
WATER QUALITY SUMMARY REPORT NO. 33

**1998 Follow-up Studies to
Ground Water Contamination Detections**

**Idaho Department of Health and Welfare
Division of Environmental Quality
July 1999**

Idaho Division of Environmental Quality
Boise Regional Office



1998 Follow-up Studies
to Ground Water Contamination Detections

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ABSTRACT

The ground water studies were generally conducted within a one mile radius of the wells with a ground water contamination detection. If there were not enough wells available within the one mile radius, the study was expanded to include the nearest wells available. All of the sites are near wells that were sampled for the Statewide Ambient Ground Water Monitoring Program with results showing contaminants of concern. Only one Statewide Ambient Ground Water Monitoring Program well, in Mountain Home, was sampled during the 1998 Follow-up Ground Water Studies. It was requested by Idaho Department of Water Resources that the Statewide Ambient Ground Water Monitoring Program wells not be included in the studies, unless absolutely necessary.

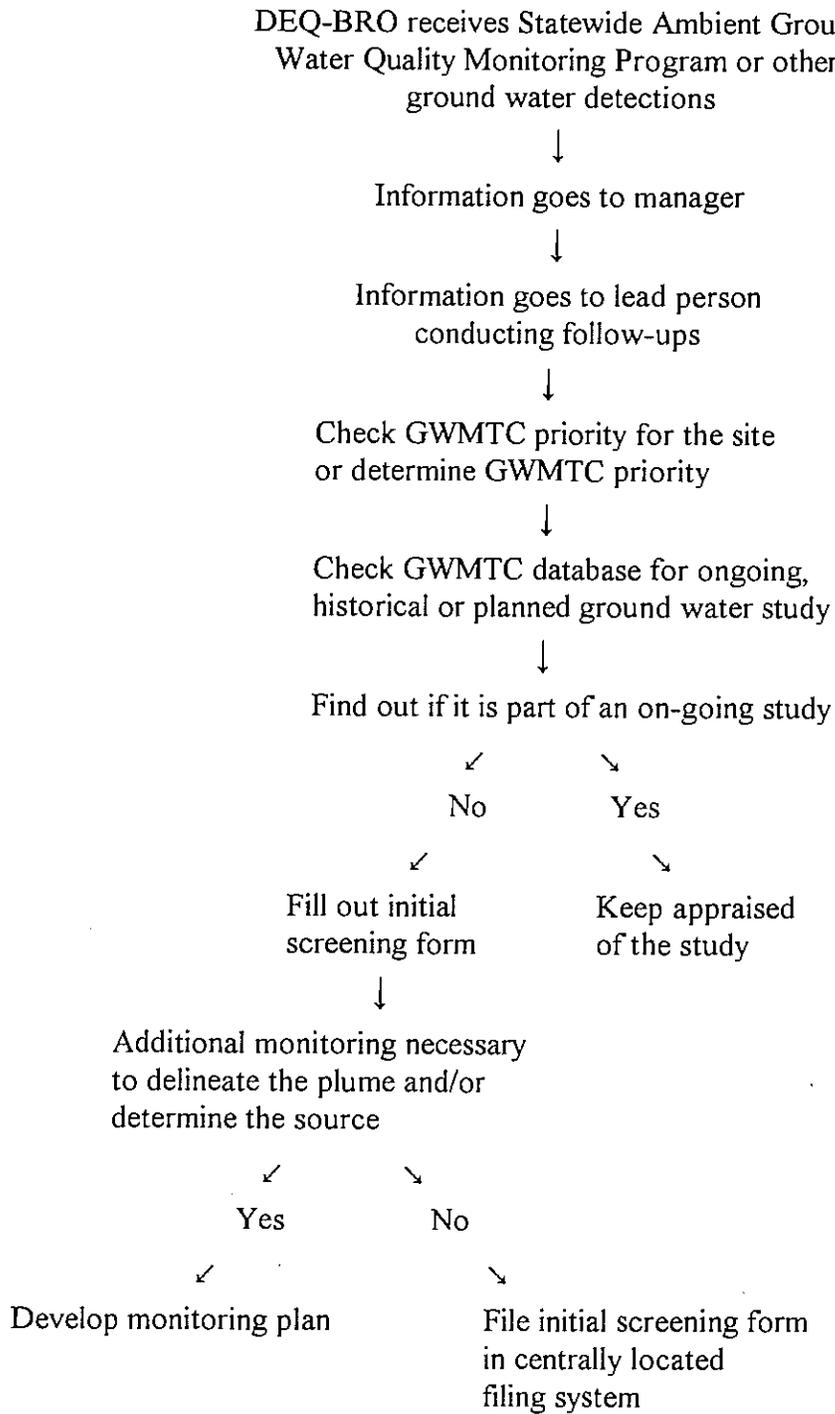
Three of the nitrate study areas were localized problems. The nitrate and arsenic in the West Caldwell area will need additional samples collected in a larger area to identify the cause of the impacts. The arsenic found in the ground water near the Snake River in Canyon and Owyhee Counties was too pervasive to be a localized problem (see Figures 5, 6, 7 and 8 on pages 11, 12, 13, and 14; respectively). The arsenic along the Snake River and the fluoride in the Idaho Batholith appear to be naturally occurring. Additional work is needed to understand the scope of this problem and to help the well owners understand their ground water quality.

INTRODUCTION

The Ground Water Protection Act of 1989 formed the Ground Water Quality Council to develop a Ground Water Quality Plan for Idaho (Ground Water Quality Council, 1992). The Idaho Ground Water Quality Plan of 1992 is a planning document to manage protection of ground water quality, prevention of ground water contamination and remediation of contaminated ground water. It establishes the basis for continuing efforts to protect ground water now, and for future generations.

The policy of the state of Idaho, as stated in the Idaho Ground Water Quality Plan, is to implement and maintain a monitoring program designed to investigate ground water quality in regional and local areas where contamination may have occurred. The Ground Water Monitoring Technical Committee, which is composed of numerous agencies, was formed to identify and prioritize where ground water contamination was found. This report documents the regional follow-up ground water studies in fifteen "Priority One" areas as identified by the Ground Water Monitoring Technical Committee for the Division of Environmental Quality, Boise Regional Office (DEQ-BRO).

Ground Water Detection Follow-up Flow Chart



C:\DATA\WP61\FOLLOW.UP

METHODS AND MATERIALS

The process of collecting and handling of samples followed the Standard Operating Procedures for the Statewide Ambient Ground Water Quality Monitoring Program (Statewide Program) and Guidelines for the Collection, Treatment, and Analysis of Water Samples, U.S. Geological Survey Western Region Field Manual. All well owners were mailed information regarding the constituent of concern in their area, along with their sampling results and an explanation of their water quality.

RESULTS AND DISCUSSION

Figure 1 on page 4 shows the location of all the ground water study areas. The following text describes the individual ground water studies, first grouped by county and then alphabetically by site name.

ADA COUNTY

Dry Creek

The Dry Creek study area is in Ada County, near Highway 55 and Beacon Light Road, northeast of Eagle. The area is rural with a transition to urban use. Geographically the area is undulating and is located within the alluvial fan of Dry Creek and Goose Creek.

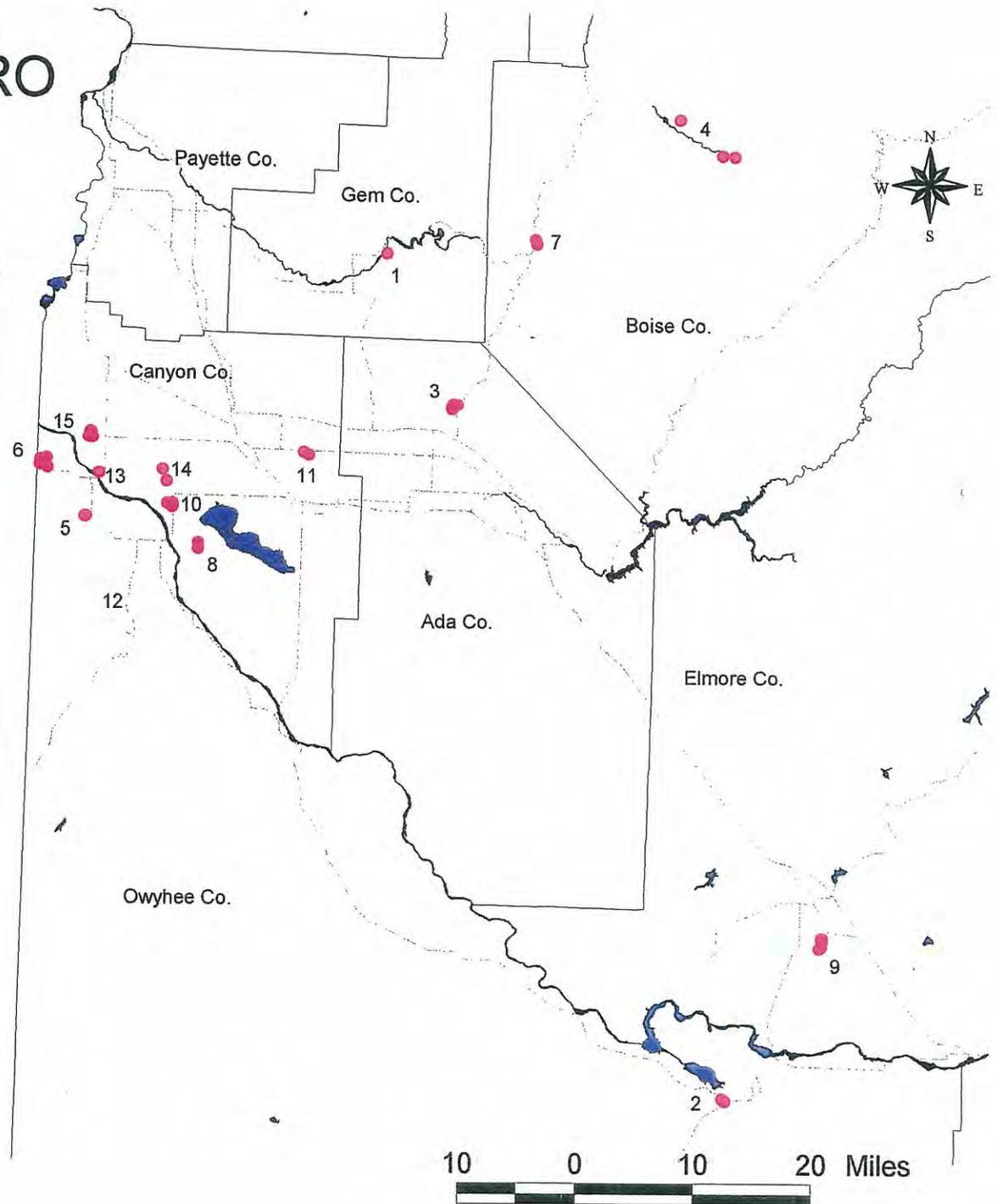
The Statewide Monitoring well in this area had elevated nitrate level of 11 mg/l in 1995. The well was drilled in 1954 to a shallow depth of 54 feet deep with a 20-foot casing. This well is not used for household purposes by the owner. The nitrate problem in this well could originate anywhere from 20 to 54 feet or from the surface since the surface seal for this well is unknown. The integrity of the well may be compromised due to the age of the well (metal corrodes with time) and the location of the well in a low spot from the yard and pastures.

