Boise County
Groundwater Quality Improvement and Drinking Water Source Protection Plan



2024

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2024

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Idaho Department of Environmental Quality

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Idaho Department of Water Resources

Idaho Public Health Districts

Idaho Soil and Water Conservation Commission

Idaho Association of Soil Conservation Districts

Natural Resources Conservation Service

University of Idaho Cooperative Extension

Boise County, Idaho

Public and local government representatives providing input.

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Acronyms and Abbreviations

APA	American Planning Association
BMP	best management practice
CAFO	confined animal feeding operation
CDHD	Central District Health Department
DEQ	Idaho Department of Environmental Quality
EPA	United States Environmental Protection Agency
EQIP	Environmental Quality Incentives Program
GWQP	Groundwater Quality Plan
HUC	hydrologic unit code
IASCD	Idaho Association of Soil Conservation Districts
IDAPA	Refers to citations of Idaho administrative rules
IDWR	Idaho Department of Water Resources
ISWC	Idaho Soil and Water Conservation Commission
ISDA	Idaho State Department of Agriculture
IWM	irrigation water management
IWRRI	Idaho Water Resources Research Institute
LUST	leaking underground storage tank
MCL	maximum contaminant level
mg/L	milligrams per liter
NMP	nutrient management plan
NPA	nitrate priority area
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
PWS	public water system
RCRA	Resource Conservation and Recovery Act
SBA	subbasin assessment
SWA	source water assessment
TMDL	total maximum daily load
USGS	United States Geological Survey
UST	underground storage tank

1 Introduction

Drinking water in Boise County, Idaho, is supplied by groundwater pumped from numerous public and private wells. In addition, the city of Horseshoe Bend drinking water system includes surface water intakes from the Upper and Lower Payette Rivers and the city of Idaho City water system includes an emergency surface water intake from Elk Creek. Clean, safe water is a vital resource for the state's economy and human health. Groundwater and surface water are commonly interconnected, and both are vulnerable to contamination from nonpoint source pollution due to land use activities (e.g., farming) and point sources (e.g., gas stations) nearby. However, contamination can be prevented through efforts such as education and the use of best management practices (BMPs) to avoid or minimize vulnerability from potential contaminant sources.

Groundwater provides over 95% of the drinking water in Idaho and is often taken for granted since it is concealed underground. Although the quality of groundwater in Idaho is generally good, water quality monitoring shows that Idaho's groundwater has been significantly degraded in certain portions of the state. This localized degradation negatively impacts water quality and potentially threatens domestic water supplies and other groundwater beneficial uses, such as aquaculture, agriculture, mining, and industrial uses.

Nitrate is one of the contaminants responsible for this degradation and is one of the most widespread groundwater contaminants in Idaho. Precipitation, irrigation, and sandy soils allow nitrate to percolate through soil and into surface water and groundwater. While nitrate is just one of the potential groundwater contaminants in Idaho, more is known about nitrate in Idaho groundwater than other contaminants. In addition, the presence of nitrate is a good indicator of aquifer vulnerability and the potential for other water quality problems. The Idaho Department of Environmental Quality (DEQ) has defined and prioritized areas with groundwater degradation by nitrate to most effectively allocate resources for water quality improvement. These areas are known as nitrate priority areas (NPAs).

This binder serves as the *Boise County Groundwater Quality Improvement and Drinking Water Source Protection Plan*. The information provided is an educational and informational resource for local governments and land-management entities. It is intended to provide background information for decision-making and to help prioritize and coordinate water quality-related activities throughout Boise County. The information in this binder addresses the following:

- Discusses why nitrates are a concern and describes potential nitrate sources to groundwater, as well as the risks associated with high levels of nitrate in groundwater.
- Provides statewide NPA maps and rankings.
- Recognizes activities and accomplishments made to improve groundwater quality throughout Boise County.
- Outlines the general strategies that will be implemented to reduce nitrate contamination in groundwater and protect public water supplies.
- Presents information for protecting sources of public drinking water systems to be used during the decision-making process.

- Summarizes information relating to surface water quality and impaired streams in Boise County.
- Provides a list of agency contacts, regulatory directories, and website resources for technical assistance and resource information.
- Assembles sources of funding for BMP implementation.
- Provides multiple public outreach and technical resources for use in strategic planning.

Idaho's Groundwater Quality Protection Act of 1989 (Idaho Code § 39-1) authorized a comprehensive approach for maintaining and improving Idaho's groundwater quality. The 1996 *Idaho Ground Water Quality Plan* (GWQP) was written as a result of the act and outlines the various state and local responsibilities for protecting Idaho's groundwater quality (Ground Water Quality Council 1996). DEQ is designated as the primary agency to coordinate and administer groundwater quality protection programs for the state.

The GWQP and DEQ's *Policy for Addressing Degraded Groundwater Quality Areas* (Policy Memorandum PM00-004) provide guidance and direction in identifying, delineating, and prioritizing areas where groundwater is significantly degraded.

As the primary agency responsible for groundwater quality protection, DEQ chairs the Groundwater Monitoring Technical Committee. This committee meets periodically throughout the year to coordinate monitoring projects, share results and protocols, and develop evaluation criteria. The committee representatives from other agencies include the following:

- Idaho Department of Water Resources (IDWR)
- Idaho State Department of Agriculture (ISDA)
- Idaho Soil and Water Conservation Commission (ISWC)
- Idaho Association of Soil Conservation Districts (IASCD)
- Idaho public health districts
- Idaho Water Resources Research Institute (IWRRI)
- Idaho's universities
- Federal agencies (such as the United States Geological Survey [USGS])

DEQ helped develop the *Boise County Groundwater Quality Improvement and Drinking Water Protection Plan* in a collaborative effort with IDWR, ISDA, ISWC, IASCD, Central District Health Department (CDHD), University of Idaho Extension, and Natural Resources Conservation Service (NRCS).

2 Geologic Setting and Groundwater Conditions

2.1 Physical Setting

Boise County is located in western Idaho, bordered by Ada and Elmore Counties to the south, Custer County to the east, Valley County to the north, and Gem County to the west. The county has a total area of approximately 1,900 square miles, most of it mountainous and forested, with a limited number of highways or paved roads. Major drainages include the North Fork Boise River, which flows from the northeast to southwest along the eastern border of the county; South Fork Payette River, which flows from east to west in the central portion of the county; and Payette River, which flows north to south along the western border of the county. The smaller Mores and Grimes Creeks drain significant areas in the central portion of the county surrounding Idaho City. Elevations range from approximately 10,500 feet in the Sawtooth Mountains in the northeast, to approximately 2,500 feet along the Payette River in the southeast. Figure 2-1 shows a topographic map of Boise County and the surrounding area.

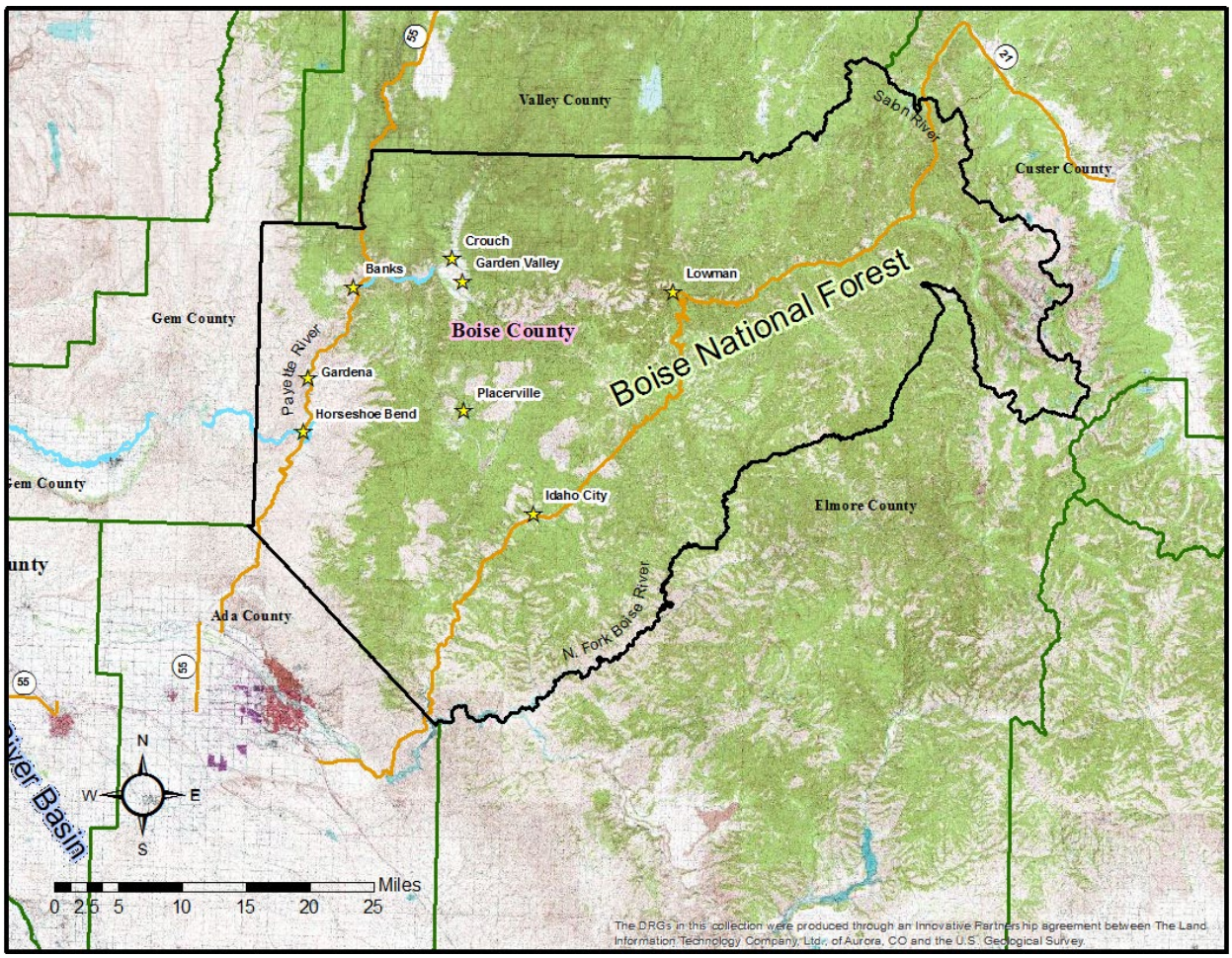


Figure 2-1. Topographic map of Boise County, Idaho, and vicinity.

2.2 Regional Geology[1]

Boise County contains a large area of the central Idaho mountains between Ada County and the city of Boise and the Sawtooth Mountains on the east. This country is drained by the Payette and Boise Rivers and Grimes and Bear Valley Creeks. Most of the area is underlain by Cretaceous granodiorite of the Idaho Batholith. Eocene intrusions are present in the Sawtooth Mountains on the east and in the Idaho City area. Near Idaho City, there are extensive placer gold workings from the 19th century. Mineralization along a northeast trending fault zone is associated with the trans-Challis fault zone (Great Falls lineament). A north-tending Basin and Range fault lies on the east bounds of the system's northeast-striking trans-Challis faults.

Tonalitic intrusive rock of the Idaho Batholith and Miocene Columbia River basalt in the valleys are found west of Horseshoe Bend on the Payette River. This basalt flowed northeast, or up the valleys from sources to the west in Oregon and westernmost Idaho.

Horseshoe Bend is the site of recurrent landslides in Miocene sedimentary rocks of the Payette Formation. These landslides caused rerouting of Highway 55 to avoid the active scarps (*Digital Atlas of Idaho*).

The bedrock in Boise County consists almost entirely of granite and granite-related rock of the Idaho Batholith province. The Idaho Batholith province consists primarily of crystalline granitic rocks that are 65 to 95 million years old. The granitic rocks in Boise County are part of the Atlanta Batholith and the southern section of the Idaho Batholith, which formed between 70 and 90 million years ago. The typical granite of the Idaho Batholith is pale gray on fresh or broken surfaces, becoming a pinkish brown color on weathered surfaces. Other granitic rocks present in the county are younger (approximately 50 million years old) and thought to be associated with the trans-Challis fault zone. This zone of northeast-trending faults extends from Boise to southwest Montana and consists of dike swarms (igneous magma injected into a fracture or fault) and smaller igneous bodies that are likely related to melting of parts of the Idaho Batholith.

The topography of the Atlanta Batholith in Boise County ranges from relatively steep-sloped forested mountains in the majority of the central and western areas of the county to the glacially carved Sawtooth Mountains in the northeast. Streams and rivers are generally contained in steep-walled canyons, with some of the larger rivers developing limited floodplains.

Boise County, and the area surrounding Idaho City, is famous for its historical gold deposits. In 1862, gold was discovered in the area around Idaho City, and by 1863, the population of Idaho City had swelled to approximately 6,200 people (Boise County 2014). Initially mined as placer deposits, later mining techniques included hydraulic jets and dredge mining. Large dredges were used to dig up the streambeds and previously worked gravels and wash the gold out of the deposits. Dredge mining leaves behind large windrows and piles of gravel and cobbles, which can be seen along streambeds in the area surrounding Idaho City.

In the extreme western portion of Boise County along the Payette River are limited exposures of Columbia River basalts. The Columbia River basalts present in Boise County erupted from fissures in northeastern Oregon and southeastern Washington approximately 17 to 15 million

[1] Alt and Hyndman (1998) and *Digital Atlas of Idaho*

years ago. The basalts flooded large areas of Oregon and Washington and flowed into and up valleys in western Idaho.

Figure 2-2 shows a geologic map of Boise County. The map shows recent (less than 10,000 years) sediments (Qa, Qs, Qf, Qls); older (5 to 23 million years) lake and stream sedimentary deposits (Ts); 15–17 million year old Columbia River basalts (Tcr); granite and related igneous rock (Tgs, Tgdd, Kgd, Ktg) from the Eocene (44 to 50 million years) and Cretaceous (70 to 90 million years); and older rocks of uncertain age (PzYsq).

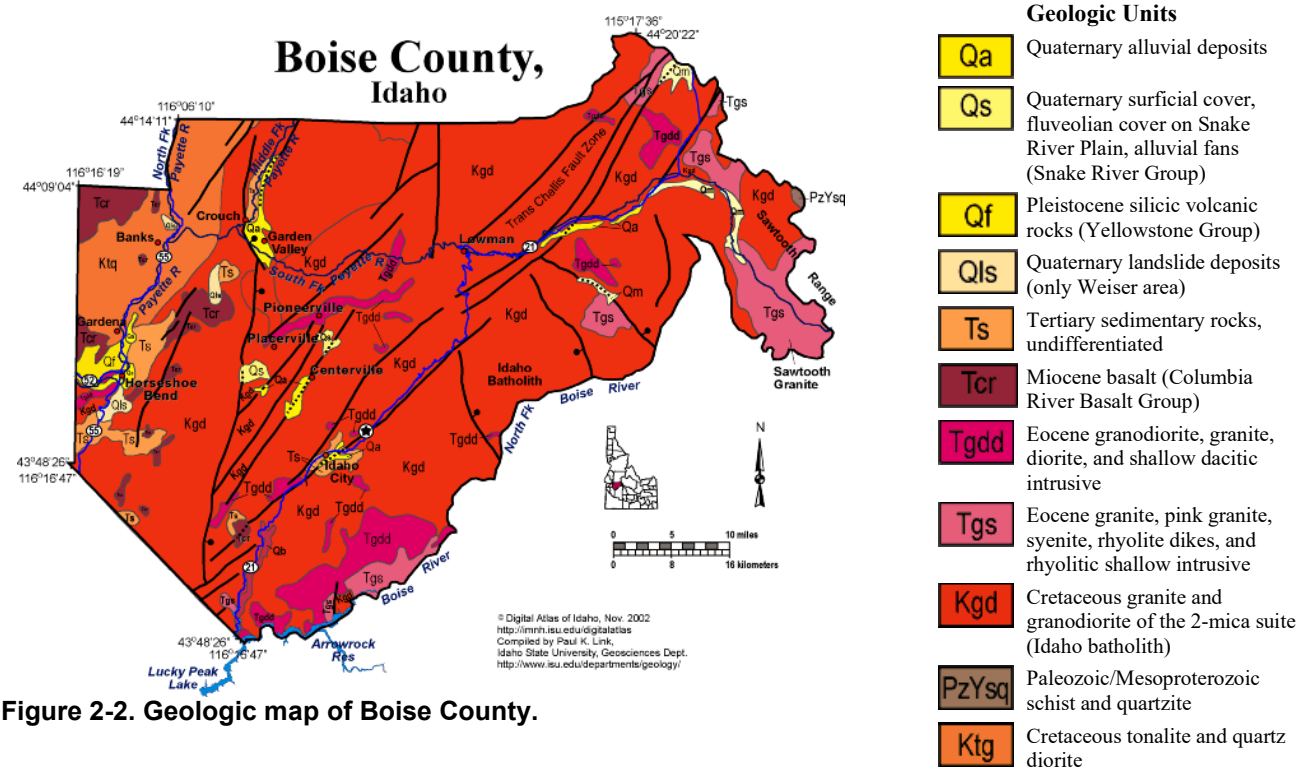


Figure 2-2. Geologic map of Boise County.

Geologic Units

Qa	Quaternary alluvial deposits
Qs	Quaternary surficial cover, fluveolian cover on Snake River Plain, alluvial fans (Snake River Group)
Qf	Pleistocene silicic volcanic rocks (Yellowstone Group)
Qls	Quaternary landslide deposits (only Weiser area)
Ts	Tertiary sedimentary rocks, undifferentiated
Tcr	Miocene basalt (Columbia River Basalt Group)
Tgdd	Eocene granodiorite, granite, diorite, and shallow dacitic intrusive
Tgs	Eocene granite, pink granite, syenite, rhyolite dikes, and rhyolitic shallow intrusive
Kgd	Cretaceous granite and granodiorite of the 2-mica suite (Idaho batholith)
PzYsq	Paleozoic/Mesoproterozoic schist and quartzite
Ktg	Cretaceous tonalite and quartz diorite

Map Key Symbols	
Yp	Geologic units with unit designation
	Normal Fault: certain; dashed where approximately located; dotted where concealed
	Thrust Fault: certain; dashed where approximately located; dotted where concealed
	Detachment Fault: certain; dashed where approximately located; dotted where Concealed
15	Interstate Route
93	US Route
1	State Route
	Location of rock from the county
	Cities
	Feature location

2.3 Groundwater Presence and Flow[2]

Groundwater aquifers in Boise County are generally located in near-surface unconsolidated material, stream and river sediments in valleys and other lowlands, and within fracture, faults, or weathered zones in the granitic bedrock. Groundwater in fractured granitic bedrock does not extend beyond 300 to 400 feet, and yields decrease with depth (USGS 1994). Recharge to the aquifers is from precipitation and infiltration from surface streams.

