



State of Utah
Department of Agriculture
and Food

2001 State of Utah Ground-Water Program



By
Mark C. Quilter
And
Ivan Sanderson

ACKNOWLEDGMENTS

The Utah Department of Agriculture and Food's (UDAF's) 2001 Ground-Water Sampling Program is successful because of contributions made by many people. UDAF's ground-water steering committee consists of Commissioner Cary Peterson; Directors Randy Parker, Dick Wilson, and Dr. David Clark; and Section and Program leaders George Hopkin and Clark Burgess. This committee gives guidance, support, and direction to the program.

Efforts by members of the Utah Association of Conservation Districts (UACD) have also contributed greatly to the success of the 2001 sampling program. They helped select sampling sites and navigated us to locations of wells to be sampled. Their knowledge of local areas and contact with people who desired well sampling proves invaluable.

Terry Monroe, Jarred Manning, and Will Atkin of Utah Division of Water Rights (WR) also helped in selection of well sites in the Pahvant and Curlew valleys. Mike Lowe and Janae Wallace of the Utah Geological Survey (UGS) allowed us to participate in a joint ground-water study in Cedar Valley. We also received help from Summit County Health Department, which led to sampling of many wells in Summit County.

This program has received excellent support from the UDAF Chemistry Laboratory Division, which performed sample analyses. The State Chemist, Dr. David Clark; staff chemists, Mohammed Sharaf, Cham Hoang, and Roxy Mabbutt and technical assistant Alba Fields provided prompt analysis of pesticide and inorganic samples collected during the year.

A critical part of the program is the collection, distribution and maintenance of data. Anne M. Johnson, UDAF's GIS Coordinator, has been most helpful by efficiently producing GIS-based maps and giving suggestions for proper data management. Her work is exhibited throughout this report.

Virginia Sligting, secretary in The Division of Marketing and Conservation, has worked tirelessly in assembling, editing, and proofreading the report manuscript. Her careful work has insured a much more accurate document.

Finally, thanks are extended to the owners of wells without whose participation and trust this program would not have functioned.

Prepared by:
Mark Quilter and Ivan Sanderson
Utah Department of Agriculture and Food

Front Cover: Dee Waldron of UACD assists Ivan Sanderson in testing water from a local well.

Table of Contents

Utah Department of Agriculture & Food State Ground-Water Program Report 2001	1
Cooperative Effort.....	1
UDAF's Ground-Water Sampling Procedures.....	1
Areas Sampled	2
Summary of Water Quality for 2001	2
UDAF Pre-Sample Information Form	4
 Zone 1	
Blacksmith Fork District	5
Sample Site Test Data for Blacksmith Fork District.....	7
North Cache District	8
Sample Site Test Data for North Cache District	9
Map #1 Blacksmith Fork and North Cache Districts	10
Northern Utah District & Idaho	11
Sample Site Test Data for Northern Utah District & Idaho	13
Map #2 Northern Utah District	17
Rich County District	18
Sample Site Test Data for Rich County District.....	20
Map #3 Rich County District	22
 Zone 2	
Davis County District	23
Sample Site Test Data for Davis County District	25
Map #4 Davis County District	29
Grantsville District	30
Sample Site Test Data for Grantsville District	32
Map #5 Grantsville and Shambip Districts.....	36
Morgan District.....	37
Sample Site Test Data for Morgan District	39
Map #6 Morgan District.....	43
Salt Lake District	44
Sample Site Test Data for Salt Lake District	46
Map #7 Salt Lake	50

Shambip District	51
Sample Site Test Data for Shambip District	52
Map #5 Grantsville & Shambip District	36
Weber District	53
Sample Site Test Data for Weber District	55
Map #8 Weber District	59

Zone 3

Alpine District	60
Sample Site Test Data for Alpine District	62
Map #9 Alpine	66
Kamas Valley District	67
Sample Site Test Data for Kamas Valley District	69
Map #10 Kamas Valley District.....	77
Summit District	78
Sample Site Test Data for Summit District	80
Map #11 Summit District.....	82
Timp-Nebo District	83
Sample Site Test Data for Timp-Nebo District.....	85
Map #12 Timp-Nebo District	89
Wasatch District	90
Sample Site Test Data for Wasatch.....	92
Map 13# Wasatch District.....	93

Zone 4

Delta District	94
Sample Site Test Data for Delta	96
Map #14 Delta District	97
Fremont River District	98
Sample Site Test Data for Fremont River District.....	99
Map #15 Fremont River District.....	100
Juab County District	101
Sample Site Test Data for Juab County District	103
Map #16 Juab County District.....	105
Millard District	106
Sample Site Test Data for Millard District.....	109
Map #17 Millard North Section District	113
Map #18 Millard South Section District.....	114
Sanpete County District	115
Sample Site Test Data for Sanpete County District.....	117
Map #19 Sanpete County District.....	121

Sevier County District	122
Sample Site Test Data for Sevier County District	124
Map #20 Sevier County District	125
 Zone 5	
Beaver District	126
Sample Site Test Data for Beaver District	128
Map #21 Beaver, Enterprise and Iron, and Upper Sevier Districts	129
Dixie District	130
Sample Site Test Data for Dixie District	132
Map #22 Dixie District	136
Enterprise and Iron (E & I) District	137
Sample Site Test Data for Enterprise and Iron District	138
Map #21 Beaver, Enterprise and Iron, and Upper Sevier Districts	129
Upper Sevier District	139
Sample Site Test Data for Upper Sevier District	140
Map #21 Beaver, Enterprise and Iron, and Upper Sevier Districts	129
 Zone 6	
Duchesne County District	141
Sample Site Test Data for Duchesne District	143
Map #23 Duchesne District	144
 Zone 7	
Green River District	145
Sample Site Test Data for Green River District	147
Price River Watershed District	148
Sample Site Test Data for Price River Watershed District	150
Map #24 Green River and Price River Watershed District	151
San Juan District	152
Sample Site Test Data for San Juan District	154
Map #25 San Juan County, Southern Section	158
Map #26 San Juan County, Northern Section	159

Utah Department of Agriculture & Food

State Ground-Water Program

Report 2001

The Utah Department of Agriculture and Food's (UDAF's) State Ground-Water Program is funded by the legislature to assist private well owners and other agencies, organizations and concerned citizens in having a better understanding of water quality. Provisions of the Federal Clean Water Act requiring drinking water testing exclude private wells used for drinking water, irrigation, and livestock watering even though these wells account for the majority of ground-water use in the State of Utah.

This report covers activities of UDAF's State Ground-Water Program for 2001.

Cooperative Effort

UDAF has a memorandum of understanding with the Utah Division of Water Rights (WR) for collecting ground-water data from the Pahvant and Curlew valleys. Sample analyses were done for inorganic and organic constituents that influence water quality. Guidance from WR has helped in selecting sampling sites and sharing data. Sampling was also done in cooperation with the Utah Geological Survey (UGS) in the Cedar Valley area of Utah County and in cooperation with the Summit County Health Department in Summit County.

UDAF also works closely with the Department of Environmental Quality (DEQ) in providing expertise for the State Pesticide Management Plan and other ground-water programs. This relationship benefits UDAF by allowing agriculture's voice to be heard and its ideas considered during the planning process. UDAF is an essential link between DEQ and farmers and ranchers of the state regarding environmental issues.

The State Ground-Water Program works with the members of local Soil Conservation Districts (SCDs) and the Utah Association of Conservation Districts (UACD) to identify private wells for sampling. SCD cooperation and knowledge of the local area has been very beneficial in identifying wells for sampling, meeting well owners, and distributing information. The work of local district members who advertise, collect names, and organize the sampling events help to make the program successful.

UDAF's Ground-Water Sampling Procedures

UDAF meets with SCDs to educate them on ground-water issues. Districts then select wells in their area for sampling and obtain preliminary sample information by using UDAF's Pre-Sample Information Form (Fig. 1). WR selected wells to be sampled in the Pahvant and Curlew valleys.

The local SCD members escorted UDAF personnel to selected well sites. At each well, location was determined using a Global Positioning System (GPS) receiver. Water was then collected for inorganic, bacteria, and pesticide analysis at each well using established protocol. Samples were packed in ice and taken to the laboratory for analysis. Reports summarizing laboratory results were sent to each well owner. GPS information was provided to UDAF's GIS administrator who provided maps of the sampled areas.

During 2001, UDAF tested all samples for coliform and E. coli bacteria using IDEXX Colilert MUG kits in the field. This has been a significant addition to the program. We also conducted nitrate testing in the field using an enzyme procedure from the Nitrate Elimination Company Incorporated, Lake Linden, Michigan. We found this procedure to be more dependable and accurate than cadmium reduction procedures that we have used in the past.

Areas Sampled

During 2001, 520 samples were taken from wells, drains, and springs in 6 of the 7 UACD zones in the state. Each UACD district sampled is addressed in this report, with a map showing sample location and a table of chemical analyses. Narrative reports are also provided for each sampled district. Below is a general summary of ground water quality for sampling during 2001.

Summary of Water Quality for 2001

There were no pesticide detections in the 520 samples taken during the 2001 sampling season. The results show that water quality is diverse throughout the state with electrical conductivity (EC) ranging from 50 to 23,100 $\mu\text{mhos/cm}$ with a mean of 1,349 $\mu\text{mhos/cm}$. Values exceeding 750 $\mu\text{mhos/cm}$ may cause damage to sensitive plants when this water is used for irrigation. When this value exceeds 3,000 $\mu\text{mhos/cm}$ severe damage to all but the most salt tolerant plants is expected. Three hundred and sixteen samples exceeded the 750 $\mu\text{mhos/cm}$ level and 33 exceeded the 3,000 $\mu\text{mhos/cm}$ level. The Federal Clean Water Act sets an aesthetic standard of 833 $\mu\text{mhos/cm}$ for drinking water. Water that exceeds this level has an objectionable flavor. Two hundred and eighty-two samples exceeded this value. When EC exceeds 3,333 $\mu\text{mhos/cm}$ it becomes a health issue. Twenty-nine samples exceeded this value. Since livestock have a much higher tolerance for saline water, the critical value for livestock watering is 8,333 $\mu\text{mhos/cm}$. Only 3 samples exceeded this level.

Variation in water temperature also demonstrates the great diversity of ground water quality throughout the state. For samples collected in 2001, water temperatures range from just above freezing at 1.7 °C to above body temperature, with a high reading of 38.3 °C. The average temperature was 14.9 °C.

An important chemical characteristic of water is pH. Generally the groundwater in Utah is slightly alkaline, with a mean pH of 7.68. The range of pH for samples collected this year is 5.2 to 9.45. The value of pH can help estimate types of dissolved minerals and compounds to be found in the water. Water on either end of this range has characteristics that adversely affect water quality. A pH value less than 6.5 indicates possible presence of heavy minerals, and a pH value greater than 9.0 may indicate the presence of excessive sodium.

Hardness of water is determined on the basis of how much calcium (Ca) and magnesium (Mg) are in the water. In Utah calcium (Ca) and magnesium (Mg) are plentiful in the soils and are also plentiful in ground water. Hardness values based on grains per gram (gpg) of water range from 0.13 (soft) to 47 (very hard) with an average of 7.6 (hard). Soft water can have high sodium values and may not be fit for culinary use even though it is classified as "soft."

Sodium affects water quality and soil in various ways. Sodium causes soil particles to separate, freeing organic matter. Soils with high sodium levels appear as dark, slick, waterlogged areas. These soils are not suitable for crop production because air and water cannot pass through them. An indicator that measures whether irrigation water can degrade soils through excess sodium is called the Sodium Absorption Ratio (SAR). When the SAR value reaches 3, soils may begin to degrade. When the SAR value reaches 9, damage is severe. SAR values for samples this year range from 0.06 to 67, with a mean of 2.4. Special irrigation practices are required when using water with a high SAR value.

As found in previous years, bacteria are a major problem for private water systems. Nine percent of the wells and springs sampled this year tested positive for coliform bacteria, as compared to 59% in 1999 and 36% in 2000. Although most coliform bacteria do not pose a health problem, their presence in well water indicates that surface waters, soil, or other contamination is getting into the well. Bacteria problems are usually seen in older wells, wells with improper casing and caps, wells that are too shallow or systems that have been improperly maintained. Of greater concern is the presence of *E. coli* in water samples. During 2001, 1% of the wells and springs sampled tested positive for *E. coli* as compared to

34% in 1999 and 7% in 2000. These wells have been contaminated with mammalian fecal material, the only source for this bacterium. The source could be effluent from septic systems near the well, poor well construction with livestock near the well head, or open wells in areas where animals and manure are present.

Specific elements that exceed irrigation, livestock, or drinking water standards are discussed in the area reports as described below.

More detailed descriptions of water quality for each sampled area are presented in this report. The report covers specific UACD zones and districts where sampling was conducted, and in some cases separate areas within districts are presented where circumstances warrant separate treatment. A map for each area is presented that shows sampling site locations. Tables of chemical, bacterial, and physical characteristics of sampled water are also presented. Measured values on the tables that exceed the primary drinking water standards are shaded, whereas those exceeding secondary standards are underlined. Measured values that exceed livestock health standards are also shaded, and values that indicate minor animal health problems are underlined. Measured values that exceed irrigation standards are underlined, with levels in the severe range being shaded.

Sample site locations can be identified on the map using the "Id#" column from the associated table. Values of -0.1 indicate that this element or compound was not measured above the detection limits of the procedure used to test for the element or compound. Appendix I lists critical values for each standard.

UDAF PRE-SAMPLE INFORMATION FORM

(This is a non-regulatory program. Data from sampling this well will be for your use and information)

Name: _____

Water Right #: _____

Address: _____

Depth of Well: _____

City: _____

Depth of Water: _____

Telephone #: _____

Conservation District: _____

Please sketch a map showing how to locate your well (North is the top of the page.) Please give street name, and distances from major intersections or any other landmarks.

May we turn your pump on without you being present? _____

Are there instructions we need to sample your well? _____

By signing this form you are giving permission for the State of Utah Department of Agriculture and Food to cross your property and sample your well.

I the undersigned am the lawful agent of the above described well and grant permission to the State of Utah Department of Agriculture and Food to sample said well. I also grant access permission to the well.

Sign on the above line

Date

For any further information contact:

Mark Quilter, Ground-Water Specialist
UDAF, 350 North Redwood Road
Box 146500, Salt Lake City, UT 84114-6500
(801) 538-9905 Fax: (801) 538-9436

FIG. 1. Pre-Sample Information Form.

Zone 1

UACD Zone 1 consists of four districts in three counties comprising the northern tier of the state including Box Elder, Cache and Rich counties.

Sixty-two sites were sampled in the four districts in Zone 1 during the spring, summer and fall of 2001. These included five sampled in the Blacksmith Fork District, two in the North Cache District, 42 in the Northern Utah District and 13 in the Rich County District. Three wells located in Idaho were also sampled. A separate narrative report is presented for each district, with maps showing approximate locations of the sample sites. The Idaho wells are discussed with the Northern Utah District. Each report covers three categories of water quality criteria: irrigation, livestock and culinary. Data are presented in four tables for each zone, grouped according to district, namely general parameters (temperature, pH, total dissolved solids (TDS), and chemicals for which there are no standards); irrigation, livestock and drinking water parameters.

Blacksmith Fork District

Water sampled in this area varies from moderate-hard to hard with gpg (grains per gallon) ranging from 5.1 to 8.3, with a mean of 6.7. Water temperature ranges from 11.5 °C to 19.2 °C, with a mean of 15.32 °C. The pH for this area ranges from 6.88 to 7.43, with a mean of 7.19.

Irrigation:

Salinity is a measurement of the concentration of ionic salts dissolved in water. It is measured as electrical conductivity (EC), in $\mu\text{mhos/cm}$. Higher conductivity values indicate higher concentrations of dissolved salts. Water high in dissolved salts increases osmotic pressures, making it difficult for plants to get water necessary for growth. Generally when EC exceeds 750 $\mu\text{mhos/cm}$, salt-sensitive plants begin to be affected. When EC exceeds 3,000 $\mu\text{mhos/cm}$, most plants would be severely injured. No samples in this district exceed the 750 $\mu\text{mhos/cm}$ standard. However, sample 1489 has a value of 747 $\mu\text{mhos/cm}$, close to the standard.

The sodium absorption ratio (SAR) measures how much sodium (Na) is in solution compared to calcium (Ca) and magnesium (Mg). Excessive sodium in the soil causes soil particles to repel each other. This destroys the structure of the soil, preventing air and water movement. SAR values greater than 3 mark the beginning of problems and values greater than 9 indicate severe problems. None of the water sampled in this district has elevated SAR values.

Bicarbonate (HCO_3) is an ion common to water solutions. It can be hazardous to plants in excessive amounts, especially when used in sprinkler irrigation. Bicarbonate also causes white deposits on plants and their fruits, which degrades their visual appeal. Bicarbonate also increases the effect of sodium when both are present. Special attention is needed when using water with excessive bicarbonate. With sensitive plants minor problems appear with bicarbonate concentrations in excess of 1.5 meq/l and severe problems appear when it exceeds 8.5 meq/l. All of the samples collected in this area have high bicarbonate, which is common for water in Utah.

No other elements were detected above concentration levels harmful to plants.

Livestock:

All of the tested water samples meet livestock quality standards.

Culinary:

Iron was found in some samples to exceed the aesthetic drinking water quality standard. Samples 1491 and 1493 have high iron (Fe). This can cause discoloration of plumbing fixtures and promote the growth of iron bacteria, which stain anything they contact. Again, this is an aesthetic issue, not a health concern.

The most serious problem with drinking water from private water systems is bacterial contamination. Because disease-causing organisms are rare, non-parasitic coliform bacteria that are found in association with parasitic bacteria are used as indicators to assess whether water could be contaminated with harmful bacteria. Coliform bacteria can occur naturally in the soil whereas E. coli, a type of coliform, develops only in the digestive systems of mammals. The presence of coliform bacteria indicates that surface water, soil, or other contaminants are entering the well. The presence of E. coli in well water, on the other hand, indicates that mammalian fecal material is entering the well. Bacterial contamination is commonly the result of well construction problems. Contamination may result from inadequate capping, a leaking well casing, improper grouting, or lack of a casing. E. coli contamination can come from defective septic systems, manure operations or septic systems too close to wells, leaky sewer systems, or shallow water tables.

Samples 1490 and 1491 are contaminated with E. coli. Wells from which these samples were collected should be inspected carefully to determine the source of contamination and should not be used for culinary purposes until the problem is corrected.

Sample Site Test Data for Blacksmith Fork District

General

Id#	Be	Ca	K	Li	Mg	Na	P	pH	°C	TDS
1489	-0.1000	114.55	13.18	-0.1000	27.82	35.32	-0.10	7.43	15.0	448
1490	-0.1000	100.07	13.45	-0.1000	23.32	25.30	0.14	7.36	19.2	397
1491	-0.1000	107.91	9.54	-0.1000	23.52	26.21	-0.10	7.33	17.8	403
1492	-0.1000	67.41	1.14	-0.1000	19.01	10.00	-0.10	6.96	11.5	245
1493	-0.1000	77.99	9.09	-0.1000	28.24	62.46	-0.10	6.88	13.1	426

Values of -0.1 are below detection limits of testing procedure

Irrigation

Id#	Al	B	Cl	CO3 meq/l	Cu	Fe	HCO3 meq/l	Mn	Se	Zn	SAR	EC umhos/cm
1489	-0.1000	0.10	37.83	-0.10	-0.1000	0.0254	<u>6.62</u>	-0.1000	-0.1000	0.22	0.8	747
1490	-0.1000	0.11	27.71	-0.10	-0.1000	0.0251	<u>5.59</u>	-0.1000	-0.1000	-0.10	0.6	661
1491	0.0595	0.10	25.51	-0.10	-0.1000	0.0510	<u>6.03</u>	0.0411	-0.1000	0.05	0.6	673
1492	0.0436	-0.10	12.29	-0.10	-0.1000	0.0268	<u>3.88</u>	0.0228	-0.1000	0.05	0.3	408
1493	0.0433	0.13	66.75	-0.10	-0.1000	0.7743	<u>5.68</u>	0.1719	-0.1000	0.14	1.5	710

Underlined values exceed irrigation standards. Shaded values indicate severe risks. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure.

Livestock

Id#	Al	As	B	Cd	Co	Cr	Mo	Ni	Pb	S	Se	EC umhos/cm	V	Zn
1489	-0.1000	-0.1000	0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	11.30	-0.1000	747	-0.1000	0.22
1490	-0.1000	-0.1000	0.11	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	<u>0.1402</u>	8.80	-0.1000	661	-0.1000	-0.10
1491	0.0595	-0.1000	0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	8.56	-0.1000	673	-0.1000	0.05
1492	0.0436	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	6.07	-0.1000	408	-0.1000	0.05
1493	0.0433	-0.1000	0.13	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	6.42	-0.1000	710	-0.1000	0.14

Underlined values indicate minor health problems (particularly smaller and younger animals). Shaded values indicate a serious health risk. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure.

Culinary

Id#	As	Ba	Cd	Cr	Cu	Fe	Mn	NO3-N	Pb	S	Se	EC umhos/cm	Zn	pH	Col	Ecoli	Hardness gpg
1489	-0.1000	0.1062	-0.1000	-0.1000	-0.1000	0.0254	-0.1000	5.4	-0.1000	11.30	-0.1000	747	0.22	7.43	0	0	8.3
1490	-0.1000	0.0743	-0.1000	-0.1000	-0.1000	0.0251	-0.1000	4.6	-0.1000	8.80	-0.1000	661	-0.10	7.36	<u>1</u>	<u>1</u>	7.2
1491	-0.1000	0.1369	-0.1000	-0.1000	-0.1000	0.0510	0.0411	2.0	-0.1000	8.56	-0.1000	673	0.05	7.33	<u>1</u>	<u>1</u>	7.7
1492	-0.1000	0.0939	-0.1000	-0.1000	-0.1000	0.0268	0.0228	0.2	-0.1000	6.07	-0.1000	408	0.05	6.96	0	0	5.1
1493	-0.1000	0.2162	-0.1000	-0.1000	-0.1000	<u>0.7743</u>	<u>0.1719</u>	0.0	-0.1000	6.42	-0.1000	710	0.14	6.88	0	0	6.2

Underlined values exceed Secondary (aesthetic) standards. Shaded values exceed Primary (health) standards. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure. For Col and Ecoli 1 = present 0 =absent.

North Cache District

The water sampled in the North Cache District area tested moderate-hard, with gpg (grains per gallon) readings from 4.8 to 5.1, with a mean of 4.9. Water temperature sampling ranges from 17.3 °C to 18.5 °C, with a mean of 17.9 °C. The pH for the area ranges from 8.12 to 7.78, with a mean of 7.95.

Irrigation:

Salinity is a measurement of the concentration of ionic salts dissolved in water. It is measured as electrical conductivity (EC), in $\mu\text{mhos/cm}$. Higher conductivity values indicate higher concentrations of dissolved salts. Water high in dissolved salts increases osmotic pressures, making it difficult for plants to get water necessary for growth. Generally when EC exceeds 750 $\mu\text{mhos/cm}$, salt-sensitive plants begin to be affected. When EC exceeds 3,000 $\mu\text{mhos/cm}$, most plants would be severely injured. No samples in this district exceed the 750 $\mu\text{mhos/cm}$ standard.

SAR measures how much sodium (Na) is in solution compared to calcium (Ca) and magnesium (Mg). Excessive sodium in the soil causes soil particles to repel each other. This destroys the structure of the soil, preventing air and water movement. SAR values greater than 3 mark the beginning of problems and values greater than 9 indicate severe problems. None of the water sampled in this district has elevated SAR values.

Bicarbonate (HCO_3) is an ion common to water solutions. It can be hazardous to plants in excessive amounts, especially when used in sprinkler irrigation. Bicarbonate causes white deposits on plants and their fruits, which degrades their visual appeal. Bicarbonate also increases the effect of sodium when both are present. Special attention is needed when using water with excessive bicarbonate. With sensitive plants minor problems appear with bicarbonate concentrations in excess of 1.5 meq/l and severe problems appear when it exceeds 8.5 meq/l. Samples 1263 and 1264, collected in this district, have high bicarbonate levels, which is common for water in Utah.

No other elements were detected above concentrations that are harmful to plants.

Livestock:

All of the tested water samples meet livestock quality standards.

Culinary:

The most serious problem with drinking water from private water systems is bacterial contamination. Because disease-causing organisms are rare, non-parasitic coliform bacteria that are found in association with parasitic bacteria are used as indicators to assess whether water could be contaminated with harmful bacteria. Coliform bacteria can occur naturally in the soil, whereas *E. coli*, a type of coliform, develops only in the digestive systems of mammals. The presence of coliform bacteria indicates that surface water, soil, or other contaminants are entering the well. The presence of *E. coli* in well water, on the other hand, indicates that mammalian fecal material is entering the well. Bacterial contamination is commonly the result of well construction problems. Contamination may result from inadequate capping, a leaking well casing, improper grouting, or lack of a casing. *E. coli* contamination can come from defective septic systems, manure operations or septic systems too close to wells, leaky sewer systems, or shallow water tables.

Sample 1264 is contaminated with coliform. The well from which this sample was collected should be inspected carefully to determine the source of contamination and should not be used for culinary purposes until the problem is corrected.

No samples were contaminated with *E. coli*.

Sample Site Test Data for North Cache District

General

Id #	Be	Ca	K	Li	Mg	Na	P	pH	°C	TDS
1263	0.0774	65.30	1.29	-0.1000	17.20	11.63	-0.1	7.78	18.5	272
1264	0.1360	59.63	1.61	-0.1000	27.02	12.40	-0.1	8.12	17.3	300

Values of -0.1 are below detection limits of testing procedure

Irrigation

Id #	Al	B	Cl	CO3 meq/l	Cu	Fe	HCO3 meq/l	Mn	Se	Zn	SAR	EC umhos/cm
1263	-0.1000	-0.10	5.62	-0.10	-0.1000	-0.1000	4.19	-0.1000	-0.1000	0.15	0.3	453
1264	-0.1000	-0.10	15.74	-0.10	-0.1000	0.0302	3.76	-0.1000	-0.1000	-0.10	0.3	500

Underlined values exceed irrigation standards. Shaded values indicate severe risks. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure.

Livestock

Id #	Al	As	B	Cd	Co	Cr	Mo	Ni	Pb	S	Se	EC umhos/cm	V	Zn
1263	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	4.06	-0.1000	453	-0.1000	0.15
1264	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	6.16	-0.1000	500	-0.1000	-0.10

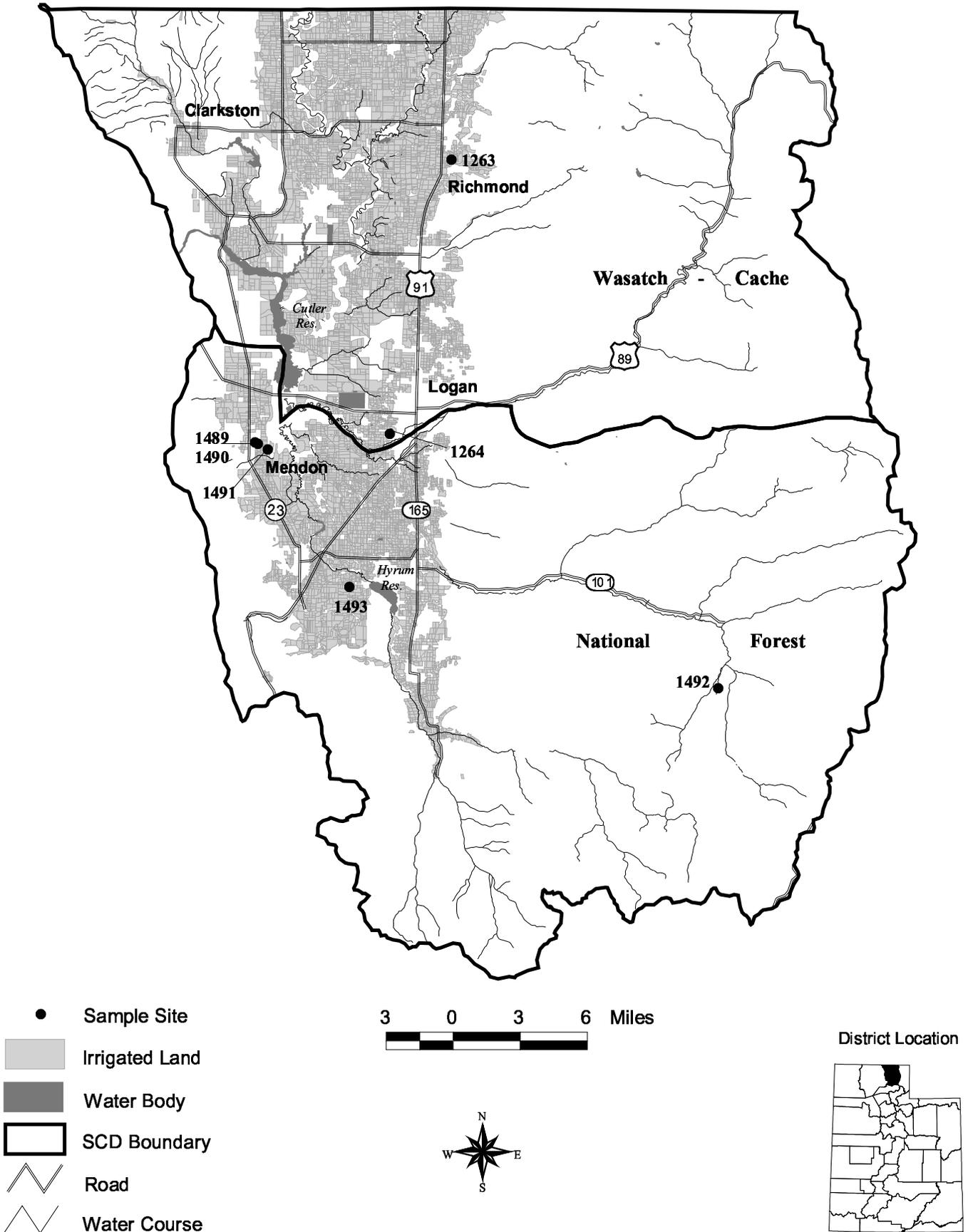
Underlined values indicate minor health problems (particularly smaller and younger animals). Shaded values indicate a serious health risk. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure.