Nitrate is a naturally occurring inorganic ion which makes up part of the nitrogen cycle. Elevated levels of nitrate can result from fertilizers, septic systems and decaying organic material. Nitrate levels greater than 10 milligrams per liter have the potential to cause methemoglobinemia, also known as blue baby syndrome. Methemoglobinemia related to drinking water has been observed in infants up to the age of six months and is suspected of possibly causing miscarriages.

Three permission letters to nearby well owners with well drillers' reports on their wells brought no response from the well owners giving DEQ-BRO permission to sample their wells. At a later

Figure 1. 1998 DEQ-BRO
Follow-up Studies to
Ground Water
Contaminant Detections

- Legend
- 1 Black Canyon
 - 2 Bruneau
 - 3 Dry Creek
 - 4 Garden Valley
 - 5 Homedale
 - 6 Homedale/Adrian
 - 7 Horseshoe Bend
 - 8 Lake Lowell
 - 9 Mountain Home
 - 10 North Marsing
 - 11 North Nampa
 - 12 South Marsing
 - 13 South Wilder
 - 14 West Caldwell
 - 15 West Wilder



date, three more permission letters were sent to nearby well owners with well drillers' reports. By the end of the sampling season, all six well owners asked to be included in the ground water study. Three of the wells results, well # D2, D4 and D6, were non-detect or less than the laboratory detection level for nitrate. The other three wells, well # D1, D3 and D5, had nitrate levels of 2.49 to 4.06 mg/l. The depths of the wells with nitrate detected are 70 feet or less. Nitrate fact sheets were mailed to the well owners with the results.

Similar to some other areas in Idaho, this area is showing elevated nitrate in the very shallow water-bearing zone. The deeper wells have very low nitrate levels, below or just above the laboratory detection level. The Statewide monitoring well is the only well in this area where nitrate level exceeds the Maximum Contaminant Level (MCL) of 10 mg/l. Primary MCLs are based upon health reasons. Previous ground water sampling at a regional level (>10 square miles) has not indicated that nitrate is a regional problem (see Figure 2 page 6).

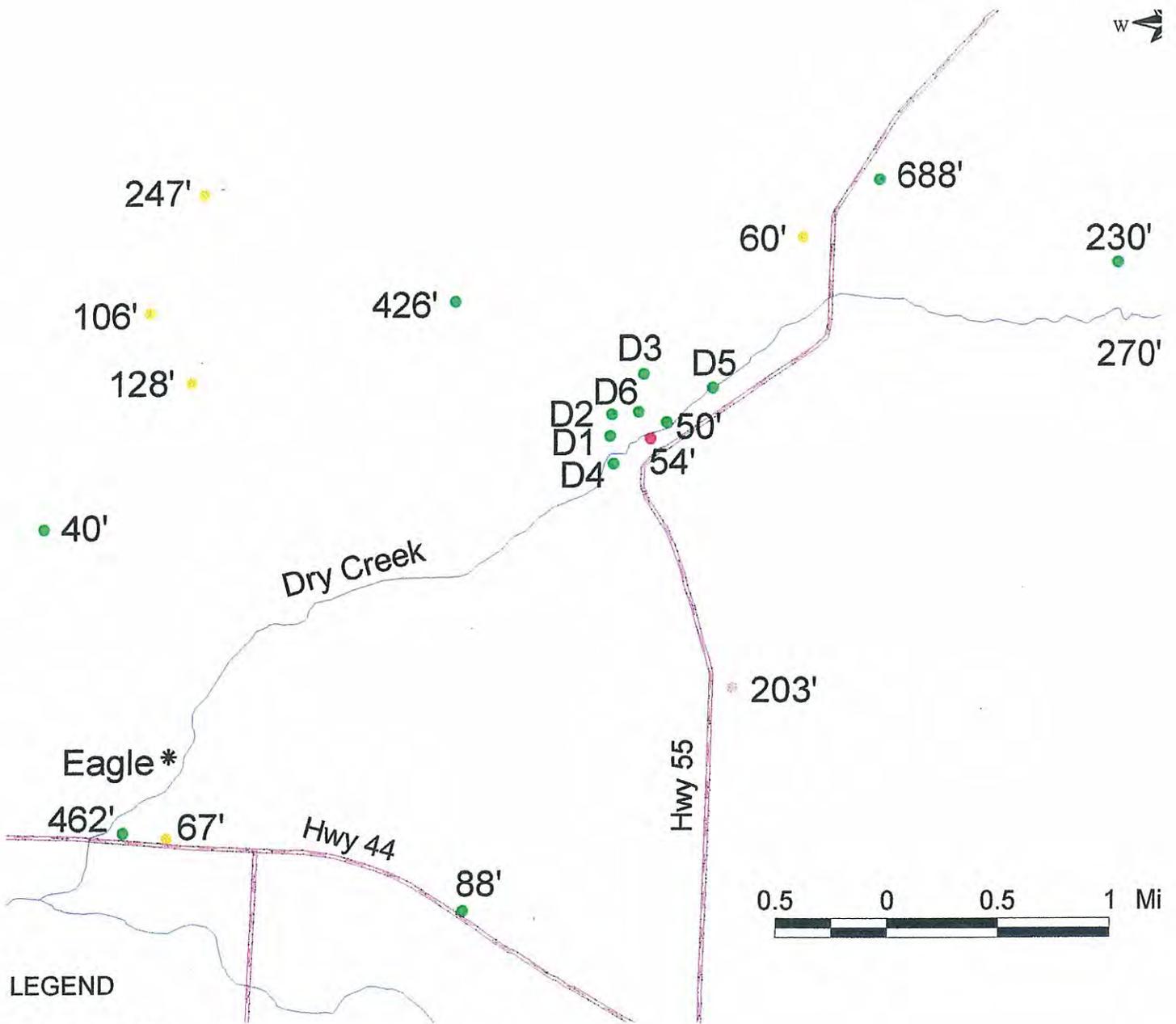
BOISE COUNTY

Garden Valley

The Garden Valley study area is in Boise County. It is located along the Banks to Lowman Highway and the Payette River, from the city of Garden Valley east about five miles. This is a sparsely populated area on the edge of the Boise National Forest. Except for the yards around the homes native plants are commonly found in this area. The Idaho Batholith, or more specifically the Atlanta Batholith is a visible geologic feature. Numerous geothermal hot springs can be found in this area.

The Statewide Program well in this area had elevated fluoride of 7.5 mg/l. The well is 152 feet deep with a 152-foot casing. The 23-foot surface seal is bentonite. The well was drilled in 1987. The water temperature is 22.2°C, so the possibility of geothermal water influence is very likely. Previous ground water sampling at a regional level (>10 square miles) has indicated that fluoride is a regional problem (see Figure 3 page 7).

Fluoride minerals are commonly found in most volcanic rocks and the soils they form. These minerals are typically not very easily dissolved in water. As a result, natural fluoride concentrations in ground and surface waters are usually low. However, under certain circumstances, natural concentrations can become elevated. Geothermal waters, or cold water bodies that are geothermal-influenced, often contain elevated fluoride concentrations. Fluoride can be helpful or harmful to your body, depending on the fluoride level. Low levels of fluoride in drinking water can be helpful in preventing tooth decay, 0.7 to 1.2 mg/l. Moderate levels, 2 to 4 mg/l, can cause staining and pitting of permanent teeth. Elevated levels, >4 mg/l, in drinking



LEGEND

Nitrate (mg/l)

