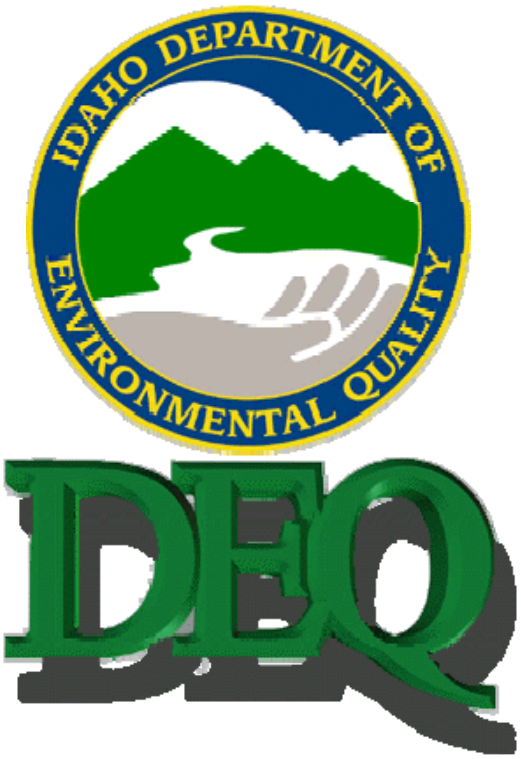
Idaho 2002 Water Quality Status Integrated Report

for Ground Water



October 9, 2002 (Partially updated in May 2007)

Prepared by
Mark Shumar, Robert Taylor, Doug Davidson, and Toni Mitchell

State Technical Services Office
Idaho Department of Environmental Quality

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Acronyms and Abbreviations

BMP	Best Management Practice
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COLORRS	Consolidated Listing of Reported Remediation Sites
DEQ	Idaho Department of Environmental Quality
DWIMS	Drinking Water Information Management System
EDMS	Environmental Data Management System (IDWR)
EPA	U.S. Environmental Protection Agency
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
GIS	Geographical Information System
GPS	Global Positioning System
GWMTC	Ground Water Monitoring Technical Committee
GWQM	Statewide Ground Water Quality Monitoring Program (Statewide Program, IDWR)
IDWR	Idaho Department of Water Resources
IOC	Inorganic Compound
ISDA	Idaho Department of Agriculture
IVRA	Idaho Voluntary Remediation Act (DEQ)
LUST	Leaking Underground Storage Tank
NPDES	National Pollutant Discharge Elimination System
PCI	Primary Contaminant Inventory
PMP	Idaho Pesticide State Management Plan (ISDA)
PWS	Public Drinking Water System
RCRA	Resource Conservation and Recovery Act
SARA	Superfund Amendments and Reauthorization Act
SDWA	Safe Drinking Water Act
SERC	State Emergency Response Commission
SOC	Synthetic Organic Compound
TGM	Technical Guidance Manual for Individual and Subsurface Sewage Systems (DEQ)
UIC	Underground Injection Control
USGS	United States Geological Survey
UST	Underground Storage Tank
VOC	Volatile Organic Compound

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GROUND WATER QUALITY STATUS

2007 Update Preface

This report was completed on October 9, 2002, using information available at that time; however, the report has not been released until now. The report is being released now to provide a baseline for future ground water quality status reports. The next ground water quality status report will be released in 2008 and will cover the information available through the end of 2007. Future plans include releasing ground water quality status reports every two years.

Some parts of this report have been updated to provide the latest (2007) website links for information sources that were not available in 2002. These updates are contained in footnotes.

Ground Water Use and Protection in Idaho

Idaho is one of the top five states in the country for the volume of ground water used. The state uses an average of 9 billion gallons of ground water daily. Of this 9 billion gallons, 60% is used by agriculture for crop irrigation and stock animals, 36% is used by industry, and 3-4% percent is used for drinking water.

Idaho relies on ground water for drinking water supplies more than any other state in the nation. Even though the volume of ground water used as drinking water is relatively small in comparison to the total ground water use, approximately 96% of the people in Idaho rely on ground water for their drinking water supply, with the other 4% relying on surface water for their drinking water supply. Of the 96% of the population using ground water for drinking water, about 80% are served by public water systems regulated under the Safe Drinking Water Act (SDWA), and about 20% obtain their drinking water through private systems typically represented by private domestic wells.

Idaho's ground water also contributes to surface water flows throughout the year, especially during low flow periods. Therefore, the protection of Idaho's ground water quality is necessary to protect the wide range of ground and surface water uses throughout the State.

1. GROUND WATER CONTAMINATION SOURCES

Idaho's 1996 305(b) report (DEQ, 1996a) identified the ten highest priority source categories of ground water contamination as well as other high priority source categories, based on the professional judgment of State ground water quality program personnel (Table 1). The ten highest priority source categories of ground water contamination in Idaho, listed in no particular order, were determined to be animal feedlots, fertilizer applications (including land application of manure), pesticide applications, land application (of wastewater, sludge, etc.), underground storage tanks, waste tailings, landfills, septic systems, shallow injection wells/urban runoff, and industrial facilities. Other high priority source categories of ground water contamination in Idaho, listed in no particular order, include agricultural chemical facilities, agricultural drainage wells, above ground storage tanks, surface impoundments, waste piles, deep injection wells, mining and mine drainage, and spills (including spills relating to on-farm agricultural mixing and

loading procedures). These numerous ground water contamination source categories need to be addressed through ground water protection related activities and programs in order to protect the quality of Idaho's ground water and surface water.

Table 1. Major Ground Water Contamination Source Categories in Idaho* (from DEQ, 1996a)

Contaminant Source Category	Ten Highest Priority Sources	Other High Priority Sources	Factors Considered in Selecting Contaminant Source Categories[a]	Contaminants[b]
Agricultural Activities				
Agricultural chemical facilities		( )	A, B, C, D, E, F	1, 2, 4, 5
Animal feedlots	( )		A, B, C, D, E, F	5, 7, 10, 11, 12
Drainage wells		( )	A, B, C, D, E, F	1, 2, 3, 5, 10, 12
Fertilizer applications	( )		A, B, C, D, E, F	5
Irrigation practices				
Pesticide applications	( )		A, B, C, D, E, F	1, 2, 3, 4
Storage and Treatment Activities				
Land application	( )		A, B, C, D, E, F	5, 7, 8, 10, 13 (organics)
Material stockpiles				
Storage tanks (above ground)		( )	A, B, C, D, E, F	1, 2, 3, 4, 8
Storage tanks (underground)	( )		A, B, C, D, E, F	2, 3, 4, 8
Surface impoundments		( )	C, D	6, 7, 8, 9
Waste piles		( )	A, E, F	6, 8, 9
Waste tailings	( )		A, B, D, E, F	8, M (pH)
Disposal Activities				
Deep injection wells		( )	A, B, C, D, E, F	2, 3, 5, 10, 12
Landfills	( )		A, B, C, D, E, F	2, 3, 4, 5, 8, 10, 12, 13 (VOCs, IOCs)
Septic systems	( )		A, B, C, D, E, F	5, 10, 12
Shallow injection wells/Urban Runoff	( )		A, B, C, D, E, F	1, 2, 3, 4, 5, 7, 8, 10, 12
Other				
Hazardous waste generators				
Hazardous waste sites				
Industrial facilities	( )		A, B, D, E, F	3, 4, 7, 8, 13 (creosote)
Material transfer operations				
Mining and mine drainage		( )	A, D, E	8, 13 (cyanide compounds)
Pipelines and sewer lines				
Spills		( )	A, C, E, F	1, 2, 3, 4, 9, 13 (fertilizer)
Transportation of Materials				

* Prioritization of source categories in this table is based on professional judgment and input from each of the six Idaho DEQ Regional Offices, the Idaho Department of Water Resources, and the Idaho Department of Agriculture.

a. Factors used to select contaminant source categories:
   A. Human health and/or environmental risk (toxicity)
   B. Size of the population at risk
   C. Location of the sources relative to drinking water sources
   D. Number and/or size of contaminant sources
   E. Hydrogeologic sensitivity
   F. State findings, other findings

b. Contaminants/classes of contaminants associated with checked source categories:
   1. Inorganic pesticides
   2. Organic pesticides
   3. Halogenated solvents
   4. Petroleum compounds
   5. Nitrate
   6. Fluoride
   7. Salinity/brine
   8. Metals
   9. Radionuclides
   10. Bacteria
   11. Protozoa
   12. Viruses

13. Other

2. EXISTING AND POTENTIAL GROUND WATER CONTAMINATION SITES

Table 2 summarizes some of the existing and potential contamination sites found throughout the State in 2001. These sites all relate to one or more of the major contaminant source categories shown in Table 1. Not all existing and potential sources of contamination are included in Table 2. Current efforts in the Idaho Source Water Assessment Program are expected to provide significantly more information about the numbers and locations of existing or potential contamination sites throughout the State, which can then be included in future integrated reports.

Table 2. Statewide Summary of Existing and Potential Ground Water Contamination Sites (2001 data)

Source Type	# of Sites	# of Sites w/ Confirmed Contamination	Typical Contaminants That May Have Been Detected or May Exist
CERCLA sites (includes Department of Defense and Department of Energy sites)	6	6	Metals, VOCs, Radionuclides
Active Leaking Underground Storage Tank (LUST) Sites	266	~130	Petroleum Compounds
Active Underground Storage Tank Sites (UST)	1350	not applicable	Petroleum Compounds
RCRA Corrective Action & Misc. Cleanup Sites	25	23	VOCs, Pesticides, Radionuclides, metals, etc.
Wastewater Land Application Permitted Sites	127	24[a]	Total Dissolved Solids, Chloride, Iron, Manganese, Nitrate
Ore Processing by Cyanidation Permitted Sites	7	1	Cyanide, Metals
Septic Systems	156,423	data not available	Nitrate, Bacteria
Class V Underground Injection Wells (excluding septic systems)	~10,000	data not available	Bacteria, Nitrate, Pesticides
Active Municipal Landfills	28	2	VOCs
Historical Landfills	1022	data not available	Metals, VOCs
Confined Animal Feed Operations (NPDES permitted)	17	1	Nitrate
IVRA Voluntary Remediation Sites	1	1	Petroleum Compounds, Pesticides, VOCs
Other Voluntary Remediation Sites	54	data not available	VOCs, Nitrate, Bacteria, Pesticides, Metals, etc

[a] From DEQ, 1998. Some contaminated sites have associated secondary contaminants such as Total Dissolved Solids.

3. SUMMARY OF GROUND WATER PROTECTION PROGRAMS AND ACTIVITIES

Table 3 lists Idaho ground water protection programs and activities, along with information on implementation status and responsible agency for each. Many of these programs and activities address one or more of the major contamination source categories identified in Table 1 and the known and potential ground water contamination source types identified in Table 2.

Following Table 3, a short narrative description and status is provided for each program or activity identified in the table.

Table 3. Summary of Idaho Ground Water Protection Programs Status in 2002

Program or Activities	Implementation Status	Responsible State Agency[a]
Active SARA Title III Program	Continuing Efforts	SERC
Statewide Ground Water Quality Monitoring Program	Fully Established	IDWR
Aquifer protection program: Rathdrum Prairie	Fully Established	Panhandle Health District/DEQ
Aquifer vulnerability assessment	Continuing Efforts	DEQ/IDWR*
Aquifer mapping	Continuing Efforts	IDWR/DEQ
Aquifer characterization	Continuing Efforts	IDWR/DEQ
Comprehensive data management system	Continuing Efforts	IDWR
Ground water discharge permits	Continuing Efforts	DEQ/IDWR
Ground water legislation	Fully Established	DEQ
Ground water classification	Fully Established	DEQ
Ground water quality standards	Fully Established	DEQ
Ground water nonpoint source controls	Continuing Efforts	DEQ*
Ground water Best Management Practices	Continuing Efforts	DEQ*
Interagency coordination for ground water protection initiatives	Continuing Efforts	DEQ/IDWR/ISDA
Ore Processing by Cyanidation Regulations	Fully Established	DEQ
Pesticide State Management Plan	Under Development**	ISDA
ISDA Pesticides monitoring program	Continuing Efforts	ISDA
Pesticides control program	Continuing Efforts	ISDA
Pollution prevention program	Continuing Efforts	DEQ
Regional & local ground water quality monitoring	Continuing Efforts	DEQ/ISDA
Resource Conservation and Recovery Act (RCRA) Primacy	Fully Established	DEQ
Solid waste management	Continuing Efforts	DEQ*
Source Water Assessment program	Continuing Efforts	DEQ
Drinking water protection program	Continuing Efforts	DEQ
State Superfund	Continuing Efforts	DEQ
State RCRA program more stringent than RCRA primacy	Not Applicable	NA
State septic system regulations	Fully Established	DEQ/Health Districts
Underground storage tank installation requirements	Continuing Efforts	DEQ
Underground Storage Tank Remediation Fund	Continuing Efforts	DEQ
Underground Storage Tank Permit Program	Continuing Efforts	DEQ
Underground Injection Control Program	Fully Established	IDWR
Wastewater Land Application Permit Program	Fully Established	DEQ
Well installation regulations	Fully Established	IDWR
Well abandonment regulations	Continuing Efforts	IDWR
Nitrate Priority Area Designation	Continuing Efforts	DEQ

[a] Agency abbreviations: SERC - State Emergency Response Commission; DEQ - (Idaho) Department of Environmental Quality; IDWR - Idaho Department of Water Resources; ISDA - Idaho State Department of Agriculture.