Culinary

Id #	As	Ba	Cd	Cr	Cu	Fe	Mn	NO3-N	Pb	S	Se	EC umhos/cm	Zn	pH	Col	Ecoli	Hardness gpg
1263	-0.1000	0.0774	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	7.6	-0.1000	4.06	-0.1000	19	0.15	7.78	0	0	4.8
1264	-0.1000	0.1360	-0.1000	-0.1000	-0.1000	0.0302	-0.1000	3.8	-0.1000	6.16	-0.1000	17	-0.10	8.12	1	0	5.1

Underlined values exceed Secondary (aesthetic) standards. Shaded values exceed Primary (health) standards. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure. For Col and Ecoli 1 = present 0 =absent.

Map 1. Blacksmith Fork and North Cache Districts



Northern Utah District & Idaho

The water sampled in this area varies from soft to very hard, with gpg (grains per gallon) ranging from 1.2 to 33.9 with a mean of 11.2. Water temperatures range from 12.5 °C to 38.3 °C, with a mean of 18.21 °C. The pH for the area ranges from 6.58 to 9.3, with a mean of 8.1.

Irrigation:

Salinity is a measurement of the concentration of ionic salts dissolved in water. It is measured as electrical conductivity (EC), in $\mu\text{mhos/cm}$. Higher conductivity values indicate higher concentrations of dissolved salts. Water high in dissolved salts increases osmotic pressures, making it difficult for plants to get water necessary for growth. Generally when EC exceeds 750 $\mu\text{mhos/cm}$, salt-sensitive plants begin to be affected. When EC exceeds 3,000 $\mu\text{mhos/cm}$, most plants would be severely injured. Only four samples (1424, 1488, 1494 and 1495) have EC values less than 750 $\mu\text{mhos/cm}$. Thirteen samples exceed the severe-injury level of 3,000 $\mu\text{mhos/cm}$ (1406 through 1408, 1414, 1417, 1418, 1420, 1433, and 1479 through 1483).

SAR measures how much sodium (Na) is in solution compared to calcium (Ca) and magnesium (Mg). Excessive sodium in the soil causes soil particles to repel each other. This destroys the structure of the soil, preventing air and water movement. SAR values greater than 3 mark the beginning of problems and values greater than 9 indicate severe problems. All but fourteen water samples (1419, 1421 through 1424, 1427, 1428, 1484 through 1488, 1494 and 1495) in this district have elevated SAR values. Samples 1406 through 1408, 1416 through 1418, 1433, and 1479 through 1483 exceed the severe level of 9.

Bicarbonate (HCO_3) is an ion common to water solutions. It can be hazardous to plants in excessive amounts, especially when used in sprinkler irrigation. Bicarbonate also causes white deposits on plants and their fruits, which degrades their visual appeal. Bicarbonate also increases the effect of sodium when both are present. Special attention is needed when using water with excessive bicarbonate. With sensitive plants minor problems appear with bicarbonate concentrations in excess of 1.5 meq/l and severe problems appear when it exceeds 8.5 meq/l. All of the samples collected this year except for samples 1417 and 1494 have high bicarbonate, which is common for water in Utah. No samples exceed 8.5, the level above which severe problems appear.

Some specific elements can be toxic to plants. Samples 1406 and 1482 have elevated boron (B), which is toxic to sensitive plants when it exceeds concentrations of 0.7 ppm. It causes severe injury at 10.0 ppm. However, boron in trace amounts is required for proper plant growth. It is important to monitor this element because the margin separating health from toxicity is small.

Chlorine, found in the form of chloride (Cl^-), can damage sensitive plants at concentrations above 145 ppm, and concentrations exceeding 355 ppm can cause severe damage to almost all plants. Damage increases under sprinkler irrigation and is more severe in windy conditions. Samples 1404, 1405, 1409 through 1413, 1415, 1419, 1421 through 1423, 1428 through 1432, and 1484 through 1487 have elevated chlorine. Many of these samples also exceed the severe level (samples 1404, 1409 through 1413, 1415, 1419, and 1428 through 1432).

Copper (Cu) is toxic to plants when its concentration is greater than 0.2 ppm. Sample 1494 has copper just above the standard. Copper interferes with iron uptake and causes chlorosis in plants.

No other elements were detected in concentrations harmful to plants.

Livestock:

Electrical Conductivity (EC) is the measure of salts in water. Values above 8,332 $\mu\text{mhos/cm}$ are too high in salts for most livestock. Usually livestock will not drink water of this quality unless forced. Samples 1406, 1408, and 1482 exceed the salinity standard for livestock.

Sample 1414 has sulfur (S) at a concentration of 208 ppm, which exceeds the livestock standard for sulfur. Sulfur in the form of sulfate can cause water to be off flavored and also diarrhea in animals not used to drinking it. Problems start when the sulfur level in water exceeds 167 ppm.

Samples 1406 and 1488 have greater than 0.01 ppm molybdenum (Mo). Livestock eating plants irrigated with water that has molybdenum concentration greater than 0.01 ppm may be harmed. High concentrations of molybdenum interfere with copper nutrition in livestock.

Culinary:

Salinity (EC) for all samples except 1424, 1488, 1494, and 1495 exceed the EPA aesthetic standard of 833 $\mu\text{mhos/cm}$. At this 833 level the water may be off-flavored, but it is not a health problem until the EC level reaches 3,333. Samples 1406 through 1408, 1414, 1417, 1418, 1420, and 1479 through 1483 all exceed the health standard for salinity.

Several minerals were found to exceed the aesthetic drinking water quality standard. Sample 1494 has high iron (Fe). This can cause discoloration of plumbing fixtures and promote the growth of iron bacteria, which stains anything that it contacts. Again, this is an aesthetic issue, not a health concern.

Samples 1406, 1409, 1417, and 1483 have high manganese (Mn) concentrations. EPA has set an aesthetic standard of 0.05 ppm for manganese. Water with high concentrations may cause discoloration of plumbing fixtures and have poor flavor.

Samples 1404, 1406, 1409, 1411, 1414, 1479 and 1480 also have high sulfur (S). Sulfate is a soluble form of sulfur that can cause flavor problems in drinking water if its concentration is greater than 83 ppm sulfur. Bacteria in the water use sulfur and produce hydrogen sulfide gas (rotten egg gas). The bacteria that produce this compound can live in plumbing fixtures and even hot water heaters. It is not uncommon to get strong odors when the hot water is turned on in areas where there is high sulfate. Generally, people cannot tolerate the odor from this gas. Even if the gas is not present high sulfate concentrations can cause diarrhea in people not used to drinking it.

The most serious problem with drinking water from private water systems is bacterial contamination. Because disease-causing organisms are rare, non-parasitic coliform bacteria that are found in association with parasitic bacteria are used as indicators to assess whether water could be contaminated with harmful bacteria. Coliform bacteria can occur naturally in the soil, whereas *E. coli*, a type of coliform, develops only in the digestive systems of mammals. The presence of coliform bacteria indicates that surface water, soil, or other contaminants are entering the well. The presence of *E. coli* in well water, on the other hand, indicates that mammalian fecal material is entering the well. Bacterial contamination is commonly the result of well construction problems. Contamination may result from inadequate capping, a leaking well casing, improper grouting, or lack of a casing. *E. coli* contamination can come from defective septic systems, manure operations or septic systems too close to wells, leaky sewer systems, or shallow water tables.

Eighteen of the 42 samples tested positive for coliform bacteria. These include samples 1404, 1405, 1407, 1409, 1414, 1415, 1417, 1420, 1423, 1429, 1433, 1480 through 1482, 1484, 1485, 1488, and 1495. Samples 1405, 1409, 1417, 1481, 1484, 1485, and 1488 tested positive for *E. coli*. Wells from which these samples were collected should be inspected carefully to determine the source of contamination and should not be used for culinary purposes until the problem is corrected.

Sample Site Test Data for Northern Utah District and Idaho

General

Id #	Be	Ca	K	Li	Mg	Na	P	pH	°C	TDS
1404	-0.1000	153.63	20.39	0.1012	83.62	324.37	-0.10	8.05	12.5	1,644
1405	-0.1000	67.35	10.69	0.0617	36.08	151.79	-0.10	8.88	17.1	689
1406	-0.1000	290.12	218.63	2.0461	109.44	4563.85	-0.10	7.77	16.8	13,860
1407	-0.1000	135.51	43.50	0.2555	69.72	530.44	-0.10	8.62	16.3	2,226
1408	-0.1000	165.23	96.84	0.6342	109.42	1544.60	-0.10	8.19	23.3	5,052
1409	-0.1000	116.33	18.77	0.0925	62.55	237.69	-0.10	8.8	14.3	1,151
1410	-0.1000	99.22	12.89	0.0820	41.18	192.57	-0.10	8.3	14.7	897
1411	-0.1000	210.21	19.88	0.0987	96.08	336.44	-0.10	7.88	16.5	1,584
1412	-0.1000	94.85	12.31	0.0720	41.94	210.69	-0.10	8.24	21.2	1,034
1413	-0.1000	158.25	18.02	0.0955	62.49	239.27	-0.10	7.95	18.1	1,368
1414	-0.1000	170.95	19.58	0.1234	122.28	432.47	-0.10	8.17	13.6	2,052
1415	-0.1000	106.71	11.03	0.0716	53.93	193.75	-0.10	8.37	22.4	1,139
1416	-0.1000	71.19	10.14	0.1300	30.22	483.95	-0.10	8.46	24.8	1,734
1417	-0.1000	42.07	20.78	0.2917	37.18	1078.34	-0.10	9.3	38.3	3,528
1418	-0.1000	91.70	30.20	0.2591	30.70	921.71	-0.10	8.36	25.1	3,048
1419	-0.1000	160.16	17.07	-0.1000	46.94	93.79	-0.10	8.12	20.9	1,000
1420	-0.1000	457.88	34.31	0.0869	122.05	431.46	-0.10	7.95	21.9	3,054
1421	-0.1000	111.97	11.33	-0.1000	27.12	39.69	-0.10	8.54	18.2	607
1422	-0.1000	183.27	15.42	-0.1000	28.25	48.82	-0.10	8.27	20.5	597
1423	-0.1000	118.88	14.73	-0.1000	30.56	43.65	-0.10	8.22	20.1	656
1424	-0.1000	65.67	6.82	-0.1000	15.71	20.25	-0.10	8.38	17.3	320
1425	-0.1000	183.27	23.65	0.0822	57.45	304.85	-0.10	8.00	20.2	1,680
1426	-0.1000	152.42	23.01	0.0924	51.09	373.71	-0.10	8.03	18.2	1,722
1427	-0.1000	209.05	20.62	0.0618	68.26	165.17	-0.10	7.98	17.8	1,530
1428	-0.1000	160.66	14.80	-0.1000	49.94	94.62	-0.10	8.45	16.8	1,007
1429	-0.1000	95.19	19.26	0.1776	40.25	277.20	-0.10	8.37	21.7	1,272
1430	-0.1000	160.50	17.88	0.0519	44.17	186.13	-0.10	8.08	18.6	1,120
1431	-0.1000	147.30	17.13	0.0930	58.92	277.51	-0.10	8.01	15.2	1,452
1432	-0.1000	179.61	14.61	0.0958	88.53	211.91	-0.10	8.17	18.1	1,452
1433	-0.1000	90.99	26.21	0.1109	34.11	487.56	-0.10	8.38	24.2	1,812
1479	-0.1000	134.38	35.04	0.2117	60.20	654.92	-0.10	8.00	14.8	2,142
1480	-0.1000	154.81	36.28	0.2187	66.49	664.87	-0.10	7.83	14.2	2,238
1481	-0.1000	105.83	41.37	0.2481	44.13	757.68	0.16	7.81	14.3	2,550
1482	-0.1000	216.14	124.51	0.9928	87.98	3165.54	-0.10	7.23	17.7	7,698
1483	-0.1000	108.05	87.97	0.5455	54.53	1689.39	0.15	7.86	14.3	4,600
1484	-0.1000	111.12	10.41	-0.1000	27.91	44.53	-0.10	7.84	13.1	535
1485	-0.1000	152.94	9.32	-0.1000	33.69	40.83	-0.10	7.67	12.5	663
1486	-0.1000	136.85	9.28	-0.1000	31.15	46.62	-0.10	7.58	17.9	602
1487	-0.1000	113.17	10.00	-0.1000	26.09	37.83	-0.10	7.76	16.8	533
1488	-0.1000	41.86	17.85	-0.1000	35.50	53.59	-0.10	7.95	12.7	387
1494	-0.1000	15.08	1.10	-0.1000	5.00	8.60	-0.10	6.58	15.4	74
1495	-0.1000	37.36	6.01	-0.1000	17.74	31.35	0.29	7.62	16.6	230

Values of -0.1 are below detection limits of testing procedure

Sample Test Site Data for Northern Utah District and Idaho

Irrigation

Id #	Al	B	Cl	CO3 meq/l	Cu	Fe	HCO3 meq/l	Mn	Se	Zn	SAR	EC umhos/cm
1404	-0.1000	0.18	<u>631.44</u>	-0.10	-0.1000	-0.10	4.75	-0.1000	-0.1000	-0.10	5.2	2,740
1405	0.1828	0.16	217.38	-0.10	-0.1000	0.14	4.23	-0.1000	-0.1000	-0.10	3.7	1,149
1406	-0.1000	<u>1.39</u>	-0.10	-0.10	-0.1000	0.08	4.27	0.1307	-0.1000	0.06	<u>57.9</u>	23,100
1407	-0.1000	0.28	-0.10	-0.10	-0.1000	-0.10	<u>2.89</u>	-0.1000	-0.1000	-0.10	<u>9.2</u>	3,710
1408	-0.1000	0.60	-0.10	-0.10	-0.1000	-0.10	<u>2.99</u>	-0.1000	-0.1000	0.12	<u>22.9</u>	8,420
1409	-0.1000	0.17	<u>496.04</u>	-0.10	-0.1000	0.07	<u>3.80</u>	0.0611	-0.1000	0.18	4.4	1,919
1410	-0.1000	0.17	<u>374.78</u>	-0.10	-0.1000	0.04	<u>4.11</u>	-0.1000	-0.1000	0.22	4.1	1,495
1411	-0.1000	0.20	<u>670.72</u>	-0.10	-0.1000	-0.10	<u>4.37</u>	-0.1000	-0.1000	0.11	4.8	2,640
1412	-0.1000	0.14	<u>443.26</u>	-0.10	-0.1000	0.02	<u>4.15</u>	-0.1000	-0.1000	0.04	4.5	1,724
1413	-0.1000	0.12	<u>620.47</u>	-0.10	-0.1000	-0.10	<u>3.49</u>	-0.1000	-0.1000	0.06	4.1	2,280
1414	-0.1000	0.28	-0.10	-0.10	0.0271	-0.10	<u>4.87</u>	-0.1000	-0.1000	-0.10	<u>6.2</u>	3,420
1415	-0.1000	0.12	<u>531.55</u>	-0.10	-0.1000	0.02	<u>5.28</u>	-0.1000	-0.1000	-0.10	<u>3.8</u>	1,899
1416	-0.1000	0.11	-0.10	-0.10	-0.1000	-0.10	<u>3.41</u>	-0.1000	-0.1000	-0.10	<u>12.1</u>	2,890
1417	-0.1000	0.17	-0.10	-0.10	-0.1000	0.04	0.74	0.0818	-0.1000	-0.10	<u>29.2</u>	5,880
1418	-0.1000	0.18	-0.10	-0.10	-0.1000	0.15	<u>2.87</u>	-0.1000	-0.1000	0.16	<u>21.3</u>	5,080
1419	-0.1000	0.08	<u>536.06</u>	-0.10	-0.1000	-0.10	<u>2.25</u>	-0.1000	-0.1000	-0.10	1.7	1,667
1420	-0.1000	0.11	-0.10	-0.10	-0.1000	0.04	<u>1.90</u>	-0.1000	-0.1000	-0.10	4.6	5,090
1421	-0.1000	-0.10	275.05	-0.10	-0.1000	-0.10	<u>2.33</u>	-0.1000	-0.1000	-0.10	0.9	1,012
1422	-0.1000	-0.10	253.61	-0.10	-0.1000	0.03	<u>2.33</u>	-0.1000	-0.1000	-0.10	0.9	995
1423	-0.1000	-0.10	295.56	-0.10	-0.1000	-0.10	<u>2.29</u>	-0.1000	-0.1000	-0.10	0.9	1,094
1424	-0.1000	-0.10	82.71	-0.10	-0.1000	-0.10	<u>2.56</u>	-0.1000	-0.1000	-0.10	0.6	533
1425	-0.1000	0.13	-0.10	-0.10	-0.1000	-0.10	<u>3.26</u>	-0.1000	-0.1000	-0.10	5.0	2,800
1426	-0.1000	0.14	-0.10	-0.10	-0.1000	-0.10	<u>3.88</u>	-0.1000	-0.1000	-0.10	<u>6.7</u>	2,870
1427	-0.1000	0.12	-0.10	-0.10	-0.1000	-0.10	<u>2.58</u>	-0.1000	-0.1000	-0.10	2.5	2,550
1428	-0.1000	0.11	<u>518.83</u>	-0.10	-0.1000	-0.10	<u>2.46</u>	-0.1000	-0.1000	0.08	1.7	1,678
1429	0.0423	0.25	<u>605.73</u>	-0.10	-0.1000	0.02	<u>3.45</u>	0.0252	-0.1000	-0.10	<u>6.0</u>	2,120
1430	0.0411	0.10	<u>557.41</u>	-0.10	-0.1000	0.03	<u>2.93</u>	0.0306	-0.1000	0.05	3.4	1,867
1431	-0.1000	0.13	<u>643.61</u>	-0.10	-0.1000	0.07	<u>4.29</u>	0.0229	-0.1000	-0.10	<u>4.9</u>	2,420
1432	-0.1000	0.11	<u>665.58</u>	-0.10	-0.1000	-0.10	<u>3.82</u>	-0.1000	-0.1000	-0.10	<u>3.2</u>	2,420
1433	-0.1000	0.12	-0.10	-0.10	-0.1000	0.03	<u>3.24</u>	-0.1000	-0.1000	-0.10	<u>11.1</u>	3,020
1479	-0.1000	0.33	-0.10	-0.10	-0.1000	0.04	<u>2.44</u>	-0.1000	-0.1000	0.05	<u>11.8</u>	3,570
1480	-0.1000	0.37	-0.10	-0.10	-0.1000	0.02	<u>2.50</u>	-0.1000	-0.1000	-0.10	<u>11.3</u>	3,730
1481	0.0402	0.31	-0.10	-0.10	-0.1000	0.06	<u>2.93</u>	-0.1000	-0.1000	-0.10	<u>15.6</u>	4,250
1482	-0.1000	<u>0.72</u>	-0.10	-0.10	-0.1000	-0.10	<u>4.19</u>	-0.1000	-0.1000	-0.10	<u>45.9</u>	12,830
1483	-0.1000	0.58	-0.10	-0.10	-0.1000	-0.10	<u>4.37</u>	0.1363	-0.1000	-0.10	<u>33.1</u>	7,667
1484	-0.1000	0.11	<u>220.28</u>	-0.10	-0.1000	-0.10	<u>2.27</u>	-0.1000	-0.1000	0.25	1.0	891
1485	-0.1000	0.10	<u>311.71</u>	-0.10	0.0212	0.07	<u>2.33</u>	-0.1000	-0.1000	0.90	0.8	1,105
1486	-0.1000	0.12	<u>231.61</u>	-0.10	-0.1000	0.03	<u>2.77</u>	-0.1000	-0.1000	0.99	0.9	1,003
1487	-0.1000	0.10	<u>212.48</u>	-0.10	-0.1000	0.08	<u>2.23</u>	0.0218	-0.1000	1.47	0.8	899
1488	-0.1000	0.15	30.11	-0.10	-0.1000	0.03	<u>4.31</u>	0.0266	-0.1000	0.13	1.5	645
1494	-0.1000	-0.10	11.96	-0.10	<u>0.2077</u>	0.23	0.80	0.0425	-0.1000	0.64	0.5	124
1495	-0.1000	0.09	15.77	-0.10	-0.1000	0.03	<u>3.38</u>	0.0219	-0.1000	-0.10	1.1	383

Underlined values exceed irrigation standards. Shaded values indicate severe risks. All values are mg/l unless labeled differently. Values of <u>-0.1</u> are below detection limits of testing procedure.

Sample Site Test Data for Northern Utah District and Idaho

Livestock

Id #	Al	As	B	Cd	Co	Cr	Mo	Ni	Pb	S	Se	EC umhos/cm	V	Zn
1404	-0.1000	-0.1000	0.18	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	108.60	-0.1000	2,740	-0.1000	-0.10
1405	0.1828	-0.1000	0.16	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	36.68	-0.1000	1,149	-0.1000	-0.10
1406	-0.1000	0.0428	1.39	-0.1000	-0.1000	-0.10	<u>0.0127</u>	-0.1000	-0.1000	134.16	-0.1000	23,100	-0.1000	0.06
1407	-0.1000	-0.1000	0.28	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	44.91	-0.1000	3,710	-0.1000	-0.10
1408	-0.1000	-0.1000	0.60	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	73.96	-0.1000	8,420	-0.1000	0.12
1409	-0.1000	-0.1000	0.17	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	94.91	-0.1000	1,919	-0.1000	0.18
1410	-0.1000	-0.1000	0.17	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	29.77	-0.1000	1,495	-0.1000	0.22
1411	-0.1000	-0.1000	0.20	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	121.54	-0.1000	2,640	-0.1000	0.11
1412	-0.1000	-0.1000	0.14	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	37.62	-0.1000	1,724	-0.1000	0.04
1413	-0.1000	-0.1000	0.12	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	55.86	-0.1000	2,280	-0.1000	0.06
1414	-0.1000	-0.1000	0.28	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>207.65</u>	-0.1000	3,420	-0.1000	-0.10
1415	-0.1000	-0.1000	0.12	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	36.51	-0.1000	1,899	-0.1000	-0.10
1416	-0.1000	-0.1000	0.11	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	17.45	-0.1000	2,890	-0.1000	-0.10
1417	-0.1000	-0.1000	0.17	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	2.60	-0.1000	5,880	-0.1000	-0.10
1418	-0.1000	-0.1000	0.18	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	25.27	-0.1000	5,080	-0.1000	0.16
1419	-0.1000	-0.1000	0.08	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	17.46	-0.1000	1,667	-0.1000	-0.10
1420	-0.1000	-0.1000	0.11	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	24.57	-0.1000	5,090	-0.1000	-0.10
1421	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	11.95	-0.1000	1,012	-0.1000	-0.10
1422	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	11.19	-0.1000	995	-0.1000	-0.10
1423	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	10.81	-0.1000	1,094	-0.1000	-0.10
1424	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	9.83	-0.1000	533	-0.1000	-0.10
1425	-0.1000	-0.1000	0.13	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	38.65	-0.1000	2,800	-0.1000	-0.10
1426	-0.1000	-0.1000	0.14	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	50.95	-0.1000	2,870	-0.1000	-0.10
1427	-0.1000	-0.1000	0.12	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	30.16	-0.1000	2,550	-0.1000	-0.10
1428	-0.1000	-0.1000	0.11	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	21.86	-0.1000	1,678	-0.1000	0.08
1429	0.0423	-0.1000	0.25	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	16.88	-0.1000	2,120	-0.1000	-0.10
1430	0.0411	-0.1000	0.10	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	33.79	-0.1000	1,867	-0.1000	0.05
1431	-0.1000	-0.1000	0.13	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	50.93	-0.1000	2,420	-0.1000	-0.10
1432	-0.1000	-0.1000	0.11	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	61.84	-0.1000	2,420	-0.1000	-0.10
1433	-0.1000	-0.1000	0.12	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	18.95	-0.1000	3,020	-0.1000	-0.10
1479	-0.1000	-0.1000	0.33	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	126.39	-0.1000	3,570	-0.1000	0.05
1480	-0.1000	-0.1000	0.37	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	149.62	-0.1000	3,730	-0.1000	-0.10
1481	0.0402	-0.1000	0.31	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	76.01	-0.1000	4,250	-0.1000	-0.10
1482	-0.1000	-0.1000	0.72	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	74.51	-0.1000	12,830	-0.1000	-0.10
1483	-0.1000	-0.1000	0.58	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	51.85	-0.1000	7,667	-0.1000	-0.10
1484	-0.1000	-0.1000	0.11	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	22.31	-0.1000	891	-0.1000	0.25
1485	-0.1000	-0.1000	0.10	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	9.61	-0.1000	1,105	-0.1000	0.90
1486	-0.1000	-0.1000	0.12	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	16.23	-0.1000	1,003	-0.1000	0.99
1487	-0.1000	-0.1000	0.10	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	10.17	-0.1000	889	-0.1000	1.47
1488	-0.1000	-0.1000	0.15	-0.1000	-0.1000	-0.10	<u>0.0193</u>	-0.1000	-0.1000	30.87	-0.1000	645	-0.1000	0.13
1494	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	3.03	-0.1000	124	-0.1000	0.64
1495	-0.1000	-0.1000	0.09	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	5.71	-0.1000	383	-0.1000	-0.10

Underlined values indicate minor health problems (particularly smaller and younger animals). Shaded values indicate a serious health risk. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure.

