) had NO_3-N concentrations ranging from 2 mg/L to less than 5 mg/L. The maximum detection was 44 mg/L. The median value was 3.5 mg/L, while the mean value was 11.64 mg/L. Sampling of this project will continue on a yearly basis indefinitely.

Table 7. Summary statistics for 2004 nitrate concentration for Eagle local project.

Concentration Range (mg/L)	2004 (17 Wells)
<LDL[1] (0.033)	0
LDL to <2.0	3 (18%)
2.0 to <5.0	7 (41%)
5.0 to <10.0	2 (12%)
>10.0	5 (29%)
Mean Value	11.64 mg/L
Median Value	3.5 mg/L
Maximum Value	44 mg/L

[1]LDL – Laboratory Detection Limit

Elmore County Local Project

There were 27 wells analyzed for NO_3-N in the ISDA local project located south of Mountain Home (Figure 7). There were five wells (or 18.5% of wells tested) with concentrations over the EPA's MCL of 10 mg/L for NO_3-N, and were mainly located near the intersection of S. 18th E. and Hamilton Roads (Figure 23).

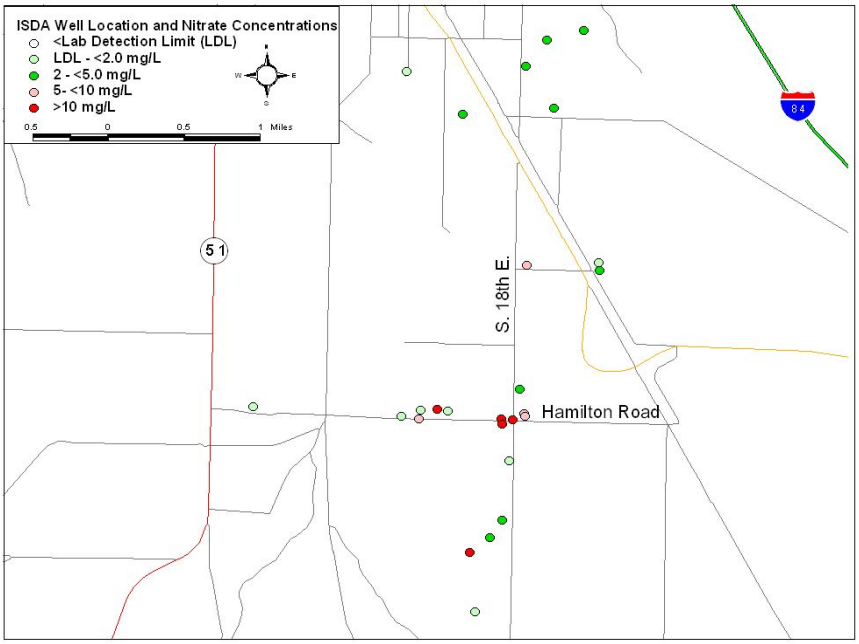

Figure 7. Well locations and 2004 nitrate concentrations for ISDA Elmore County local project.

Table 8 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. Five wells, or 18.5% of the wells sampled, were over the EPA MCL for nitrate. The majority of the wells (ten wells or 37%) had NO_3-N concentrations ranging from 2 mg/L to less than 5 mg/L. The maximum detection was 32 mg/L. The median concentration was 3.7 mg/L, while the mean concentration was 6.21 mg/L. Sampling of this project will continue on a yearly basis indefinitely.

Table 8. Summary statistics for 2004 nitrate concentration for Elmore County local project.

Concentration Range (mg/L)	2004 (27 Wells)
<LDL[1] (0.033)	0
LDL to <2.0	8 (29.5%)
2.0 to <5.0	10 (37%)
5.0 to <10.0	4 (15%)
>10.0	5 (18.5%)
Mean Value	6.21 mg/L
Median Value	3.7 mg/L
Maximum Value	32 mg/L

[1]LDL – Laboratory Detection Limit

Nitrogen Isotopes

Wells with high NO_3-N detections within the Eagle local project area were chosen for $\delta^{15}N$ analysis. In 2004, nine wells in the Eagle local project area were tested for $\delta^{15}N$. All nine wells had $\delta^{15}N$ values between $5^0/_{00}$ and $10^0/_{00}$, which suggests a combination of sources or organic source (Table 9). Figure 8 is a location map of the wells that were tested for $\delta^{15}N$.