* Indicates significant involvement of other agencies.

** The Pesticide State Management Plan was "Fully Established" in 2006.

Active SARA Title III Program

The Superfund Amendments and Reauthorization Act (SARA) Title III, also known as the Emergency Planning and Community Right-to-Know Act (EPCRA), helps state and local governments improve their preparedness to handle chemical accidents. In Idaho, SARA Title III is implemented under federal guidelines by the Idaho State Emergency Response Commission (SERC). The implementation status of the State's highly successful program is considered "Continuing Efforts."

Statewide Ground Water Quality Monitoring Program

Idaho has a "Fully Established" Statewide Ground Water Quality Monitoring Program (Statewide Program or GWQM) that consists of a statistically-designed monitoring network of more than 1,500 wells. The network was primarily designed to characterize the ambient water quality of the State's aquifers, and is stratified by the hydrogeologic sub-areas shown in Figure 3 on page 32. About 400 of the network wells are sampled each year, with most being sampled once every five years. To better identify trends, a subset of about 100 wells have been monitored annually since 1995.

Results from the Statewide Program are used in this report and discussed in section 4. The Idaho Department of Water Resources (IDWR) is the lead agency responsible for this network/program.[1] The U.S. Geological Survey (USGS) collects the samples used in the program.

Aquifer Protection Program: Rathdrum Prairie

This is a "Fully Established" aquifer protection program in the northern part of Idaho. The Spokane Valley - Rathdrum Prairie (Rathdrum Prairie) Aquifer receives additional regulatory protection because of its designation as a "sole source aquifer" under the SDWA, and because of its categorization as a "Sensitive Resource" aquifer under the Idaho *Ground Water Quality Rule* (IDAPA 58.01.11). The sole source designation provides additional aquifer protection through federal projects. The sensitive resource categorization, combined with specific narrative standards within the Ground Water Quality Rule, provides additional protection from all point source and nonpoint source activities. These regulations help support an active aquifer protection program, which addresses multiple contaminant sources through improved pollution prevention technologies, education, and land use planning. These aquifer protection efforts have strong public support from area residents, which initially resulted in the aquifer's listing as a sole source aquifer and helped lead to subsequent categorization as a Sensitive Resource.

Aquifer Mapping, Characterization, and Vulnerability Assessment

These are all rated as "Continuing Efforts." Because of the complex geologic makeup of Idaho, identifying and characterizing every aquifer is a difficult task. Graham and Campbell (1981) took the approach of identifying and describing the 70 major ground water flow systems within the State. Many of these 70 ground water systems comprise more than one aquifer. In addition, the United States Geological Survey (USGS) has performed a significant amount of aquifer

[1] As of May 2007, IDWR has a website for the program at http://www.idwr.idaho.gov/hydrologic/info/statewide/.

mapping and characterization work in the state, with much of their work focused on the eastern Snake River Plain aquifer. Aquifer mapping and characterization efforts continue, with the Statewide Program providing additional aquifer characterization information and with the continuation of USGS aquifer characterization efforts. Characterization also results from studies and efforts undertaken by state universities, state agencies, local entities, and consultants, to address issues such as resource protection and contaminant investigations. Much of the aquifer characterization work associated with ground water quality is included in this report.

Vulnerability assessment efforts include development of a modified version of the U.S. Environmental Protection Agency's DRASTIC model for the eastern Snake River Plain and the subsequent development of vulnerability maps for this and other significant aquifers in the State. In addition, the USGS has been developing calibrated vulnerability maps, referred to as probability maps, for the eastern Snake River Plain. These contaminant-specific maps are complete for nitrate and nearly complete for the pesticide (herbicide) Atrazine.

Comprehensive Data Management System

The Idaho Ground Water Quality Plan (Ground Water Quality Council, 1996) recognizes an Environmental Data Management System (EDMS) as the State's comprehensive data management system to include data from past, present, and future ground water quality monitoring. Idaho's comprehensive data management system implementation status is considered "Continuing Efforts." The EDMS is administered by IDWR. Although it is currently in use, not all relevant ground water quality data is routinely submitted to and entered into the EDMS and there is a backlog of past data that could be incorporated into the system. Recent efforts to help increase the amount of data routinely submitted to EDMS include development of a compatible Access database structure that can be placed on individual computers and used for project- or program-specific data. Once the data is entered into the Access database, it can be transferred into EDMS. Data provided in other standard formats will be loaded if suitable data conversion routines can be developed.

In addition, development is in progress to make EDMS data available on the IDWR Web site. For data searches relating to specific geographic areas, map sequences will allow the searcher to visually identify the target area. Parameter selection will then allow "zeroing in" on specific characteristics of available data, providing tabular results from the EDMS database. Searchers will also be able to use browser-based search tools to build custom queries to locate specific data.

Ground Water Protection Legislation

Ground water protection legislation in Idaho is considered "Fully Established." The Environmental Protection and Health Act provide general authorities for protection of human health and the environment. The Ground Water Quality Protection Act, enacted in 1989, established State goals for ground water quality, including: maintain the existing high quality of the State's ground water, satisfy existing and projected future beneficial uses, and prevent contamination of ground water from point and nonpoint sources of contamination to the maximum extent practical. The act also established the Ground Water Quality Council. The

Council was directed to develop a ground water quality plan describing the State's overall approach to protecting its ground water.

The Idaho Ground Water Quality Plan (Ground Water Quality Council, 1996) was adopted by the Idaho Legislature in 1992 and revised in 1996 (agricultural additions) after a lengthy public involvement process. The plan contains six major policy areas directing state agencies and entities for the protection of ground water quality. The six policies include protection, prevention, public education, government interaction/public participation, monitoring/data information, and remediation. Rationales for the policies and implementation items, which guide responsible agencies on protection activities, are included within each of the policy areas. The Ground Water Quality Plan, which was the basis for Idaho's Ground Water Quality Rule, was enacted in 1997.

Ground Water Quality Standards/Ground Water Classification

Ground water quality standards and ground water classification (referred to as categorization in Idaho) are "Fully Established." Idaho's Ground Water Quality Rule includes ground water quality standards, an aquifer categorization system, and ground water quality protection requirements. The numerical and narrative ground water quality standards, which apply to all ground water in Idaho, are based on the need to protect the resource for drinking water and other beneficial uses. The numerical standards are essentially equal to both the primary and secondary SDWA Maximum Contaminant Levels. In addition, the rule requires that ground water quality be protected from significant degradation even if the standard has not been exceeded. Degradation is to be avoided through the use of appropriate ground water quality protection practices and methods.

Categories for aquifers or portions of aquifers include "Sensitive Resource," "General Resource," and "Other Resource." Ground water quality is to be protected through a combination of best available methods, best management practices, and best practical methods, depending on the aquifer category. All aquifers not categorized as a Sensitive Resource or Other Resource default to General Resource, for which the ground water quality standards apply. Negotiated rule-making is required for changing the category of an aquifer. Stricter standards and protection requirements are possible in a Sensitive Resource aquifer, and less strict standards and protection requirements are possible in an Other Resource aquifer. At this time in Idaho, the Rathdrum Prairie aquifer is the only Sensitive Resource aquifer, and there are no Other Resource aquifers.

Ground Water Nonpoint Source Controls and Ground Water Best Management Practices

Idaho's programs and activities for ground water nonpoint source controls and implementation of Best Management Practices (BMP's) are rated as "Continuing Efforts." Section 319 of the Clean Water Act requires each state to develop and implement a nonpoint source management program. Idaho's Nonpoint Source Management Plan (DEQ, 1999a) includes ground water. The plan addresses these ground water related sources: agriculture, septic systems, urban runoff, and industrial chemicals, and provides for further protection of ground water resources through the implementation of the State's drinking water protection and source water assessment programs.

The plan recognizes that the Ground Water Quality Rule provides the underlying guidance for protecting the State's ground water from nonpoint source contamination. In addition, most ground water programs and activities are continually updating and improving BMP's and nonpoint source controls. These ground water programs and activities are described in this report (Table 3 and narrative descriptions) and throughout the ground water section of the Nonpoint Source Management Plan. Many are documented in guidance manuals such as exist for septic systems, wastewater land application, and confined feed operations.

Numerous agricultural related programs address nonpoint sources. The Agricultural Ground Water Quality Protection Program was adopted by the Idaho Legislature during the 1995 session as a part of the Idaho Ground Water Quality Plan. The program was developed to "describe the management approaches to prevent ground water contamination and to respond to the occurrence(s) of such ground water contamination." This program will also integrate pesticide management as described in the yet-to-be-developed State Pesticide Management Plan. A major focus of the program is implementation of the BMP feedback loop for agricultural nonpoint sources of contamination.

Interagency Coordination for Ground Water Protection Activities

There are "Continuing Efforts" within the State to further interagency coordination on ground water protection.

The Ground Water Quality Plan of 1992 and other State statutes identify specific ground water protection roles for State agencies and local governments and contain policies that provide direction for interagency coordination. A significant accomplishment since previous 305(b) reports is the completion of Idaho Ground Water Protection Interagency Cooperative Agreement, signed in 1996 by three major State ground water quality agencies: the ISDA, the IDWR, and the Idaho Department of Environmental Quality (DEQ). This agreement focuses on implementing the Ground Water Quality Plan through coordination of the three agencies' ground water quality related programs. The three agencies hold joint meetings quarterly to help ensure a coordinated approach to ground water quality protection in Idaho.

Another method routinely utilized to facilitate interagency coordination is the formation of multi-agency committees to provide input on specific areas that may impact the ground water quality management activities of various agencies. Some of the committees currently facilitating this coordination include the Agricultural Coordination Committee and the Ground Water Monitoring Technical Committee (GWMTC).

The Agricultural Ground Water Quality Protection Program for Idaho, enacted in 1995, was developed by the Idaho State Department of Agriculture (ISDA) with committee assistance. To implement this plan, ISDA chairs the Agricultural Ground Water Coordination Committee, which meets quarterly with members representing local, state, and federal government agencies and industry.

The Ground Water Monitoring Technical Committee, which was formed in 1996 to ensure a coordinated approach for regional and local monitoring efforts within Idaho, is chaired by DEQ and includes membership from other Idaho state agencies, Idaho Health Districts, the Idaho

Water Research Institute, Idaho's universities, and federal agencies. The committee's work is described in more detail below, under Regional and Local Monitoring Program.

To help ensure that regional and local monitoring is pursued in a coordinated manner, the Idaho GWMTC was formed in 1996, as described above under the section titled Interagency Coordination for Ground Water Protection Activities. The GWMTC includes representatives from 12 state and federal agencies. One of the committee's key products is the identification and prioritization of monitoring needs based on known problem sites and areas. The ground water quality data presented in section 4 represents a major source of information for identifying these problem sites and areas. Another committee product is the identification of historical, ongoing, and planned monitoring activities in Idaho. Both committee products are captured in geographical information system (GIS) projects.

Ore Processing by Cyanidation Regulations

Idaho has a "Fully Established" Ore Processing by Cyanidation Permit Program covered under *Rules and Regulations for Ore Processing by Cyanidation*[2] (IDAPA 58.01.13). Permits are issued for ore processing facilities that use cyanide. The goal is to protect beneficial uses of surface and ground waters and not endanger public safety or the environment. Important ground water protection measures include requirements for review and approval of designs and operation plans. Design and operation requirements include measures to prevent discharges to ground water and a monitoring strategy that incorporates ground water and leak detection monitoring.

Pesticide State Management Plan

Idaho's Pesticide State Management Plan (PMP) outlines the processes that ISDA and cooperating agencies will take to prevent and respond to the protection of ground water from pesticides.[3]

ISDA Pesticides Monitoring Program

ISDA conducts comprehensive statewide regional, local, and enforcement ground water monitoring to determine the impacts of pesticides on ground water. This work is done to implement the Agricultural Ground Water Quality Protection Program for Idaho (1996), the PMP, and ISDA's cooperative agreement with EPA regarding the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). Monitoring is conducted in 14 regional and numerous local project areas throughout the state, based on detections and other agencies' information from the IDWR Statewide Monitoring Program data. (The Statewide Program is discussed above on page 6.) EPA drinking water analysis methods for pesticides, nutrients, and common ions are used by the University of Idaho Holm Research Laboratory to determine water quality results. Up to 2002, the most common pesticides found have been Atrazine, Atrazine Desethyl, Simazine, Dacthal (DCPA), Prometon, Bromacil, Metribuzin, Bentazon, Propazine, Metribuzin, and Diuron. ISDA has also conducted special localized monitoring programs, through funding

[2] The name of this rule has been changed to *Rules for Ore Processing by Cyanidation.*

[3] In accordance with the plan, the *Rules Governing Pesticide Management Plans for Ground Water Protection* (IDAPA 02.03.01) were promulgated, effective in 2005.

from EPA, to determine extent and magnitude of specific pesticide detections. ISDA may create Chemical Specific PMPs for a number of these pesticides. ISDA nitrate data is one source used by the GWMTC to determine Nitrate Priority Areas.