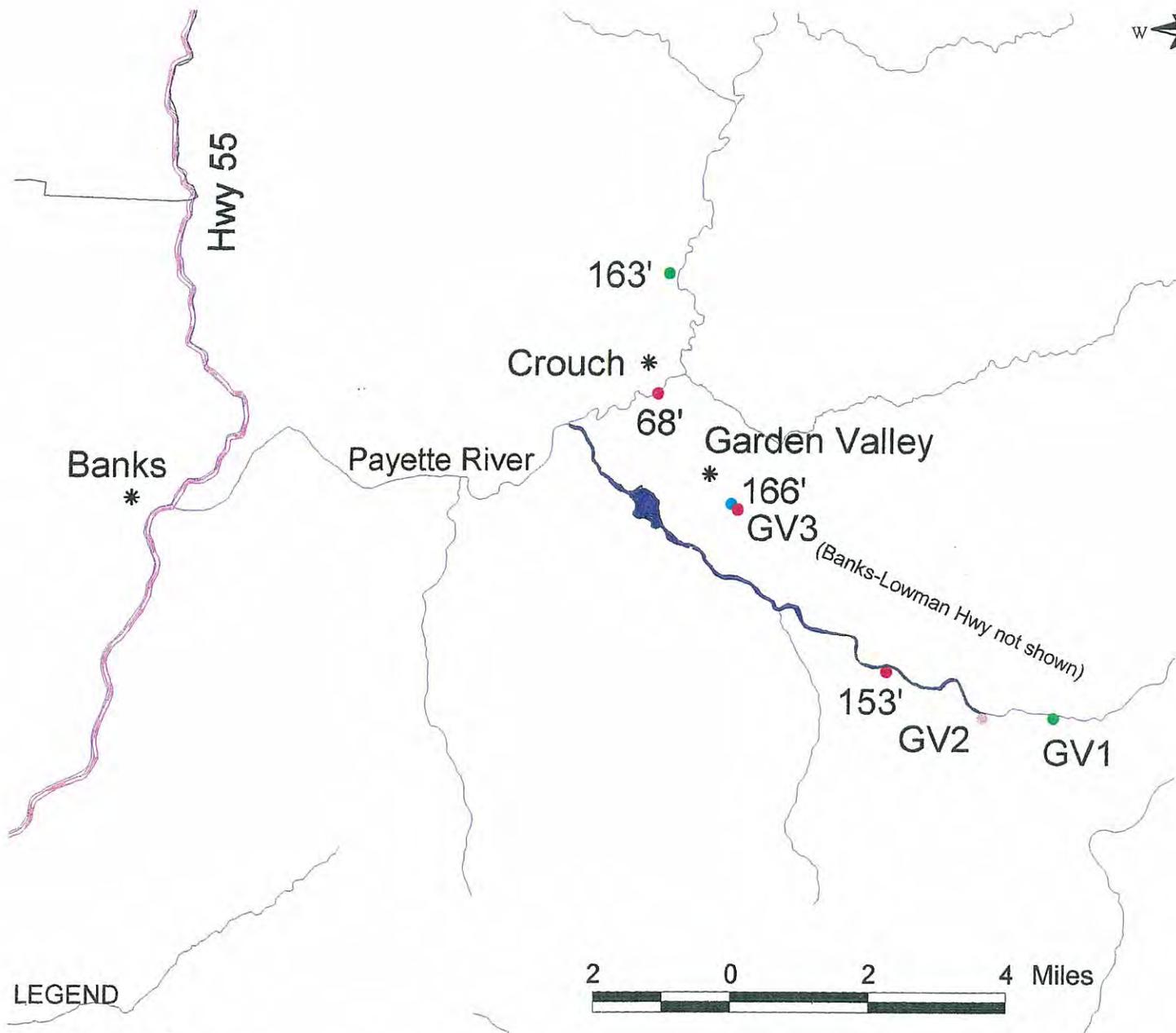
- >10
- 5-10
- 2-4.99
- <0.01-1.99

* Cities

Depths of wells
on diagram (feet)

Sites Sampled during
this Study have their
Well # instead of
Well Depth

**Figure 2. 1998 Follow-up
Ground Water Study in
the Dry Creek area plus
Historic Data**



LEGEND

Fluoride (mg/l)

- >4
- 2-3.99
- 0.4-1.99
- 0.1-0.39

* Cities

Depths of wells on diagram (feet)

Sites Sampled during this Study have their Well # instead of Well Depth

Figure 3. 1998 Follow-up Ground Water Study in the Garden Valley area plus Historic Data

water for many years may result in joint stiffness and pain, followed by serious bone and joint problems known as skeletal fluorosis.

Four well drillers' reports were found and permission letters were sent to the well owners. Only two well owners responded. While out in the area sampling, a neighbor requested to have her well included in the study, which was sampled as well # GV2. A well driller's report for well #GV2 could not be found, the well was reported to be 200 feet.

Of the three wells that were sampled, only one well had fluoride greater than the MCL of 4 mg/l. The fluoride was 5.27 mg/l in well #GV3. All well owners were mailed information explaining fluoride, including what can be done if they have fluoride at levels that should require pre-treatment or an alternate drinking source. Additional information discussed the presence of fluoride as a common naturally occurring constituent found in the ground water in the Idaho Batholith with geothermal influence. Water temperatures show the correlation of the influence of the warmer geothermal waters, the warmer the water the higher the fluoride level (see Table B2).

Horseshoe Bend

The Horseshoe Bend study area is in Boise County along the Payette River and Highway 55 in the foothills just at the edge of the Boise National Forest. This is a sparsely populated rural area of mainly range land is located on the north side of Horseshoe Bend. The Idaho Batholith, or more specifically the Atlanta Batholith, is a visible geologic feature to the north of the area.

The Statewide Monitoring well had elevated fluoride of 13 mg/l. The well is 392 feet deep with a 159-foot casing. It was drilled in 1978. The 20-foot surface seal is composed of the well cuttings.

Four well drillers' reports were found near the Statewide Monitoring well. Three well owners allowed their wells to be sampled. All of the wells had elevated fluoride; well # HB2 and HB3 had fluoride level greater than the MCL which is 4 mg/l. The depths of these wells were 250 to 300 feet. The water temperature ranged from 16.6 to 17.7 °C.

The limited data for this area near Horseshoe Bend shows elevated fluoride in the area ground water (see Figure 4 page 9). All well owners were mailed information explaining fluoride, including what can be done if they have fluoride at levels that should require pre-treatment or an alternate drinking source. Additional information discussed the presence of fluoride as a common naturally occurring constituent found in the ground water in the Idaho Batholith with geothermal influence. Water temperatures show the correlation of the influence of the warmer geothermal waters, the warmer the water the higher the fluoride level (see Table B2).

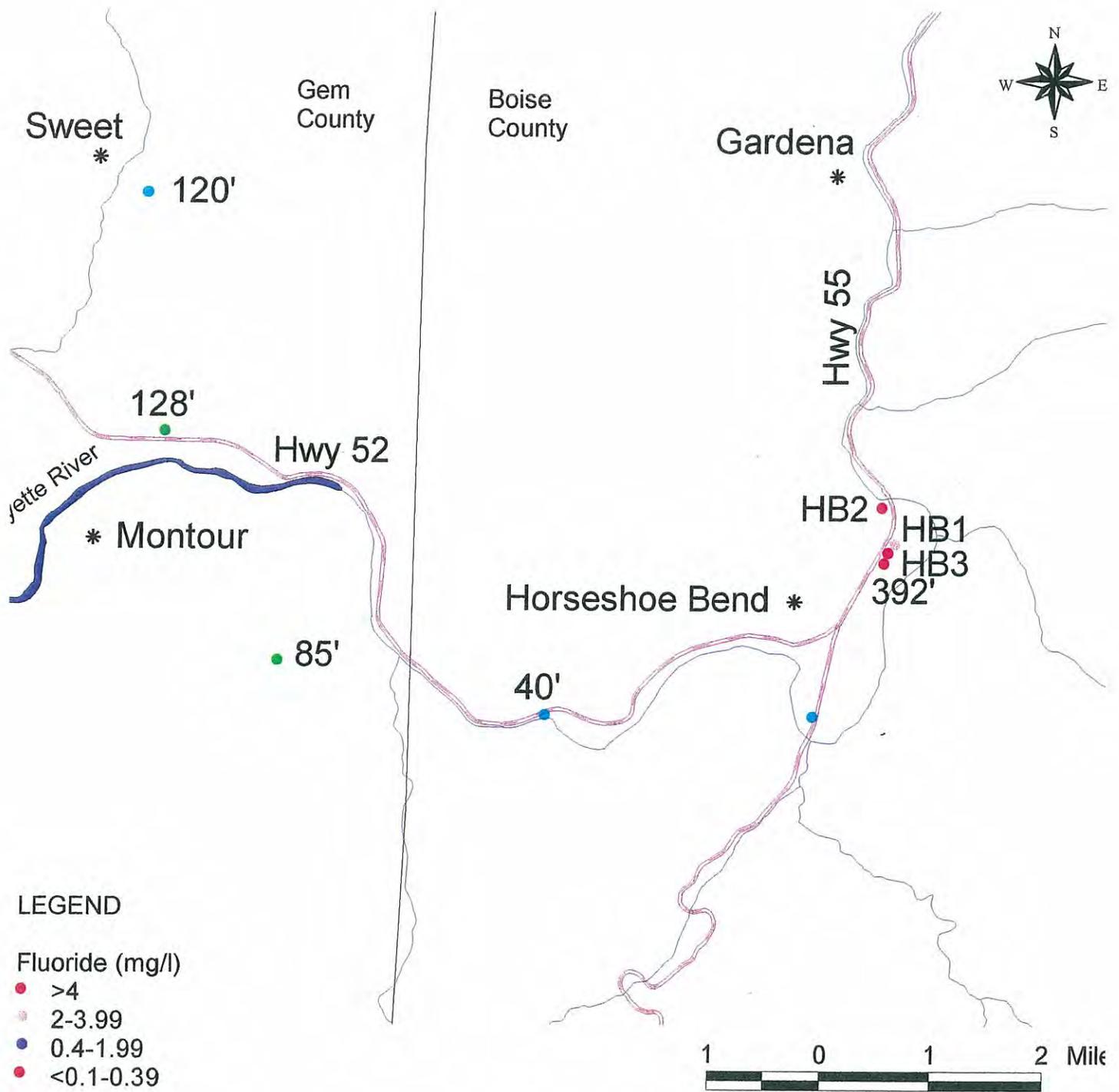


Figure 4. 1998 Follow-up Ground Water Study in the Horseshoe Bend Area plus Historic Data

CANYON COUNTY

Lake Lowell

The Lake Lowell study area is in Canyon County. The location is between the lower dam on Lake Lowell and the Snake River. It is in a sparsely populated rural area of large acreage home sites with some subdividing of homes on just a few acres. Alfalfa and wheat were the major crops growing during this sampling period. The topography is undulating to the terraces overlooking the Snake River.