Groundwater flow in the mountains and hills in Boise County follows the general surface topography, flowing from areas of higher elevations to lower elevations and towards surface drainage features. Regional flow in the county is towards the South Fork Payette River in the north and northeast areas of the county, towards the North Fork Boise River in the southeast, towards Grimes and Mores Creeks in the central and southern areas of the County, and towards the Payette River in the west. Figure 2-3 shows the general groundwater flow directions in Boise County.

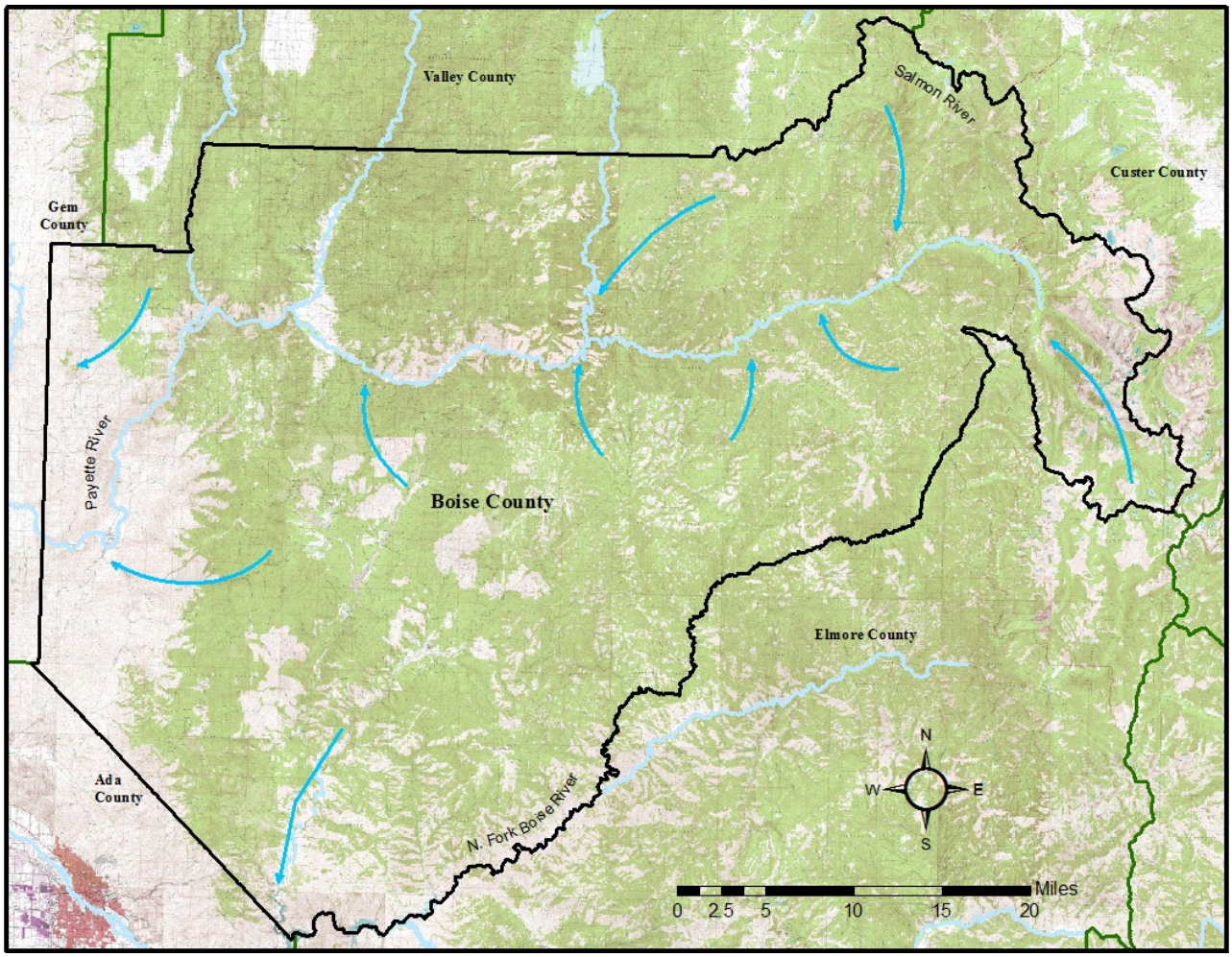


Figure 2-3. Groundwater flow directions.

[2] Groundwater aquifers and flow direction section summarized USGS Hydrogeologic Investigations Atlas 730-H (1994).

2.4 Groundwater Quality

Elevated nitrates have been found along Highway 55, just past Gardena. Elevated fluoride is common in the Garden Valley and Lowman areas and north of Horseshoe Bend. Elevated arsenic has been found along Highway 21 from south of the Robie Creek turn off to Idaho City, in Garden Valley, and north of Horseshoe Bend.

2.4.1 Idaho Department of Health and Welfare

The Idaho Department of Health and Welfare (IDHW) created an interactive map to make private well owners aware of existing groundwater quality data in their area and promote regular groundwater quality testing. Groundwater quality at privately owned wells is not regulated by the State of Idaho. Private well owners are responsible for maintaining their well and ensuring the water is safe to drink, which can be accomplished through periodic testing. View the *Groundwater Quality Map* for more information.

2.4.2 Idaho Department of Water Resources

The Idaho Department of Water Resources (IDWR) began the Statewide Groundwater Quality Monitoring Program in 1990. Every year, about 200–250 monitoring sites are sampled. Most sites are sampled once every 5 years. Water quality results include nutrients, common ions, metals, pesticides, and emerging contaminants. The Statewide Program provides valuable information about Idaho's groundwater quality to private citizens, consulting companies, and governmental entities—as well as provides data for the *Environmental Data Management System*.

Results from the most recent sampling event are shown for the selected parameters: arsenic (Figure 2-4), nitrate (Figure 2-5), uranium (Figure 2-6),and fluoride (Figure 2-7). Data and maps were provided by IDWR.

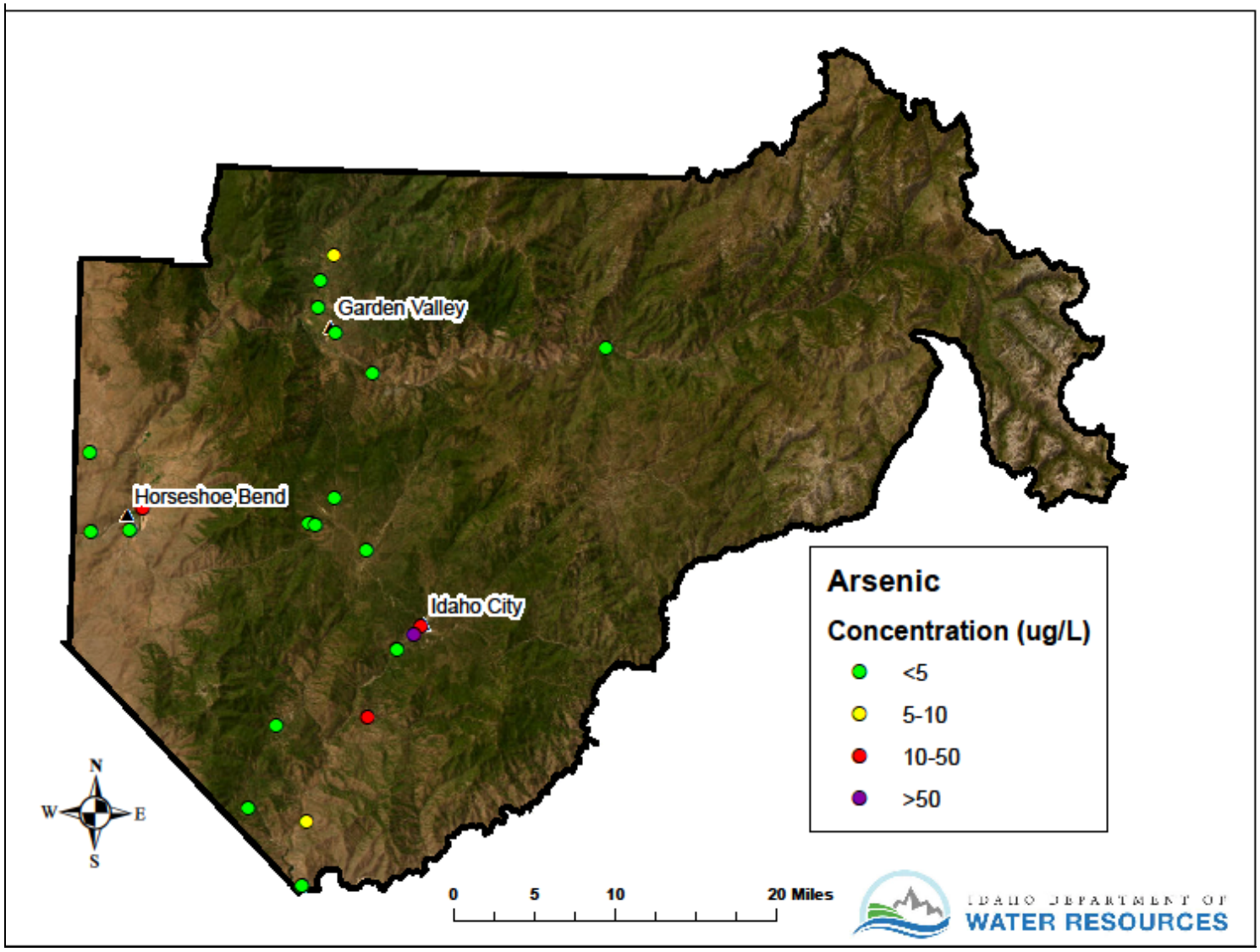


Figure 2-4. Arsenic concentrations from the most recent sampling event for Boise County. Wells sampled by IDWR's Statewide Program. For reference, the arsenic MCL is 10 µg/L (or 0.010 mg/L).

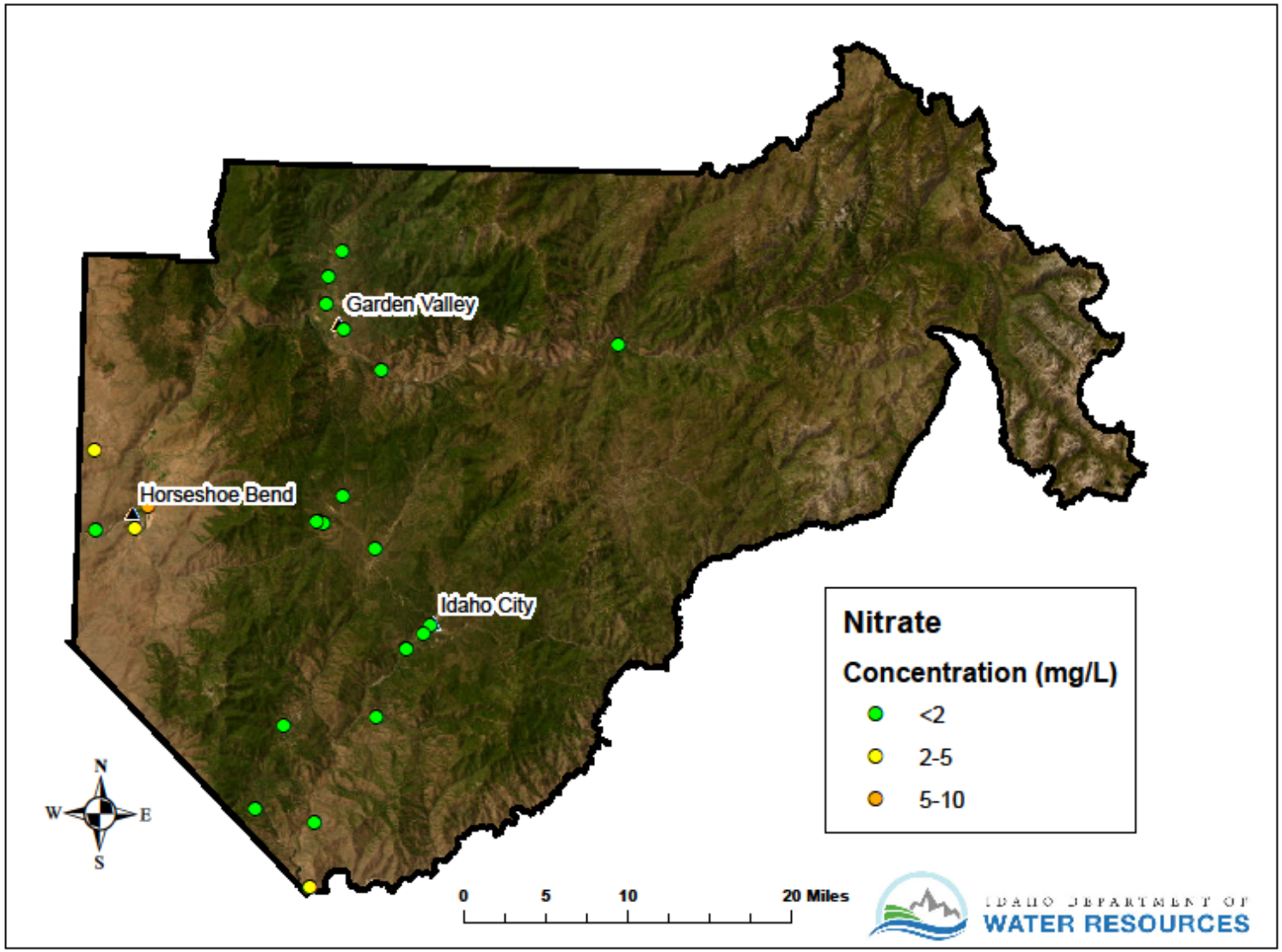


Figure 2-5. Nitrate concentrations from the most recent sampling event for Boise County. Wells sampled by IDWR's Statewide Program. For reference, the nitrate MCL is 10 mg/L.

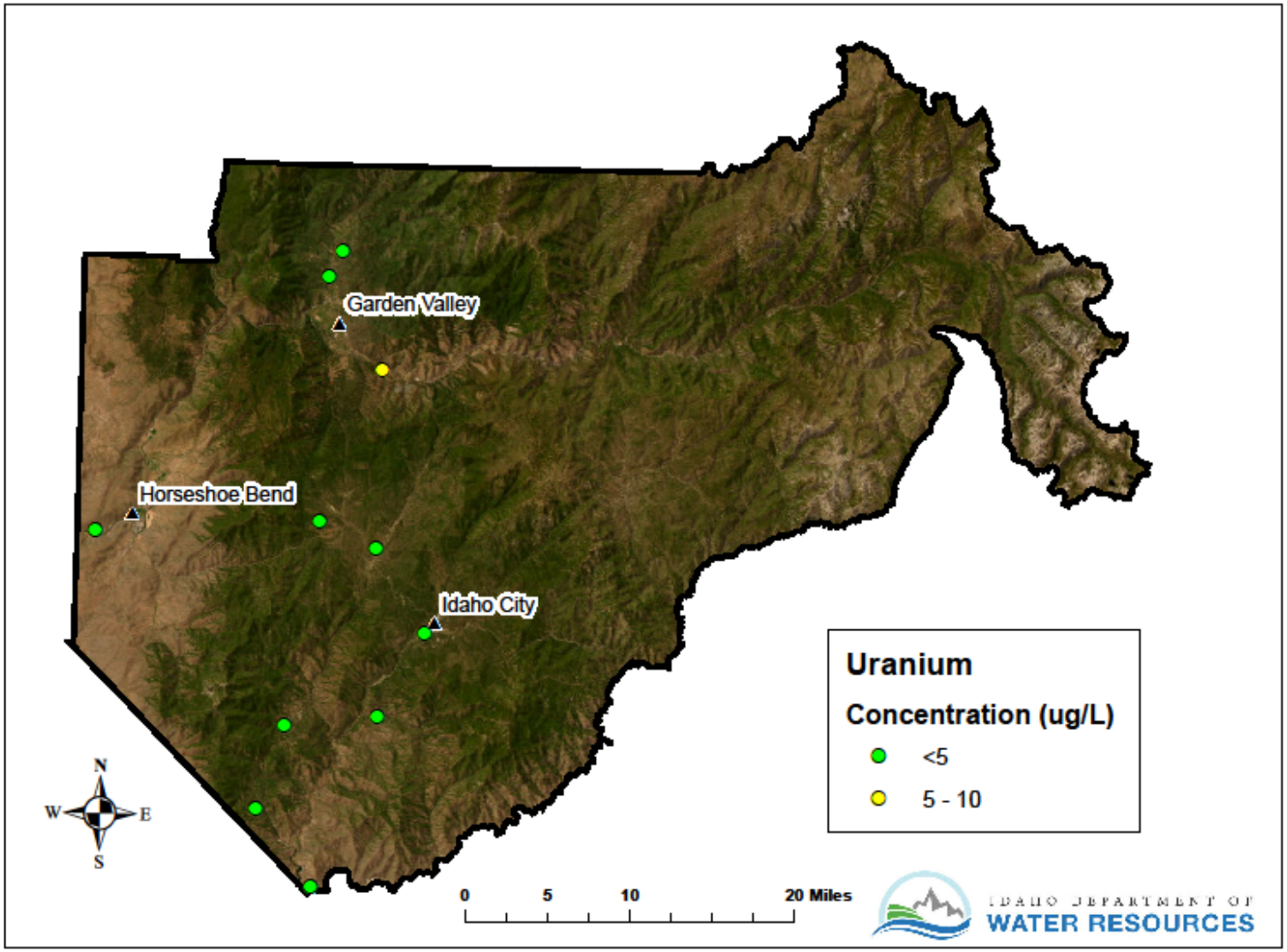


Figure 2-6. Uranium concentrations from the most recent sampling event for Boise County. Wells sampled by IDWR's Statewide Program. For reference, the uranium MCL is 30 µg/L.