Pesticides Control Program

Idaho's pesticides control program implementation status is "Continuing Efforts." There is currently a Pesticide Cooperative Agreement with the EPA for the implementation of FIFRA in Idaho. The Pesticide Use and Application Rules (IDAPA 02.03.03) address the registration, use, handling, transportation, storage, distribution, and disposal of pesticides and their containers. The licensing of pesticide applicators is also covered. The Chemigation Rules (IDAPA 02.03.04)[4] provide for regulation of the irrigation systems, which are utilized for the application of pesticides and fertilizers. Included are backflow prevention standards, licensing, inspections, and training programs. Other program activities include initial and re-certification training of applicators and dealers and a Pesticides Disposal Program which addresses the problems of unusable pesticides through collection and disposal of the unusable agricultural pesticides with no cost or liability to the participant. ISDA also collects triple rinsed pesticide containers through the container chipper program.

Pollution Prevention Program

The Pollution Prevention Program promotes incorporation of pollution prevention into DEQ programs and business, industry, government, and public practices. The objective of the program is to prevent the contamination of air, land, and water through source reduction techniques. The program status is listed as "Continuing Efforts" because it is a dynamic program working in a matrix system with other programs and efforts. As projects are completed, the focus is re-evaluated and modified to fit current environmental concerns. Typical program accomplishments over the past few years include providing information and technical assistance to Idaho businesses, industries, and citizens in the areas of water conservation, waste reduction, and energy conservation. These projects have addressed many of the major contaminant source categories identified in section 1 and many of the specific contaminants often found in ground water as discussed in section 4.

Regional and Local Monitoring Program

A regional and local ground water quality monitoring program is used to investigate ground water contamination that is known or suspected to exist in Idaho's ground water. Regional and local monitoring is needed to: 1) identify and delineate ground water contamination problems that are local or regional in scale and may not show up on the scale of the statewide monitoring effort, 2) determine the aerial extent of ground water contamination so beneficial uses of the resource can be protected, 3) provide information, direction, or prioritization to state ground water quality programs, and 4) follow up on IDWR Statewide Program monitoring detections or

[4] The Idaho Pesticide and Chemigation Laws were combined. IDAPA 02.03.03, "Idaho Department of Agriculture Rules Governing Pesticide Use and Application," and IDAPA 02.03.04, "Rules Governing Chemigation," were combined and the new combined rule named "Idaho Department of Agriculture Rules Governing Pesticide and Chemigation Use and Application," IDAPA 02.03.03. (When the chemigation rules were combined into the pesticide rules, IDAPA 02.03.04 was repealed in its entirety and the designation IDAPA 02.03.04 is not currently in use.)

other concerns such as District Health requests or complaints. In several cases, regional and local monitoring has confirmed significant contamination needing remediation, including pesticides and industrial solvents. Several contamination sites and areas within the State have been or currently are being characterized through regional and local monitoring, although there are still numerous contamination sites and areas throughout the State that need initial and/or further characterization. Therefore, this program is rated as "Continuing Efforts."

Resource Conservation and Recovery Act (RCRA) Primacy and Stringency

RCRA primacy implementation for the State is considered "Fully Established." The Idaho Hazardous Waste Management Act of 1983 directs the State of Idaho to maintain primacy for the implementation of the RCRA program in Idaho and to promulgate rules and standards that are consistent with federal hazardous waste regulations. In the *Rules and Standards for Hazardous Waste* (IDAPA 58.01.05), 40 CFR Parts 260 through 266, 268, 270, 273, 279, 124, and RCRA 3005(j) are incorporated by reference.[5] DEQ was authorized to operate the RCRA program by EPA in April 1990. The State and EPA are currently working together to implement Federal RCRA regulations promulgated after July 1, 1996, and will continue to do so until Idaho's hazardous waste rules are updated to incorporate changes and subsequently approved by EPA in future Revised Authorization Applications.

Solid Waste Management

The Idaho Solid Waste Facilities Act of 1992, amended in 1993 and 1996, has led to Idaho's EPA-approved municipal solid waste program. The program, rated as "Continuing Efforts," is designed to prevent ground water contamination from municipal solid waste landfill operations. This is accomplished through DEQ review and approval of landfill location, landfill design, and ground water monitoring plans, and through Health District approval of operations and closure.

The 1992 solid waste rules are being updated through the negotiated rulemaking process. This rulemaking will revise the entire solid waste rule and recommend a statute change to the legislature outlining the roles and responsibilities of state agencies and local governments. [6] The revised solid waste rules will address transfer stations, composting/biological processing, chemical processing/incinerators, non-municipal solid waste landfills, and material recovery facilities.

Source Water Assessment Program

Under the SDWA Amendments of 1996, states having primacy over their drinking water were required by EPA to assess every source of public drinking water for its relative susceptibility to contaminants regulated by the SDWA. The assessments are based on a land use inventory of the delineated assessment area and sensitivity factors associated with the water supply sources (wells, surface water intakes, springs, and any other sources) and aquifer characteristics. Idaho's Source Water Assessment Plan (DEQ, 1999b) was approved by EPA Region X in October 1999. With more than 2,900 public water sources (PWSs) in Idaho, there is limited time

[5] As of May 2007, the rules have been updated and this list of items incorporated by reference now consists of 40 CFR Parts 124, 260 through 268, 270, 273, and 279 (with exceptions as specified in IDAPA 58.01.05.002.01).
[6] These rules were updated and are now the *Solid Waste Management Rules* (IDAPA 58.01.06).

and resources to accomplish the assessments. All assessments must be completed by May of 2003.[7] An in-depth, site-specific investigation of each significant potential source of contamination is not possible, however, each PWS is provided an opportunity during the enhanced phase of the assessment to review the potential contamination source inventory and provide comments and updates as they deem necessary. Information on the entire source water assessments program, including an outline of the assessment process and a link to individual assessments, is at http://www.deq.idaho.gov/water/prog_issues/source_water/assessment.cfm.

Source water assessment is composed of four steps. First, the water contributing to each public water system is delineated for 0 to 10 years (3-, 6-, & 10-year time-of-travel (TOT) zones), with the exception of surface water sources, which are delineated 25 miles upstream from the intake or 4 hours TOT, whichever is greater. Transient systems are delineated with a 1,000-ft fixed radius. This delineation modeling is and has been completed by DEQ and various contractors including Washington Group International, BARR Engineering, the University of Idaho, and Idaho State University. As of September 30, 2002, 98% of the delineations had been completed.

The second step in the process is to conduct a two-phased potential contaminant inventory (PCI) of each delineated area. The first phase involves identifying and documenting potential contaminant sources through the use of computer databases and GIS maps developed by DEQ (see Table 4). In the second, or enhanced, phase of the PCI, DEQ sends a request to the PWS operator, asking him or her to identify and add any additional potential contaminant sources he or she is aware of in the area. Only a percentage of the operators take advantages of this second phase opportunity, therefore, the majority of the assessments are completed without this input. As of September 30, 2002, 95% of the Primary PCI's had been completed.

In the third and fourth steps of the assessment, a susceptibility analysis is performed and all the information is combined into a report. The susceptibility of each well (or spring, surface water intake, etc.) to contamination is ranked as high, moderate, or low risk, according to the following considerations: hydrologic characteristics, physical integrity of the well, land use characteristics, and potentially significant contaminant sources. The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. Therefore, a high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for each well is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgment. As of September 30, 2002, 83% of the susceptibility analyses had been completed.

Current workforce projections (2002) have about 30% of DEQ State Office ground water staff dedicated to the timely completion of the remainder of the source water assessements work. Regional offices each have at least one person dedicated to completing the task. After May 2003, some resources are expected to be reduced ("assessment" monies will be reduced; however, overall monies will not, as efforts/funds will be transferred to the Drinking Water Protection Program), though the Assessment effort will continue as Idaho continues to grow and expand its usage of ground water. After all initial assessments are complete, new assessments

[7] In May 2003, DEQ met its obligation under the SDWA 1996 amendments by completing delineations for all 2100+ PWSs active in Idaho by August 1999. Source water assessments for new PWSs are developed as they come online.

will be completed based on this priority order: 1) new sources, 2) non-public systems that change to PWSs, 3) re-delineating sources based on acquisition of new hydrogeologic data.

Table 4. Potential Ground Water Contamination Sites Statewide from Source Water Assessment Databases.

Databases (see list of acronyms and definitions below)	Potential Sites
SARA Title III	1288
Toxic Release Inventory	66
CERCLA	259
RICRIS	1132
UST	3621
LUST	1173
Dairies	954
NPDES	445
Mines (may include prospects on record)	8791
Recharge wells	133
Injection wells	430
Group 1	181
Cyanide	20
Landfills	220
Wastewater Land Application	127
Aboveground Storage Tanks (AST) (~10% of total)	273

AST (Aboveground Storage Tanks) – Sites with aboveground storage tanks.

CERCLIS – The CERCLA Information System, which includes sites considered for listing under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA). CERCLA, more commonly known as Superfund, is designed to clean up hazardous waste sites that are on the national priority list (NPL).

Cyanide Site – DEQ permitted and known historical sites/facilities using cyanide.

Dairy – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

Deep Injection Well – Injection wells regulated under the Idaho Department of Water Resources, generally for the disposal of stormwater runoff or agricultural field drainage.

Group 1 Sites – These are sites that show elevated levels of contaminants and are not within a priority one area.

Inorganic Priority Area – Priority one areas where greater than 25% of the wells/springs show inorganic constituents at levels higher than primary standards or other health standards.

Landfill – Areas of open and closed municipal and non-municipal landfills.

LUST (Leaking Underground Storage Tank) – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

Mines and Quarries – Mines and quarries permitted through the Idaho Department of Lands.

Nitrate Priority Area – Area where greater than 25% of wells/springs show nitrate values above 5mg/l.

NPDES (National Pollutant Discharge Elimination System) – Sites with NPDES permits. The Clean Water Act requires any discharge of a pollutant to waters of the United States from a point source to be authorized by an NPDES permit.

Organic Priority Areas – These are any areas where greater than 25 % of wells/springs show levels greater than 1% of the primary standard or other health standards.

Recharge Point – This includes active, proposed, and possible recharge sites on the Snake River Plain.

RICRIS – Site regulated under Resource Conservation Recovery Act (RCRA). RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

Toxic Release Inventory (TRI) – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

UST (Underground Storage Tank) – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

Wastewater Land Applications Sites – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

In 2007, the DEQ Source Water Assessments are posted on the DEQ Web site, at http://www.deq.idaho.gov/water/SWAReports/InternetQuery.cfm.

Drinking Water Protection Program

As the Source Water Assessments for various communities are completed, DEQ is working with the communities to develop and implement Drinking Water Protection Plans (formerly referred to as Source Water Protection Plans). Implementation status is, therefore, considered "Continuing Efforts." Idaho's voluntary program stresses common sense methods for preventing ground water contamination, which include both regulatory and non-regulatory approaches. DEQ is working closely with the Idaho Rural Water Association, Idaho Association of Soil Conservation Districts, the Association of Idaho Cities, and other state and local entities to encourage implementation of drinking water protection activities, and to provide technical assistance to public water systems developing drinking water protection programs. The program is on DEQ's Web site at http://www.deq.idaho.gov/water/prog_issues/source_water/protection.cfm.

In 2000, DEQ published Protecting Drinking Water Sources in Idaho, which explains the steps involved in developing a state-certifiable Drinking Water Protection Plan. Drinking Water Protection Plans consist of five primary action components: 1) formation of a planning team, 2) delineation of the land area to be protected, 3) identification of potential contaminant sources, 4) development and implementation of a management plan for the drinking water protection area, and 5) planning for the future: development of a contingency plan and planning for future drinking water sources. Steps 2 and 3 are completed during the source water assessment phase of the project.

As of October 2002, 22 PWSs within Idaho had developed and implemented state-certified Drinking Water Protection Plans, and an additional 18 public water systems are expected to submit protection plans to DEQ for certification by the end of state fiscal year 2003[8]. Two counties and numerous municipalities passed wellhead protection ordinances before the present Drinking Water Protection Program was established. As efforts in the Ground Water Program transition from source water assessment to drinking water protection over the next two fiscal years, the number of PWS that develop and implement certifiable protection plans should increase significantly. Idaho DEQ is committed to EPA's goal of ensuring that 40% of all public drinking water systems be implementing drinking water protection measures by the year 2005.

State Superfund

DEQ is tasked with 4 major activities under the Superfund Grant Program: 1) Planning and Policy Development – designed to support short and long-term planning of remediation programs including evaluation and development of program enhancements as well as establishing remediation program priorities under the Idaho Land Remediation Act (i.e., Brownfield's and voluntary cleanup projects), 2) Agency Safety and Health Support for training of agency environmental remediation staff, 3) Emergency Response and Preparedness to provide for ongoing non-site specific emergency response capabilities within DEQ and facilitate

[8] As of June 30, 2006, 100 PWSs in Idaho have developed and implemented state-certified Drinking Water Protection Plans.

coordination of emergency response activities with other state agencies, and 4) Information Technology to provide for the design, implementation and administration of the agency's Consolidated Listing of Reported Remediation Sites (COLORRS) database, which presently accounts for 450 designated remediation sites in the state.