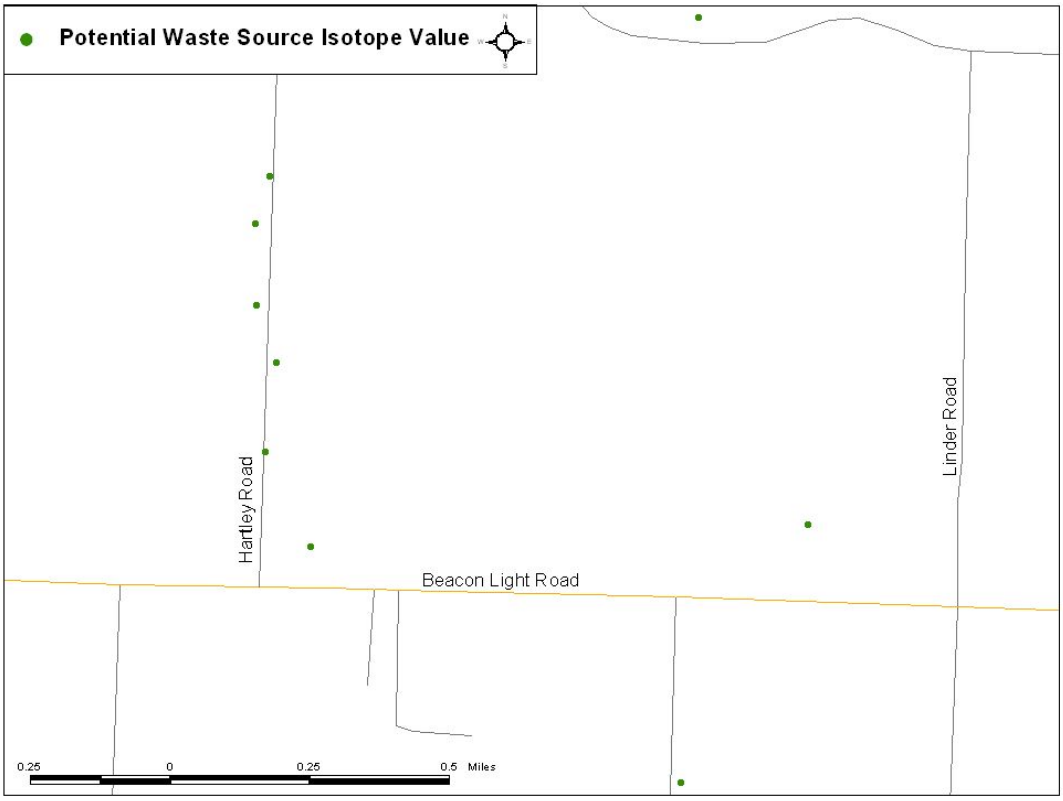

Figure 8. 2004 isotope results in the Eagle local project.

Table 9. Summary of $\delta^{15}N$ results for Eagle local project.

Well ID	NO_3-N (mg/L)	$\delta^{15}N$ ($^0/_{00}$)
5302501	16	6.62
7600601	44	8.35
5302701	38	8.59
5303301	21	8.81
5303701	38	8.33
5301101	4.9	6.06
5302001	10	5.98
5302401	8.2	6.26
5303001	1.3	5.48

Elmore County Local Project

Wells with high NO_3-N detections within the Elmore County local project area were chosen for $\delta^{15}N$ analysis. In 2004, seven wells in the Elmore County local project area were tested for $\delta^{15}N$. Results of $\delta^{15}N$ analysis are currently pending from the laboratory.

Pesticides

Eagle Local Project

Two wells along Hartley Road were analyzed for volatile organic compounds (VOCs) in the Eagle local project (Figure 9). The VOC 1,2,3-Trichloropropane was found in both wells, while the VOC 1,2-Dichloropropane was found in only one well. These two volatile compounds are believed to be found in insecticidal fumigants as either an active ingredient, inert, or impurity (Whitney et al., 1992). 1,2,3-Trichloropropane is a chemical intermediate in the production of several chemicals, including Dichloropropene. Some common trade names for the fungicide Dichloropropene are Telon, Vorlex, and D-D92. There are other non-agricultural products with 1,2,3-Trichloropropane as a chemical intermediate.