The Statewide Monitoring well in this study area had elevated arsenic of 58 ug/l. The well is 247 feet deep with a 239-foot casing. The well was drilled in 1983. It has an 18-foot surface seal of puddling clay.

Four well drillers' reports were found in the area near the Statewide Monitoring well. Two of the well owners responded allowing the sampling of their wells. Well # L1 was 190 feet deep and 244 feet deep for L2. Both had elevated arsenic of 50 and 39 ug/l, respectively. The nitrate levels for the wells were a low 0.51 and 2.06 mg/l, respectively. Information on arsenic was provided to the well owners.

This appears to be the first of many sites along the Snake River where elevated arsenic levels will be discussed. The diagram for the area shows elevated arsenic from the Lake Lowell area to Huston (see Figures 5 page 11, 6 page 12, 7 page 13 and 8 page 14). The consistent elevated levels of arsenic in this area will require additional sampling before the cause of the contamination can be determined. Research on the subject alludes to the geology and hydrogeology of the area. Geothermal water along the Snake River has shown elevated arsenic, sulfate, zinc and fluoride levels in the ground water in a reduced environment (Lindholm 1983, Parlman 1983, Wood 1987, and Wood 1988). The elevated arsenic may be a consequence of geothermal water mixing with the cold water system. Health effects of arsenic over 0.05 milligrams per liter may include gastrointestinal problems, changes in fingernails and toenails, abnormal skin thickening or pigment and long term exposure includes nerve damage (including numbness in limbs) and skin cancer. However, sensitivity to arsenic varies between individuals.

North Marsing

The North Marsing study area is in Canyon County near Highway 55 in the Sunnyslope area. Topographic features are undulating. It is in a sparsely populated rural area of large orchards with some subdividing of homes on just a few acres. Just south of the study area is a large, extinct basalt vent called Lizard Butte.

The Statewide Monitoring well in this area had elevated arsenic of 85 ug/l. The well is 80 feet deep with a 79 feet of casing. The surface seal is 18 feet deep of puddling clay. The well was drilled in 1971.

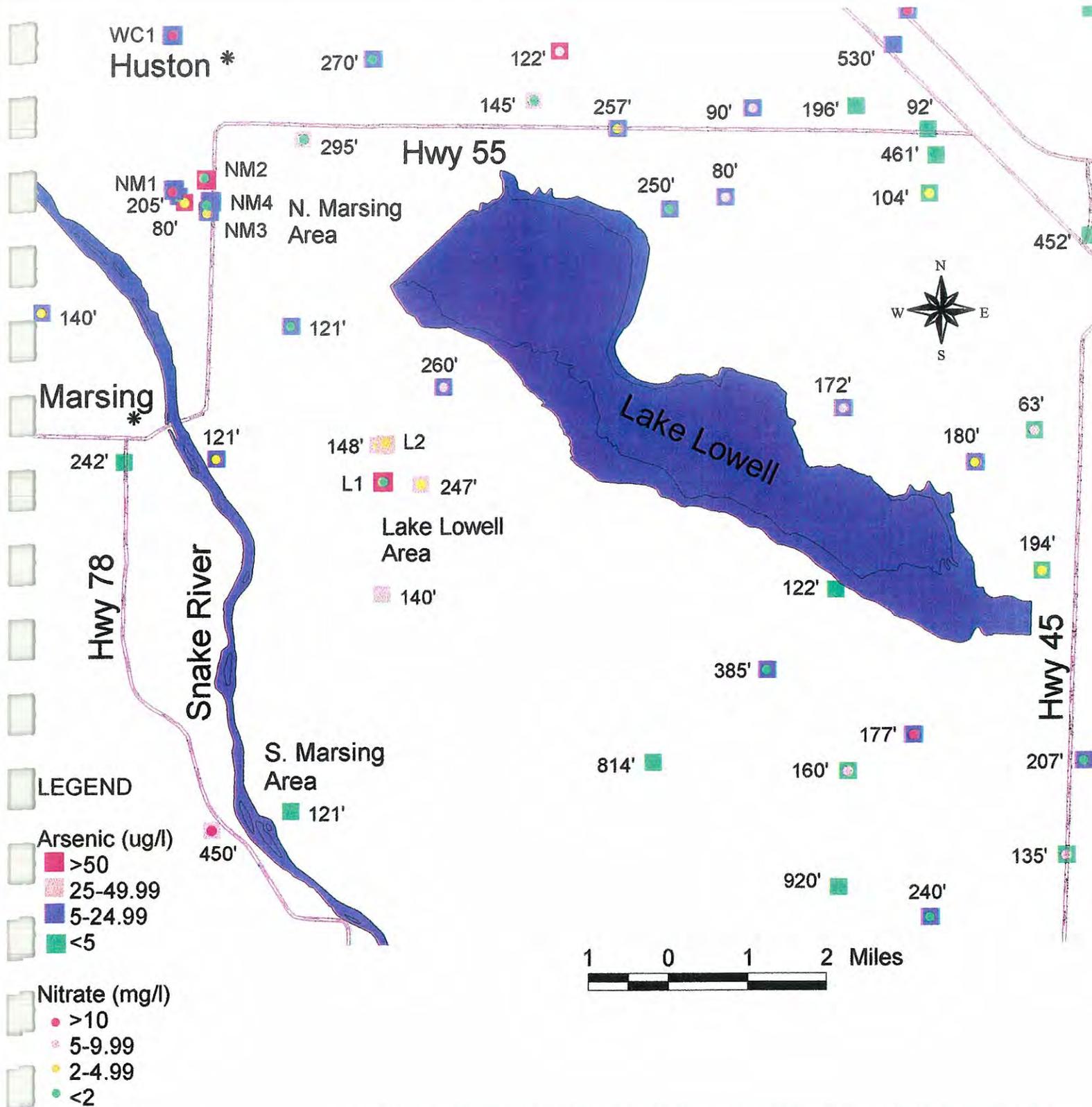


Figure 5. 1998 Follow-up Ground Water Study in the Lake Lowell and Marsing Areas plus Historic Data

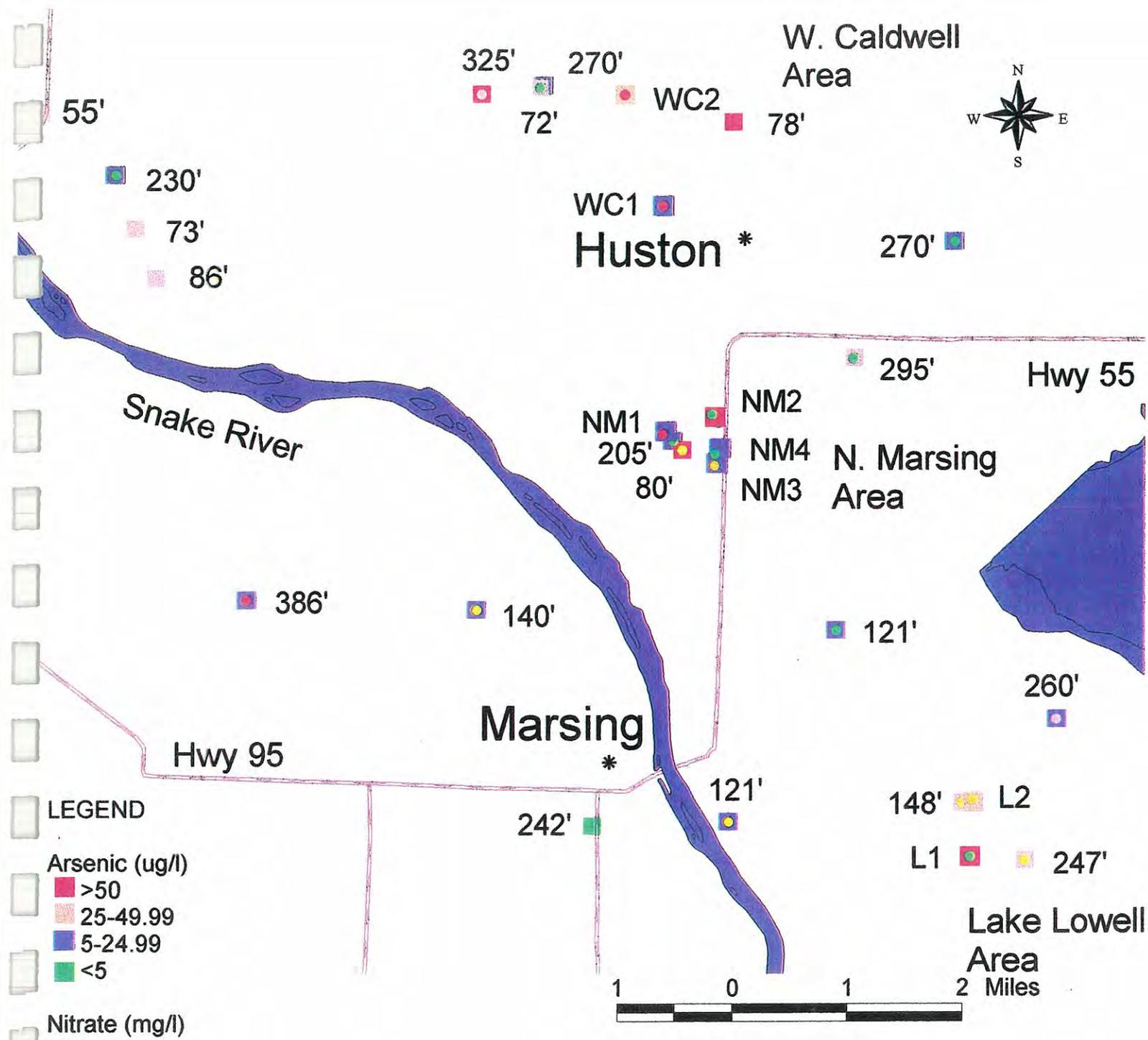


Figure 6. 1998 Follow-up Ground Water Studies in the W. Caldwell and N. Marsing Areas plus Historic Data