State Septic System Regulations

Idaho's state septic system regulations are "Fully Established" under the *Individual/Subsurface Sewage Disposal Rules* (IDAPA 58.01.03), and the *Rules Governing the Cleaning of Septic Tanks* (IDAPA 58.01.15). Implementation is primarily through Idaho's seven health districts with technical assistance from DEQ. The health districts implement the day-to-day activities in the program by conducting site evaluations, issuing system permits, issuing septic tank pumping licenses, and conducting inspections. DEQ responsibilities include plan and specification reviews. DEQ and the health districts also conduct training courses for installers and pumpers.

The *Technical Guidance Manual for Subsurface Sewage Disposal Systems* (TGM) (DEQ, 1996b) is used to assist in site evaluations, septic tank designs, system operations and maintenance, land use planning, and implementation of best available technologies. The TGM serves as the reference for Environmental Health Specialists, licensed installers, and professional engineers.

Both the septic system regulations and the technical guidance manual are routinely updated. The TGM was updated in 1997.[9] Updates included a new section in the Soils and Ground Water Chapter regarding cut-off trench design and installation. A new Recirculating Sand Filter Section was also added to the Alternative System Chapter. This new section addresses reducing nitrate loading to ground water by denitrifying nitrate to nitrogen gas in the recirculating tank.

Underground Storage Tank (UST) Installation Requirements, Permit Program, and Remediation Fund

The EPA currently maintains enforcement authority of federally regulated UST tanks, but the State has a small UST Program that provides pollution prevention outreach to UST owners/operators and also operates and maintains the State UST registration data base system.[10] Because of the State involvement, the implementation status is considered "Continuing Efforts" for the Release Prevention Requirements Program. USTs must be registered with the State, but there is no permitting requirement. The UST Remediation Fund is also considered "Continuing Efforts" because the existing Idaho Petroleum Storage Tank Fund provides environmental liability insurance that is applicable to new releases from insured sites. Idaho does not have a remediation fund that provides financial support for cleanups of existing contamination.

The State has a Leaking Underground Storage Tank (LUST) program that has full enforcement authority to address all petroleum releases, as defined under the Water Quality Standards and Wastewater Treatment Requirements (IDAPA 58.01.02), which includes a section (Section 851)

[9] There is now a continual process for updating or adding TGM sections, many of which were updated in 2000 and 2004- 2006. The update history with links to new/updated sections is on the DEQ web site at http://www.deq.idaho.gov/water/assist_business/septic/tech_manual_updates.cfm.

[10] In March 2007, the Idaho Legislature authorized DEQ to implement federal UST regulations.

that addresses the reporting, investigation, and confirmation of petroleum releases. The LUST program utilizes a risk-based corrective action (RBCA) approach that establishes site-specific cleanup levels. The LUST program's 1996 comprehensive publication, entitled Risk-Based Corrective Action Guidance Document for Petroleum Releases, provides detailed procedures for cleanups performed using the RBCA approach.[11]

Underground Injection Control (UIC) Program

Idaho's UIC program addresses ground water quality protection from underground injection wells and is "Fully Established." The UIC program, permitting and rulemaking are under the authority of the Idaho Department of Water Resources. The *Rules for Construction and Use of Injection Wells* (IDAPA 37.03.03) apply to Class V wells and prohibit all other classes. The rules are reviewed periodically and updated to reflect changes in technology and policy to assure that ground water is protected from contamination. Idaho's UIC program components include well inventory, permitting, and inspections. The underground injection well inventory contains information from more than 5000 injection wells. Permitting requirements apply to most injection wells deeper than 18 feet. Operational injection well inspections are unannounced and include inspecting well construction components, inspecting any treatment facilities, noting the position of any production wells in the area, and sampling injection fluid when possible.

Wastewater Land Application Permit Program

Idaho has a "Fully Established" Wastewater Land Application Permit Program covered under, *Wastewater - Land Application Permit Regulations* (IDAPA 16.01.17).[12] There are currently more than 100 permits, which authorize wastewater application to more than 16,000 acres. About two-thirds of these permits are for municipal wastewater treatment plants, and about one-third are issued to industry, most of which are represented by agricultural food processors. The guidance and permit conditions are based on wastewater applications at agronomic rates during the growing season and on the available water capacity in the soils during the non-growing season to minimize leaching of nutrients below the crop root zone and into ground water. Ground water quality monitoring is a standard permit requirement. The *Handbook for Land Application of Municipal and Industrial Wastewater* is a technical guidance document, which was completed in April 1996 and is under current revision.[13]

Well Installation and Abandonment Regulations

Well installation regulations are considered "Fully Established" under the *Well Construction Standards Rules* (IDAPA 37.03.09). The well construction program, permitting and rulemaking are under the authority of the Idaho Department of Water Resources. These rules provide detailed well construction requirements for cold water, geothermal, injection, cathodic

[11] As of May 2007, the program now provides technical assistance with risk evaluation. The Risk Evaluation Manual is available via DEQ's website at http://www.deq.idaho.gov/Applications/Brownfields/index.cfm?site=risk.htm. Also available are risk evaluation software, and training in use of the software and manual.

[12] These rules have been revised and are now the *Rules for the Reclamation and Reuse of Municipal and Industrial Wastewater*, IDAPA 58.01.17.

[13] This guidance has been revised and is now the *Guidance for Reclamation and Reuse of Municipal and Industrial Wastewater*, http://www.deq.idaho.gov/water/permits_forms/permitting/guidance_reuse_part1.pdf, updated 2006.

protection, monitoring and other wells, as well as requirements for well abandonment. The rules set up a well drilling permit system and a system to designate “Areas of Drilling Concern” to protect public health or to prevent waste and contamination of ground and/or surface water because of factors such as contaminated ground or surface waters. In addition, a technical guidance for well abandonment has been developed to supplement the well construction standards. Well abandonment regulations are rated as “Continuing Efforts” because of inclusion within the well installation regulations and the existence of technical guidance.

Priority One Nitrate Area Ranking Process

Pursuant to guidance provided in the DEQ Policy Memorandum PM004, entitled "Policy for Addressing Degraded Ground Water Quality Areas" dated March 1, 2000, a statewide list of significantly degraded areas for nitrate was developed. The policy states that the list will be prioritized and the public given an opportunity to comment. The draft Priority One Nitrate Area Ranking Process was released for public comment on April 24, 2001. After an initial 30 days, the public comment period was extended an additional 30 days until June 23, 2001. Public comments were incorporated into the ranking process as appropriate.

The Nitrate Area Ranking Process (Ranking Process), developed by DEQ in consultation with the GWMTC, provides the rationale for numerically ranking areas in Idaho with identified ground water degradation from nitrates. The process was initially limited to ranking 33 Priority One Nitrate Areas (Nitrate Priority Areas) identified by the GWMTC in 1999. The current number of Nitrate Priority Areas has been reduced to 25, largely through consolidation of smaller areas into larger ones. The small areas that were consolidated were adjacent and in close proximity with similar hydrogeologic parameters. Furthermore, from the standpoint of implementing corrective measures, the consolidated areas lend themselves to easier management by local entities. The statewide priority list created through this process will be used to prioritize the implementation of protective management strategies or corrective action measures within the Nitrate Priority Areas. The prioritization process employed an approach intended to:

minimize subjectivity,
have statewide applicability,
be transferable to other types of contaminants, such as pesticides, and
make use of existing information.

The prioritization process gives consideration to three weighted principal criteria: population, existing water quality, and water quality trends. A secondary criterion, impacts to beneficial uses other than potable water supply, is considered to a lesser extent because it is not directly related to public health. The secondary criterion is included to comply with the DEQ Policy Memorandum PM004, entitled "Policy for Addressing Degraded Ground Water Quality Areas." The worksheet used for scoring against the criteria is shown in Figure 1 on page 20 and is followed by descriptions for each of the four criteria.

Figure 1. Sample Ranking Worksheet.

Nitrate Priority Area Ranking Worksheet					
Priority Area Number: [example]		**Priority Area Name:** [example]			
Ranking Criteria				Score	Comments
1) POPULATION					
a) Within Priority Area	Points		Select One		
<1000	1				
1,000 to 10,000	2		x	2	Pop. = 5853
10,000 to 100,000	3				
		Subtotal		2	
b) Source Water Protection Areas or Public Water System wells in Priority Area	Points		Select One		
0	0				
1 to 20	1		x	1	11 PWSs
>20	2				
		Subtotal		1	
c) Number of Wells with nitrate (NO_3) 10 mg/l	Points		Select One		
0	0				
1 to 2	1				
3 to 5	2				
6 to 9	3				
10 to 15	4				
>15	5		x	5	29 wells
		Subtotal		5	
		Population Score Subtotal (max possible = 10)		**8**	
2) WATER QUALITY					
	% wells	Nitrate Concentration Criteria			
% of wells with nitrate (NO_3)≥2 mg/l	88%	2		1.76	
% of wells with nitrate (NO_3)≥5 mg/l	73%	5		3.65	
% of wells with nitrate (NO_3)≥10 mg/l	45%	10		4.50	
		Water Quality Score Subtotal		**9.91**	
3) WATER QUALITY TRENDS					
	Points	Select One			
Increasing	10	x		10	
No Discernable Trend	5				
Decreasing trend	0				
		Trend Score Subtotal (max. possible = 10)		**10**	
4) OTHER BENEFICIAL USES					
Other beneficial uses are impaired		Yes=2 No = 0		No	
		Beneficial Use Score Subtotal (max. possible = 2)		**0**	
		Total Score		**27.91**	

Criteria and Scoring

Primary Criteria

1) **Population** - The population criterion considers the number of people living in an area that are potentially drinking nitrate-degraded water. This criterion consists of an assessment of three elements and assignment of points for each.

   a) Population within the priority area. This element is based upon census data. For this element, 1 to 3 points are assigned. One point is assigned if the area population is less than 1,000; 2 points are assigned if the area populations are between 1,000 and 10,000; and 3 points are assigned if the area populations are 10,000 or more.
   Example: Population =5,853, in the 1,000 to 10,000 range = 2 points.

   b) Source Water Protection Areas or Public Water System (PWS) wells within the priority area. The DEQ Policy for Addressing Degraded Ground Water Quality Areas Memorandum directs DEQ to consider source water assessment areas in ranking the priority areas. Source water assessment areas include delineated "capture zones," which represent the aerial extent of 3-, 6-, and 10-year travel times for ground water to reach the PWS well. However, at this time, source water assessments are not yet completed for the state.[14] Therefore, to meet the intent of the policy, PWS well locations are used instead of source water assessment areas. This substitution is not conservative because wells located outside the priority areas may have source water assessment/protection areas extending into a neighboring priority area. If source water assessment/protection delineation is in the vicinity of a nitrate priority area, the susceptibility rating of the source water assessment is increased. Once the source water assessments are completed, the ratings can be revised to reflect the number of source water assessment/protection areas rather than PWSs affected by the nitrate priority area. For this element, 0, 1, or 2 points are assigned. Areas without a PWS are assigned 0 points, .areas with 1 to 20 PWSs are assigned 1 point, and areas with more than 20 PWSs are assigned 2 points.
   Example: PWS wells in Priority Area=11= 1 point

   c) Number of Wells with Nitrate Concentrations greater than 10 milligrams per liter (mg/l). The GWMTC determined the number of wells with nitrate exceeding 10 mg/l was an important ranking factor. Furthermore, the number of sampled wells with nitrate greater than or equal to 10 mg/l within the priority area is representative of the potential for the public to ingest contaminated ground water. This step is intended to equalize the scoring of a large populations' drinking water from uncontaminated sources with small populations' drinking water from nitrate-contaminated sources. Nitrate contamination greater than or equal to 10 mg/l is the only factor tallied. For this element, points are assigned as follows. For the number of wells with nitrate concentration exceeding 10 mg/l: 0 = 0 points, 1 to 2 = 1 point, 3 to 5 = 2 points, 6 to 9 = 3 points, 10 to 15 = 4 points, and more than 15 = 5 points.
   Example: Number of wells with nitrate greater than 10 mg/l = 29 wells = 5 points

   At this stage, the population scores are subtotaled.
   Example: (2 + 1 + 5 = 8)

[14] In May 2003, DEQ met its obligation under the SDWA 1996 amendments by completing delineations for all 2100+ PWSs that were active in Idaho as of August 1999. Source water assessments for new PWSs are being developed as those systems come online. See the Source Water Assessment Program section on page 12 for more information.

