STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

2024 Summary Report

Summary Report for the Idaho Department of Environmental Quality Groundwater Quality Monitoring Projects.

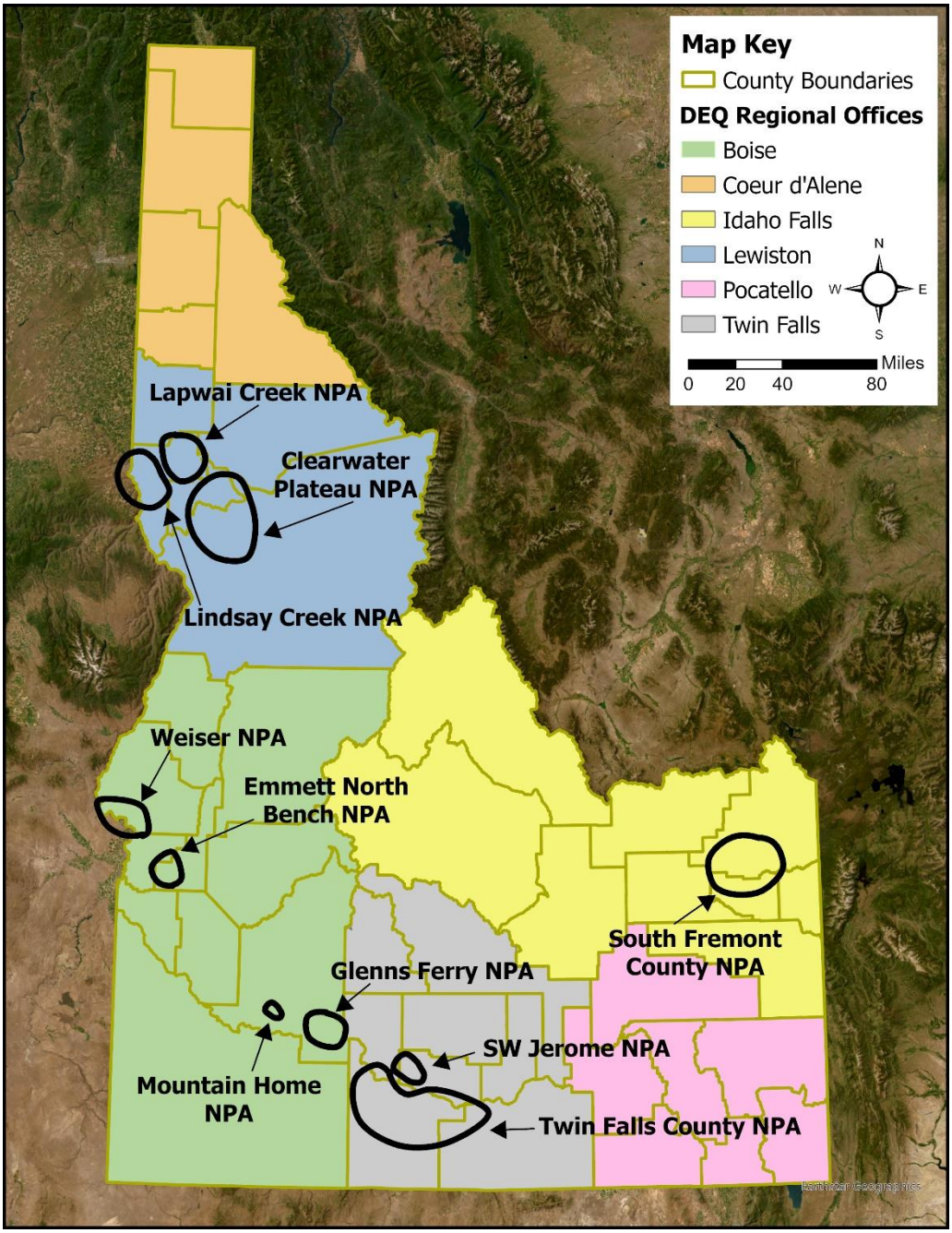


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STATE OF IDAHO
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2024 Summary Report: Clearwater Plateau Nitrate Priority Area

The Idaho Department of Environmental Quality's (DEQ's) Groundwater Quality Rule is intended to maintain and protect the existing high quality of Idaho's groundwater. By sampling and monitoring wells throughout the state, DEQ can assess water quality to aid in land use management decisions that impact groundwater.

This monitoring project is designed to provide the data necessary for evaluating trends in groundwater nitrate concentrations in and around the Clearwater Plateau Nitrate Priority Area (NPA).

Background

In 2024, DEQ evaluated the water quality and sampled for various contaminants within the Clearwater Plateau NPA in Idaho and Lewis Counties, Idaho (Figure 1). The Clearwater Plateau NPA was designated based in part on the 1998 nitrate investigation and has been included in every update of NPA delineation.

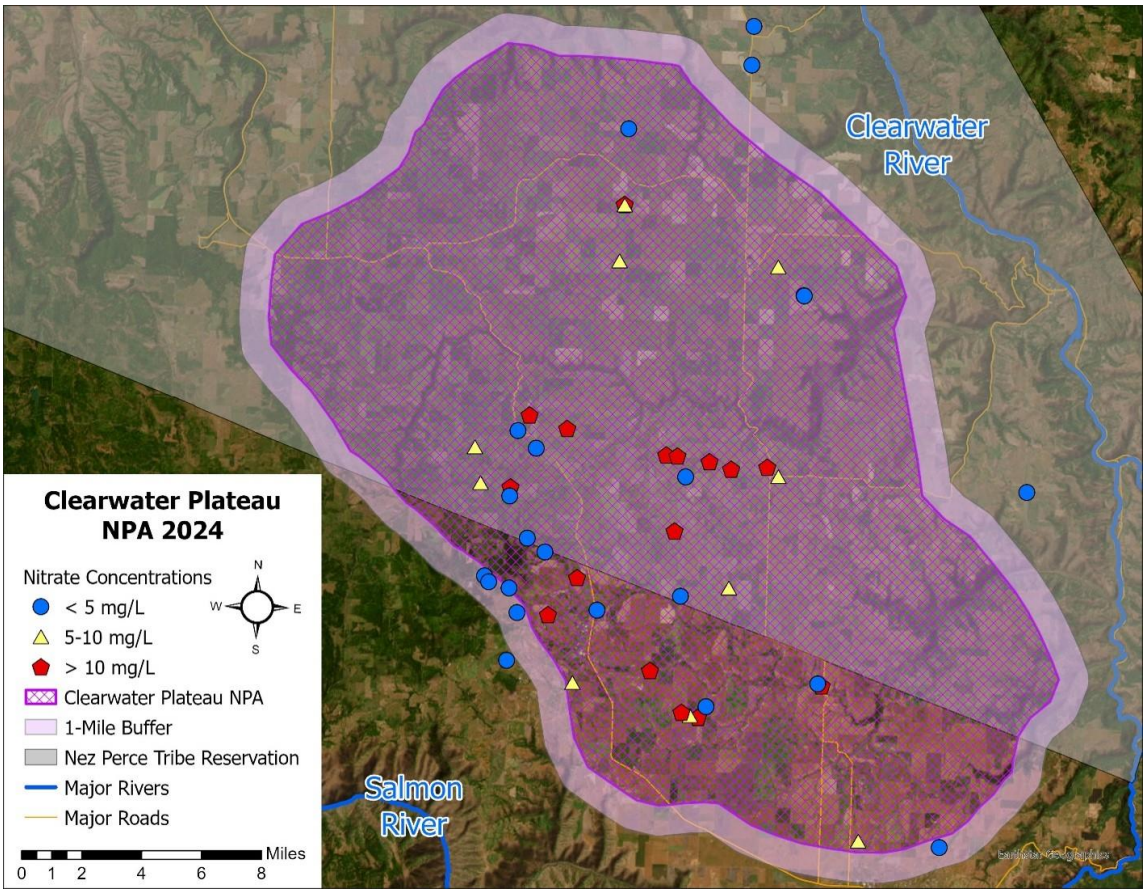


Figure 1. Location of wells sampled in the Clearwater Plateau NPA in 2024 and nitrate concentrations.

NPAs in Idaho are identified by the presence of elevated nitrate concentrations in groundwater samples collected by DEQ or other agencies. Elevated nitrate concentrations indicate that the groundwater has been impacted by a nitrate source—typically wastewater, sewage, fertilizer, or animal waste—and the groundwater aquifer is susceptible to other surface contaminants. Once an area of elevated nitrate concentrations is identified, DEQ conducts a more focused investigation by sampling domestic and irrigation wells in the area and then uses the sampling data to identify boundaries to the area of nitrate impact. NPAs throughout the state are evaluated and ranked by existing nitrate concentrations, statistical trends in the nitrate concentrations over time (if available), and local populations potentially affected. In 2020, the Clearwater Plateau NPA was ranked 15th in the state (out of 35 NPAs) with no change in statistical trend for nitrate concentration (DEQ 2021). The statewide rank reflects relative concern compared to other NPAs, with higher scores representing areas of greater concern. This NPA was previously sampled quarterly from 2005–2015, but with the limited seasonal variability of nitrate concentrations observed in most wells, DEQ reduced the monitoring to once per year. Due to the pandemic and staffing limitations, no monitoring was completed in 2020, 2021, and 2023. DEQ resumed annual sampling in 2024.

The project area is located immediately north of Grangeville, Idaho, and includes portions of Lewis and Idaho Counties, including the towns of Cottonwood, Ferdinand, Craigmont, and Nez Perce. Land use is primarily agricultural, specifically dry-land farming with rangeland and grazing also common throughout the area. The Clearwater Plateau NPA is bordered regionally by the Salmon River to the south, the Snake River to the west, and the Clearwater River to the north and east. Groundwater beneath the plateau generally flows northeast through Miocene basalt layers. These basalt layers are overlain by loess that ranges from tens to hundreds of feet thick and forms much of the present land surface of the Palouse and occasionally in the alluvial valley aquifers and basement rocks (Hagan 2003). Well depths from groundwater sampling locations ranged from 70 to 450 feet below ground surface (IDWR 2025).

Drinking Water Standards

The United States Environmental Protection Agency (EPA) sets national drinking water standards for approximately 90 contaminants. The maximum contaminant level (MCL) is an enforceable standard set by EPA that defines the maximum level of a contaminant allowed in water delivered to a public water system. DEQ adopts drinking water standards, with a few exceptions, in the Ground Water Quality Rule, IDAPA 58.01.11.200. DEQ uses these standards to evaluate private well water quality.

Groundwater Monitoring Results

In 2024, DEQ sampled groundwater from 48 sites (47 domestic or irrigation wells and one spring) in the Clearwater Plateau NPA. DEQ analyzed samples for nitrate and nitrite as nitrogen and bacteria to assess water quality in the project area. Sixteen wells were also analyzed for major ions—alkalinity, chloride, sulfate, calcium, potassium, magnesium, and sodium. Fifteen of the sites had been previously sampled, and 33 new ones were added. DEQ provided sample results to the homeowners.

Nitrate

Nitrate is a widespread groundwater contaminant in Idaho. Common sources of nitrate include decaying plants and other organic matter, septic systems, byproducts from animal facilities, nitrogen-based fertilizers, and others. Sixteen of the 48 sources sampled (33%) had nitrate concentrations over the MCL (10 milligrams per liter [mg/L]). Ten of the 48 sources (21%) had nitrate concentrations greater than 5 mg/L but below the MCL. Twelve wells were sampled for ammonia in addition to nitrate. Ammonia concentrations for this project were all non-detect, less than 0.2 mg/L (Table 1).

Bacteria

All 48 sites were analyzed for *Escherichia coli* (*E. coli*) and total coliform (TC) bacteria. TC bacteria are common in the environment and are generally not harmful. *E. coli* is a subgroup of coliform found in greater quantities than TC in animal fecal matter. If *E. coli* is detected with TC, this indicates that contamination from animal or sewage waste is present and that disinfection is necessary to ensure the water is safe for drinking (*Coliform Bacteria Fact Sheet*). Follow up sampling is recommended to confirm the result. Eight sites (17%) had positive detections for TC, and one of those eight was also positive for *E. coli*.

Table 1. 2024 nutrient and bacteria results—Clearwater Plateau Nitrate Priority Area Ground Water Monitoring Project.

DEQ Site ID	Well Depth	Sample Date	Nutrient Concentration		Bacteria Concentrations[B]	
			Nitrate + Nitrite[A]	Ammonia	*E. coli*	Total Coliform
			mg/L	mg/L	MPN/100 mL	MPN/100 mL
Water Quality Standard:			10	No Stand.	<1	1.0
199	140	04/30/2024	25.40	-	<1	<1
202	400	05/08/2024	3.74	-	<1	<1
409	Unk	05/07/2024	39.10	-	<1	<1
416	100	05/08/2024	19.70	-	<1	<1
417	187	05/08/2024	ND	ND	<1	<1
419	Unk	05/01/2024	14.50	-	<1	<1
2587	Unk	05/06/2024	1.83	ND	<1	<1
2673	400	04/29/2024	1.59	ND	<1	<1
2674	Unk	04/30/2024	13.30	-	<1	1.0
2678	340	05/06/2024	3.33	ND	<1	<1
3251	350	05/08/2024	ND	-	<1	<1
3255	400	05/09/2024	ND	-	<1	2.0
3265	175	05/07/2024	29.30	-	<1	<1
3274	283	05/01/2024	ND	ND	<1	<1
3277	240	05/08/2024	2.99	-	<1	<1
3517	280	04/29/2024	0.225	-	<1	<1
3518	154	04/29/2024	2.34	-	<1	<1
3519	77	04/29/2024	18.30	-	<1	<1
3520	405	04/29/2024	5.49	-	<1	<1
3521	450	04/30/2024	12.70	-	<1	<1
3522	150	04/30/2024	4.73	-	<1	<1

DEQ Site ID	Well Depth	Sample Date	Nutrient Concentration		Bacteria Concentrations[B]	
			Nitrate + Nitrite[A]	Ammonia	*E. coli*	Total Coliform
			mg/L	mg/L	MPN/100 mL	MPN/100 mL
3523	Unk	04/30/2024	8.77	-	<1	<1
3524	203	04/30/2024	9.96	-	<1	<1
3525	124	04/30/2024	2.78	ND	<1	<1
3526	89	05/01/2024	7.50	-	<1	<1
3527	220	05/01/2024	8.32	-	<1	<1
3528	215	05/01/2024	ND	ND	<1	<1
3529	Unk	05/01/2024	14.30	-	<1	<1
3530	280	05/01/2024	14.90	ND	<1	9.4
3531	264	05/02/2024	8.26	-	<1	<1
3532	165	05/02/2024	ND	ND	<1	<1
3533	Unk	05/02/2024	1.08	-	<1	7.3
3534	225	05/02/2024	3.97	-	<1	<1
3535	407	05/02/2024	0.361	ND	<1	<1
3536	275	05/02/2024	10.80	-	<1	<1
3537	190	05/02/2024	ND	ND	<1	<1
3538	70	05/06/2024	7.47	-	<1	3.1
3539	375	05/06/2024	5.45	-	<1	<1
3540	257	05/06/2024	11.20	-	<1	<1
3541	255	05/06/2024	6.08	ND	<1	2.0
3542	275	05/07/2024	19.30	-	<1	4.1
3543	280	05/07/2024	1.54	-	1.0	14.5
3544	115	05/07/2024	10.30	-	<1	<1
3545	Unk	05/07/2024	17.30	-	<1	<1
3546	160	05/08/2024	5.66	-	<1	<1
3547	360	05/08/2024	3.51	-	<1	<1
3548	107	05/09/2024	13.50	-	<1	<1
3549	390	05/09/2024	ND	-	<1	<1

Notes: mg/L = milligrams per liter; Unk=Unknown. Well log not found; MPN/100 mL = most probable number per 100 milliliters; (-) =Not Analyzed; No Stand = No Primary or Secondary Drinking Water Regulation or Idaho Ground Water Quality Rule standard currently established;

[A] Contaminant with a National Primary Drinking Water Regulation standard.

[B] Total coliform and E. coli standards are from the Idaho Ground Water Quality Rule (IDAPA 58.01.11.200). An exceedance of the primary ground water quality standard for total coliform (indicated by gray shaded numbers) is not a violation of these rules. Total coliform is not a health threat in itself; it is used to indicate whether other potentially harmful bacteria may be present. Although the standards are given in cfu/100 mL, analytical results provided in MPN/100 mL are acceptable for comparison to the standard.

Major Ions

DEQ analyzed 16 wells for major ions, primarily those that have not been analyzed for ions in the past. Groundwater chemistry results at all wells were acceptable, with no analyte exceeding set drinking water standards (Figure 2).

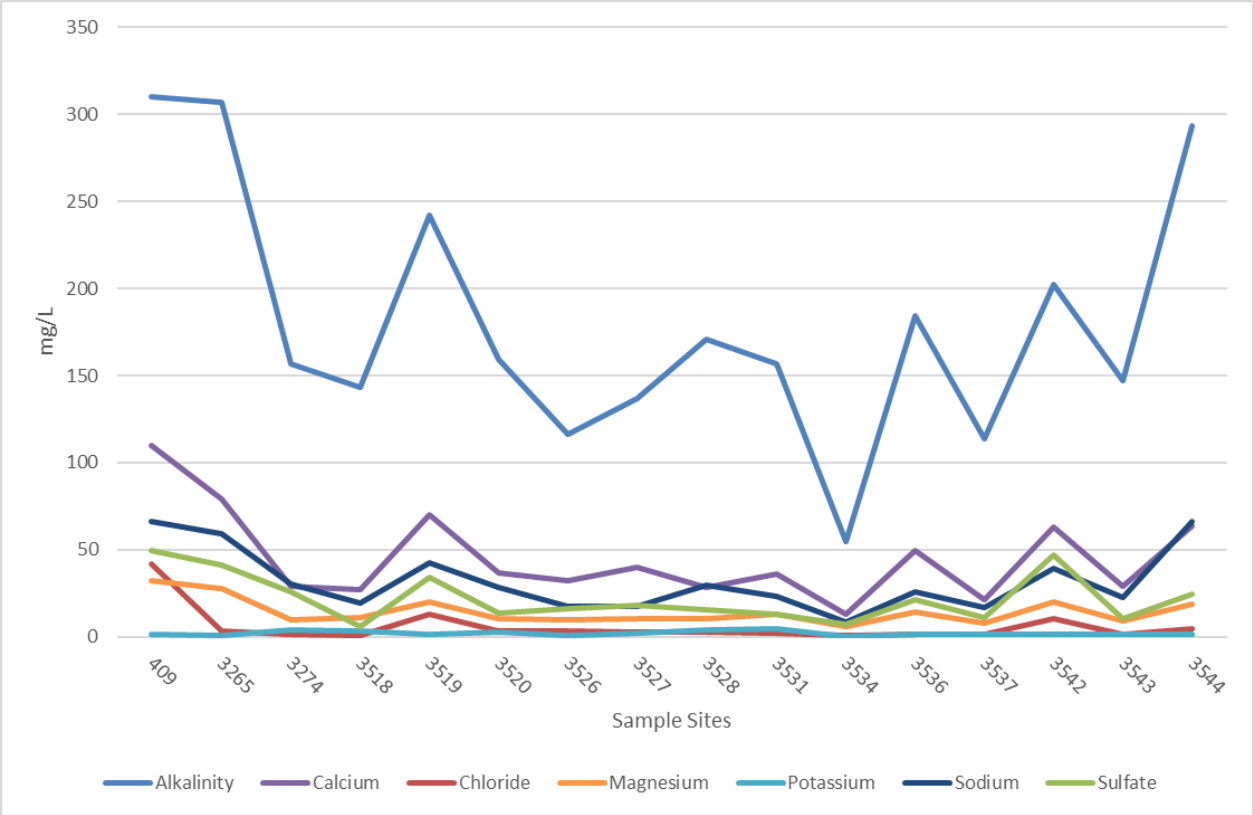


Figure 2. Major ion results for Clearwater Plateau NPA sampled in 2024.