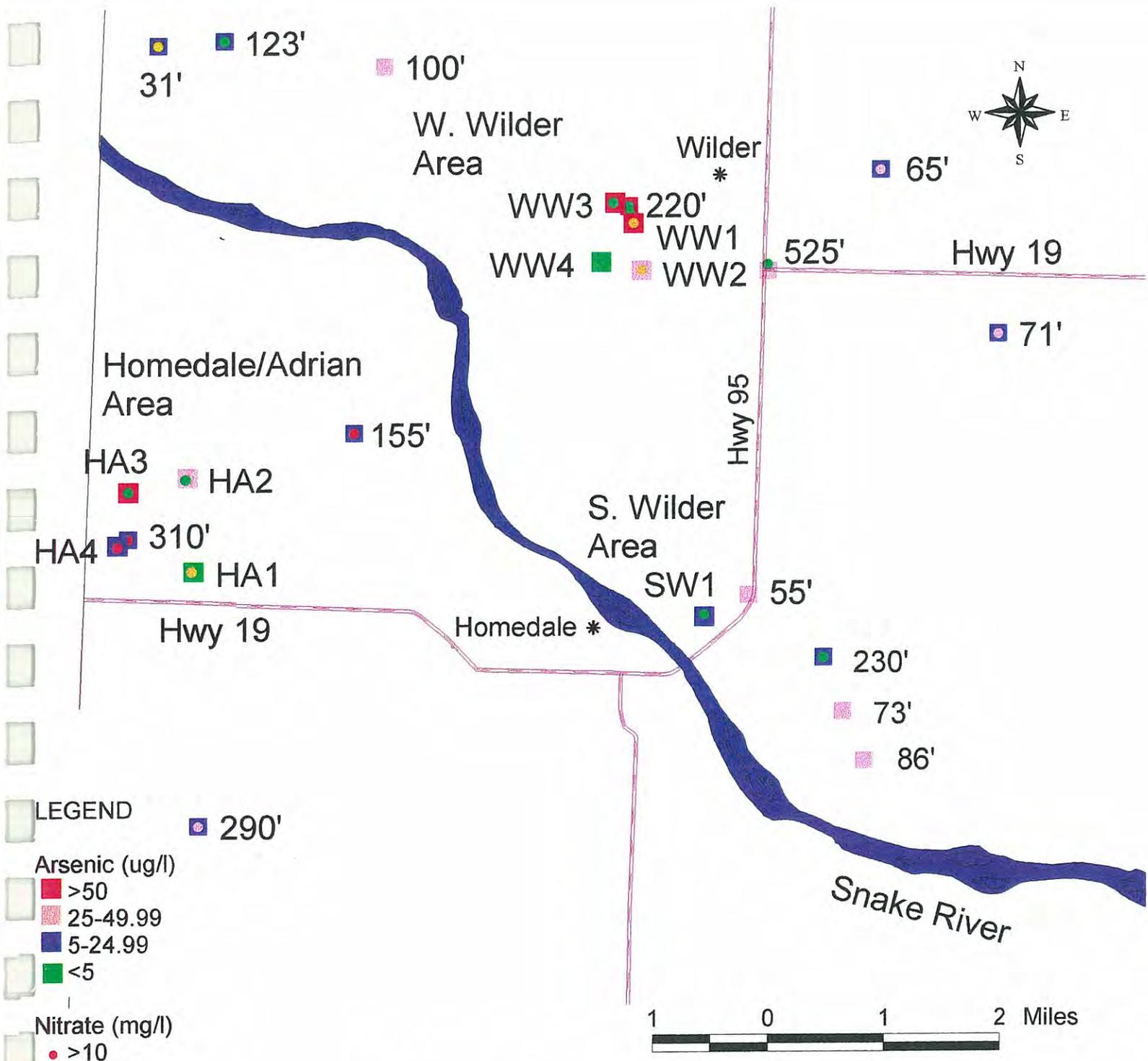


Figure 7. 1998 Follow-up Ground Water Studies in the W. Wilder, S. Wilder and Homedale/Adrian Areas plus Historic Data

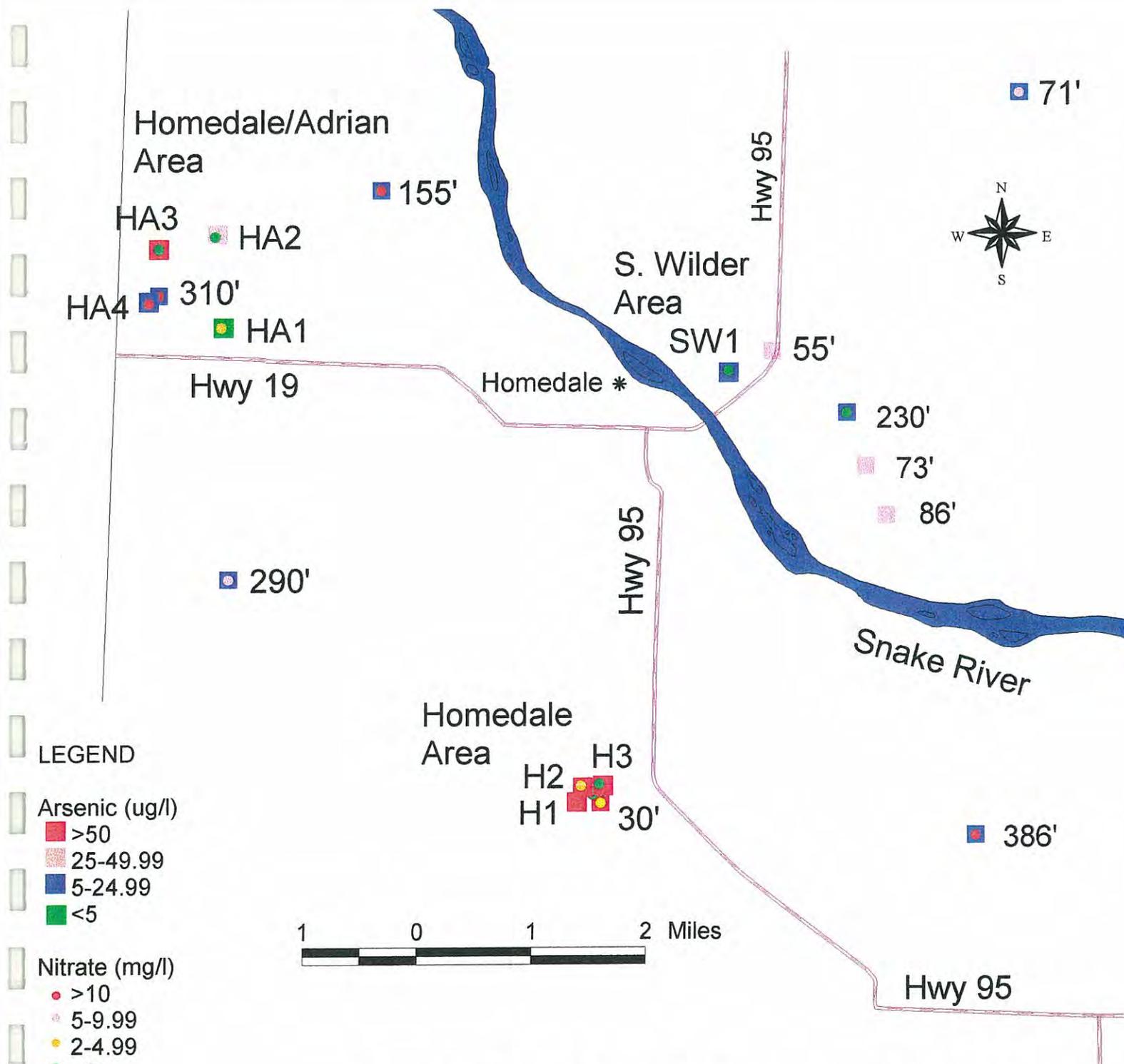


Figure 8. 1998 Follow-up Ground Water Studies in the S. Wilder, Homedale and Homedale/Adrian Areas plus Historic Data

Four well drillers' reports were found for wells near the Statewide Monitoring well. Three of the well owners gave permission to sample their wells. A fourth well, well # NM4, was added while out sampling. This well owner requested the sampling and a well drillers report was available for his well. The nitrate levels in the sampled wells were low to moderate, 1.17 - 6.01 mg/l. The well depths were 98 to 120 feet deep. The arsenic levels were 21 to 68 ug/l. The well owners were mailed information on what arsenic and nitrate are and what they can do in regard to elevated arsenic and nitrate in their well water.

This appears to be another area along the Snake River that has elevated arsenic levels. The diagram for the area shows elevated arsenic from the Lake Lowell area to Huston (see Figures 5 page 11, 6 page 12, 7 page 13 and 8 page 14). The consistent elevated levels of arsenic in this area will require additional sampling before the cause of the contamination can be determined. Research on the subject alludes to the geology and hydrogeology of the area. Geothermal water along the Snake River has shown elevated arsenic, sulfate, zinc and fluoride levels in the ground water in a reduced environment (Lindhholm 1983, Parlman 1983, Wood 1987, and Wood 1988). The elevated arsenic may be a consequence of geothermal water mixing with the cold water system.