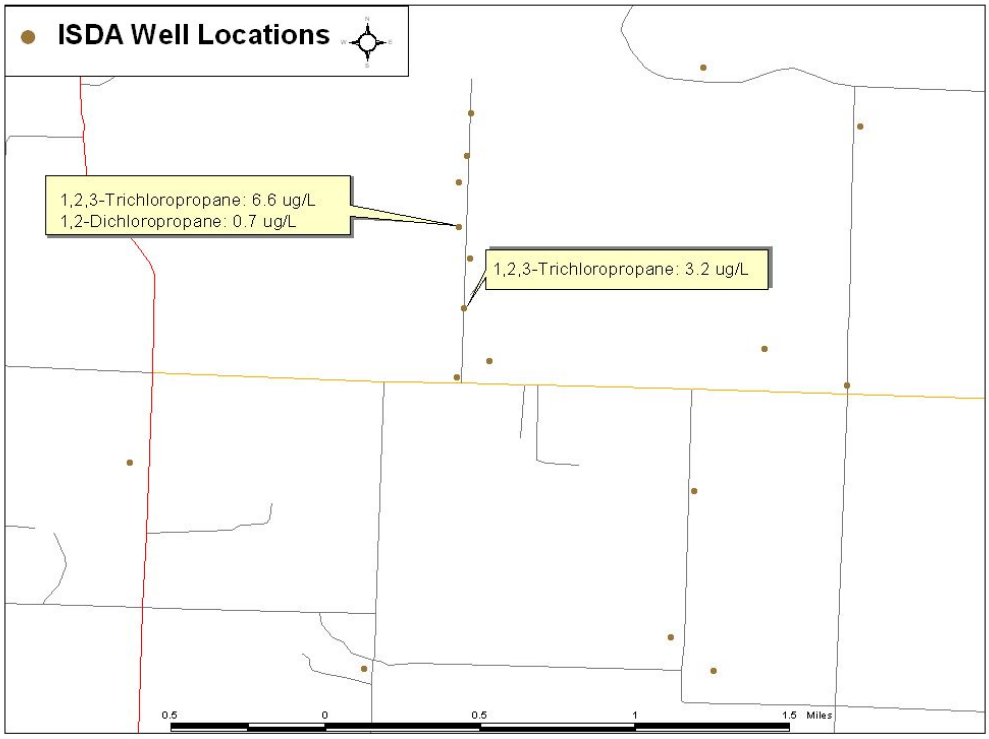

Figure 9. 2004 pesticide detections in the Eagle local project.

Table 10 summarizes the pesticide detections found in the Eagle local project. All detections were less than the EPA health standards. The two wells will be tested for VOCs on an annual basis indefinitely.

Table 10. Summary statistics for 2004 nitrate concentration for Eagle local project.

Pesticide	Number of Detects	Range (µg/L)	Mean Value	Health Standard (µg/L)
1,2,3-Trichloropropane	2	3.2 - 6.6	4.9	40 (RfD)[1]
1,2-Dichloropropane	1	0.7	0.7	5 (MCL)[2]

[1]RfD – EPA Reference Dose
[2]MCL – EPA Maximum Contaminant Level

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

Site Selection

Beef CAFO and dairy project locations are based on review of nitrate data, complaints, and 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 rely 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 select 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 project monitoring plan be written prior to formal project sampling.

Standard Operating Procedures

For all beef CAFO and dairy projects and monitoring activities, ISDA Ground Water Program staff adheres to established protocols 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 adheres to the Ground Water Program SOPs which meet EPA standards.

Water Quality Findings

ISDA Ground Water Program staff sampled 210 wells related to beef CAFO and dairy projects in 2004. The EPA health standard of 10 mg/L for nitrate was exceeded in 31% of all project wells. However, the percentage of wells over the MCL for nitrate varied between projects from 0% to 64%. Project locations are illustrated in Figure 10 below. Number of wells sampled, constituents tested, and nitrate concentration distributions are listed in the tables that follow.

