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
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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 agriculutural 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; deethyatrazine 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

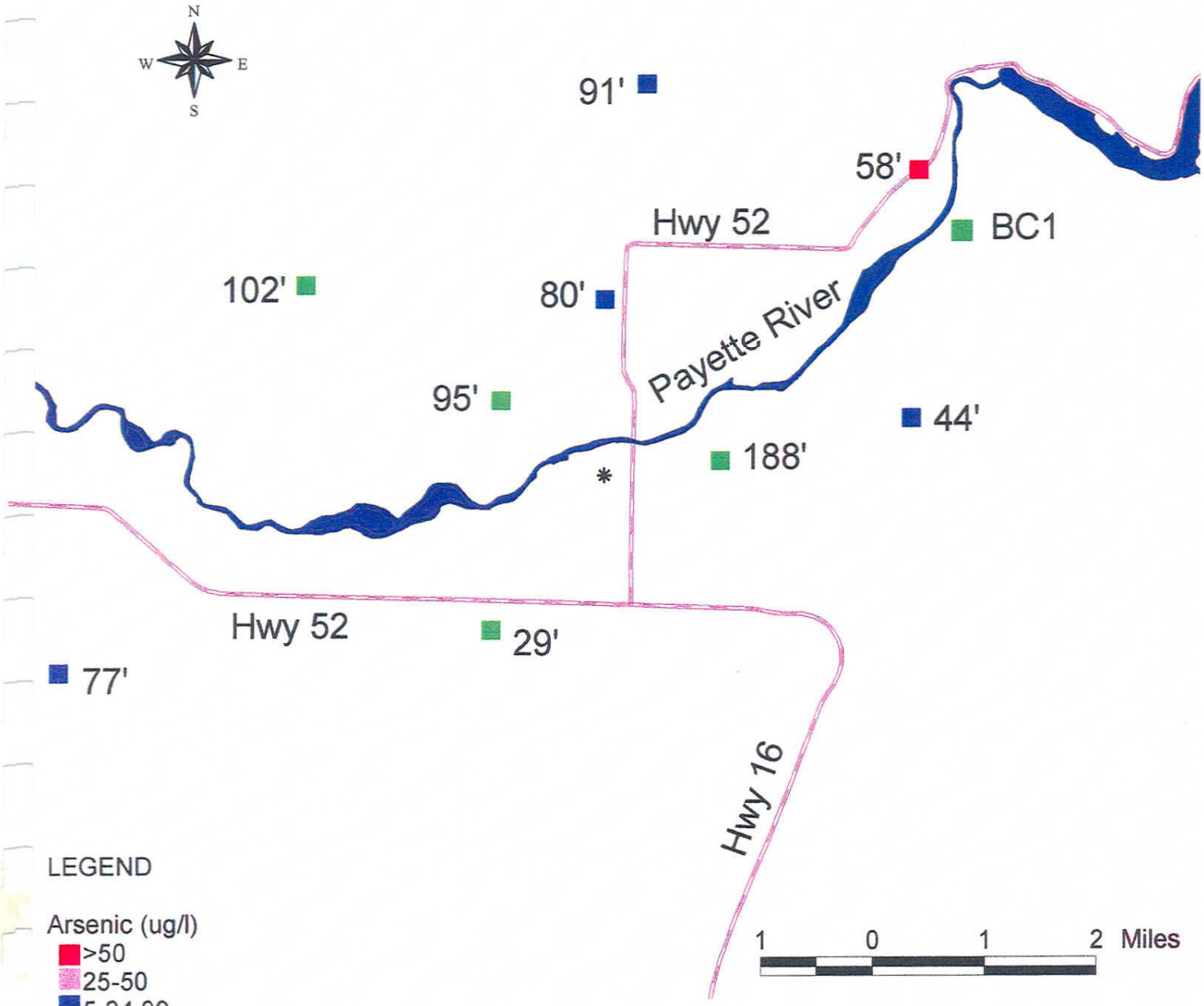
The Bruneau study area is in Owyhee County. It is located near the junction of Highway 78 and Highway 51. This is a sparsely populated rural area within an open range setting. The study sites were approximately a half a mile away and 50 feet higher than the Bruneau River. Basalt outcrops are visible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