North Nampa

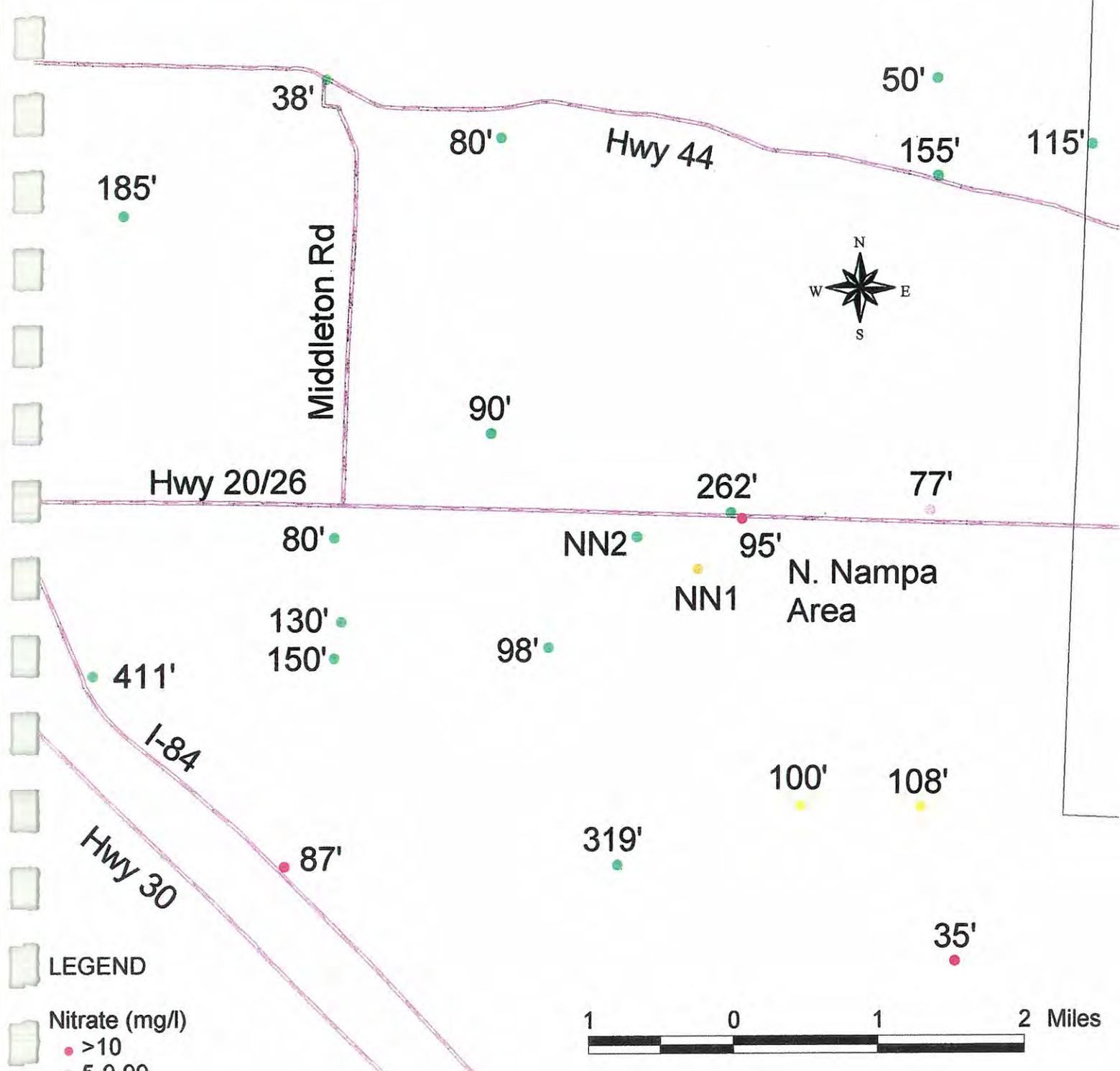
The North Nampa study area is in Canyon County on the south side of Highway 20/26 and west of Franklin Road. It is in a sparsely populated rural area with some subdividing of homes on just a few acres. The topography is a flat valley. Common row crops are sugar beets, alfalfa and potatoes.

The Statewide Monitoring well is 95 feet deep with a 90-foot casing. The surface seal of well cuttings and slurry pit is 20 feet deep. The well was drilled in 1982. The nitrate level was 17.2 mg/l from the Statewide Program results.

Four well drillers' reports were found in the area of the Statewide Monitoring well. Two well owners agreed to be part of the ground water study. These two wells are of similar depth and close proximity to the Statewide Monitoring well. Neither wells had elevated nitrate, 1.05 mg/l in well # NN1 and 2.7 mg/l in well #NN2. The historic data in the area does not show the nitrate problem that has been identified in the Statewide Monitoring well (see Figure 9 page 16). The Statewide Program well is the only well in this area where nitrate level exceeds the MCL.

South Wilder

The South Wilder study area is in Canyon County about three miles south of Wilder near Highway 95. It is in a sparsely populated rural area with some subdividing of homes on just a few acres. The topography is undulating.



- LEGEND
- Nitrate (mg/l)
 - >10
 - 5-9.99
 - 2-4.99
 - <2
 - * Cities
 - Depths of wells on diagram (feet)
 - Sites sampled during this study have their Well # instead of Well Depth

Figure 9. 1998 Follow-up Ground Water Study in N. Nampa Area plus Historic Data

The Statewide Monitoring well had elevated arsenic of 50 ug/l. The well is 55 feet deep with 40 feet of casing. The 18-foot surface seal is composed of well cuttings. The well was drilled in 1976.

Only two well drillers' reports could be found near the Statewide Monitoring well. Only one well owner responded regarding the sampling of his well. His 78-foot well had elevated arsenic of 21 ug/l, which is less than half the concentration found in the Statewide Monitoring well. Arsenic information was mailed to the well owner with his results.

The consistent elevated historic level of arsenic shows that additional sampling will need to be conducted before the cause of the contamination can be determined (see Figure 7 page 13). This appears to be another site along the Snake River that has elevated arsenic levels. The diagram for the area shows elevated arsenic from the Lake Lowell area to Huston (see Figures 5 page 11, 6 page 12, 7 page 13 and 8 page 14). The consistent elevated levels of arsenic in this area will require additional sampling before the cause of the contamination can be determined. Research on the subject alludes to the geology and hydrogeology of the area. Geothermal water along the Snake River has shown elevated arsenic, sulfate, zinc and fluoride levels in the ground water in a reduced environment (Lindholm 1983, Parlman 1983, Wood 1987, and Wood 1988). The elevated arsenic may be a consequence of geothermal water mixing with the cold water system.

West Caldwell

The West Caldwell study area is in Canyon County, about five miles west of Caldwell in Lower Deer Flat area just south of Pipe Gulch. It is in a sparsely populated rural area with some subdividing of homes on just a few acres. The topography is undulating.

The Statewide Monitoring well had elevated arsenic of 120 ug/l, and elevated nitrate of 14 mg/l. The well is 78 feet deep with a 78 feet of casing. The 35-foot surface seal is puddling clay. The well was drilled in 1974 and is used for irrigation purposes.

Five well drillers' reports were found near the Statewide Monitoring well. Only two well owners allowed their wells to be sampled. The wells were 50 and 102 feet deep. The arsenic results were 13 and 31 ug/l and nitrate concentrations were 30 and 14.3 mg/l in the 50 and 102-foot well; respectively. The well owners were mailed information on arsenic and nitrate.

This area needs additional sampling to determine the cause of the elevated nitrate. The elevated arsenic may be naturally occurring. Both constituents need to be address with any additional sampling. The area does not have any obvious potential cause for the nitrate. There is the agricultural land-use that is similar to other areas that do not have elevated nitrate.

Topographically, the area has numerous gulches and drains, in addition to the normal surface water irrigation system. Perhaps this extra water movement allows more movement of nutrients (see Figure 6 page 12).

West Wilder

The West Wilder study area is in Canyon County about a mile west of Wilder. It is in a sparsely populated rural area with some subdividing of homes on just a few acres. The topography is undulating to the terraces overlooking the Snake River.

The Statewide Monitoring well had elevated arsenic of 46 ug/l. The well is 220 feet deep that is cased to 179 feet. The 18-foot surface seal is bentonite. The well was drilled in 1989.

Four well drillers' reports were found near the Statewide Monitoring well. Two of the well owners allowed their wells to be included in the study. Two more wells were added while out in the field, by request of the well owners. A well drillers' report was located for one of the wells, well # WW4. The second well depth was known, since it was a new well, no well drillers' report could be found. Three of the wells had arsenic levels of 37 to 58 ug/l. The fourth well, well # WW2 was <0.01 mg/l for arsenic. Well # WW2 and WW4 were the two wells at the edge of the terrace overlooking the Snake River and were the only wells that had a hydrogen sulfide smell in the water during the sampling. All four wells had low nitrate levels, the highest nitrate level was in well # WW2 which was 2.68 mg/l.

This appears to be another site along the Snake River that has elevated arsenic levels (see Figure 7 page 13). The diagram for the area shows elevated arsenic from the Lake Lowell area to West Wilder (see Figures 5 page 11, 6 page 12, 7 page 13 and 8 page 14). The consistent elevated levels of arsenic in this area will require additional sampling before the cause of the contamination can be determined. Research on the subject alludes to the geology and hydrogeology of the area. Geothermal water along the Snake River has shown elevated arsenic, sulfate, zinc and fluoride levels in the ground water in a reduced environment (Lindholm 1983, Parlman 1983, Wood 1987, and Wood 1988). The elevated arsenic may be a consequence of geothermal water mixing with the cold water system.

ELMORE COUNTY

Mountain Home

The Mountain Home study area is in Elmore County about four miles south of Mountain Home. It is in a sparsely populated rural area of large acreage home sites with some homes on just a few acres. The main crops growing in the area during the sampling was alfalfa, wheat and sugar beets. The land-use is rangeland where crops are not grown. The topography is a flat valley. The well drillers' reports for the area show the geology to have about twenty feet of top soil overlain by basalt. There are visible basalt cobbles and boulders throughout the valley where fields are not used for agricultural purposes. This study area was a cooperative ground water study with the Idaho State Department of Agriculture (ISDA).