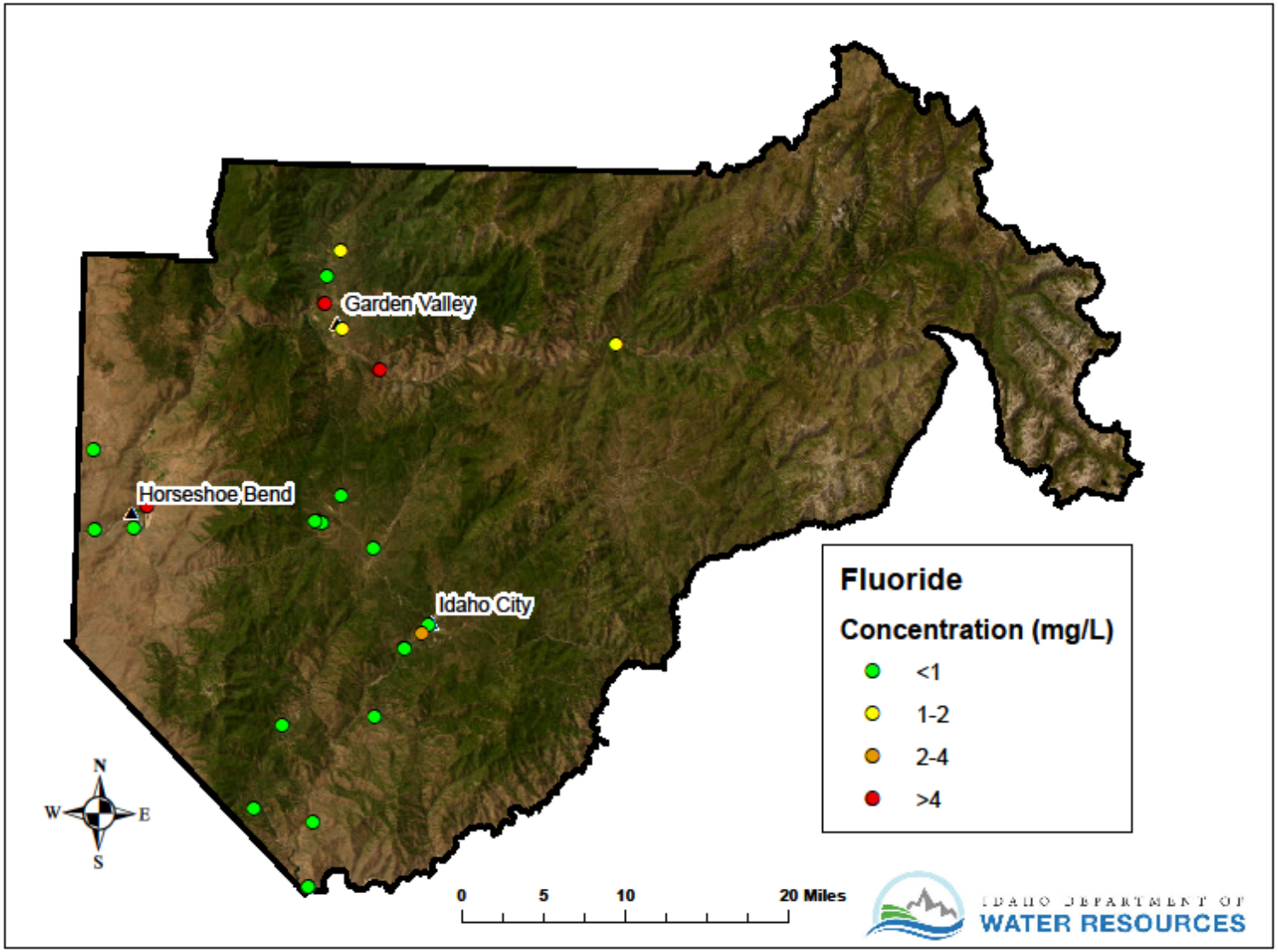


Figure 2-7. Fluoride concentrations from the most recent sampling event for Boise County.Wells sampled by IDWR's Statewide Program. For reference, the uranium MCL is 4.0 mg/L.

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3 Statewide Nitrate Priority Areas and Rankings

As part of the goal to restore degraded groundwater, DEQ has developed a list of NPAs throughout the state where groundwater has been compromised due to nitrate contamination. The list ranks NPAs in the state based on severity of nitrate degradation; a ranking of 1 indicates the most severely impacted area in the state. A statewide map depicting current NPAs and rankings is provided in this section.

In 2001, DEQ, in consultation with the Groundwater Monitoring Technical Committee—comprised of staff from IDWR, ISDA, USGS, and the Idaho public health districts—delineated nitrate-degraded groundwater areas using groundwater quality monitoring analytical results combined with hydrogeologic and land use data. The first NPA delineation document was published in 2002. These initial NPAs can be viewed on DEQ's *Groundwater Quality* web page.

Data used to define and rank the priority of each area are updated on a continual basis. However, updated NPA delineations and rankings only occur about every 5 years. The 2008 Nitrate Priority Area Delineation and Ranking Process document was published in 2008 based on data collected prior to 2007.

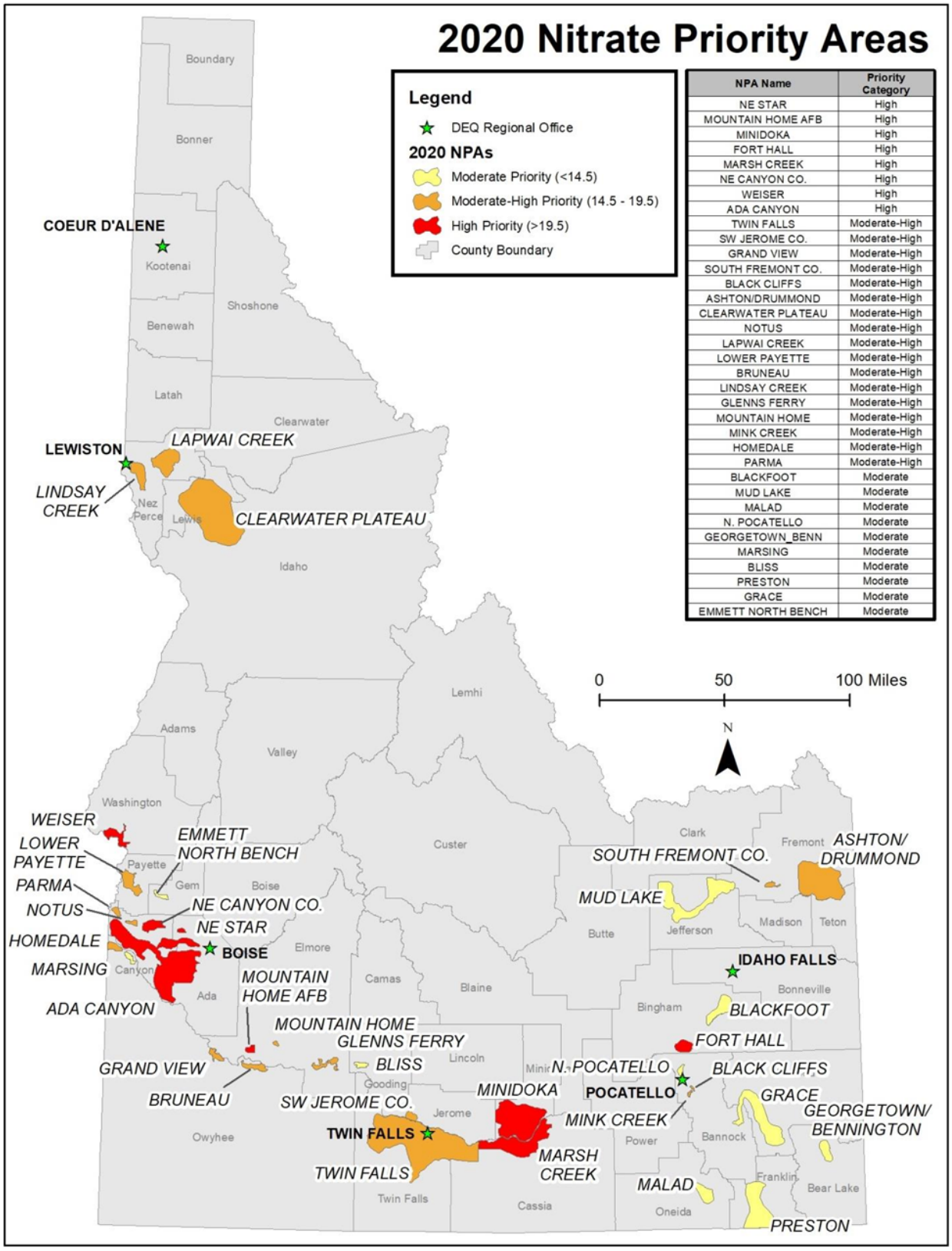
DEQ began reevaluating the NPAs in 2018. The areas, boundaries, and ranking was updated by incorporating data collected from 2007–2011. The Nitrate Priority Area Trend Analysis was published in 2020.

The main criteria in identifying a NPA requires 25% of the groundwater samples collected, in a hydrogeologically similar area, contain nitrate levels greater than or equal to 5 mg/L or one half of the 10 mg/L federal drinking water standard for nitrate.

Areas are ranked based on criteria such as population, existing water quality, water quality trends, and other factors. The process also accounts for impacts on the beneficial uses (other than water supply) of an area's groundwater.

Figure 3-1 shows 35 NPAs in Idaho, along with their rankings. Figure 3-2 is a map of the NPAs in DEQ's Boise region (Washington, Payette, Gem, Boise, Canyon, Ada, Owyhee, and Elmore Counties). Figure 3-3 shows increasing and decreasing trends for Idaho's NPAs in 2002, 2008, 2014, and 2020.

Table 3-1 summarizes the 2020 statewide ranking of NPAs, with data showing nitrate levels in each area.



NPA Name	Priority Category
NE STAR	High
MOUNTAIN HOME AFB	High
MINIDOKA	High
FORT HALL	High
MARSH CREEK	High
NE CANYON CO.	High
WEISER	High
ADA CANYON	High
TWIN FALLS	Moderate-High
SW JEROME CO.	Moderate-High
GRAND VIEW	Moderate-High
SOUTH FREMONT CO.	Moderate-High
BLACK CLIFFS	Moderate-High
ASHTON/DRUMMOND	Moderate-High
CLEARWATER PLATEAU	Moderate-High
NOTUS	Moderate-High
LAPWAI CREEK	Moderate-High
LOWER PAYETTE	Moderate-High
BRUNEAU	Moderate-High
LINDSAY CREEK	Moderate-High
GLENNS FERRY	Moderate-High
MOUNTAIN HOME	Moderate-High
MINK CREEK	Moderate-High
HOMEDALE	Moderate-High
PARMA	Moderate-High
BLACKFOOT	Moderate
MUD LAKE	Moderate
MALAD	Moderate
N. POCATELLO	Moderate
GEORGETOWN_BENN	Moderate
MARSING	Moderate
BLISS	Moderate
PRESTON	Moderate
GRACE	Moderate
EMMETT NORTH BENCH	Moderate

Figure 3-1. Map of 34 nitrate priority areas designated in Idaho (2020).

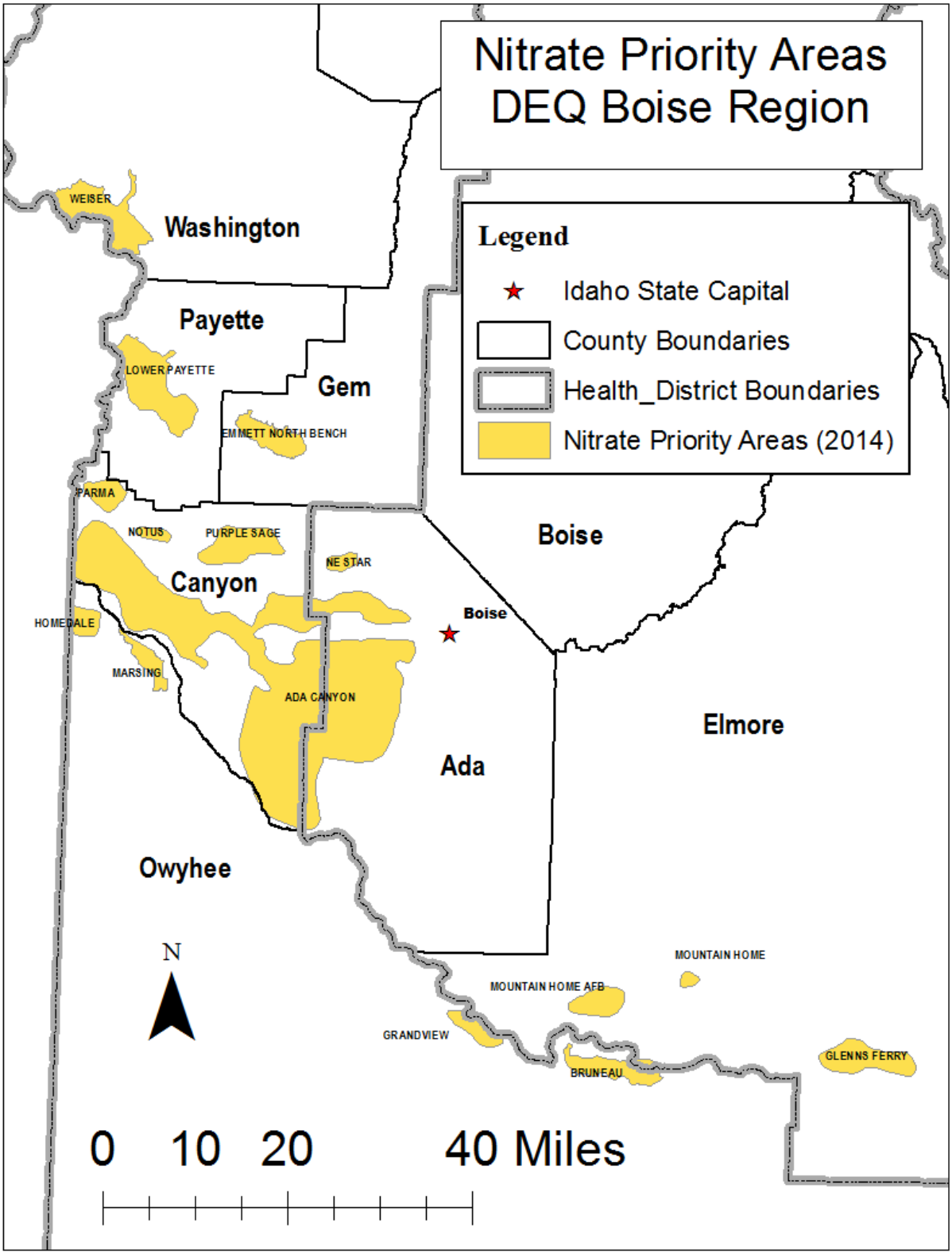


Figure 3-2. Nitrate priority areas in DEQ's Boise region.

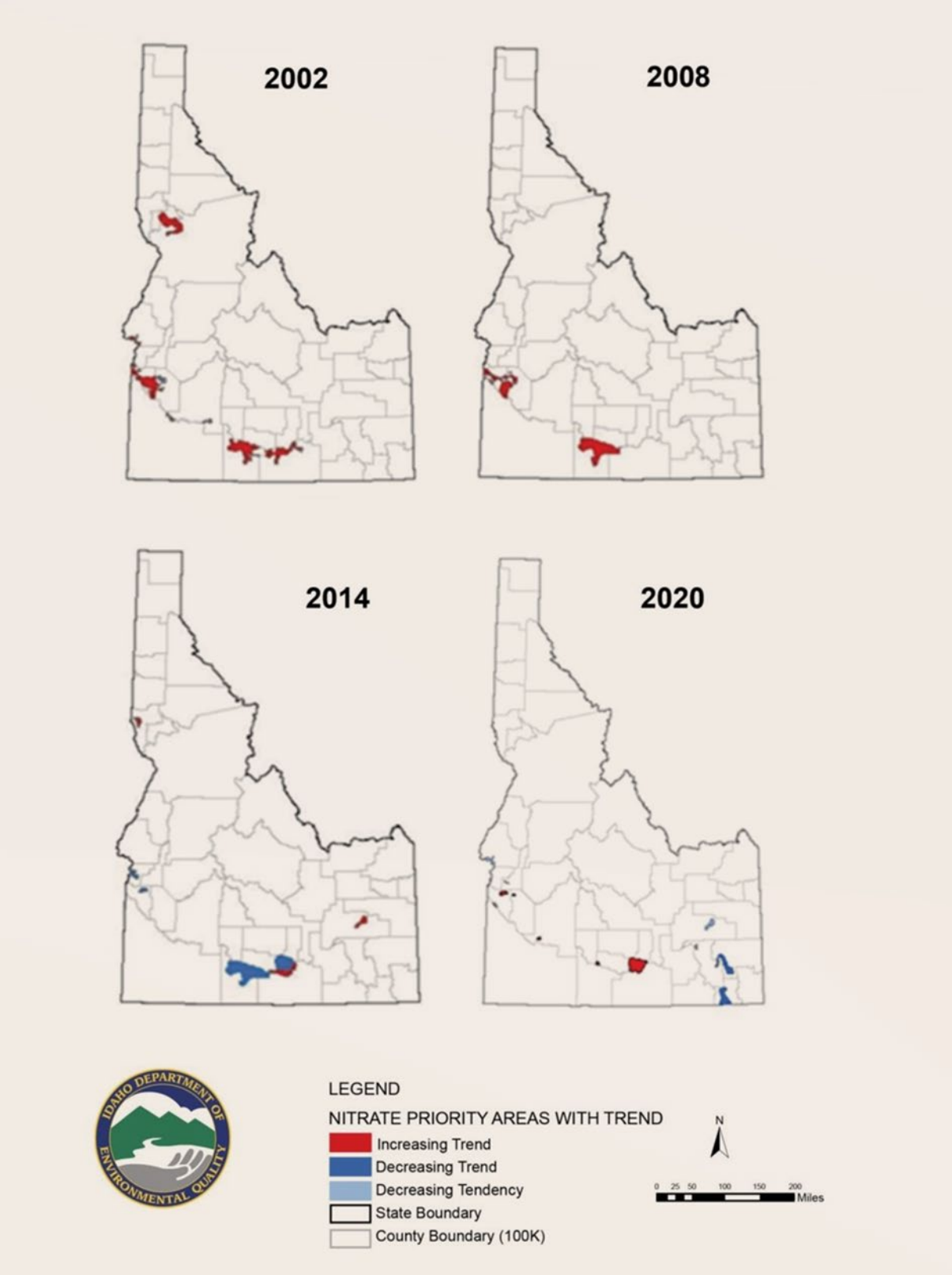


Figure 3-3. Increasing and decreasing trends for 2002, 2008, 2014, and 2020.

Table 3-1. 2020 ranked nitrate priority areas with score components.