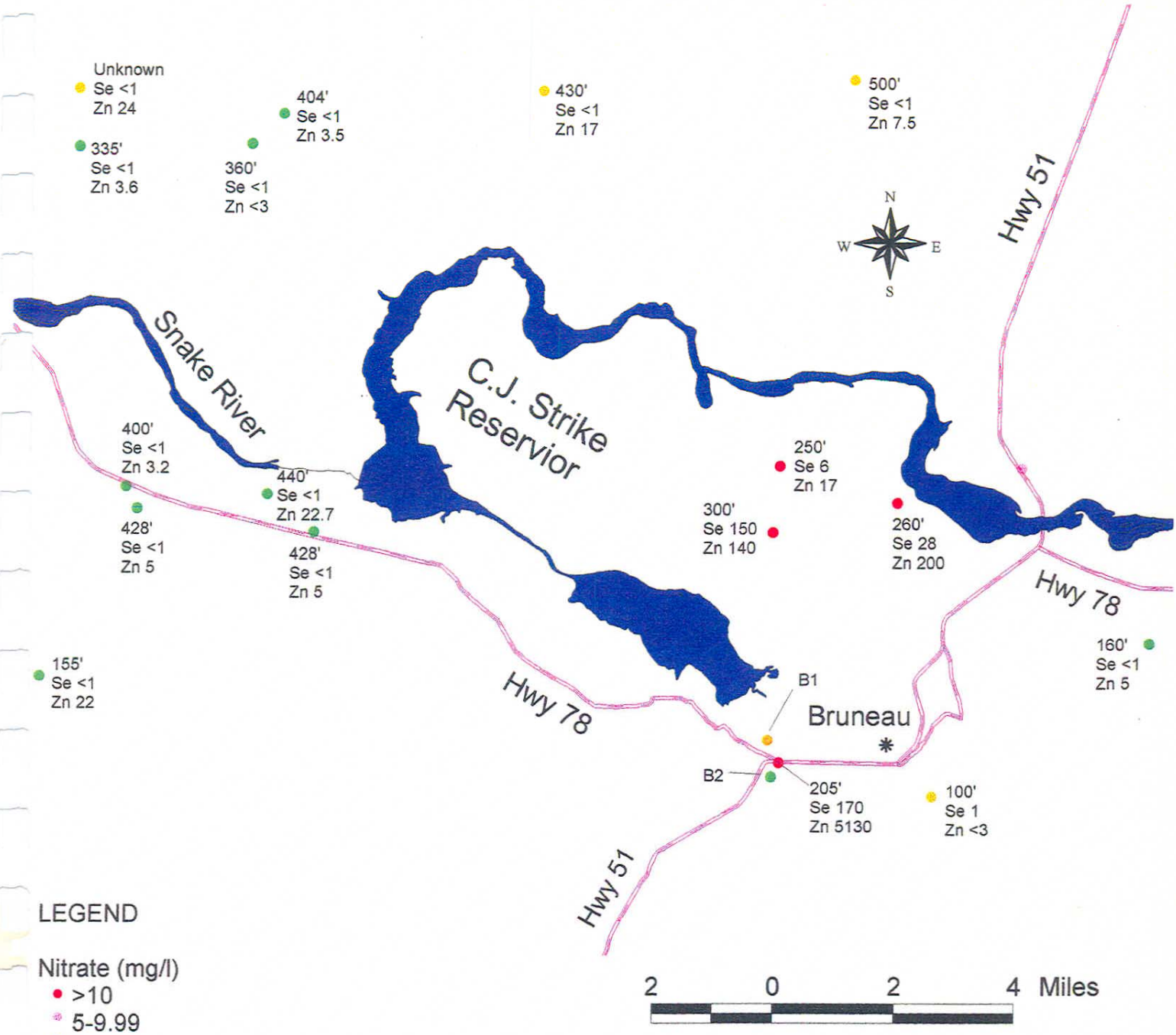
Arsenic (ug/l)
- >50
- 25-50
- 5-24.99
- <5

* 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



LEGEND

Nitrate (mg/l)
- >10
- 5-9.99
- 2-4.99
- <2

* Cities

On Diagram
Well Depth (feet)
Selenium (ug/l)
Zinc (ug/l)

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

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 (Lindholm 1983, Parliman 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).

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 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 (Lindholm 1983, Parliman 1983, Wood 1987, and Wood 1988). The elevated arsenic may be a consequence of geothermal water mixing with the cold water system.

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.

There was no response from any of the few well owners in this sparsely populated area. None of the well owners returned a permission letter to include their well in the study. Consequently, no ground water study was conducted in this area. Figure 5 page 11 shows the historic ground water data for this area.

CONCLUSIONS AND RECOMMENDATIONS

A total of forty-three wells were sampled in fourteen different study areas during the 1998 Follow-up Ground Water Studies. A total of fifteen sites had been selected. No well owners in the South Marsing area returned permission letters for their wells to be sampled, consequently no wells could sampled in that area.

Two of the sites, Black Canyon and South Wilder, only had one well owner that returned a permission letter and allowed their well to be sampled. Neither of the two wells in these two areas exhibited the arsenic or nitrate contamination that had been analyzed in the Statewide Program wells. Due to the low response from the area well owners a possible cause for the contamination could not be determined.

At three sites the results from the Follow-up studies determined that the contamination was only found in the Statewide Program well. These sites were Dry Creek, Bruneau, and North Nampa, all of the Statewide Program wells in these areas had elevated nitrate.

The sampling results from the remaining nine sites showed that the contamination problem is more extensive than just the Statewide Program well. Fifteen of the wells sampled had contamination near or above the levels found in the Statewide Program well.

Twenty-eight of the forty-three wells had contaminant levels that were below the laboratory detection level or half the level found in the Statewide Program well. The remaining fifteen wells had similar concerns that had been evaluated in the Statewide Program wells.

The 1999 Ground Water Follow-up studies need to concentrate on the wells sampled by the Statewide Program with elevated arsenic along the Snake River, and arsenic and nitrate in West Canyon County. A process to get the water quality information to more well owners in the areas and to better delineate the areas of concern needs to be developed, and in addition, continue the necessary follow-up ground water studies by DEQ.

The sites in the Idaho Batholith identified with a fluoride concern by the Statewide Program were included in the 1998 Ground Water Follow-up Studies. The Idaho Batholith ground water has been studied by the Central District Health District and DEQ in 1995 and identified the elevation

of fluoride by geothermal water intrusion in the Crouch/Garden Valley area. The 1998 Ground Water Follow-up Studies showed that the fluoride problem is also found west of Garden Valley and in Horseshoe Bend. A process needs to be developed for getting this information to current well owners and those that are planning to drill a new well in this large area.

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