2) **Water Quality** - This criterion considers the concentration of nitrate contamination with respect to drinking water standards. The criterion is based on the percent of sampled wells with ground water nitrate concentrations greater than or equal to 2 mg/l, 5mg/l, and 10 mg/l. These categories were selected to maintain consistency with existing data formats used by the GWMTC.

a) Percentage of wells with nitrate concentrations greater than or equal to 2 mg/l. This concentration threshold provides an indication of human-caused (anthropogenic) impacts. The upper limit for naturally occurring (background) concentrations of nitrate is considered to be about 2 mg/l. Points are calculated by multiplying the percentage of sampled wells with this nitrate concentration by 2.
Example: 88% of the wells sampled equaled or exceeded 2 mg/l (0.88 x 2 = 1.76)

b) Percentage of wells with nitrate concentrations greater than or equal to 5 mg/l. A nitrate concentration of 5 mg/l is considered evidence of significant degradation. This concentration represents one half the drinking water standard for nitrate of 10 mg/l. Public drinking water systems are required to increase monitoring frequency when the 5 mg/l level is reached. Because wells with nitrate concentrations of at least 5 mg/l are a subset of the wells with nitrate greater than or equal to 2 mg/l, this percentage is always less than or equal to the percentage of wells with concentrations greater than 2 mg/l. Points are calculated by multiplying the percentage of sampled wells with this nitrate concentration by 5.
Example: 73% of the wells sampled equaled or exceeded 5 mg/l (0.73 x 5 = 3.65)

c) Percentage of wells with nitrate concentrations greater than or equal to 10 mg/l. The State of Idaho and federal drinking water standard Maximum Contaminant Level (MCL) for nitrate is 10 mg/l. Nitrate concentrations above this level present health risks to certain individuals. Because wells with nitrate concentrations this great are a subset of the wells containing nitrate concentration equal to or greater than 5 mg/l , this percentage is always less than or equal to the percentage of wells with nitrate concentrations greater than or equal to 5 mg/l. Points are calculated by multiplying the percentage of sampled wells with this nitrate concentration by 10.
Example: 45% of the wells sampled equaled or exceeded 10 mg/l (0.45 x 10 = 4.50)

The sum of all three factors above gives the final water quality score.
Example: (1.76 + 3.65 + 4.50 = 9.91 points)

3) **Water Quality Trends.** This criterion considers water quality trends within each priority area. Determining water quality for a specific priority area is a complex process requiring a comprehensive analysis of water quality data. DEQ contracted with the U.S. Geological Survey to evaluate the nitrate data using statistical methods to determine if scientifically defensible water quality trends are present in the areas. The concentrations of nitrate are classified as increasing, no discernable trend, or decreasing.

A maximum value of 10 points will be assigned for Water Quality Trends. The scoring breakdown is listed below:

a) Increasing = 10 points
b) Static or no discernable trend = 5 points
c) Decreasing = 0 points

Example - Increasing Trend = 10 points

Secondary Criteria

4) **Other Beneficial Uses** - The "Other Beneficial Use" criterion is included in the process because DEQ policy states that this is to be a consideration in ranking the Nitrate Priority Areas. If other beneficial uses are impacted, 2 points are added to the score. However, this factor does not appear to be an issue in any of the existing Nitrate Priority Areas with the exception of Twin Falls area aquaculture. Aquaculture is an example of a beneficial use potentially impacted by elevated nitrates.
Example: no other beneficial uses = 0 points
Total Score - (8 + 9.91 + 10 + 0 = 27.9) (The final score is rounded to the nearest tenth – in this example, from 27.91 to 27.9.)

1999-2000 Draft Priority Ranking

The locations and water quality data of wells and springs where ground water samples were collected have been incorporated into geographic information system (GIS) coverages. The ground water data are from public water system (PWSs) and Statewide Monitoring Program sampling (IDWR/USGS), Idaho Department of Agriculture (ISDA) studies (dairy and other), and regional/local projects conducted by DEQ and other agencies. Data for PWSs are maintained by DEQ. The IDWR and the USGS maintain the Statewide Ground Water Quality Monitoring Program data. The water quality GIS coverages were classified into concentration ranges. In clusters where ground water samples showed nitrate levels higher than natural or background conditions, areas were delineated around the clusters incorporating considerations such as hydrogeologic units and land use.

The criterion for a Group 1 Nitrate Priority Area is that at least 25% of the wells sampled within the area have nitrate concentrations exceeding 5 mg/l. This is half of the state and federal MCL of 10 mg/l nitrate.

The ranking process was finalized in June 2001, following a public comment period, and includes 1999 and 2000 analytical data. For PWSs, the highest value from the most recent analysis was used. Anomalous or inconsistent values were not considered. The reporting period for PWSs was limited to the years of 1999-2000, and attempts were made to select analysis results consistent with the Statewide Program sampling period, which is during the months of May through September.

For the Statewide Program, DEQ regional/local monitoring, and ISDA data sources, the most recent value was selected from sites with multiple sampling events. The reporting period in years for such wells is variable, yet sampling periods are usually during the months of May through September. Well use in the Statewide Program includes domestic (68%), irrigation (19%), public (6%), stock (4%), commercial and industrial (2%), and other (1%) such as recreation, aquaculture, de-watering, and unused. Numerous studies conducted by the USGS are included in the Statewide Program. Wells in DEQ regional/local monitoring projects are generally used for domestic purposes, and wells in ISDA projects include domestic and dairy use.

Water Quality Trends

DEQ contracted with the USGS to perform a statistical analysis of all nitrate data from wells within the priority areas to determine whether the overall nitrate concentration in an area was

increasing, unchanged, or decreasing. The USGS estimated trends, using all available water quality data (whereas the ranking process is restricted to recent data).

There was insufficient data to adequately determine a trend for the Genesee/Cow Creek and Bliss Nitrate Priority Areas at the time the trend analysis was completed. In these areas, DEQ assigned a "no discernable trend" score into the ranking score. Seven areas showed an increasing trend: Camas Prairie, Weiser, Lower Boise/Canyon County, Grand View, Hammett, Twin Falls, and Burley/Marsh Creek. Only one area, Boise/Meridian, showed a decreasing trend.

Final Scores

Final ranking scores for all the 1999 – 2000 Group 1 Nitrate Priority Areas can be found in Table 6 on page 26. The areas are listed in decreasing order of nitrate impacts. Area 1 represents the area with the most significant impact overall, while Area 25 represents the area with the least impact. Figure 2 shows the locations of the ranked Group 1 Nitrate Priority Areas for 1999-2000.

Tie Scores

Two of the areas, Bruneau and Lapwai Creek, have identical ranking scores of 15.00. In the Bruneau area, 40% of sample results have nitrate concentrations greater than or equal to 10 mg/l nitrate, versus 25% for the Lapwai Creek area. The Bruneau area also had a greater number of samples taken than in the Lapwai Creek area and a higher average nitrate concentration. These factors have placed Bruneau above Lapwai Creek in order of overall impact.

Two other areas, Preston/Cache Valley and Genesee/Cow Creek, also have identical ranking scores. Preston/Cache Valley has a higher percentage (5%) of samples with nitrate concentrations greater than or equal to 10 mg/l, versus 0% ≥ 10 mg/l for Genesee/Cow Creek, and more samples were taken than in the Genesee/Cow Creek area. These factors place the Preston/Cache Valley above Genesee/Cow Creek in order of overall impact.

Criteria Implications

Data sorting and calculations were performed for all of the 25 areas. Upon completion, three areas did not meet the criterion for inclusion with Group 1 sites of having 25% of wells sampled with nitrate concentration greater than 5 mg/l. These three sites, along with the number of wells sampled for each, are listed in Table 5 and in Table 6 they are highlighted.

Table 5. Three Sites Not Meeting the Group 1 Inclusion Criterion

NAME	% > 5 mg/l Nitrate	1998 Samples	1999-2000 Samples
Soda Springs/Bear River	22%	55	76
Preston/Cache Valley	23%	14	61
Hibbard	19%	74	64

The 1999 ranking using 1998 data for Soda Springs/Bear River included results from 34 Statewide Program wells and 21 PWS wells for a total of 55 wells sampled. The 1999-2000 ranking includes 53 Statewide Program wells, 22 PWS sites (19 wells and 3 springs), and 1 ISDA well, for a total of 76 samples.

The 1999 ranking using 1998 data for Preston/Cache Valley included sampling results from 6 Statewide Program wells and 8 PWS wells for a total of 14 wells sampled. The ranking for 1999-2000 for Preston/Cache Valley includes results from 10 PWSs (6 wells and 4 springs), 11 Statewide Program wells, and 40 ISDA wells for a total of 61 sources sampled.

Both the Soda Springs/Bear River and the Preston/Cache Valley areas have had an increase in the number of samples with nitrate concentrations greater than 5 mg/l since the 1999 ranking period using 1998 data.

The 1999 ranking period for Hibbard included results from 13 PWS wells and 61 Statewide Program wells (includes USGS studies) for a total of 74 sampling locations. The 1999-2000 ranking period for Hibbard includes 16 PWS sites, 45 Statewide Program sites, and 3 ISDA sites for a total of 64 sites. The Hibbard area shows a decrease in the total number of sampling locations.

The total ranking score for these three areas remains higher than the lowest ranked area. Soda Springs/Bear River ranked 18th with a score of 13.84, Hibbard ranked 20th with a score of 12.81, and Preston/Cache Valley ranked 22nd with a score of 11.73. Of the Group 1 Nitrate Priority areas, the lowest or least severe is Bliss with a rank of 25th and a score of 10.79.

For the 1999-2000 ranking period, DEQ will maintain Group 1 Nitrate Priority status for Soda Springs/Bear River, Hibbard, and Preston/Cache Valley, with re-evaluation in the 2002 ranking period using 2001 data. If one or more of these areas continue to remain below the Nitrate Group 1 criteria, DEQ will evaluate removal of the area from Group 1 status with the GWMTC.

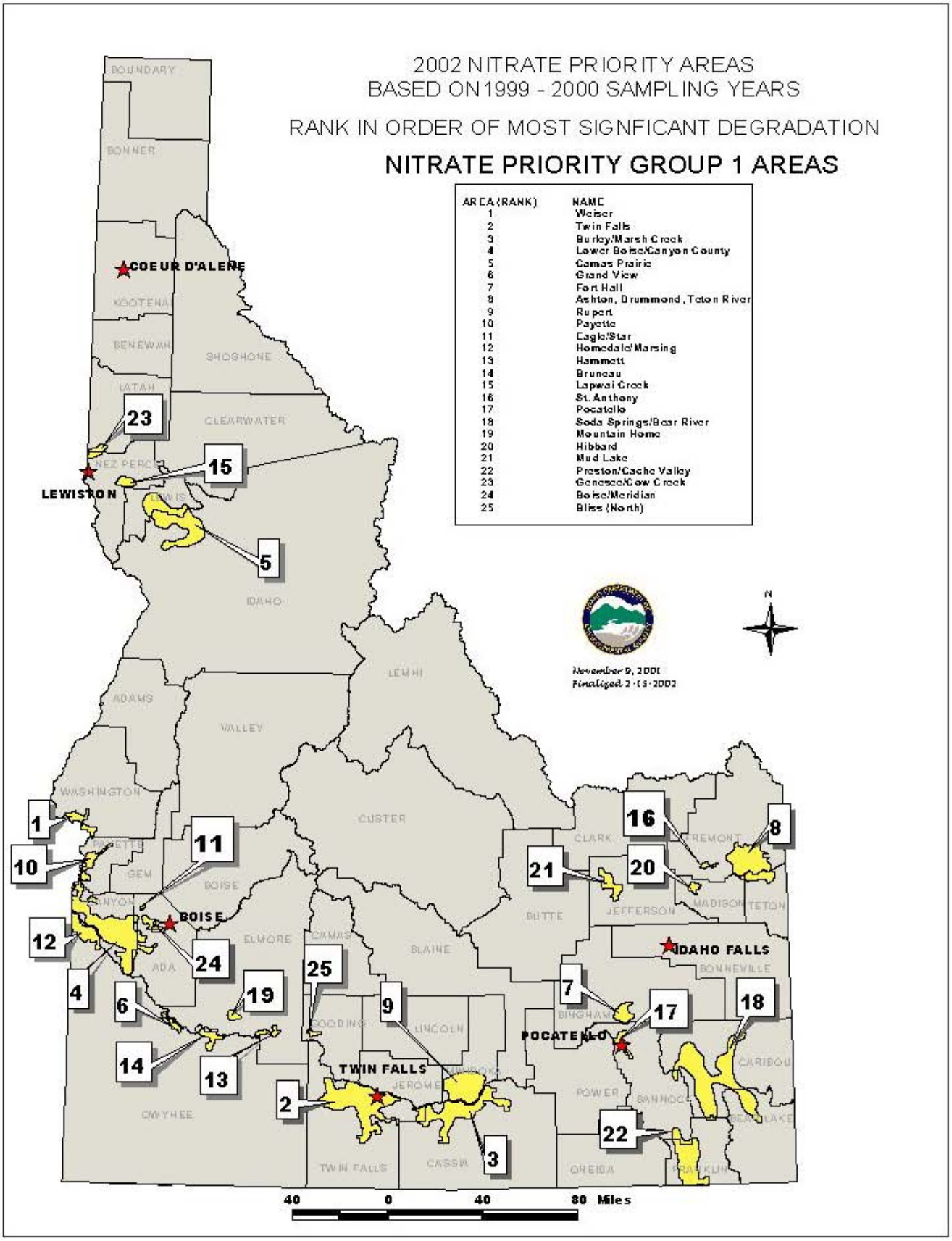
Additional information, together with details pertaining to the scoring calculations, can be obtained at http://www.deq.idaho.gov/water/prog_issues/ground_water/nitrate.cfm#ranking.