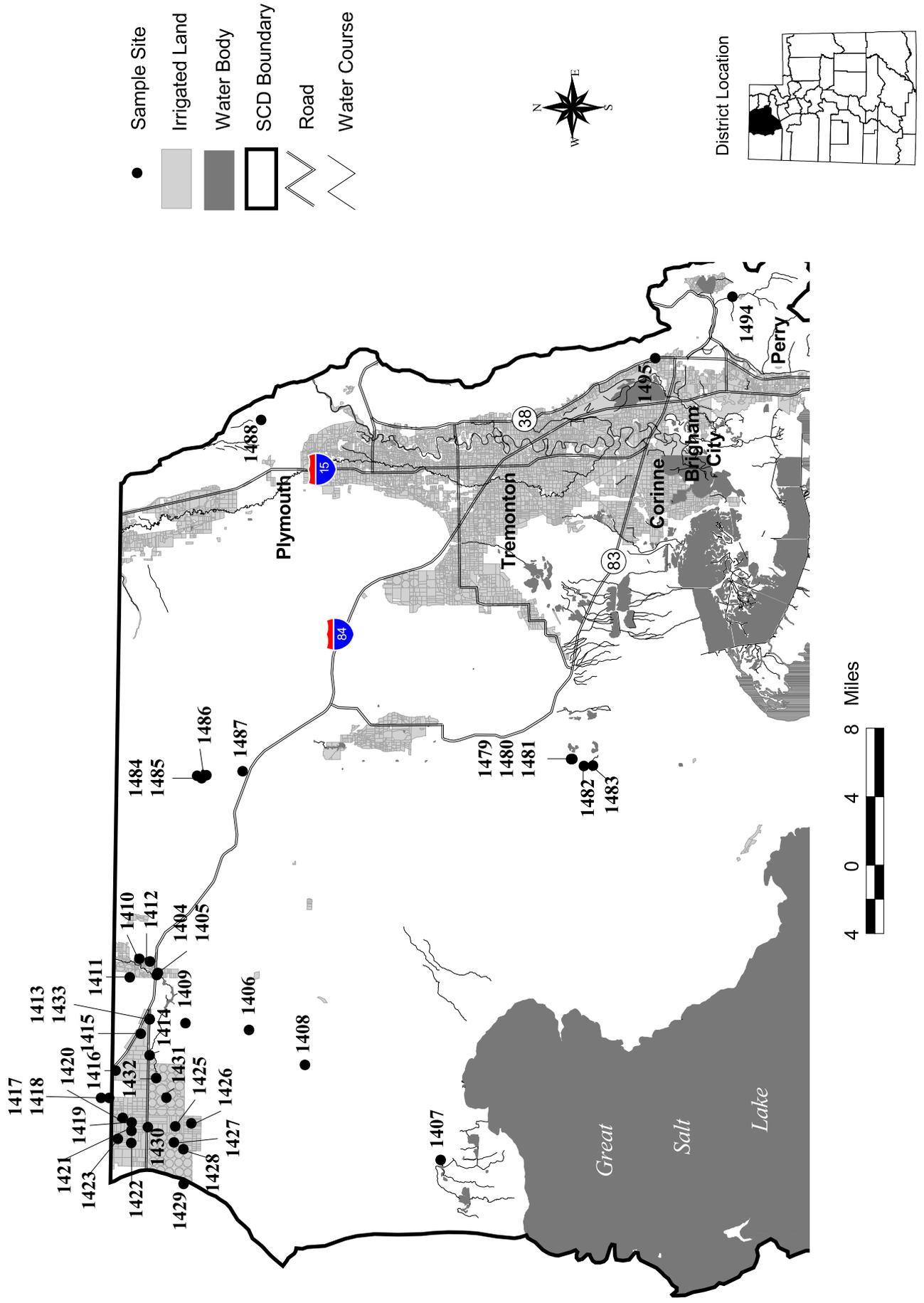
Sample Site Test Data for Northern Utah District and Idaho

Culinary

Id	As	Ba	Cd	Cr	Cu	Fe	Mn	NO3-N	Pb	S	Se	EC		pH	Col	Ecoli	Hardness gpg
												umhos/cm	Zn				
1404	-0.1000	0.0622	-0.1000	-0.1000	-0.1000	-0.10	-0.1000	1.7	-0.1000	108.60	-0.1000	2.740	-0.10	8.05	1	0	13.9
1405	-0.1000	0.0972	-0.1000	-0.1000	-0.1000	0.14	-0.1000	0.2	-0.1000	36.68	-0.1000	1.149	-0.10	8.88	1	1	6.0
1406	0.0428	0.0671	-0.1000	-0.1000	-0.1000	0.08	0.1307	0.2	-0.1000	134.16	-0.1000	23.100	0.06	7.77	0	0	23.4
1407	-0.1000	0.1135	-0.1000	-0.1000	-0.1000	-0.10	-0.1000	0.6	-0.1000	44.91	-0.1000	3.710	-0.10	8.62	1	0	12.0
1408	-0.1000	0.0907	-0.1000	-0.1000	-0.1000	-0.10	-0.1000	0.8	-0.1000	73.96	-0.1000	8.420	0.12	8.19	0	0	16.1
1409	-0.1000	0.0759	-0.1000	-0.1000	-0.1000	0.07	0.0611	0.8	-0.1000	94.91	-0.1000	1.919	0.18	8.80	1	1	10.5
1410	-0.1000	0.1327	-0.1000	-0.1000	-0.1000	0.04	-0.1000	0.4	-0.1000	29.77	-0.1000	1.495	0.22	8.30	0	0	8.2
1411	-0.1000	0.0490	-0.1000	-0.1000	-0.1000	-0.10	-0.1000	0.9	-0.1000	121.54	-0.1000	2.640	0.11	7.88	0	0	17.9
1412	-0.1000	0.1222	-0.1000	-0.1000	-0.1000	0.02	-0.1000	0.6	-0.1000	37.62	-0.1000	1.724	0.04	8.24	0	0	8.0
1413	-0.1000	0.1685	-0.1000	-0.1000	-0.1000	-0.10	-0.1000	2.7	-0.1000	55.86	-0.1000	2.280	0.06	7.95	0	0	12.9
1414	-0.1000	0.0473	-0.1000	-0.1000	0.0271	-0.10	-0.1000	8.6	-0.1000	207.65	-0.1000	3.420	-0.10	8.17	1	0	17.1
1415	-0.1000	0.1454	-0.1000	-0.1000	-0.1000	0.02	-0.1000	1.6	-0.1000	36.51	-0.1000	1.899	-0.10	8.37	1	0	9.4
1416	-0.1000	0.0947	-0.1000	-0.1000	-0.1000	-0.10	-0.1000	0.6	-0.1000	17.45	-0.1000	2.890	-0.10	8.46	0	0	5.9
1417	-0.1000	0.0458	-0.1000	-0.1000	-0.1000	0.04	0.0818	0.3	-0.1000	2.60	-0.1000	5.880	-0.10	9.30	1	1	4.6
1418	-0.1000	0.1736	-0.1000	-0.1000	-0.1000	0.15	-0.1000	0.3	-0.1000	25.27	-0.1000	5.080	0.16	8.36	0	0	7.2
1419	-0.1000	0.2490	-0.1000	-0.1000	-0.1000	-0.10	-0.1000	4.7	-0.1000	17.46	-0.1000	1.667	-0.10	8.12	0	0	12.1
1420	-0.1000	0.7364	-0.1000	-0.1000	-0.1000	0.04	-0.1000	3.3	-0.1000	24.57	-0.1000	5.090	-0.10	7.95	1	0	33.9
1421	-0.1000	0.2166	-0.1000	-0.1000	-0.1000	-0.10	-0.1000	2.3	-0.1000	11.95	-0.1000	1.012	-0.10	8.54	0	0	8.1
1422	-0.1000	0.2013	-0.1000	-0.1000	-0.1000	0.03	-0.1000	1.2	-0.1000	11.19	-0.1000	995	-0.10	8.27	0	0	12.4
1423	-0.1000	0.2930	-0.1000	-0.1000	-0.1000	-0.10	-0.1000	1.1	-0.1000	10.81	-0.1000	1.094	-0.10	8.22	1	0	8.7
1424	-0.1000	0.1221	-0.1000	-0.1000	-0.1000	-0.10	-0.1000	0.9	-0.1000	9.83	-0.1000	533	-0.10	8.38	0	0	4.8
1425	-0.1000	0.1615	-0.1000	-0.1000	-0.1000	-0.10	-0.1000	1.2	-0.1000	38.65	-0.1000	2.800	-0.10	8.00	0	0	14.1
1426	-0.1000	0.1199	-0.1000	-0.1000	-0.1000	-0.10	-0.1000	1.2	-0.1000	50.95	-0.1000	2.870	-0.10	8.03	0	0	11.9
1427	-0.1000	0.1852	-0.1000	-0.1000	-0.1000	-0.10	-0.1000	0.9	-0.1000	30.16	-0.1000	2.550	-0.10	7.98	0	0	16.2
1428	-0.1000	0.2641	-0.1000	-0.1000	-0.1000	-0.10	-0.1000	0.8	-0.1000	21.86	-0.1000	1.678	0.08	8.45	0	0	12.3
1429	-0.1000	0.2795	-0.1000	-0.1000	-0.1000	0.02	0.0252	0.4	-0.1000	16.88	-0.1000	2.120	-0.10	8.37	1	0	7.9
1430	-0.1000	0.0837	-0.1000	-0.1000	-0.1000	0.03	0.0306	3.3	-0.1000	33.79	-0.1000	1.867	0.05	8.08	0	0	12.0
1431	-0.1000	0.0654	-0.1000	-0.1000	-0.1000	0.07	0.0229	1.2	-0.1000	50.93	-0.1000	2.420	-0.10	8.01	0	0	12.1
1432	-0.1000	0.1516	-0.1000	-0.1000	-0.1000	-0.10	-0.1000	6.5	-0.1000	61.84	-0.1000	2.420	-0.10	8.17	0	0	15.7
1433	-0.1000	0.2291	-0.1000	-0.1000	-0.1000	0.03	-0.1000	0.7	-0.1000	18.95	-0.1000	3.020	-0.10	8.38	1	0	7.3
1479	-0.1000	0.0934	-0.1000	-0.1000	-0.1000	0.04	-0.1000	6.1	-0.1000	126.39	-0.1000	3.570	0.05	8.00	0	0	11.4
1480	-0.1000	0.1012	-0.1000	-0.1000	-0.1000	0.02	-0.1000	6.3	-0.1000	149.62	-0.1000	3.730	-0.10	7.83	1	0	12.9
1481	-0.1000	0.0713	-0.1000	-0.1000	-0.1000	0.06	-0.1000	3.7	-0.1000	76.01	-0.1000	4.250	-0.10	7.81	1	1	8.8
1482	-0.1000	0.1028	-0.1000	-0.1000	-0.1000	-0.10	-0.1000	0.2	-0.1000	74.51	-0.1000	12.830	-0.10	7.23	1	0	17.8
1483	-0.1000	0.2616	-0.1000	-0.1000	-0.1000	-0.10	0.1363	0.0	-0.1000	51.85	-0.1000	7.667	-0.10	7.86	0	0	9.5
1484	-0.1000	0.2084	-0.1000	-0.1000	-0.1000	-0.10	-0.1000	6.1	-0.1000	22.31	-0.1000	891	0.25	7.84	1	1	8.1
1485	-0.1000	0.3603	-0.1000	-0.1000	0.0212	0.07	-0.1000	2.8	-0.1000	9.61	-0.1000	1.105	0.90	7.67	1	1	10.9
1486	-0.1000	0.1979	-0.1000	-0.1000	-0.1000	0.03	-0.1000	3.2	-0.1000	16.23	-0.1000	1.003	0.99	7.58	0	0	9.8
1487	-0.1000	0.3668	-0.1000	-0.1000	-0.1000	0.08	0.0218	3.2	-0.1000	10.17	-0.1000	889	1.47	7.76	0	0	8.1
1488	-0.1000	0.0432	-0.1000	-0.1000	-0.1000	0.03	0.0266	1.0	-0.1000	30.87	-0.1000	645	0.13	7.95	1	1	4.5
1494	-0.1000	0.0772	-0.1000	-0.1000	0.2077	0.23	0.0425	0.2	-0.1000	3.03	-0.1000	124	0.64	6.58	0	0	1.2
1495	-0.1000	0.2737	-0.1000	-0.1000	-0.1000	0.03	0.0219	0.0	-0.1000	5.71	-0.1000	383	-0.10	7.62	1	0	3.2

detection limits of testing procedure. For Col and Ecoli 1 = present 0 = absent.

Map 2. Northern Utah District



Rich County District

The water in this area varies from moderate-hard to hard with gpg (grains per gallon) readings from 4.2 to 11.1, with a mean of 6.5. Water temperatures range from 11.8 °C to 25.2 °C, with a mean of 15.6 °C. The pH for area ranges from 7.59 to 8.46 with a mean of 7.99.

Irrigation:

Salinity is a measurement of the concentration of ionic salts dissolved in water. It is measured as electrical conductivity (EC), in $\mu\text{mhos/cm}$. Higher conductivity values indicate higher concentrations of dissolved salts. Water high in dissolved salts increases osmotic pressures, making it difficult for plants to get water necessary for growth. Generally when EC exceeds 750 $\mu\text{mhos/cm}$, salt-sensitive plants begin to be affected. When EC exceeds 3,000 $\mu\text{mhos/cm}$, most plants would be severely injured. Samples 1250 and 1254 through 1257 exceed the 750 $\mu\text{mhos/cm}$ standard. None of the samples exceeded the severe injury level of 3,000 $\mu\text{mhos/cm}$.

SAR measures how much sodium (Na) is in solution compared to calcium (Ca) and magnesium (Mg). Excessive sodium in the soil causes soil particles to repel each other. This destroys the structure of the soil, preventing air and water movement. SAR values greater than 3 mark the beginning of problems and values greater than 9 indicate severe problems. Sample 1254 has a SAR value of 4.2, which may cause problems.

Bicarbonate (HCO_3) is an ion common to water solutions. It can be hazardous to plants in excessive amounts, especially when used in sprinkler irrigation. Bicarbonate also causes white deposits on plants and their fruits, which degrades their visual appeal. Bicarbonate also increases the effect of sodium when both are present. Special attention is needed when using water with excessive bicarbonate. With sensitive plants minor problems appear with bicarbonate concentrations in excess of 1.5 meq/l and severe problems appear when it exceeds 8.5 meq/l. All of the samples have high bicarbonate, which is common for water in Utah.

Some elements are toxic to plants. Chlorine, found in the form of Chloride (Cl^-), can damage sensitive plants at concentrations above 145 ppm and concentrations exceeding 355 ppm can cause severe damage to almost all plants. Damage increases under sprinkler irrigation and is more severe in windy conditions. Samples 1254 and 1257 have elevated chlorine.

Sample 1258 has elevated manganese (Mn). Manganese above 0.2 ppm can injure plants and cause reduction in dry matter production. Excess manganese interferes with the plant's ability to use other nutrients such as calcium (Ca).

No other elements were above concentrations that are harmful to plants.

Livestock:

Samples 1250, 1252 through 1257, 1261, and 1262 have greater than 0.01 ppm molybdenum (Mo). Livestock eating plants irrigated with water that has a molybdenum concentration greater than 0.01 ppm may be harmed. High concentrations of molybdenum interfere with copper nutrition in livestock.

Culinary:

Salinity (EC) for samples 1254, 1255, 1256, and 1257 exceeds the EPA aesthetic standard of 833 $\mu\text{mhos/cm}$. At or above this level water may be off-flavored, but it is not a health problem until the EC level reaches 3,333.

In some samples several minerals were found to exceed the aesthetic drinking water quality standard. Samples 1251, 1258, 1259, and 1262 have high iron (Fe). This can cause discoloration of plumbing fixtures and promote the growth of iron bacteria, which stain anything they contact. This is an aesthetic issue, not a health concern.

Samples 1251, 1254, 1258, 1259, 1260, and 1262 have high manganese (Mn) concentrations. EPA has set an aesthetic standard of 0.05 ppm for manganese. Water with high concentrations may cause discoloration of plumbing fixtures and have poor flavor.

Samples 1254 and 1255 both exceed the EPA nitrate (NO_3) standard of 10 ppm nitrate expressed as nitrogen ($\text{NO}_3\text{-N}$). NO_3 is an important nutrient for plant growth. It is found in nitrogen fertilizers, manure, septic systems, and some minerals. NO_3 is toxic to young infants (usually less than 6 months of age) and causes "blue baby syndrome." NO_3 can only be removed from water by reverse osmosis or distillation.

The most serious problem with drinking water from private water systems is bacterial contamination. Because disease-causing organisms are rare, non-parasitic coliform bacteria that are found in association with parasitic bacteria are used as indicators to assess whether water could be contaminated with harmful bacteria. Coliform bacteria can occur naturally in the soil, whereas *E. coli*, a type of coliform, develops only in the digestive systems of mammals. The presence of coliform bacteria indicates that surface water, soil, or other contaminants are entering the well. The presence of *E. coli* in well water, on the other hand, indicates that mammalian fecal material is entering the well. Bacterial contamination is commonly the result of well construction problems. Contamination may result from inadequate capping, a leaking well casing, improper grouting, or lack of a casing. *E. coli* contamination can come from defective septic systems, manure operations or septic systems too close to wells, leaky sewer systems, or shallow water tables.

Sample 1260 is the only sample contaminated with coliform. The well from which this sample was collected should be inspected carefully to determine the source of contamination and should not be used for culinary purposes until the problem is corrected.

No samples were contaminated with *E. Coli*.

Sample Site Test Data for Rich County District

General

Id #	Be	Ca	K	Li	Mg	Na	P	pH	°C	TDS
1250	-0.1000	80.10	5.19	-0.1000	38.11	36.61	-0.10	7.93	13.2	461
1251	-0.1000	70.13	1.80	-0.1000	21.53	27.84	-0.10	8	17.7	371
1252	-0.1000	53.83	1.64	-0.1000	29.82	10.59	-0.10	7.93	11.8	295
1253	-0.1000	62.14	2.39	-0.1000	30.95	44.54	-0.10	7.92	13.9	423
1254	-0.1000	62.80	3.89	-0.1000	83.14	213.24	-0.10	7.89	12.8	1,073
1255	-0.1000	74.68	13.03	-0.1000	69.00	71.74	0.21	7.74	14.4	667
1256	-0.1000	87.72	3.59	-0.1000	66.51	60.23	-0.10	7.88	20.2	626
1257	-0.1000	103.23	5.43	-0.1000	86.88	118.19	-0.10	7.59	14.5	1,014
1258	-0.1000	79.88	1.41	-0.1000	27.96	19.37	-0.10	7.95	16.3	365
1259	-0.1000	53.50	1.15	-0.1000	18.07	10.11	-0.10	8.46	25.2	241
1260	-0.1000	65.36	1.83	-0.1000	24.60	10.85	-0.10	8.2	15.2	298
1261	-0.1000	59.65	1.76	-0.1000	24.26	19.17	-0.10	8.01	13.8	309
1262	-0.1000	56.39	1.96	-0.1000	23.01	19.58	-0.10	8.4	13.4	299

Values of -0.1 are below detection limits of testing procedure

Irrigation

Id #	Al	B	Cl	CO3 meq/l	Cu	Fe	HCO3 meq/l	Mn	Se	Zn	SAR	EC umhos/cm
1250	-0.1000	0.10	34.49	-0.10	-0.1000	0.0548	6.17	-0.1000	-0.1000	-0.10	0.8	769
1251	-0.1000	-0.10	39.69	-0.10	-0.1000	0.4355	4.52	0.1190	-0.1000	-0.10	0.7	619
1252	-0.1000	-0.10	12.98	-0.10	-0.1000	0.1703	4.52	-0.1000	-0.1000	-0.10	0.3	491
1253	-0.1000	0.14	55.21	-0.10	-0.1000	0.0399	4.68	-0.1000	-0.1000	0.04	1.2	705
1254	-0.1000	0.38	193.56	-0.10	-0.1000	0.0229	9.12	0.0576	-0.1000	-0.10	4.2	1,789
1255	-0.1000	0.22	87.66	-0.10	-0.1000	0.0447	7.57	-0.1000	-0.1000	-0.10	1.4	1,112
1256	-0.1000	0.14	89.38	-0.10	-0.1000	0.0406	5.41	-0.1000	-0.1000	0.15	1.2	1,043
1257	-0.1000	0.26	192.45	-0.10	-0.1000	0.0206	8.42	-0.1000	-0.1000	0.09	2.1	1,690
1258	-0.1000	-0.10	14.40	-0.10	-0.1000	0.4976	3.94	0.2840	-0.1000	0.36	0.5	608
1259	-0.1000	-0.10	7.07	-0.10	-0.1000	0.5218	3.88	0.1202	-0.1000	0.09	0.3	401
1260	-0.1000	-0.10	24.82	-0.10	-0.1000	0.2987	3.88	0.1842	-0.1000	-0.10	0.3	496
1261	-0.1000	-0.10	27.43	-0.10	-0.1000	-0.1000	4.23	-0.1000	-0.1000	0.09	0.5	515
1262	-0.1000	0.07	23.78	-0.10	-0.1000	0.5437	4.58	0.1874	-0.1000	-0.10	0.6	499

Underlined values exceed irrigation standards. Shaded values indicate severe risks. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure.

Sample Site Test Data for Rich County District

Livestock

Id #	Al	As	B	Cd	Co	Cr	Mo	Ni	Pb	S	Se	EC umhos/cm	V	Zn
1250	-0.1000	-0.1000	0.10	-0.1000	-0.1000	-0.1000	0.0295	-0.1000	-0.1000	14.03	-0.1000	769	0.0105	-0.10
1251	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	11.25	-0.1000	619	-0.1000	-0.10
1252	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	0.0136	-0.1000	-0.1000	7.61	-0.1000	491	-0.1000	-0.10
1253	-0.1000	-0.1000	0.14	-0.1000	-0.1000	-0.1000	0.0409	-0.1000	-0.1000	17.57	-0.1000	705	0.0131	0.04
1254	-0.1000	-0.1000	0.38	-0.1000	-0.1000	-0.1000	0.0652	-0.1000	-0.1000	68.27	-0.1000	1,789	0.0245	-0.10
1255	-0.1000	-0.1000	0.22	-0.1000	-0.1000	-0.1000	0.0615	-0.1000	-0.1000	29.92	-0.1000	1,112	0.0228	-0.10
1256	-0.1000	-0.1000	0.14	-0.1000	-0.1000	-0.1000	0.0450	-0.1000	-0.1000	69.69	-0.1000	1,043	-0.1000	0.15
1257	-0.1000	-0.1000	0.26	-0.1000	-0.1000	-0.1000	0.0599	-0.1000	-0.1000	80.39	-0.1000	1,690	-0.1000	0.09
1258	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	2.85	-0.1000	608	-0.1000	0.36
1259	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	4.46	-0.1000	401	-0.1000	0.09
1260	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	12.89	-0.1000	496	-0.1000	-0.10
1261	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	0.0111	-0.1000	-0.1000	14.94	-0.1000	515	-0.1000	0.09
1262	-0.1000	-0.1000	0.07	-0.1000	-0.1000	-0.1000	0.0121	-0.1000	-0.1000	12.58	-0.1000	499	-0.1000	-0.10

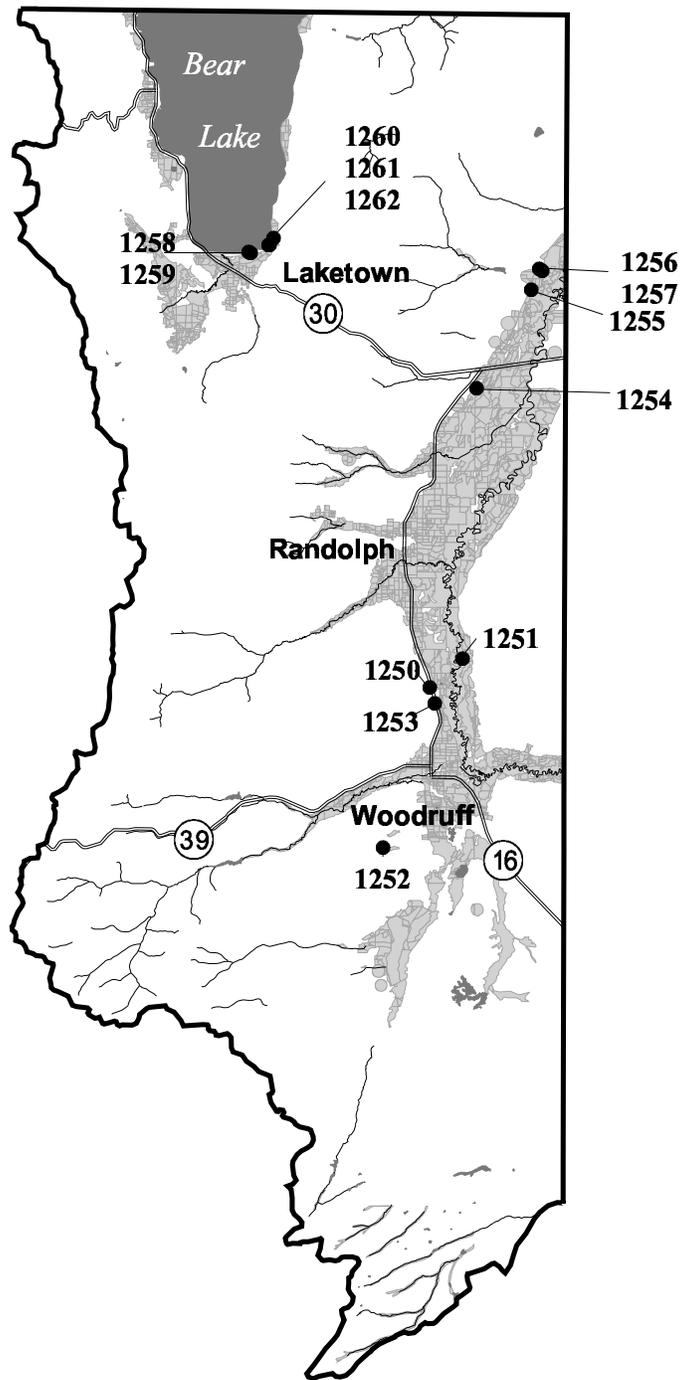
Underlined values indicate minor health problems (particularly smaller and younger animals). Shaded values indicate a serious health risk. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure.

Culinary

Id #	As	Ba	Cd	Cr	Cu	Fe	Mn	NO3-N	Pb	S	Se	EC umhos/cm	Zn	pH	Col	Ecoli	Hardness gpg
1250	-0.1000	0.1285	-0.1000	-0.1000	-0.1000	0.0548	0.0295	3.8	-0.1000	14.03	-0.1000	769	-0.10	7.93	0	0	6.9
1251	-0.1000	0.3322	-0.1000	-0.1000	-0.1000	0.4355	-0.1000	0.0	-0.1000	11.25	-0.1000	619	-0.10	8.00	0	0	5.4
1252	-0.1000	0.0993	-0.1000	-0.1000	-0.1000	0.1703	0.0136	0.4	-0.1000	7.61	-0.1000	491	-0.10	7.93	0	0	4.9
1253	-0.1000	0.0554	-0.1000	-0.1000	-0.1000	0.0399	0.0409	3.3	-0.1000	17.57	-0.1000	705	0.04	7.92	0	0	5.4
1254	-0.1000	0.0357	-0.1000	-0.1000	-0.1000	0.0229	0.0652	88.1	-0.1000	68.27	-0.1000	1,789	-0.10	7.89	0	0	8.5
1255	-0.1000	0.0831	-0.1000	-0.1000	-0.1000	0.0447	0.0615	45.9	-0.1000	29.92	-0.1000	1,112	-0.10	7.74	0	0	8.4
1256	-0.1000	0.0338	-0.1000	-0.1000	-0.1000	0.0406	0.0450	2.3	-0.1000	69.69	-0.1000	1,043	0.15	7.88	0	0	9.0
1257	-0.1000	0.1161	-0.1000	-0.1000	-0.1000	0.0206	0.0599	3.8	-0.1000	80.39	-0.1000	1,690	0.09	7.59	0	0	11.1
1258	-0.1000	0.1857	-0.1000	-0.1000	-0.1000	0.4976	-0.1000	0.4	-0.1000	2.85	-0.1000	608	0.36	7.95	0	0	6.3
1259	-0.1000	0.1493	-0.1000	-0.1000	-0.1000	0.5218	-0.1000	0.0	-0.1000	4.46	-0.1000	401	0.09	8.46	0	0	4.2
1260	-0.1000	0.2343	-0.1000	-0.1000	-0.1000	0.2987	-0.1000	0.4	-0.1000	12.89	-0.1000	496	-0.10	8.20	1	0	5.3
1261	-0.1000	0.1746	-0.1000	-0.1000	-0.1000	-0.1000	0.0111	0.4	-0.1000	14.94	-0.1000	515	0.09	8.01	0	0	4.9
1262	-0.1000	0.2227	-0.1000	-0.1000	-0.1000	0.5437	0.0121	0.0	-0.1000	12.58	-0.1000	499	-0.10	8.40	0	0	4.6

Underlined values exceed Secondary (aesthetic) standards. Shaded values exceed Primary (health) standards. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure. For Col and Ecoli 1 = present 0 =absent.

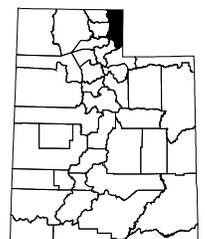
Map 3. Rich County District



- Sample Site
- Irrigated Land
- Water Body
- SCD Boundary
- ↗ Road
- ↗ Water Course



District Location



Zone 2

UACD Zone 2 consists of six districts in six counties including Weber, Morgan, Davis, Salt Lake, and Tooele counties.

One hundred and thirty-four sites were sampled in the six districts of Zone 2 during the spring, summer, and fall of 2001 with 18 sampled in the Davis County District, 18 in the Grantsville District, 37 in the Morgan District, 37 in the Salt Lake District, 1 in the Shambip District, and 23 in the Weber District. A separate narrative report is presented for each district with maps showing the location of the sample sites. Each report covers three categories of water quality criteria: irrigation, livestock and culinary. Data are presented in four tables for each zone, grouped according to district. These include general parameters (temperature, pH, total dissolved solids (TDS), and chemicals for which there are no standards); irrigation, livestock and drinking water parameters.

Davis County District

The water in this area ranges from soft to moderate-hard with gpg (grains per gallon) readings from 1.5 to 5.7, with a mean of 2.9. Water temperatures range from 6.2 °C to 26.3 °C, with a mean of 15.62 °C. The pH for the area has a mean of 7.96 and ranges from 6.76 to 9.22. The value 9.22 for sample 1037 is beyond the recommended range for pH.