The Statewide Monitoring well is a shallow well (79 feet deep). It is an older well with no well drillers' report available. The well had elevated nitrate of 29 mg/l and low detections of pesticides (atrazine 2 ug/l; cyanazine 0.1 ug/l; deethylatrazine 0.61; and prometon 0.009 ug/l).

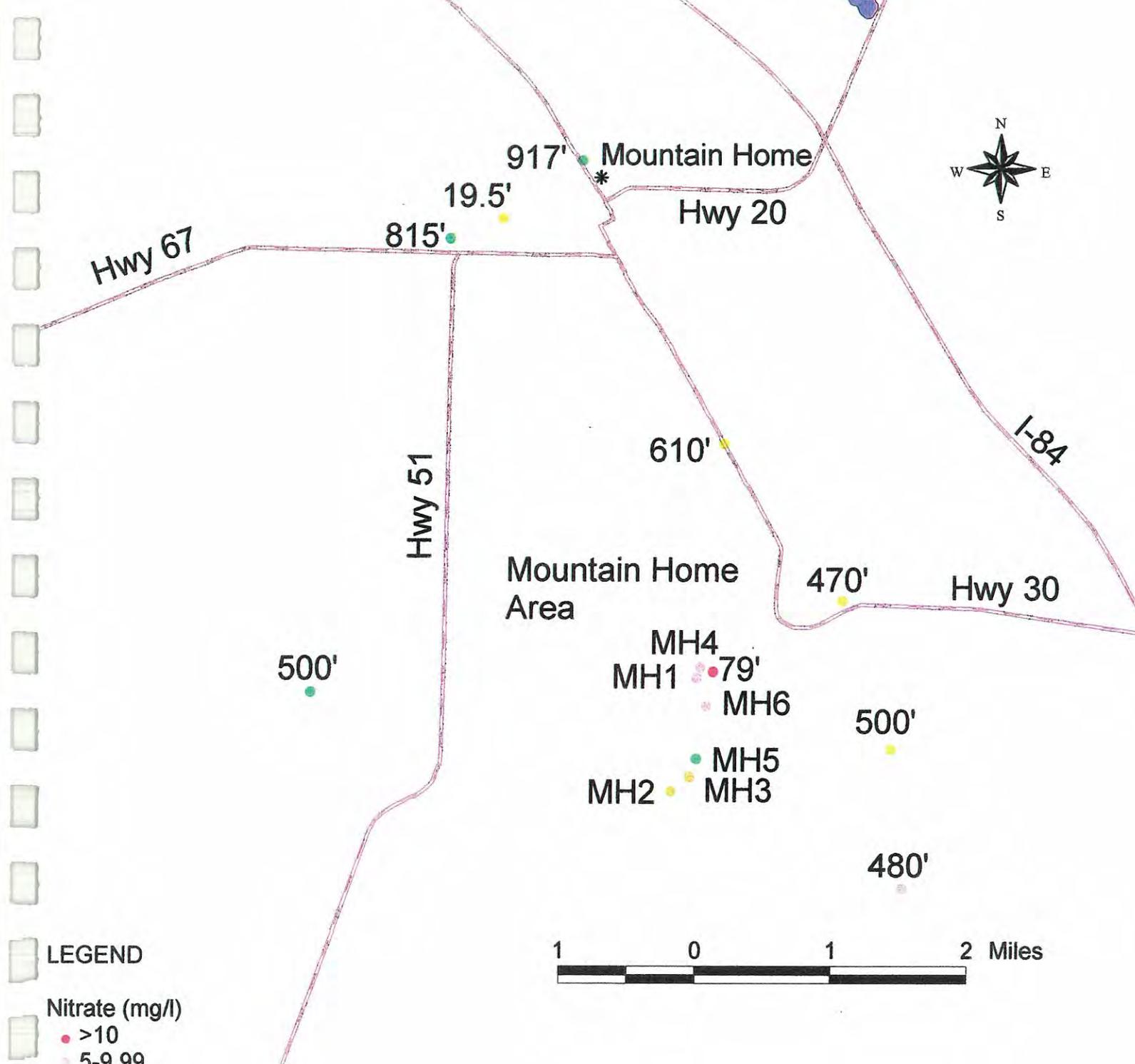
Five well drillers' reports were found in the area. The well owner's allowed their wells to be sampled, but only four well drillers' reports matched four of the wells. The well owner of well # MH6 and MH4 requested that their domestic wells be sampled, even though a well driller's report for those wells could not be found. The highest nitrate levels in this study area were found in the shallowest well. However, it may be a localized nitrate problem (see Figure 10 on page 20), the shallow wells are all in close proximity and the deeper wells were located farther away from the shallow wells. A better mix of shallow and deep wells could not be found in this study area.

GEM COUNTY

Black Canyon

The Black Canyon study area is in Gem County. It is located from Plaza Road bridge down stream of the Payette River for approximately two miles. This sparsely populated rural area is within the Payette River floodplain. The area has mainly pastures for livestock and some orchards, only pastures are near the Statewide Program well.

The Statewide Monitoring well in this area had elevated arsenic of 58 ug/l in 1994. The well is 94 feet deep, cased 93 feet with a 18-foot casing. The surface seal is puddling clay. The well was drilled in 1971.



- LEGEND**
- Nitrate (mg/l)
 - >10
 - 5-9.99
 - 2-4.99
 - <2
 - * Cities
 - Depths of wells on diagram (feet)
 - Sites sampled during this study have their Well # instead of Well Depth

Figure 10. 1998 Follow-up Ground Water Study in the Mountain Home Area plus Historic Data

Only three well drillers' reports could be found on the west side of the Payette River which is where the Statewide Monitoring well is located. None of these well owners responded. Three more well drillers' reports showed wells on the east side of the Payette River. Only one well owner responded and granted permission to sample his well. No arsenic was detected (<10 ug/l) in this well. The process of determining the cause for the elevated arsenic level in the Statewide Monitoring well cannot be made due to the low response from well owners in the study area. Previous ground water sampling at a regional level (>10 square miles) has not indicated arsenic as a regional problem (see Figure 11 page 22).

OWYHEE COUNTY

Bruneau

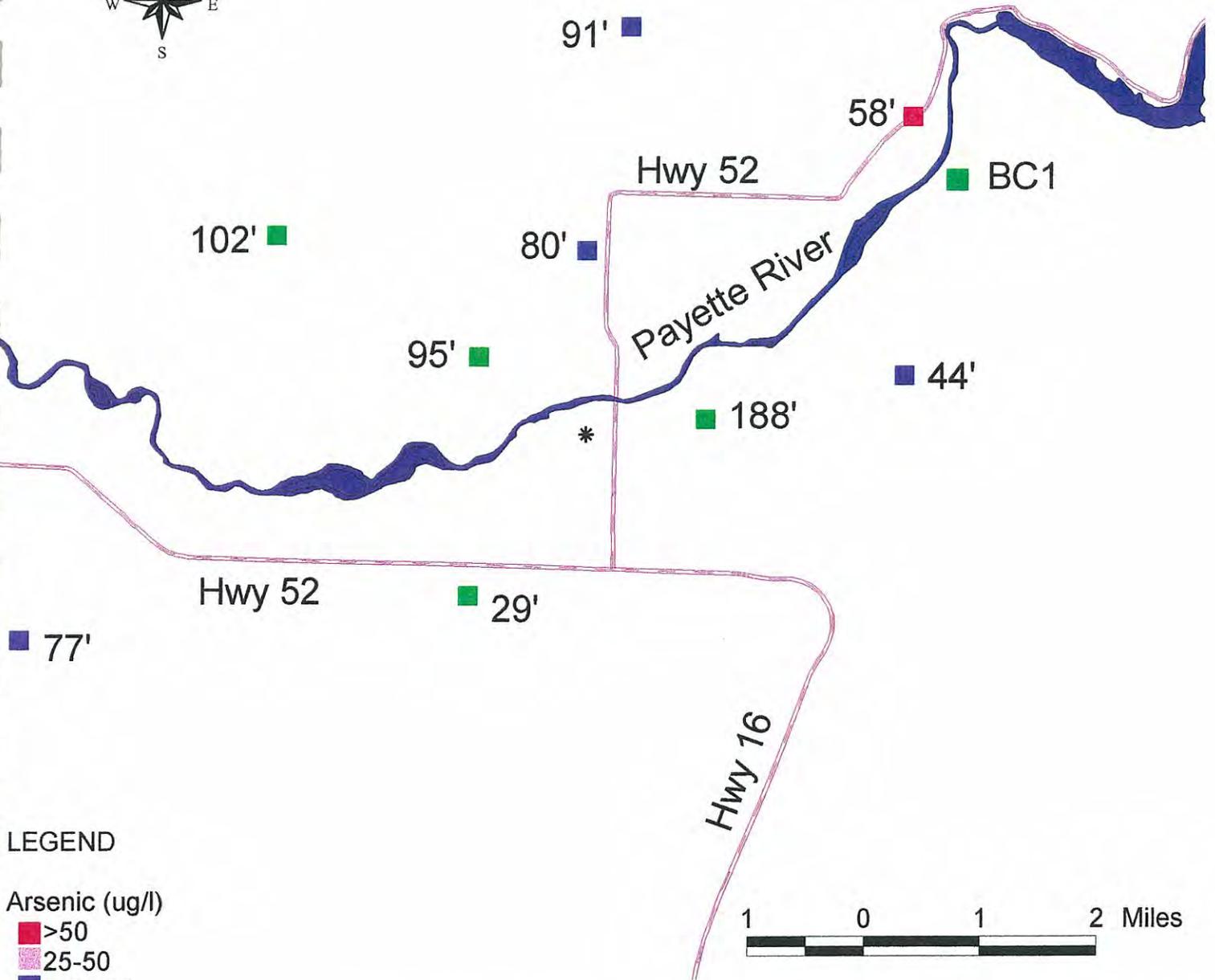
The Bruneau study area is in Owyhee County. It is located near the junction of Highway 78 and Highway 51. This is a sparsely populated rural area within an open range setting. The study sites were approximately a half a mile away and 50 feet higher than the Bruneau River. Basalt outcrops are visible throughout the study area.