Name	Region	Acres	Sq. Miles	Population	Number of Sites	Max. Nitrate	Average Nitrate	Median	PWS Wells	PWS SWA	# ≥ 2mg/L	% ≥ 2mg/L	# ≥ 5mg/L	% ≥ 5mg/L	# ≥ 10mg/L	% ≥ 10mg/L	2007-2016 Trend*	2020 Score	Rounded 2020 Score	2020 Rank
NE STAR	BRO	3,180	5	357	47	44	12.2	7.7	2	5	35	74	29	62	22	47	**Increasing Trend**	24.28	24	1
MOUNTAIN HOME AFB	BRO	5,983	9	3,238	33	27.9	9.4	7.8	7	6	31	94	25	76	11	33	**Increasing Trend**	23.98	24	2
MINIDOKA	TFRO	145,083	227	18,605	347	83	5.1	4.3	48	75	227	65	142	41	27	8	**Increasing Trend**	23.15	23	3
FORT HALL	PRO	17,277	27	1,158	17	23.6	11.7	11.0	3	5	16	94	14	82	10	59	Ins. Data/No Trend	21.88	22	4
MARSH CREEK	TFRO	101,345	158	18,084	403	40	6.8	5.8	55	46	354	88	242	60	81	20	No Trend	21.76	22	5
NE CANYON CO. (PURPLE S.)	BRO	18,653	29	4,847	176	27	5.9	5.4	32	27	149	85	94	53	17	10	**Increasing Trend**	21.35	21	6
WEISER	BRO	21,462	34	7,393	150	60	12.0	10.1	26	24	130	87	118	79	75	50	*Decreasing Tendency*	21.19	21	7
ADA CANYON	BRO	251,883	394	205,419	1117	38.4	5.1	4.2	274	339	837	75	462	41	130	12	*No Trend*	19.75	20	8
TWIN FALLS	TFRO	363,687	568	76,293	719	41	4.9	4.7	111	91	621	86	315	44	30	4	No Trend	19.32	19	9
SW JEROME CO.	TFRO	7,901	12	615	30	30	7.4	5.0	0	0	29	97	15	50	5	17	**Increasing Trend**	19.14	19	10
GRAND VIEW	BRO	9,173	14	596	32	110	13.3	8.2	2	2	30	94	26	81	13	41	Ins. Data/No Trend	19.03	19	11
SOUTH FREMONT CO.	IFRO	4,964	8	156	13	38	14.5	7.9	0	4	11	85	9	69	6	46	Ins. Data/No Trend	18.75	19	12
BLACK CLIFFS	PRO	1,030	2	493	28	28.68	10.3	9.8	2	2	19	68	17	61	14	50	Ins. Data/No Trend	18.41	18	13
ASHTON/DRUMMOND	IFRO	145,111	227	2,367	209	38.3	7.3	6.4	12	16	187	89	148	71	35	17	No Trend	18.03	18	14
CLEARWATER PLATEAU	LRO	268,361	419	3,760	138	52	6.4	4.2	18	22	98	71	61	44	31	22	No Trend	17.82	18	15
NOTUS	BRO	4,288	7	211	20	16	7.6	7.3	1	1	17	85	16	80	6	30	Ins. Data/No Trend	17.7	18	16
LAPWAI CREEK	LRO	49,168	77	1,163	37	18.8	7.4	6.6	5	10	28	76	23	62	11	30	Ins. Data/No Trend	17.62	18	17
LOWER PAYETTE	BRO	26,205	41	7,214	207	61	6.3	4.4	23	37	148	71	96	46	38	18	No Trend	17.52	18	18
BRUNEAU	BRO	13,420	21	32	8	92	22.6	13.1	0	0	7	88	6	75	4	50	Ins. Data/No Trend	17.51	18	19
LINDSAY CREEK	LRO	26,246	41	13,212	65	21	5.6	4.3	19	19	42	65	31	48	15	23	No Trend	17.00	17	20
GLENNS FERRY	BRO	13,398	21	1,578	17	73.3	12.1	6.5	3	2	14	82	11	65	5	29	Ins. Data/No Trend	16.79	17	21
MOUNTAIN HOME	BRO	2,014	3	480	53	40	9.6	5.5	3	3	46	87	29	55	17	32	Ins. Data/No Trend	16.69	17	22
MINK CREEK	PRO	1,576	2	643	34	21	5.4	4.0	6	30	23	68	15	44	8	24	Ins. Data/No Trend	15.96	16	23
HOMEDALE	BRO	8,765	14	1,753	40	17.1	5.4	3.4	9	14	22	55	17	43	10	25	Ins. Data/No Trend	15.75	16	24
PARMA	BRO	4,980	8	998	30	16	5.7	5.2	5	6	19	63	16	53	8	27	Ins. Data/No Trend	15.61	16	25
BLACKFOOT	PRO	32,620	51	1,979	22	16	5.5	5.4	3	24	17	77	12	55	3	14	**Deceasing Tendency**	13.19	13	26
MALAD	PRO	22,379	35	2,803	16	11.51	3.3	2.6	4	4	8	50	4	25	2	13	Ins. Data/No Trend	12.55	13	27
MUD LAKE	IFRO	111,709	175	1,682	97	26	4.3	4.2	18	14	73	75	30	31	5	5	No Trend	12.55	13	28
N. POCATELLO	PRO	5,511	9	23,062	25	8.9	4.4	4.0	26	40	22	88	7	28	2	8	*Decreasing Tendency*	12.46	12	29
GEORGETOWN_BENN	PRO	17,764	28	795	22	13.3	4.2	2.8	2	2	14	64	10	45	2	9	Ins. Data/No Trend	12.43	12	30
MARSING	BRO	5,994	9	393	35	56	12.3	6.6	3	3	24	69	21	60	14	40	**Decreasing Trend**	12.38	12	31
BLISS	TFRO	6,218	10	66	24	19	4.6	2.9	0	0	14	58	9	38	4	17	Ins. Data/No Trend	11.76	12	32
PRESTON	PRO	94,761	148	9,856	82	27.75	5.9	4.5	14	18	56	68	39	48	13	16	**Decreasing Trend**	10.36	10	33
GRACE	PRO	95,693	150	2,737	60	42.57	5.1	2.8	27	19	37	62	18	30	6	10	**Decreasing Trend**	9.74	10	34
EMMETT NORTH BENCH	BRO	5,414	8	424	40	21	4.6	3.7	1	3	32	80	14	35	2	5	**Decreasing Trend**	6.85	7	35

*For this iteration, NPA nitrate concentrations between 2007–2011 and 2012–2016 were compared using previously established statistical methods and the threshold criteria analysis (DEQ 2014, Neely 2013). The methods and results of this nitrate trend analysis are presented in Nitrate Priority Area Trend Analysis, 2011-2016, DEQ 2020.

High Priority
Moderate - High Priority
Moderate Priority

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4 Boise County Nitrate Priority Area Maps

There are no NPAs identified in Boise County at this time.

If you own a well, it is particularly important to test your well water on a regular basis. If your well is not in an NPA, this does not rule out the potential for nitrate contamination, so testing your well water regularly is still recommended. See Section 14, Public Information and Outreach Materials, for private well owner information and analytical laboratory contacts.

More information is provided about nitrates in groundwater on DEQ's *Groundwater Quality* web page.

An interactive map-based source of information on groundwater quality areas where nitrate concentrations potentially degrade drinking water quality is found at *2020 Nitrate Priority Areas*.

If 25% of groundwater samples collected in an area contain nitrate levels greater than or equal to one-half the federal drinking water standard (i.e., greater than or equal to 5 mg/L), the area qualifies as an NPA. The federal drinking water standard for nitrate, as set by the United States Environmental Protection Agency (EPA), is 10 mg/L.

To view an interactive map-based source of information on groundwater quality analytical data collected by DEQ (or DEQ contractors), go to *Groundwater Quality Monitoring and Protection*.

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5 Nitrate, Potential Nitrate Sources, and Other Groundwater Contaminants

5.1 Why is Nitrate a Concern?

Groundwater supplies 95% of the water used in Idaho households and provides drinking water to more than 200 Idaho cities and towns. High levels of nitrate in drinking water are associated with adverse health effects. Therefore, strategies aimed at eliminating or minimizing nitrate contamination in the environment are critical.

Nitrate is a form of nitrogen. Nitrogen is an essential nutrient for plant growth; its compounds are vital components of plant foods and fertilizers. A variety of sources generate nitrate, such as precipitation, septic sewer systems, plants, waste from animals, nitrogen-based fertilizers, and other organic matter that returns nitrate to the soil as it decomposes.

Nitrate is the most widespread contaminant in Idaho's groundwater; it is also the most preventable. In fact, it is "the most widespread contaminant found in Idaho groundwater and the most common contaminant identified in public water drinking systems" (DEQ 2001). Nitrate levels in groundwater serve as an indicator of the likelihood that other contaminants will reach the aquifer. While many other contaminants have been identified in Idaho groundwater, nitrate's abundance, chemical mobility, and clear association with widespread land uses establishes it as a priority contaminant.

Groundwater quality monitoring data collected by DEQ, IDWR, ISDA, and USGS revealed nitrate concentrations, in some areas of Idaho, above or near the maximum contaminant level (MCL) for drinking water established by EPA.

5.2 Drinking Water Maximum Contaminant Level

The drinking water MCL is the highest permissible level of contaminant in drinking water for it to be deemed suitable for human consumption. EPA has established federal drinking water standards, called MCLs, for many contaminants; the MCL for nitrate is 10 mg/L. The Idaho groundwater quality standard for nitrate in drinking water is also 10 mg/L. Nitrate concentrations of 2 mg/L or greater generally indicate an anthropogenic (human-caused) impact to groundwater.

People who rely on private wells for their drinking water supply are particularly at risk of exposure to high levels of nitrate and other contaminants. Private well owners are not required to test their water on a regular basis and may not be aware a problem exists. See Tab 14, Public Information and Outreach Materials, for private well owner information and analytical laboratory contacts. Public water systems (PWSs) are subject to the Safe Drinking Water Act and are required to test regularly. Nitrate levels in public drinking water must be below 10 mg/L MCL.

5.3 Health Effects

Elevated nitrate levels can pose a health threat for both humans and animals and can be an indicator of other water quality problems. The MCL of 10 mg/L is based on studies assessing the risk of developing methemoglobinemia (also known as blue baby syndrome) in infants as a result of exposure to nitrates. Methemoglobinemia is the inability to absorb oxygen in the blood system. Nitrate levels above the regulatory level have been associated with methemoglobinemia. The condition typically affects newborns and infants up to 6 months of age and occurs when nitrate is converted to nitrite in a child's body. Nitrite reduces oxygen in the child's blood, leading to shortness of breath and blueness of skin. This condition can be serious, causing the child's health to deteriorate rapidly over a period of days, and can result in death. Other populations potentially vulnerable to methemoglobinemia include pregnant women, adults with reduced stomach acidity, adults who lack a hereditary enzyme needed to combat effects of nitrate in their body, and dialysis patients (Cohen and Wiles 1996). Healthy adults are typically not affected short-term by elevated nitrate in water. However, long-term effects for consuming high-nitrate water are uncertain (Mahler et al. 2007).

High-nitrate water is generally a health hazard to animals only when used with high-nitrate feed. Short-term use of water with nitrate levels up to 40 mg/L is generally considered acceptable for animals. Water with nitrate levels greater than 100 mg/L is not recommended for livestock (Mahler et al. 2007). For more information about how water quality can affect animals, visit *Washington State University's College of Veterinary Medicine* website or the *University of Idaho's College of Agricultural and Life Sciences* website.

5.4 Nitrate in Groundwater

Nitrate is soluble in water and can easily pass through soil to groundwater supplies. Groundwater is the primary source for drinking water in the Boise County area; therefore, groundwater with high nitrate levels can potentially impact drinking water reserves. Nitrate can persist in groundwater for decades and accumulate at high levels as more nitrogen is added to the soil every year and leaches into the groundwater. High levels of nitrate in soil, groundwater, and drinking water can originate from the application of nitrogen in the form of commercial fertilizer and animal waste, legume crop plow-down, and septic tank failures. Shallow wells, wells in sandy soil, or wells that are improperly constructed or maintained are more likely to have nitrate contamination than deeper wells with protective casings and effective well seals. Nitrate in groundwater is often an indicator of aquifer vulnerability and may suggest the presence of other contaminants. The presence of higher concentrations of nitrate in groundwater is generally associated with certain land use activities (section 6). Whenever nitrogen-containing compounds come into contact with soil, the potential for nitrate leaching into groundwater exists. Nitrate is highly soluble and will stay as a solution in percolation water after leaving the root zone until it reaches groundwater. Nitrate is difficult to remove from water; it cannot be removed from water by boiling, filtration, disinfection, or water softening. Water treatment that is effective in removing nitrate includes distillation, reverse osmosis, and ion exchange.

6 Potential Nitrate Sources

"It's not a matter of who is most responsible.
What's important is that you do what you can in the hope that
what you do matters."—unknown

Sources of nitrate include both point and nonpoint sources. A point source is a distinct and mappable supply of contamination. Nonpoint source pollution occurs with no visible or obvious point from which the contamination originates. Identified below are land use practices often serving as both point and nonpoint sources associated with nitrate contamination. When these land use practices are managed appropriately, they do not result in the degradation of water quality. However, poor management or inadequate control over such land use activities can lead to decreased water quality.

6.1 Well Construction

Older well construction standards did not offer the level of protection to groundwater that more current standards require. Older well seals can allow contaminants from the land surface to move down along the outside casing of the well toward groundwater. A well with multiple-screened intervals may create cross-contamination between aquifers. Also, improperly abandoned wells provide a direct connection between the land surface and the aquifer, allowing surface contaminants an easy path to groundwater. Each circumstance or combination of issues can increase the probability of developing a nitrate contamination problem within an aquifer.

6.2 Residential Land Uses

6.2.1 Fertilizer Application, Irrigation Practices, and Other Residential Activities

The following activities associated with residential development are possible contributors to nitrate problems in residential areas:

- Excessive use of fertilizer on lawns, gardens, and other landscaping
- Excessive use of water on lawns, gardens, and landscaping
- Animal waste management (pastures and kennels)
- Septic system discharge

The combination of these activities may be a potential source of nitrate contamination in groundwater.

Pastured animals on small acreages can also degrade groundwater if not managed properly. According to Scott Jensen with the Canyon County Cooperative Extension Service, "Pasture management involves more than just grass care. It involves managing the interrelationships among animals, plants, and soil" (Jensen 2002).

Information for rural residential homeowners is currently available from the University of Idaho Extension.

6.2.2 Septic Systems

Domestic septic systems may contribute to elevated concentrations of nitrate in groundwater. The standard household septic system is not designed to effectively treat wastewater for nitrates. Systems that are properly operating deliver a certain amount of nitrate to the groundwater. In areas underlain by deep, well-drained soils on uplands, nitrate concentrations delivered to groundwater may range from 22 to 136 mg/L. In areas with an extremely high water table and poorly drained soils, nitrate concentrations delivered to groundwater may average between 6.9 and 11 mg/L (Environmental Effects of Septic Tank Systems, EPA 1977).

Groundwater problems can occur in areas where high septic densities exist. Primarily, these sites are found within cities' urban growth boundaries or in more isolated subdivisions. Low-density settings have little impact as groundwater dilutes the discharged wastewater and spreads pollutants over a large area. As densities increase, discharge volumes increase as well and may overcome the groundwater's ability to dilute wastes, which increases the potential for contamination.

The "Individual/Subsurface Sewage Disposal Rules" (IDAPA 58.01.03) establish minimum standards for the design, construction, siting, and use of individual and subsurface sewage disposal systems. These rules also establish requirements for obtaining an installation permit and an installer's registration permit.

These rules are administered by Idaho's seven public health districts under a memorandum of understanding with DEQ. The public health districts permit and inspect septic systems, and for a fee, also conduct site evaluations to determine the suitability of a location for a septic system.

Septage can present public health hazards and generate strong odors. IDAPA 58.01.03 establishes standards for pumping and cleaning septic systems and transporting and disposing of human excrement. To prevent public health hazards and nuisance conditions, septage must be collected, pumped, transported, stored, and disposed of according to these rules.

In cases where the concentration of nitrate entering groundwater may be a problem, additional treatment systems can be placed on the septic tanks, reducing the effluent nitrate concentration to 27 mg/L or 16 mg/L.

DEQ requires a nutrient-pathogen (NP) evaluation for proposed central septic systems located in NPAs, oversensitive resource aquifers, and for all proposed large soil absorption systems (LSAS).

DEQ or a county agency may also require an NP evaluation on parcels of land where certain conditions may impact surface water or groundwater quality:

- Nutrient and/or pathogen contamination already exists and has the potential to create a health risk.
- Soil depth is shallow.
- A predominance of gravel or coarse-grained sediment exists.
- Groundwater is close to the surface (10 feet or less).
- Fractured bedrock is close to the surface (10 feet or less).

This assessment determines the number of septic tanks permitted on a single subdivision site, avoiding any adverse impact on groundwater quality. DEQ reviews the NP studies on behalf of each health district.

Additionally, health districts perform day-to-day activities to regulate septic systems. These tasks include conducting site evaluations and inspections, issuing system permits, and issuing septic tank pumper licenses. Health district programs have also been developed to address key issues, such as establishing design standards and acceptable waste management practices for private septic systems; establishing criteria under which sanitary permits are issued to build private septic systems discharging pollutants to waters in the state; and establishing site soil evaluation standards for placement of septic systems.

Other DEQ septic system regulation responsibilities include conducting plan and specification reviews for LSAS or drainfields with greater than 2,500 gallons per day effluent; reviewing NP studies for LSAS; heading the technical guidance committee; reviewing new technologies; and providing training courses for installers and pumpers.

6.3 Agriculture

Agricultural activities generate sources of nitrate through all forms of fertilizers, legume crops, and organic matter. Nitrogen not used by plant growth is stored in the soil and can leach to groundwater as nitrate if sufficient water is available to carry the compound through various layers of soil (known as the soil profile).