Irrigation:

Salinity is a measurement of the concentration of ionic salts dissolved in water. It is measured as electrical conductivity (EC), in $\mu\text{mhos/cm}$. Higher conductivity values indicate higher concentrations of dissolved salts. Water high in dissolved salts increases osmotic pressures, making it difficult for plants to get water necessary for growth. Generally when EC exceeds 750 $\mu\text{mhos/cm}$, salt-sensitive plants begin to be affected. When EC exceeds 3,000 $\mu\text{mhos/cm}$, most plants would be severely injured. Six wells in this area exceeded the irrigation standard of 750 $\mu\text{mhos/cm}$ (1037, 1049, 1050, 1192, 1193, and 1210). Sample 1192 has an EC of 4,090, which could cause severe damage if used for irrigation.

The sodium absorption ratio (SAR) measures how much sodium (Na) is in solution compared to calcium (Ca) and magnesium (Mg). Excessive sodium in the soil causes soil particles to repel each other. This destroys the structure of the soil, preventing air and water movement. SAR values greater than 3 mark the beginning of problems and values greater than 9 indicate severe problems. Samples 1050, 1193, and 1210 have elevated SAR and 1037 has a SAR of 9.5, which could cause serious problems.

Bicarbonate (HCO_3) is an ion common to water solutions. It can be hazardous to plants in excessive amounts, especially when used in sprinkler irrigation. Bicarbonate also causes white deposits on plants and their fruits, which degrades their visual appeal. Bicarbonate also increases the effect of sodium when both are present. Special attention is needed when using water with excessive bicarbonate. With sensitive plants minor problems appear with bicarbonate concentrations in excess of 1.5 meq/l, and severe problems appear when it exceeds 8.5 meq/l. All of the samples have high bicarbonate, which is common for water in Utah. Sample 1193 exceeds the severe level with a value of 9.

Some elements are toxic to plants. Chlorine, found in the form of Chloride (Cl^-), can damage sensitive plants at concentrations above 145 ppm and concentrations exceeding 355 ppm can cause severe damage to almost all plants. Damage increases under sprinkler irrigation and is more severe in windy conditions. Samples 1037 and 1050 have elevated chlorine.

Sample 1193 has elevated manganese (Mn). Manganese above 0.2 ppm can injure plants and cause reduction in dry matter production. Excess manganese interferes with the plant's ability to use other nutrients such as calcium (Ca).

No other elements were above concentrations that are harmful to plants.

Livestock:

Samples 1037, 1038, 1045 through 1051, 1192, 1193, and 1210 have greater than 0.01 ppm molybdenum (Mo). Livestock eating plants irrigated with water that has molybdenum concentration greater than 0.01 ppm may be harmed. High concentrations of molybdenum interfere with copper nutrition in livestock.

Culinary:

Salinity (EC) for samples 1037, 1049, 1050, 1192, 1193, and 1210 exceeds the EPA aesthetic standard of 833 $\mu\text{mhos/cm}$. At this 833 level the water may be off-flavored, but it is not a health problem until the EC level reaches 3,333. Sample 1192 exceeds the primary standard with a value of 4,090.

Several minerals were found to exceed the aesthetic and primary health drinking water quality standards. Sample 1050 has elevated barium (Ba) with a value of 1.3, exceeding the primary standard of 1.0 ppm.

Seven samples (1036, 1037, 1040, 1041, 1050, 1051, and 1532) have elevated iron (Fe). Iron can cause staining and off flavor at levels above the aesthetic standard of 0.3 ppm.

All but four samples, 1037, 1038, 1039, and 1048, have high manganese (Mn) levels. EPA has set an aesthetic standard of 0.05 ppm for manganese. Water with high concentrations may cause discoloration of plumbing fixtures and have poor flavor.

The most serious problem with drinking water from private water systems is bacterial contamination. Because disease-causing organisms are rare, non-parasitic coliform bacteria that are found in association with parasitic bacteria are used as indicators to assess whether water could be contaminated with harmful bacteria. Coliform bacteria can occur naturally in the soil, whereas *E. coli*, a type of coliform, develops only in the digestive systems of mammals. The presence of coliform bacteria indicates that surface water, soil, or other contaminants are entering the well. The presence of *E. coli* in well water, on the other hand, indicates that mammalian fecal material is entering the well. Bacterial contamination is commonly the result of well construction problems. Contamination may result from inadequate capping, a leaking well casing, improper grouting, or lack of a casing. *E. coli* contamination can come from defective septic systems, manure operations or septic systems too close to wells, leaky sewer systems, or shallow water tables.

Two samples -1036 and 1192 - are contaminated with coliform. Wells from which these samples were collected should be inspected carefully to determine the source of contamination and should not be used for culinary purposes until the problem is corrected.

Sample Site Test Data for Davis County District

General

Id #	Be	Ca	K	Li	Mg	Na	P	pH	°C	TDS
1036	-0.1000	31.99	1.47	-0.1000	6.71	16.23	-0.10	8.09	12.6	242
1037	-0.1000	7.61	12.20	-0.1000	17.75	210.52	-0.10	9.22	12.3	975
1038	-0.1000	26.99	2.75	-0.1000	7.63	15.80	-0.10	8.12	11.1	227
1039	-0.1000	34.54	1.40	-0.1000	8.09	13.95	-0.10	7.97	12.5	250
1040	-0.1000	31.56	1.34	-0.1000	6.92	13.76	-0.10	8.30	13.6	231
1041	-0.1000	30.60	1.36	-0.1000	7.30	13.45	-0.10	8.15	12.8	230
1042	-0.1000	29.08	1.43	-0.1000	6.76	17.42	-0.10	8.17	16.5	219
1045	-0.1000	32.47	1.77	-0.1000	10.62	30.80	-0.10	8.10	15.5	315
1046	-0.1000	39.46	1.78	-0.1000	10.31	26.83	-0.10	7.96	10.7	325
1047	-0.1000	28.50	2.89	-0.1000	7.73	46.47	-0.10	8.03	20.7	336
1048	-0.1000	35.50	2.78	-0.1000	10.41	27.66	-0.10	8.02	22	325
1049	-0.1000	47.83	4.90	-0.1000	14.35	52.12	-0.10	7.88	21.9	525
1050	-0.1000	75.43	7.94	-0.1000	21.54	154.83	-0.10	7.76	26.3	1,206
1051	-0.1000	52.69	2.69	-0.1000	16.69	22.25	-0.10	7.61	16.9	405
1192	-0.1000	18.48	2.31	-0.1000	12.72	21.46	-0.10	7.81	19	2,454
1193	-0.1000	64.07	6.85	-0.1000	22.83	133.69	-0.10	7.63	6.2	927
1210	-0.1000	49.07	2.93	-0.1000	15.64	101.42	0.20	6.76	14.1	688
1532	-0.1000	49.52	2.68	-0.1000	16.62	22.21	-0.10	7.67	16.4	260

Values of -0.1 are below detection limits of testing procedure

Sample Site Test Data for Davis County District

Irrigation

Id #	Al	B	Cl	CO3 meq/l	Cu	Fe	HCO3 meq/l	Mn	Se	Zn	SAR	EC umhos/cm
1036	-0.1000	-0.10	0.00	0.00	-0.1000	0.3659	2.54	0.0959	-0.1000	-0.10	0.7	404
1037	-0.1000	0.31	<u>160.47</u>	1.20	-0.1000	0.8060	5.35	0.0212	-0.1000	-0.10	<u>9.5</u>	<u>1,625</u>
1038	-0.1000	-0.10	10.03	0.00	-0.1000	0.1437	2.29	-0.1000	-0.1000	-0.10	0.7	378
1039	-0.1000	-0.10	12.50	0.00	-0.1000	0.0429	2.44	-0.1000	-0.1000	0.07	0.6	417
1040	-0.1000	-0.10	10.43	0.00	-0.1000	0.3468	2.37	0.0910	-0.1000	-0.10	0.6	385
1041	-0.1000	-0.10	10.03	0.00	-0.1000	0.5506	2.35	0.0619	-0.1000	-0.10	0.6	384
1042	-0.1000	-0.10	11.01	0.00	-0.1000	0.1251	2.33	0.0745	-0.1000	-0.10	0.8	365
1045	-0.1000	-0.10	15.73	0.00	-0.1000	0.2252	3.32	0.0646	-0.1000	-0.10	1.2	525
1046	-0.1000	-0.10	15.57	0.00	-0.1000	0.1133	3.28	0.0839	-0.1000	-0.10	1.0	541
1047	-0.1000	-0.10	0.00	0.00	-0.1000	0.0681	3.59	0.0691	-0.1000	-0.10	2.0	560
1048	-0.1000	-0.10	17.17	0.00	-0.1000	0.0789	3.28	0.0401	-0.1000	-0.10	1.0	542
1049	-0.1000	-0.10	82.01	0.00	-0.1000	0.2071	3.28	0.0760	-0.1000	-0.10	1.7	<u>875</u>
1050	-0.1000	0.13	<u>335.71</u>	0.00	-0.1000	0.3721	3.12	0.1431	-0.1000	-0.10	<u>4.0</u>	<u>2,010</u>
1051	-0.1000	-0.10	21.76	0.00	-0.1000	0.7266	4.00	0.0779	-0.1000	-0.10	0.7	675
1192	-0.1000	-0.10	22.39	-0.10	-0.1000	0.1142	1.94	0.1338	-0.1000	0.18	0.9	<u>4,090</u>
1193	0.1006	0.12	73.51	-0.10	-0.1000	0.2896	<u>9.00</u>	<u>0.3618</u>	-0.1000	-0.10	<u>3.6</u>	<u>1,545</u>
1210	-0.1000	0.13	49.20	-0.10	-0.1000	0.2184	6.62	0.1288	-0.1000	-0.10	<u>3.2</u>	<u>1,146</u>
1532	-0.1000	-0.10	19.48	-0.10	-0.1000	0.6974	3.74	0.0728	-0.1000	-0.10	0.7	434

Underlined values exceed irrigation standards. Shaded values indicate severe risks. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure.

Sample Site Test Data for Davis County District

Livestock

Id #	Al	As	B	Cd	Co	Cr	Mo	Ni	Pb	S	Se	EC umhos/cm	V	Zn
1036	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	0.65	-0.1000	404	-0.1000	-0.10
1037	-0.1000	-0.1000	0.31	-0.1000	-0.1000	-0.1000	<u>0.0957</u>	-0.1000	-0.1000	8.78	-0.1000	1,625	-0.1000	-0.10
1038	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0110</u>	-0.1000	-0.1000	0.55	-0.1000	378	-0.1000	-0.10
1039	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	2.97	-0.1000	417	-0.1000	0.07
1040	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.83	-0.1000	385	-0.1000	-0.10
1041	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.69	-0.1000	384	-0.1000	-0.10
1042	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	0.98	-0.1000	365	-0.1000	-0.10
1045	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0190</u>	-0.1000	-0.1000	0.69	-0.1000	525	-0.1000	-0.10
1046	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0156</u>	-0.1000	-0.1000	2.12	-0.1000	541	-0.1000	-0.10
1047	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0276</u>	-0.1000	-0.1000	0.92	-0.1000	560	-0.1000	-0.10
1048	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0219</u>	-0.1000	-0.1000	3.50	-0.1000	542	-0.1000	-0.10
1049	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0474</u>	-0.1000	-0.1000	6.22	-0.1000	875	-0.1000	-0.10
1050	-0.1000	-0.1000	0.13	-0.1000	-0.1000	-0.1000	<u>0.1097</u>	-0.1000	-0.1000	2.78	-0.1000	2,010	-0.1000	-0.10
1051	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0120</u>	-0.1000	-0.1000	4.79	-0.1000	675	-0.1000	-0.10
1192	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0184</u>	-0.1000	-0.1000	3.71	-0.1000	4,090	-0.1000	0.18
1193	0.1006	-0.1000	0.12	-0.1000	-0.1000	-0.1000	<u>0.0368</u>	-0.1000	-0.1000	1.99	-0.1000	1,545	-0.1000	-0.10
1210	-0.1000	-0.1000	0.13	-0.1000	-0.1000	-0.1000	<u>0.0247</u>	-0.1000	-0.1000	1.34	-0.1000	1,146	-0.1000	-0.10
1532	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	4.90	-0.1000	434	-0.1000	-0.10

Underlined values indicate minor health problems (particularly smaller and younger animals). Shaded values indicate a serious health risk. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure.

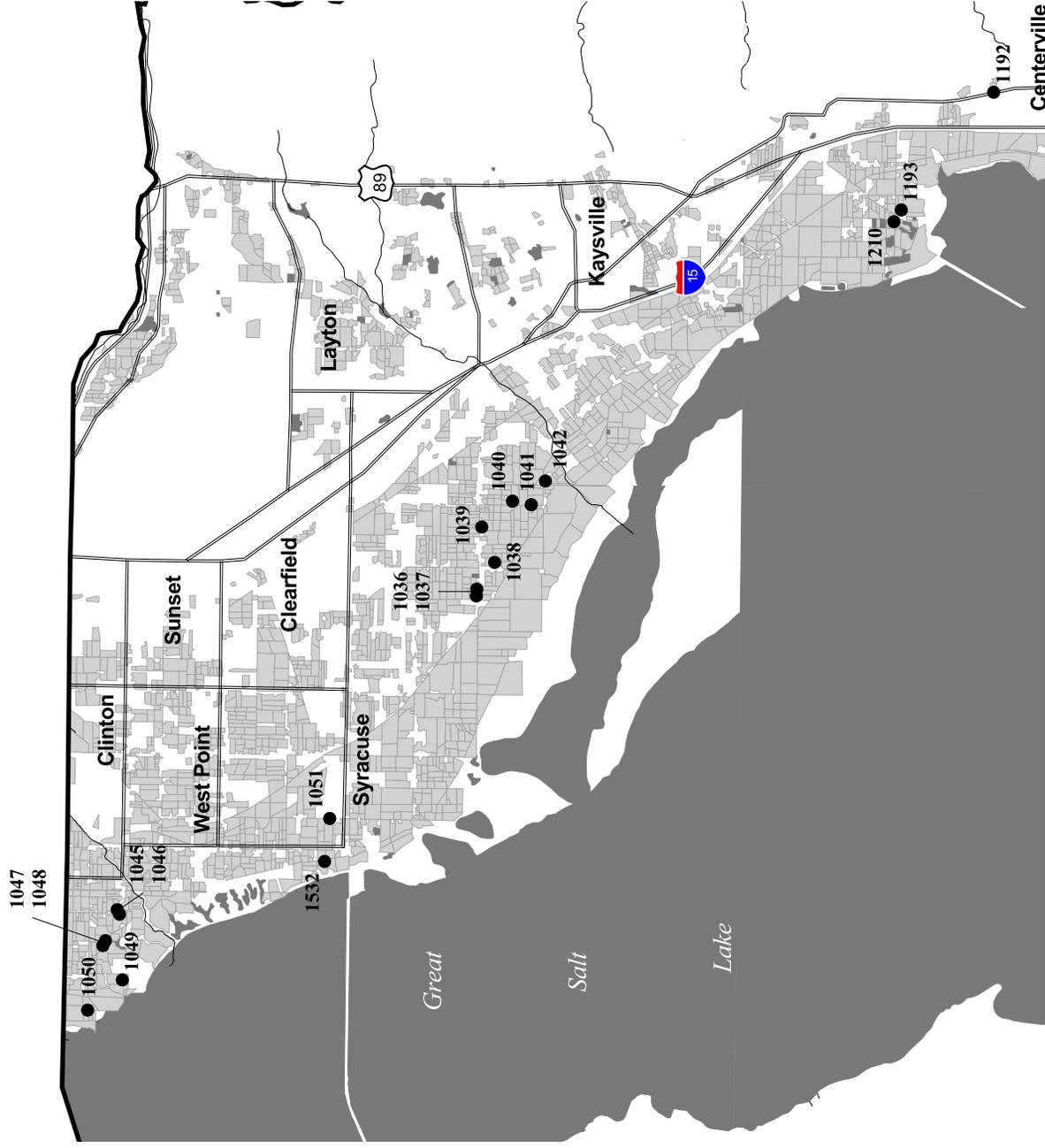
Sample Site Test Data for Davis County District

Culinary

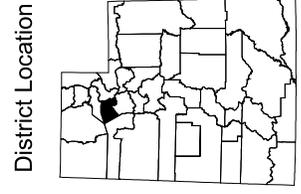
Id#	As	Ba	Cd	Cr	Cu	Fe	Mn	NO3-N	Pb	S	Se	EC umhos/cm	Zn	pH	Col	Ecoli	Hardness gpg
1036	-0.1000	0.2619	-0.1000	-0.1000	-0.1000	<u>0.3659</u>	<u>0.0959</u>	1.7	-0.1000	0.65	-0.1000	404	-0.10	8.09	<u>1</u>	0	2.3
1037	-0.1000	0.0225	-0.1000	-0.1000	-0.1000	<u>0.8060</u>	0.0212	1.3	-0.1000	8.78	-0.1000	<u>1.625</u>	-0.10	<u>9.22</u>	0	0	1.5
1038	-0.1000	0.2096	-0.1000	-0.1000	-0.1000	0.1437	-0.1000	0.8	-0.1000	0.55	-0.1000	378	-0.10	8.12	0	0	2.0
1039	-0.1000	0.1799	-0.1000	-0.1000	-0.1000	0.0429	-0.1000	1.0	-0.1000	2.97	-0.1000	417	0.07	7.97	0	0	2.5
1040	-0.1000	0.2432	-0.1000	-0.1000	-0.1000	<u>0.3468</u>	<u>0.0910</u>	0.6	-0.1000	1.83	-0.1000	385	-0.10	8.30	0	0	2.3
1041	-0.1000	0.1677	-0.1000	-0.1000	-0.1000	<u>0.5506</u>	<u>0.0619</u>	1.0	-0.1000	1.69	-0.1000	384	-0.10	8.15	0	0	2.2
1042	-0.1000	0.2859	-0.1000	-0.1000	-0.1000	0.1251	<u>0.0745</u>	0.8	-0.1000	0.98	-0.1000	365	-0.10	8.17	0	0	2.1
1045	-0.1000	0.2809	-0.1000	-0.1000	-0.1000	0.2252	<u>0.0646</u>	1.2	-0.1000	0.69	-0.1000	525	-0.10	8.10	0	0	2.5
1046	-0.1000	0.3707	-0.1000	-0.1000	-0.1000	0.1133	<u>0.0839</u>	1.0	-0.1000	2.12	-0.1000	541	-0.10	7.96	0	0	2.9
1047	-0.1000	0.3015	-0.1000	-0.1000	-0.1000	0.0681	<u>0.0691</u>	0.8	-0.1000	0.92	-0.1000	560	-0.10	8.03	0	0	2.1
1048	-0.1000	0.3211	-0.1000	-0.1000	-0.1000	0.0789	0.0401	0.8	-0.1000	3.50	-0.1000	542	-0.10	8.02	0	0	2.7
1049	-0.1000	0.3664	-0.1000	-0.1000	-0.1000	0.2071	<u>0.0760</u>	0.7	-0.1000	6.22	-0.1000	<u>875</u>	-0.10	7.88	0	0	3.6
1050	-0.1000	<u>1.3156</u>	-0.1000	-0.1000	-0.1000	0.3721	0.1431	0.9	-0.1000	2.78	-0.1000	<u>2.010</u>	-0.10	7.76	0	0	5.7
1051	-0.1000	0.3890	-0.1000	-0.1000	-0.1000	0.7266	<u>0.0779</u>	1.0	-0.1000	4.79	-0.1000	675	-0.10	7.61	0	0	4.1
1192	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	0.1142	<u>0.1338</u>	0.9	-0.1000	3.71	-0.1000	<u>4.090</u>	0.18	<u>7.81</u>	<u>1</u>	0	1.8
1193	-0.1000	0.3288	-0.1000	-0.1000	-0.1000	0.2896	<u>0.3618</u>	1.8	-0.1000	1.99	-0.1000	<u>1.545</u>	-0.10	7.63	0	0	5.1
1210	-0.1000	0.2631	-0.1000	-0.1000	-0.1000	0.2184	<u>0.1288</u>	0.0	-0.1000	1.34	-0.1000	<u>1.146</u>	-0.10	6.76	0	0	3.8
1532	-0.1000	0.3698	-0.1000	-0.1000	-0.1000	<u>0.6974</u>	<u>0.0728</u>	0.0	-0.1000	4.90	-0.1000	434	-0.10	7.67	0	0	3.9

detection limits of testing procedure. For Col and Ecoli 1 = present 0 = absent.

Map 4. Davis County District



- Sample Site
- Irrigated Land
- Water Body
- SCD Boundary
- ══ Road
- 〰 Water Course



Grantsville District

The water in this area varies from moderate to hard with gpg (grains per gallon) readings from 4.9 to 15.1, with a mean of 8.6. Water temperatures range from 2.5 °C to 21.5 °C, with a mean of 15.99 °C. The pH for the area has a mean of 7.54 and ranges from 7.2 to 7.84.

Irrigation:

Salinity is a measurement of the concentration of ionic salts dissolved in water. It is measured as electrical conductivity (EC), in $\mu\text{mhos/cm}$. Higher conductivity values indicate higher concentrations of dissolved salts. Water high in dissolved salts increases osmotic pressures, making it difficult for plants to get water necessary for growth. Generally when EC exceeds 750 $\mu\text{mhos/cm}$, salt-sensitive plants begin to be affected. When EC exceeds 3,000 $\mu\text{mhos/cm}$, most plants would be severely injured. Only two wells in this area did not exceed the irrigation standard of 750 $\mu\text{mhos/cm}$ (1454 and 1455). Samples 1461 and 1462 have EC values exceeding 3,000 $\mu\text{mhos/cm}$ that could cause severe damage if used for irrigation.

SAR measures how much sodium (Na) is in solution compared to calcium (Ca) and magnesium (Mg). Excessive sodium in the soil causes soil particles to repel each other. This destroys the structure of the soil, preventing air and water movement. SAR values greater than 3 mark the beginning of problems and values greater than 9 indicate severe problems. Samples 1457 through 1459, 1461 through 1464, and 1533 have elevated SAR and 1462 has a SAR of 10.8 that could cause serious problems.

Bicarbonate (HCO_3) is an ion common to water solutions. It can be hazardous to plants in excessive amounts, especially when used in sprinkler irrigation. Bicarbonate also causes white deposits on plants and their fruits, which degrades their visual appeal. Bicarbonate also increases the effect of sodium when both are present. Special attention is needed when using water with excessive bicarbonate. With sensitive plants minor problems appear with bicarbonate concentrations in excess of 1.5 meq/l and severe problems appear when it exceeds 8.5 meq/l. All of the samples collected in this area have high bicarbonate, which is common for water in Utah. No samples exceeded the severe level of 8.5 meq/l.

Some elements are toxic to plants. Chlorine, found in the form of Chloride (Cl^-), can damage sensitive plants at concentrations above 145 ppm and concentrations exceeding 355 ppm can cause severe damage to almost all plants. Damage increases under sprinkler irrigation and is more severe in windy conditions. Samples 1459, 1460, 1463, 1464, 1469, 1470, and 1533 have elevated chlorine levels. Water from Samples 1459, 1460, and 1464 could cause severe damage to plants.

No other elements were above concentrations that are harmful to plants.

Livestock:

No water quality standards for livestock were exceeded..

Culinary:

Salinity (EC) for samples 1457 through 1460, 1463, 1464, 1469, 1470, and 1533 exceeds the EPA aesthetic standard of 833 $\mu\text{mhos/cm}$. At this 833 level the water may be off-flavored but it is not a health problem until the EC level reaches 3,333 $\mu\text{mhos/cm}$. Samples 1461 and 1462 exceed the primary standard and are a health risk.

Two minerals were found to exceed the aesthetic drinking water quality standards. Sample 1459 has elevated iron (Fe) with a value of 0.51 ppm. Iron can cause staining and off flavor at levels above the aesthetic standard of 0.3 ppm.

Sample 1469 has high sulfur (S), with a value of 130.5 ppm. Sulfate is a soluble form of sulfur that can cause flavor problems in drinking water if there is more than 83 ppm sulfur. Bacteria in the water metabolize sulfur and produce hydrogen sulfide gas (rotten egg gas). The bacteria that produce this compound can live in plumbing fixtures and even hot water heaters. It is not uncommon to get strong odors when the hot water is turned on in areas where there is high sulfate. Generally, people cannot tolerate the odor from this gas. Even if the gas is not present, high sulfate concentrations can cause diarrhea in people not used to drinking it.

The most serious problem with drinking water from private water systems is bacterial contamination. Because disease-causing organisms are rare, non-parasitic coliform bacteria that are found in association with parasitic bacteria are used as indicators to assess whether water could be contaminated with harmful bacteria. Coliform bacteria can occur naturally in the soil, whereas *E. coli*, a type of coliform, develops only in the digestive systems of mammals. The presence of coliform bacteria indicates that surface water, soil, or other contaminants are entering the well. The presence of *E. coli* in well water, on the other hand, indicates that mammalian fecal material is entering the well. Bacterial contamination is commonly the result of well construction problems. Contamination may result from inadequate capping, a leaking well casing, improper grouting, or lack of a casing. *E. coli* contamination can come from defective septic systems, manure operations or septic systems too close to wells, leaky sewer systems, or shallow water tables.

Many species of coliform, including *E. coli* bacteria are not harmful although some strains of *E. coli* such as O157, are very infectious. Four samples are contaminated with coliform bacteria (1458, 1459, 1465, and 1466). Wells from which these samples were collected should be inspected carefully to determine the source of contamination and should not be used for culinary purposes until the problem is corrected.

Sample Site Test Data for Grantsville District

General

Id #	Be	Ca	K	Li	Mg	Na	P	pH	°C	TDS
1454	-0.1000	76.90	2.19	-0.1000	23.91	35.07	-0.10	7.58	14.3	391
1455	-0.1000	62.97	2.95	-0.1000	26.46	36.47	-0.10	7.80	13.6	381
1456	-0.1000	102.34	3.02	-0.1000	28.31	38.89	-0.10	7.46	15.2	494
1457	-0.1000	149.18	4.88	-0.1000	55.70	284.64	-0.10	7.32	16.2	1,590
1458	-0.1000	167.00	5.08	-0.1000	58.83	307.69	-0.10	7.27	15.5	1,512
1459	-0.1000	140.49	4.74	-0.1000	53.91	277.76	-0.10	7.37	18.5	1,410
1460	-0.1000	134.11	3.78	-0.1000	52.40	88.14	-0.10	7.50	18.2	857
1461	-0.1000	181.33	10.87	0.1270	76.73	495.88	-0.10	7.29	20.1	2,208
1462	-0.1000	172.95	14.60	0.1585	66.51	658.23	-0.10	7.63	21.5	2,436
1463	-0.1000	68.08	3.17	-0.1000	25.00	117.47	-0.10	7.75	17.2	616
1464	-0.1000	81.54	3.57	-0.1000	26.49	335.04	-0.10	7.58	15.8	1,180
1465	-0.1000	78.03	2.01	-0.1000	26.27	61.84	-0.10	7.67	15.7	478
1466	-0.1000	61.84	2.44	-0.1000	21.26	95.34	-0.10	7.73	16.1	485
1467	-0.1000	77.89	2.13	-0.1000	26.29	68.42	-0.10	7.84	15.9	474
1468	-0.1000	82.17	2.01	-0.1000	35.95	54.87	-0.10	7.61	19.4	484
1469	-0.1000	144.68	4.88	-0.1000	61.91	114.01	-0.10	7.45	15.5	854
1470	-0.1000	70.58	5.63	-0.1000	29.51	118.89	-0.10	7.75	16.7	624
1533	-0.1000	72.71	4.10	-0.1000	29.18	147.68	-0.10	7.20	2.5	1,290

Values of -0.1 are below detection limits of testing procedure

Sample Site Test Data for Grantsville District

Irrigation

Id #	Al	B	Cl	CO3 meq/l	Cu	Fe	HCO3 meq/l	Mn	Se	Zn	SAR	EC umhos/cm
1455	-0.1000	-0.10	67.25	-0.10	-0.1000	0.0900	4.27	-0.1000	-0.1000	0.23	0.9	7
1455	-0.1000	-0.10	75.48	-0.10	0.0264	0.0941	3.69	-0.1000	-0.1000	0.05	1.0	635
1456	-0.1000	-0.10	96.84	-0.10	-0.1000	0.0571	5.02	-0.1000	-0.1000	-0.10	0.9	824
1457	-0.1000	0.10	-0.10	-0.10	-0.1000	-0.1000	5.04	-0.1000	-0.1000	-0.10	5.0	2,650
1458	-0.1000	0.10	-0.10	-0.10	-0.1000	-0.1000	3.05	-0.1000	-0.1000	0.06	5.2	2,520
1459	-0.1000	0.10	693.88	-0.10	0.0203	0.5127	3.24	0.0419	-0.1000	0.05	5.0	2,350
1460	-0.1000	0.08	415.10	-0.10	-0.1000	0.0228	2.72	-0.1000	-0.1000	0.04	1.6	1,428
1461	-0.1000	0.22	-0.10	-0.10	-0.1000	0.0826	3.38	-0.1000	-0.1000	0.56	7.8	3,680
1462	-0.1000	0.19	-0.10	-0.10	-0.1000	0.1448	2.79	0.0399	-0.1000	-0.10	10.8	4,060
1463	-0.1000	-0.10	237.87	-0.10	-0.1000	0.0527	3.78	-0.1000	-0.1000	0.06	3.1	1,027
1464	-0.1000	0.09	572.56	-0.10	-0.1000	0.0207	3.90	-0.1000	-0.1000	-0.10	8.2	1,967
1465	-0.1000	-0.10	55.32	-0.10	-0.1000	0.1039	3.49	-0.1000	-0.1000	0.08	1.5	796
1466	-0.1000	-0.10	86.05	-0.10	-0.1000	-0.1000	3.78	-0.1000	-0.1000	-0.10	2.7	808
1467	-0.1000	-0.10	58.44	-0.10	-0.1000	-0.1000	3.55	-0.1000	-0.1000	-0.10	1.7	790
1468	-0.1000	-0.10	61.42	-0.10	-0.1000	-0.1000	4.00	-0.1000	-0.1000	-0.10	1.3	806
1469	-0.1000	0.13	209.64	-0.10	-0.1000	0.0245	4.37	-0.1000	-0.1000	0.06	2.0	1,423
1470	-0.1000	0.11	207.00	-0.10	-0.1000	0.0477	3.65	-0.1000	-0.1000	0.12	3.0	1,040
1533	-0.1000	0.08	296.11	-0.10	-0.1000	-0.1000	3.69	-0.1000	-0.1000	0.09	3.7	2,150

Underlined values exceed irrigation standards. Shaded values indicate severe risks. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure.