Conclusions

Twenty-six out of the 48 wells and springs (54%) sampled in the Clearwater Plateau NPA in 2024 had nitrate concentrations over half the MCL, and 16 of those 26 exceeded the MCL of 10 mg/L. Of the 15 sites that had been previously sampled, four had increased nitrate concentrations compared to previous results, seven had lower nitrate concentrations, and four had no change. Eight wells had a positive detection for TC and one for *E. coli*. Together, these findings highlight the importance of continued monitoring and groundwater management in the Clearwater Plateau NPA. DEQ will use the results to evaluate NPAs and determine the extent and level of concern of groundwater degradation. Sampling will be conducted again in 2025.

All Clearwater Plateau NPA sampling results are available at *Ground Water Quality Monitoring and Protection*.

Contact: DEQ Lewiston Regional Office, (208) 799-4370

References

DEQ (Idaho Department of Environmental Quality). 2021. *2020 Nitrate Priority Area Delineation and Ranking Process*. Boise, ID: DEQ Water Quality Division. *https://www2.deq.idaho.gov/admin/LEIA/api/document/download/14704.*

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2024 Summary Report: Lapwai Creek Nitrate Priority Area

The Idaho Department of Environmental Quality's (DEQ's) Groundwater Quality Rule is intended to maintain and protect the existing high quality of Idaho's groundwater. By sampling and monitoring wells throughout the state, DEQ can assess water quality to aid in land use management decisions that impact groundwater.

This monitoring project is designed to provide the data necessary for evaluating trends in groundwater nitrate concentrations in and around the Lapwai Creek Nitrate Priority Area (NPA).

Background

In 2024, DEQ evaluated the water quality and sampled for various contaminants within the Lapwai Creek NPA in Nez Perce County, Idaho (Figure 1). The Lapwai Creek NPA was designated during the 2002 NPA ranking and delineation.

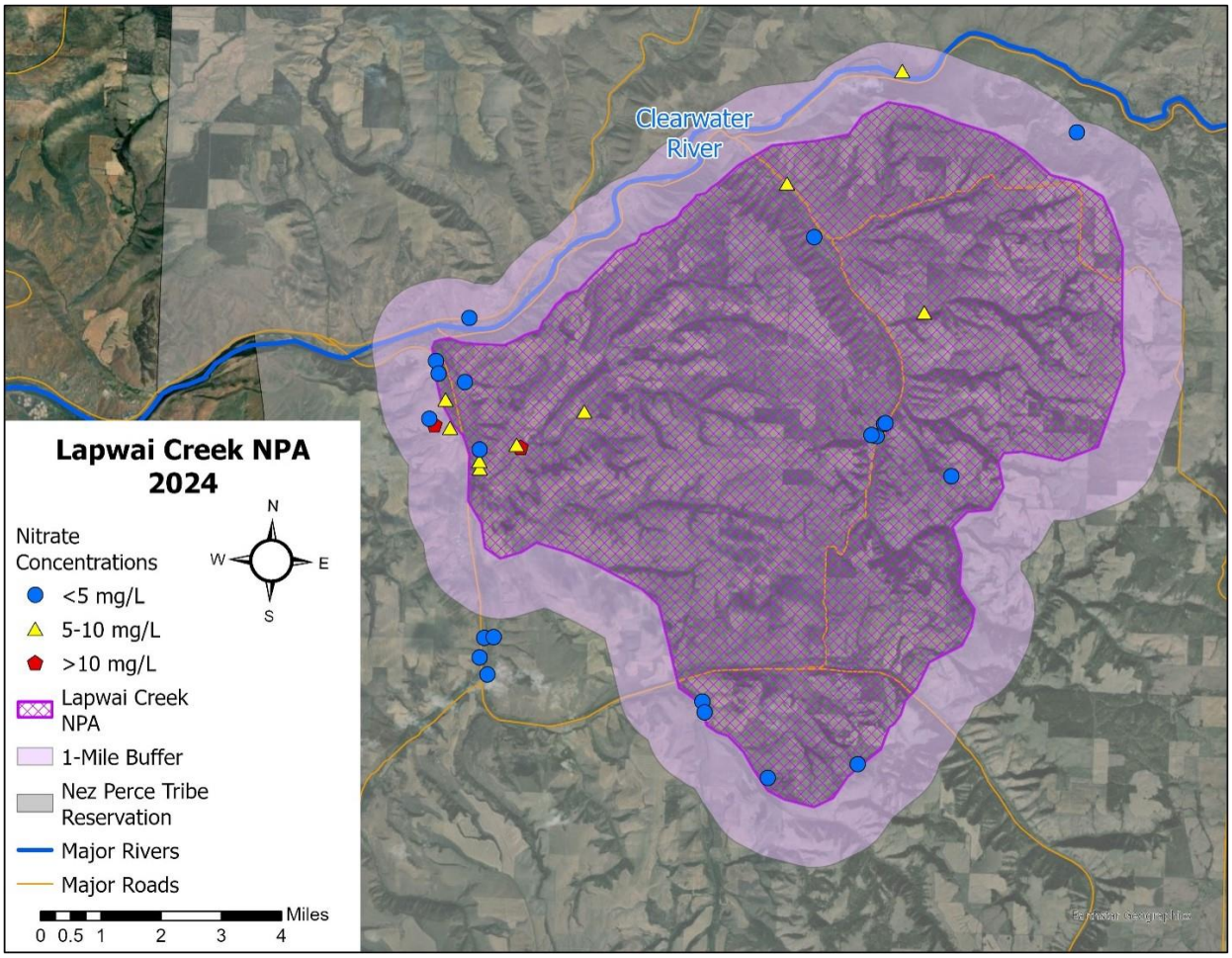


Figure 1. Locations of wells sampled in the Lapwai Creek NPA in 2024 and nitrate concentrations.

NPAs in Idaho are identified by the presence of elevated nitrate concentrations in groundwater samples collected by DEQ or other agencies. Elevated nitrate concentrations indicate that the groundwater has been impacted by a nitrate source—typically wastewater, sewage, fertilizer, or animal waste—and the groundwater aquifer is susceptible to other surface contaminants. Once an area of elevated nitrate concentrations is identified, DEQ conducts a more focused investigation by sampling domestic and irrigation wells in the area and then uses the sampling data to identify boundaries to the area of nitrate impact. NPAs throughout the state are evaluated and ranked by existing nitrate concentrations, statistical trends in the nitrate concentrations over time (if available), and local populations potentially affected. In 2020, Lapwai Creek NPA was ranked 17th in the state (out of 35 NPAs) with no change in statistical trend for nitrate concentration (DEQ 2021). The statewide rank reflects relative concern compared to other NPAs, with higher scores representing areas of greater concern. DEQ conducted monitoring within the NPA during the 2014 Cottonwood Creek Nitrate Investigation. Thanks to a partnership with the Nez Perce Tribe's Water Resources Division (WRD), 2023 was the first time the NPA was sampled in its entirety.

The project area is located within the Nez Perce Tribe Reservation, including the cities of Lapwai and Culdesac. The land use is primarily agricultural, specifically dry-land farming. Rangeland and grazing are also common in the area. The NPA is on the eastern edge of the Lewiston Basin which consists of a series of shallow perched aquifers in the Saddle Mountain and Wanapum basalt flows with sedimentary interbeds in those formations, and a deep regional basalt aquifer in the Grande Ronde Formation (Neely 2012). Well depths from groundwater sampling locations ranged from 90 feet to 1090 feet (IDWR 2025).

Drinking Water Standards

The United States Environmental Protection Agency (EPA) sets national drinking water standards for approximately 90 contaminants. The maximum contaminant level (MCL) is an enforceable standard set by EPA that defines the maximum level of a contaminant allowed in water delivered to a public water system. DEQ adopts drinking water standards, with a few exceptions, in the Ground Water Quality Rule, IDAPA 58.01.11.200. DEQ uses these standards to evaluate private well water quality.

Groundwater Monitoring Results

In 2024, DEQ sampled groundwater from 33 domestic or irrigation wells in the Lapwai Creek NPA. DEQ collected 34 samples from 33 wells. Two samples were collected from the same well, and both results are reported for site 3660. All samples were analyzed for nitrate and nitrite as nitrogen and bacteria to assess water quality in the project area. Nineteen wells were also analyzed for alkalinity and major ions —chloride, sulfate, calcium, potassium, magnesium, and sodium. The Nez Perce Tribe's WRD contributed funding for the following samples: nitrite and nitrate as nitrogen (nine samples), alkalinity (six samples), and major ions (four samples). They also ran 10 bacteria samples in their in-house lab. Fifteen of the 33 wells were previously sampled, and 18 new ones were added. DEQ provided sample results to the homeowners.

Nitrate

Nitrate is a widespread groundwater contaminant in Idaho. Common sources of nitrate include decaying plants and other organic matter, septic systems, byproducts from animal facilities, nitrogen-based fertilizers, and others. Two of the 33 sites sampled (6%) had nitrate detections over the MCL (10 milligrams per liter [mg/L]). Nine of the 33 sites (27%) had nitrate concentrations greater than 5 mg/L but below the MCL. A total of seven wells were sampled for ammonia in addition to nitrate. Ammonia concentrations for this project were all non-detect, less than 0.2 mg/L (Table 1).

Bacteria

All 33 sites were analyzed for *Escherichia coli* (*E. coli*) and total coliform (TC) bacteria. TC bacteria are common in the environment and are generally not harmful. *E. coli* is a subgroup of coliform found in greater quantities than TC in animal fecal matter. If *E. coli* is detected with TC, this indicates that contamination from animal or sewage waste is present, and disinfection is necessary to ensure the water is safe for drinking (*Coliform Bacteria Fact Sheet*). Follow up sampling is recommended to confirm the result. A bacteria sample was collected for 3665, but the lab prepared the sample incorrectly, and the sample was not analyzed. Sixteen sites (48%) had positive detections for TC. Of those positive for TC, *E. coli* was detected in three samples.

Table 1. 2024 nutrient and bacteria results—Lapwai Creek Nitrate Priority Area Groundwater Monitoring Project.

DEQ Site ID	Well Depth	Sample Date	Nutrient Concentration		Bacteria Concentrations[B]	
			Nitrate + Nitrite[A]	Ammonia	*E. coli*	Total Coliform
			mg/L	mg/L	MPN/100 mL	MPN/100 mL
Water Quality Standard:			10	No Stand.	<1	1.0
548	90	09/23/2024	ND	-	3.1	8.5
3184	Unk	09/23/2024	3.58	-	<1	<1
3340	Unk	09/24/2024	6.81	-	<1	<1
3341	Unk	09/24/2024	8.41	-	<1	<1
3342	Unk	09/25/2024	1.18	-	<1	280.9
3407	152	09/24/2024	6.28	-	<1	3.1
3408	145	09/24/2024	7.00	-	<1	<1
3412	97	09/24/2024	3.72	-	<1	<1
3414	1090	09/25/2024	3.69	-	<1	<1
3420	135	09/25/2024	ND	-	<1	<1
3424	240	09/24/2024	13.70	-	<1	<1
3425	375	09/30/2024	4.81	-	<1	<1
3426	500	09/23/2024	ND	-	<1	<1
3428	240	09/23/2024	2.49	-	<1	<1
3429	110	09/23/2024	1.58	-	<1	1.0
3430	220	09/23/2024	5.18	-	<1	1.0
3436	132	10/01/2024	ND	-	<1	<1
3439	Unk	10/01/2024	5.34	-	<1	<1
3441	215	09/24/2024	12.00	-	<1	<1
3442	220	09/24/2024	9.60	-	<1	25.3

DEQ Site ID	Well Depth	Sample Date	Nutrient Concentration		Bacteria Concentrations[B]	
			Nitrate + Nitrite[A]	Ammonia	*E. coli*	Total Coliform
			mg/L	mg/L	MPN/100 mL	MPN/100 mL
Water Quality Standard:			10	No Stand.	<1	1.0
3659	Unk	09/25/2024	2.68	-	<1	<1
3660	Unk	09/25/2024	2.18	-	1.0	42.8
3660	Unk	09/25/2024	2.23	-	1.0	50.4
3661	Unk	09/30/2024	ND	ND	<1	4.1
3662	Unk	09/30/2024	ND	ND	<1	65.0
3663	Unk	09/30/2024	2.87	-	<1	24.1
3664	103	09/30/2024	ND	ND	<1	1.0
3665	Unk	09/30/2024	1.82	ND	-	-
3666	Unk	10/01/2024	2.81	-	3.1	5.2
3667	Unk	10/08/2024	7.32	-	<1	<1
3668	Unk	10/08/2024	ND	ND	<1	436.0
3669	Unk	10/08/2024	7.82	-	<1	7.5
3670	Unk	10/08/2024	ND	ND	<1	1.0
3671	Unk	10/08/2024	ND	ND	<1	7.5

Notes: mg/L = milligrams per liter; MPN/100 mL = most probable number per 100 milliliters; Unk=Unknown. Well log not found; (-) =Not Analyzed; ND = not detected; No Stand = No Primary or Secondary Drinking Water Regulation or Idaho Ground Water Quality Rule standard currently established;

[A] Contaminant with a National Primary Drinking Water Regulation standard.
[B] Total coliform and *E. coli* standards are from the Idaho Ground Water Quality Rule (IDAPA 58.01.11.200). An exceedance of the primary ground water quality standard for total coliform (indicated by gray shaded numbers) is not a violation of these rules. Total coliform is not a health threat in itself; it is used to indicate whether other potentially harmful bacteria may be present. Although the standards are given in cfu/100 mL, analytical results provided in MPN/100 mL are acceptable for comparison to the standard.

Major Ions

Nineteen wells were analyzed for major ions, primarily those that have not been sampled for ions in the past. Groundwater chemistry results at all wells were acceptable, with no analyte exceeding any secondary drinking water standards (Figure 2).

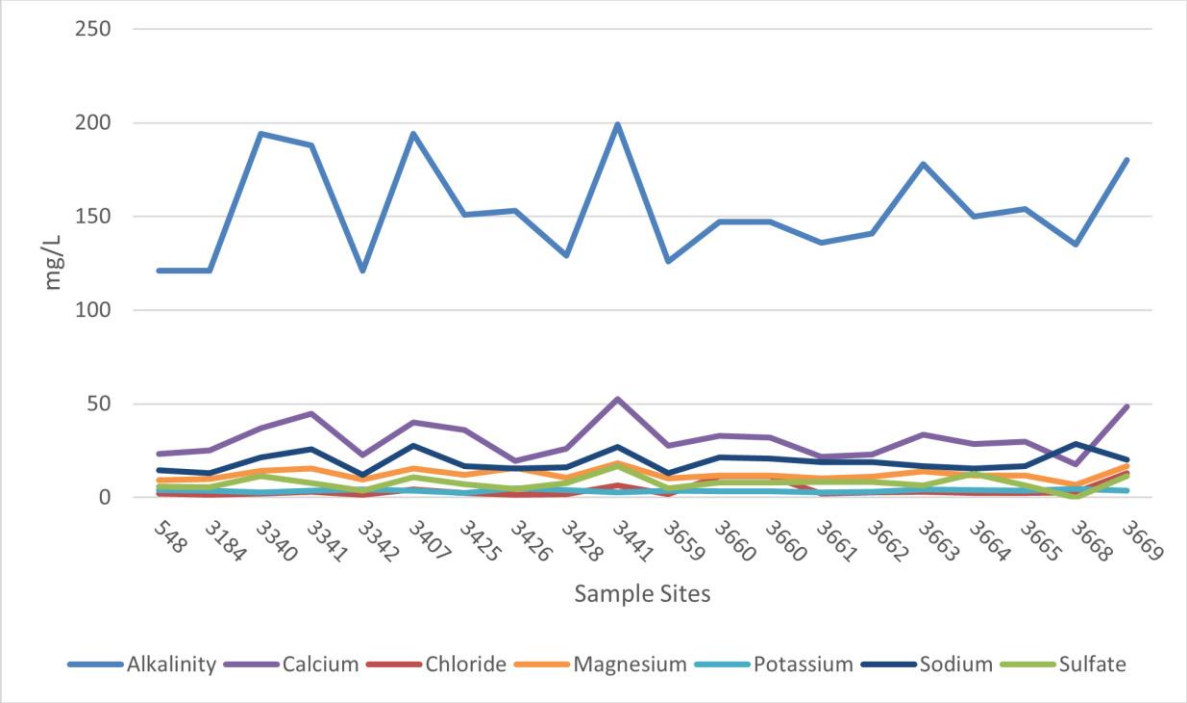


Figure 2. Major ion results for Lapwai Creek NPA sampled in 2024.

Conclusions

Eleven out of the 33 sites sampled (33%) in the Lapwai Creek NPA in 2024 had nitrate concentrations over half the MCL and two of those 11 exceeded the MCL of 10 mg/L. Of the 15 sites that had been previously sampled, five had increased nitrate results compared to previous results, seven had lower nitrate results, and three had no change. Sixteen sites had positive detections for TC and three of those 16 had positive detections for *E. coli*. Together, these findings highlight the importance of continued monitoring and management in the Lapwai Creek NPA. This project was completed thanks to the partnership with the Nez Perce Tribe. DEQ plans to sample the Lapwai Creek NPA again in 2025.

All Lapwai Creek NPA sampling results are available at *Ground Water Quality Monitoring and Protection*.

Contact: DEQ Lewiston Regional Office, (208) 799-4370

References

DEQ (Idaho Department of Environmental Quality). 2021. *2020 Nitrate Priority Area Delineation and Ranking Process. Boise: Idaho Department of Environmental Quality Water Quality Division*. Boise, ID: DEQ. *https://www2.deq.idaho.gov/admin/LEIA/api/document/download/14704.*

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Neely, K.W. 2012. *Summary of Groundwater Level Data and Trends in the Lindsay Creek Groundwater Management Area and the Tammany Creek Area, 2012*. Boise, ID: Idaho Department of Water Resources.

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2024 Summary Report: Lindsay Creek Nitrate Priority Area

The Idaho Department of Environmental Quality's (DEQ's) Groundwater Quality Rule is intended to maintain and protect the existing high quality of Idaho's groundwater. By sampling and monitoring wells throughout the state, DEQ can assess water quality to aid in land use management decisions that impact groundwater.