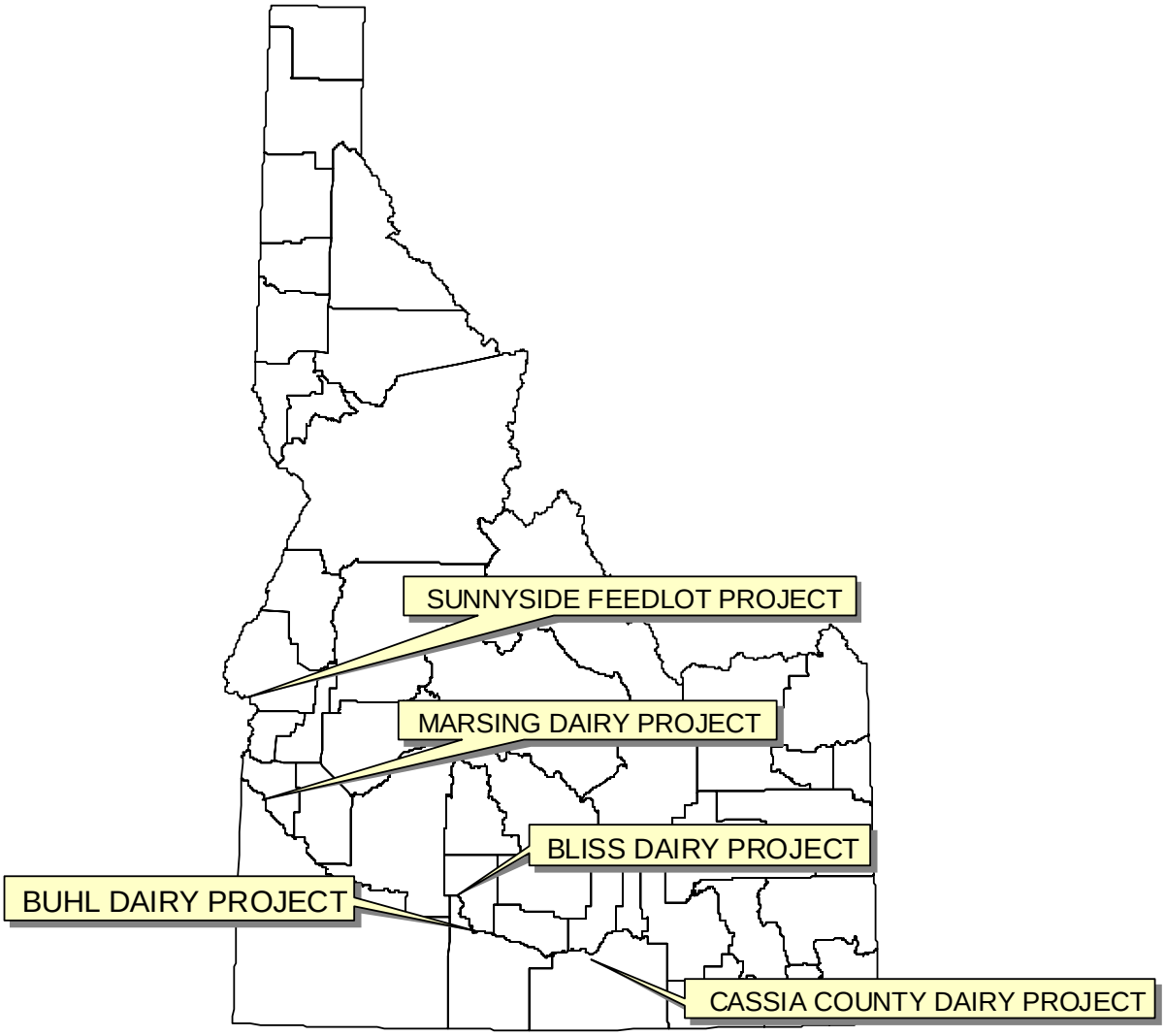

Figure 10. ISDA Ground Water Program dairy and CAFO project locations.