Sample Site Test Data for Grantsville District

Livestock

Id #	Al	As	B	Cd	Co	Cr	Mo	Ni	Pb	S	Se	EC umhos/cm	V	Zn
1454	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.10	10.47	-0.1000	652	-0.1000	0.23
1455	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.10	9.29	-0.1000	635	-0.1000	0.05
1456	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.10	14.77	-0.1000	824	-0.1000	-0.10
1457	-0.1000	-0.1000	0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.10	21.58	-0.1000	2,650	-0.1000	-0.10
1458	-0.1000	-0.1000	0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.10	22.23	-0.1000	2,520	-0.1000	0.06
1459	-0.1000	-0.1000	0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.10	25.44	-0.1000	2,350	-0.1000	0.05
1460	-0.1000	-0.1000	0.08	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.10	17.59	-0.1000	1,428	-0.1000	0.04
1461	-0.1000	-0.1000	0.22	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.10	50.76	-0.1000	3,680	-0.1000	0.56
1462	-0.1000	-0.1000	0.19	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.10	34.60	-0.1000	4,060	-0.1000	-0.10
1463	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.10	11.68	-0.1000	1,027	-0.1000	0.06
1464	-0.1000	-0.1000	0.09	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.10	18.52	-0.1000	1,967	-0.1000	-0.10
1465	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.10	62.27	-0.1000	796	-0.1000	0.08
1466	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.10	42.89	-0.1000	808	-0.1000	-0.10
1467	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.10	61.92	-0.1000	790	-0.1000	-0.10
1468	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.10	54.53	-0.1000	806	-0.1000	-0.10
1469	-0.1000	-0.1000	0.13	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.10	130.46	-0.1000	1,423	-0.1000	0.06
1470	-0.1000	-0.1000	0.11	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.10	27.17	-0.1000	1,040	-0.1000	0.12
1533	-0.1000	-0.1000	0.08	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.10	13.50	-0.1000	2,150	-0.1000	0.09

Underlined values indicate minor health problems (particularly smaller and younger animals). Shaded values indicate a serious health risk. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure.

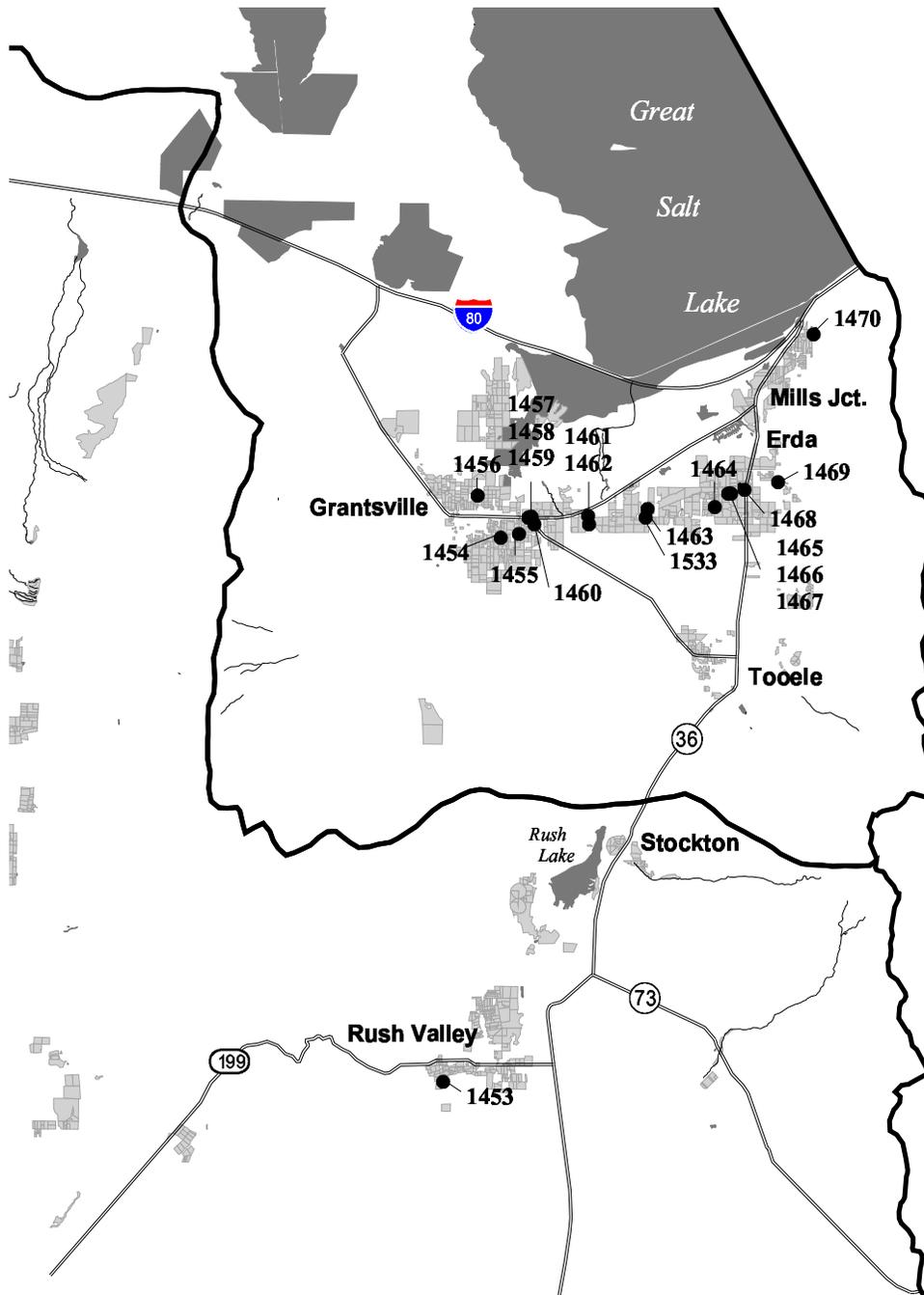
Sample Site Test Data for Grantsville District

Culinary

Id #	As	Ba	Cd	Cr	Cu	Fe	Mn	NO3-N	Pb	S	Se	EC umhos/cm	Zn	pH	Col	Ecoli	Hardness gpg
1454	-0.1000	0.2100	-0.1000	-0.1000	-0.1000	0.0900	-0.1000	4.0	-0.1000	10.50	-0.1000	652	0.23	7.58	0	0	5.9
1455	-0.1000	0.1809	-0.1000	-0.1000	0.0264	0.0941	-0.1000	4.8	-0.1000	9.29	-0.1000	635	0.05	0.05	0	0	5.2
1456	-0.1000	0.2906	-0.1000	-0.1000	-0.1000	0.0571	-0.1000	7.2	-0.1000	14.77	-0.1000	824	-0.10	-0.10	0	0	7.6
1457	-0.1000	0.3571	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.1	-0.1000	21.58	-0.1000	2.650	-0.10	-0.10	0	0	12.0
1458	-0.1000	0.4566	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.1	-0.1000	22.23	-0.1000	2.520	0.06	0.06	1	0	13.2
1459	-0.1000	0.2923	-0.1000	-0.1000	0.0203	0.5127	0.0419	1.3	-0.1000	25.44	-0.1000	2.350	0.05	0.05	1	0	11.4
1460	-0.1000	0.3338	-0.1000	-0.1000	-0.1000	0.0228	-0.1000	0.1	-0.1000	17.59	-0.1000	1.428	0.04	0.04	0	0	10.9
1461	-0.1000	0.1604	-0.1000	-0.1000	-0.1000	0.0826	-0.1000	4.6	-0.1000	50.76	-0.1000	3.680	0.56	0.56	0	0	15.1
1462	-0.1000	0.1586	-0.1000	-0.1000	-0.1000	0.1448	0.0399	0.6	-0.1000	34.60	-0.1000	4.060	-0.10	-0.10	0	0	14.0
1463	-0.1000	0.1077	-0.1000	-0.1000	-0.1000	0.0527	-0.1000	4.6	-0.1000	11.68	-0.1000	1.027	0.06	0.06	0	0	5.4
1464	-0.1000	0.1316	-0.1000	-0.1000	-0.1000	0.0207	-0.1000	3.2	-0.1000	18.52	-0.1000	1.967	-0.10	-0.10	0	0	6.3
1465	-0.1000	0.1278	-0.1000	-0.1000	-0.1000	0.1039	-0.1000	4.3	-0.1000	62.27	-0.1000	796	0.08	0.08	1	0	6.1
1466	-0.1000	0.0955	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	2.7	-0.1000	42.89	-0.1000	808	-0.10	-0.10	1	0	4.9
1467	-0.1000	0.1260	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	4.1	-0.1000	61.92	-0.1000	790	-0.10	-0.10	0	0	6.1
1468	-0.1000	0.0804	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	4.6	-0.1000	54.53	-0.1000	806	-0.10	-0.10	0	0	6.9
1469	-0.1000	0.0389	-0.1000	-0.1000	-0.1000	0.0245	-0.1000	1.9	-0.1000	130.46	-0.1000	1.423	0.06	0.06	0	0	12.1
1470	-0.1000	0.0948	-0.1000	-0.1000	-0.1000	0.0477	-0.1000	2.1	-0.1000	27.17	-0.1000	1.040	0.12	0.12	0	0	5.9
1533	-0.1000	0.1804	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	2.3	-0.1000	13.50	-0.1000	2.150	0.09	0.09	0	0	6.0

detection limits of testing procedure. For Col and Ecoli 1 = present 0 =absent.

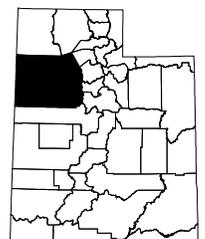
Map 5. Grantsville and Shambip Districts



- Sample Site
- Irrigated Land
- Water Body
- ▭ SCD Boundary
- ══ Road
- ══ Water Course



District Location



Morgan District

The water in this area varies from soft to hard with gpg (grains per gallon) readings from 2.9 to 14.8, with a mean of 5.8. Water temperatures range from 5.4 °C to 20.8 °C, with a mean of 10.2 °C. The pH for the area has a mean of 7.50 and ranges from 6.61 to 8.22.

Irrigation:

Salinity is a measurement of the concentration of ionic salts dissolved in water. It is measured as electrical conductivity (EC), in $\mu\text{mhos/cm}$. Higher conductivity values indicate higher concentrations of dissolved salts. Water high in dissolved salts increases osmotic pressures, making it difficult for plants to get water necessary for growth. Generally when EC exceeds 750 $\mu\text{mhos/cm}$, salt-sensitive plants begin to be affected. When EC exceeds 3,000 $\mu\text{mhos/cm}$, most plants would be severely injured. Only five wells in this area did not exceed the irrigation standard of 750 $\mu\text{mhos/cm}$. These are 1026, 1031, 1032, 1360, and 1361. No samples exceed 3,000 $\mu\text{mhos/cm}$ which could cause severe damage if used for irrigation.

SAR measures how much sodium (Na) is in solution compared to calcium (Ca) and magnesium (Mg). Excessive sodium in the soil causes soil particles to repel each other. This destroys the structure of the soil, preventing air and water movement. SAR values greater than 3 mark the beginning of problems and values greater than 9 indicate severe problems. None of the water sampled in this district has elevated SAR values.

Bicarbonate (HCO_3) is an ion common to water solutions. It can be hazardous to plants in excessive amounts, especially when used in sprinkler irrigation. Bicarbonate also causes white deposits on plants and their fruits, which degrades their visual appeal. Bicarbonate also increases the effect of sodium when both are present. Special attention is needed when using water with excessive bicarbonate. With sensitive plants minor problems appear with bicarbonate concentrations in excess of 1.5 meq/l and severe problems appear when it exceeds 8.5 meq/l. All of the samples collected in this area have high bicarbonate, which is common for water in Utah. No samples exceeded the severe level of 8.5 meq/l.

Some elements are toxic to plants. Chlorine, found in the form of Chloride (Cl^-), can damage sensitive plants at concentrations above 145 ppm and concentrations exceeding 355 ppm can cause severe damage to almost all plants. Damage increases under sprinkler irrigation and is more severe in windy conditions. Samples 1004 and 1285 have elevated chlorine.

Copper (Cu) is toxic to plants when its concentration is greater than 0.2 ppm. Sample 1013 has copper just above the standard. Copper interferes with iron uptake and causes chlorosis in plants.

Sample 1031 has elevated manganese (Mn). Manganese above 0.2 ppm can injure plants and cause reduction in dry matter production. Excess manganese interferes with the plant's ability to use other nutrients such as calcium (Ca).

Sample 1007 has elevated zinc (Zn) that can cause growth problems in plants at concentrations greater than 2.0 ppm in water. High concentrations of zinc decrease root growth and leaf expansion as well as inhibit the uptake of iron and phosphorus.

No other elements were above concentrations that are harmful to plants.

Livestock:

All samples except 1016, 1026, 1031 through 1033, 1209, 1360, and 1361 have greater than 0.01 ppm molybdenum (Mo). Livestock eating plants irrigated with water that has molybdenum concentration

greater than 0.01 ppm may be harmed. High concentrations of molybdenum interfere with copper nutrition in livestock.

Culinary:

Only samples 1005, 1026, 1031 through 1033, 1360, and 1361 did not exceed the EPA salinity aesthetic standard of 833 $\mu\text{mhos/cm}$. At this 833 level the water may be off-flavored but it is not a health problem until the EC level reaches 3,333.

Two elements, iron (Fe) and manganese (Mn) were found to exceed the aesthetic drinking water quality standards. Samples 1031 and 1209 have elevated iron (Fe). Iron can cause staining and off flavor at levels above the aesthetic standard of 0.3 ppm.

Manganese (Mn) was found to exceed the aesthetic drinking water quality in sample 1031. EPA has set an aesthetic standard of 0.05 ppm for manganese. Water with high concentrations may cause discoloration of plumbing fixtures and have poor flavor.

Sample 1285 exceeds the EPA nitrate (NO_3) standard of 10 ppm nitrate expressed as nitrogen ($\text{NO}_3\text{-N}$). NO_3 is an important nutrient for plant growth. It is found in nitrogen fertilizers, manure, septic systems, and some minerals. NO_3 is toxic to young infants (usually less than 6 months of age) and causes "blue baby syndrome." NO_3 can only be removed from water by reverse osmosis or distillation.

The most serious problem with drinking water from private water systems is bacterial contamination. Because disease-causing organisms are rare, non-parasitic coliform bacteria that are found in association with parasitic bacteria are used as indicators to assess whether water could be contaminated with harmful bacteria. Coliform bacteria can occur naturally in the soil, whereas *E. coli*, a type of coliform, develops only in the digestive systems of mammals. The presence of coliform bacteria indicates that surface water, soil, or other contaminants are entering the well. The presence of *E. coli* in well water, on the other hand, indicates that mammalian fecal material is entering the well. Bacterial contamination is commonly the result of well construction problems. Contamination may result from inadequate capping, a leaking well casing, improper grouting, or lack of a casing. *E. coli* contamination can come from defective septic systems, manure operations or septic systems too close to wells, leaky sewer systems, or shallow water tables.

Eight samples are contaminated with coliform, including 1004, 1006 through 1008, 1027, 1029, 1360, and 1361. Wells from which these samples were collected should be inspected carefully to determine the source of contamination and should not be used for culinary purposes until the problem is corrected.

Sample Site Test Data for Morgan District

General

Id#	Be	Ca	K	Li	Mg	Na	P	pH	°C	TDS
1001	-0.1000	148.69	6.74	-0.1000	21.43	56.56	0.19	7.21	10.7	966
1002	-0.1000	102.32	4.83	-0.1000	19.58	37.86	0.15	7.07	8.6	1,221
1003	-0.1000	109.24	4.98	-0.1000	20.93	42.94	0.22	7.08	8	1,336
1004	-0.1000	133.36	12.76	-0.1000	28.16	62.52	-0.10	6.86	9.4	1,946
1005	-0.1000	61.14	1.98	-0.1000	13.94	22.81	-0.10	7.54	5.4	817
1006	-0.1000	66.65	11.29	-0.1000	24.42	32.85	-0.10	7.54	9.8	1,124
1007	-0.1000	82.50	3.04	-0.1000	24.99	35.88	-0.10	7.19	8.2	1,229
1008	-0.1000	85.81	0.69	-0.1000	16.70	64.58	-0.10	7.57	8.5	1,360
1009	-0.1000	73.24	6.46	-0.1000	20.95	33.13	-0.10	7.48	12	1,067
1010	-0.1000	89.22	3.75	-0.1000	18.28	29.55	-0.10	7.41	20.8	1,126
1011	-0.1000	68.14	9.53	-0.1000	24.64	21.76	-0.10	7.51	12.7	1,046
1012	-0.1000	58.19	1.78	-0.1000	15.51	29.64	-0.10	7.73	9.7	902
1013	-0.1000	66.44	1.66	-0.1000	17.61	34.50	-0.10	7.66	10.3	1,062
1014	-0.1000	82.24	2.00	-0.1000	16.86	26.27	-0.10	7.33	8.6	1,087
1015	-0.1000	86.29	2.53	-0.1000	18.06	27.35	-0.10	7.22	7.1	1,140
1016	-0.1000	80.21	2.11	-0.1000	16.89	25.22	-0.10	7.34	9.8	1,002
1017	-0.1000	84.00	2.45	-0.1000	18.66	27.76	-0.10	7.39	10	1,113
1018	-0.1000	81.83	2.82	-0.1000	19.85	29.61	-0.10	7.57	8.9	1,142
1019	-0.1000	57.76	8.23	-0.1000	16.87	26.43	-0.10	7.97	10.1	922
1020	-0.1000	63.83	6.49	-0.1000	17.17	26.61	-0.10	7.42	10.6	954
1021	-0.1000	47.65	5.71	-0.1000	18.79	26.34	-0.10	7.71	10	833
1022	-0.1000	89.85	5.45	-0.1000	19.99	28.94	0.17	7.28	11	1,196
1023	-0.1000	80.83	3.25	-0.1000	20.58	25.23	-0.10	7.92	9.3	1,087
1024	-0.1000	81.51	3.57	-0.1000	21.63	25.53	-0.10	7.42	8	1,106
1025	-0.1000	80.15	3.59	-0.1000	20.76	24.91	-0.10	7.44	8.9	1,081
1026	-0.1000	40.87	2.07	-0.1000	8.00	12.36	-0.10	8.02	10.7	527
1027	-0.1000	55.13	4.43	-0.1000	19.94	22.19	-0.10	7.78	6.9	864
1028	-0.1000	58.36	5.70	-0.1000	19.39	23.87	-0.10	7.83	9.8	900
1029	-0.1000	70.22	2.81	-0.1000	21.17	25.18	-0.10	7.61	8.8	998
1031	-0.1000	47.91	4.51	-0.1000	10.29	14.80	-0.10	7.83	6.5	632
1032	-0.1000	62.67	3.79	-0.1000	8.79	11.85	-0.10	7.66	7.8	674
1033	-0.1000	58.08	1.69	-0.1000	20.09	18.95	-0.10	7.67	10.1	812
1208	-0.1000	75.36	2.15	-0.1000	19.90	26.06	-0.10	6.61	16.3	927
1209	-0.1000	73.70	2.17	-0.1000	22.74	20.80	-0.10	6.67	13	868
1285	-0.1000	215.38	11.60	-0.1000	37.62	73.34	-0.10	7.58	15.2	1,878
1360	-0.1000	82.36	0.59	-0.1000	3.03	7.24	-0.10	8.22	8.8	417
1361	-0.1000	77.24	0.61	-0.1000	5.96	4.49	-0.10	7.99	18.2	396

Values of -0.1 are below detection limits of testing procedure

Sample Site Test Data for Morgan District

Irrigation

Id #	Al	B	Cl	CO3 meq/l	Cu	Fe	HCO3 meq/l	Mn	Se	Zn	SAR	EC umhos/cm
1001	-0.1000	0.11	34.06	-0.10	-0.1000	-0.1000	7.74	-0.1000	-0.1000	0.06	1.1	966
1002	-0.1000	0.07	40.37	-0.10	0.0583	0.0322	6.89	-0.1000	-0.1000	0.08	0.9	1,221
1003	-0.1000	0.11	33.46	-0.10	-0.1000	-0.1000	7.39	-0.1000	-0.1000	0.05	1.0	1,336
1004	-0.1000	0.08	198.87	-0.10	0.0280	0.0748	6.36	-0.1000	-0.1000	-0.10	1.3	1,946
1005	-0.1000	-0.10	35.61	-0.10	-0.1000	-0.1000	3.86	-0.1000	-0.1000	-0.10	0.7	817
1006	-0.1000	-0.10	83.59	-0.10	0.0379	0.0782	4.56	-0.1000	-0.1000	-0.10	0.9	1,124
1007	-0.1000	0.07	68.49	-0.10	0.0802	0.0713	5.99	-0.1000	-0.1000	4.10	0.9	1,229
1008	-0.1000	0.09	90.02	-0.10	-0.1000	-0.1000	5.20	-0.1000	-0.1000	-0.10	1.7	1,360
1009	-0.1000	0.07	64.38	-0.10	-0.1000	0.3300	5.01	-0.1000	-0.1000	0.26	0.9	1,067
1010	-0.1000	-0.10	48.04	-0.10	0.0466	0.0298	5.66	-0.1000	-0.1000	-0.10	0.7	1,126
1011	-0.1000	-0.10	62.15	-0.10	0.0368	-0.1000	5.10	-0.1000	-0.1000	-0.10	0.6	1,046
1012	-0.1000	-0.10	61.92	-0.10	-0.1000	-0.1000	3.82	-0.1000	-0.1000	0.10	0.9	902
1013	-0.1000	-0.10	89.99	-0.10	0.2267	0.2224	3.86	0.0316	-0.1000	0.14	1.0	1,062
1014	-0.1000	-0.10	52.65	-0.10	-0.1000	-0.1000	5.10	-0.1000	-0.1000	-0.10	0.7	1,087
1015	-0.1000	-0.10	55.60	-0.10	0.0206	-0.1000	5.45	-0.1000	-0.1000	-0.10	0.7	1,140
1016	-0.1000	-0.10	49.47	-0.10	-0.1000	0.0284	5.32	-0.1000	-0.1000	0.08	0.7	1,002
1017	-0.1000	-0.10	54.98	-0.10	0.0422	0.0329	4.97	-0.1000	-0.1000	0.22	0.7	1,113
1018	-0.1000	-0.10	60.51	-0.10	0.0217	0.0263	5.02	-0.1000	-0.1000	0.10	0.8	1,142
1019	-0.1000	-0.10	43.58	-0.10	0.0907	-0.1000	4.31	-0.1000	-0.1000	-0.10	0.8	922
1020	-0.1000	-0.10	46.22	-0.10	-0.1000	-0.1000	4.33	-0.1000	-0.1000	0.04	0.8	954
1021	-0.1000	-0.10	43.51	-0.10	-0.1000	0.0284	4.23	-0.1000	-0.1000	-0.10	0.8	833
1022	-0.1000	-0.10	61.60	-0.10	0.0694	-0.1000	5.45	-0.1000	-0.1000	-0.10	0.7	1,196
1023	-0.1000	-0.10	47.53	-0.10	0.0259	0.0346	5.12	-0.1000	-0.1000	0.07	0.6	1,087
1024	-0.1000	-0.10	45.67	-0.10	-0.1000	-0.1000	5.10	-0.1000	-0.1000	0.04	0.6	1,106
1025	-0.1000	-0.10	41.30	-0.10	0.0297	0.0229	5.74	-0.1000	-0.1000	0.20	0.6	1,081
1026	-0.1000	-0.10	20.66	-0.10	-0.1000	-0.1000	2.58	-0.1000	-0.1000	-0.10	0.5	527
1027	-0.1000	-0.10	35.89	-0.10	-0.1000	-0.1000	4.13	-0.1000	-0.1000	-0.10	0.7	864
1028	-0.1000	-0.10	39.74	-0.10	0.0227	0.0681	4.31	0.0463	-0.1000	0.07	0.7	900
1029	-0.1000	-0.10	42.92	-0.10	-0.1000	-0.1000	4.85	-0.1000	-0.1000	-0.10	0.7	998
1031	-0.1000	-0.10	18.83	-0.10	-0.1000	1.8098	3.65	0.7373	-0.1000	0.08	0.5	632
1032	-0.1000	-0.10	13.71	-0.10	-0.1000	0.1600	3.82	-0.1000	-0.1000	0.13	0.4	674
1033	-0.1000	-0.10	24.32	-0.10	-0.1000	0.0289	4.38	-0.1000	-0.1000	-0.10	0.5	812
1208	0.0622	-0.10	39.58	-0.10	-0.1000	-0.1000	4.48	-0.1000	-0.1000	0.06	0.7	927
1209	-0.1000	-0.10	30.58	-0.10	0.0385	0.3049	4.52	0.0379	-0.1000	1.76	0.5	868
1285	-0.1000	0.10	177.72	-0.10	-0.1000	0.0396	6.13	-0.1000	-0.1000	0.07	1.2	1,878
1360	-0.1000	-0.10	7.28	-0.10	-0.1000	-0.1000	3.86	-0.1000	-0.1000	-0.10	0.2	417
1361	-0.1000	-0.10	4.91	-0.10	-0.1000	-0.1000	3.94	-0.1000	-0.1000	0.27	0.1	396

Underlined values exceed irrigation standards. Shaded values indicate severe risks. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure.