This monitoring project is designed to provide the data necessary for evaluating trends in groundwater nitrate concentrations in and around the Lindsay Creek Nitrate Priority Area (NPA).

Background

In 2024, DEQ evaluated the water quality and sampled for various contaminants within the Lindsay Creek NPA in Nez Perce County, Idaho (Figure 1). The Lindsay Creek NPA, formerly named the Project of Tammany and Lindsay Creeks, was designated and renamed during the 2008 NPA ranking and delineation update.

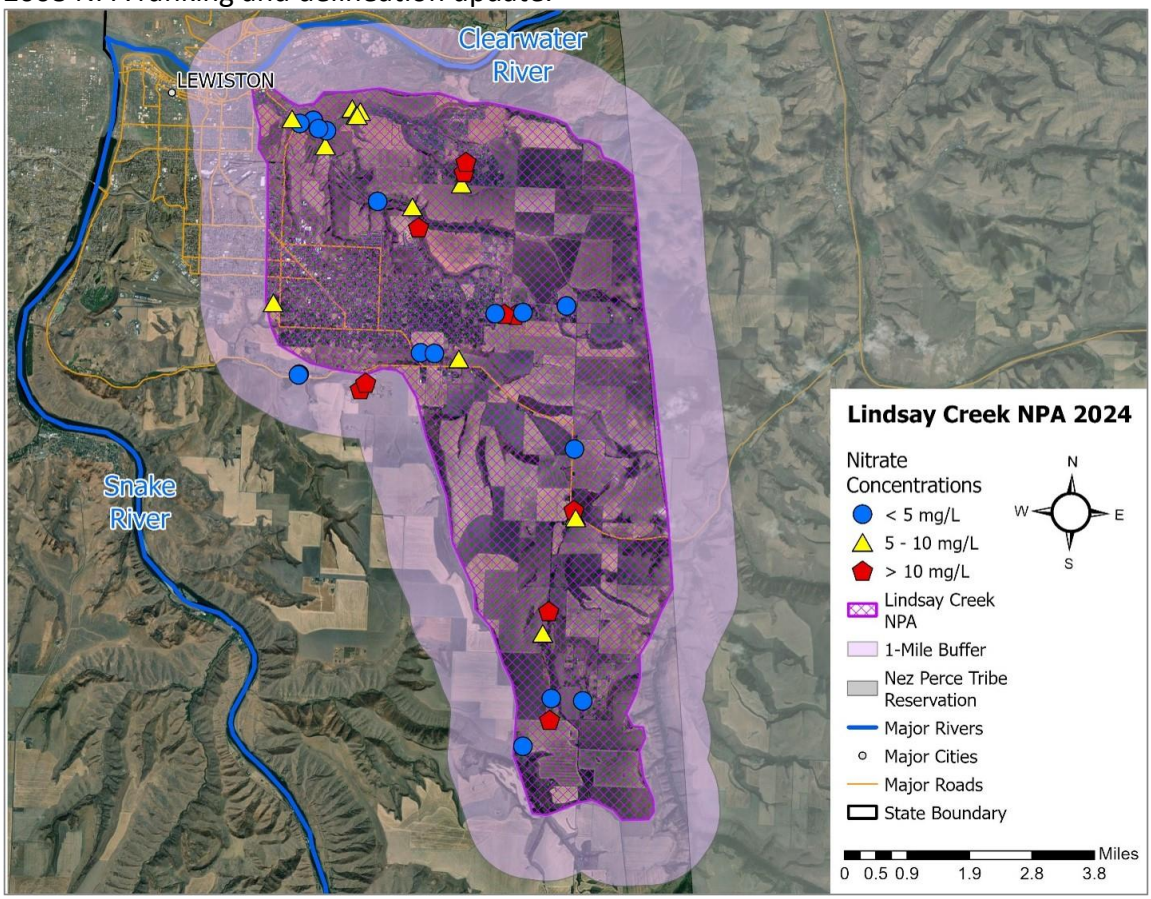


Figure 1. Locations of wells sampled in the Lindsay Creek NPA in 2024 and nitrate concentrations.

NPAs in Idaho are identified by the presence of elevated nitrate concentrations in groundwater samples collected by DEQ or other agencies. Elevated nitrate concentrations indicate that the

groundwater has been impacted by a nitrate source—typically wastewater, sewage, fertilizer, or animal waste—and the groundwater aquifer is susceptible to other surface contaminants. Once an area of elevated nitrate concentrations is identified, DEQ conducts a more focused investigation by sampling domestic and irrigation wells in the area and then uses the sampling data to identify boundaries to the area of nitrate impact. NPAs throughout the state are evaluated and ranked by existing nitrate concentrations, statistical trends in the nitrate concentrations over time (if available), and local populations potentially affected. In 2020, the Lindsay Creek NPA was ranked 20th in the state (out of 35 NPAs) with no change in statistical trend for nitrate concentration (DEQ 2021). The statewide rank reflects relative concern compared to other NPAs, with higher scores representing areas of greater concern. This NPA was previously sampled quarterly from 2008–2015, but with the limited seasonal variability of nitrate concentrations observed in most wells, monitoring was reduced to once per year. Due to the pandemic and staffing limitations, no monitoring was completed in 2021, but it resumed in 2022.

The project area is located east and southeast of Lewiston, Idaho. The land use is primarily agricultural, specifically dry-land farming. Rangeland and grazing are also common in the area. The area is underlain by the Columbia River Basalts and consists of units that formed when lava flows filled in the preexisting topography during the Miocene era (Stevens et al. 2003). A thin layer of loess forms the present-day land surface for most of the area. Groundwater in the area is mostly found in the basalt and occasionally in the alluvial valley sediments and basement rocks. Groundwater generally flows to the north and eventually discharges into the Clearwater River (Hagan 2003). Well depths from groundwater sampling locations ranged from 16 feet to 1,125 feet (IDWR 2025).

Drinking Water Standards

The United States Environmental Protection Agency (EPA) sets national drinking water standards for approximately 90 contaminants. The maximum contaminant level (MCL) is an enforceable standard set by EPA that defines the maximum level of a contaminant allowed in water delivered to a public water system. DEQ adopts drinking water standards, with a few exceptions, in the Ground Water Quality Rule, IDAPA 58.01.11.200. DEQ uses these standards to evaluate private well water quality.

Groundwater Monitoring Results

In 2024, DEQ sampled groundwater from 39 sites (35 domestic or irrigation wells and four springs) in the Lindsay Creek NPA. Samples were analyzed for nitrate and nitrite as nitrogen and bacteria to assess water quality in the project area. Sixteen wells were also analyzed for major ions—alkalinity, chloride, sulfate, calcium, potassium, magnesium, and sodium. Twenty-nine of the sites had been previously sampled, and 10 new ones were added. DEQ provided sample results to the homeowners.

Nitrate

Nitrate is a widespread groundwater contaminant in Idaho. Common sources of nitrate include decaying plants and other organic matter, septic systems, byproducts from animal facilities, nitrogen-based fertilizers, and others. Ten of the 39 sources sampled (26%) had nitrate concentrations over the MCL (10 milligrams per liter [mg/L]). Fourteen of the 39 sources (36%) had nitrate concentrations greater than 5 mg/L but below the MCL. Three wells were sampled for ammonia in addition to nitrate. Ammonia concentrations for this project were all non-detect, less than 0.2 mg/L (Table 1).

Bacteria

All 39 sites were analyzed for *Escherichia coli* (*E. coli*) and total coliform (TC) bacteria. TC bacteria are common in the environment and are generally not harmful. *E. coli* is a subgroup of coliform found in greater quantities than TC in animal fecal matter. If *E. coli* is detected with TC, this indicates that contamination from animal or sewage waste is present and that disinfection is necessary to ensure the water is safe for drinking (*Coliform Bacteria Fact Sheet*). Follow up sampling is recommended to confirm the result. Eighteen sites (46%) had positive detections for TC, and two of those eighteen were also positive for *E. coli*.

Table 1. 2024 nutrient and bacteria results—Lindsay Creek Nitrate Priority Area Groundwater Monitoring Project.

DEQ Site ID	Well Depth	Sample Date	Nutrient Concentration		Bacteria Concentrations[B]	
			Nitrate + Nitrite[A]	Ammonia	*E. coli*	Total Coliform
			mg/L	mg/L	MPN/100 mL	MPN/100 mL
Water Quality Standard:			10	No Stand.	<1	1.0
533	225	10/17/2024	11.3	-	<1	<1
696	Unk	10/22/2024	ND	-	<1	<1
699	285	10/17/2024	ND	-	<1	<1
1034	Unk	10/22/2024	ND	-	<1	<1
1037	420	10/21/2024	ND	-	<1	1.0
1038	150	10/23/2024	9.64	-	<1	<1
1225	16	10/17/2024	6.88	-	<1	37.9
1233	Unk	10/17/2024	5.92	-	<1	98.5
1241	Unk	10/22/2024	ND	-	<1	3.1
1253	56	10/22/2024	8.34	-	<1	<1
1312	1025	10/15/2024	ND	-	<1	7.2
1315	589	10/15/2024	12.7	-	<1	58.3
2655	203	10/17/2024	19.9	-	<1	1.0
2880	Unk	10/16/2024	9.74	-	<1	<1
3239	290	10/23/2024	5.71	-	<1	<1
3240	303	10/23/2024	12.6	-	<1	9.7
3241	300	10/15/2024	9.44	-	<1	4.0

DEQ Site ID	Well Depth	Sample Date	Nutrient Concentration		Bacteria Concentrations[B]	
			Nitrate + Nitrite[A]	Ammonia	*E. coli*	Total Coliform
			mg/L	mg/L	MPN/100 mL	MPN/100 mL
Water Quality Standard:			10	No Stand.	<1	1.0
3242	310	10/15/2024	ND	ND	<1	10.9
3243	425	10/17/2024	4.37	-	<1	<1
3244	490	10/23/2024	ND	-	<1	<1
3245	173	10/22/2024	13.3	-	<1	<1
3246	229	10/22/2024	14.3	-	<1	1.0
3258	230	10/16/2024	7.56	-	<1	<1
3259	275	10/16/2024	6.86	-	<1	<1
3263	150	10/16/2024	18.8	-	<1	<1
3269	540	10/21/2024	ND	ND	<1	<1
3271	Unk	10/21/2024	9.43	-	<1	<1
3279	370	10/16/2024	ND	-	<1	86
3448	850	10/17/2024	0.131	-	1.0	2.0
3702	1125	10/15/2024	ND	-	<1	2.0
3703	Unk	10/15/2024	10.8	-	<1	2.0
3704	Unk	10/16/2024	10.1	-	<1	<1
3705	Unk	10/16/2024	8.84	-	<1	<1
3706	Unk	10/16/2024	9.01	-	<1	45
3707	875	10/17/2024	ND	-	<1	<1
3708	680	10/22/2024	ND	-	<1	<1
3709	450	10/22/2024	5.26	ND	<1	<1
3710	304	10/23/2024	5.67	-	<1	517.2
3711	Unk	10/23/2024	15.3	-	40.4	50.4

Notes: mg/L = milligrams per liter; MPN/100 mL = most probable number per 100 milliliters; Unk=Unknown. Well log not found; (-) =Not Analyzed; ND = Non-Detect; No Stand = No Primary or Secondary Drinking Water Regulation or Idaho Ground Water Quality Rule standard currently established;

[A] Contaminant with a National Primary Drinking Water Regulation standard.

[B] Total coliform and *E. coli* standards are from the Idaho Ground Water Quality Rule (IDAPA 58.01.11.200). An exceedance of the primary ground water quality standard for total coliform (indicated by gray shaded numbers) is not a violation of these rules. Total coliform is not a health threat in itself; it is used to indicate whether other potentially harmful bacteria may be present. Although the standards are given in cfu/100 mL, analytical results provided in MPN/100 mL are acceptable for comparison to the standard.

Major Ions

DEQ analyzed sixteen wells for major ions, primarily those that have not been sampled for ions in the past. Groundwater chemistry results at all wells were acceptable, with no analyte exceeding any secondary drinking water standards (Figure 2).

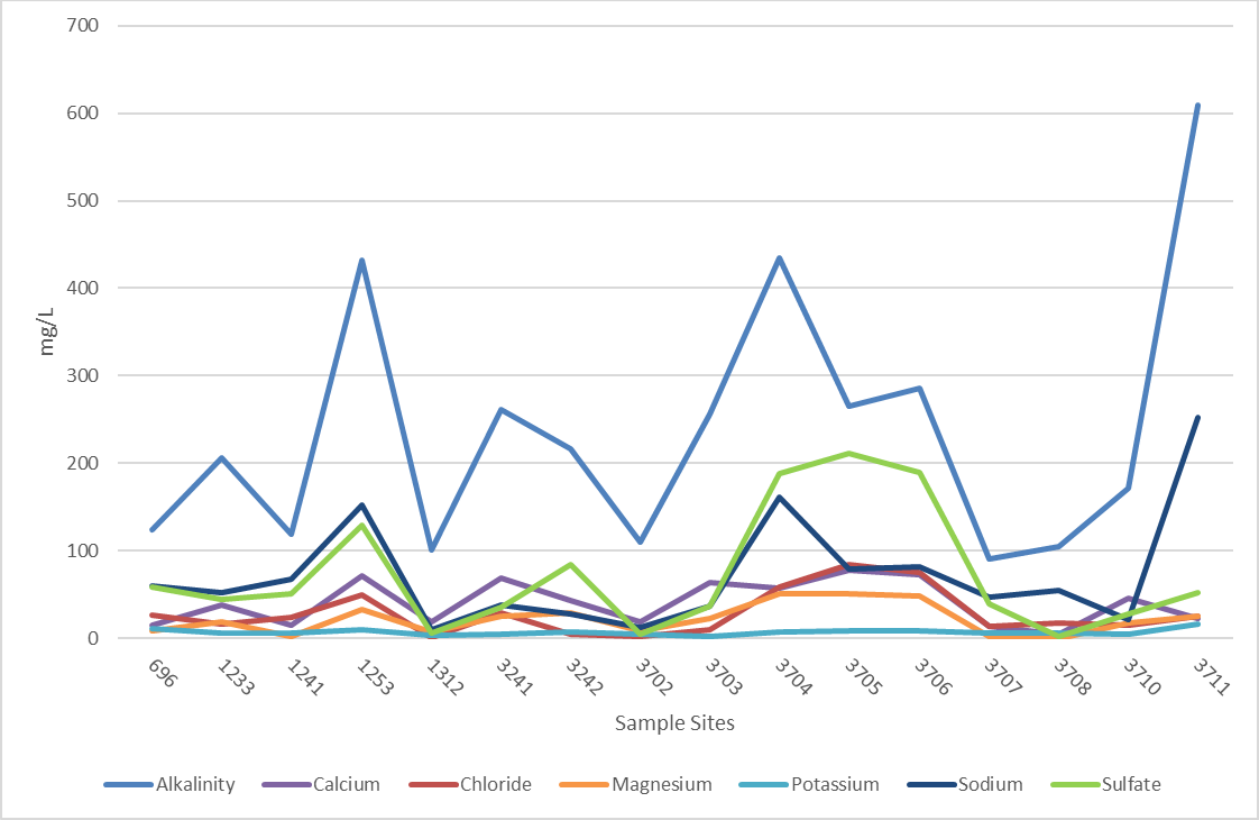


Figure 2. Major ion results for Lindsay Creek NPA sampled in 2024.

Conclusions

Twenty-four out of the 39 sites (62%) sampled in the Lindsay Creek NPA in 2024 had nitrate concentrations over half the MCL, and 10 of those 24 exceeded the MCL of 10 mg/L. Of the 29 previously sampled sites, 11 had increased nitrate results compared to previous results, 9 had lower nitrate results, and 9 had no change. Eighteen sites had a positive detection for TC and two for *E. coli*. Together, these findings highlight the importance of continued monitoring in the Lindsay Creek NPA. DEQ will use the results to evaluate NPAs and determine the extent and level of concern of groundwater degradation. Sampling will be conducted again in 2025.

All Lindsay Creek NPA sampling results are available at *Ground Water Quality Monitoring and Protection*.

Contact: DEQ Lewiston Regional Office, (208) 799-4370

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STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

2024 Summary Report: Emmett North Bench Nitrate Priority Area

The Idaho Department of Environmental Quality's (DEQ's) Groundwater Quality Rule is intended to maintain and protect the existing high quality of Idaho's groundwater. By sampling and monitoring wells throughout the state, DEQ can assess water quality to aid in land use management decisions that impact groundwater.

This monitoring project is designed to provide the data necessary for evaluating trends in groundwater nitrate concentrations in and around the Emmett North Bench Nitrate Priority Area (NPA).

Background

In 2024, DEQ evaluated the water quality and sampled for various contaminants within the Emmett North Bench NPA in Gem County, Idaho (Figure 1). This NPA was previously sampled in 2014 and 2019 as part of DEQ's statewide NPA evaluation process.

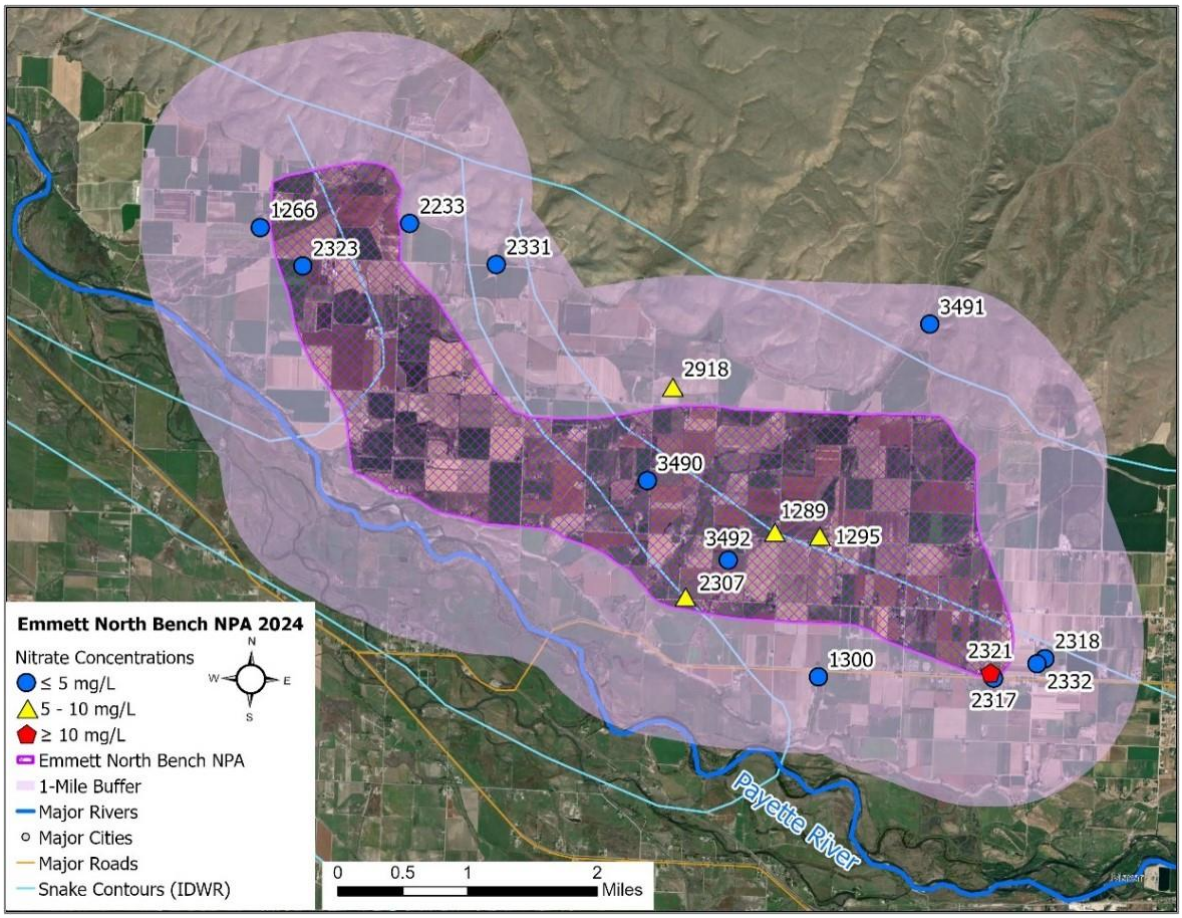


Figure 1. Locations of wells sampled in the Emmett North Bench NPA in 2024 and nitrate concentrations.