Several factors influence the degree of nitrogen leaching in agricultural areas. For instance, soil type, irrigation practices, and volume of water applied affect how quickly and easily nitrate leaches through the soil. The nitrogen source itself, application season, and application rate directly impact overall levels of nitrogen introduced. Overapplication of nitrogen can occur in several ways:

- Applying fertilizers at rates greater than what the crop needs or can use
- Failing to account for residual and organic nitrogen sources already present in the soil profile, especially in the form of nitrogen-fixing crops
- Inappropriately timing nutrient application with regard to crop needs
- Failing to account for other nitrogen sources such as irrigation water
- Failing to calibrate solid waste delivery systems to ensure uniform application over the entire land application area
- Failing to conduct nutrient analysis of solid waste and wastewater to determine the appropriate amount for land application

Irrigation systems may include gravity, solid set, hand line, wheel line, drip, surge, and center pivot. All systems have the potential to increase nitrate levels in groundwater. Gravity or flood irrigation methods apply large volumes of water and are most effective in leaching nitrate through the soil profile and have the highest potential to degrade groundwater quality.

A number of programs and activities address irrigation practices. The University of Idaho's Nutrient and Pest Management Program is an educational effort based on soil testing programs and soil fertility recommendations appropriate to soil type and crop. The NRCS, ISWC, and

local soil and water conservation districts coordinate and implement a number of programs. Their focus is to use cost-sharing BMPs and educational outreach to reduce nutrient loads from agriculture and provide nutrient management planning and engineering technical support. These programs include the Environmental Quality Incentives Program (EQIP), Soil and Water Conservation Assistance Program, and State Water Quality Program for Agriculture. For additional information, visit the *NRCS website*.

6.4 Animal Feeding Operations and Dairies

An Animal Feeding Operation (AFO) is a facility where "animals have been, are, or will be stabled or confined and fed or maintained for a total of 45 days or more in any 12-month period and where vegetation is not sustained in the confinement area during the normal growing season." Sources of nitrate from such AFOs are typically attributed to runoff, facility wastewater, and manure. An AFO is a CAFO (Concentrated Animal Feeding Operation) if it meets the regulatory definition of a large or medium CAFO (Table 6-1), or DEQ has designated it as a CAFO.

On June 15, 2020, EPA reissued the National Pollutant Discharge Elimination System (NPDES) General Permit No. IDG010000, which applies to all CAFOs in Idaho (excluding tribal lands) that have a discharge of pollutants to a water of the United States. This general permit is due to be renewed in June 2025. Upon approval of the Idaho Pollutant Discharge Elimination System Program (IPDES) program to issue general permits on July 1, 2020, any CAFO facility covered under NPDES Permit No. IDG010000 will transfer to DEQ as IPDES General Permit No. IDG010000, and DEQ will be the lead agency for permitting authority, compliance monitoring, and evaluation. DEQ intends to renew the CAFO general permit in 2025.

The Food & Water Watch and Snake River Waterkeeper filed Petition for Review in the Ninth Circuit challenging EPA's issuance of Idaho's CAFO general permit. As a result, EPA will retain jurisdiction over the general permit until the appeal is resolved. This general permit will be renewed in June 2025.

Table 6-1. Regulatory definition of a large or medium CAFO.

Number of Animals	Type of Animal
700	Mature dairy cows, whether milked or dry
1,000	Veal calves
1,000	Cattle, other than mature dairy cows or veal calves (Cattle includes but is not limited to heifers, steers, bulls, and cow/calf pairs.)
2,500	Swine, each weighing 55 pounds or more
10,000	Swine, each weighing less than 55 pounds
500	Horses
10,000	Sheep or lambs
55,000	Turkeys
30,000	Laying hens or broilers, if the AFO uses a liquid-manure handling system
125,000	Chickens (other than laying hens), if the AFO uses other than a liquid-manure handling system
82,000	Laying hens, if the AFO uses other than a liquid-manure handling system
30,000	Ducks, if the AFO uses other than a liquid-manure handling system
5,000	Ducks, if the AFO uses a liquid-manure handling system

If the facility does not discharge to a water of the United States, it will not be designated as a CAFO and will not require a NPDES permit. More information is found on *EPA's CAFO* web page.

The ISDA has the authority to promulgate and enforce rules for dairy operations. Noncompliance with the rules or discharge violations may result in revocation of authority to sell milk for human consumption. ISDA also conducts dairy waste inspections to prevent waste discharges and evaluate waste collection, treatment, handling, disposal, and management procedures for compliance with the federal Clean Water Act and ISDA regulations.

Additionally, ISDA collects groundwater samples for nitrate analysis during annual inspections at all active dairies in Idaho. Every 5 years, ISDA will run nitrogen isotope tests on water samples from each dairy showing nitrate concentrations greater than 5 parts per million. ISDA also has authority to require further compliance and operation changes where evidence indicates a dairy is a nitrate source contributing to aquifer degradation. To date, follow-up has been restricted due to limited staff resources.

6.5 Industrial and Municipal Wastewater Land Application Areas

Wastewater land application facilities generate nutrient-rich water that is typically treated to reduce nutrients before land application, referred to as recycled water. Such facilities are among the few sources of nitrate regulated by DEQ. These facilities are required to obtain a reuse permit to apply recycled water to land. DEQ's regulatory water reuse permit program requires land appliers to take the following steps:

- Limit recycled water applications to meet crop nutrient and water needs.
- Develop management plans for irrigation and nutrient use.
- Develop water and nutrient budgets.
- Sample wastewater, groundwater, soil, and crops as required by permit.
- Prepare reports on how activities are functioning and whether the process is meeting permit limits.
- More information on *reuse permits* is available on DEQ's website.

6.6 Groundwater Recharge

Groundwater recharge occurs naturally when standing water is allowed to seep into the ground. Depending on the specific conditions, recharge with contaminated water may adversely affect the groundwater quality.

Managed groundwater recharge takes place when water is pumped into a recharge basin or is injected into the ground in compliance with an IDWR permit.

6.7 Groundwater and Surface Water Interaction

The mutual influence and interaction between groundwater and surface water quality are important considerations in evaluating sources of nitrate contamination. In some areas,

groundwater and surface water are hydraulically connected and combine to form a single water source. Thus, if degraded water quality exists in one, it may degrade the other as well.

6.8 Stormwater Disposal

Stormwater is rain or melting snow that does not immediately soak into the ground. Stormwater runs off the land and hard surfaces (e.g., streets, parking lots, rooftops) and picks up pollutants (e.g., fertilizers, dirt, pesticides, oil, grease). Eventually, stormwater soaks into the ground or discharges to surface water (usually through storm drains), bringing pollutants with it. Federal, state, and local government agencies, businesses, industries, and individual landowners all share responsibility for stormwater management. Stormwater permits are typically general permits and cover stormwater runoff from construction projects, industrial facilities, and municipal separate storm sewer systems.

As land development increases, so does the volume of concentrated stormwater runoff. A variety of contaminants, including nutrients, are contained in the runoff. However, nitrate is found in relatively low concentrations in most stormwater and has a low-to-moderate potential for contaminating groundwater, either through surface percolation (the downward movement of water through soil and rocks) or through subsurface infiltration and injection practices. (Pitt et al. 1994).

Stormwater management methods use ponds (retention, detention, evaporation, and infiltration), seepage beds, swales, or a combination. Practices infiltrating stormwater (i.e., allowing stormwater to enter the soil's surface) have the greatest potential to contribute nitrate to groundwater. The *Idaho Catalog of Storm Water Best Management Practices* describes various types of best management practices that can be used to reduce discharge of stormwater runoff related pollutants.

Over the past 30 years, a number of local jurisdictions have implemented stormwater management functions at various levels of authority. These entities often require detention or retention of stormwater runoff during real estate development activities. In practice, jurisdictions requiring on-site control of stormwater flows after development activities are completed expect the runoff to be retained on site. This is due to few developments having access to drains, canals, or water bodies for off-site stormwater discharge.

DEQ requires permit coverage of stormwater discharges according to the applicable federal requirements. DEQ will apply the regulatory criteria in IDAPA 58.01.25.130 to determine which permit type to issue. Three categories of stormwater discharges are covered in the IPDES Program: construction, industrial, and municipal activities. DEQ IPDES requirements are found on the *Storm Water* web page.

6.9 Other Groundwater Contaminants

Although nitrate is a common and widespread contaminant in groundwater within Boise County, other potential and major contaminant sources exist and are briefly discussed in this section. Also note there are several naturally occurring contaminants (metals) present in groundwater within Boise County.

Regardless of the efforts operators and regulators undertake to protect human health and the environment, releases still occur. Accidental spillage, leaking underground pipes, or improper handling of waste materials can all lead to groundwater contamination.

6.9.1 Petroleum Sources

Often businesses, such as gas stations, store large quantities of petroleum in underground storage tanks (USTs). Gas tanks and/or piping leaks have the potential to leak benzene, ethyl benzene, toluene, xylenes, and naphthalene that can impact shallow groundwater. DEQ conducts inspections of UST facilities on a regular basis to confirm current standards are being met and tanks are not leaking.

DEQ inspectors are required to visit each facility at least once every 3 years; however, leaks may still occur even with prevention systems in place. DEQ oversees petroleum release investigation and cleanup under the leaking underground storage tank (LUST) program. An overview of USTs and LUSTs in Idaho is provided on DEQ's *Storage Tanks* web page.

6.9.2 Hazardous Chemicals

Businesses in Boise County often use chemicals as part of their function or process. There are several laws and regulations to govern the purchase, transport, storage, use, and handling of these chemicals. Inspectors at DEQ regularly examine businesses using and storing chemicals considered to be hazardous and operations generating hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Their purpose is to confirm materials are handled properly and facilities are in compliance with hazardous waste rules and regulations. Some of these chemicals do enter the environment and are present in groundwater. DEQ oversees chemical release investigation and cleanup activities under its groundwater program, RCRA program, and/or remediation program. An overview of hazardous waste management in Idaho is provided on DEQ's *Hazardous Waste* web page.

6.9.3 Drinking Water Mapping Application to Protect Source Waters

EPA offers an online mapping application, *Drinking Water Mapping Application to Protect Source Waters (DWMAPS)*, for several of the federally regulated programs in Idaho affecting groundwater and drinking water. The DWMAPS mapping tool can help you find information critical to protecting drinking water sources.

DWMAPS can provide drinking water professionals, source water collaboratives, watershed groups, and others with information to update source water assessments and prioritize source water protection measures in any location or watershed in the country.

Specifically, DWMAPS helps users with the following:

- Results of a search for all facilities with permits to discharge materials upstream of a selected point.
- Identify potential sources of contamination in locations defined by users.
- Find data to support source water assessments and plans to manage potential sources of contamination.

- Evaluate accidental spills and releases, identifying where emergency response resources for accidental releases must be readily available.
- Promote integration of drinking water protection activities with other environmental programs at the EPA, state, and local levels.

DWMAPS does not display the actual locations of public water system facility intakes but contains a wide variety of data useful to protection of drinking water sources.

If you are interested in other online mapping tools, see section 4 and section 7 for links to interactive map-based sources of information on groundwater quality.

7 Boise County Water Quality Activity Overview and Accomplishments

Table 7-1 gives an overview of completed water quality activities and accomplishments in Boise County.

Table 7-1. Overview of activities completed to improve groundwater quality in Boise County.

Drinking Water Systems and Wells	
Number of active public water systems in Boise County as of 2023	116
Number of Boise County well permits issued by Idaho Department of Water Resources since January 1950	3,127
Groundwater Quality Improvement Plans	
Boise County Ground Water Quality and Drinking Water Source Protection Plan	2019
Drinking Water Source Protection Plans	
City of Horseshoe Bend	Certified 2021
City of Idaho City	2002
Mores Creek Rim Ranch Water District	2017
Wilderness Ranch Owner's Association	Recertification 2016
Boise County Grant Awards for Source Water Protection	
City of Horseshoe Bend – 2021. Well fencing	$9,991 .00
Terrace Lakes Water Company – 2024. Well abandonment and fencing	$24,000.00
Total SWP funds since 2020	$33,991.00
Surface Water Pollutant Load Allocations (Total Maximum Daily Loads [TMDL])	
Boise-Mores Creek Subbasin - Sediment and *E. coli* 5-year review	2010 2019
Boise River (Upper) Subbasin	2000
Boise River (North/Middle Fork) Subbasin	Assessment Completed November 2002
Payette River, Middle Fork Subbasin	TMDL 2000; TMDL addendum 2007; 5-year review 2009
Payette River, North Fork Subbasin.	North Fork Payette TMDL 2007; 5-year review 2012
Payette River, South Fork Subbasin	TMDL 2005; 5-year review 2011

a. Refers to § 319 of the federal Clean Water Act.

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8 General Strategies for Improving Groundwater Quality

The general and regional management strategies provided in this section address nitrate in groundwater and offer suggestions to maintain or improve groundwater quality in each PWS. These same strategies will also serve to protect and preserve shared groundwater and drinking water resources throughout Boise County.

The implementation of these strategies is voluntary and based on the premise that citizens of Boise County want to manage their activities to limit potential impacts on their groundwater resource. Along with participating entities, state and federal agencies will periodically evaluate the progress and success of these strategies in reducing nitrate levels in each NPA.

The goals of these strategies are as follows:

- Reduce nitrate contamination to protect public health.
- Protect and preserve the groundwater and drinking water resources in the county.

The proposed objectives to support achieving these goals are as follows:

- Make resources available to local governments to assist their decision-making processes.
- Educate the public about health risks associated with drinking water containing high nitrate levels and promote testing of private wells for nitrate concentrations.
- Educate the public about sources of nitrate in groundwater to promote prevention, protection, and remediation efforts in maintaining and improving water quality.
- Implement agricultural, industrial, and residential BMPs to reduce nitrate loading of the groundwater, thereby improving groundwater quality.

Plan development would include the following:

- Gather a team of government and local advocates.
- Seek opportunities to hold education and outreach events.
- Attain grant funding if local communities show interest.

For each implementing agency, there is a table of action items (Table 8-1 through Table 8-9) including general time frames for completing each item. Detailed information regarding the agencies and the resources offered is found under Section 11, Agencies, Regulatory Directories, and Website Resources.

Table 8-1. Idaho Department of Environmental Quality implementation tasks for Boise County.

Action Item	Time Frame
Facilitation and Reporting	
Report implementation updates at Interagency Ground Water Protection Committee meetings (see the Idaho Ground Water Protection Interagency Cooperative Agreement [DEQ 2008])	Ongoing
Post summary reports and revised plan on DEQ website.	Ongoing
Work with county commissioners and other local officials to evaluate adequacy of local zoning and land use planning initiatives.	Ongoing
General Information and Education	
Provide copies of the final *Boise County Groundwater Quality Improvement and Drinking Water Source Protection Plan* and any future updates to local decision makers, including Boise County commissioners, the Boise County growth and development office, city planning and zoning office, and Squaw Creek Soil Conservation District. Post plan and revisions on DEQ's website.	As needed
Work with communities to promote proper fertilizer application in parks, cemeteries, schools, and golf courses.	Ongoing
Make the final plan available to public via DEQ's website.	Ongoing
Grant Oversight	
Award and oversee § 319 Clean Water Act grant project funding and source water protection grant projects.	Annually
Public Drinking Water Systems	
Review and approve all plan and specification submittals for engineering design of new public water supplies.	As needed
Prepare source water assessments for all new public water supplies.	As needed
Coauthor or write, review, and certify drinking water source protection plans for public water systems (PWSs).	As requested
Require and review PWS monitoring data to confirm drinking water complies with all state and federal maximum contaminant levels.	Frequencies vary
Use sanitary survey inspections to familiarize PWSs with source delineation information, provide an opportunity for PWSs to update their potential contaminant inventory, disseminate relevant outreach and education materials, and solicit involvement in the state's drinking water protection certification program.	As needed
Monitoring	
With input from other agencies and the public, compile and review regional water quality data.	As needed
Conduct coordinated groundwater monitoring as needed to better characterize the vertical extent of contamination, and/or identify the presence of nitrate contamination.	As needed
Within a regional context, assess whether a groundwater quality monitoring project is warranted and whether funding is available.	As needed

Table 8-2. Central District Health Department implementation tasks for Boise County.

Action Item	Time Frame
Septic Systems	
Provide information about treatment system options and septic system maintenance at public locations in and at the Boise County courthouse.	Ongoing
Continue with the review and permitting of all new, expanded, and replacement septic systems.	As requested
Inspect existing septic systems when new homes or home extensions are added.	As needed
Private Water Supply Wells and Public Health	
Provide information regarding the responsibilities of being a private well owner/user at public locations and at Boise County offices. Include information and resources for understanding proper well location with respect to potential sources of contamination, installation procedures, and wellhead maintenance.	Ongoing
Provide information about the health effects of nitrate at public locations and at Boise County offices.	Ongoing
Promote regular testing of private wells to determine if any contamination is present.	Ongoing
Provide sample bottles and information about analytical laboratories for testing of private wells.	As requested

Table 8-3. Local conservation districts with the assistance of Idaho Association of Soil Conservation Districts and Idaho Soil and Water Conservation Commission implementation tasks for Boise County.