Table 11. 2004 Dairy and CAFO Sampling Summary

Project Location	Wells Tested in 2004	Constituents
Sunnyside Feedlot, near Weiser	62	Nitrate, nitrite, fluoride, chloride, bromide, o-Phosphate, sulfate, alkalinity, dissolved metals, ammonia, nitrogen isotopes, bacteria, antibiotics, steroids, pesticides, TDS, temp, Ph, conductivity
Marsing	31	Nitrate, nitrite, fluoride, chloride, o-Phosphate, phosphorous, sulfate, ammonia, nitrogen isotopes, bacteria, antibiotics, steroids, TDS, temp, Ph, conductivity
Bliss	15	Nitrate, ammonia, nitrogen isotopes, bacteria, TDS, temp, Ph, conductivity
Cassia County	54	Nitrate, nitrite, fluoride, chloride, bromide, o-Phosphate, sulfate, ammonia, nitrogen isotopes, bacteria, TDS, temp, Ph, conductivity
Buhl	48	Nitrate, nitrite, fluoride, chloride, bromide, o-Phosphate, sulfate, ammonia, nitrogen isotopes, bacteria, TDS, temp, Ph, conductivity
Total	**210**	

Table 12. May 2004 Sunnyside Nitrate Concentration Distribution

Concentration Range (mg/L)	Number of Wells	% of Total
0.0 to 10.0	9	36
10.0 to 20.0	9	36
20.0 to 30.0	4	16
> 30.0	3	12
Total	25	100.0
Mean Value	15.1 mg/L	
Median Value	13 mg/L	
Maximum Value	43 mg/L	
64% of wells exceeded EPA health standard of 10 mg/L for nitrate		

Table 13. November 2004 Sunnyside Nitrate Concentration Distribution

Concentration Range (mg/L)	Number of Wells	% of Total
0.0 to 10.0	17	46
10.0 to 20.0	9	24.3
20.0 to 30.0	8	21.6
> 30.0	3	8.1
Total	37	100.0
Mean Value	13.8 mg/L	
Median Value	11 mg/L	
Maximum Value	38 mg/L	
54% of wells exceeded EPA health standard of 10 mg/L for nitrate		

Table 14. April 2004 Marsing Nitrate Concentration Distribution

Concentration Range (mg/L)	Number of Wells	% of Total
0.0 to 10.0	9	56.2
10.0 to 20.0	3	18.8
20.0 to 30.0	2	12.5
> 30.0	2	12.5
Total	16	100.0
Mean Value	11.4 mg/L	
Median Value	8.5 mg/L	
Maximum Value	40 mg/L	
44% of wells exceeded EPA health standard of 10 mg/L for nitrate		

Table 15. November 2004 Marsing Nitrate Concentration Distribution

Concentration Range (mg/L)	Number of Wells	% of Total
0.0 to 10.0	6	40
10.0 to 20.0	3	20
20.0 to 30.0	4	26.7
> 30.0	2	13.3
Total	15	100.0
Mean Value	15.7 mg/L	
Median Value	13.2 mg/L	
Maximum Value	42.4 mg/L	
60% of wells exceeded EPA health standard of 10 mg/L for nitrate		

Table 16. July 2004 Bliss nitrate concentration distribution.

Concentration Range (mg/L)	Number of Wells	% of Total
0.0 to 2.0	4	26.7
2.0 to 5.0	5	33.3
5.0 to 10.0	6	40
> 10.0	0	0
Total	15	100.0
Mean Value	3.9 mg/L	
Median Value	4.2 mg/L	
Maximum Value	8.7 mg/L	
0% of wells exceeded EPA health standard of 10 mg/L for nitrate		

Table 17. August 2004 Cassia nitrate concentration distribution.

Concentration Range (mg/L)	Number of Wells	% of Total
0.0 to 2.0	3	5.5
2.0 to 5.0	9	16.7
5.0 to 10.0	28	51.9
> 10.0	14	25.9
Total	54	100.0
Mean Value	8.6 mg/L	
Median Value	7.9 mg/L	
Maximum Value	22 mg/L	
26% of wells exceeded EPA health standard of 10 mg/L for nitrate		

Table 18. August 2004 Buhl Nitrate concentration distribution.