NPAs in Idaho are identified by the presence of elevated nitrate concentrations in groundwater samples collected by DEQ or other agencies. Elevated nitrate concentrations indicate that the groundwater has been impacted by a nitrate source—typically wastewater, sewage, fertilizer, or animal waste—and the groundwater aquifer is susceptible to other surface contaminants. Once an area of elevated nitrate concentrations is identified, DEQ conducts a more focused investigation by sampling domestic and irrigation wells in the area and then uses the sampling data to identify boundaries to the area of nitrate impact. NPAs throughout the state are evaluated and ranked by existing nitrate concentrations, statistical trends in the nitrate concentrations over time (if available), and local populations potentially affected. In 2020, DEQ ranked the Emmett North Bench NPA 35th in the state (out of 35 NPAs), with a statistically decreasing trend in nitrate concentrations (DEQ 2021). The statewide rank reflects relative concern compared to other NPAs, with higher scores representing areas of greater concern.

The Emmett North Bench NPA lies in southwestern Gem County within the Western Snake River Plain. Groundwater flow across the NPA trends southwest towards the Payette River (see Figure 1 groundwater contours). Land uses in the Emmett North Bench NPA are generally agricultural and residential. Residents within the NPA rely on domestic wells and individual wastewater disposal (septic) systems.

Well Driller's reports filed with the Idaho Department of Water Resources (IDWR) reported that the depth of the wells sampled in the project area range from 43 to 149 feet deep (IDWR 2025). General lithology of the area is interbedded layers of gravel, sand, and clay, with groundwater sourced in sand and gravel aquifers (Graham and Campbell 1981).

Drinking Water Standards

The United States Environmental Protection Agency (EPA) sets national drinking water standards for approximately 90 contaminants. The maximum contaminant level (MCL) is an enforceable standard set by EPA that defines the maximum level of a contaminant allowed in water delivered to a public water system. DEQ adopts drinking water standards, with a few exceptions, in the Ground Water Quality Rule, IDAPA 58.01.11.200. DEQ uses these standards to evaluate private well water quality.

Groundwater Monitoring Results

In 2024, DEQ sampled groundwater from 16 domestic and irrigation wells in the Emmett North Bench NPA. DEQ analyzed samples for nitrate, nitrite, nitrogen isotope ($\delta^{15}N$), uranium, arsenic, alkalinity, and bacteria to assess water quality in the project area. Twelve wells were previously sampled in 2019, and eight of those 12 were sampled in both 2014 and 2019. Four wells were sampled for the first time in 2024. DEQ provided sample results to homeowners.

Nitrate

Nitrate is a widespread groundwater contaminant in Idaho. Common sources of nitrate include decaying plants and other organic matter, septic systems, byproducts from animal facilities, nitrogen-based fertilizers, and others. One well (6%) sampled in the Emmett North Bench NPA

had a nitrate detection over the MCL (10 milligrams per liter [mg/L]). Four more (25%) had nitrate concentrations greater than half the MCL (5 mg/L). Two of the 16 wells (13%) had detections for nitrite, but neither were above the nitrite MCL of 1 mg/L (Table 1).

DEQ also analyzed the five wells with nitrate detections of 5 mg/L or greater for $\delta^{15}N$. $\delta^{15}N$ is frequently used as an environmental tracer and can provide information on the origin and fate of nitrogen in a sample. One well (Well 1289) had an isotope ratio in the -4 per mil (‰) to +4‰ range, indicating the nitrate source was likely commercial fertilizer. The other four wells were between 4.1‰ and 6.7‰, consistent with a mix of organic sources. No nitrogen isotope results were above 9‰, which would point to waste sources (Seiler 1996).

Table 1. Nutrient, isotope, and bacteria concentrations in the Emmett North Bench NPA.

DEQ Site ID	Well Depth	Sample Date	Nutrient Concentration			Isotopes	Bacteria Concentrations[B]	
			Nitrite[A]	Nitrate[A]	Ammonia	N-15/14	*E. coli*	Total Coliform
			mg/L	mg/L	mg/L	‰	MPN/100 mL	MPN/100 mL
Water Quality Standard:			1.0	10	No Stand.	No Stand.	<1	1.0
1266	96	04/17/2024	<0.30	3.43	—	—	<1.0	<1.0
1289	55	04/17/2024	<0.30	5.60	—	3.4	<1.0	<1.0
1295	68	04/17/2024	<0.30	9.41	—	6.7	<1.0	<1.0
1300	78	04/22/2024	<0.30	2.09	—	—	<1.0	<1.0
2233	109	04/17/2024	<0.30	3.22	—	—	<1.0	<1.0
2307	98	04/22/2024	<0.30	5.49	—	4.1	<1.0	<1.0
2317	129	04/22/2024	<0.30	2.83	—	—	<1.0	<1.0
2318	98	04/22/2024	<0.30	0.494	0.890	—	<1.0	<1.0
2321	117	04/22/2024	<0.30	19.30	—	4.5	<1.0	<1.0
2323	73	04/17/2024	<0.30	4.09	—	—	<1.0	5.0
2331	86	04/17/2024	0.0459	2.88	—	—	<1.0	<1.0
2332	117	04/22/2024	<0.30	0.057	0.066	—	<1.0	<1.0
2918	59	04/17/2024	0.0479	7.72	—	5.6	<1.0	<1.0
3490	60	04/17/2024	<0.30	3.31	—	—	<1.0	<1.0
3491	149	04/22/2024	<0.30	0.480	—	—	<1.0	<1.0
3492	43	04/22/2024	<0.30	<0.18	0.048	—	<1.0	<1.0

Notes: mg/L = milligrams per liter; ‰ = permil; (—)=Not Analyzed; No Stand = No Primary or Secondary Drinking Water Regulation or Idaho Ground Water Quality Rule standard currently established; MPN/100 mL = most probable number per 100 milliliters;

[A] Contaminant with a National Primary Drinking Water Regulation standard.

[B] Total coliform and *E. coli* standards are from the Idaho Ground Water Quality Rule (IDAPA 58.01.11.200). An exceedance of the primary ground water quality standard for total coliform (indicated by gray shaded numbers) is not a violation of these rules. Total coliform is not a health threat in itself; it is used to indicate whether other potentially harmful bacteria may be present. Although the standards are given in cfu/100 mL, analytical results provided in MPN/100 mL are acceptable for comparison to the standard.

Bacteria

DEQ analyzed all 16 wells for *Escherichia coli* (*E. coli*) and total coliform (TC) bacteria. TC bacteria are common in the environment and are generally not harmful. *E. coli* is a subgroup of

coliform found in greater quantities than TC in animal fecal matter. If *E. coli* is detected with TC, this indicates that contamination from animal or sewage waste is present, and disinfection is necessary to ensure the water is safe for drinking (*Coliform Bacteria Fact Sheet*). One well (6%) had a positive detection for TC, but *E. coli* was not detected in any sample. Follow up sampling is recommended to confirm the detection.

Arsenic

As a naturally occurring element in the earth's crust, trace amounts of arsenic are found in all living matter, rocks, soil, water, and air. Water that encounters rock formations can dissolve arsenic and carry it into underground aquifers, streams, and rivers that may be used as drinking water sources. In the Emmett North Bench NPA, five out of 16 wells (31%) were over the drinking water MCL (0.01 mg/L) for arsenic. Data compiled by the IDWR shows generally higher arsenic concentrations in southwestern Idaho.

Uranium

Uranium is a naturally occurring element in rock that can percolate into groundwater after erosion. Fifteen out of 16 wells (94%) in the Emmett North Bench NPA had uranium detections, but no wells had concentrations over the drinking water MCL (30 micrograms per liter).

Conclusions

One out of 16 wells (6%) sampled in the Emmett North Bench NPA in 2024 was above the MCL of 10 mg/L for nitrate. Four more wells had nitrate concentrations greater than half the MCL. One well tested positive for TC, but no wells had detections of *E. coli.* Five wells were also above the arsenic MCL and fifteen above the uranium MCL, consistent with generally known higher arsenic and uranium concentrations observed in parts of southwest Idaho. Together, these findings highlight the importance of continued monitoring and management in the Emmett North Bench NPA. DEQ will use the results to evaluate NPAs and determine the extent and level of concern of groundwater degradation. Sampling will be conducted again in 2029.

All Emmett North Bench NPA sampling results are available at *Ground Water Quality Monitoring and Protection*.

Contact: DEQ Boise Regional Office, (208) 373-0550

References

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STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

2024 Summary Report: Glenns Ferry Nitrate Priority Area

The Idaho Department of Environmental Quality's (DEQ's) Groundwater Quality Rule is intended to maintain and protect the existing high quality of Idaho's groundwater. By sampling and monitoring wells throughout the state, DEQ can assess water quality to aid in land use management decisions that impact groundwater.

This monitoring project is designed to provide the data necessary for evaluating trends in groundwater nitrate concentrations in and around the Glenns Ferry Nitrate Priority Area (NPA).

Background

In 2024, DEQ evaluated the water quality and sampled for various contaminants within the Glenns Ferry NPA in Elmore County, Idaho (Figure 1). This NPA was previously sampled in 2014 and 2019 as part of DEQ's NPA evaluation process.

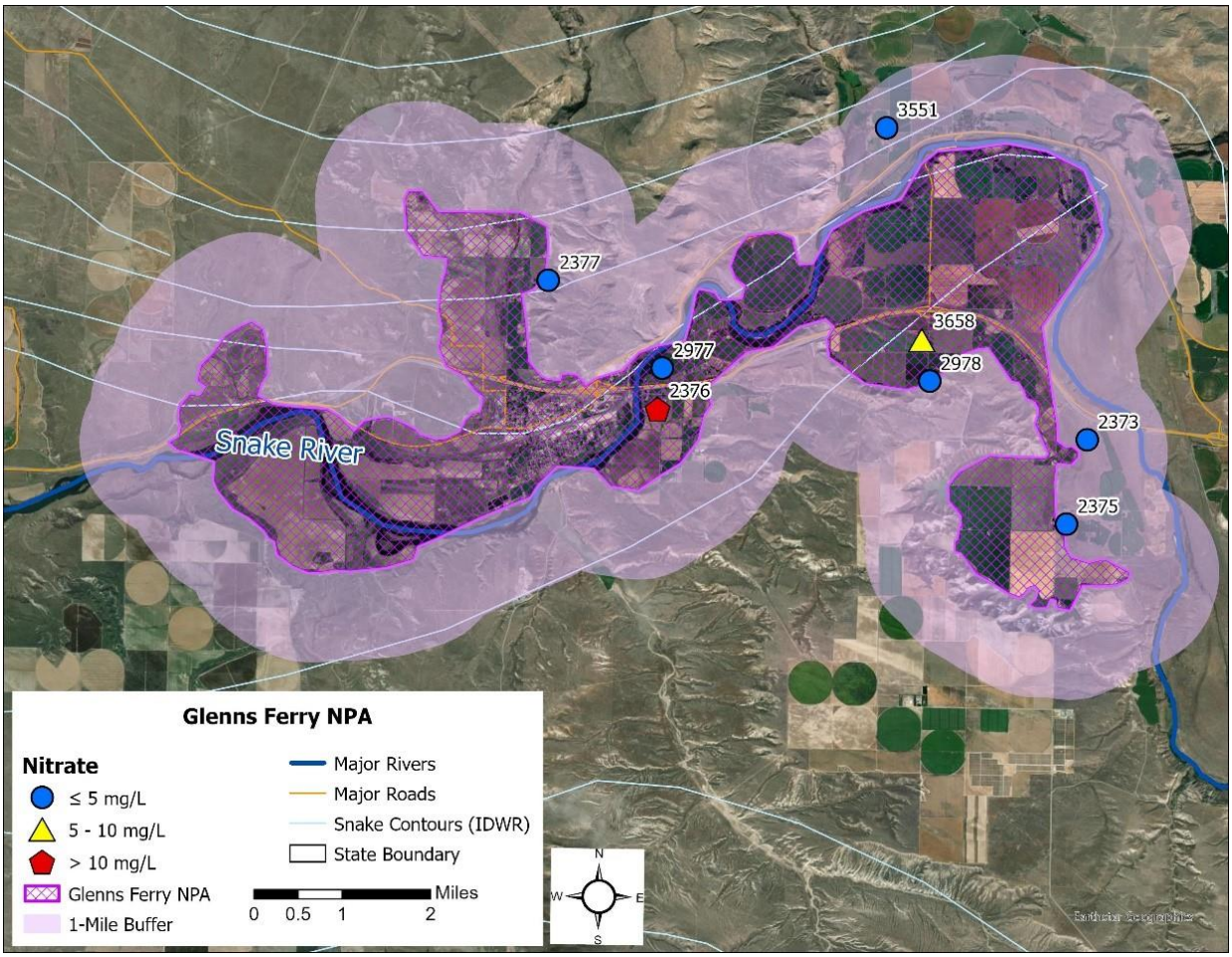


Figure 1. Locations of wells sampled in the Glenns Ferry NPA in 2024 and nitrate concentrations.

NPAs in Idaho are identified by the presence of elevated nitrate concentrations in groundwater samples collected by DEQ or other agencies. Elevated nitrate concentrations indicate that the groundwater has been impacted by a nitrate source—typically wastewater, sewage, fertilizer, or animal waste—and the groundwater aquifer is susceptible to other surface contaminants. Once an area of elevated nitrate concentrations is identified, DEQ conducts a more focused investigation by sampling domestic and irrigation wells in the area and then uses the sampling data to identify boundaries to the area of nitrate impact. NPAs throughout the state are evaluated and ranked by existing nitrate concentrations, statistical trends in the nitrate concentrations over time (if available), and local populations potentially affected. In 2020, the Glenns Ferry NPA was ranked 21st in the state (out of 35 NPAs), but a statistical trend of nitrate concentrations in groundwater (increasing, decreasing, or stable) was not determined (DEQ 2021). The statewide rank reflects relative concern compared to other NPAs, with higher scores representing areas of greater concern.

The Glenns Ferry NPA lies in southern Elmore County, Idaho, along the northeast margin of the central western Snake River Plain (Shervais et al. 2002). Groundwater flow on either side of the NPA trends toward the Snake River, which cuts through the middle of the NPA (see Figure 1 groundwater contours). Land uses in the Glenns Ferry NPA are generally agricultural and residential, with irrigated cropland and cattle grazing being the primary agricultural uses. The residences within the NPA are typically served by private wells and individual wastewater disposal (septic) systems.

Well Driller's Reports filed with the Idaho Department of Water Resources (IDWR) reported that the depth of the eight wells sampled in the Glenns Ferry NPA ranged from 120 to 600 feet (average of approximately 303 feet) and depths to groundwater ranged from 100 to 390 feet (IDWR 2025). General lithology of the area is interbedded layers of gravel, sand, and clay, with groundwater sourced in sand and gravel aquifers (Graham and Campbell 1981).

Drinking Water Standards

The United States Environmental Protection Agency (EPA) sets national drinking water standards for approximately 90 contaminants. The maximum contaminant level (MCL) is an enforceable standard set by EPA that defines the maximum level of a contaminant allowed in water delivered to a public water system. DEQ adopts drinking water standards, with a few exceptions, in the Ground Water Quality Rule, IDAPA 58.01.11.200. DEQ uses these standards to evaluate private well water quality.

Groundwater Monitoring Results

In 2024, DEQ sampled groundwater from eight domestic wells in the Glenns Ferry NPA. DEQ analyzed samples for nitrate, nitrite, nitrogen isotope ($\delta^{15}N$), uranium, arsenic, alkalinity, and bacteria to assess water quality in the project area. Two wells were previously sampled in both 2014 and 2019, two were sampled only in 2014, and two more were sampled only in 2019. Two wells were sampled for the first time in 2024. DEQ provided sample results to homeowners.

Nitrate and Nitrite

Nitrate is a widespread groundwater contaminant in Idaho. Common sources of nitrate include decaying plants and other organic matter, septic systems, byproducts from animal facilities, nitrogen-based fertilizers, and others. One well (13%) sampled in the Glenns Ferry NPA had a nitrate concentration over the MCL (10 milligrams per liter [mg/L]). Another well had a nitrate concentration greater than half the MCL. DEQ found no nitrite in any of the wells but detected ammonia in four wells (2373, 2377, 2977, and 2978).

DEQ also analyzed wells with nitrate detections of 5 mg/L or greater for $\delta^{15}N$ (2 wells). $\delta^{15}N$ is frequently used as an environmental tracer and can provide information on the origin and fate of nitrogen in a sample. Both wells had ratios from -4 per mil (‰) to +4‰, indicating the nitrate source was likely commercial fertilizer (Seiler 1996).

Bacteria

DEQ analyzed all eight wells for *Escherichia coli* (*E. coli*) and total coliform (TC) bacteria. TC bacteria are common in the environment and are generally not harmful. *E. coli* is a subgroup of coliform found in greater quantities than TC in animal fecal matter. If *E. coli* is detected with TC, this indicates that contamination from sewage or animal waste is present, and disinfection is necessary to ensure the water is safe for drinking (*Coliform Bacteria Fact Sheet*). Follow up sampling is recommended to confirm the result. Two wells (25%) had positive detections for TC, but *E. coli* was not detected in any sample. Although *E. coli* was not detected in any sample, the elevated TC results in well 2373 indicates the need for follow-up sampling to confirm the result and evaluate potential well integrity or sampling-related issues.

Table 1. Nutrient, isotope, and bacteria concentrations in the Glenns Ferry NPA.