Action Items	Time Frame
Public Awareness, Education, and Outreach	
Prepare an information and education plan that includes timelines, public service announcements, brochures, mailings, demonstrations, and tours.	Ongoing
Contact producers to inform them of the following: – Water quality goals and objectives for projects implemented – Potential agricultural impacts of nitrate contamination in groundwater – Benefits of proper nutrient management plan (NMP) – Irrigation water management (IWM) benefits – Details on incentive programs – Information and education programs	Ongoing
Conduct IWM outreach: – Conduct irrigation workshops. – Make soil moisture monitoring equipment available to producers interested in optimizing their irrigation applications. – Encourage sprinkler irrigators to take advantage of the Idaho Power Energy Efficiency for Agricultural Irrigation program.	As requested Ongoing
Identify additional high-priority landowners and offer them information on the benefits of implementing NMP and IWM, using data and outputs compiled over the course of the project.	Ongoing
Work with communities to promote proper fertilizer application in parks, cemeteries, schools, and golf courses.	Ongoing
Work with county commissioners and other local officials to evaluate adequacy of local zoning and land use planning initiatives.	As requested
Provide information and training to private landowners who accept manure or compost from animal feeding operations for use as fertilizer.	Ongoing
Develop and distribute the following information and training: – Identify target audience. – Create informational brochures, flyers, or pamphlets as guidance for proper storage and application methods. – In coordination with the University of Idaho Extension and other interested groups, develop seminar and presentation materials for workshops. – Disseminate information to the target audience through mailings, workshops, or other means as appropriate.	
Best Management Practices—Program Planning	
Submit a § 319 Clean Water Act grant application to fund implementation of best management practices (BMPs).	As Needed
Establish a steering committee of Ada Soil and Water Conservation District members and staff from IASCD, SWC, DEQ, ISDA, and NRCS to develop a project plan that will include the following: – Criteria for prioritizing activities in the NPA for NMP, IWM, and total maximum daily loads (TMDLs) – Contracting procedures for NMP – Estimating incentives to be offered and methods of distribution – Monitoring and evaluation of BMP effectiveness – Information and education outreach options and methods to be utilized	As Needed

Action Items	Time Frame
Prepare a work plan that includes the following components: – Develop a producer contact list for project information and education. – Prepare a written conservation plan and contract for NMP development and implementation (NMP services to include soil sampling, analysis, and planning for crops with cost share). – Educate landowners on IWM and the installation and monitoring of water sensors. – Track load reductions. – Deliver biannual Project Findings Reports to DEQ. – Provide an educational campaign to major producers and other landowners. – Evaluate unregulated manure storage sites to identify risk to groundwater supplies. – Develop remediation plans and implement BMPs. This project component includes evaluation of agronomic application rates.	As Needed
NMP, IWM, and BMP Implementation and Evaluation	
Implement NMPs: – Identify and focus on high priority or critical areas. – Review water quality monitoring reports and data from other agencies. – Contact critical landowners. – Develop and conduct NMPs. – Follow-up with producers to review and evaluate NMPs. – Compile general (nonproducer-specific) information in report to DEQ.	Ongoing
IWM evaluations: – Identify fields to evaluate. – Install soil moisture equipment. – Analyze data. – Report findings to producers. – Compile general (nonproducer-specific) information in report to DEQ.	Ongoing
Implement BMP Effectiveness Evaluation Program: – Analyze soil sampling data/fertilizer receipts to determine compliance with NMPs. – Analyze soil moisture sensor data to evaluate irrigation management recommendations. – Review groundwater quality results for samples collected within all NPAs identified in Boise County.	Ongoing
Perform Biannual Reviews and Prepare § 319 Grant Report for DEQ	
Conduct status review with each participant.	Annually
Prepare report with general information about activities and results conducted and submit to DEQ in a time frame that coincides with the invoice period (as required by DEQ).	As required
Prepare a work plan that includes the following components: – Develop a producer contact list for project information and education. – Prepare a written conservation plan and contract for NMP development and implementation (NMP services to include soil sampling, analysis, and planning for managing the amount, source, placement, form, and timing of the land application of nutrients and soil amendments for plant production).	Implementation schedule will be set after funding is obtained.

Table 8-4. United States Department of Agriculture, Natural Resources Conservation Service implementation tasks for Boise County.

Action Item	Time Frame
Public Awareness, Education, and Outreach	
Coordinate with and support the Soil Conservation District information and education plan.	Ongoing
Provide timely announcements of all Farm Bill sign-ups and other funding opportunities for implementation of best management practices (BMPs) to address resource concerns.	Ongoing
Work with producers in NRCS programs and provide information on the following: – Water quality resource concerns on their lands – Potential impacts of nitrate contamination to groundwater quality – Proper nutrient management – Irrigation water management (IWM) and the benefits of high-level IWM implementation – Use of conservation crop rotation and other practices to mitigate groundwater quality impacts	Ongoing
Participate in community activities and meetings, providing technical assistance and information on BMPs to address groundwater and surface water quality concerns.	Ongoing
Coordination with Conservation Partners	
Inform all conservation partners of the availability of special Environmental Quality Incentive Program (EQIP) funding (AWEP, CCPI, etc.) to target specific resource concerns/areas of concern.	Ongoing
Work with the NRCS State Technical Committee and the Soil Conservation Districts to use ranking and other processes to help target special resource concerns (e.g., nitrate priority areas).	Ongoing
Participate in and coordinate with any special projects (e.g., § 319 Clean Water Act projects) active in the county to help implement BMPs. Assist ISCC and SCD, when requested, in evaluating program success through water quality modeling of estimated load reductions.	Dependent on active project(s)
Participate as a member of the ISDA Agricultural Groundwater Committee and the DEQ Groundwater Quality Technical Committee to stay abreast of current issues and inform partners of NRCS activities.	Ongoing
Implementation of Conservation Practices	
Use the existing field office work plan to accomplish the following: – Provide information to producers on incentive programs, such as EQIP, to implement best management practices. – Develop contracts with producers and assist with implementing needed conservation practices that address resource concerns. Use NRCS tools to track progress and results.	Ongoing
Contract with interested producers and provide technical assistance to implement the following conservation practices to address ground and surface water quality protection and/or mitigation: – Irrigation water management – Nutrient management – Pest management – Conservation crop rotation – Residue management – Prescribed grazing Structural practices and improved technologies to include the following: – Upgrade irrigation systems and technologies to improve efficiency – Filter strips and riparian buffers – Sediment basins and pump-back systems	Ongoing

Table 8-5. Idaho State Department of Agriculture implementation tasks for Boise County.

Action Item	Time Frame
Education and Outreach	
Through the Idaho State Department of Agriculture, Agriculture Groundwater Coordination Committee, complete the following: – Request that University of Idaho fertilizer application guides are reviewed and updated as needed. – Promote education and outreach regarding potential sources of nitrate. – Promote voluntary implementation of best management practices (BMPs).	Ongoing
Work with communities to promote proper fertilizer application in parks, cemeteries, schools, and golf courses.	Ongoing
Work with county commissioners and other local officials to evaluate adequacy of local zoning and land use planning initiatives.	As requested
Livestock Facility Waste Management	
Continue to require nutrient management plans (NMPs) at every licensed dairy and beef cattle feeding operation designated as a confined animal feeding operation (CAFO) (>1,000 head of animals) to help control runoff and infiltration of animal waste.	Ongoing
Identify all beef cattle feeding operations (<1,000 head of animals) that could be considered significant contributors of contaminants to waters of the state and work with the operators to properly manage waste and develop NMPs for their facilities.	Ongoing
Manure Storage and Application	
Continue to aid owners and operators in developing the required manure storage and application procedures in beef and dairy facility NMPs.	As Needed
Develop information and training for private landowners who accept manure or compost from animal feeding operations for use as fertilizer. Develop the following components: – Identify target audience. – Create informational brochures, flyers, or pamphlets as guidance for proper storage and application methods. – In coordination with the University of Idaho Extension and other interested groups, develop seminar and presentation materials for workshops. – Disseminate information to the target audience through mailings, workshops, or other means, as appropriate.	As Needed
Monitoring	
Collect samples annually for coliform bacteria and nitrate at licensed dairies. Every 5 years, monitor dairy wells that have nitrate levels greater than 5 parts per million for nitrogen isotopes.	Ongoing
Conduct groundwater monitoring for pesticides in accordance with the Idaho Pesticide Management Plan and federal Insecticide, Fungicide and Rodenticide Act grant while coordinating with the Idaho Department of Environmental Quality and Idaho Department of Water Resources.	

Table 8-6. Idaho Department of Water Resources implementation tasks for Boise County.

Action Item	Time Frame
Information and Education	
Using the well permitting process, provide information to homeowners concerning the potential presence of nitrate in drinking water supplies.	Ongoing
Work with county commissioners and other local officials to evaluate the adequacy of local zoning and land use planning initiatives if requested.	As requested
Monitoring	
Through the Statewide Ambient Groundwater Quality Monitoring Program, conduct groundwater monitoring to better characterize nitrate contamination, determine nitrate concentration trends, and identify the presence of nitrate contamination inside and outside the nitrate priority area boundaries.	Ongoing

Table 8-7. Confined animal feeding operation siting team implementation tasks for Boise County.

Action Item	Time Frame
The Idaho State Department of Agriculture (as team lead of Idaho's confined animal feeding operation [CAFOs] site advisory team), Idaho Department of Environmental Quality, and Idaho Department of Water Resources will continue to review sites proposed for CAFOs, determine environmental risks, and submit site-suitability determinations to counties.	As requested

Table 8-8. University of Idaho Extension implementation tasks for Boise County.

Action Item	Time Frame
Information and Education	
Provide education to all fertilizer users through University of Idaho Extension educators, workshops, website, and materials, such as newsletters and factsheets. Information should address proper irrigation and fertilizer application procedures, rates (based on University of Idaho Extension guidance), and timing, with consideration for crop up-take, migration of excess nitrates, and impacts to groundwater.	Ongoing
Encourage ongoing outreach and provision of information by the University of Idaho Extension to small acreage operations and part-time agricultural operations (hobby farms).	Ongoing
Distribute University of Idaho Extension publications to homeowners in priority areas through mass mailings or through distribution by local retailers and develop new publications as needed. Educational materials should address fertilizer and pesticide application rates and impacts to groundwater.	Ongoing
Promote demonstration projects and disseminate results.	Ongoing

Table 8-9. Municipalities implementation tasks for Boise County.

Action Item	Time Frame
Groundwater Quality Protection	
"Environmental Quality—Health" (Idaho Code § 39-1) states, "Cities, counties and other political subdivisions of the state shall incorporate the ground water quality protection plan in their programs and are also authorized and encouraged to implement ground water quality protection policies within their respective jurisdictions…" (*Idaho Code § 39-126*)	Required
Education and Outreach	
Work with residents, landscape contractors, cemeteries, and schools within jurisdiction to promote proper fertilizer application.	Ongoing
Work with DEQ, ISDA, IDWR, IASCD, ISWC, other agencies, and local governments to gather their input on local zoning, plans, and ordinances.	As needed
Comprehensive Planning	
"Local Land Use Planning" (Idaho Code § 67-65) states that "When considering amending, repealing, or adopting a comprehensive plan, the local governing board shall consider the effect the proposed amendment, repeal, or adoption of the comprehensive plan would have on the source, quantity and quality of ground water in the area" (*Idaho Code § 67-6537*). Review and consider maps of watersheds, aquifer recharge areas, groundwater basins, and unique water resource conditions to accurately determine the potential impacts of development on water quality and water resources in areas of interest. Identify existing and potential water pollution sources (landfills; chemical storage sites; abandoned commercial, industrial, and mine properties; and agricultural nonpoint sources) when considering land use changes. Identify appropriate land uses in areas of sensitive water resources.	As appropriate
Planning and Zoning Decisions	
Consider potential impacts to water quality when evaluating land use changes. Use the confined animal feeding operation (CAFO) siting team to review sites proposed for CAFOs and determine environmental risks. Consider the harmful impacts that may occur to groundwater resources before approving the following: – Fertilizer manufacturing and/or distribution centers – Commercial endeavors that use large volumes of liquids in above ground and below ground tanks – Placement and/or expansion of CAFOs or animal feeding operations – Subdivision development; specifically residential densities using individual wells and septic systems	As appropriate
Work with the Association of Idaho Cities and Idaho Association of Counties as necessary and appropriate.	Ongoing and as appropriate

Notes: Idaho Department of Environmental Quality (DEQ), Idaho State Department of Agriculture (ISDA), Idaho Department of Water Resources (IDWR), Idaho Association of Soil Conservation Districts (IASCD), and Idaho Soil and Water Conservation Commission (ISWC)

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9 Drinking Water Source Protection

PWSs can be publicly or privately owned and serve many Idahoans. A PWS is defined as an operation serving at least 25 people or 15 service connections for at least 60 days per year. Many citizens get their drinking water from private wells that are not regulated under the Safe Drinking Water Act. As such, private well owners are responsible for ensuring their water is safe to drink.

Over 95% of Idaho's drinking water comes from groundwater. Protecting this resource is largely done through voluntary action where communities develop programs to help prevent drinking water supplies from being contaminated. These programs may involve creating a drinking water protection plan and implementing regulatory and/or nonregulatory management practices. Most human activities at the land surface cause some change in water quality in the aquifer below. Where groundwater is the primary source of drinking water, a community should protect the physical area around the wellhead and the areas above which the well pumps water for drinking.

The maps in this section show Boise County PWSs and their source areas, known as delineations, or the portions of the watershed or subsurface area contributing groundwater to wells. Figure 9-1 depicts the delineations for all of Boise County. Figure 9-2 provides a county view of domestic and PWS wellheads. Each well can act as a conduit for groundwater contamination. The maps in this section are provided as a reference tool when making land use decisions that may affect groundwater and/or drinking water quality in Boise County.

Preventing groundwater contamination requires thoughtful management and cooperation on the part of citizens and the various levels of government. In many cases, land use planning efforts by both city and county governments are the best instruments available for protecting aquifers. If potential contamination sources are prevented from being located over critical recharge areas, the risk of contamination can be greatly reduced.

DEQ sees great potential to protect public health and preserve and protect Idaho's drinking water by providing community leaders with a countywide mapping application that depict drinking water capture zones and delineations. These maps should be considered as land use decisions are made.

For interactive map-based sources of information on groundwater quality and for areas where nitrate concentrations potentially degrade drinking water quality, visit the *2020 Nitrate Priority Areas*.

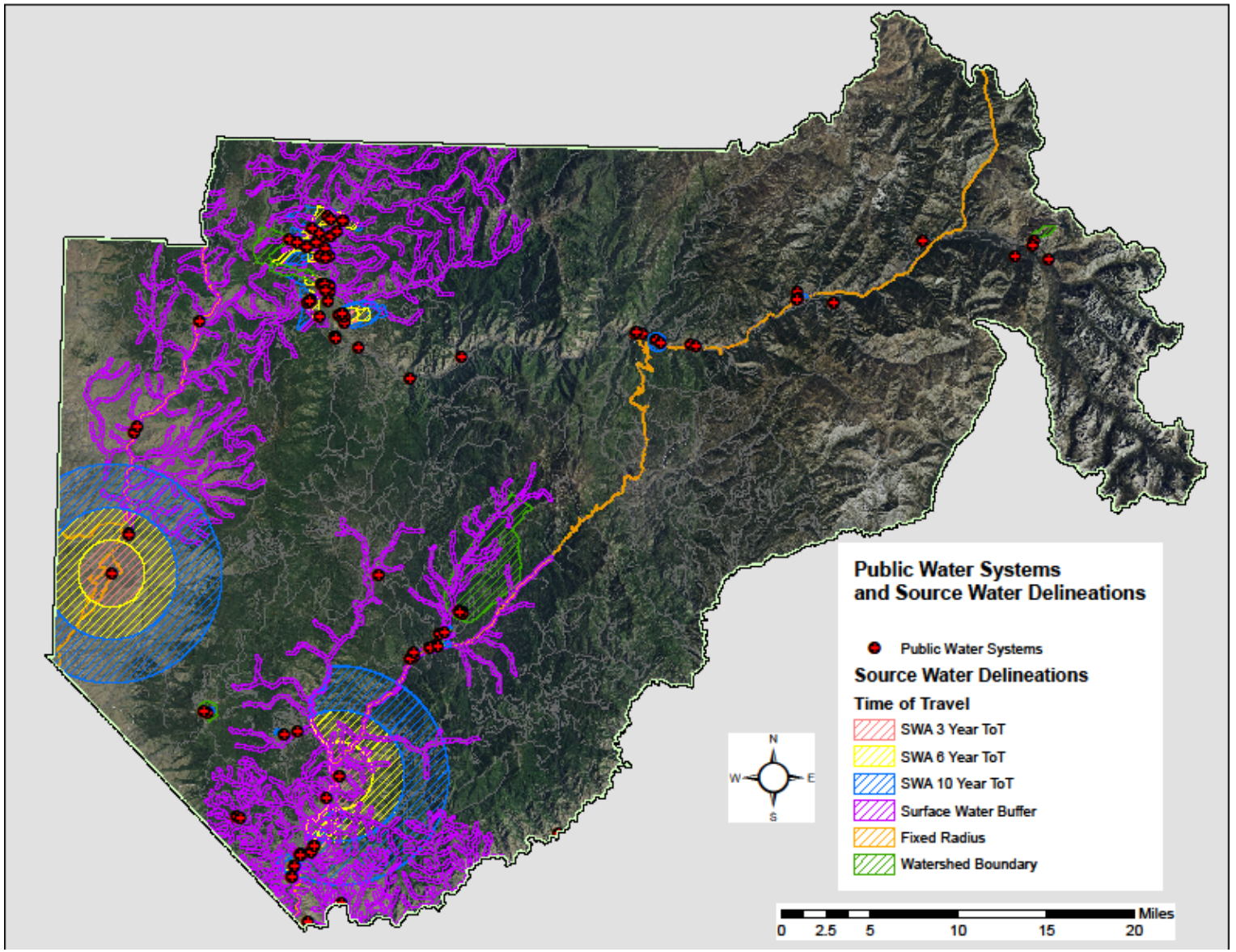


Figure 9-1. Boise County public water systems with source water delineations.

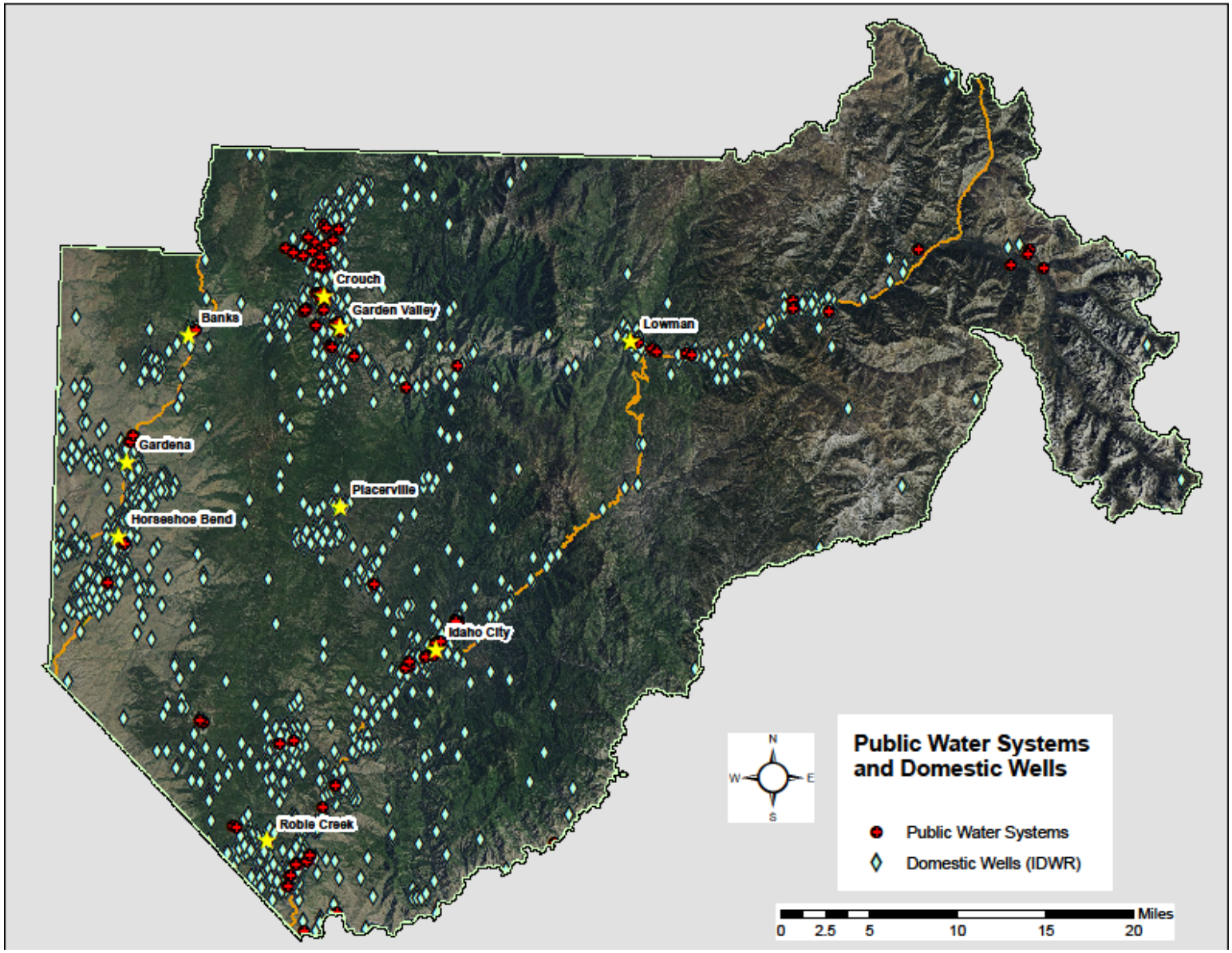


Figure 9-2. Boise County public water system wells and domestic wells.