Table 6. Group 1 Nitrate Priority Areas for 1999-2000

AREA RANK	AREA NAME	Population (Est.)	Area (acres)	Total Samples	PWS	% >=10 mg/l Nitrate	% >=5 mg/l Nitrate	% >=2 mg/l Nitrate	Min Nitrate (mg/l)	Max Nitrate (mg/l)	Avg. Nitrate (mg/l)	Land Use	TREND	SCORE
1	Weiser	5853	31479	65	11	45%	73%	88%	0.00	29.50	9.90	Irrigate	Incr.	27.9
2	Twin Falls	47,687	244229	303	59	6%	44%	93%	0.00	30.50	5.30	Irrigate	Incr.	26.7
3	Burley/Marsh Creek	11,787	169563	234	33	17%	60%	88%	0.00	20.00	6.36	Irrigate	Incr.	26.5
4	Lower Boise/Canyon County	80,806	238149	640	149	9%	32%	63%	0.00	33.40	4.20	Irrigate	Incr.	23.8
5	Camas Prairie	686	187001	120	5	24%	52%	77%	0.00	79.50	8.70	Dry Ag.	Incr.	23.5
6	Grandview	450	13987	21	2	29%	67%	76%	0.00	26.00	8.90	Irrigate	Incr.	22.8
7	Fort Hall	1000	32323	63	8	25%	60%	83%	0.10	24.00	8.30	Irrigate	No Chg	20.2
8	Ashton, Drummond, Teton R.	1724	146170	120	0	15%	74%	95%	0.10	38.20	7.40	Irrg/Dry Ag	No Chg	20.1
9	Rupert	25,132	116780	236	29	8%	44%	78%	0.00	100.00	5.60	Irrigate	No Chg	19.6
10	Payette	2725	30509	74	15	20%	53%	70%	0.00	23.40	6.50	Irrigate	No Chg	18.0
11	Eagle/Star	100	1739	19	0	47%	58%	58%	0.00	45.20	11.63	Irrigate	No Chg	17.8
12	Homedale\Marsing	840	50914	70	3	27%	30%	41%	0.00	38.20	5.85	Irrigate	No Chg	17.0
13	Hammett	1657	14416	15	4	0%	38%	63%	0.00	8.90	4.00	Irrg/Rng	Incr.	16.2
14	Bruneau	100	24255	10	3	40%	40%	50%	0.00	110.00	17.49	Irrig/Rng	No Chg	15.0
15	Lapwai Creek	600	17587	4	4	25%	50%	100%	2.60	15.00	7.20	Dry Ag	No Chg	15.0
16	St. Anthony	2000	6725	14	0	29%	36%	43%	0.90	37.90	7.60	Irrigate	No Chg	14.6
17	Pocatello	63,527	22576	62	0	3%	26%	87%	0.90	14.50	3.80	Urban	No Chg	14.3
18	Soda Springs/Bear River	5942	310611	76	44	5%	22%	62%	0.00	24.00	3.90	Dry Ag	No Chg	13.8
19	Mountain Home	262	11223	23	22	13%	35%	74%	1.10	28.00	5.40	Irrg/Rng	No Chg	13.5
20	Hibbard	1409	10907	64	16	6%	19%	63%	0.00	25.90	3.70	Irrigate	No Chg	12.8
21	Mud Lake	523	36417	37	3	5%	41%	68%	0.00	14.00	3.90	Irrigate	No Chg	11.9
22	Preston/Cache Valley	620	129115	61	10	5%	23%	54%	0.00	18.70	3.20	Irrigate	No Chg	11.7
23	Genesee/Cow Creek	775	18439	3	2	0%	67%	67%	0.88	7.10	4.53	Dry Ag.	No Chg	11.7
24	Boise/Meridian	225,383	18032	197	0	3%	30%	83%	0.00	18.00	4.10	Urban, Irrg	Decr.	11.5
25	Bliss	50	6806	18	39	5%	39%	67%	0.00	12.20	3.90	Irrigate	No Chg	10.8

Area (acres) is rounded to the nearest full acre
PWS = Public Water System
mg/l = Milligrams per Liter
Trends are abbreviated to represent Increasing, Decreasing and No Change
Land Uses are abbreviated to represent Irrigated & Dry Agriculture and Range

Figure 2. Ranked Group 1 Nitrate Priority Areas for 1999-2000.



Priority Ranked List of Group 1 Nitrate Priority Areas, ranking finalized 2001

Rank	AREA NAME
1.	Weiser
2.	Twin Falls
3.	Burley/Marsh Creek
4.	Lower Boise/Canyon County
5.	Camas Prairie
6.	Grand View
7.	Fort Hall
8.	Ashton, Drummond, Teton R.
9.	Rupert
10.	Payette
11.	Eagle/Star
12.	Homedale/Marsing
13.	Hammett
14.	Bruneau
15.	Lapwai Creek
16.	St. Anthony
17.	Pocatello
18.	Soda Springs/Bear River
19.	Mountain Home
20.	Hibbard
21.	Mud Lake
22.	Preston/Cache Valley
23.	Genesee/Cow Creek
24.	Boise/Meridian
25.	Bliss

4. GROUND WATER QUALITY RESULTS SUMMARY

Ground Water Quality Monitoring Data Sources

The ground water quality results summarized in this report are from two major sources of ground water quality data. One source is the Idaho Statewide Ground Water Quality Monitoring Program. The other source is water quality data from Public Water System (PWS) locations regulated under the Safe Drinking Water Act (SDWA). Below is a more detailed description of each of these two data sources.

Statewide Monitoring Program

Idaho maintains a statistically-designed ground water quality Statewide Monitoring Program, described above on page 6. Of the more than 1500 wells of all types in the network, the three most common types are domestic (67%), irrigation (20%), and PWS (7%). The Statewide Program was designed using stratified random site selection to satisfy the sampling program's first objective: to characterize the (ambient) water quality of the state's aquifers. The Statewide Program is stratified by DEQ Regions, which are shown in Figure 3 on page 32. The regions generally encompass more than one of the major ground water flow systems identified within the State (Graham and Campbell, 1981). Each flow system includes at least one major aquifer, with some systems being comprised of several aquifers, which may be interconnected. The vast majority of Statewide Program monitoring locations withdraw water from the major aquifers also identified in Figure 3.

In the sample location selection process, the more populated regions were weighted higher, generally causing more sites to be assigned to those Regions. Within each Region, sampling was sometimes biased to the areas where wells were available versus remote locations where no wells were available. Sampling is not conducted in the central Idaho mountains and southwestern Owyhee County because of the remote locations, sparse populations, and limited ground water use in both areas.

About 400 of the network wells are sampled each year, so that as many sites as possible are sampled at least once every four years. To identify time trends more easily, a subset of about 100 wells is being monitored annually. This report provides data from the 1998 through 2000 sampling subsets, resulting in about 1,000 different sample locations throughout the State during the three-year period. Where two sets were of data associated with yearly monitoring locations, the highest value (greatest level of contamination) was used for each available parameter for reporting purposes.

The monitoring analyses include many from locations monitored under the SDWA. All locations were sampled for volatile organic compounds (VOCs), nitrate (all nitrate results in this report are nitrate-nitrogen), fecal coliform bacteria (SDWA monitoring requires total coliform monitoring, of which fecal coliform is a subset), metals (filtered), radionuclides, immunoassay pesticides (which include most of the pesticides generally found in Idaho's ground water), and major ions (filtered). In addition, a significant percentage of the sites were also sampled for pesticides using gas chromatography methods. Results from radionuclide and pesticide sampling are not presented in this report. In addition to nitrate concentrations exceeding Ground Water Standards ($\geq$ 10 mg/l), elevated levels of nitrates (> 5 mg/l) are also reported.

More detailed information about the Statewide Program and results from earlier years can be obtained from the Statewide Program website (http://www.idwr.state.id.us/hydrologic/info/statewide/) and from Idaho's 1996 and 1998 305(b) water quality status reports as well as the following two reports:

Idaho Statewide Ground Water Quality Monitoring Program Network Design; (Neely, 1994)

Idaho Statewide Ground Water Quality Monitoring Program - Summary of Results, 1991 through 1993; (Crockett, 1995).

Water Quality Data From PWS Locations

This information includes monitoring results from PWS locations throughout the State. The results presented in this report were obtained from the DWIMS database for monitoring performed during 1998 through 2000. This resulting DWIMS information represents essentially all available data from the reference time period for public water systems that use ground water. To correlate this data with the Statewide Program, all PWS locations were organized by DEQ Regions in which they are located. Because they have been located via GPS, these community and non-community non-transient wells are accurately assigned to their respective DEQ Regions. Transient systems are currently located via mailing address, which may be in a different subarea than the physical system, resulting in assignment to the wrong DEQ region. For future 305(b) reports, the incorrect assignments can be corrected using the results of a project to locate all transient systems via GPS, which is currently in progress.

Many of the PWS locations had multiple sampling events over the 1998 through 2000 period. In such situations, the highest value (greatest level of contamination) was used for each available parameter for reporting purposes.

Analytes for all PWS sampling are selected in accordance with SDWA requirements. For the purpose of this report, general PWS parameter sampling groups include nitrate, VOCs, synthetic organic compounds (SOCs), and inorganic compounds (IOCs), which include many of the pesticides sampled via immunoassay methods under the Statewide Program. The standardized SDWA monitoring framework has sampling for VOCs, SOCs, and most IOCs due in 1998. In addition, monitoring for VOCs, SOCs, and many IOCs are not required for the non-community non-transient and transient systems under the SDWA. Therefore, monitoring associated with VOCs, SOCs, and many IOCs is limited to relatively small subsets of community PWS locations, generally associated with those systems that were required to monitor due to previous detections. On the other hand, there are significant amounts of data available for nitrate, which has a greater sampling frequency for all PWS locations under the SDWA.

Many PWS locations consist of more than one well, with a common sampling point representing a mixture of ground water from several closely spaced wells. In this report, the terms "locations" and "wells" are used interchangeably. In some situations, the sampling well or location may actually be a spring or several wells or springs combined for distribution purposes. As previously mentioned, some PWS locations (less than 100) also serve as sample locations under the Statewide Program.

It is also important to note that some PWS locations may have undergone chlorination or other treatment approaches to address existing contamination concerns, although a large number of locations will have had no form of treatment.

Comparison of Data From Two Sources

In comparing the data from the Statewide Program with PWS data, care must be taken because of differences in aspects such as sampling methods, sample parameters, and analytical methods. Nevertheless, both data sets provide important information about ground water quality in Idaho, as well as important information regarding the quality of Idaho's drinking water.

Discussion of Results

In addition to elevated levels of nitrates, which has been discussed in detail under the Nitrate Priority Area Ranking Process in Chapter 3, the most common contaminant found to exceed ground water standards is arsenic (see Table IV-VII). In each region, a number of wells in the Statewide Program showed levels of arsenic exceeding 50 micrograms per liter (ug/l). With the exception of the Panhandle area, 15% to 33% of all wells sampled had elevated levels of arsenic. Rarely, did PWS show levels this high. Ironically, as the arsenic standard is changed to 10 ug/l, very few additional Statewide Program wells would be added to these maps. In other words, when arsenic is high in ground water, it is usually higher than 50 ug/l. That is not the case for PWS wells. Currently about nine PWS wells around the state exceed the 50 ug/l level in this data set. When the level is 10 ug/l, the number of PWS wells on these maps would increase from 9 to 88.

The number of wells showing elevated levels of arsenic has substantially increased since Idaho's 1998 305(b) water quality status report. In that report 12 wells showed elevated arsenic, presently the number is over 700 wells. The reason for this increase is unclear. It may be the result of increased emphasis on analyzing well samples for arsenic in recent years, not the result of increased levels in ground water.

Each region appears to have several other contaminants that show up as exceeding standards. The Eastern and Southwest Regions show several wells with elevated levels of bacteria and fluoride, whereas in the Southeast and South Central Regions bacteria and several VOCs are elevated (Table IV-VII). In the North and North Central Regions, elevated bacteria and VOCs are less common; however, the North Central Region has three wells with elevated fluoride.

Sites and Areas of Ground Water Quality Concern

Figure 4 through Figure 9 show locations of wells exceeding ground water quality standards for various constituents. Additionally, these figures show wells that contain elevated levels (> 5 mg/l) of nitrates. The results are also summarized in Table 7 and Table 8. Data are from both the Statewide Program and PWS reporting. Figure 4 through Figure 9 each depict one of DEQ's Regions, the boundaries of which are displayed on a state map in Figure 3. This state map also shows the major aquifers in the state.

Figure 3. DEQ Regional Office boundaries and major ground water aquifers.