DEQ Site ID	Well Depth	Sample Date	Nutrient Concentration		Isotopes	Bacteria Concentrations[B]	
			Nitrite[A]	Nitrate[A]	N-15/14	*E. coli*	Total Coliform
			mg/L	mg/L	‰	MPN/100 mL	MPN/100 mL
Water Quality Standard:			1.0	10	No Stand.	<1	1.0
2373	500	09/11/2024	<0.30	<0.18	—	<1.0	>2420
2375	240	09/11/2024	<0.30	0.0358	—	<1.0	<1.0
2376	165	09/11/2024	<0.30	12.7	3.9	<1.0	<1.0
2377	360	09/11/2024	<0.30	0.555	—	<1.0	<1.0
2977	500	09/11/2024	<0.30	<0.18	—	<1.0	1.0
2978	380	09/09/2024	<0.30	0.0348	—	<1.0	<1.0
3551	120	09/11/2024	<0.30	4.61	—	<1.0	<1.0
3658	160	09/11/2024	<0.30	8.92	3.6	<1.0	<1.0

Notes: mg/L = milligrams per liter; ‰ = permil; (—)=Not Analyzed; No Stand = No Primary or Secondary Drinking Water Regulation or Idaho Ground Water Quality Rule standard currently established; MPN/100 mL = most probable number per 100 milliliters
[A] Contaminant with a National Primary Drinking Water Regulation standard.
[B] Total coliform and *E. coli* standards are from the Idaho Ground Water Quality Rule (IDAPA 58.01.11.200). An exceedance of the primary ground water quality standard for total coliform (indicated by gray shaded numbers) is not a violation of these rules. Total coliform is not a health threat in itself; it is used to indicate whether other potentially harmful bacteria may be present. Although the standards are given in cfu/100 mL, analytical results provided in MPN/100 mL are acceptable for comparison to the standard.

Arsenic

As a naturally occurring element in the earth's crust, trace amounts of arsenic are found in all living matter, rocks, soil, water, and air. Water that encounters rock formations can dissolve arsenic and carry it into underground aquifers, streams, and rivers that may be used as drinking water sources. No wells sampled in the Glenns Ferry NPA were over the drinking water MCL (0.01 mg/L) for arsenic.

Uranium

Uranium is a naturally occurring element in rock that can percolate into groundwater after erosion. No wells in the Glenns Ferry NPA had uranium detections above the drinking water MCL (30 micrograms per liter).

Conclusions

One out of eight wells (13%) sampled in the Glenns Ferry NPA in 2024 was above the MCL for nitrate and two wells had detections of TC bacteria. Together, these findings highlight the importance of continued monitoring and management in the Glenns Ferry NPA. DEQ will use the results of this sampling effort to evaluate NPAs and determine the extent and level of concern of groundwater degradation. Sampling will be conducted again in 2029.

All Glenns Ferry NPA sampling results are available at *Ground Water Quality Monitoring and Protection*.

Contact: DEQ Boise Regional Office, (208) 373-0550

References

DEQ (Idaho Department of Environmental Quality). 2021. *2020 Nitrate Priority Area Delineation and Ranking Process*. Boise, ID: DEQ Water Quality Division. *https://www2.deq.idaho.gov/admin/LEIA/api/document/download/14704*.

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STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

2024 Summary Report: Mountain Home Nitrate Priority Area

The Idaho Department of Environmental Quality's (DEQ's) Groundwater Quality Rule is intended to maintain and protect the existing high quality of Idaho's groundwater. By sampling and monitoring wells throughout the state, DEQ can assess water quality to aid in land use management decisions that impact groundwater.

This monitoring project is designed to provide the data necessary for evaluating trends in groundwater nitrate concentrations in and around the Mountain Home Nitrate Priority Area (NPA).

Background

In 2024, DEQ evaluated the water quality and sampled for various contaminants within the Mountain Home NPA in Elmore County, Idaho (Figure 1). This NPA was previously sampled in 2014 and 2021 as part of DEQ's statewide NPA evaluation process.

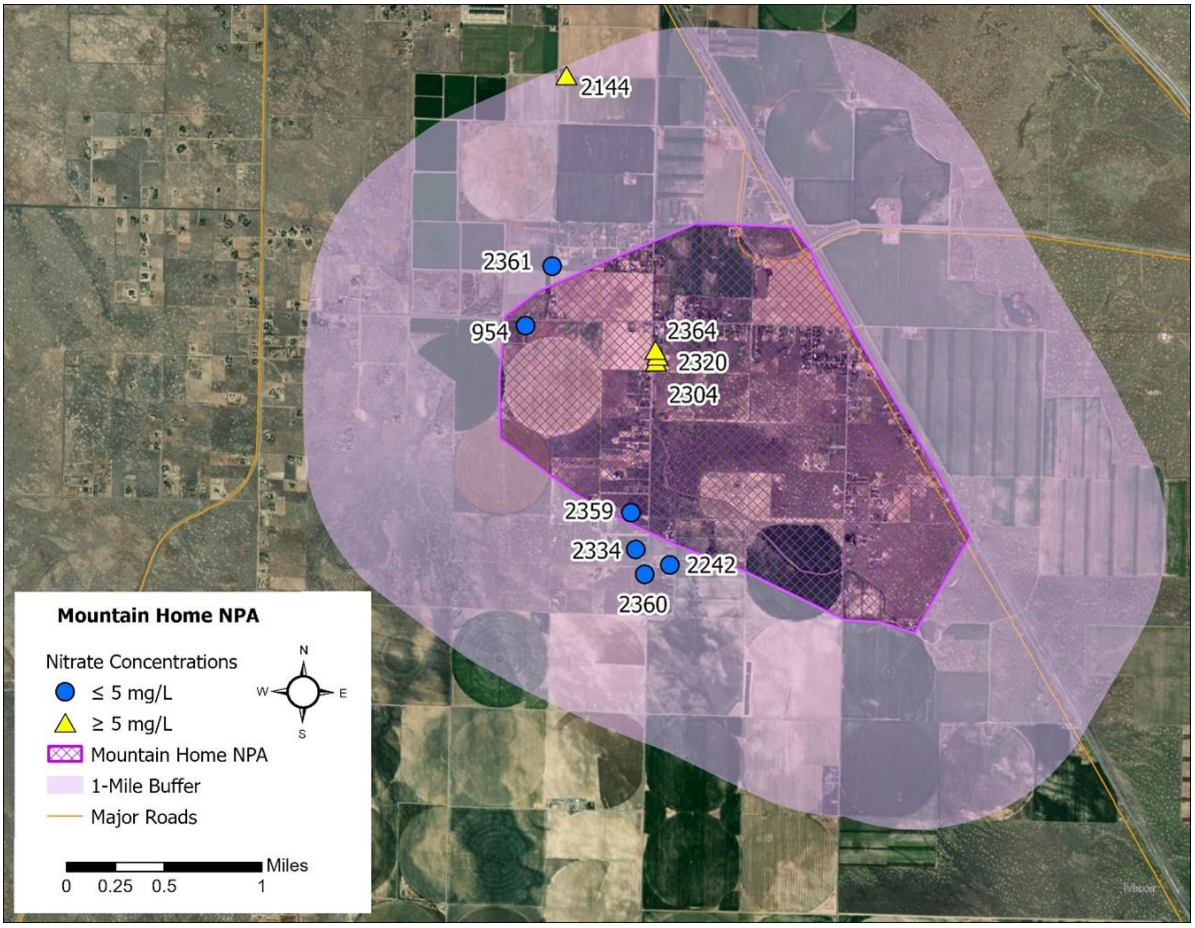


Figure 1. Locations of wells sampled in the Mountain Home NPA in 2024 and nitrate concentrations.

NPAs in Idaho are identified by the presence of elevated nitrate concentrations in groundwater samples collected by DEQ or other agencies. Elevated nitrate concentrations indicate that the groundwater has been impacted by a nitrate source—typically wastewater, sewage, fertilizer, or animal waste—and the groundwater aquifer is susceptible to other surface contaminants. Once an area of elevated nitrate concentrations is identified, DEQ conducts a more focused investigation by sampling domestic and irrigation wells in the area and then uses the sampling data to identify boundaries to the area of nitrate impact. NPAs throughout the state are evaluated and ranked by existing nitrate concentrations, statistical trends in the nitrate concentrations over time (if available), and local populations potentially affected. In 2020, the Mountain Home NPA was ranked 22nd in the state (out of 35 NPAs), but a statistical trend of nitrate concentrations in groundwater (increasing, decreasing, or stable) was not determined (DEQ 2021). The statewide rank reflects relative concern compared to other NPAs, with higher scores representing areas of greater concern.

The Mountain Home NPA lies on a plateau within the Western Snake River Plain and north of the Snake River. Groundwater flow across the NPA trends south towards the Snake River. Land uses in the NPA are generally agricultural and residential. The primary agricultural land use is irrigated cropland, and the residences within the NPA are all served by private wells. The city waste lagoons are located northeast of the NPA, with wastewater reuse areas inside the NPA borders.

Well Driller's Reports filed with the Idaho Department of Water Resources reported that the depth of the 10 wells sampled in the Mountain Home NPA range from 521 to 600 feet with an average of approximately 559 feet (IDWR 2025). General lithology of the area is interbedded layers of gravel, sand, and clay, with groundwater sourced in sand and gravel aquifers (Graham and Campbell 1981).

Drinking Water Standards

The United States Environmental Protection Agency (EPA) sets national drinking water standards for approximately 90 contaminants. The maximum contaminant level (MCL) is an enforceable standard set by EPA that defines the maximum level of a contaminant allowed in water delivered to a public water system. DEQ adopts drinking water standards, with a few exceptions, in the Ground Water Quality Rule, IDAPA 58.01.11.200. DEQ uses these standards to evaluate private well water quality.

Groundwater Monitoring Results

In 2024, DEQ sampled groundwater from 10 domestic wells in the Mountain Home NPA. DEQ analyzed samples for nitrate, nitrite, nitrogen isotope ($\delta^{15}N$), uranium, arsenic, alkalinity, and bacteria to assess water quality in the project area. Eight wells were sampled previously both in 2014 and 2021, one was sampled in 2014 only, and one was sampled in 2021 only. No new wells were added to the project area. DEQ provided sample results to homeowners.

Nitrate

Nitrate is a widespread groundwater contaminant in Idaho. Common sources of nitrate include decaying plants and other organic matter, septic systems, byproducts from animal facilities, nitrogen-based fertilizers, and others. No wells sampled in the Mountain Home NPA had nitrate detections over the MCL (10 milligrams per liter [mg/L]). Four wells (40%) had nitrate concentrations greater than 5 mg/L but below the MCL. No wells had detections for nitrite or ammonia.

DEQ also analyzed wells with nitrate detections of 5 mg/L or greater for $\delta^{15}N$ analysis (four wells). $\delta^{15}N$ is frequently used as an environmental tracer and can provide information on the origin and fate of nitrogen in a sample. Wells 2304 and 2320 had $\delta^{15}N$ ratios from +4 per mil (‰) to +9‰, indicating the nitrate sources were consistent with mixed organic nitrogen sources (Seiler 1996). The isotope samples for Wells 2364 and 2144 were lost during shipping, so no results are available.

Bacteria

DEQ analyzed all 10 wells for *Escherichia coli* (*E. coli*) and total coliform (TC) bacteria. TC bacteria are common in the environment and are generally not harmful. *E. coli* is a subgroup of coliform found in greater quantities than TC in animal fecal matter. If *E. coli* is detected with TC, this indicates that contamination from sewage or animal waste is present and disinfection is necessary to ensure the water is safe for drinking (*Coliform Bacteria Fact Sheet*). Follow up sampling is recommended to confirm the result. Well 2144 had a positive detection for both TC and *E. coli*. No TC or *E.coli* were detected in any other sample.

Table 1. Nutrient, isotope, and bacteria concentrations in the Mountain Home NPA.

DEQ Site ID	Well Depth	Sample Date	Nutrient Concentration		Isotopes	Bacteria Concentrations[B]	
			Nitrite[A]	Nitrate[A]	N-15/14	*E. coli*	Total Coliform
			mg/L	mg/L	‰	MPN/100 mL	MPN/100 mL
Water Quality Standard:			1.0	10	No Stand.	<1	1.0
954	600	09/09/2024	<0.30	2.08	—	<1.0	<1.0
2144	550	09/09/2024	<0.30	6.25	—	12	921
2242	570	09/09/2024	<0.30	1.12	—	<1.0	<1.0
2304	536	09/09/2024	<0.30	6.43	7.5	<1.0	<1.0
2320	521	09/09/2024	<0.30	6.80	7.6	<1.0	<1.0
2334	599	09/09/2024	<0.30	1.16	—	<1.0	<1.0
2359	575	09/09/2024	<0.30	2.88	—	<1.0	<1.0
2360	580	09/09/2024	<0.30	1.04	—	<1.0	<1.0
2361	532	09/09/2024	<0.30	3.04	—	<1.0	<1.0
2364	525	09/09/2024	<0.30	8.59	—	<1.0	<1.0

Notes: mg/L = milligrams per liter; ‰ = permil; (-)=Not Analyzed; No Stand = No Primary or Secondary Drinking Water Regulation or Idaho Ground Water Quality Rule standard currently established; MPN/100 mL = most probable number per 100 milliliters.
[A] Contaminant with a National Primary Drinking Water Regulation standard.
[B] Total coliform and *E. coli* standards are from the Idaho Ground Water Quality Rule (IDAPA 58.01.11.200). An exceedance of the primary ground water quality standard for total coliform (indicated by gray shaded numbers) is not a violation of these rules. Total coliform is not a health threat in itself; it is used to indicate whether other potentially harmful bacteria may be present. Although the standards are given in cfu/100 mL, analytical results provided in MPN/100 mL are acceptable for comparison to the standard.

Arsenic

As a naturally occurring element in the earth's crust, trace amounts of arsenic are found in all living matter, rocks, soil, water, and air. Water that encounters rock formations can dissolve arsenic and carry it into underground aquifers, streams, and rivers that may be used as drinking water sources. No wells in the Mountain Home NPA had arsenic detections over the drinking water MCL of 0.01 mg/L.

Uranium

Uranium is a naturally occurring element in rock that can percolate into groundwater after erosion. All 10 wells had uranium detections, but no wells had concentrations over the drinking water MCL (30 micrograms per liter [µg/L]).

Conclusions

None of the 10 wells sampled in the Mountain Home NPA in 2024 were above the MCL of 10 mg/L for nitrate. Four (40%) had concentrations greater than 5 mg/L (half the MCL). One well had positive detections of both TC and *E. coli*; DEQ notified the homeowner of this result so they could take appropriate action. No wells had arsenic or uranium concentrations above their respective drinking water MCLs. Together, these findings highlight the importance of continued monitoring in the Mountain Home NPA. DEQ will use the results to evaluate NPAs and determine the extent and level of concern of groundwater degradation. Sampling will be conducted again in 2029.

All Mountain Home NPA sampling results are available at *Ground Water Quality Monitoring and Protection*.

Contact: DEQ Boise Regional Office, (208) 373-0550

References

DEQ (Idaho Department of Environmental Quality). 2021. *2020 Nitrate Priority Area Delineation and Ranking Process*. Boise, ID: DEQ Water Quality Division. *https://www2.deq.idaho.gov/admin/LEIA/api/document/download/14704*.

Graham, W.G. and L.J. Campbell. 1981. *Groundwater Resources of Idaho*. Boise, ID: Idaho Department of Water Resources.

IDAPA. 1997. "Ground Water Quality Rule." Idaho Administrative Code. IDAPA 58.01.11.200.

IDWR (Idaho Department of Water Resources). 2025. "Well Construction Research." *https://idwr.idaho.gov/wells/research/*.

Seiler, R.L. 1996. *Methods for Identifying Sources of Nitrogen Contamination of Ground Water in Valleys in Washoe County, Nevada*. Carson City, NV: US Geological Survey. US Geological Survey Open-File Report 96-461.

STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

2024 Summary Report: Weiser Nitrate Priority Area

The Idaho Department of Environmental Quality's (DEQ's) Groundwater Quality Rule is intended to maintain and protect the existing high quality of Idaho's groundwater. By sampling and monitoring wells throughout the state, DEQ can assess water quality to aid in land use management decisions that impact groundwater.

This monitoring project is designed to provide the data necessary for evaluating trends in groundwater nitrate concentrations in and around the Weiser Nitrate Priority Area (NPA).

Background

In 2024, DEQ evaluated the water quality and sampled for various contaminants within the Weiser NPA in Washington County, Idaho (Figure 1). This NPA was previously sampled in 2014 and 2019 as part of DEQ's statewide NPA evaluation process.

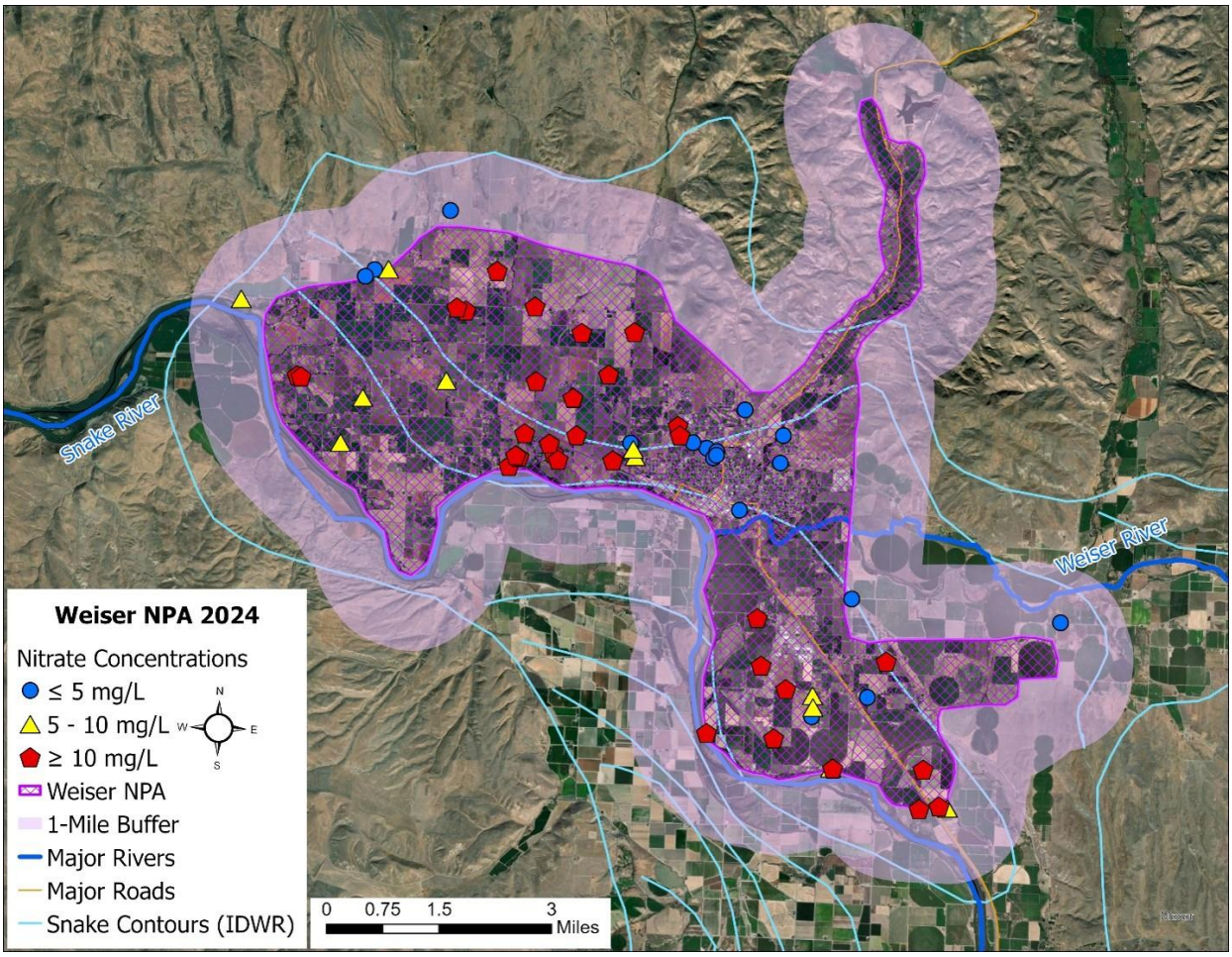


Figure 1. Locations of wells sampled in the Weiser NPA in 2024 and nitrate concentrations.