Concentration Range (mg/L)	Number of Wells	% of Total
0.0 to 2.0	8	16.7
2.0 to 5.0	18	37.5
5.0 to 10.0	22	45.8
> 10.0	0	0
Total	48	100.0
Mean Value	4.6 mg/L	
Median Value	4.5 mg/L	
Maximum Value	9.7 mg/L	
0% of wells exceeded EPA health standard of 10 mg/L for nitrate		

Table 19. Percentage of wells exceeding the EPA MCL for nitrate.

Project Location	% of wells exceeding EPA health standard of 10 mg/L for nitrate
Sunnyside Feedlot, near Weiser	
April, 2004	**64**
November 2004	**54**
Marsing	
April, 2004	**44**
November, 2004	**60**
Bliss	**0**
Cassia County	**26**
Buhl	**0**

Sampling of all projects listed above will continue indefinitely. Sampling of the Butler Spring within the Bliss project area will also continue on a monthly basis indefinitely. ISDA began monitoring the Butler Spring in November 1999. New dairy projects along Happy Valley Road east of Nampa, and in the Dry Lakes area south of Lake Lowell began in the spring of 2005.

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 2004, the ISDA Ground Water Program received two grants, one for monitoring and one for educational work. The monitoring grant allowed for testing of approximately 60 wells and focused on testing in agricultural areas where little testing had been done in the past. Discretionary grants are implemented by fiscal year, so the grant awarded and discussed in this report covers fiscal year 2005 (July 1, 2004 through June 30, 2005). Information regarding this grant covers only those wells tested in 2004 (49 wells). Additional follow-up testing is scheduled for 2005. 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

In 2004 forty-nine wells were sampled statewide for NO3-N in an EPA discretionary grant project (Figure 11). One well had a concentration over the EPA's MCL of 10 mg/L for NO3-N located near Glenns Ferry in Elmore County (Figure 21).

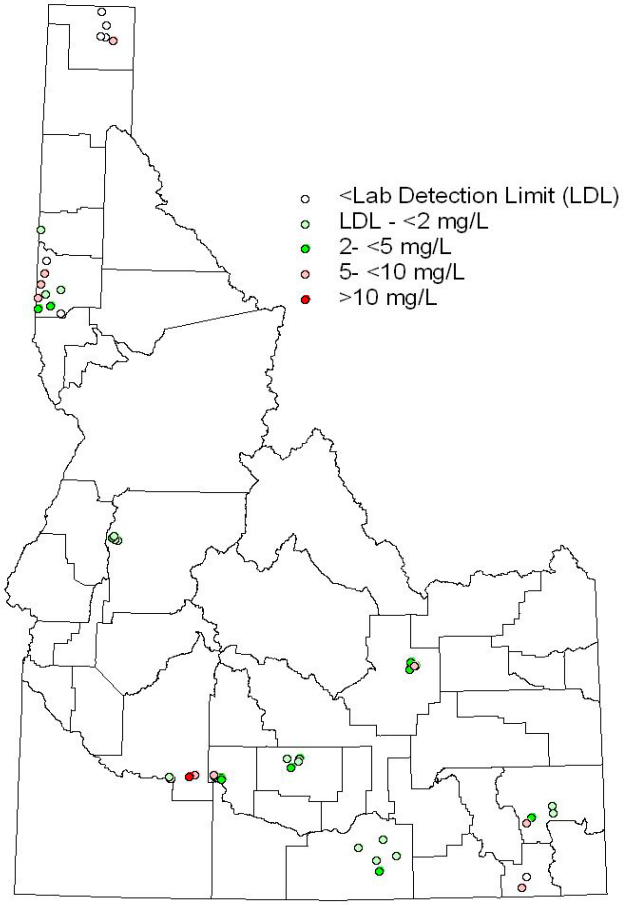

Figure 11. Well locations and 2004 nitrate concentrations for EPA discretionary project.

Table 20 presents statistics for the 49 wells sampled for the discretionary project. Eight wells, or 16% of the wells sampled, had non-detects of NO3-N or detections less than the laboratory detection limit. The majority of the wells (sixteen wells or 33%) had NO3-N concentrations ranging from the lab detection limit of 0.033 mg/L to less than 2 mg/L. The maximum detection was 21 mg/L and was located near Glenns Ferry. The median concentration was 2.2 mg/L, while the mean concentration was 3.05 mg/L.