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10 Surface Water Total Maximum Daily Loads

This section is provided as a resource for making land use decisions to protect surface water quality and to use as supporting documentation for funding requests about projects related to groundwater and surface water quality.

Groundwater and surface water are interrelated (Figure 10-1). Groundwater is surface water (i.e., lakes, rivers, streams, or overland flow) that has percolated into and through the ground to an aquifer (the porous sediment or fractured rock below the water table). Groundwater may move back into surface water bodies through seeps, springs, or base flow into a river or lake, depending on the geology of an area.

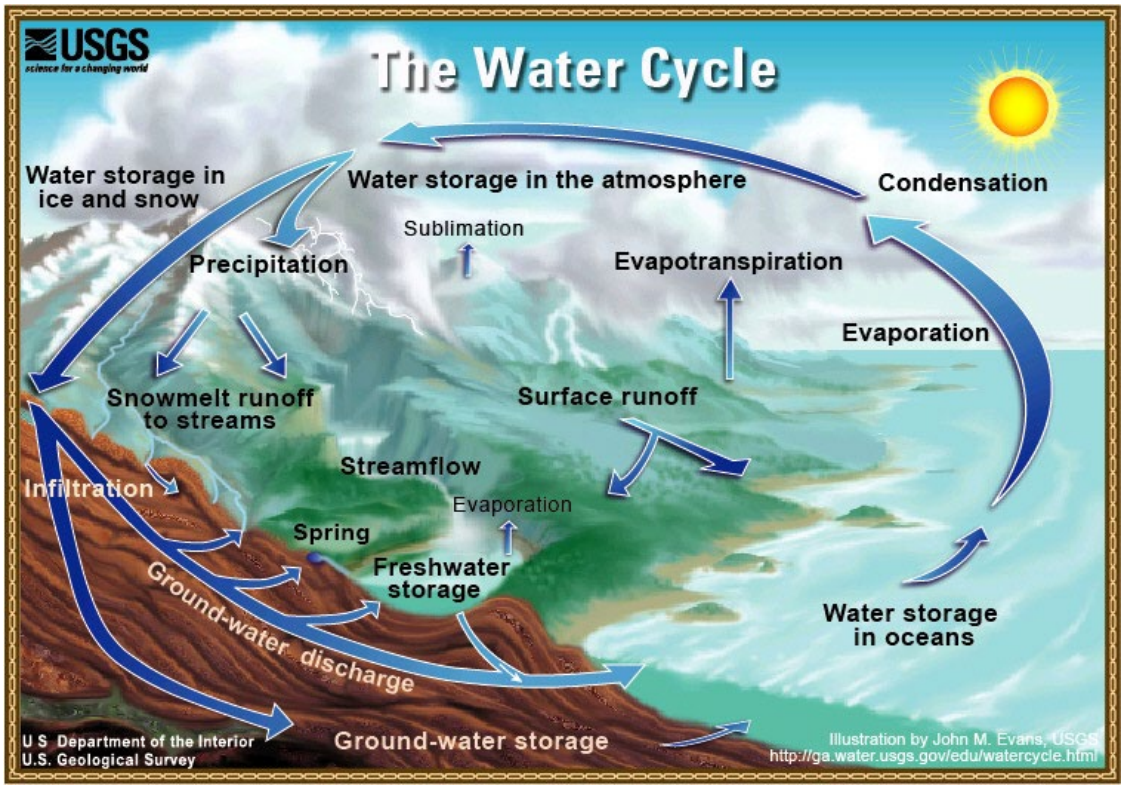


Figure 10-1. Interaction between groundwater and surface water.

Many management practices known to protect groundwater quality are also used to prevent nonpoint source surface water pollution. Unlike point sources, which are directly related to a specific source or facility, nonpoint sources are generally related to activities taking place at multiple locations throughout a watershed or large-scale activities. Nonpoint source pollution is the cumulative effect of activities such as fertilizer use, pesticide use whether for home or agriculture, oil disposed down storm drains, and various land use practices including urban development, agriculture, mining, and forestry. For these reasons, modifying land use activities can reduce and control nonpoint source pollution. Due to Idaho's rural nature, most water pollution in the state is related to nonpoint sources.

To restore degraded surface waters in the state, Idaho (DEQ specifically) must develop water quality management plans for its various water bodies. These are called subbasin assessments

and total maximum daily loads (TMDLs). The TMDL provides a pollution budget written for point and nonpoint sources of pollution for that surface water body. It includes a calculation of the maximum amount of a pollutant a water body can receive from human-caused sources and still meet water quality standards. The pollution budget is expressed in terms of load: the amount of pollutant added to a water body during a given time or per a given volume of water.

There are a number of watersheds (drainage areas) within the county boundary. Each watershed is a basin or subbasin, depending on scale, and each may be subject to a TMDL.

To learn more about the quality of the surface water bodies in Boise County, Figure 10-2 provides a point of reference.

Information about the beneficial use support status and causes of impairment to a surface water is found using the hydrologic unit code (HUC) number/name, or water body name.

To see an interactive, map-based source of information on the water quality of lakes, rivers, and streams in Idaho, including the Clean Water Act § 303(d) listed water bodies, visit the *Final 2022 § 305(b) Integrated Report.*

An overview of the TMDL process and TMDL documents for the impaired waters in Boise County are available on DEQ's *Total Maximum Daily Loads* web page.

Written reports for the following TMDLs and subbasins are found on DEQ's website:

Subbasin Name	Hydrologic Unit Code	DEQ Website
Payette River (Middle Fork) Subbasin	17050121	*Total Maximum Daily Loads* Use the associated subbasin name or number to locate TMDLs, implementation plans, and 5-year reviews.
Payette River (South Fork) Subbasin	17050120	
Payette River (North Fork) Subbasin	17050122	
Boise River (Upper) Subbasin	17020111	
Boise–Mores Creek Subbasin	17020112	

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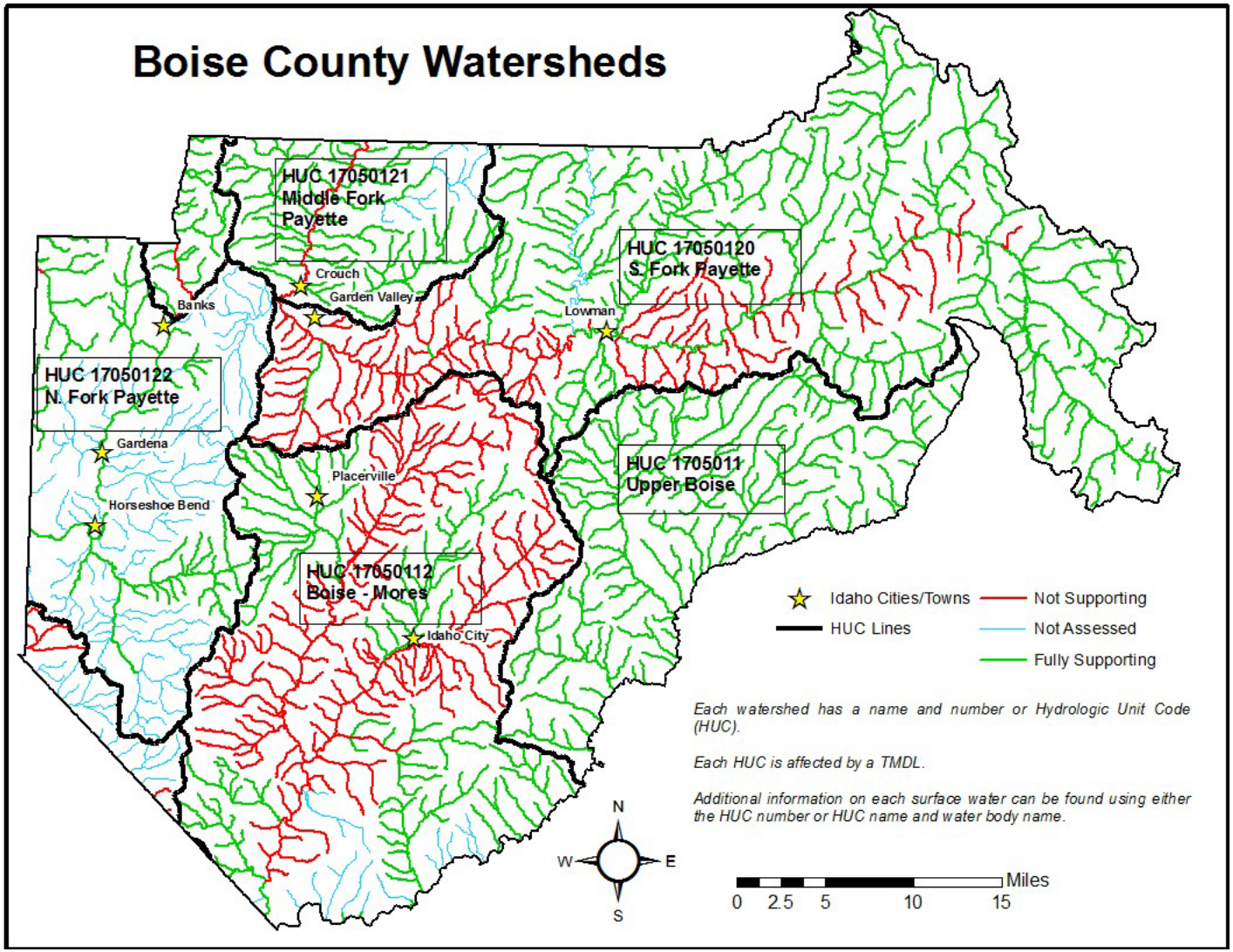


Figure 10-2. Boise County watersheds.

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11 Agencies, Directories, and Website Resources

Table 11-1 lists entities that can assist in groundwater quality management and/or drinking water protection. Additional information and resources are found in section 11.1.

Table 11-1. Resources and authorities for groundwater quality management in Idaho.

Resource	Phone Number and Website
Idaho Association of Soil Conservation Districts – Nutrient and irrigation water management plans – Grant opportunities – Technical assistance – Restoration and urban conservation	(208) 963-4693 *https://www.iascd.org/*
Idaho Soil and Water Conservation Commission – Technical assistance to owners/operators of private lands for planning, implementing, and evaluating agricultural best management practices – Nutrient and irrigation water management plans	(208) 332-1790 *www.swc.idaho.gov*
Idaho State Department of Agriculture – Beef and dairy animal feeding operations – Confined animal feeding operation (CAFO) siting team – Pesticides	(208) 332-8500 *www.agri.idaho.gov*
Idaho Department of Water Resources – Well construction, permits, and underground injection – Water rights – Hydrogeologic studies	(208) 287-4800 *www.idwr.idaho.gov*
Natural Resources Conservation Service Technical assistance to implement conservation practices for erosion control and water quality	(208) 963-4700 *www.id.nrcs.usda.gov/*
Idaho Department of Environmental Quality – Groundwater quality – Nutrient-pathogen studies – Public drinking water systems – Source water protection – CAFO siting team – CAFOs for swine, poultry, horses, sheep, mink, and deer – Wastewater permitting, large soil absorption systems, land application	(208) 373-0550 *www.deq.idaho.gov*
Central District Health Department – Septic tanks and drainfields – Subdivision sanitary restrictions – Noncommunity drinking water systems – Smaller community drinking water systems – Private well owner assistance with water quality sampling	(208) 375-5211 *www.cdhd.idaho.gov*

Resource	Phone Number and Website
Idaho Water Resources Research Institute Provide research-generated information to water managers, agency research scientists, and the public at large.	(208) 885-2018 *https://www.uidaho.edu/research/entities/iwrri*
Boise Watershed – Project WET partner – Outreach and training materials on water issues for teachers	(208) 608-7300 *https://bee.cityofboise.org/visit/boise-watershed*
University of Idaho Extension—Gem and Boise Counties – 4-H and youth development – Agriculture – Small acreage farming – Farm financial management – Livestock production	(208) 365-6363 *https://www.uidaho.edu/extension/county/gem*
University of Idaho Animal and Veterinary Science Department Water quality effects on animal health	(208) 885-6111 *https://www.uidaho.edu/cals/animal-veterinary-and-food-sciences*
Idaho Rural Water Training and technical assistance for water and wastewater systems	(800) 962-3257 or (208) 343-7001 *https://www.idahoruralwater.com/*
Association of Idaho Cities Ordinance development assistance	(208) 344-8594 *www.idahocities.org*

11.1 Regulatory Directory and Website Resources

The following is not intended as a source of regulatory guidance but is provided to direct readers to proper agencies.

11.1.1 Idaho Department of Environmental Quality

DEQ is responsible for protecting the quality of groundwater in Idaho and relies on a combination of programs to protect groundwater from pollution, clean up degraded groundwater, and monitor and assess groundwater quality. DEQ's groundwater policy is to maintain and protect the existing high quality of Idaho's groundwater and restore degraded groundwater, where feasible. DEQ has identified areas, known as NPAs, where groundwater quality has been degraded. DEQ conducts *source water assessments* to help PWSs understand potential threats to their public water supplies and approves and regulates PWSs and wastewater systems. DEQ Groundwater Program staff in the state office can be contacted at (208) 373-0502. Groundwater Program staff in DEQ's Boise Regional Office can be contacted at (208) 373-0550.

The following DEQ web pages provide more information:

- *Groundwater specific to nitrate contamination*
- *Private, domestic drinking water*
- *Source water protection*
- *Source water assessments of public drinking water systems*
- *Source water protection grants* (when available)
- *Operating swine facilities*
- *Nutrient pathogen studies for septic tank effluent evaluations*
- *Design of septic systems*
- *Final 2022 § 305(b) Integrated Report*

11.1.2 Idaho State Department of Agriculture

ISDA serves the agriculture industry and consumers through regulatory and service activities. ISDA safeguards the public, plants, animals, and environment through promotion, education, and regulation. ISDA is responsible for dairy and feedlot permitting and monitoring, pesticide management and monitoring, agricultural chemical regulation, and nutrient management. ISDA staff can be contacted at (208) 332-8500.

ISDA programs affecting groundwater quality are described below:

- The Nutrient Management Program is designed to minimize adverse impacts on surface or groundwater. Managing nutrients is a priority to protect agriculture's economic viability and the environment. For more information, visit the *Environmental/Nutrient Management Program*.
- The ISDA *Animal Industries Division* provides information on CAFOs and can be reached at (208) 332-8500.
- Authority to regulate siting of CAFOs in Idaho rests with the counties. County ordinances can regulate CAFO zoning and contain environmental protection clauses and rules about waste removal. Counties can request an environmental risk assessment for site suitability. See *CAFO siting information*.

- ISDA Dairy & Eggs can be reached at (208) 332-8550. For more information, visit *Dairy* and *Eggs*.
- The Agricultural Water Quality Program implements monitoring and protection programs related to pesticides with public and private partners to protect ground and surface water quality. The ISDA Water Quality Program staff can be reached at (208) 332-8597. For more information, visit the *Agricultural Water Quality Program*.
- The Division of Agricultural Resources works to promote, direct, and ensure safe agricultural and environmental practices. Through education and enforcement, the division ensures compliance with federal and state rules and laws governing pesticide use in Idaho. The ISDA Agricultural Resources program can be reached at (208) 332-8605. For more information, visit *Pesticide Programs*.

11.1.3 Idaho Soil and Water Conservation Commission

ISWC provides support and service to Idaho's 50 soil and water conservation districts, encouraging the wise use and enhancement of soil, water, and related resources. Responsibilities of the ISWC include the following:

- Administer general funds appropriated by the Idaho Legislature to the districts for implementing resource conservation practices.
- Provide technical assistance personnel to the districts to administer water quality projects.
- Administer the Resource Conservation and Rangeland Development Programs (RCRDP), a program that provides low interest loans for new conservation projects on private land.

ISWC staff can be contacted at (208) 332-1790. For more information, visit the *Soil & Water Conservation Commission.*

11.1.4 Soil Conservation Districts

Soil conservation districts provide action at the local level to promote the wise and beneficial conservation of natural resources, with emphasis on soil and water. Idaho's soil conservation districts, ISWC, and NRCS have forged a unique local, state, and federal partnership to promote soil conservation. Water quality projects are administered locally by soil and water conservation districts. These projects address nonpoint source water quality problems coming from agricultural activities and encourage voluntary use of BMPs.

Soil conservation district offices and contact information are found at *IASCD*.

11.1.5 Central District Health Department

The mission of Idaho's seven Public Health Districts is to prevent disease, disability, and premature death; promote healthy lifestyles; and protect the health and quality of the environment. The Central District Health Department (CDHD) is responsible for small public water systems, nonpublic water systems, septic tank and sewage disposal rules for nonmunicipal systems, and approving permits for new and replacement septic systems.