NPAs in Idaho are identified by the presence of elevated nitrate concentrations in groundwater samples collected by DEQ or other agencies. Elevated nitrate concentrations indicate that the groundwater has been impacted by a nitrate source—typically wastewater, sewage, fertilizer, or animal waste—and the groundwater aquifer is susceptible to other surface contaminants. Once an area of elevated nitrate concentrations is identified, DEQ conducts a more focused investigation by sampling domestic and irrigation wells in the area and then uses the sampling data to identify boundaries to the area of nitrate impact. NPAs throughout the state are evaluated and ranked by existing nitrate concentrations, statistical trends in the nitrate concentrations over time (if available), and local populations potentially affected. In 2020, the Weiser NPA was ranked 7th in the state (out of 35 NPAs), with a statistically decreasing trend in nitrate concentrations (DEQ 2021). The statewide rank reflects relative concern compared to other NPAs, with higher scores representing areas of greater concern.

The Weiser NPA is north of the Snake River, east of the Idaho-Oregon border, and part of the Western Snake River Plain. The Western Snake River Plain is a down dropped fault-block basin, with normal (vertical) north-northwest trending faults along its margins. The area surrounding Weiser contains Lake Idaho-related sediments (clay, silt, and sand) and more recent stream- and wind-deposited sediments. Groundwater flow across the NPA trends southwest toward the Snake River and Idaho-Oregon state border (Wood and Clemens 2002).

All wells sampled for this project had a well completion depth of less than 165 feet below ground surface (IDWR 2025). Land uses in the Weiser NPA are a mix of agricultural and residential. The area is undergoing moderately increased residential building on historically agricultural land and relies on domestic wells and individual wastewater disposal (septic) systems.

Drinking Water Standards

The United States Environmental Protection Agency (EPA) sets national drinking water standards for approximately 90 contaminants. The maximum contaminant level (MCL) is an enforceable standard set by EPA that defines the maximum level of a contaminant allowed in water delivered to a public water system. DEQ adopts drinking water standards, with a few exceptions, in the Ground Water Quality Rule, IDAPA 58.01.11.200. DEQ uses these standards to evaluate private well water quality.

Groundwater Monitoring Results

In 2024, DEQ sampled groundwater from 60 domestic and irrigation wells in the Weiser NPA. DEQ analyzed samples for nitrate, nitrite, nitrogen isotope ($\delta^{15}N$), uranium, arsenic, alkalinity, and bacteria to assess water quality in the project area. All 60 wells were previously sampled in 2019, and 12 were also sampled in 2014. No new wells were added in the project area. DEQ provided sample results to homeowners. Due to the number of wells sampled, individual analytical results are not included in this summary report. All Weiser NPA sampling results are available by request.

Nitrate and Nitrite

Nitrate is a widespread groundwater contaminant in Idaho. Common sources of nitrate include decaying plants and other organic matter, septic systems, byproducts from animal facilities, nitrogen-based fertilizers, and others. Thirty-two out of 60 wells (53%) had nitrate detections above the MCL (10 milligrams per liter [mg/L]). Eleven wells (18%) had concentrations over 5 mg/L but below the MCL. Thirteen wells had detections of nitrite, but none were over the MCL of 1 mg/L.

DEQ also analyzed wells with nitrate detections of 5 mg/L or greater for $\delta^{15}N$ (43 wells; 72%). $\delta^{15}N$ is frequently used as an environmental tracer and can provide information on the origin and fate of nitrogen in a sample. Nineteen wells had ratios in the -4 per mil (‰) to +4‰ range, indicating the nitrate source was consistent with commercial fertilizer. Eighteen wells were between 4.1‰ and 7.4‰, indicating a mix of organic sources. Six wells had nitrogen isotope ratios above 9.0‰, which is consistent with waste sources (Seiler 1996).

Bacteria

DEQ analyzed all 60 wells for *Escherichia coli* (*E. coli*) and total coliform (TC) bacteria. TC bacteria are common in the environment and are generally not harmful. *E. coli* is a subgroup of coliform found in greater quantities than TC in animal fecal matter. If *E. coli* is detected with TC, this indicates that contamination from animal or sewage waste is present and that disinfection is necessary to ensure the water is safe for drinking (*Coliform Bacteria Fact Sheet*). Follow up sampling is recommended to confirm the result. Twelve wells (20%) had positive detections for TC, but *E. coli* was not detected in any sample.

Arsenic

As a naturally occurring element in the earth's crust, trace amounts of arsenic are found in all living matter, rocks, soil, water, and air. Water that encounters rock formations can dissolve arsenic and carry it into underground aquifers, streams, and rivers that may be used as drinking water sources. In the Weiser NPA, 42 wells (70%) were over the drinking water MCL for arsenic (0.01 mg/L). Data compiled by the Idaho Department of Water Resources shows generally higher arsenic concentrations in southwestern Idaho.

Uranium

Uranium is a naturally occurring element in rock that can percolate into groundwater after erosion. Fifty-seven wells had detections for uranium, but only 5 were above the drinking water MCL of 30 micrograms per liter.

Conclusions

All 60 of the wells DEQ sampled in 2024 had been previously sampled in 2019. This will facilitate the building of a historical record of groundwater concentrations in the area. Thirty-two out of 60 wells (53%) had nitrate concentrations above the MCL, and 11 additional wells (18%) had

nitrate concentractions greater than half the MCL but below the MCL. Twelve wells had positive detections of TC bacteria, but *E. coli* was not detected in any sample. Arsenic concentrations exceed the drinking water MCL in 42 wells (70%), and uranium concentrations exceeded the MCL in five wells. Together, these findings highlight the importance of continued monitoring in the Weiser NPA. DEQ will use the results to evaluate NPAs and determine the extent and level of concern of groundwater degradation. Sampling will be conducted again in 2029.

All Weiser NPA sampling results are available at *Ground Water Quality Monitoring and Protection*.

Contact: DEQ Boise Regional Office, (208) 373-0550

References

DEQ (Idaho Department of Environmental Quality). 2021. *2020 Nitrate Priority Area Delineation and Ranking Process*. Boise: DEQ Water Quality Division. *https://www2.deq.idaho.gov/admin/LEIA/api/document/download/14704.*

Graham, W.G. and L.J. Campbell. 1981. *Groundwater Resources of Idaho*. Boise, ID: Idaho Department of Water Resources.

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STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

2024 Summary Report: Twin Falls Nitrate Priority Area

The Idaho Department of Environmental Quality's (DEQ's) Groundwater Quality Rule is intended to maintain and protect the existing high quality of Idaho's groundwater. By sampling and monitoring wells throughout the state, DEQ can assess water quality to aid in land use management decisions that impact groundwater.

This monitoring project is designed to provide the data necessary for evaluating trends in groundwater nitrate concentrations in and around the Twin Falls Nitrate Priority Area (NPA).

Background

In 2024, DEQ evaluated water quality samples for various contaminants within the Twin Falls NPA located in Twin Falls County, Idaho (Figure 1). This is the first time DEQ has sampled the Twin Falls NPA as part of DEQ's statewide NPA monitoring program though the area had been previously sampled by other agencies.

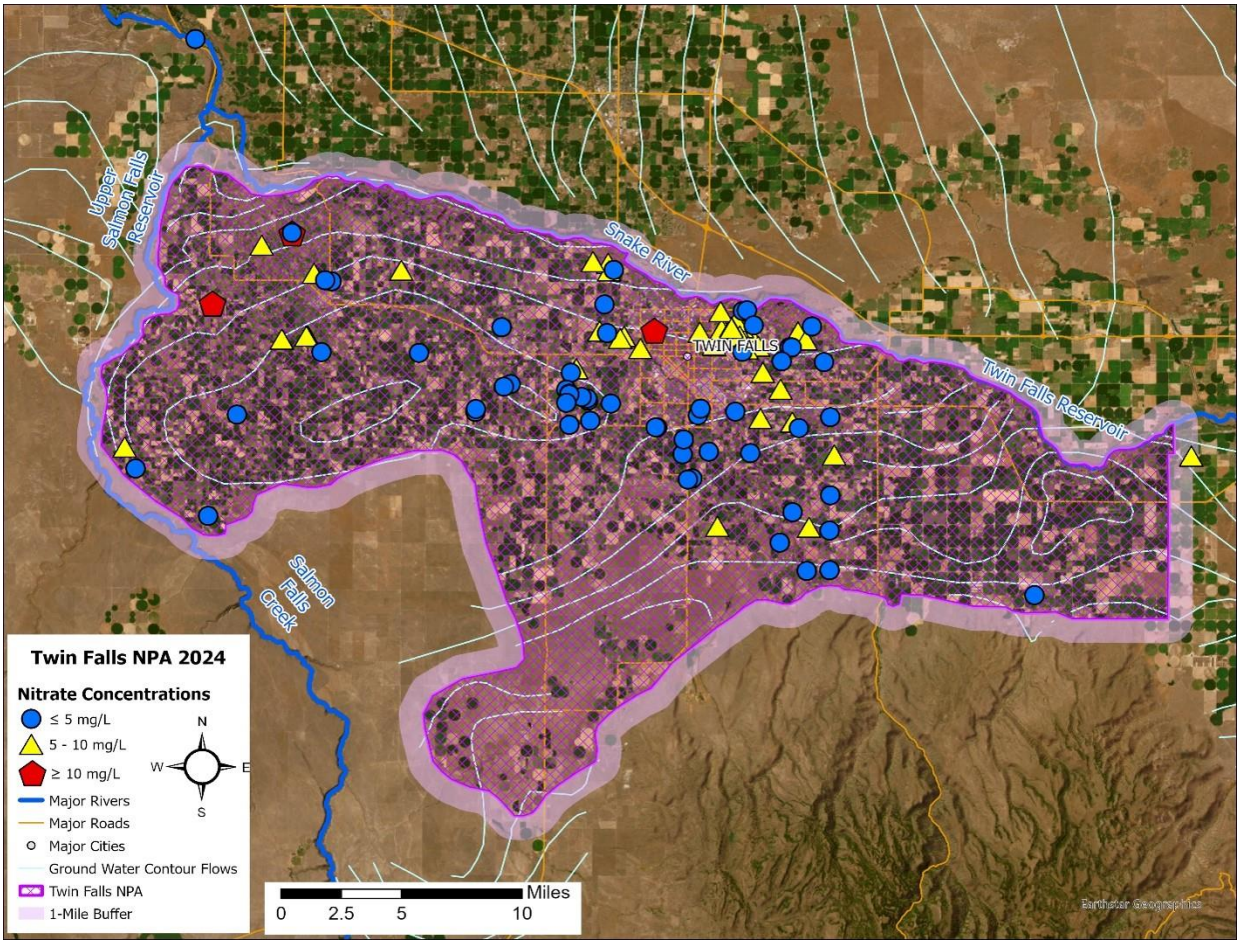


Figure 1. Locations of wells sampled in the Twin Falls NPA and nitrate concentrations.

NPAs in Idaho are identified by the presence of elevated nitrate concentrations in groundwater samples collected by DEQ or other agencies. Elevated nitrate concentrations indicate that the groundwater has been impacted by a nitrate source—typically wastewater, sewage, fertilizer, or animal waste—and the groundwater aquifer is susceptible to other surface contaminants. Once an area of elevated nitrate concentrations is identified, DEQ conducts a more focused investigation by sampling domestic and irrigation wells in the area and then uses the sampling data to identify boundaries to the area of nitrate impact. NPAs throughout the state are evaluated and ranked by existing nitrate concentrations, statistical trends in the nitrate concentrations over time (if available), and local populations potentially affected. In 2020, the Twin Falls NPA was ranked 9th in the state (out of 35 NPAs), with no statistical trend of levels of nitrate concentrations in groundwater (DEQ 2021). The statewide rank reflects relative concern compared to other NPAs, with higher scores representing areas of greater concern.

The Twin Falls NPA was first designated in 2008 and encompasses 568 square miles. It lies within the western part of the Eastern Snake River Plain Aquifer (ESRPA) and the Magic Valley Aquifer. Groundwater flow direction across the NPA is generally west-northwest towards the Snake River, which runs along the northern border of the NPA, with localized variations due to topography and pumping activities (see Figure 1 groundwater contours). Approximately 76,300 people live within the Twin Falls NPA (IDOL 2025). The primary land uses are irrigated agriculture and concentrated animal feeding operations. Canals and ditches are utilized for agricultural purposes.

Idaho Department of Water Resources (IDWR) Well Driller's Reports provided the depths of 42 out of the 107 wells sampled. Well depth ranged from 20 to 427 feet below ground surface (bgs), and the average depth was 98 feet bgs (IDWR 2025). The general lithology of the area as reported in the Well Driller's Reports is interbedded layers of basalt and cinder and ash pockets with groundwater sourced in a basalt aquifer. Additionally, localized aquifers exist within the county, particularly in basalt and alluvial deposits. These include shallow perched aquifers in volcanic rock and sedimentary deposits and deep confined aquifers that are hydraulically connected to the ESRPA.

Drinking Water Standards

The United States Environmental Protection Agency (EPA) sets national drinking water standards for approximately 90 contaminants. The maximum contaminant level (MCL) is an enforceable standard set by EPA that defines the maximum level of a contaminant allowed in water delivered to a public water system. DEQ adopts drinking water standards, with a few exceptions, in the Ground Water Quality Rule, IDAPA 58.01.11.200. DEQ uses these standards to evaluate private well water quality.

Groundwater Monitoring Results

In 2024, DEQ collected groundwater samples from 110 sites (107 domestic wells and three springs) in the Twin Falls NPA. Samples were analyzed for nitrate, nitrite, arsenic, and bacteria to assess water quality in the project area. Two wells were sampled previously as part of other

DEQ sampling projects, and 105 sources were added to the project area. DEQ provided sample results to the homeowners. Due to the number of wells sampled, individual analytical results are not included in this summary report. All Twin Falls NPA sampling results are available by request.

Nitrate and Nitrite

Nitrate is a widespread groundwater contaminant in Idaho. Common sources of nitrate include decaying plants and other organic matter, septic systems, byproducts from animal facilities, nitrogen-based fertilizers, and others. The average nitrate concentration of the 110 sampled locations was 4.95 milligrams per liter (mg/L). Fifty-four wells (49%) were above 5 mg/L, and four of them also exceeded the EPA MCL of 10 mg/L.

Bacteria

DEQ analyzed all 110 wells and springs for *Escherichia coli* (*E. coli*) and total coliform (TC) bacteria. TC bacteria are common in the environment and are generally not harmful. *E. coli* is a subgroup of coliform found in greater quantities than TC in animal fecal matter. If *E. coli* is detected with TC, this indicates that contamination from animal or sewage waste is present, and disinfection is necessary to ensure the water is safe for drinking (*Coliform Bacteria Fact Sheet*). Follow up sampling is recommended to confirm the result. Twenty-five sources (23%) had TC present, and five of those sites also had a positive detection for *E. coli*.

Arsenic

As a naturally occurring element in the earth's crust, trace amounts of arsenic are found in all living matter, rocks, soil, water, and air. Water that encounters rock formations can dissolve arsenic and carry it into underground aquifers, streams, and rivers that may be used as drinking water sources. Seventy-three wells (66%) were over the MCL (10 micrograms per liter [µg/L]) for arsenic, and the average concentration was 11.5 µg/L. Data compiled by the Idaho Department of Water Resources shows generally higher arsenic concentrations in southern Idaho (IDWR 2004).

Conclusions

DEQ completed its first full NPA monitoring for the Twin Falls NPA for the first time in 2024. Four out of 110 sampled sites (4%) exceeded the MCL for nitrate. Seventy three of the 110 sites (66%) exceeded the drinking water arsenic MCL of 10 ug/L concentration, which is consistent with higher naturally occurring concentrations in southern Idaho. Statistical trends were not established because there were insufficient data from previous sampling events. Together, these findings highlight the importance of continued monitoring in the Twin Falls NPA. DEQ will use the results to evaluate NPAs and determine the extent and level of concern of groundwater degradation. Sampling will be conducted again in 2029.

All Twin Falls NPA sampling results are available at *Ground Water Quality Monitoring and Protection*.

Contact: Twin Falls Regional Office, (208) 736-2190

References

DEQ (Idaho Department of Environmental Quality). 2021. *2020 Nitrate Priority Area Delineation and Ranking Process*. Boise, ID: DEQ Water Quality Division. *https://www2.deq.idaho.gov/admin/LEIA/api/document/download/14704.*

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STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

2024 Summary Report: Southwest Jerome Nitrate Priority Area

The Idaho Department of Environmental Quality's (DEQ's) Groundwater Quality Rule is intended to maintain and protect the existing high quality of Idaho's groundwater. By sampling and monitoring wells throughout the state, DEQ can assess water quality to aid in land use management decisions that impact groundwater.

This monitoring project is designed to provide the data necessary for evaluating trends in groundwater nitrate concentrations in and around the Southwest Jerome Nitrate Priority Area (NPA).

Background

In 2024, DEQ evaluated water quality samples for various contaminants within the Southwest Jerome NPA located southwest of the city of Jerome, Idaho (Figure 1). The Southwest Jerome NPA was last sampled in 2016 as part of DEQ's statewide NPA monitoring program.