Table 20. Nitrate summary statistics for EPA discretionary project.

Concentration Range (mg/L)	2004 (49 Wells)
<LDL[1] (0.033)	8 (16%)
LDL to <2.0	16 (33%)
2.0 to <5.0	13 (27%)
5.0 to <10.0	11 (22%)
>10.0	1 (2%)
Mean Value	3.05 mg/L
Median Value	2.2 mg/L
Maximum Value	21 mg/L

[1]LDL – Lab Detection Limit

Pesticides

In 2004, forty-nine wells were sampled statewide for pesticides with a discretionary grant from EPA. Of these 49 wells, five wells had positive detections of one pesticide, and one well had positive detections of two pesticides. Figure 12 is a map of the wells tested in the discretionary project in which pesticides were identified. The map breaks the pesticide concentrations into detection levels based on the *Idaho Pesticide Management Plan (PMP) 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. ISDA has adopted reference points which relies on MCLs. 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.

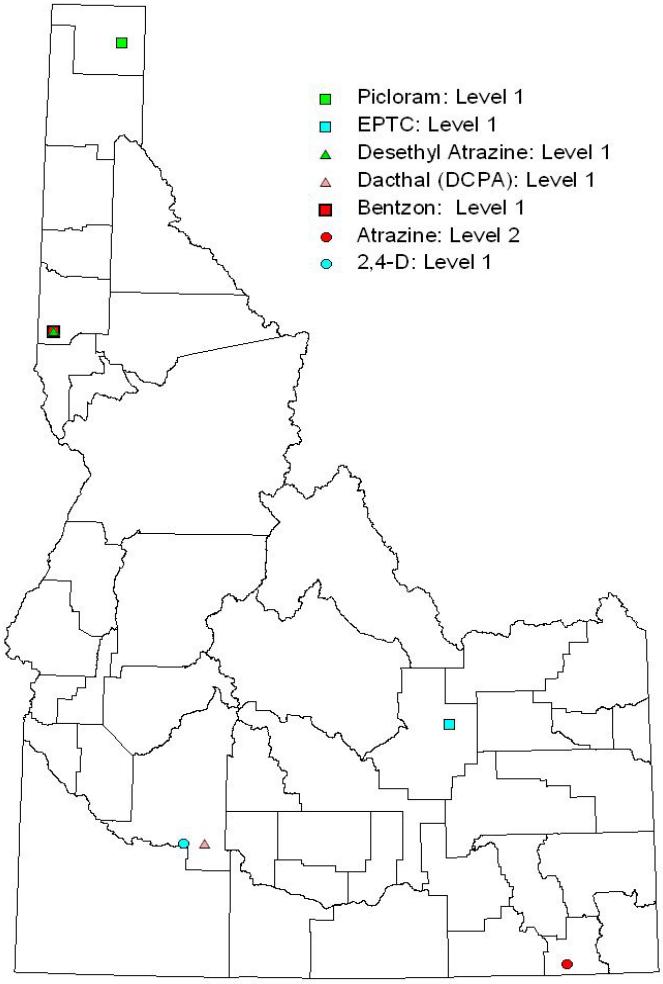

Figure 12. Well locations and 2004 pesticide concentrations for EPA discretionary project.

Table 21 summarizes the pesticides detected in the EPA discretionary project. Pesticides were detected in Boundary, Butte, Elmore, Franklin, and Latah Counties. None of the pesticides detected exceeded any health standards.

Table 21. Pesticide summary statistics for EPA discretionary project.

Pesticide	Quantity (µg/L)	Reference Point (µg/L)	County of Detection
2,4-D	0.13	70 (MCL)[1]	Elmore
Atrazine	0.67	3 (MCL)	Franklin
Bentazon	2.9	200 (HAL)[2]	Latah
Dacthal (DCPA)	0.18	70 (HAL)	Elmore
Desethyl Atrazine	0.44	-------[3]	Latah
EPTC	0.13	175 (RfD)[4]	Butte
Picloram	0.35	500 (MCL)	Boundary

[1]MCL – EPA Maximum Contaminant Level
[2]HAL – EPA Lifetime Health Advisory Level
[3]Desethyl Atrazine is a breakdown product of Atrazine. Although there is no health standard for Desethyl Atrazine, a conservative approach is to apply the MCL of Atrazine (3 µg/L) to Desethyl Atrazine.
[4]RfD – EPA Reference Dose

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.