Sample Site Test Data for Morgan District

Livestock

Id #	Al	As	B	Cd	Co	Cr	Mo	Ni	Pb	S	Se	EC umhos/cm	V	Zn
1001	-0.1000	-0.1000	0.11	-0.1000	-0.1000	-0.1000	<u>0.0309</u>	-0.1000	-0.1000	8.41	-0.1000	966	-0.1000	0.06
1002	-0.1000	-0.1000	0.07	-0.1000	-0.1000	-0.1000	<u>0.0310</u>	-0.1000	-0.1000	8.23	-0.1000	1,221	-0.1000	0.08
1003	-0.1000	-0.1000	0.11	-0.1000	-0.1000	-0.1000	<u>0.0329</u>	-0.1000	-0.1000	8.61	-0.1000	1,336	-0.1000	0.05
1004	-0.1000	-0.1000	0.08	-0.1000	-0.1000	-0.1000	<u>0.0232</u>	-0.1000	-0.1000	9.90	-0.1000	1,946	-0.1000	-0.10
1005	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	0.0100	-0.1000	-0.1000	8.42	-0.1000	817	-0.1000	-0.10
1006	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0264</u>	-0.1000	-0.1000	7.28	-0.1000	1,124	-0.1000	-0.10
1007	-0.1000	-0.1000	0.07	-0.1000	-0.1000	-0.1000	<u>0.0387</u>	-0.1000	-0.1000	12.39	-0.1000	1,229	-0.1000	4.10
1008	-0.1000	-0.1000	0.09	-0.1000	-0.1000	-0.1000	<u>0.0336</u>	-0.1000	-0.1000	15.72	-0.1000	1,360	0.0120	-0.10
1009	-0.1000	-0.1000	0.07	-0.1000	-0.1000	-0.1000	<u>0.0256</u>	-0.1000	-0.1000	7.99	-0.1000	1,067	-0.1000	0.26
1010	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0150</u>	-0.1000	-0.1000	10.68	-0.1000	1,126	-0.1000	-0.10
1011	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0179</u>	-0.1000	-0.1000	6.09	-0.1000	1,046	-0.1000	-0.10
1012	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0228</u>	-0.1000	-0.1000	7.04	-0.1000	902	-0.1000	0.10
1013	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0249</u>	-0.1000	-0.1000	8.28	-0.1000	1,062	-0.1000	0.14
1014	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0112</u>	-0.1000	-0.1000	13.38	-0.1000	1,087	-0.1000	-0.10
1015	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0112</u>	-0.1000	-0.1000	12.68	-0.1000	1,140	-0.1000	-0.10
1016	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	12.23	-0.1000	1,002	-0.1000	0.08
1017	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0127</u>	-0.1000	-0.1000	13.64	-0.1000	1,113	-0.1000	0.22
1018	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0139</u>	-0.1000	-0.1000	14.33	-0.1000	1,142	-0.1000	0.10
1019	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0203</u>	-0.1000	-0.1000	7.98	-0.1000	922	-0.1000	-0.10
1020	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0211</u>	-0.1000	-0.1000	8.89	-0.1000	954	-0.1000	0.04
1021	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0222</u>	-0.1000	-0.1000	7.62	-0.1000	833	-0.1000	-0.10
1022	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0181</u>	-0.1000	-0.1000	13.23	-0.1000	1,196	-0.1000	-0.10
1023	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0128</u>	-0.1000	-0.1000	14.14	-0.1000	1,087	-0.1000	0.07
1024	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0152</u>	-0.1000	-0.1000	15.76	-0.1000	1,106	-0.1000	0.04
1025	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0137</u>	-0.1000	-0.1000	16.56	-0.1000	1,081	-0.1000	0.20
1026	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	3.67	-0.1000	527	-0.1000	-0.10
1027	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0183</u>	-0.1000	-0.1000	7.85	-0.1000	864	-0.1000	-0.10
1028	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0167</u>	-0.1000	-0.1000	7.98	-0.1000	900	-0.1000	0.07
1029	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0144</u>	-0.1000	-0.1000	10.96	-0.1000	998	-0.1000	-0.10
1031	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.17	-0.1000	632	-0.1000	0.08
1032	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	6.11	-0.1000	674	-0.1000	0.13
1033	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	9.52	-0.1000	812	-0.1000	-0.10
1208	0.0622	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0110</u>	-0.1000	-0.1000	9.16	-0.1000	927	-0.1000	0.06
1209	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	11.10	-0.1000	868	-0.1000	1.76
1285	-0.1000	-0.1000	0.10	-0.1000	-0.1000	-0.1000	<u>0.0380</u>	-0.1000	-0.1000	30.89	-0.1000	1,878	-0.1000	0.07
1360	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	4.91	-0.1000	417	-0.1000	-0.10
1361	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	3.64	-0.1000	396	-0.1000	0.27

Underlined values indicate minor health problems (particularly smaller and younger animals). Shaded values indicate a serious health risk. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure.

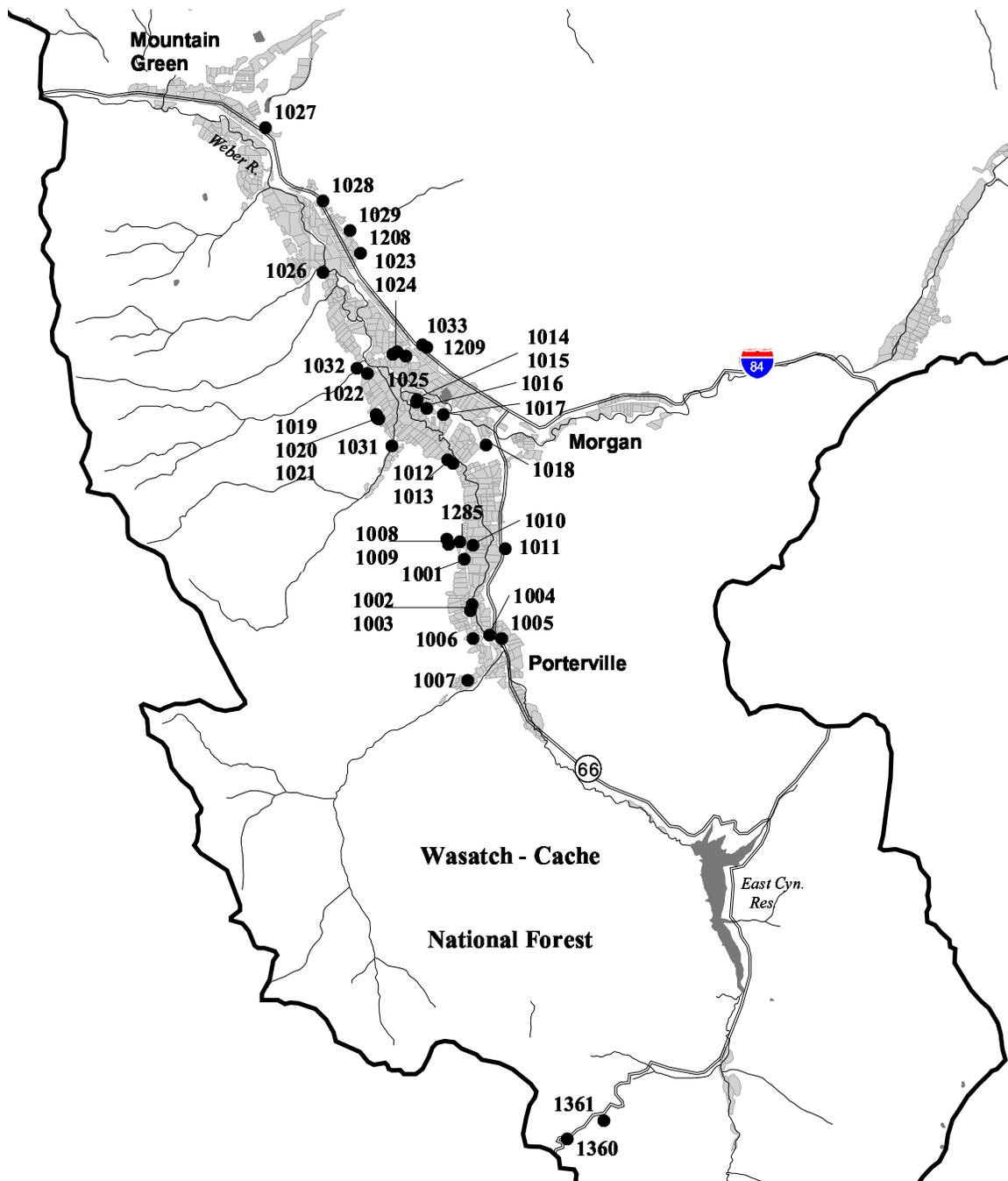
Sample Site Test Data for Morgan District

Culinary

Id #	As	Ba	Cd	Cr	Cu	Fe	Mn	NO3-N	Pb	S	Se	EC umhos/cm	Zn	pH	Col	Ecoli	Hardness gpg
1001	-0.1000	0.3501	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.4	-0.1000	8.41	-0.1000	966	0.06	7.21	0	0	9.9
1002	-0.1000	0.2634	-0.1000	-0.1000	0.0583	0.0322	-0.1000	2.5	-0.1000	8.23	-0.1000	1,221	0.08	7.07	0	0	7.1
1003	-0.1000	0.3041	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.8	-0.1000	8.61	-0.1000	1,336	0.05	7.08	0	0	7.6
1004	-0.1000	0.3253	-0.1000	-0.1000	0.0280	0.0748	-0.1000	1.7	-0.1000	9.90	-0.1000	1,946	-0.10	6.86	1	0	9.4
1005	-0.1000	0.0859	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.5	-0.1000	8.42	-0.1000	817	-0.10	7.54	0	0	4.4
1006	-0.1000	0.2403	-0.1000	-0.1000	0.0379	0.0782	-0.1000	1.1	-0.1000	7.28	-0.1000	1,124	-0.10	7.54	1	0	5.3
1007	-0.1000	0.0953	-0.1000	-0.1000	0.0802	0.0713	-0.1000	0.4	-0.1000	12.39	-0.1000	1,229	4.10	7.19	1	0	6.3
1008	-0.1000	0.1171	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	0.8	-0.1000	15.72	-0.1000	1,360	-0.10	7.57	1	0	6.0
1009	-0.1000	0.1487	-0.1000	-0.1000	-0.1000	0.3300	-0.1000	1.3	-0.1000	7.99	-0.1000	1,067	0.26	7.48	0	0	5.5
1010	-0.1000	0.2093	-0.1000	-0.1000	0.0466	0.0298	-0.1000	2.2	-0.1000	10.68	-0.1000	1,126	-0.10	7.41	0	0	6.3
1011	-0.1000	0.3239	-0.1000	-0.1000	0.0368	-0.1000	-0.1000	1.0	-0.1000	6.09	-0.1000	1,046	-0.10	7.51	0	0	5.4
1012	-0.1000	0.1325	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.5	-0.1000	7.04	-0.1000	902	0.10	7.73	0	0	4.3
1013	-0.1000	0.1277	-0.1000	-0.1000	0.2267	0.2224	0.0316	0.6	-0.1000	8.28	-0.1000	1,062	0.14	7.66	0	0	4.9
1014	-0.1000	0.1495	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.1	-0.1000	13.38	-0.1000	1,087	-0.10	7.33	0	0	5.8
1015	-0.1000	0.1444	-0.1000	-0.1000	0.0206	-0.1000	-0.1000	0.6	-0.1000	12.68	-0.1000	1,140	-0.10	7.22	0	0	6.1
1016	-0.1000	0.1636	-0.1000	-0.1000	-0.1000	0.0284	-0.1000	0.9	-0.1000	12.23	-0.1000	1,002	0.08	7.34	0	0	5.7
1017	-0.1000	0.1657	-0.1000	-0.1000	0.0422	0.0329	-0.1000	0.8	-0.1000	13.64	-0.1000	1,113	0.22	7.39	0	0	6.0
1018	-0.1000	0.1604	-0.1000	-0.1000	0.0217	0.0263	-0.1000	1.7	-0.1000	14.33	-0.1000	1,142	0.10	7.57	0	0	5.9
1019	-0.1000	0.1749	-0.1000	-0.1000	0.0907	-0.1000	-0.1000	0.9	-0.1000	7.98	-0.1000	922	-0.10	7.97	0	0	4.4
1020	-0.1000	0.1956	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.0	-0.1000	8.89	-0.1000	954	0.04	7.42	0	0	4.7
1021	-0.1000	0.1396	-0.1000	-0.1000	-0.1000	0.0284	-0.1000	1.1	-0.1000	7.62	-0.1000	833	-0.10	7.71	0	0	3.9
1022	-0.1000	0.2479	-0.1000	-0.1000	0.0694	-0.1000	-0.1000	1.0	-0.1000	13.23	-0.1000	1,196	-0.10	7.28	0	0	6.4
1023	-0.1000	0.1820	-0.1000	-0.1000	0.0259	0.0346	-0.1000	1.4	-0.1000	14.14	-0.1000	1,087	0.07	7.92	0	0	5.9
1024	-0.1000	0.1697	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.6	-0.1000	15.76	-0.1000	1,106	0.04	7.42	0	0	6.0
1025	-0.1000	0.1731	-0.1000	-0.1000	0.0297	0.0229	-0.1000	2.3	-0.1000	16.56	-0.1000	1,081	0.20	7.44	0	0	5.9
1026	-0.1000	0.1737	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.3	-0.1000	3.67	-0.1000	527	-0.10	8.02	0	0	2.9
1027	-0.1000	0.2493	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	2.1	-0.1000	7.85	-0.1000	864	-0.10	7.78	1	0	4.4
1028	-0.1000	0.2038	-0.1000	-0.1000	0.0227	0.0681	0.0463	1.3	-0.1000	7.98	-0.1000	900	0.07	7.83	0	0	4.5
1029	-0.1000	0.1760	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.7	-0.1000	10.96	-0.1000	998	-0.10	7.61	1	0	5.3
1031	-0.1000	0.2447	-0.1000	-0.1000	-0.1000	1,8098	0,7373	1.2	-0.1000	1.17	-0.1000	632	0.08	7.83	0	0	3.4
1032	-0.1000	0.2321	-0.1000	-0.1000	-0.1000	0.1600	-0.1000	0.6	-0.1000	6.11	-0.1000	674	0.13	7.66	0	0	4.2
1033	-0.1000	0.1338	-0.1000	-0.1000	-0.1000	0.0289	-0.1000	1.3	-0.1000	9.52	-0.1000	812	-0.10	7.67	0	0	4.6
1208	-0.1000	0.2618	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	2.0	-0.1000	9.16	-0.1000	927	0.06	6.61	0	0	5.6
1209	-0.1000	0.1805	-0.1000	-0.1000	0.0385	0.3049	0.0379	0.9	-0.1000	11.10	-0.1000	868	1.76	6.67	0	0	5.6
1285	-0.1000	0.3195	-0.1000	-0.1000	-0.1000	0.0396	-0.1000	18.8	-0.1000	30.89	-0.1000	1,878	0.07	7.58	0	0	14.8
1360	-0.1000	0.0267	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	0.1	-0.1000	4.91	-0.1000	417	-0.10	8.22	1	0	5.0
1361	-0.1000	0.0259	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	0.0	-0.1000	3.64	-0.1000	396	0.27	7.99	1	0	4.9

Underlined values exceed Secondary (aesthetic) standards. Shaded values exceed Primary (health) standards. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure. For Col and Ecoli 1 = present 0 =absent.

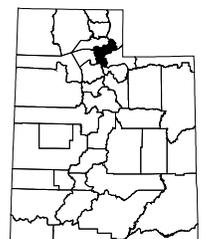
Map 6. Morgan District



- Sample Site
- Irrigated Land
- Water Body
- ▭ SCD Boundary
- ⚡ Road
- ⚡ Water Course



District Location



Salt Lake District

The water in this area varies from soft to very hard, with gpg (grains per gallon) ranging from 0.8 to 24.3 with a mean of 9.4. Water temperatures range from 9.3 °C to 20.9 °C, with a mean of 15.3 °C. The pH for the area has a mean of 7.58 and ranges from 6.94 to 8.57. The pH in sample 1332 is elevated.

Irrigation:

Salinity is a measurement of the concentration of ionic salts dissolved in water. It is measured as electrical conductivity (EC), in $\mu\text{mhos/cm}$. Higher conductivity values indicate higher concentrations of dissolved salts. Water high in dissolved salts increases osmotic pressures, making it difficult for plants to get water necessary for growth. Generally when EC exceeds 750 $\mu\text{mhos/cm}$, salt-sensitive plants begin to be affected. When EC exceeds 3,000 $\mu\text{mhos/cm}$, most plants would be severely injured. Only two of the thirty-seven samples have EC values less than 750 $\mu\text{mhos/cm}$ - samples 1142 and 1324. Two of the samples (1190 and 1191) exceeded the severe-injury level of 3,000 $\mu\text{mhos/cm}$, which would affect most plants.

SAR measures how much sodium (Na) is in solution compared to calcium (Ca) and magnesium (Mg). Excessive sodium in the soil causes soil particles to repel each other. This destroys the structure of the soil, preventing air and water movement. SAR values greater than 3 mark the beginning of problems and values greater than 9 indicate severe problems. Six of the wells sampled in this district - 1057, 1058, 1140, 1309, 1310 and 1332 - have elevated SAR values. Samples 1191 and 1359 exceed 9 $\mu\text{mhos/cm}$ and may cause severe damage to the soil if used for irrigation.

Bicarbonate (HCO_3) is an ion common to water solutions. It can be hazardous to plants in excessive amounts, especially when used in sprinkler irrigation. Bicarbonate also causes white deposits on plants and their fruits, which degrades their visual appeal. Bicarbonate also increases the effect of sodium when both are present. Special attention is needed when using water with excessive bicarbonate. With sensitive plants minor problems appear with bicarbonate concentrations in excess of 1.5 meq/l and severe problems appear when it exceeds 8.5 meq/l. All of the samples have high bicarbonate, which is common for water in Utah.

Some specific elements can be toxic to plants. Chlorine, found in the form of Chloride (Cl^-), can damage sensitive plants at concentrations above 145 ppm and concentrations exceeding 355 ppm can cause severe damage to almost all plants. Damage increases under sprinkler irrigation and is more severe in windy conditions. Samples 1054 through 1060, 1140, 1141, 1146, 1147, 1190, 1309, 1310, 1331, 1357 through 1359, 1450, 1534, and 1536 have elevated chlorine. Samples 1056, 1309, 1310, and 1359 have over 355 ppm of chlorine and will likely cause severe injury to plants.

Copper (Cu) is toxic to plants when its concentration is greater than 0.2 ppm. Sample 1310 has copper above the standard. Copper interferes with iron uptake and causes chlorosis in plants.

Sample 1329 has elevated manganese (Mn). Manganese above 0.2 ppm can injure plants and cause reduction in dry matter production. Excess manganese interferes with the plant's ability to use other nutrients such as calcium (Ca).

No other elements were found in concentrations harmful to plants.

Livestock:

Sample 1190 has a sulfur (S) level of 351.1 ppm which exceeds the livestock standard for sulfur. Sulfur in the form of sulfate can cause water to be off flavored and also diarrhea in animals not used to drinking it. Problems start when the sulfur level in water exceeds 167 ppm.

Samples 1054 through 1060, 1140, 1141, 1143 through 1147, 1190, and 1191 have elevated molybdenum (Mo). Livestock eating plants irrigated with water that has molybdenum concentration greater than 0.01 ppm may be harmed. High concentrations of molybdenum interfere with copper nutrition in livestock.

Culinary:

Salinity (EC) for samples 1142 and 1324 did not exceed the EPA aesthetic standard of 833 $\mu\text{mhos/cm}$. The remaining samples with salinity values above this level may have water off-flavored. This is not a health problem until the EC level reaches 3,333. Two samples, 1190 and 1191, exceeded the 3,333 level.

Several minerals were found to exceed the aesthetic drinking water quality standard. Samples 1057, 1058, 1141, 1329, and 1332 have high iron (Fe). This can cause discoloration of plumbing fixtures and promote the growth of iron bacteria, which stain anything they contact. This is an aesthetic issue, not a health concern.

Five samples have high manganese (Mn) concentrations: 1057, 1058, 1141, 1329, and 1359. EPA has set an aesthetic standard of 0.05 ppm for manganese. Water with high concentrations may cause discoloration of plumbing fixtures and have poor flavor.

Samples 1054, 1141 and 1190 also have high sulfur (S). Sulfate is a soluble form of sulfur that can cause flavor problems in drinking water if there is more than 83 ppm sulfur. Bacteria in the water metabolize sulfur and produce hydrogen sulfide gas (rotten egg gas). The bacteria that produce this compound can live in plumbing fixtures and even hot water heaters. It is not uncommon to get strong odors when the hot water is turned on in areas where there is high sulfate. Generally, people cannot tolerate the odor from this gas. Even if the gas is not present high sulfate concentrations can cause diarrhea in people not used to drinking it.

The most serious problem with drinking water from private water systems is bacterial contamination. Because disease-causing organisms are rare, non-parasitic coliform bacteria that are found in association with parasitic bacteria are used as indicators to assess whether water could be contaminated with harmful bacteria. Coliform bacteria can occur naturally in the soil, whereas *E. coli*, a type of coliform, develops only in the digestive systems of mammals. The presence of coliform bacteria indicates that surface water, soil, or other contaminants are entering the well. The presence of *E. coli* in well water, on the other hand, indicates that mammalian fecal material is entering the well. Bacterial contamination is commonly the result of well construction problems. Contamination may result from inadequate capping, a leaking well casing, improper grouting, or lack of a casing. *E. coli* contamination can come from defective septic systems, manure operations or septic systems too close to wells, leaky sewer systems, or shallow water tables.

Samples 1140, 1141, 1191, 1327, 1331, 1357, and 1450 are contaminated with coliform. Sample 1331 is contaminated with *E. coli*. Wells from which these samples were collected should be inspected carefully to determine the source of contamination and should not be used for culinary purposes until the problem is corrected.

Sample Site Test Data for Salt Lake District

General

Id #	Be	Ca	K	Li	Mg	Na	P	pH	°C	TDS
1054	-0.1000	176.27	8.76	-0.1000	43.93	143.21	-0.10	7.43	14.4	1488
1055	-0.1000	84.54	3.90	-0.1000	22.89	53.91	-0.10	7.31	16.3	752
1056	-0.1000	210.82	8.28	-0.1000	41.38	74.60	-0.10	7.14	13.3	1536
1057	-0.1000	86.35	15.01	-0.1000	26.62	140.24	0.18	7.60	14.5	1159
1058	-0.1000	69.78	14.06	-0.1000	22.32	158.00	0.17	7.65	18.1	1103
1059	-0.1000	126.63	4.37	-0.1000	43.50	89.58	-0.10	7.23	16.2	1103
1060	-0.1000	130.10	4.09	-0.1000	43.86	79.67	-0.10	7.07	12.3	1111
1140	-0.1000	81.99	6.45	-0.1000	49.59	183.54	-0.10	7.20	15.8	1374
1141	-0.1000	216.96	4.16	-0.1000	81.21	98.00	-0.10	7.64	15.5	1776
1142	-0.1000	50.62	1.64	-0.1000	17.76	11.99	-0.10	7.75	16.5	373
1143	-0.1000	74.79	1.83	-0.1000	30.20	18.52	-0.10	7.29	14.4	608
1144	-0.1000	133.25	4.55	-0.1000	52.10	87.93	-0.10	7.08	16.4	1190
1145	-0.1000	120.61	3.34	-0.1000	54.68	46.53	-0.10	7.02	14.9	1053
1146	-0.1000	131.67	2.55	-0.1000	28.69	95.47	-0.10	7.37	11.1	1091
1147	-0.1000	129.59	2.48	-0.1000	38.98	93.93	-0.10	7.20	20.1	1148
1190	-0.1000	322.97	11.00	-0.1000	91.85	231.82	-0.10	7.46	14.6	2466
1191	-0.1000	132.26	34.18	-0.1000	51.26	707.62	-0.10	8.16	15.6	3672
1309	-0.1000	157.65	2.61	-0.1000	36.87	162.46	-0.10	7.64	11.6	1147
1310	-0.1000	157.46	2.77	-0.1000	31.18	176.86	-0.10	7.40	13.1	1174
1324	-0.1000	75.43	2.54	-0.1000	22.92	34.28	-0.10	8.24	16.3	414
1325	-0.1000	105.97	3.96	-0.1000	40.62	69.47	-0.10	7.65	20.9	709
1326	-0.1000	117.15	3.04	-0.1000	47.52	42.99	-0.10	7.67	16.0	686
1327	-0.1000	97.77	2.64	-0.1000	37.09	25.75	-0.10	7.88	16.5	502
1328	-0.1000	100.72	3.57	-0.1000	36.02	51.09	-0.10	7.72	16.4	607
1329	-0.1000	104.15	4.23	-0.1000	35.27	51.04	-0.10	7.86	15.4	616
1330	-0.1000	110.65	3.59	-0.1000	41.58	42.57	-0.10	7.90	14.9	589
1331	-0.1000	117.21	2.65	-0.1000	50.53	68.09	-0.10	8.11	19.9	747
1332	-0.1000	24.03	5.64	0.0501	11.33	180.75	0.33	8.57	17.9	617
1356	-0.1000	106.52	2.08	-0.1000	31.07	74.42	-0.10	8.02	9.3	691
1357	-0.1000	146.72	2.13	-0.1000	36.26	112.86	-0.10	7.18	13.0	926
1358	-0.1000	161.25	2.59	-0.1000	32.70	153.05	-0.10	7.80	14.7	985
1359	-0.1000	10.78	1.31	-0.1000	2.76	531.49	-0.10	7.90	19.3	1452
1362	-0.1000	117.83	3.22	-0.1000	42.29	31.89	-0.10	8.08	16.7	566
1450	-0.1000	152.14	4.35	-0.1000	41.73	62.73	-0.10	8.15	17.3	785
1534	-0.1000	129.88	5.68	-0.1000	41.98	104.94	-0.10	6.97	12.7	1224
1535	-0.1000	104.52	3.18	-0.1000	31.91	52.45	-0.10	6.94	13.4	878
1536	-0.1000	125.64	1.99	-0.1000	28.59	75.42	-0.10	7.03	10.1	1040

Values of -0.1 are below detection limits of testing procedure

Sample Site Test Data for Salt Lake District

Irrigation

Id #	Al	B	Cl	CO3 meq/l	Cu	Fe	HCO3 meq/l	Mn	Se	Zn	SAR	EC umhos/cm
1054	-0.1000	0.40	<u>183.25</u>	0.00	-0.1000	0.0300	<u>6.91</u>	0.0300	-0.1000	0.06	2.5	<u>2,480</u>
1055	-0.1000	0.10	<u>152.38</u>	0.00	-0.1000	0.1490	<u>3.67</u>	0.0437	-0.1000	0.49	1.3	<u>1,253</u>
1056	-0.1000	0.12	<u>420.35</u>	0.00	-0.1000	0.0259	<u>2.13</u>	0.0276	-0.1000	0.31	1.2	<u>2,560</u>
1057	-0.1000	0.28	<u>225.59</u>	0.00	-0.1000	0.6014	<u>2.74</u>	0.4398	-0.1000	-0.10	3.4	<u>1,932</u>
1058	-0.1000	0.33	<u>212.18</u>	0.00	-0.1000	0.3873	<u>4.87</u>	0.1665	-0.1000	-0.10	<u>4.2</u>	<u>1,839</u>
1059	-0.1000	0.14	<u>157.78</u>	0.00	-0.1000	0.1588	<u>6.23</u>	-0.1000	-0.1000	0.10	1.8	<u>1,839</u>
1060	-0.1000	0.13	<u>149.80</u>	0.00	-0.1000	0.1475	<u>6.23</u>	0.0292	-0.1000	0.06	1.5	<u>1,852</u>
1140	-0.1000	0.42	<u>171.20</u>	-0.10	-0.1000	-0.1000	<u>6.44</u>	-0.1000	-0.1000	-0.10	<u>3.9</u>	<u>2,290</u>
1141	-0.1000	0.13	<u>323.68</u>	-0.10	-0.1000	0.9362	<u>3.45</u>	0.1347	-0.1000	-0.10	1.4	<u>2,960</u>
1142	-0.1000	-0.10	<u>16.78</u>	-0.10	-0.1000	-0.1000	<u>2.75</u>	-0.1000	-0.1000	-0.10	0.4	<u>622</u>
1143	-0.1000	-0.10	<u>16.78</u>	-0.10	-0.1000	-0.1000	<u>3.49</u>	-0.1000	-0.1000	-0.10	0.5	<u>1,014</u>
1144	-0.1000	0.17	<u>139.50</u>	-0.10	-0.1000	0.0386	<u>6.69</u>	-0.1000	-0.1000	-0.10	1.6	<u>1,983</u>
1145	-0.1000	0.11	<u>127.84</u>	-0.10	-0.1000	-0.1000	<u>5.20</u>	-0.1000	-0.1000	-0.10	0.9	<u>1,755</u>
1146	-0.1000	0.07	<u>220.60</u>	-0.10	-0.1000	0.0826	<u>4.99</u>	-0.1000	-0.1000	0.06	2.0	<u>1,818</u>
1147	-0.1000	0.10	<u>202.61</u>	-0.10	0.0873	0.0373	<u>6.50</u>	-0.1000	-0.1000	0.75	1.9	<u>1,913</u>
1190	-0.1000	0.25	<u>305.75</u>	-0.10	-0.1000	-0.1000	<u>5.59</u>	-0.1000	-0.1000	-0.10	2.9	<u>4,110</u>
1191	-0.1000	0.68	-0.10	-0.10	-0.1000	0.0297	<u>4.27</u>	-0.1000	-0.1000	-0.10	<u>13.2</u>	<u>6,120</u>
1309	-0.1000	-0.10	<u>404.69</u>	-0.10	-0.1000	0.0241	<u>6.25</u>	-0.1000	-0.1000	-0.10	<u>3.0</u>	<u>1,912</u>
1310	-0.1000	-0.10	<u>432.49</u>	-0.10	<u>0.3832</u>	-0.1000	<u>6.21</u>	-0.1000	-0.1000	-0.10	3.4	<u>1,957</u>
1324	-0.1000	-0.10	<u>79.90</u>	-0.10	-0.1000	0.0401	<u>3.32</u>	-0.1000	-0.1000	0.07	0.9	<u>690</u>
1325	-0.1000	0.08	<u>136.95</u>	-0.10	-0.1000	-0.1000	<u>5.53</u>	-0.1000	-0.1000	-0.10	1.5	<u>1,182</u>
1326	-0.1000	0.07	<u>104.33</u>	-0.10	-0.1000	0.0288	<u>5.45</u>	-0.1000	-0.1000	-0.10	0.8	<u>1,144</u>
1327	-0.1000	-0.10	<u>45.58</u>	-0.10	-0.1000	0.0244	<u>4.21</u>	-0.1000	-0.1000	-0.10	0.6	<u>836</u>
1328	-0.1000	0.09	<u>78.30</u>	-0.10	-0.1000	0.0267	<u>5.26</u>	-0.1000	-0.1000	-0.10	1.1	<u>1,011</u>
1329	0.0432	0.09	<u>80.29</u>	-0.10	0.0241	0.5411	<u>5.34</u>	<u>0.2545</u>	-0.1000	0.10	1.1	<u>1,026</u>
1330	-0.1000	-0.10	<u>72.49</u>	-0.10	-0.1000	-0.1000	<u>4.93</u>	-0.1000	-0.1000	-0.10	0.9	<u>982</u>
1331	-0.1000	0.17	<u>145.72</u>	-0.10	-0.1000	-0.1000	<u>6.58</u>	-0.1000	-0.1000	-0.10	1.3	<u>1,245</u>
1332	-0.1000	0.12	<u>111.27</u>	-0.10	-0.1000	0.3921	<u>7.57</u>	0.0267	-0.1000	-0.10	<u>7.6</u>	<u>1,029</u>
1356	-0.1000	0.08	<u>144.61</u>	-0.10	-0.1000	0.0430	<u>5.88</u>	-0.1000	-0.1000	0.07	1.6	<u>1,152</u>
1357	-0.1000	0.15	<u>245.06</u>	-0.10	-0.1000	0.0746	<u>8.09</u>	-0.1000	-0.1000	0.07	2.2	<u>1,544</u>
1358	0.1169	0.18	<u>296.33</u>	-0.10	-0.1000	-0.1000	<u>7.24</u>	-0.1000	-0.1000	0.06	2.9	<u>1,641</u>
1359	-0.1000	0.08	<u>598.11</u>	-0.10	-0.1000	0.0762	<u>4.91</u>	0.0502	-0.1000	0.15	<u>37.4</u>	<u>2,420</u>
1362	-0.1000	0.08	<u>55.58</u>	-0.10	-0.1000	-0.1000	<u>4.04</u>	-0.1000	-0.1000	-0.10	0.6	<u>944</u>
1450	-0.1000	0.09	<u>309.03</u>	-0.10	-0.1000	0.0212	<u>3.76</u>	-0.1000	-0.1000	0.04	1.2	<u>1,309</u>
1534	-0.1000	0.21	<u>165.21</u>	-0.10	-0.1000	-0.1000	<u>6.65</u>	-0.1000	-0.1000	0.05	2.0	<u>2,040</u>
1535	-0.1000	0.07	<u>126.41</u>	-0.10	-0.1000	-0.1000	<u>3.53</u>	-0.1000	-0.1000	-0.10	1.2	<u>1,463</u>
1536	-0.1000	0.09	<u>169.66</u>	-0.10	-0.1000	0.0674	<u>5.01</u>	-0.1000	-0.1000	0.24	1.6	<u>1,734</u>

Underlined values exceed irrigation standards. Shaded values indicate severe risks. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure.