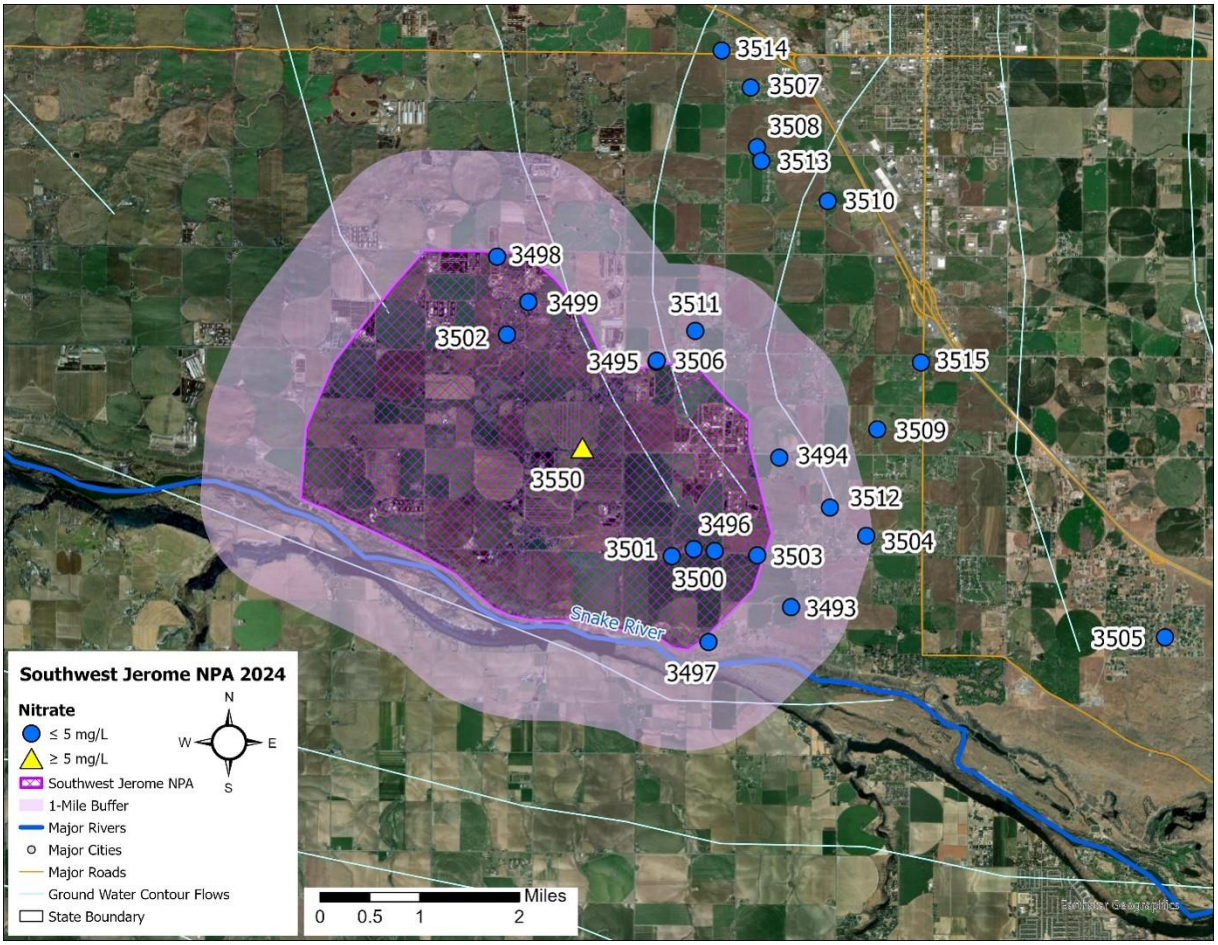


Figure 1. Southwest Jerome NPA 2024 source locations and nitrate concentrations.

NPAs in Idaho are identified by the presence of elevated nitrate concentrations in groundwater samples collected by DEQ or other agencies. Elevated nitrate concentrations indicate that the groundwater has been impacted by a nitrate source—typically wastewater, sewage, fertilizer, or animal waste—and the groundwater aquifer is susceptible to other surface contaminants. Once an area of elevated nitrate concentrations is identified, DEQ conducts a more focused investigation by sampling domestic and irrigation wells in the area and then uses the sampling data to identify boundaries to the area of nitrate impact. NPAs throughout the state are evaluated and ranked by existing nitrate concentrations, statistical trends in the nitrate concentrations over time (if available), and local populations potentially affected. In 2020, the Southwest Jerome NPA was ranked 10th in the state (out of 35 NPAs), with a statistical trend of increasing nitrate concentration levels in groundwater (DEQ 2021). The statewide rank reflects relative concern compared to other NPAs, with higher scores representing areas of greater concern.

The Southwest Jerome NPA encompasses 12 square miles and lies within the western part of the Eastern Snake River Plain Aquifer. Groundwater flow direction across the NPA is generally west-southwest towards the Snake River, which runs along the southern border of the NPA (see Figure 1 groundwater contours). Approximately 615 people live within the NPA (IDOL 2025). The primary land uses are irrigated agriculture fed water by canals and ditches, and concentrated animal feeding operations.

Idaho Department of Water Resources (IDWR) Well Driller's Reports provided the depths of 17 out of the 24 wells sampled. Well depth ranged from 125 to 280 feet below ground surface (bgs), and the average well depth was approximately 232 feet bgs (IDWR 2025). General lithology of the area as reported in the Well Driller's Reports is interbedded layers of basalt and cinder and ash pockets with groundwater sourced in a basalt aquifer.

Drinking Water Standards

The United States Environmental Protection Agency (EPA) sets national drinking water standards for approximately 90 contaminants. The maximum contaminant level (MCL) is an enforceable standard set by EPA that defines the maximum level of a contaminant allowed in water delivered to a public water system. DEQ adopts drinking water standards, with a few exceptions, in the Ground Water Quality Rule, IDAPA 58.01.11.200. DEQ uses these standards to evaluate private well water quality.

Groundwater Monitoring Results

In 2024, DEQ collected groundwater samples from 24 domestic wells in the Southwest Jerome NPA. Samples were analyzed for nitrate, nitrite, ammonia, bacteria, fluoride, chloride, and sulfate. All of these sites were sampled for the first time during this sampling round. DEQ provided sample results to the homeowners.

Nitrate

Nitrate is a widespread groundwater contaminant in Idaho. Common sources of nitrate include decaying plants and other organic matter, septic systems, byproducts from animal facilities, nitrogen-based fertilizers, and others. One well (4%) sampled in the Southwest Jerome NPA had nitrate concentrations greater than half the MCL of 10 milligrams per liter (mg/L). The rest of the samples were below that 5 mg/L threshold. The average nitrate value in the sampling area was 3.44 mg/L. None of the 24 wells had detections for nitrite or ammonia (Table 1).

Bacteria

All 24 sources were analyzed for *Escherichia coli* (*E. coli*) and total coliform (TC) bacteria. TC bacteria are common in the environment and are generally not harmful. *E. coli* is a subgroup of coliform found in greater quantities than TC in animal fecal matter. If *E. coli* is detected with TC, this indicates that contamination from animal or sewage waste is present, and disinfection is necessary to ensure the water is safe for drinking (*Coliform Bacteria Fact Sheet*). Follow up sampling is recommended to confirm the result. No *E. coli* or TC were detected in any sample (Table 1).

Table 1. Nutrient and bacteria concentrations in the Southwest Jerome NPA.

DEQ Site ID	Well Depth	Sample Date	Nutrient Concentration			Bacteria Concentration[B]	
			Nitrite[A]	Nitrate[A]	Ammonia	*E. coli*	Total Coliform
			mg/L	mg/L	mg/L	MPN/100 mL	MPN/100 mL
Water Quality Standard:			1.0	10	No Stand.	<1	1.0
3493	180	05/14/2024	<0.30	2.96	<0.050	<1	<1
3494	240	05/13/2024	<0.30	3.98	<0.050	<1	<1
3495	203	05/13/2024	<0.30	3.34	<0.050	<1	<1
3496	280	05/14/2024	<0.30	3.26	<0.050	<1	<1
3497	125	05/14/2024	<0.30	4.44	<0.050	<1	<1
3498	240	05/13/2024	<0.30	3.21	<0.050	<1	<1
3499	259	05/13/2024	<0.30	4.06	<0.050	<1	<1
3500	200	05/14/2024	<0.30	3.22	<0.050	<1	<1
3501	245	05/22/2024	<0.30	3.57	<0.050	<1	<1
3502	280	05/13/2024	<0.30	3.83	<0.050	<1	<1
3503	205	05/14/2024	<0.30	3.68	<0.050	<1	<1
3504	Unk	05/13/2024	<0.30	3.56	<0.050	<1	<1
3505	255	05/14/2024	<0.30	1.94	<0.050	<1	<1
3506	165	05/13/2024	<0.30	3.94	<0.050	<1	<1
3507	255	05/15/2024	<0.30	2.43	<0.050	<1	<1
3508	Unk	05/15/2024	<0.30	2.84	<0.050	<1	<1
3509	Unk	05/15/2024	<0.30	3.08	<0.050	<1	<1
3510	300	05/15/2024	<0.30	2.61	<0.050	<1	<1
3511	281	05/13/2024	<0.30	3.19	<0.050	<1	<1

DEQ Site ID	Well Depth	Sample Date	Nutrient Concentration			Bacteria Concentration[B]	
			Nitrite[A]	Nitrate[A]	Ammonia	*E. coli*	Total Coliform
			mg/L	mg/L	mg/L	MPN/100 mL	MPN/100 mL
Water Quality Standard:			1.0	10	No Stand.	<1	1.0
3512	Unk	05/14/2024	<0.30	3.50	<0.050	<1	<1
3513	Unk	05/15/2024	<0.30	2.58	<0.050	<1	<1
3514	Unk	05/15/2024	<0.30	2.22	<0.050	<1	<1
3515	Unk	05/15/2024	<0.30	3.23	<0.050	<1	<1
3550	240	06/03/2024	<0.60	7.95	<0.050	<1	<1

Notes: mg/L = milligrams per liter; Unk=Unknown. Well log not found; No Stand = No Primary or Secondary Drinking Water Regulation or Idaho Ground Water Quality Rule standard currently established; MPN/100 mL = most probable number per 100 milliliters

[A] Contaminant with a National Primary Drinking Water Regulation standard.

[B] Total coliform and *E. coli* standards are from the Idaho Ground Water Quality Rule (IDAPA 58.01.11.200). An exceedance of the primary ground water quality standard for total coliform (indicated by gray shaded numbers) is not a violation of these rules. Total coliform is not a health threat in itself; it is used to indicate whether other potentially harmful bacteria may be present. Although the standards are given in cfu/100 mL, analytical results provided in MPN/100 mL are acceptable for comparison to the standard.

General Groundwater Chemistry

All 24 wells were analyzed for fluoride, chloride, and sulfate. Water chemistry at all wells was acceptable, with no analytes exceeding applicable drinking water standards.

Conclusions

In 2024, all the wells in the Southwest Jerome NPA project were sampled for the first time. Samples were analyzed for nitrate, nitrite, ammonia, bacteria, fluoride, chloride, and sulfate to assess water quality in the project area. No wells were above the MCL for nitrate and no TC or *E.coli* bacteria were detected in any source. Together, these findings highlight the importance of continued monitoring in the Southwest Jerome NPA. DEQ will use the results to evaluate NPAs and determine the extent and level of concern of groundwater degradation. Sampling will be conducted again in 2029.

All Southwest Jerome NPA sampling results are available at *Ground Water Quality Monitoring and Protection*.

Contact: Twin Falls Regional Office, (208) 736-2190

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STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

2024 Summary Report: South Fremont County Nitrate Priority Area

The Idaho Department of Environmental Quality's (DEQ's) Groundwater Quality Rule is intended to maintain and protect the existing high quality of Idaho's groundwater. By sampling and monitoring wells throughout the state, DEQ can assess water quality to aid in land use management decisions that impact groundwater.

This monitoring project is designed to provide the data necessary for evaluating the trends in groundwater nitrate concentrations in and around the South Fremont County Nitrate Priority Area (NPA).

Background

In 2024, DEQ evaluated the water quality for various contaminant concentrations in and around the South Fremont County NPA in Fremont County, Idaho. The South Fremont County NPA, formerly St. Anthony NPA, was designated in DEQ's 2008 NPA ranking and delineation evaluation.

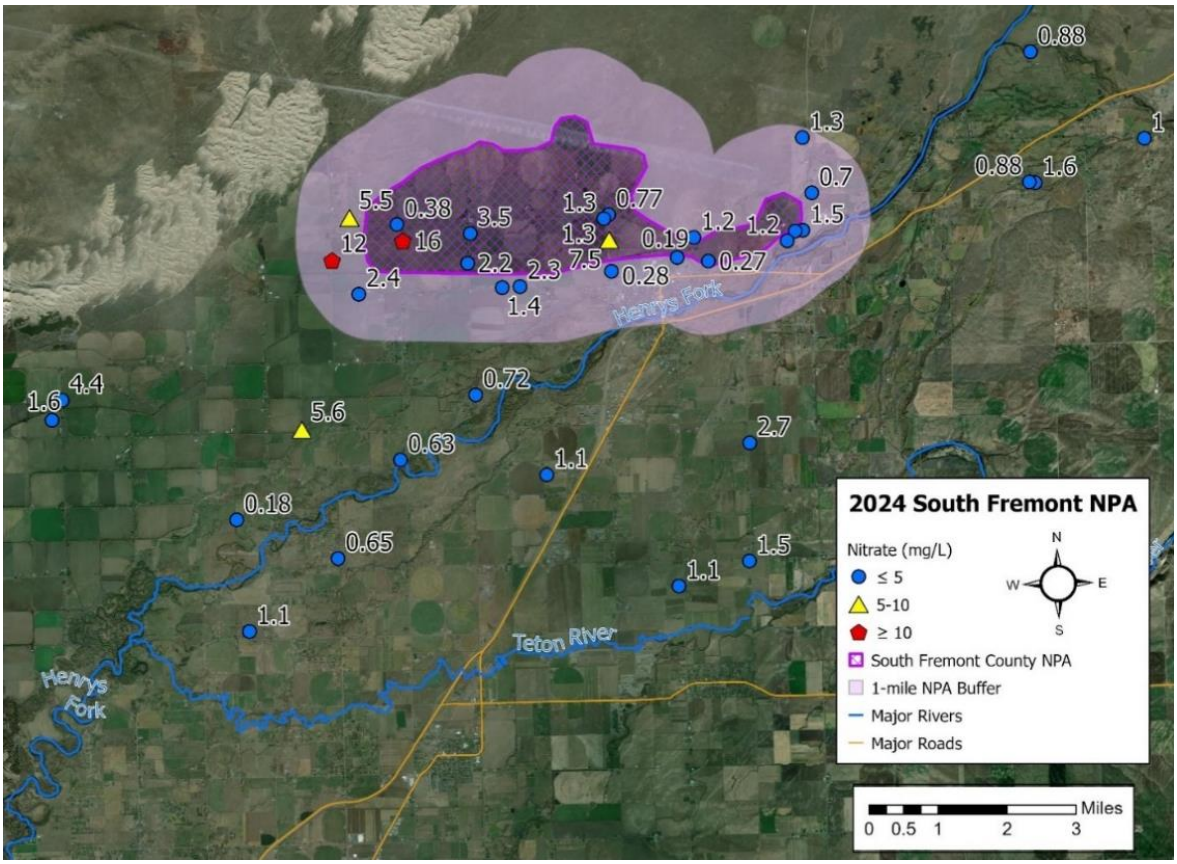


Figure 1. Locations of wells sampled in the South Fremont County NPA in 2024 and nitrate (nitrate + nitrite) concentrations.

NPAs in Idaho are identified by the presence of elevated nitrate concentrations in groundwater samples collected by DEQ or other agencies. Elevated nitrate concentrations indicate that the groundwater has been impacted by a nitrate source—typically wastewater, sewage, fertilizer, or animal waste—and the groundwater aquifer is susceptible to other surface contaminants. Once an area of elevated nitrate concentrations is identified, DEQ conducts a more focused investigation by sampling domestic and irrigation wells in the area and then uses the sampling data to identify boundaries to the area of nitrate impact. NPAs throughout the state are evaluated and ranked by existing nitrate concentrations, statistical trends in the nitrate concentrations over time (if available), and local populations potentially affected. In 2020, the South Fremont County NPA was ranked 12th in the state (out of 35 NPAs), but a statistical trend of nitrate concentrations in groundwater (increasing, decreasing, or stable) was not determined (DEQ 2021). The statewide rank reflects relative concern compared to other NPAs, with higher scores representing areas of greater concern.

The South Fremont County NPA is located directly north of the town of St. Anthony, Idaho. Ranging between 0.2 and 2.5 miles northwest of Henry's Fork River and southeast of the Saint Anthony Sand Dunes, the 8 square mile NPA is in the northern extent of the upper Eastern Snake River Plain aquifer (ESRPA). The ESRPA is underlain by basalt flows that emanated from multiple source vents that erupted lava throughout the Pleistocene and Holocene (Bonnichsen et al. 2002). Well Driller's Reports from the Idaho Department of Water Resources show sedimentary layers (eolian sands and lacustrine and fluvial deposits) with water present dispersed amongst the basalt shields (IDWR 2025).

Drinking Water Standards

The United States Environmental Protection Agency (EPA) sets national drinking water standards for approximately 90 contaminants. The maximum contaminant level (MCL) is an enforceable standard set by EPA that defines the maximum level of a contaminant allowed in water delivered to a public water system. DEQ adopts drinking water standards, with a few exceptions, in the Ground Water Quality Rule, IDAPA 58.01.11.200. DEQ uses these standards to evaluate private well water quality.

Groundwater Monitoring Results

In 2024, DEQ sampled groundwater from 37 domestic and irrigation wells in and around the South Fremont County NPA. Samples were analyzed for nitrate and nitrite as nitrogen and bacteria to assess water quality in the project area. Twelve wells had been sampled previously in 2015, and 25 new sites were added to the project area. DEQ provided sample results to the homeowners.

Nitrate

Nitrate is a widespread groundwater contaminant in Idaho. Common sources of nitrate include decaying plants and organic matter, septic system waste, byproducts from animal facilities, nitrogen-based fertilizers, and others. Results ranged from 0.18 to 16 milligrams per liter

(mg/L), with an average of 2.4 mg/L and a median of 1.3 mg/L. Five of the 37 sources sampled (14%) had nitrate concentrations over 5 mg/L, and two (5%) had nitrate concentrations over the MCL (10 mg/L).

Table 1. Nutrient and bacteria results for 2024 South Fremont County NPA.