CDHD is responsible for Ada, Elmore, Boise, and Valley Counties. Additional information is found at *Division of Community and Environmental Health.* Some of CDHD's responsibilities are described below:

- CDHD Environmental Health Services regulates subsurface sewage disposal systems in cooperation with DEQ. Developers/homeowners should contact CDHD to discuss applications and permitting requirements for subsurface sewage disposal system. Note that a subsurface sewage permit is usually a prerequisite to obtaining a building permit from the county. CDHD Environmental Health Services can be contacted at (208) 375-5211. Additional septic tank information is found at *Septic System Services.*
- CDHD Environmental Health Services is responsible for maintaining and releasing sanitary restrictions in force on all platted subdivisions (*Idaho Code § 50-13*).
- Owners of private water supplies have the sole responsibility to maintain them and ensure safe potable water. The Private Water Program that CDHD administers provides education, technical assistance, and water sampling, for a nominal fee. Private residents can choose to collect their own water samples as well. CDHD can provide guidance on what tests would be beneficial and what the results mean to public health. For more information, contact the CDHD Public Drinking Water Coordinator at (208) 375-5211, or visit *Water Quality and Wells*.

SWDH developed the following brochures related to groundwater issues:

- *Disinfecting Your Wells*
- *Hydrogen Sulfide in Drinking Water*

The Idaho Department of Health and Welfare Environmental Section developed the following brochures related to groundwater issues:

- *Nitrate in Your Well Water*
- *Fluoride in Your Well Water*
- *Arsenic in Your Well Water*
- *Iron in Your Well Water*
- *Uranium in Your Drinking Water*
- *Pesticides in Your Well Water*
- *How to Take a Water Sample (Video)*

11.1.6 Idaho Department of Water Resources

IDWR serves the people of Idaho by ensuring water is conserved and available to sustain Idaho's economy, ecosystem, and resulting quality of life. IDWR provides a variety of services for the public, such as administering the appropriation and allotment of water resources for the state; licensing drillers; regulating the construction, modification, and abandonment of wells; collecting and serving groundwater data; dam safety inspections; and regulating stream channel alterations. The IDWR State Office can be contacted at (208) 287-4800. The IDWR Western Regional Office can be contacted at (208) 334-2190. More information is available on the web pages listed below.

- Review information about the *Statewide Groundwater Quality Monitoring Program*.
- IDWR administers the Environmental Data Management System, and data from can be viewed on the *map viewer* or accessed through a *bulk download*.
- Review *groundwater level data*.
- For information about well construction standards or to apply for a permit for a new well, visit *Wells*.

- View a *map of wells drilled in Idaho*.

11.1.7 Natural Resources Conservation Service

NRCS provides technical assistance to farmers, ranchers, and other private landowners, helping them implement conservation practices on their land. This assistance includes providing information on soils, forestry management, pasture and hayland management, erosion control, and water quality. For NRCS field office programs and technical resources, contact (208) 378-5700. NRCS field office contact information by county and conservation district are available at *Find Your Local Service Center*.

NRCS programs are generally divided between financial assistance and technical assistance. More information on specific programs is given below:

- *EQIP* is a voluntary conservation program that allows some farmers to receive financial and technical assistance for conservation practices on agricultural land.
- The program, *Conservation Innovation Grants,* is voluntary and is intended to stimulate the development and adoption of innovative conservation approaches and technologies while leveraging federal investment in environmental enhancement and protection, in conjunction with agricultural production.
- The *Conservation Reserve Program* provides financial and technical assistance to eligible farmers and ranchers to address soil, water, and natural resource concerns.
- The program, *Conservation Technical Assistance,* provides technical assistance supported by science-based technology and tools to help people conserve, maintain, and improve their natural resources.
- Ecological Sciences/Technical Resources for water quality include the following:
  - *Nitrogen Transport Risk Assessment (2022)*
  - *Nutrient management*
  - *Agronomy*

11.1.8 University of Idaho Extension

Professionals with the University of Idaho Extension work with Idahoans to address agricultural, natural resources, youth, family, community, and environmental issues. Collaborative relationships with countless agencies, groups, and individuals make a vast array of innovative educational programs available to the state. Extension faculty are joined by several thousand volunteers and dozens of cooperating agencies, organizations, and businesses, both public and private, on local, state, and national levels.

In keeping with the land-grant mission, the University of Idaho Extension, Southern District provides lifelong education and serves the needs of adults and youth in the district. The Southern District encompasses 18 counties of southwestern and south-central Idaho. Agricultural enterprises include farming, ranching, and dairy. Tree fruit, seed, row crops, and forages are the main crops spanning the Boise, Canyon, and Weiser River valleys. Cow-calf operations center in the rangeland areas of Owyhee, Washington, and Adams Counties. Dairies are located primarily in Ada and Canyon Counties. Extension education covers production, management, and marketing of these agricultural commodities, as well as natural resource conservation and

development. The Southern District can be contacted at (208) 459-6003. View a *list of extension offices by county*.

Dairy and beef producers can draw on University of Idaho Extension expertise to protect herds and operate more efficiently. The extension provides research-based, local information to help producers protect the environment and manage their animals. More information is found at the *Department of Animal, Veterinary and Food Sciences*.

The University of Idaho Extension provides timely and local research-based information to help growers control pests, market products, and find new varieties. More information can be obtained at the *Extension's publications* web page.

11.1.9 Idaho Water Resource Research Institute

IWRRI plays an important role in facilitating, participating in, and developing innovative education/outreach programs that provide research-generated information to water managers, agency research scientists and the public at large.

11.1.10 Project WET at Boise Watershed

As a local partner of *Project Wet*, the *Boise Watershed* provides educational materials, lesson plans for watershed protection, and teacher workshops to reach children and their parents.

11.1.11 General State of Idaho Contacts

For information about other state resources not found in this section, see *Access Idaho*.

11.1.12 Idaho's Geospatial Data Clearinghouse

Downloadable geographic information systems data allow efficient processing of geospatial data into deliverable data and maps. See *Idaho's Geospatial Data Clearinghouse.*

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12 Funding Sources

12.1 Funding Integration Tool for Source Water

If you are planning a future Source Water Protection Project, consider using EPA's *Funding Integration Tool for Source Water (FITS)*. FITS is a one-stop-shop explaining how users can integrate various federal funding sources to support activities that protect sources of drinking water. FITS has three sections to help plan your source water protection project.

- ***Source Water Protection Funding*** provides relevant information on major federal funding sources to support activities that protect sources of drinking water. This section includes 11 funding sources/programs, eight from the EPA (e.g., Drinking Water State Revolving Fund, Clean Water State Revolving Fund, Clean Water Act § 319 Nonpoint Source Management Program), and the remainder from other federal agencies (e.g., NRCS, US Forest Service, and Federal Emergency Management Agency).
- ***Planning and Funding Coordination*** covers the steps or components of a source water program. For each step, the tool lays out general information, potential funding sources that may support it, and recommendations for long-term planning and program collaboration. This section identifies planning considerations for future steps of a source water protection program along with tips for users to maximize eligibility for federal funding.
- ***Examples*** provides illustrations of funding sources in action. Examples are geographically diverse and include cross-program collaboration and leveraging multiple funding sources for source water protection goals.

12.2 Enhancing State and Tribal Programs Initiative

The goal of the *Enhancing State and Tribal Programs (ESTP) Initiative* is to enhance EPA's delivery of technical and financial support for state and tribal wetlands programs. The overall objective is to accelerate program development on a national scale.

12.3 Section 319 (h) Nonpoint Source Grants, United States Environmental Protection Agency/Idaho Department of Environmental Quality

The Nonpoint Source Management Program provides financial assistance for implementing BMPs to abate nonpoint source pollution. DEQ manages the nonpoint source program. All projects must demonstrate the applicant's ability to abate nonpoint source pollution through the implementation of BMPs. More information is available on DEQ's *Nonpoint Source Subgrants in Idaho* web page.

12.4 Conservation Technical Assistance, Natural Resources Conservation Service

The NRCS provides conservation technical assistance to private landowners, conservation districts, tribes, and other organizations. Conservation plan preparation and BMP implementation

is the main form of technical assistance. Assistance includes interpreting soil, plant, water, and other physical conditions needed to determine the proper BMPs. The *Conservation Technical Assistance program* provides financial assistance in implementing BMPs described in the conservation plan.

12.5 Environmental Quality Incentives Program, Natural Resources Conservation Service

EQIP offers technical assistance and cost-share monies to landowners for establishing a 5- to 10-year conservation agreement for activities such as manure management, pest management, and erosion control. The program gives special consideration to contracts in those areas where agricultural improvements will help meet water quality objectives.

12.6 Conservation Programs, Natural Resources Conservation Service

NRCS's *natural resources conservation programs* help people reduce soil erosion, enhance water supplies, improve water quality, increase wildlife habitat, and reduce damage caused by floods and other natural disasters. Public benefits include enhanced natural resources that help sustain agricultural productivity and environmental quality while supporting continued economic development, recreation, and scenic beauty.

Programs include, but are not limited to, the following:

- Conservation Technical Assistance Program and activities
- Environmental Improvement Programs
- Agricultural Management Assistance
- Environmental Quality Incentives Program (EQIP)
- National Water Quality Initiative (NWQI)
- Conservation Innovation Grants (CIG)
- Wildlife Habitat Incentive Program (WHIP)

For more information, see *programs specific to Idaho*.

12.7 Source Water Protection Grants, Idaho Department of Environmental Quality

DEQ's Source Water Protection Grants provide funding for projects to protect sources of public drinking water. Projects can take either a local or regional approach. Local projects will concentrate on protecting a specific community public water supply system, while regional protection activities will cover multiple systems and communities. Water treatment and water system operations and maintenance are not eligible activities. More information is available on DEQ's *Source Water Protection Grants* web page.

12.8 Resource Conservation and Rangeland Loan Development Program, Idaho Soil and Water Conservation Commission

The *Resource Conservation and Rangeland Loan Development Program* provides loans for improving rangeland and riparian areas and loans for developing and implementing conservation improvements.

12.9 Financial Programs, Idaho Water Resource Board

The *Idaho Water Resource Board Financial Program* assists local governments, water and homeowner associations, nonprofit water companies, and canal and irrigation companies with funding for water system infrastructure projects. The types of projects that can be funded include public drinking water systems; irrigation systems; drainage or flood control; groundwater recharge; and water project engineering, planning, and design. Funds are made available through loans, grants, bonds, and a revolving development account.

12.10 Aquifer Protection District, Local Initiative

In 2006, Kootenai County voters approved the formation of the state's first aquifer protection district established to ensure the county can continue to pay for services and programs necessary to prevent the contamination of drinking water. Those services include protecting source water, preventing spills by secondary containment and proper handling of hazardous materials, minimizing septic discharges, managing stormwater, monitoring groundwater quality, and conducting education and outreach activities. More information is available at the *Kootenai County Aquifer Protection District.*

12.11 Embrace-A-Stream Program, Trout Unlimited

Trout Unlimited provides funding to landowners for small-scale stream restoration projects. These projects have significant involvement from Trout Unlimited volunteers.

12.12 Pheasants Forever

Pheasants Forever can provide up to 100% cost-share for projects establishing, maintaining, or enhancing wildlife habitat for pheasant and other upland game.

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13 Planning Tools for Local Governments

The information presented in this section is specific to local government planning for protecting groundwater and source water within their jurisdiction.

13.1 Planning Tools

Local governments are encouraged to use the following tools during the planning, zoning, and permitting process to protect and improve groundwater and source water in Boise County.

1. Review *Environmental Planning Tools and Techniques*—This document is useful in protecting groundwater by linking land use to water quality.
2. Review *Idaho Land Use Handbook: The Law of Planning, Zoning, and Property Rights in Idaho.* This free handbook is available from Givens Pursley LLP. You must provide an email address.
3. Review DEQ's *Individual and Subsurface Sewage Disposal Systems Technical Guidance Manual* for BMPs for unsewered developments.
4. Use the checklists included at the end of this section.
5. Use the Local Government Checklist for Individual Project Proposals when evaluating land use decisions and approving proposed projects within your jurisdiction.
6. Use the Local Government Checklist for Addressing Source Water in Comprehensive Plan when reviewing county and municipal comprehensive plans to ensure source water protection has been addressed.
7. Consider using BMPs for projects that may affect groundwater. Review the following publications: *BMP information* and *Idaho Agricultural BMPs*.
8. Use DEQ's *Individual and Subsurface Sewage Disposal Systems Technical Guidance Manual* when reviewing plans for unsewered developments.
9. Use American Planning Association (APA) Policy Guides provided at the end of this section.
    - *APA Policy Guide for Water Resources Management*
    - *APA Policy Guide for Solid and Hazardous Waste Management*
    - Additional *APA policy guides*
10. Review the following information and resources provided at the end of this section.
    - *Advice Worth Drinking*
    - *Your Water Your Decision*
11. Use geospatial and interactive mapping tools.

Many sites are available for downloading and viewing geospatial information. Much of the available and downloadable data about other potential groundwater contaminant sources is available through INSIDE Idaho. INSIDE Idaho is the official geospatial data clearinghouse for the state. It serves as a comprehensive geospatial data digital library, providing access to, and a context within which to use, geospatial data and information by, for, and about Idaho.

INSIDE Idaho and other data providers use a set of services allowing efficient processing of geospatial data into deliverable data and maps.

These services are based on a number of web service models and protocols including REST, SOAP, KML, and OGC W*S and are broadly supported by a large number of products, including a desktop geographic information system.

These services directly access data and map products without downloading individual data files.

There are a variety of ways to search the available data but general categories include the following:

- Biota
- Climatology/meteorology/atmosphere
- Elevation
- Farming
- Health
- Inland waters
- Oceans
- Structure
- Boundaries
- Economy
- Environment
- Geoscientific information
- Imagery/base maps/earth cover
- Location
- Society
- Transportation

To get started, visit *Inside Idaho.* This website provides access to DEQ, IDWR, and state agency map products.

Local Government Checklist for Individual Project Proposals

- ☐ Does the project deplete groundwater supplies or interfere substantially with groundwater recharge so that there would be a net deficit in aquifer volume or a lowering of the local groundwater level? For example, would the production rate of preexisting nearby wells drop to a level that would not support existing land uses or planned uses for which permits have been granted?

- ☐ Does the project discharge into the groundwater?

- ☐ Does the project discharge any waste material into the ground from septic tanks or other sources, if any (for example: domestic sewage, industrial, agricultural, etc.)?

- ☐ Does the proposed project discharge any waste materials to surface waters?

- ☐ Does the project alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation on site or off site?

- ☐ Does the project create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?

- ☐ Does the project include measures to reduce or control surface, ground, and runoff water?

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Local Government Checklist for Addressing Source Water in Comprehensive Plan

Water, General

☐ Make an inventory of water resources

☐ Map watersheds, aquifer recharge areas, groundwater basins, unique water resources

☐ Analyze institutional arrangements and responsibilities for water management

☐ Assess adequacy of existing regulations to address water resources

Water Quality

☐ Assess the current and future quality of water resources

- ☐ Perform groundwater tests in the vicinity of landfills and hazardous materials dumps, ponds, tanks, and storage areas

☐ Assess the current and future quantity of water resources

- ☐ Analysis of current and future water consumption

☐ Identify existing and potential water pollution sources

- ☐ Inventory hazardous materials dumps, ponds, and storage sites
- ☐ Identify proposed, existing, and abandoned sources of pollution
- ☐ Identify existing nonpoint sources of contaminants
- ☐ Identify existing contaminated sites
- ☐ Identify existing groundwater contamination

☐ Assess adequacy of regulations for

- ☐ Use, storage, and disposal of hazardous materials
- ☐ Control of point and nonpoint sources
- ☐ Stormwater runoff

Assess Policy Direction Concerning

- ☐ Protection, use, and development of water resources
- ☐ Protection of watersheds and aquifer recharge areas
- ☐ Preservation of wetlands, wild rivers, and watersheds
- ☐ Prevention of contamination
- ☐ Identification of appropriate land uses in areas of sensitive water resources
- ☐ Actions necessary to maintain or improve water quantity and quality to meet projected needs
- ☐ Water conservation (ground and surface) and reuse
- ☐ Drought management and emergency contingency plans
- ☐ Direction for the establishment of local development standards that
    - ☐ Incorporate better site design
    - ☐ Use best management practices for managing impacts on water resources
    - ☐ Address the on-site prevention, retention, and treatment of stormwater runoff
- ☐ Financing strategies for needed improvements
- ☐ Private, nongovernment-owned/-operated water systems
- ☐ Implementation of policy direction

14 Public Information and Outreach Materials

The brochures listed below and provided in this section involve groundwater quality and are designed for the general public. The developing agency for each brochure is included, along with the website address for the brochure, if available.

- *Arsenic in Your Well Water* (Idaho Department of Health and Welfare)
- *Bacteria in Your Well Water* (Idaho Department of Health and Welfare)
- *Fluoride in Your Well Water* (Idaho Department of Health and Welfare)
- *Application for On-Site Sewage Permit* (CDHD)
- *Fertilizer and Pesticide Use at Home* (DEQ)
- *Homeowner's Guide to Septic Systems* (DEQ)
- *Homeowner's Guide to Septic Systems (*EPA*)*
- *Hydrogen Sulfide in Drinking Water* (SWDH)
- *Is My Well Water Safe?* (CDHD)
- *Laboratories certified for drinking water analyses* (Idaho Department of Health and Welfare)
- *Nitrate in Idaho's Ground Water* (DEQ)
- *Nitrate in Your Well Water* (Idaho Department of Health and Welfare)
- *Pesticides Groundwater* (USGS)
- *How Septic Systems Work* (EPA)
- *Septic Systems and Drainfields: What You Need to Know* (DEQ)
- *Statewide Groundwater Quality Monitoring Program* (IDWR)
- *Uranium in Your Well Water* (Idaho Department of Health and Welfare)
- *Well Disinfection* (CDHD)
- *Well Maintenance Log* (Idaho Department of Health and Welfare)
- *Well Water Testing Flow Charts Booklet* (Idaho Department of Health and Welfare)

The *Private Well Class* offers simple, free online courses in well and septic maintenance.

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15 Idaho Environmental Guide: A Resource for Local Governments

The *Idaho Environmental Guide* is a resource for local government officials to assist in managing a community's environmental responsibilities. Local government officials should consult this guide before approving projects to understand and consider impacts to air, water, and/or land potentially affecting the health, welfare, and sustainability of communities within their jurisdiction. The *Idaho Environmental Guide* is informational and should be used in strategic planning for environmental issues. This guide is not an all-encompassing summary of state and federal rules and regulations.

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