Sample Site Test Data for Salt Lake District

Livestock

Id #	Al	As	B	Cd	Co	Cr	Mo	Ni	Pb	S	Se	EC		Zn
												umhos/cm	V	
1054	-0.1000	-0.1000	0.40	-0.1000	-0.1000	0.1000	<u>0.0400</u>	0.1000	-0.1000	109.30	-0.1000	2,480	-0.1000	0.06
1055	-0.1000	-0.1000	0.10	-0.1000	-0.1000	-0.1000	<u>0.0265</u>	-0.1000	-0.1000	15.36	-0.1000	1,253	0.0107	0.49
1056	-0.1000	-0.1000	0.12	-0.1000	-0.1000	-0.1000	<u>0.0454</u>	-0.1000	-0.1000	34.39	-0.1000	2,560	-0.1000	0.31
1057	-0.1000	-0.1000	0.28	-0.1000	-0.1000	-0.1000	<u>0.1976</u>	-0.1000	-0.1000	42.61	-0.1000	1,932	-0.1000	-0.10
1058	-0.1000	-0.1000	0.33	-0.1000	-0.1000	-0.1000	<u>0.2261</u>	-0.1000	-0.1000	37.76	-0.1000	1,839	-0.1000	-0.10
1059	-0.1000	-0.1000	0.14	-0.1000	-0.1000	-0.1000	<u>0.0206</u>	-0.1000	-0.1000	56.81	-0.1000	1,839	-0.1000	0.10
1060	-0.1000	-0.1000	0.13	-0.1000	-0.1000	-0.1000	<u>0.0159</u>	-0.1000	-0.1000	55.07	-0.1000	1,852	-0.1000	0.06
1140	-0.1000	-0.1000	0.42	-0.1000	-0.1000	-0.1000	<u>0.1587</u>	-0.1000	-0.1000	72.36	-0.1000	2,290	0.0123	-0.10
1141	-0.1000	-0.1000	0.13	-0.1000	-0.1000	-0.1000	<u>0.0331</u>	-0.1000	-0.1000	161.10	-0.1000	2,960	-0.1000	-0.10
1142	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	18.56	-0.1000	622	-0.1000	-0.10
1143	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0136</u>	-0.1000	-0.1000	45.27	-0.1000	1,014	-0.1000	-0.10
1144	-0.1000	-0.1000	0.17	-0.1000	-0.1000	-0.1000	<u>0.0414</u>	-0.1000	-0.1000	70.82	-0.1000	1,983	-0.1000	-0.10
1145	-0.1000	-0.1000	0.11	-0.1000	-0.1000	-0.1000	<u>0.0305</u>	-0.1000	-0.1000	66.15	-0.1000	1,755	-0.1000	-0.10
1146	-0.1000	-0.1000	0.07	-0.1000	-0.1000	-0.1000	<u>0.0135</u>	-0.1000	-0.1000	23.40	-0.1000	1,818	-0.1000	0.06
1147	-0.1000	-0.1000	0.10	-0.1000	-0.1000	-0.1000	<u>0.0185</u>	-0.1000	-0.1000	28.51	-0.1000	1,913	-0.1000	0.75
1190	-0.1000	-0.1000	0.25	-0.1000	-0.1000	-0.1000	<u>0.1084</u>	-0.1000	-0.1000	351.10	-0.1000	4,110	-0.1000	-0.10
1191	-0.1000	-0.1000	0.68	-0.1000	-0.1000	-0.1000	<u>0.6144</u>	-0.1000	-0.1000	5.20	-0.1000	6,120	-0.1000	-0.10
1309	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	21.51	-0.1000	1,912	-0.1000	-0.10
1310	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	20.95	-0.1000	1,957	-0.1000	-0.10
1324	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	25.82	-0.1000	690	-0.1000	0.07
1325	-0.1000	-0.1000	0.08	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	46.28	-0.1000	1,182	-0.1000	-0.10
1326	-0.1000	-0.1000	0.07	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	64.66	-0.1000	1,144	-0.1000	-0.10
1327	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	56.44	-0.1000	836	-0.1000	-0.10
1328	-0.1000	-0.1000	0.09	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	58.98	-0.1000	1,011	-0.1000	-0.10
1329	0.0432	-0.1000	0.09	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	59.81	-0.1000	1,026	-0.1000	0.10
1330	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	59.64	-0.1000	982	-0.1000	-0.10
1331	-0.1000	-0.1000	0.17	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	46.88	-0.1000	1,245	-0.1000	-0.10
1332	-0.1000	-0.1000	0.12	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	3.77	-0.1000	1,029	-0.1000	-0.10
1356	-0.1000	-0.1000	0.08	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	24.70	-0.1000	1,152	-0.1000	0.07
1357	-0.1000	-0.1000	0.15	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	18.89	-0.1000	1,544	-0.1000	0.07
1358	0.1169	-0.1000	0.18	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	19.06	-0.1000	1,641	-0.1000	0.06
1359	-0.1000	-0.1000	0.08	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	20.09	-0.1000	2,420	-0.1000	0.15
1362	-0.1000	-0.1000	0.08	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	81.62	-0.1000	944	-0.1000	-0.10
1450	-0.1000	-0.1000	0.09	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	37.34	-0.1000	1,309	-0.1000	0.04
1534	-0.1000	-0.1000	0.21	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	47.24	-0.1000	2,040	-0.1000	0.05
1535	-0.1000	-0.1000	0.07	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	42.13	-0.1000	1,463	-0.1000	-0.10
1536	-0.1000	-0.1000	0.09	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	22.64	-0.1000	1,734	-0.1000	0.24

Underlined values indicate minor health problems (particularly smaller and younger animals). Shaded values indicate a serious health risk. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure.

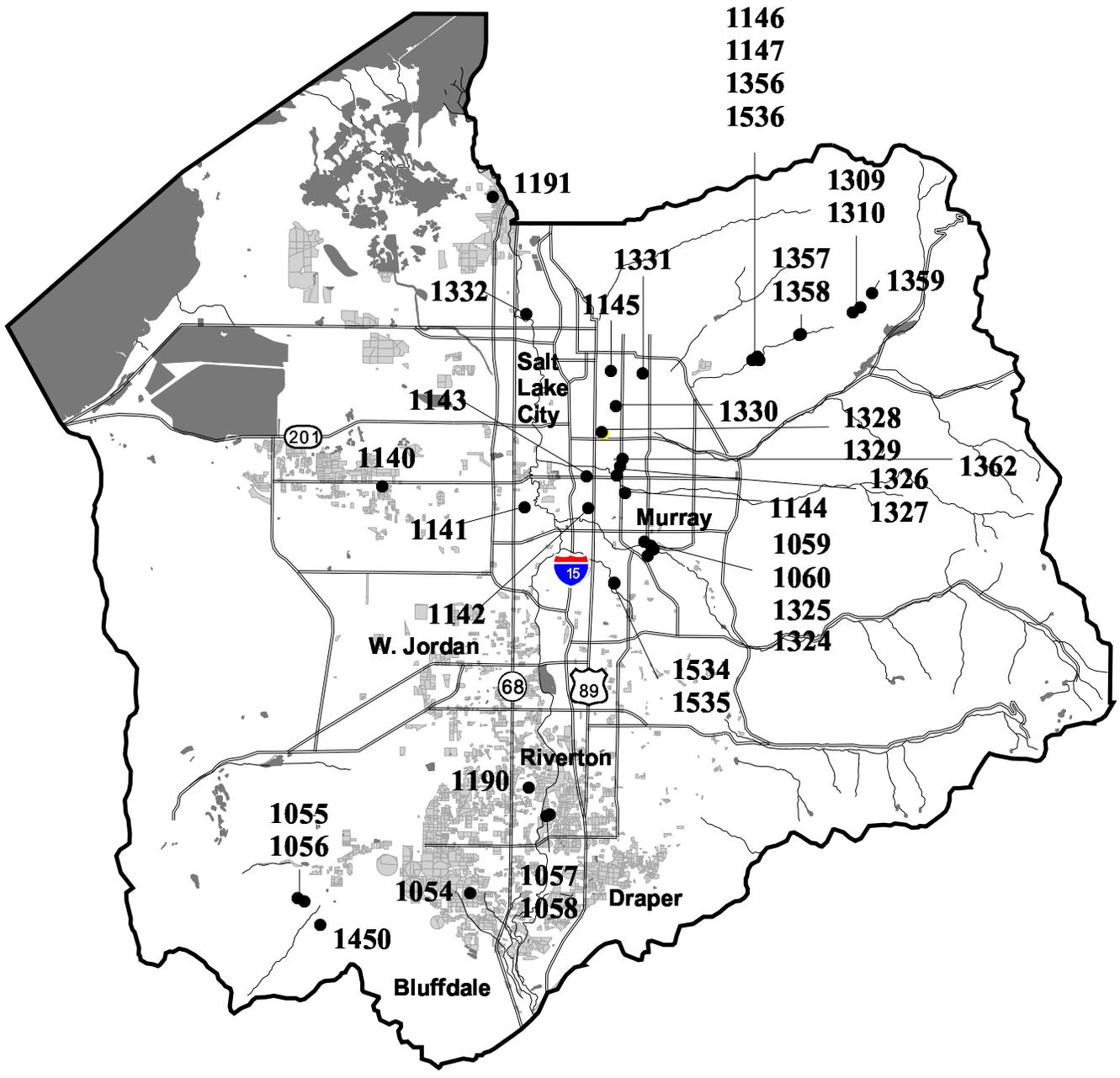
Sample Site Test Data for Salt Lake District

Culinary

Id #	As	Ba	Cd	Cr	Cu	Fe	Mn	NO3-N	Pb	S	Se	EC umhos/cm	Zn	pH	Col	Ecoli	Hardness gpg
1054	0.1000	0.1000	0.1000	0.1000	0.1000	0.0300	0.0300	1.0	0.1000	109.30	0.1000	2.480	0.06	7.43	0	0	12.9
1055	-0.1000	0.1224	-0.1000	-0.1000	-0.1000	0.1490	0.0437	1.5	-0.1000	15.36	-0.1000	1.253	0.49	7.31	0	0	6.3
1056	-0.1000	0.2627	-0.1000	-0.1000	-0.1000	0.0259	0.0276	2.4	-0.1000	34.39	-0.1000	2.560	0.31	7.14	0	0	14.7
1057	-0.1000	0.5658	-0.1000	-0.1000	-0.1000	0.6014	0.4398	1.2	-0.1000	42.61	-0.1000	1.932	-0.10	7.60	0	0	6.6
1058	-0.1000	0.0949	-0.1000	-0.1000	-0.1000	0.3873	0.1665	0.9	-0.1000	37.76	-0.1000	1.839	-0.10	7.65	0	0	5.4
1059	-0.1000	0.1925	-0.1000	-0.1000	-0.1000	0.1588	-0.1000	1.8	-0.1000	56.81	-0.1000	1.839	0.10	7.23	0	0	9.9
1060	-0.1000	0.1615	-0.1000	-0.1000	-0.1000	0.1475	0.0292	2.2	-0.1000	55.07	-0.1000	1.852	0.06	7.07	0	0	10.2
1140	-0.1000	0.0381	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	0.0	-0.1000	72.36	-0.1000	2.290	-0.10	7.20	1	0	7.7
1141	-0.1000	0.0773	-0.1000	-0.1000	-0.1000	0.9362	0.1347	0.5	-0.1000	161.10	-0.1000	2.960	-0.10	7.64	1	0	17.4
1142	-0.1000	0.0544	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.9	-0.1000	18.56	-0.1000	622	-0.10	7.75	0	0	4.0
1143	-0.1000	0.0526	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.3	-0.1000	45.27	-0.1000	1.014	-0.10	7.29	0	0	6.1
1144	-0.1000	0.0650	-0.1000	-0.1000	-0.1000	0.0386	-0.1000	1.2	-0.1000	70.82	-0.1000	1.983	-0.10	7.08	0	0	10.8
1145	-0.1000	0.0464	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	3.7	-0.1000	66.15	-0.1000	1.755	-0.10	7.02	0	0	10.3
1146	-0.1000	0.1767	-0.1000	-0.1000	-0.1000	0.0826	-0.1000	1.2	-0.1000	23.40	-0.1000	1.818	0.06	7.37	0	0	9.4
1147	-0.1000	0.1949	-0.1000	-0.1000	-0.1000	0.0373	-0.1000	1.6	-0.1000	28.51	-0.1000	1.913	0.75	7.20	0	0	9.9
1190	-0.1000	0.0232	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	2.5	-0.1000	351.10	-0.1000	4.110	-0.10	7.46	0	0	24.3
1191	-0.1000	0.9684	-0.1000	-0.1000	-0.1000	0.0297	-0.1000	1.4	-0.1000	5.20	-0.1000	6.120	-0.10	8.16	1	0	10.7
1309	-0.1000	0.2468	-0.1000	-0.1000	-0.1000	0.0241	-0.1000	0.7	-0.1000	21.51	-0.1000	1.912	-0.10	7.64	0	0	11.4
1310	-0.1000	0.2135	-0.1000	-0.1000	-0.1000	0.3832	-0.1000	1.0	-0.1000	20.95	-0.1000	1.957	-0.10	7.40	0	0	11.0
1324	-0.1000	0.0596	-0.1000	-0.1000	-0.1000	0.0401	-0.1000	0.8	-0.1000	25.82	-0.1000	690	0.07	8.24	0	0	5.8
1325	-0.1000	0.1692	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	3.5	-0.1000	46.28	-0.1000	1.182	-0.10	7.65	0	0	8.6
1326	-0.1000	0.0679	-0.1000	-0.1000	-0.1000	0.0288	-0.1000	5.0	-0.1000	64.66	-0.1000	1.144	-0.10	7.67	0	0	9.6
1327	-0.1000	0.0472	-0.1000	-0.1000	-0.1000	0.0244	-0.1000	1.4	-0.1000	56.44	-0.1000	836	-0.10	7.88	1	0	7.9
1328	-0.1000	0.0496	-0.1000	-0.1000	-0.1000	0.0267	-0.1000	1.7	-0.1000	58.98	-0.1000	1.011	-0.10	7.72	0	0	8.0
1329	-0.1000	0.0709	-0.1000	-0.1000	0.0241	0.5411	0.2545	0.0	-0.1000	59.81	-0.1000	1.026	0.10	7.86	0	0	8.2
1330	-0.1000	0.0248	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.9	-0.1000	59.64	-0.1000	982	-0.10	7.90	0	0	8.9
1331	-0.1000	0.0649	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	2.5	-0.1000	46.88	-0.1000	1.245	-0.10	8.11	1	1	9.8
1332	-0.1000	0.1013	-0.1000	-0.1000	-0.1000	0.3921	0.0267	0.0	-0.1000	3.77	-0.1000	1.029	-0.10	8.57	0	0	2.1
1356	-0.1000	0.1257	-0.1000	-0.1000	-0.1000	0.0430	-0.1000	0.7	-0.1000	24.70	-0.1000	1.152	0.07	8.02	0	0	8.0
1357	-0.1000	0.5051	-0.1000	-0.1000	-0.1000	0.0746	-0.1000	1.1	-0.1000	18.89	-0.1000	1.544	0.07	7.18	1	0	10.7
1358	-0.1000	0.5710	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	2.9	-0.1000	19.06	-0.1000	1.641	0.06	7.80	0	0	11.3
1359	-0.1000	0.0240	-0.1000	-0.1000	-0.1000	0.0762	0.0502	0.1	-0.1000	20.09	-0.1000	2.420	0.15	7.90	0	0	0.8
1362	-0.1000	0.0269	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	2.1	-0.1000	81.62	-0.1000	944	-0.10	8.08	0	0	9.4
1450	-0.1000	0.2438	-0.1000	-0.1000	-0.1000	0.0212	-0.1000	3.8	-0.1000	37.34	-0.1000	1.309	0.04	8.15	1	0	11.3
1534	-0.1000	0.2972	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.7	-0.1000	47.24	-0.1000	2.040	0.05	6.97	0	0	10.1
1535	-0.1000	0.2303	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	3.7	-0.1000	42.13	-0.1000	1.463	-0.10	6.94	0	0	8.0
1536	-0.1000	0.1755	-0.1000	-0.1000	-0.1000	0.0674	-0.1000	4.8	-0.1000	22.64	-0.1000	1.734	0.24	7.03	0	0	9.0

Underlined values indicate minor health problems (particularly smaller and younger animals). Shaded values indicate a serious health risk. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure.

Map 7. Salt Lake District



1146
1147
1356
1536

1191

1309
1310

1332

1331

1357
1358

1359

1143

1145

1330

1328

201

1140

1329

1362

1141

Murray

1144

1327

15

1059

1060

1325

1324

W. Jordan

68

89

1534

1535

Riverton

1190

1055

1056

1054

1057

1058

Draper

1450

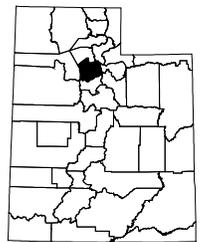
Bluffdale



- Sample Site
- Irrigated Land
- Water Body
- SCD Boundary
- Road
- Water Course



District Location



Shambip District

Only one well was sampled in this district (See sample Id # 1453). Water from this well is moderate-hard 5.71 (gpg) with a temperature of 27.10 °C and a pH of 7.77. The water exceeds the irrigation bicarbonate (HCO_3) standard.

No other standards are exceeded. (See Granstville District Map, page 36, for well locations.)

Sample Site Test Data for Shambip District

Culinary

Id #	Be	Ca	K	Li	Mg	Na	P	pH	°C	TDS
1453	-0.1000	78.16	1.72	-0.1000	19.54	29.71	-0.10	7.77	17.1	379

Values of -0.1 are below detection limits of testing procedure

Irrigation

Id #	Al	B	Cl	CO3 meq/l	Cu	Fe	HCO3 meq/l	Mn	Se	Zn	SAR	EC umhos/cm
1453	-0.1000	-0.10	51.82	-0.10	-0.1000	-0.1000	3.49	-0.1000	-0.1000	-0.10	0.8	632

Underlined values exceed irrigation standards. Shaded values indicate severe risks. All values are mg/l unless labeled differently.

Values of -0.1 are below detection limits of testing procedure.

Livestock

Id #	Al	As	B	Cd	Co	Cr	Mo	Ni	Pb	S	Se	V	Zn	EC umhos/cm
1453	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	10.97	-0.1000	-0.10	-0.10	632

Underlined values indicate minor health problems (particularly smaller and younger animals). Shaded values indicate a serious health risk. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure.

Culinary

Id #	As	Ba	Cd	Cr	Cu	Fe	Mn	NO3-N	Pb	S	Se	EC umhos/cm	Zn	pH	Col	Ecoli	Hardness gpg
1453	-0.1000	0.0786	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.4	-0.1000	10.97	-0.1000	632	-0.10	7.77	0	0	5.7

detection limits of testing procedure. For Col and Ecoli 1 = present 0 = absent.

Weber District

The water in this area varies from soft to moderate-hard, with gpg (grains per gallon) ranging from 0.6 to 9.2 with a mean of 4.1. Water temperatures range from 8.3 °C to 20.2 °C, with a mean of 13.7 °C. The pH for the area has a mean of 7.02 and ranges from 5.57 to 8.09 (there may have been faulty meter readings on some of these samples).

Irrigation:

Salinity is a measurement of the concentration of ionic salts dissolved in water. It is measured as electrical conductivity (EC), in $\mu\text{mhos/cm}$. Higher conductivity values indicate higher concentrations of dissolved salts. Water high in dissolved salts increases osmotic pressures, making it difficult for plants to get water necessary for growth. Generally when EC exceeds 750 $\mu\text{mhos/cm}$, salt-sensitive plants begin to be affected. When EC exceeds 3,000 $\mu\text{mhos/cm}$, most plants would be severely injured. Ten of the samples in this area - 1195, 1198 through 1202, 1205, 1207, 1530, and 1531 - exceeded the 750 $\mu\text{mhos/cm}$ standard. None of the samples exceeded the severe-injury level of 3,000 $\mu\text{mhos/cm}$, which would affect most plants.

SAR measures how much sodium (Na) is in solution compared to calcium (Ca) and magnesium (Mg). Excessive sodium in the soil causes soil particles to repel each other. This destroys the structure of the soil, preventing air and water movement. SAR values greater than 3 mark the beginning of problems and values greater than 9 indicate severe problems. Samples 1198 and 1199 from this area exceed the SAR standard with values greater than 9.

Bicarbonate (HCO_3) is an ion common to water solutions. It can be hazardous to plants in excessive amounts, especially when used in sprinkler irrigation. Bicarbonate also causes white deposits on plants and their fruits, which degrades their visual appeal. Bicarbonate also increases the effect of sodium when both are present. Special attention is needed when using water with excessive bicarbonate. With sensitive plants minor problems appear with bicarbonate concentrations in excess of 1.5 meq/l and severe problems appear when it exceeds 8.5 meq/l. All but one of the samples (1527) has high bicarbonate, which is common for water in Utah. Sample 1530 exceeds the 8.5 level.

Some specific elements can be toxic to plants. Sample 1531 has elevated boron (B), which is toxic to sensitive plants when concentration exceeds 0.7 ppm. It will cause severe injury at 10.0 ppm. However, boron in trace amounts is required for proper plant growth. It is important to monitor this element because the margin separating safe health from toxicity is so small.

Chlorine, found in the form of chloride (Cl^-), can damage sensitive plants at concentrations above 145 ppm and concentrations exceeding 355 ppm can cause severe damage to almost all plants. Damage increases under sprinkler irrigation and is more severe in windy conditions. Sample 1530 has elevated chlorine.

Samples 1201 and 1530 have elevated manganese (Mn). Manganese above 0.2 ppm can injure plants and cause reduction in dry matter production. Excess manganese interferes with the plant's ability to use other nutrients such as calcium (Ca).

No other elements were found in concentrations harmful to plants.

Livestock:

Sample 1530 may be toxic to livestock because of elevated arsenic (As).

Samples 1044, 1195, and 1198 through 1203 have elevated molybdenum (Mo). Livestock eating plants irrigated with water that has molybdenum concentration greater than 0.01 ppm may be harmed. High concentrations of molybdenum interfere with copper nutrition in livestock.

Culinary:

Ten of the samples (1195, 1198 through 1202, 1206, 1207, 1530, and 1531) exceed the EPA aesthetic standard of 833 $\mu\text{mhos/cm}$ for salinity. At this level the water may be off-flavored but it is not a health problem until the EC level reaches 3,333.

Arsenic (As) exceeded the primary drinking water standard in sample 1530 with a value of 0.21 - four times the standard of 0.05.

Two minerals - iron (Fe) and manganese (Mn) - were found to exceed the aesthetic drinking water quality standard. Samples 1201 and 1531 have high iron. This can cause discoloration of plumbing fixtures and promote the growth of iron bacteria, which stain anything they contact. Again, this is an aesthetic issue, not a health concern.

Six samples have high manganese concentrations: 1043, 1044, 1201, 1202, 1530, and 1531. EPA has set an aesthetic standard of 0.05 ppm for manganese. Water with high concentrations may cause discoloration of plumbing fixtures and have poor flavor.

The most serious problem with drinking water from private water systems is bacterial contamination. Because disease-causing organisms are rare, non-parasitic coliform bacteria that are found in association with parasitic bacteria are used as indicators to assess whether water could be contaminated with harmful bacteria. Coliform bacteria can occur naturally in the soil, whereas *E. coli*, a type of coliform, develops only in the digestive systems of mammals. The presence of coliform bacteria indicates that surface water, soil, or other contaminants are entering the well. The presence of *E. coli* in well water, on the other hand, indicates that mammalian fecal material is entering the well. Bacterial contamination is commonly the result of well construction problems. Contamination may result from inadequate capping, a leaking well casing, improper grouting, or lack of a casing. *E. coli* contamination can come from defective septic systems, manure operations or septic systems too close to wells, leaky sewer systems, or shallow water tables.

Samples 1203, 1206, 1527, and 1529 through 1531 are contaminated with coliform. Sample 1530 was also contaminated with *E. coli*. Wells from which these samples were collected should be inspected carefully to determine the source of contamination and should not be used for culinary purposes until the problem is corrected.