DEQ Site ID	Well Depth	Sample Date	Nutrient Concentration	Bacteria Concentrations[B]	
			Nitrate + Nitrite[A]	*E. coli*	Total Coliform
			mg/L	MPN/100 mL	MPN/100 mL
Water Quality Standard:			10	**<1**	**1.0**
2434	280	09/26/2024	1.50	<1	<1
2435	53	10/01/2024	0.19	<1	<1
2436	48	10/09/2024	7.50	<1	<1
2437	80	10/01/2024	2.30	<1	1.0
2439	157	10/09/2024	2.40	<1	<1
2442	175	10/16/2024	3.50	<1	<1
2445	104	10/03/2024	0.28	<1	<1
3672	Unk	09/18/2024	1.10	<1	1.0
3673	160	09/18/2024	5.60	<1	<1
3674	Unk	09/18/2024	0.65	<1	21.6
3675	Unk	09/26/2024	1.00	<1	<1
3676	Unk	09/26/2024	0.88	<1	1.0
3677	146	09/26/2024	1.60	<1	<1
3678	140	09/26/2024	0.88	<1	<1
3679	Unk	09/26/2024	1.40	<1	<1
3680	263	10/01/2024	0.70	<1	2.0
3681	280	10/01/2024	1.30	<1	<1
3682	Unk	10/01/2024	1.20	<1	<1
3683	Unk	10/01/2024	0.27	<1	<1
3684	225	10/01/2024	1.20	<1	<1
3685	Unk	10/03/2024	2.20	<1	60.2
3686	Unk	10/03/2024	0.38	<1	60.9
3687	220	10/03/2024	5.50	<1	<1
3688	110	10/03/2024	12.00	<1	<1
3689	180	10/03/2024	1.40	<1	<1

3690	Unk	10/09/2024	1.60	<1	3.0
3691	Unk	10/09/2024	4.40	<1	<1
3692	Unk	10/09/2024	0.77	<1	<1
3693	122	10/16/2024	1.10	<1	<1
3694	141	10/16/2024	0.18	<1	<1
3695	140	10/16/2024	0.63	<1	<1
3696	100	10/16/2024	0.72	<1	<1
3697	Unk	10/16/2024	16.00	<1	<1
3698	Unk	10/16/2024	1.30	<1	2.0
3699	200	10/16/2024	2.70	<1	<1
3700	Unk	10/16/2024	1.50	<1	<1
3701	165	10/17/2024	1.10	<1	<1

Notes: mg/L = milligrams per liter; MPN/100 mL = most probable number per 100 milliliters; Unk=Unknown. Well log not found;
[A] Contaminant with a National Primary Drinking Water Regulation standard.
B Total coliform and E. coli standards are from the Idaho Ground Water Quality Rule (IDAPA 58.01.11.200). An exceedance of the primary ground water quality standard for total coliform (indicated by gray shaded numbers) is not a violation of these rules. Total coliform is not a health threat in itself; it is used to indicate whether other potentially harmful bacteria may be present. Although the standards are given in cfu/100 mL, analytical results provided in MPN/100 mL are acceptable for comparison to the standard.

Bacteria

DEQ analyzed all 37 wells for *Escherichia coli (E. coli)* and total coliform (TC) bacteria. TC bacteria are common in the environment and are known to represent a variety of bacteria that may or may not be harmful. *E. coli* is a subgroup of coliforms found in greater quantities than TC in animal fecal matter. If *E. coli* is detected with TC, it indicates that contamination from sewage or animal waste is present and that disinfection is necessary to ensure the water is safe for drinking (*Coliform Bacteria Fact Sheet*). Follow up sampling is recommended to confirm the result. Concentrations ranged from below the detection limit (<1 most probable number per 100 milliliters [MPN/100 mL]) to 60.9 MPN/100 mL. Twenty-eight wells (76%) had no detections of TC, and 9 wells (24%) had TC concentrations ≥1 MPN/100 mL. The average concentration of the 9 wells with TC detections was 15.5 MPN/100 mL. No *E. coli* was detected at any of the 37 sites.

Conclusions

Five of the 37 sources sampled (14%) had nitrate concentrations over half the MCL, including two sources (5%) above the MCL of 10 mg/L. Of the seven wells sampled in both 2015 and 2024, three decreased and four increased in nitrate + nitrate concentrations. Nine sites (24%) had total coliform detections but *E.coli* was not detected in any sample. Together, these findings highlight the importance of continued monitoring in the South Fremont County NPA.

DEQ will use the results to evaluate NPAs and determine the extent and level of concern of groundwater degradation. Sampling will be conducted again in 2029.

All South Fremont County NPA sampling results are available at *Ground Water Quality Monitoring and Protection*.

Contact: Idaho Falls Regional Office, (208) 528-2650

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STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

2024 Summary Report: DEQ-IDWR Groundwater Monitoring Project

The Idaho Department of Environmental Quality's (DEQ's) Groundwater Quality Rule is intended to maintain and protect the existing high quality of Idaho's groundwater. By sampling and monitoring wells throughout the state, DEQ can assess water quality to aid in land use management decisions that impact groundwater.

The Idaho Department of Environmental Quality partnered with the Idaho Department of Water Resources (IDWR) to collect methane and nitrogen isotope samples from select wells to help evaluate groundwater quality in Idaho.

Background

The IDWR Statewide Ambient Groundwater Quality Monitoring Network assesses groundwater quality across Idaho. DEQ partnered with IDWR to collect samples for nitrate isotope ($\delta^{15}N$) and methane (CH_4) analysis from select wells throughout the state. The $\delta^{15}N$ samples were selected for analysis based on nitrate concentrations. IDWR staff collected the groundwater samples during statewide network sampling events, and DEQ paid for the lab analysis. $\delta^{15}N$ sampling will assist in future nitrogen source evaluation.

Drinking Water Standards

The United States Environmental Protection Agency (EPA) sets national drinking water standards for approximately 90 contaminants. The maximum contaminant level (MCL) is an enforceable standard set by EPA that defines the maximum level of a contaminant allowed in water delivered to a public water system. DEQ adopts drinking water standards, with a few exceptions, in the Ground Water Quality Rule, IDAPA 58.01.11.200. DEQ uses these standards to evaluate private well water quality.

Groundwater Monitoring Results

IDWR collected 15 samples for $\delta^{15}N$ analysis and 7 samples for methane analysis from domestic wells across Idaho. Wells that had concentrations of nitrate greater than 5 milligrams per liter (mg/L), or half the EPA MCL of 10 mg/L, were selected for $\delta^{15}N$ analysis.

Nitrogen Isotope Results

The $\delta^{15}N$ results are presented in Table 1 and Figures 1 and 2. The $\delta^{15}N$ ratios ranged from 3.7 per mil (‰) to 17.5‰. Two of the 15 samples (13%) had a ratio consistent with inorganic sources (<4.0‰); nine (60%) samples had ratios consistent with a mixed or organic source of nitrogen (4.0‰–<9.0‰); four (27%) samples had ratios consistent with waste (animal or human) sources of nitrogen (≥9.0‰; Seiler 1996).

Table 1. 2024 nitrate and nitrogen isotope ratios.

Sample ID	Map ID	$\delta^{15}N$ ‰	Nitrate (mg/L)
34N 02E 34BDD1	N-1	4.3	17
10N 05W 09ACDD1	N-2	9.8	8.2
05N 05W 20CCD1	N-3	7.8	6.6
03N 04W 03ADA1	N-4	3.7	15
02N 02W 30BBA1	N-5	3.9	9.2
03N 02W 33CAD2	N-6	6.6	7.1
03N 01W 31DDA2	N-7	5.7	6.6
03N 01E 25BCB1	N-8	6.8	5.3
05S 06E 32AAA1	N-9	9.0	1.3
05S 09E 13ACD1	N-10	17.5	13
05S 13E 32CCC1	N-11	8.5	8.9
10S 13E 14DAC1	N-12	5.4	5.4
10S 15E 07BAB1	N-13	5.2	5.8
10S 15E 08DDA1	N-14	10.3	8.6
12S 13E 26BCC1	N-15	8.3	13

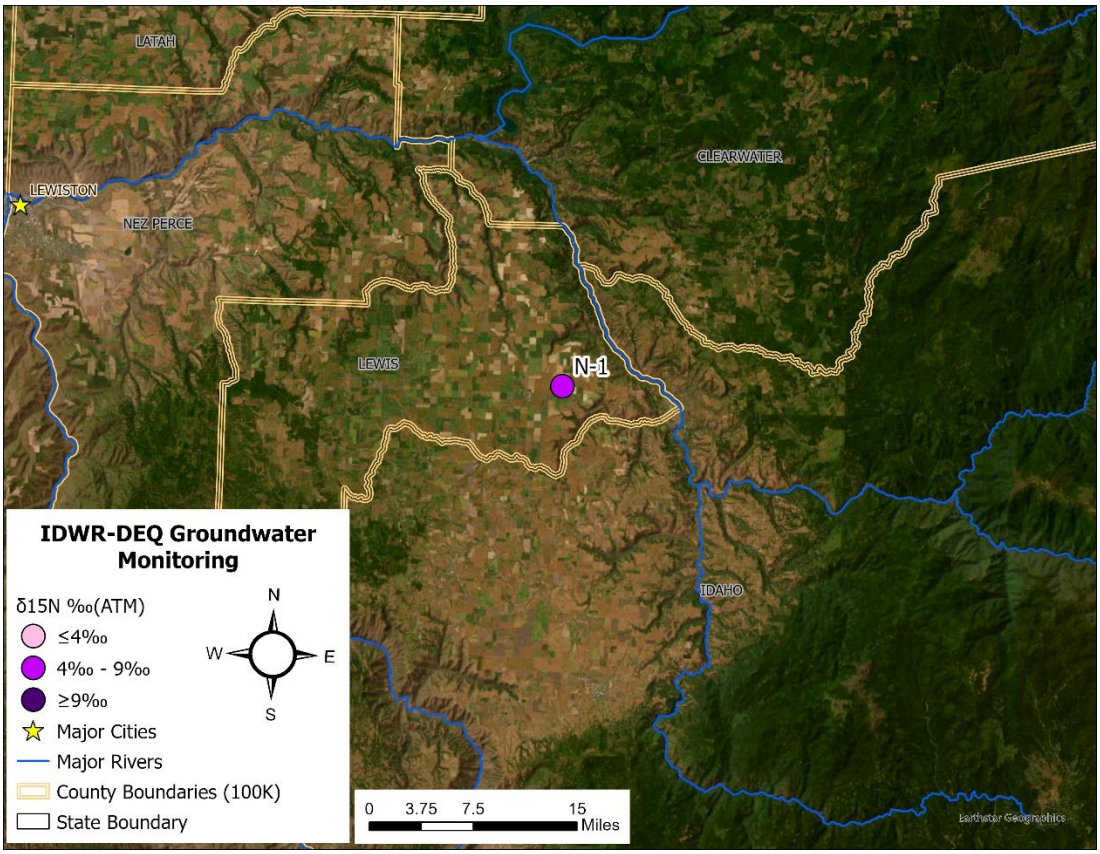


Figure 1. 2024 North Idaho nitrogen isotope ratios.

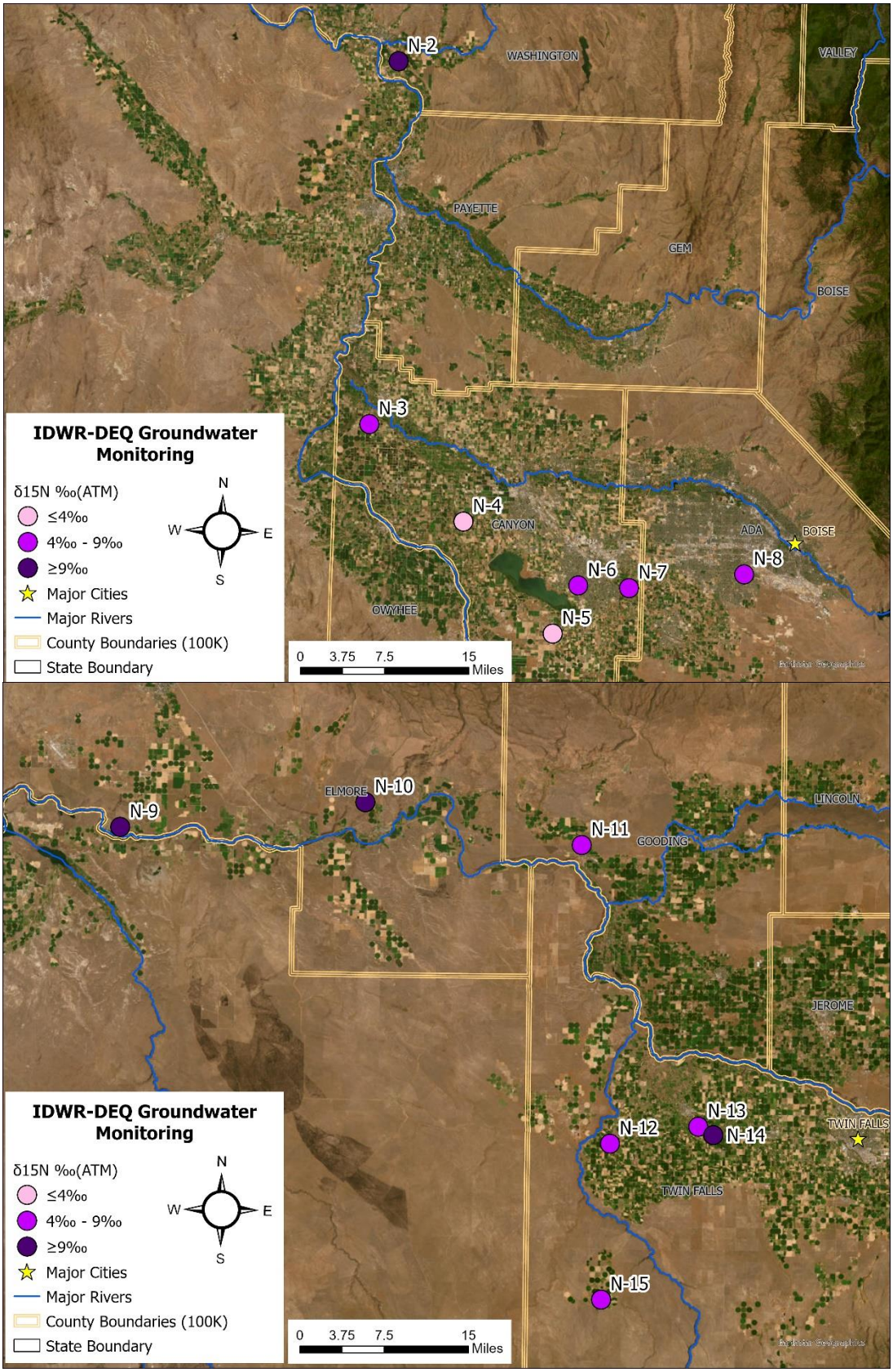


Figure 2. 2024 southern Idaho nitrogen isotope ratios.

Methane

Dissolved methane concentrations reported for this project ranged from 0.3 micrograms per liter (µg/L) to 1.8 µg/L (Table 2 and Figure 3). There is no MCL or National Secondary Drinking Water Regulation for dissolved methane in groundwater. Methane in groundwater becomes hazardous when dissolved methane exsolves (outgasses) from the water into the surrounding air or a confined space, where it can potentially ignite or explode. The suggested action level for methane is 28,000 µg/L (Eltschlager et al. 2001). All results were below the explosive risk level.

Table 2. 2024 methane concentrations.

Sample ID	Map ID	Methane (µg/L)
06N 05W 09DCA1	M-1	0.4
03N 03W 22AAA1	M-2	0.3
03N 02W 17BCB1	M-3	0.9
03N 02W 17CCB2	M-4	0.3
02N 03W 09ADA1	M-5	1.8
02N 03W 13CCA3	M-6	1.3
01N 03W 01DDD1	M-7	0.93

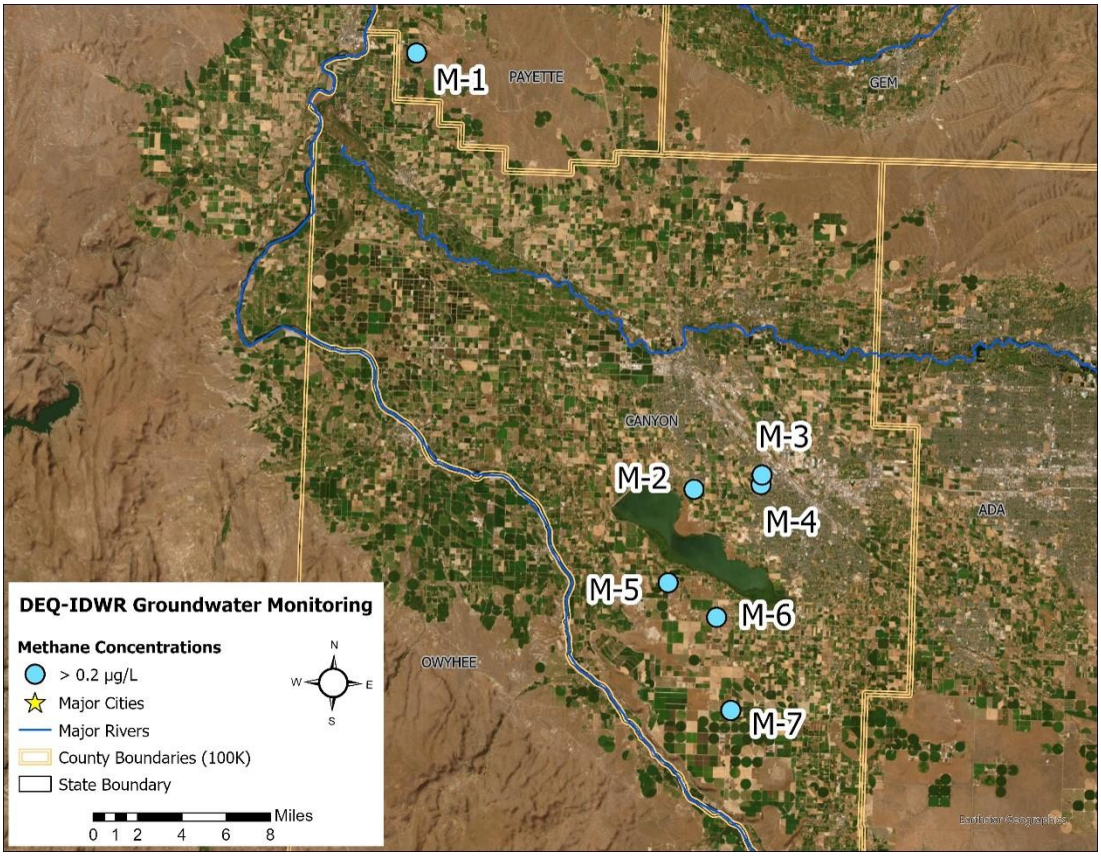


Figure 3. 2024 Idaho methane concentrations.

Conclusions

The cooperative project between IDWR and DEQ resulted in the cost-effective collection of additional methane and $\delta^{15}N$ data that will assist in future water quality evaluations. The isotope results were most often consistent with mixed or organic nitrogen sources, with fewer results consistent with inorganic fertilizer and several results consistent with animal or human waste sources. These findings highlight the importance of continued monitoring to better distinguish between land use related inputs (fertilizer vs. septic/manure) and how to guide management strategies in affected areas. IDWR and DEQ will continue these cooperative projects to increase program efficiency and protect groundwater quality in Idaho.

All sample results from this DEQ-IDWR collaborative monitoring project are available in *IDWR's Environmental Data Management System database.*

Contact: DEQ State Office, (208) 373-0502

References

Eltschlager, K.K., J.W. Hawkins, W.C. Ehler, and F. Baldassare. 2001. *Technical Measures for the Investigation and Mitigation of Fugitive Methane Hazards in Areas of Coal Mining*. Pittsburgh, PA: US Department of the Interior, Office of Surface Mining Reclamation and Enforcement.

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