Ten site evaluations were completed in 2004 with 6 receiving low risk and 4 receiving moderate risk determinations (Table 22).

Table 21. 2004 CAFO siting risk determinations by county.

County	**Number of Sitings**	**Risk Determinations (Low, Moderate, High)**
Elmore	2	Low, Moderate
Gooding	1	Low
Jerome	1	Low
Lincoln	1	Moderate
Owyhee	2	Low, Moderate
Payette	2	Low, Moderate
Twin Falls	1	Low

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 2004 included development of an overall I & E Statewide Implementation Plan and update of the Agricultural Chemical Source Matrix (Appendix A, Idaho Ground Water Quality Plan). Activities planned for 2005 include applying for grant money to conduct a statewide ground water quality protection educational campaign through the media.

In 2004 ISDA was also very active in facilitation of educational workshops designed specifically for the farmer. ISDA facilitated workshops in Burley, Twin Falls, Nampa, Caldwell, Ontario, and Emmett with over 400 farmers attending these workshops. 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 2005.

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 SCC 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 2004 ISDA assisted the Weiser River SCD, the Gooding SCD, the Lewis SCD, and the Yellowstone SCD in applying for Clean Water Act 319 funds to implement ground water BMP implementation efforts. ISDA is also active in supporting those SCDs in managing and implementing their 319 projects.

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 also located in a 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 SCC 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.

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 950 homeowner result letters and well analysis reports were mailed in 2004.

ISDA Water Program Website

The ISDA water program maintains a web site for internal and external use to easily access reports, data, and information. The site provides our goals and objections, as well as general water quality information. Project maps, data summaries, and reports are also posted. The website can be assessed 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 2004. The monitoring efforts in 2004 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 20 distinct and active ground water projects across the state. Twelve of these projects were regional based projects, five 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 10 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 four wells or nine percent of 614 regional wells sampled by the ISDA Ground Water Program in 2004 exceed the EPA MCL for nitrate. All of the 12 active regional projects show mean and medians ground water nitrate concentrations above 2 mg/L suggesting anthropogenic impacts. Overall ground water quality located in the Washington and Payette Regional Study have the highest median and mean values, 8.6 mg/L and 6.4 mg/L, respectively. The Cassia County Regional Study is next with a

mean value of 5.7 mg/L and a median of 5.3 mg/L (Table 3). All other regional projects have mean and median values less than 5mg/l.

The five Dairy and Beef CAFO projects and two local scale monitoring projects indicate significant nitrate impacts to ground water. Two of the five active dairy (Marsing and Sunnyside Projects) or CAFO projects indicate median and mean nitrate concentrations exceed the EPA MCL of 10 mg/L. Over 50 percent of wells in these two projects tested above the 10 mg/L concentration for nitrate. Overall median and mean ground water nitrate concentrations from the five active projects are considerably above 2 mg/L, suggesting anthropogenic effects.

A total of 158 different regional wells were sampled for nitrogen isotope testing in 2004. Sites selected for testing included those having nitrate levels exceeding 5 mg/L in 2003. Based on the 158 wells tested, results suggested that 17 % of the wells tested contained nitrate from a fertilizer source, 73 % from a combination of sources or purely organic source, and 10 % 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 2004 had levels that exceeded 20 percent of a health standard requiring additional response activities. These sites are located in Fremont, Owyhee, Nez Perce, and Franklin 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 than a dozen educational workshops across the state and provided technical assistance to four SCDs with implementation of field projects to help improve Idaho ground water quality in high priority areas. ISDA Ground Water Program staff also actively participated in providing assistance with the writing of ground water protection plans related to DEQ established nitrate priority areas across the state. In addition, ISDA Ground Water Program staff participated in ten CAFO siting evaluations. Seven new or expanding CAFO sites were determined to be of low risk and three of moderate risk as related to environmental or human health considerations.

References

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