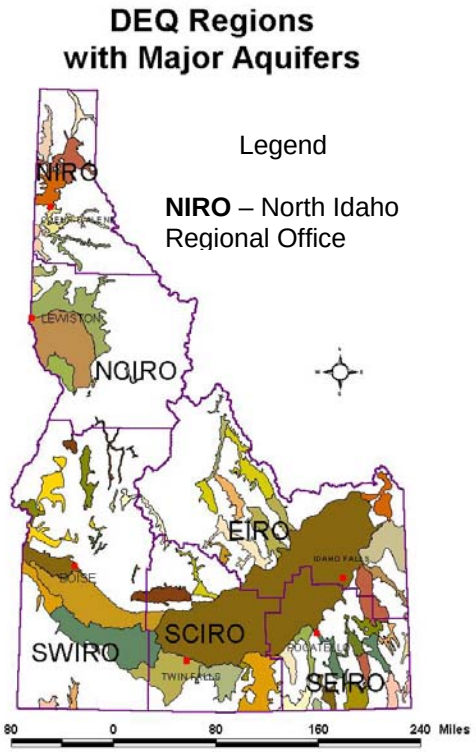


Figure 4. Elevated levels of contaminants in Statewide Monitoring wells and public drinking water system wells in the DEQ Eastern Region.

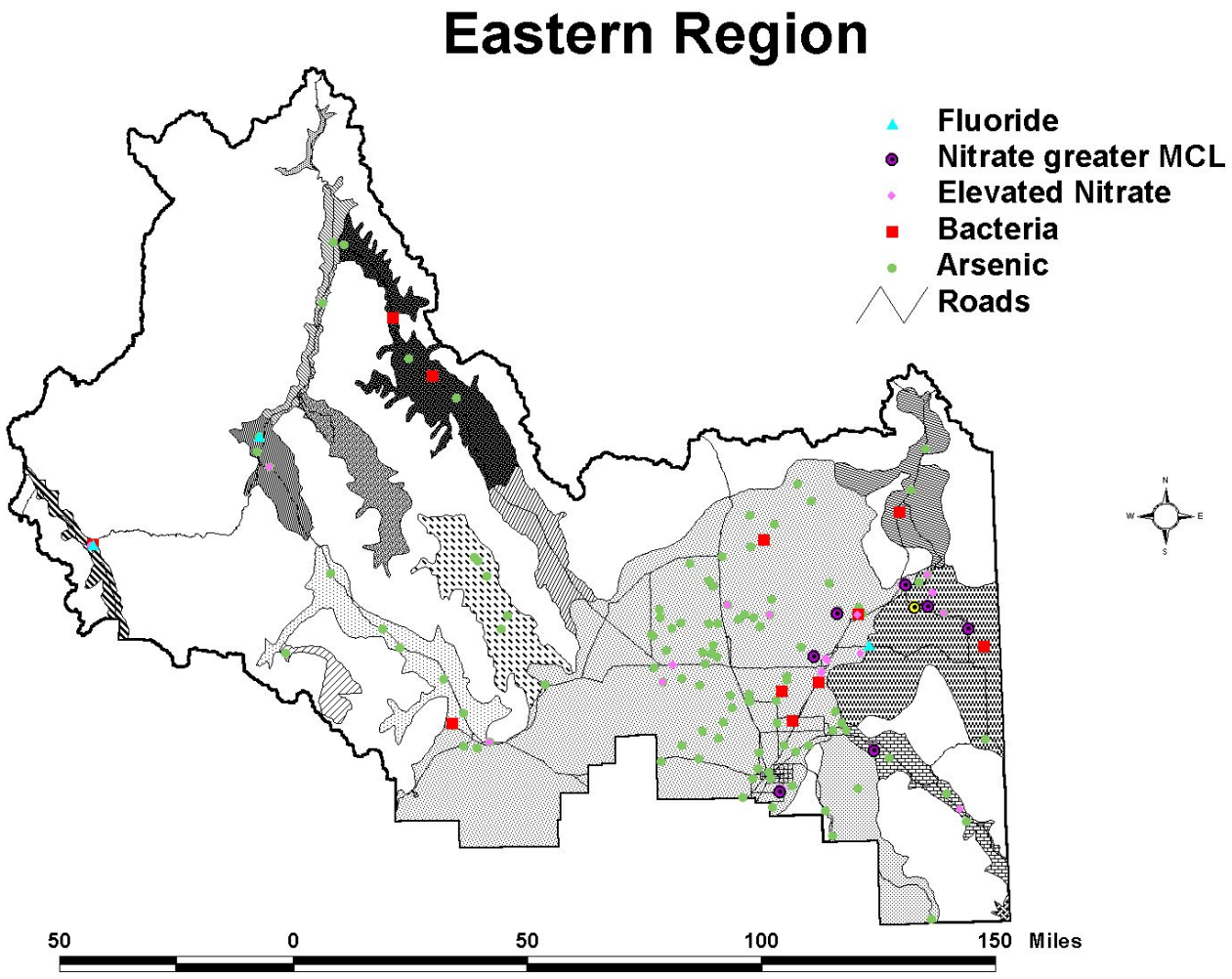


Figure 5. Elevated levels of contaminants in Statewide Program Monitoring wells and public drinking water system wells in the DEQ Southeast Region.

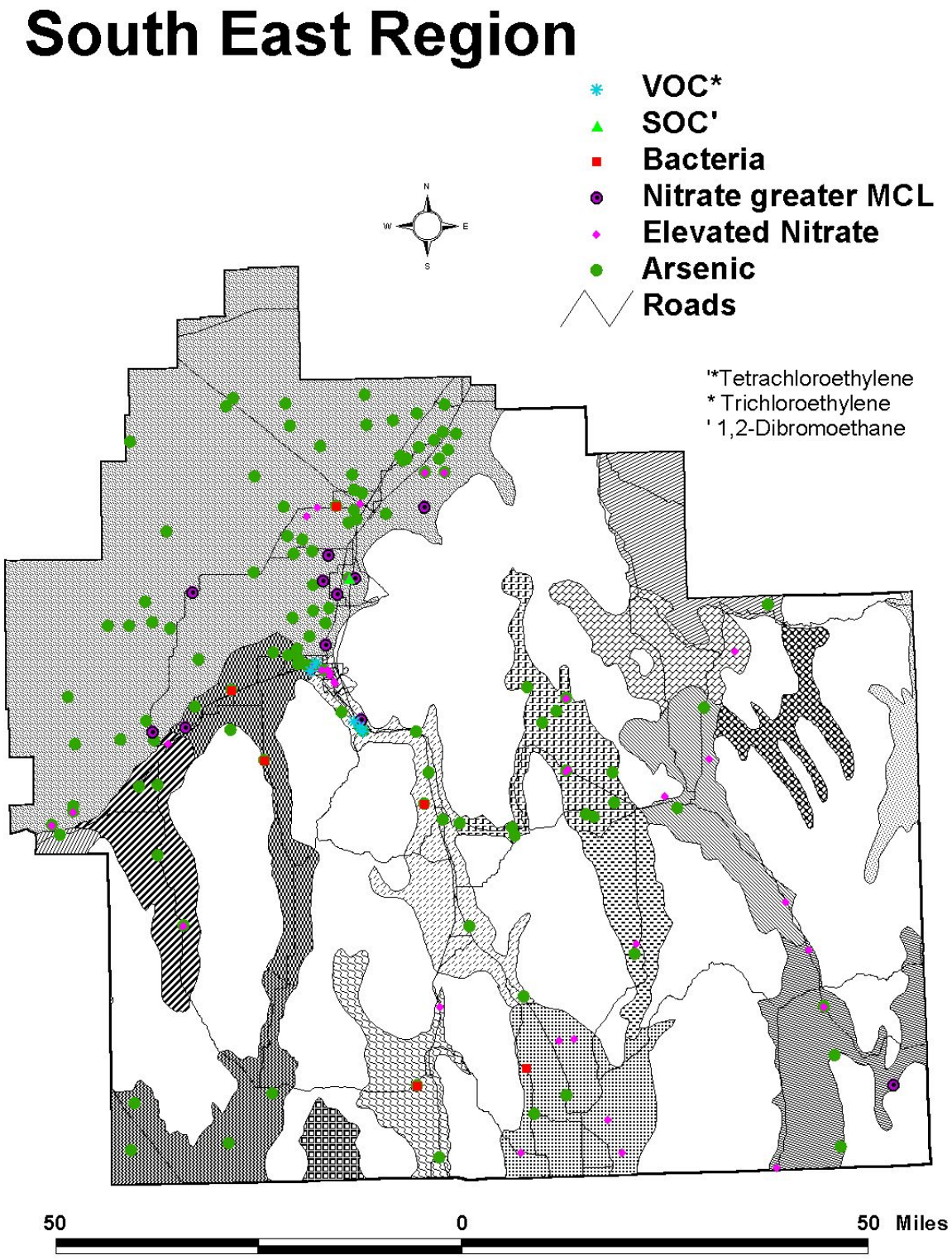


Figure 6. Elevated levels of contaminants in Statewide Program Monitoring wells and public drinking water system wells in the DEQ South Central Region.

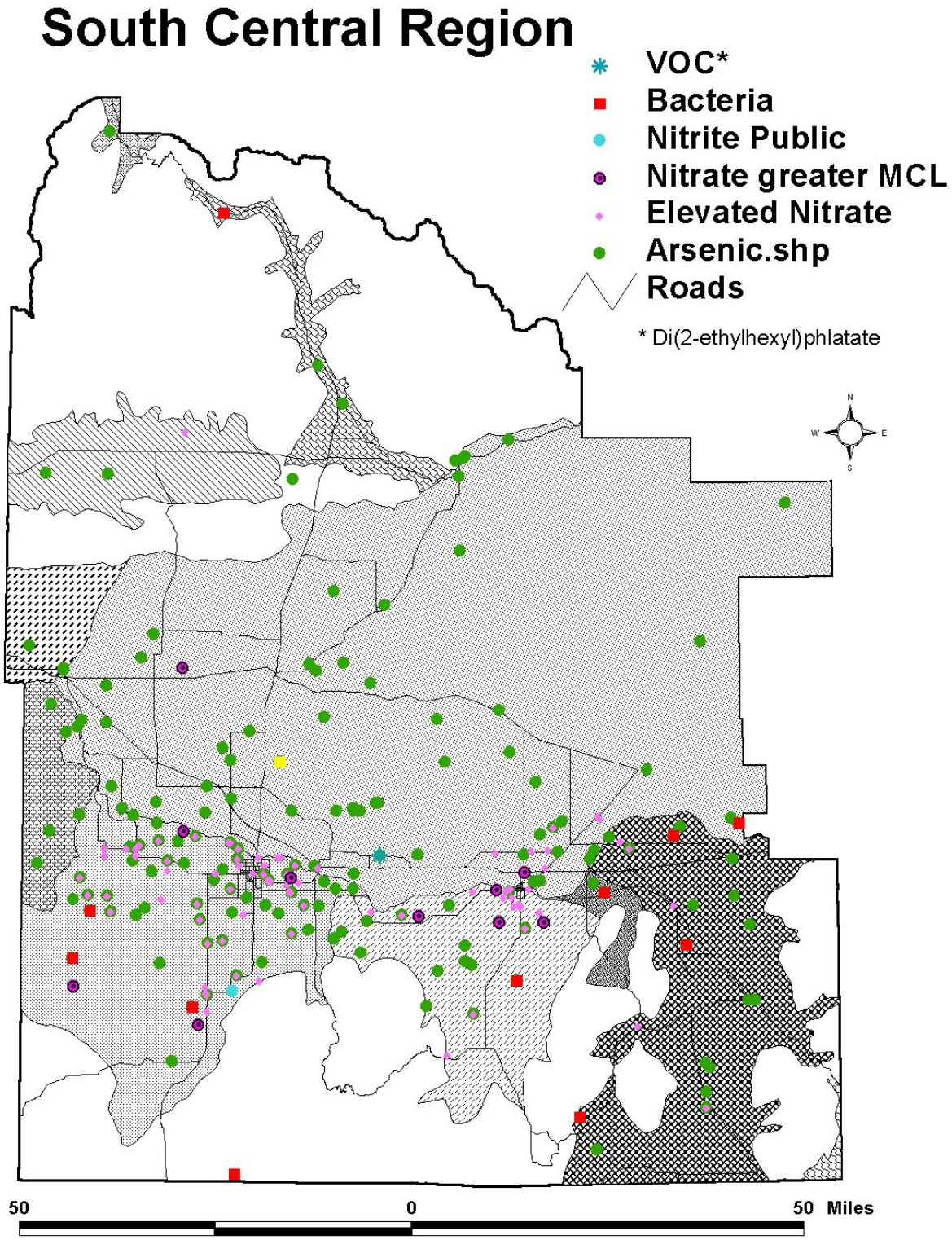


Figure 7. Elevated levels of contaminants in Statewide Program Monitoring wells and public drinking water system wells in the DEQ Southwest Region.