The Statewide Monitoring well in this area had elevated nitrate (16.3 mg/l), selenium (170 ug/l) and zinc (5130 ug/l) levels, all of these levels exceed the MCL for those constituents. As mentioned previously, the nitrate regulatory level is 10 mg/l. The regulatory level for selenium is 50 ug/l and 5000 ug/l for zinc. The well was drilled in 1976 to 205 feet deep, but was only cased to 90 feet with a screen section placed from 185 feet to 205 feet. No well casing was installed from 90 to 185 feet, that section is open through the basalt. The water quality impact in this well can be originating anywhere along the open drill hole or the screened section, from 90 feet to 205 feet. Previous ground water sampling at a regional level (>10 square miles) has not indicated that nitrate is a regional problem (see Figure 12 page 23).

Of the three wells with well drillers' reports, two of the well owners participated in the ground water study. Neither of the wells had nitrate, selenium or zinc concentrations in the impacted ranges. One of the wells had slightly elevated arsenic. An arsenic fact sheet was mailed with the results to the well owner. It appears that the Statewide monitoring well has ground water degradation due to the storage of road salting materials near the well. The well is constructed so that the shallower ground water, where contamination is greatest, is providing a significant portion of the water supply.

Homedale

The Homedale study area is in Owyhee County. It is located about three miles south of



LEGEND

Arsenic (ug/l)

- >50
- 25-50
- 5-24.99
- <5

* Cities

Depths of Wells
on Diagram (feet)

Sites sampled during
this study have their
Well # instead of
Well Depth

Figure 11. 1998 Follow-up Ground Water Study in the Black Canyon Area plus Historic Data

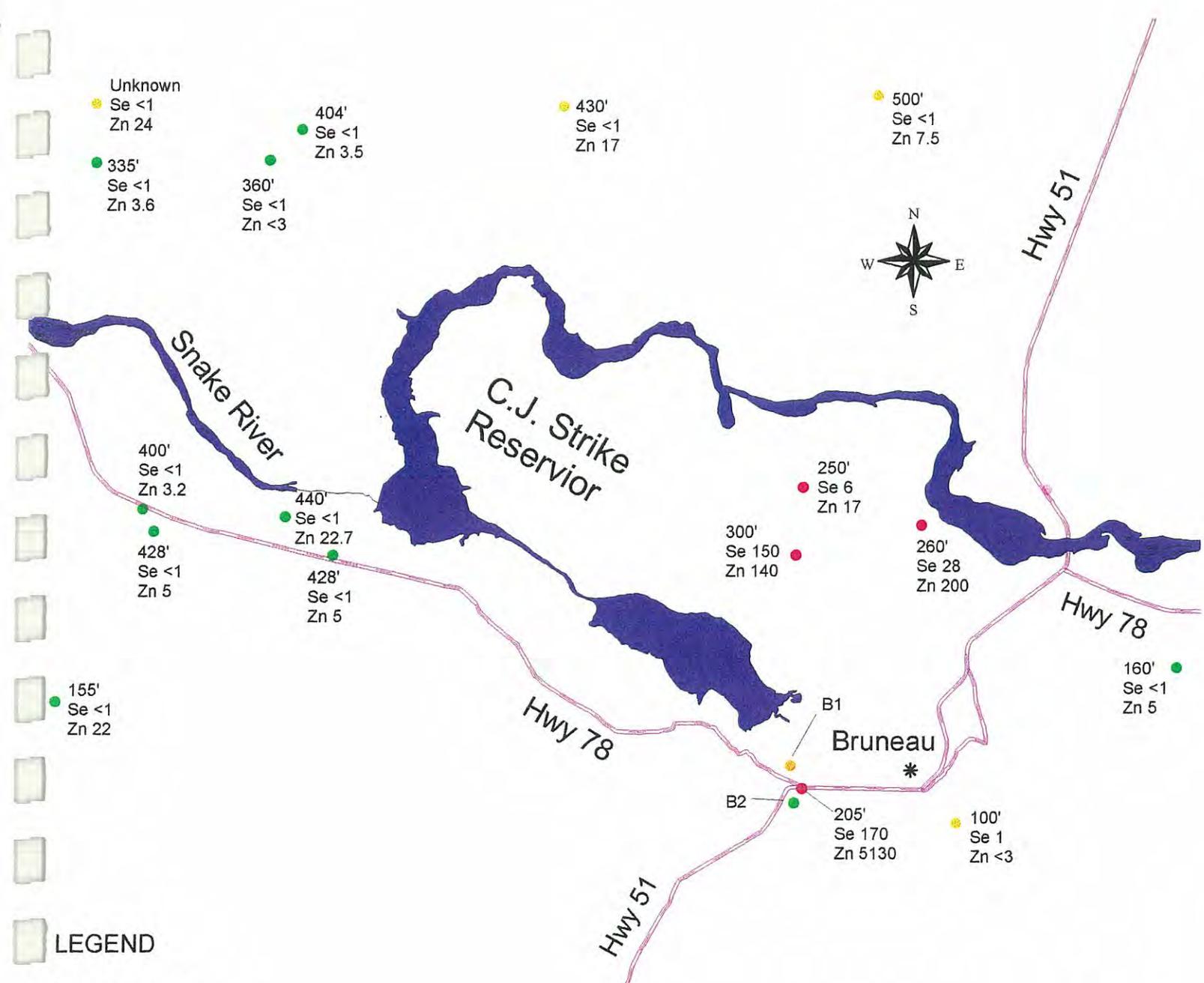


Figure 12. 1998 Follow-up Ground Water Study in the Bruneau Area plus Historic Data

Homedale on the west side of Highway 95. This is a sparsely populated rural area. This area has an extensive volcanic geologic history. The land use in the area is primarily agricultural. The most common crops growing during the study were alfalfa and corn.

The Statewide Monitoring well in this area had elevated arsenic of 58 ug/l. The well is 30 feet deep with a 29-foot casing. The 18-foot surface seal is composed of well cuttings. The well was drilled in 1975 and is used to water stock.

Three well drillers' reports were found for wells near the Statewide Monitoring well. Two of the wells owners gave permission to have their wells sampled. After arriving at one of the sites the owner explained that she had two wells on her property with available well drillers' reports, so both wells were sampled, wells # H1 and H2. The depths of the wells varied greatly. Well # H1 was 90 feet deep, well # H2 was 275 feet deep and Well #H3 was 34 feet deep. The arsenic results in the wells were 62, 54 and 105 ug/l, respectively. The nitrate levels in these wells were 12, 6.05 and 1.67 mg/l, respectively. The arsenic and nitrate levels were more elevated in the shallower wells. The arsenic levels, even though it differed with depth, was above the MCL of 50 ug/l in all the wells. The well owners were mailed information on arsenic and nitrate. Figure A8 page 14 shows the water quality for this area.

This appears to be another site along the Snake River that has elevated arsenic levels (see Figure 8 page 14). The diagram for the area shows elevated arsenic from the Lake Lowell area to Homedale (see Figures 5 page 11, 6 page 12, 7 page 13 and 8 page 14). The consistent elevated levels of arsenic in this area will require additional sampling before the cause of the contamination can be determined. Research on the subject alludes to the geology and hydrogeology of the area. Geothermal water along the Snake River has shown elevated arsenic, sulfate, zinc and fluoride levels in the ground water in a reduced environment (Lindhalm 1983, Parlman 1983, Wood 1987, and Wood 1988). The elevated arsenic may be a consequence of geothermal water mixing with the cold water system.

Homedale/Adrian

The Homedale/Adrian study area is in Owyhee County. It is located at the Idaho-Oregon state line about four miles west of Homedale on the north side of Highway 19. This is a sparsely populated rural area. This area has an extensive volcanic geologic history. The topography is undulating in this study area. The land use in the area is primarily agricultural. The most common crops growing during the study were alfalfa, wheat and corn.

The Statewide Monitoring well in this area had elevated nitrate of 15 mg/l. The well is 310 feet deep with a 49 feet of casing. The well was drilled in 1990 and has a 18-foot surface seal of puddling clay. With the 49 foot casing and the well drilled to 310 feet the nitrate found in the ground water could be pumped anywhere along the open casing from 49 feet to 310 feet from all the available water bearing zones in this interval.

Four well drillers' reports were found near the Statewide Monitoring well. All four of the well owners' gave permission to sample their wells. One of the well owners informed me that the well drillers' report mailed with the permission letter was not for their well, but that they were interested in having their well sampled. This well, well # HA3, had elevated arsenic at 50 ug/l and nitrate at 3.89 mg/l (well depth unknown). The 80-foot well across from the Statewide well, well # HA4, had elevated nitrate at 16 mg/l and arsenic at 22 ug/l. The other two wells with depths of 255 (well # HA2) and 410 (well # HA1) feet had nitrate at 1.49 and 4.11 mg/l and arsenic at 25 ug/l and non-detect, respectively. The well owners were mailed information on arsenic and nitrate.

The wells with the elevated nitrate are located near old corrals, which were empty at the time of sampling. This may or may not be the cause, but the nitrate appears to be localized (see Figure 8 page 14).

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South Marsing

The South Marsing study area is in Owyhee County. It is located about five miles south of Marsing on the west side of Owyhee Highway. This is very sparsely populated rural area on the terrace overlooking the Snake River. This area has extensive volcanic geologic history. The topography is undulating in this study area. The land use in the area is primarily range land.

The Statewide Monitoring well in this area has elevated nitrate (38.2 mg/l). The well is 450 feet deep with a 450 feet of casing. The well was drilled in 1975 and has a 50-foot surface seal of puddling clay.