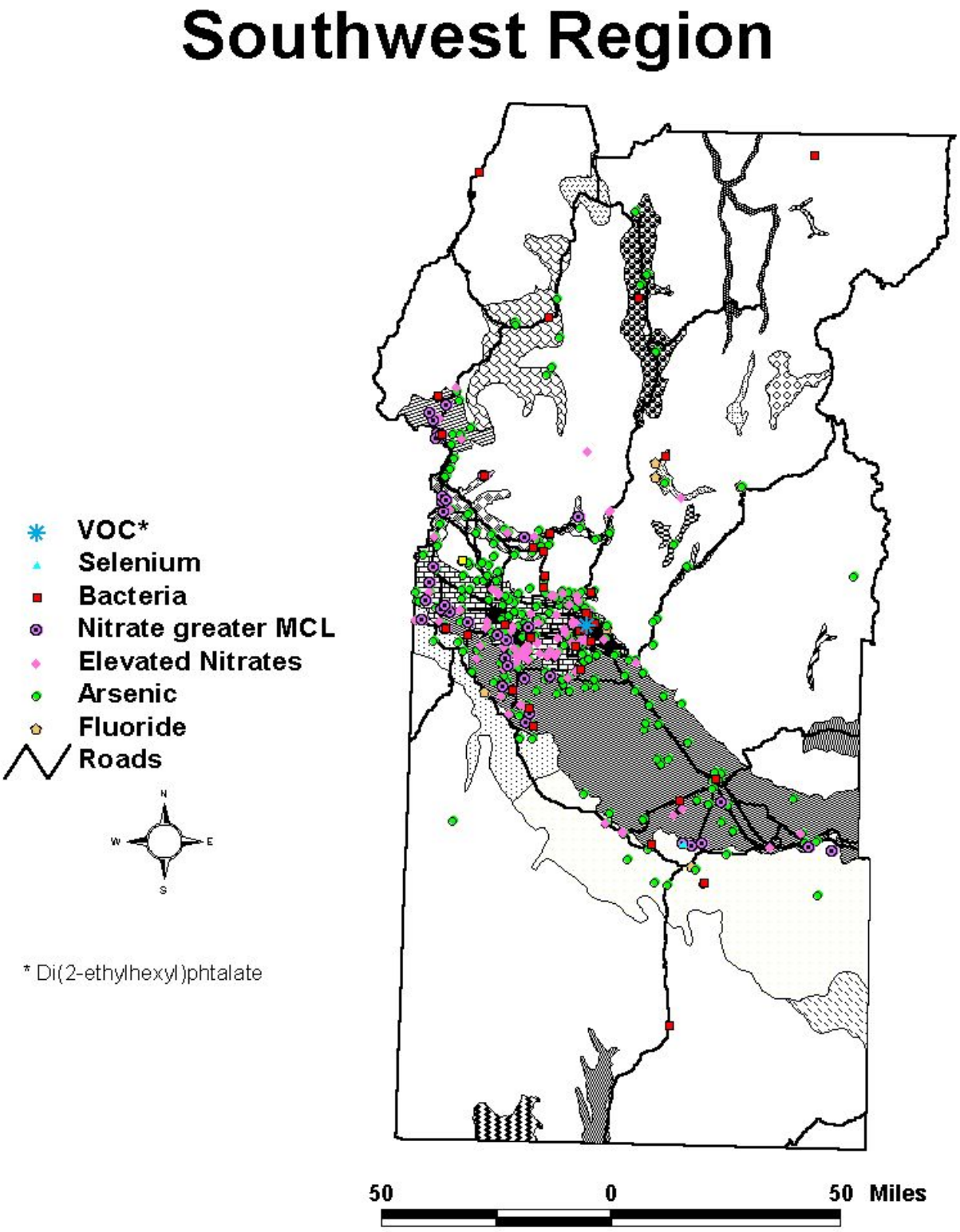


Figure 8. Elevated levels of contaminants in Statewide Program Monitoring wells and public drinking water system wells in the DEQ North Central Region.

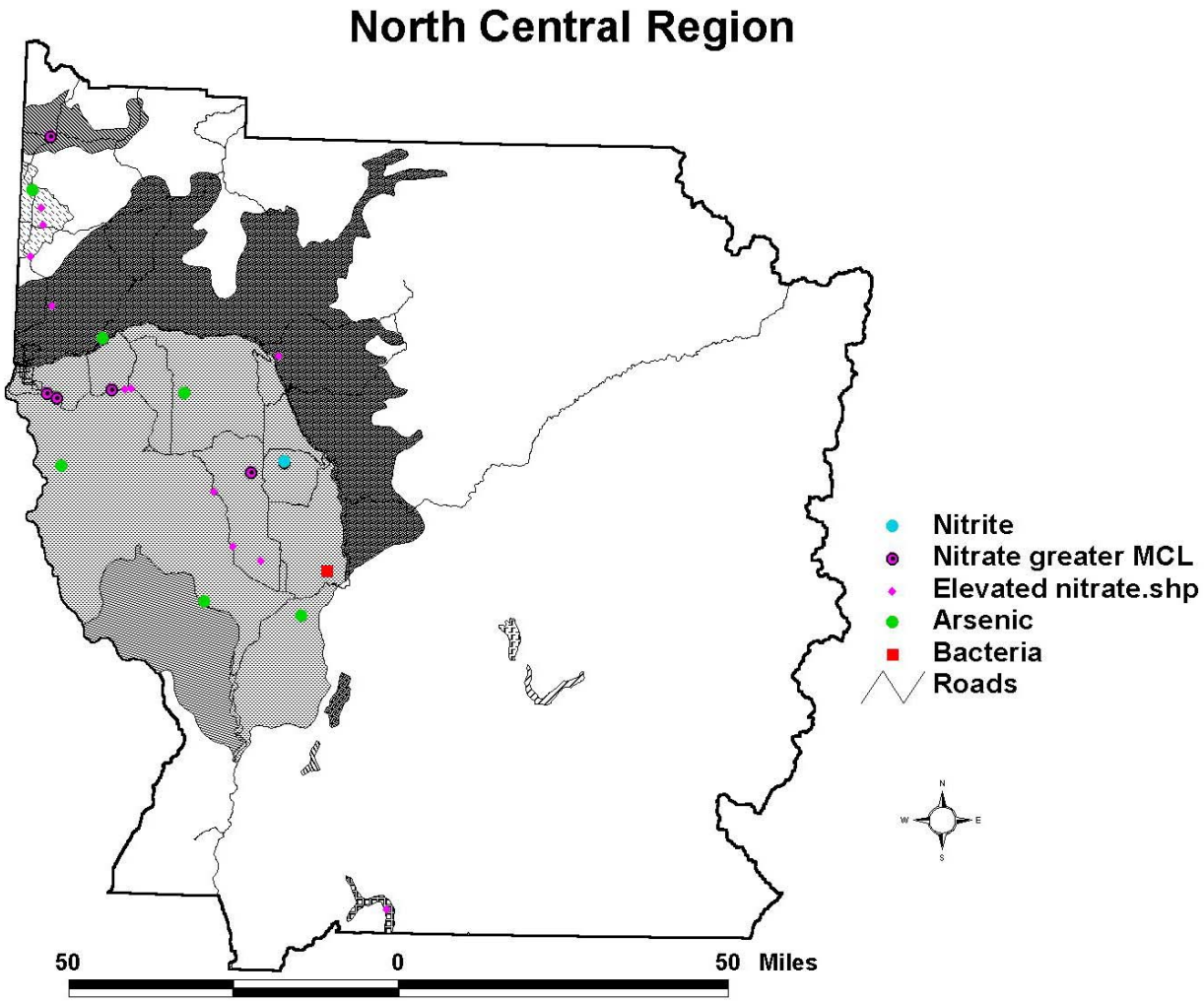


Figure 9. Elevated levels of contaminants in Statewide Program Monitoring wells and public drinking water system wells in the DEQ Northern Region.

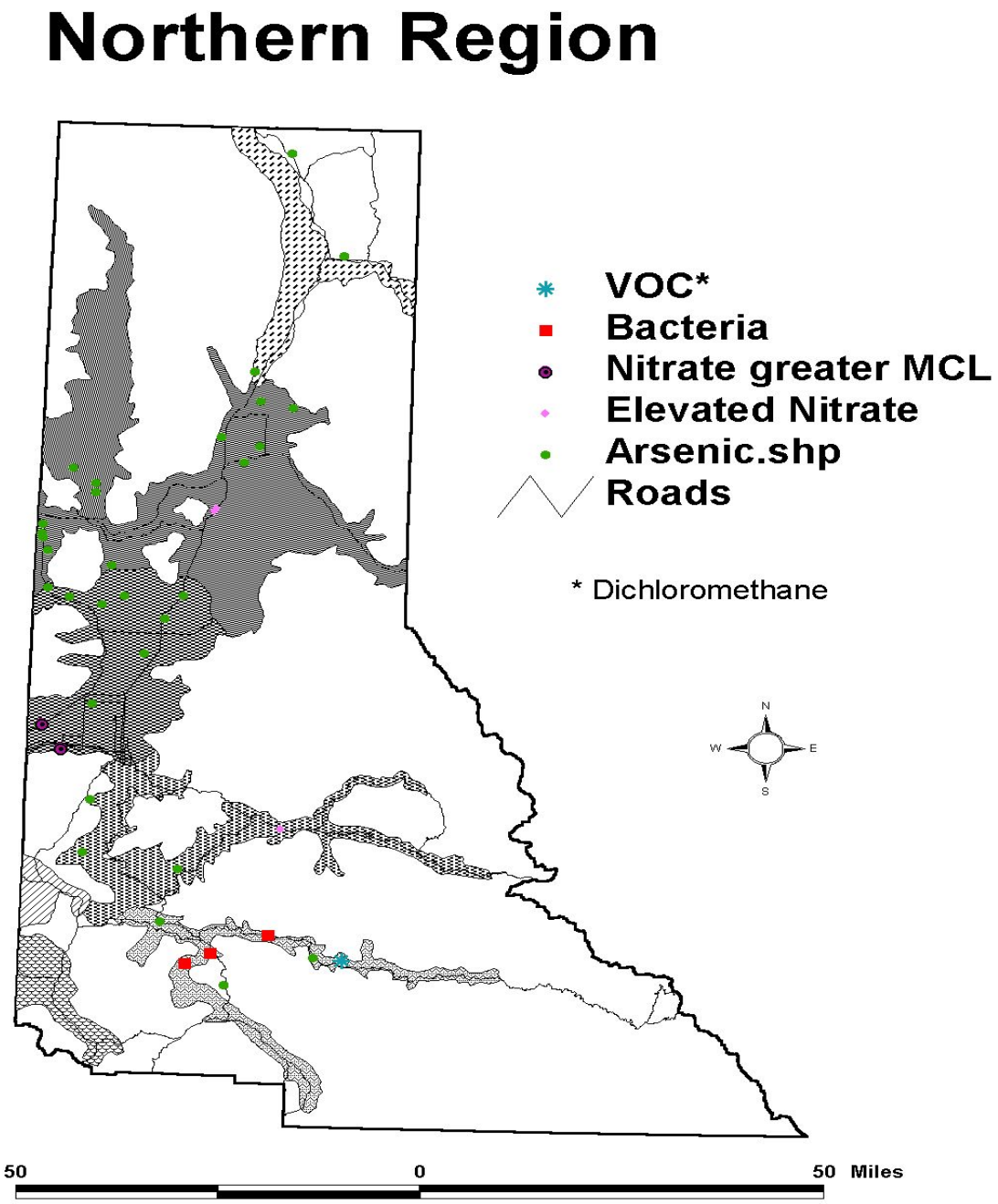


Table 7. Numbers of wells[a] containing contaminants that exceed Ground Water Standards or have elevated levels of Nitrates (> 5 mg/L).

Region	Total Wells	Arsenic (≥.05mg/l)	Bacteria	Fluoride	Nitrate (≥10mg/l)	Nitrite	SOC[b]	VOC[c]	Total[d]	Nitrate (>5mg/l)
North	610	30	3	0	3	0	0	1	37	5
North Central	284	7	1	3	6	1	0	0	18	14
Eastern	762	116	11	3	9	0	0	0	139	30
Southeast	491	119	6	0	11	0	1	4	141	42
South Central	509	168	12	0	10	1	0	1	192	96
Southwest	1171	279	38	8	43	0	0	1	369	128
Total	3827	719	71	14	82	2	1	7	896	315

a. Includes Statewide Program monitoring network wells and public drinking water system wells.
b. SOC = synthetic organic compound;
c. VOC = volatile organic compound
d. The total does not include elevated nitrates (> 5mg/l - < 10mg/l)

Table 8. Percent (%) of total wells[a] in a given region that have contaminants exceeding Ground Water Standards or have elevated levels of Nitrates (> 5 mg/L).

Region		Arsenic (≥ 0.05mg/l)	Bacteria	Fluoride	Nitrate (≥ 10mg/l)	Nitrite	SOC[b]	VOC[c]	Total[d]	Nitrate (> 5mg/l)
North		4.92	0.49	0.00	0.49	0.00	0.00	0.16	6.07	0.82
North Central		2.46	0.35	1.06	2.11	0.35	0.00	0.00	6.34	4.93
Eastern		15.22	1.44	0.39	1.18	0.00	0.00	0.00	18.24	3.94
Southeast		24.24	1.22	0.00	2.24	0.00	0.20	0.81	28.72	8.55
South Central		33.01	2.36	0.00	1.96	0.20	0.00	0.20	37.72	18.86
Southwest		23.83	3.25	0.68	3.67	0.00	0.00	0.09	31.51	10.93
Total		18.79	1.86	0.37	2.14	0.05	0.03	0.18	23.41	8.23

a. Includes Statewide Program monitoring network wells and public drinking water system wells.
b. SOC = synthetic organic compound;
c. VOC = volatile organic compound
d. The total does not include elevated nitrates (> 5mg/l - < 10mg/l)

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