Sample Site Test Data for Weber District

General

Id #	Be	Ca	K	Li	Mg	Na	P	pH	°C	TDS
1043	-0.1000	36.03	5.99	-0.1000	13.95	27.57	0.16	7.98	17.9	343
1044	-0.1000	41.39	2.18	-0.1000	10.38	23.41	-0.10	8.03	20.2	314
1194	-0.1000	42.53	0.40	-0.1000	12.18	7.23	-0.10	7.77	8.3	281
1195	-0.1000	65.61	1.08	-0.1000	18.69	77.07	-0.10	7.71	14.5	685
1196	-0.1000	56.01	0.69	-0.1000	16.75	8.98	-0.10	7.74	11.7	357
1198	-0.1000	6.05	6.17	-0.1000	3.61	116.71	0.46	6.17	13.6	547
1199	-0.1000	6.26	6.66	-0.1000	3.81	119.38	0.48	5.99	13.9	553
1200	-0.1000	119.37	2.09	-0.1000	31.53	32.48	-0.10	5.57	12.6	883
1201	-0.1000	38.72	11.19	-0.1000	21.69	78.38	0.35	5.81	13.8	578
1202	-0.1000	66.14	1.67	-0.1000	17.65	47.55	-0.10	5.99	13.4	559
1203	-0.1000	36.04	1.01	-0.1000	10.09	17.13	-0.10	5.58	14.0	276
1204	-0.1000	25.07	3.13	-0.1000	5.11	5.59	-0.10	5.69	11.2	167
1205	-0.1000	68.07	1.20	-0.1000	19.54	21.05	-0.10	6.86	12.0	491
1206	-0.1000	65.85	1.30	-0.1000	18.90	30.62	-0.10	6.75	13.0	530
1207	-0.1000	67.01	1.52	-0.1000	19.02	47.45	-0.10	6.75	13.6	611
1282	-0.1000	48.60	0.98	-0.1000	15.20	6.97	-0.10	7.98	13.0	221
1283	-0.1000	48.10	0.89	-0.1000	14.89	6.97	-0.10	8.09	12.8	211
1284	-0.1000	47.99	0.85	-0.1000	14.93	6.95	-0.10	8.03	17.1	214
1527	-0.1000	33.16	1.34	-0.1000	8.57	13.14	-0.10	7.10	10.2	185
1528	-0.1000	50.16	0.87	-0.1000	8.60	6.28	-0.10	7.20	10.7	188
1529	-0.1000	49.24	0.91	-0.1000	13.80	14.49	-0.10	7.81	16.0	224
1530	-0.1000	70.81	34.79	0.1080	65.43	117.47	1.68	7.63	15.6	727
1531	-0.1000	104.11	18.01	0.0509	52.73	84.29	-0.10	7.15	16.2	651

Values of -0.1 are below detection limits of testing procedure

Sample Site Test Data for Weber District

Irrigation

Id #	Al	B	Cl	CO3 meq/l	Cu	Fe	HCO3 meq/l	Mn	Se	Zn	SAR	EC umhos/cm
1043	-0.1000	0.08	15.37	0.00	-0.1000	0.1613	3.80	0.1412	-0.1000	-0.10	1.0	572
1044	-0.1000	-0.10	14.80	0.00	0.0330	0.1806	3.05	0.0659	-0.1000	-0.10	0.8	524
1194	-0.1000	-0.10	9.33	-0.10	-0.1000	-0.1000	2.87	-0.1000	-0.1000	-0.10	0.3	468
1195	-0.1000	-0.10	121.58	-0.10	-0.1000	0.0399	4.09	-0.1000	-0.1000	-0.10	2.2	1,142
1196	-0.1000	-0.10	13.74	-0.10	-0.1000	0.0291	3.65	-0.1000	-0.1000	-0.10	0.3	595
1198	-0.1000	0.17	25.64	-0.10	-0.1000	0.1188	4.87	0.0332	-0.1000	-0.10	9.3	912
1199	-0.1000	0.18	43.63	-0.10	-0.1000	0.1400	4.89	0.0347	-0.1000	-0.10	9.3	921
1200	-0.1000	0.08	115.70	-0.10	-0.1000	-0.1000	5.20	-0.1000	-0.1000	-0.10	0.7	1,472
1201	-0.1000	0.22	29.20	-0.10	-0.1000	0.5479	5.74	0.2208	-0.1000	-0.10	2.5	964
1202	-0.1000	-0.10	80.97	-0.10	-0.1000	0.2886	3.76	0.1470	-0.1000	0.77	1.3	932
1203	-0.1000	-0.10	24.21	-0.10	-0.1000	0.0483	1.92	-0.1000	-0.1000	-0.10	0.6	460
1204	0.0767	-0.10	-0.10	-0.10	0.1374	0.0762	1.57	-0.1000	-0.1000	0.15	0.3	279
1205	-0.1000	-0.10	46.53	-0.10	-0.1000	0.0283	3.82	-0.1000	-0.1000	0.08	0.6	819
1206	-0.1000	-0.10	61.28	-0.10	-0.1000	0.0231	3.86	-0.1000	-0.1000	0.08	0.9	883
1207	0.2916	-0.10	89.02	-0.10	-0.1000	0.0956	3.82	-0.1000	-0.1000	0.50	1.3	1,019
1282	0.0855	-0.10	7.55	-0.10	-0.1000	0.0557	3.41	-0.1000	-0.1000	-0.10	0.2	368
1283	0.0542	-0.10	7.65	-0.10	-0.1000	0.0400	3.38	-0.1000	-0.1000	-0.10	0.2	351
1284	0.0928	-0.10	7.64	-0.10	0.0995	0.0612	3.41	-0.1000	-0.1000	-0.10	0.2	357
1527	0.0432	-0.10	19.15	-0.10	0.0276	0.0417	1.11	-0.1000	-0.1000	-0.10	0.5	308
1528	-0.1000	-0.10	5.20	-0.10	-0.1000	-0.1000	2.64	-0.1000	-0.1000	-0.10	0.2	313
1529	-0.1000	0.09	8.93	-0.10	-0.1000	0.0292	3.14	-0.1000	-0.1000	-0.10	0.5	374
1530	-0.1000	0.43	145.76	-0.10	-0.1000	0.2063	9.10	0.5096	-0.1000	-0.10	2.4	1,212
1531	-0.1000	1.26	106.37	-0.10	-0.1000	0.3331	7.76	0.0855	-0.1000	-0.10	1.7	1,085

Sample Site Test Data for Weber District

Livestock

Id #	Al	As	B	Cd	Co	Cr	Mo	Ni	Pb	S	Se	EC umhos/cm	V	Zn
1044	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0189</u>	-0.1000	-0.1000	6.37	-0.1000	524	-0.10	-0.10
1194	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	3.31	-0.1000	468	-0.10	-0.10
1195	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0119</u>	-0.1000	-0.1000	5.19	-0.1000	1,142	-0.10	-0.10
1196	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	3.46	-0.1000	595	-0.10	-0.10
1198	-0.1000	-0.1000	0.17	-0.1000	-0.1000	-0.1000	<u>0.0874</u>	-0.1000	-0.1000	0.38	-0.1000	912	-0.10	-0.10
1199	-0.1000	-0.1000	0.18	-0.1000	-0.1000	-0.1000	<u>0.0921</u>	-0.1000	-0.1000	0.36	-0.1000	921	-0.10	-0.10
1200	-0.1000	-0.1000	0.08	-0.1000	-0.1000	-0.1000	<u>0.0235</u>	-0.1000	-0.1000	13.60	-0.1000	1,472	-0.10	-0.10
1201	-0.1000	0.0488	0.22	-0.1000	-0.1000	-0.1000	<u>0.0635</u>	-0.1000	-0.1000	0.95	-0.1000	964	-0.10	-0.10
1202	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0176</u>	-0.1000	-0.1000	3.43	-0.1000	932	-0.10	0.77
1203	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0147</u>	-0.1000	-0.1000	5.67	-0.1000	460	-0.10	-0.10
1204	0.0767	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.79	-0.1000	279	-0.10	0.15
1205	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	4.66	-0.1000	819	-0.10	0.08
1206	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	4.67	-0.1000	883	-0.10	0.08
1207	0.2916	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	4.99	-0.1000	1,019	-0.10	0.50
1282	0.0855	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	3.31	-0.1000	368	-0.10	-0.10
1283	0.0542	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	3.27	-0.1000	351	-0.10	-0.10
1284	0.0928	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	3.29	-0.1000	357	-0.10	-0.10
1527	0.0432	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	4.33	-0.1000	308	-0.10	-0.10
1528	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	4.47	-0.1000	313	-0.10	-0.10
1529	-0.1000	-0.1000	0.09	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	5.97	-0.1000	374	-0.10	-0.10
1530	-0.1000	<u>0.2081</u>	0.43	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	16.67	-0.1000	1,212	-0.10	-0.10
1531	-0.1000	-0.1000	1.26	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	36.87	-0.1000	1,085	-0.10	-0.10

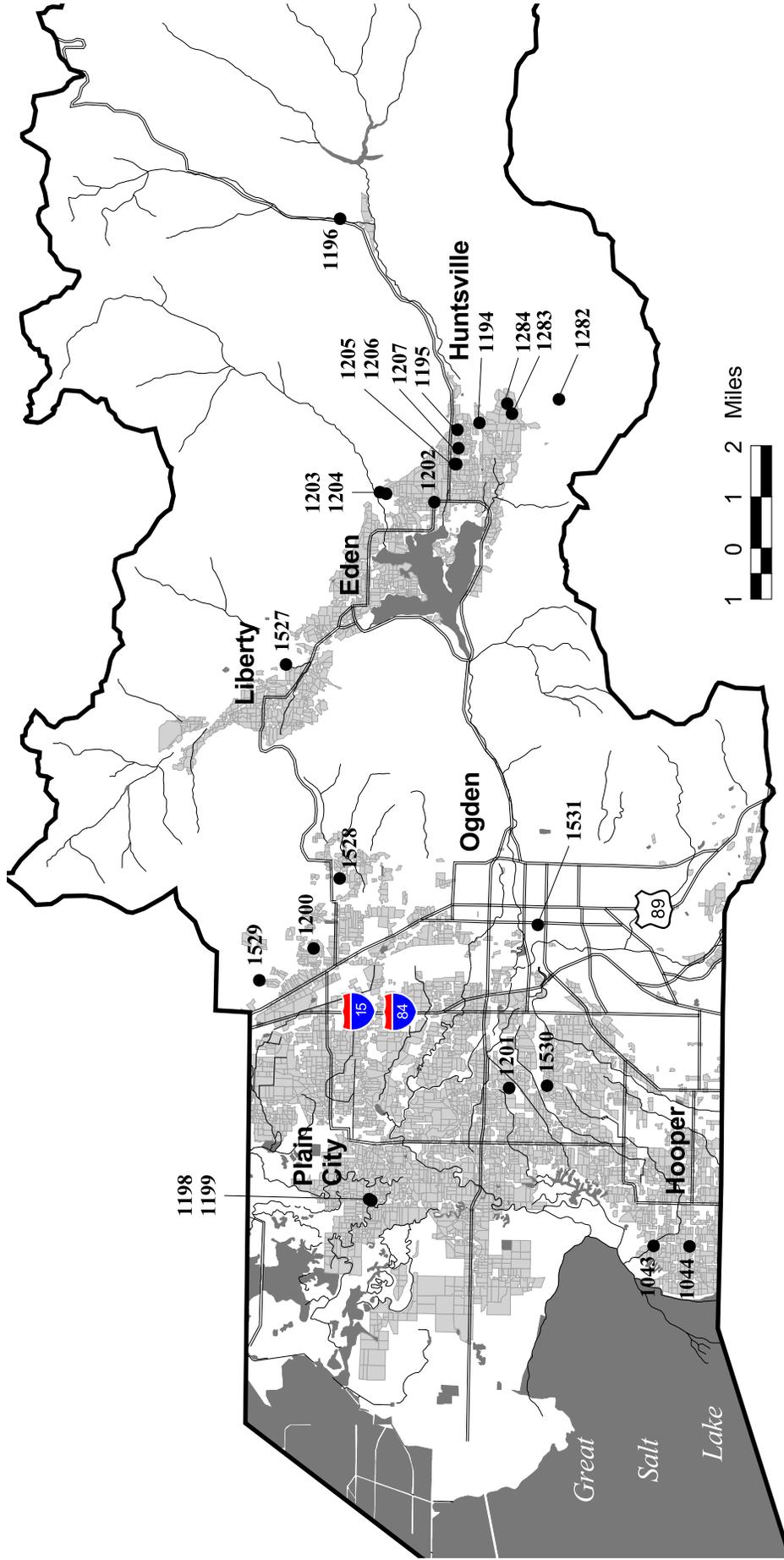
Underlined values indicate minor health problems (particularly smaller and younger animals). Shaded values indicate a serious health risk. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure.

Sample Site Test Data for Weber District

Culinary

Id #	As	Ba	Cd	Cr	Cu	Fe	Mn	NO3-N	Pb	S	Se	EC umhos/cm	Zn	pH	Col	Ecoli	Hardness gpg
1043	-0.1000	0.2951	-0.1000	-0.1000	-0.1000	0.1613	<u>0.1412</u>	1.0	-0.1000	0.77	-0.1000	572	-0.10	7.98	0	0	2.9
1044	-0.1000	0.3124	-0.1000	-0.1000	0.0330	0.1806	<u>0.0659</u>	1.2	-0.1000	6.37	-0.1000	524	-0.10	8.03	0	0	3.0
1194	-0.1000	0.0405	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.1	-0.1000	3.31	-0.1000	468	-0.10	7.77	0	0	3.2
1195	-0.1000	0.0857	-0.1000	-0.1000	-0.1000	0.0399	-0.1000	1.0	-0.1000	5.19	-0.1000	<u>1.142</u>	-0.10	7.71	0	0	4.9
1196	-0.1000	0.2268	-0.1000	-0.1000	-0.1000	0.0291	-0.1000	0.7	-0.1000	3.46	-0.1000	595	-0.10	7.74	0	0	4.3
1198	-0.1000	0.0602	-0.1000	-0.1000	-0.1000	0.1188	0.0332	0.0	-0.1000	0.38	-0.1000	<u>912</u>	-0.10	<u>6.17</u>	0	0	0.6
1199	-0.1000	0.0573	-0.1000	-0.1000	-0.1000	0.1400	0.0347	0.0	-0.1000	0.36	-0.1000	<u>921</u>	-0.10	<u>5.99</u>	0	0	0.6
1200	-0.1000	0.1504	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	3.5	-0.1000	13.60	-0.1000	<u>1.472</u>	-0.10	<u>5.57</u>	0	0	8.8
1201	0.0488	0.5582	-0.1000	-0.1000	-0.1000	<u>0.5479</u>	<u>0.2208</u>	0.0	-0.1000	0.95	-0.1000	<u>964</u>	-0.10	<u>5.81</u>	0	0	3.5
1202	-0.1000	0.1096	-0.1000	-0.1000	-0.1000	0.2886	<u>0.1470</u>	0.0	-0.1000	3.43	-0.1000	<u>932</u>	0.77	<u>5.99</u>	0	0	4.9
1203	-0.1000	0.1271	-0.1000	-0.1000	-0.1000	0.0483	-0.1000	0.9	-0.1000	5.67	-0.1000	460	-0.10	<u>5.58</u>	<u>1</u>	0	2.7
1204	-0.1000	0.0476	-0.1000	-0.1000	0.1374	0.0762	-0.1000	0.0	-0.1000	1.79	-0.1000	279	0.15	<u>5.69</u>	0	0	1.8
1205	-0.1000	0.0686	-0.1000	-0.1000	-0.1000	0.0283	-0.1000	0.9	-0.1000	4.66	-0.1000	819	0.08	6.86	0	0	5.1
1206	-0.1000	0.0724	-0.1000	-0.1000	-0.1000	0.0231	-0.1000	0.9	-0.1000	4.67	-0.1000	<u>883</u>	0.08	<u>6.75</u>	<u>1</u>	0	5.0
1207	-0.1000	0.0872	-0.1000	-0.1000	-0.1000	0.0956	-0.1000	0.9	-0.1000	4.99	-0.1000	<u>1.019</u>	0.50	6.75	0	0	5.0
1282	-0.1000	0.0618	-0.1000	-0.1000	-0.1000	0.0557	-0.1000	3.7	-0.1000	3.31	-0.1000	368	-0.10	7.98	0	0	3.7
1283	-0.1000	0.0621	-0.1000	-0.1000	-0.1000	0.0400	-0.1000	-0.1	-0.1000	3.27	-0.1000	351	-0.10	8.09	0	0	3.7
1284	-0.1000	0.0631	-0.1000	-0.1000	0.0995	0.0612	-0.1000	1.2	-0.1000	3.29	-0.1000	357	-0.10	8.03	0	0	3.7
1527	-0.1000	0.0852	-0.1000	-0.1000	0.0276	0.0417	-0.1000	2.7	-0.1000	4.33	-0.1000	308	-0.10	7.10	<u>1</u>	0	2.4
1528	-0.1000	0.0850	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	2.0	-0.1000	4.47	-0.1000	313	-0.10	7.20	0	0	3.4
1529	-0.1000	0.1897	-0.1000	-0.1000	-0.1000	0.0292	-0.1000	2.8	-0.1000	5.97	-0.1000	374	-0.10	7.81	<u>1</u>	0	3.7
1530	<u>0.2081</u>	0.3488	-0.1000	-0.1000	-0.1000	0.2063	<u>0.5096</u>	0.0	-0.1000	16.67	-0.1000	<u>1.212</u>	-0.10	7.63	<u>1</u>	<u>1</u>	8.0
1531	-0.1000	0.0819	-0.1000	-0.1000	-0.1000	0.3331	<u>0.0855</u>	0.0	-0.1000	36.87	-0.1000	<u>1.085</u>	-0.10	7.15	<u>1</u>	0	9.2

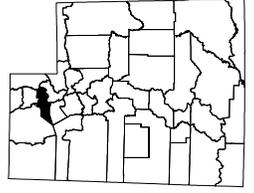
Map 8. Weber District



- Sample Site
- Irrigated Land
- Water Body
- SCD Boundary
- Road
- Water Course



District Location



Zone 3

UACD Zone 3 consists of five districts in three counties, including Summit, Utah, and Wasatch counties.

One hundred and fifty-four sites were sampled in the five districts of Zone 3 during the spring, summer, and fall of 2001. Thirty were sampled in the Alpine District, seventy-six in the Kamas District, eight in the Summit District, twenty-five in the Timp-Nebo District, and fifteen in the Wasatch District. A separate narrative report is presented for each district with maps showing the location of the sample sites. Each report covers three categories of water quality criteria: irrigation, livestock and culinary. Data are presented in four tables for each zone, grouped according to district, general parameters (temperature, pH, total dissolved solids (TDS), and chemicals for which there are no standards); irrigation, livestock and drinking water parameters.

Alpine District

The water in this area varies from soft to very hard, with gpg (grains per gallon) ranging from 1.1 to 17.2 with a mean of 6.29. Water temperatures range from 9.5 °C to 28.5 °C, with a mean of 14.18 °C. The pH for the area has a mean of 7.93 and ranges from 7.0 to 9.14. Samples 1444, 1446, and 1449 have high pH and may cause alkalinity problems such as mineral buildup.

Irrigation:

Salinity is a measurement of the concentration of ionic salts dissolved in water. It is measured as electrical conductivity (EC), in $\mu\text{mhos/cm}$. Higher conductivity values indicate higher concentrations of dissolved salts. Water high in dissolved salts increases osmotic pressures, making it difficult for plants to get water necessary for growth. Generally when EC exceeds 750 $\mu\text{mhos/cm}$, salt-sensitive plants begin to be affected. When EC exceeds 3,000 $\mu\text{mhos/cm}$, most plants would be severely injured. Only samples 1442 through 1447, 1545, 1547, and 1563 have acceptable salinity below the 750 $\mu\text{mhos/cm}$ standard. One sample –1561, with a value of 3,180 - exceeds the severe-injury level of 3,000 $\mu\text{mhos/cm}$.

The sodium absorption ratio (SAR) measures how much sodium (Na) is in solution compared to calcium (Ca) and magnesium (Mg). Excessive sodium in the soil causes soil particles to repel each other. This destroys the structure of the soil, preventing air and water movement. SAR values greater than 3 mark the beginning of problems and values greater than 9 indicate severe problems. Samples 1449 and 1554 of this area have elevated SAR values.

Bicarbonate (HCO_3) is an ion common to water solutions. It can be hazardous to plants in excessive amounts, especially when used in sprinkler irrigation. Bicarbonate also causes white deposits on plants and their fruits, which degrades their visual appeal. Bicarbonate also increases the effect of sodium when both are present. Special attention is needed when using water with excessive bicarbonate. With sensitive plants minor problems appear with bicarbonate concentrations in excess of 1.5 meq/l and severe problems appear when it exceeds 8.5 meq/l. All of the samples have high bicarbonate, which is common for water in Utah.

Chlorine, found in the form of chloride (Cl^-), can damage sensitive plants at concentrations above 145 ppm and concentrations exceeding 355 ppm can cause severe damage to almost all plants. Damage increases under sprinkler irrigation and is more severe in windy conditions. Samples 1555, 1561, 1564, 1565, and 1567 have elevated chlorine. Sample 1561 exceeds the level that could cause severe damage when used in all types of irrigation.

Sample 1564 has elevated zinc (Zn). The observed level, 4.4 ppm, can cause growth problems in plants because it is greater than the 2.0 ppm irrigation standard. High concentrations of zinc decrease root growth and leaf expansion as well as inhibit the uptake of iron and phosphorus.

No other elements were found in concentrations harmful to plants.

Livestock:

No water quality standards for livestock were exceeded.

Culinary:

All samples in this area except 1442 through 1448, 1545, 1547, 1562, and 1563 exceed the EPA aesthetic salinity standard of 833 $\mu\text{mhos/cm}$. At this level the water may be off-flavored but it is not a health problem until the EC level reaches 3,333. No samples exceed this higher level; however, sample 1561 is close with a value of 3,180.

Two minerals, Iron (Fe) and Manganese (Mn), were found to exceed the aesthetic drinking water quality standard in some samples. Samples 1449, 1546, and 1549 have high iron. This can cause discoloration of plumbing fixtures and promote the growth of iron bacteria, which stain anything they contact. Again, this is an aesthetic issue, not a health concern. Three samples (1449, 1549, and 1561) have high manganese concentration. EPA has set an aesthetic standard of 0.05 ppm for manganese. Water with high concentrations may cause discoloration of plumbing fixtures and have poor flavor.

The most serious problem with drinking water from private water systems is bacterial contamination. Because disease-causing organisms are rare, non-parasitic coliform bacteria that are found in association with parasitic bacteria are used as indicators to assess whether water could be contaminated with harmful bacteria. Coliform bacteria can occur naturally in the soil, whereas *E. coli*, a type of coliform, develops only in the digestive systems of mammals. The presence of coliform bacteria indicates that surface water, soil, or other contaminants are entering the well. The presence of *E. coli* in well water, on the other hand, indicates that mammalian fecal material is entering the well. Bacterial contamination is commonly the result of well construction problems. Contamination may result from inadequate capping, a leaking well casing, improper grouting, or lack of a casing. *E. coli* contamination can come from defective septic systems, manure operations or septic systems too close to wells, leaky sewer systems, or shallow water tables.

Samples 1443, 1444, 1449, and 1548 are contaminated with coliform. Samples 1443 and 1449 are contaminated with *E. Coli*. Wells from which these samples were collected should be inspected carefully to determine the source of contamination and should not be used for culinary purposes until the problem is corrected.

Sample Site Test Data for Alpine District

General

Id #	Be	Ca	K	Li	Mg	Na	P	pH	°C	TDS
1442	-0.1000	70.08	1.90	-0.1000	42.90	24.89	-0.10	8.31	14.5	398
1443	-0.1000	97.92	2.65	-0.1000	28.62	14.05	-0.10	8.40	18.2	389
1444	-0.1000	49.62	1.03	-0.1000	21.86	6.01	-0.10	8.69	17.9	233
1445	-0.1000	63.63	1.87	-0.1000	29.24	15.54	-0.10	8.50	14.4	309
1446	-0.1000	66.52	1.90	-0.1000	31.15	14.22	-0.10	8.91	16.6	316
1447	-0.1000	69.39	2.65	-0.1000	29.22	17.00	-0.10	8.31	16.0	326
1448	-0.1000	77.55	4.03	-0.1000	32.79	60.15	-0.10	8.10	19.6	463
1449	-0.1000	16.43	105.31	0.9567	2.48	130.40	2.64	9.14	18.4	549
1545	-0.1000	51.13	1.23	-0.1000	20.29	10.08	-0.10	7.50	11.5	396
1546	-0.1000	67.16	1.56	-0.1000	25.53	12.42	-0.10	8.00	10.0	517
1547	-0.1000	52.55	1.19	-0.1000	22.16	10.91	-0.10	7.50	9.5	430
1548	-0.1000	72.41	12.25	-0.1000	43.51	26.20	-0.10	8.00	13.5	725
1549	-0.1000	81.78	1.79	-0.1000	30.16	13.35	-0.10	7.50	10.4	635
1550	-0.1000	65.20	1.40	-0.1000	28.70	14.28	-0.10	7.50	11.3	527
1551	-0.1000	66.63	1.63	-0.1000	32.12	17.87	-0.10	8.00	11.1	571
1553	-0.1000	80.30	1.18	-0.1000	22.30	22.39	-0.10	8.00	12.4	559
1554	-0.1000	23.73	9.16	-0.1000	38.56	118.58	-0.10	7.50	13.5	856
1555	-0.1000	122.52	2.00	-0.1000	38.64	52.53	-0.10	7.50	16.5	987
1556	-0.1000	101.71	1.66	-0.1000	30.07	30.14	-0.10	7.80	11.2	945
1557	-0.1000	84.94	1.62	-0.1000	26.04	28.42	-0.10	7.80	10.5	627
1558	-0.1000	96.70	1.88	-0.1000	25.82	45.25	-0.10	7.80	12.2	737
1559	-0.1000	67.45	3.69	0.0614	27.15	39.10	-0.10	7.50	28.5	635
1560	-0.1000	30.12	3.26	0.0837	41.64	88.93	-0.10	7.80	16.1	787
1561	-0.1000	113.95	1.09	0.1294	179.73	31.48	-0.10	8.00	13.2	1908
1562	-0.1000	40.69	3.34	-0.1000	22.79	44.55	-0.10	8.00	14.1	467
1563	-0.1000	30.99	3.73	-0.1000	21.38	23.64	-0.10	8.00	12.4	377
1564	-0.1000	120.03	5.51	-0.1000	37.93	41.33	-0.10	7.50	12.8	965
1565	-0.1000	130.87	5.71	-0.1000	45.44	65.23	-0.10	7.00	12.6	1212
1566	-0.1000	54.29	6.66	0.0510	21.39	77.88	-0.10	7.50	12.9	707
1567	-0.1000	110.89	8.21	0.0678	48.86	49.26	-0.10	7.80	13.6	1156

Values of -0.1 are below detection limits of testing procedure

Sample Site Test Data for Alpine District

Irrigation

Id #	Al	B	Cl	CO3 meq/l	Cu	Fe	HCO3 meq/l	Mn	Se	Zn	SAR	EC umhos/cm
1442	-0.1000	0.09	19.03	-0.10	-0.1000	0.0350	<u>4.71</u>	-0.1000	-0.1000	-0.10	0.6	663
1443	-0.1000	-0.10	22.89	-0.10	-0.1000	-0.1000	<u>4.97</u>	-0.1000	-0.1000	-0.10	0.3	649
1444	-0.1000	-0.10	6.38	-0.10	-0.1000	-0.1000	<u>2.93</u>	-0.1000	-0.1000	0.05	0.2	389
1445	0.1389	-0.10	10.44	-0.10	-0.1000	0.0996	<u>4.54</u>	-0.1000	-0.1000	-0.10	0.4	515
1446	-0.1000	-0.10	13.68	-0.10	-0.1000	0.0228	<u>4.31</u>	-0.1000	-0.1000	0.09	0.4	527
1447	-0.1000	-0.10	13.33	-0.10	-0.1000	-0.1000	<u>4.42</u>	-0.1000	-0.1000	0.28	0.4	543
1448	-0.1000	0.10	40.72	-0.10	-0.1000	-0.1000	<u>5.02</u>	-0.1000	-0.1000	0.14	1.4	<u>772</u>
1449	-0.1000	0.15	27.46	-0.10	0.0570	0.6603	<u>5.04</u>	0.0644	-0.1000	0.06	<u>7.9</u>	<u>915</u>
1545	-0.1000	-0.10	15.98	-0.10	-0.1000	-0.1000	<u>3.34</u>	-0.1000	-0.1000	0.12	0.3	660
1546	-0.1000	-0.10	18.80	-0.10	-0.1000	0.3114	<u>4.52</u>	0.0371	-0.1000	-0.10	0.3	<u>862</u>
1547	-0.1000	-0.10	16.66	-0.10	-0.1000	-0.1000	<u>3.55</u>	-0.1000	-0.1000	0.16	0.3	716
1548	-0.1000	0.17	42.00	-0.10	0.0290	-0.1000	<u>5.86</u>	-0.1000	-0.1000	0.11	0.6	<u>1,208</u>
1549	-0.1000	-0.10	61.01	-0.10	-0.1000	0.6697	<u>4.56</u>	0.0704	-0.1000	0.10	0.3	<u>1,058</u>
1550	-0.1000	-0.10	25.55	-0.10	-0.1000	0.0223	<u>4.25</u>	-0.1000	-0.1000	0.13	0.4	<u>878</u>
1551	-0.1000	-0.10	28.04	-0.10	-0.1000	-0.1000	<u>4.58</u>	-0.1000	-0.1000	0.14	0.4	<u>952</u>
1553	-0.1000	-0.10	33.98	-0.10	-0.1000	-0.1000	<u>4.66</u>	-0.1000	-0.1000	1.94	0.6	<u>931</u>
1554	-0.1000	-0.10	125.14	-0.10	0.1282	-0.1000	<u>4.33</u>	-0.1000	-0.1000	1.23	<u>3.5</u>	<u>1,427</u>
1555	-0.1000	0.09	<u>158.79</u>	-0.10	-0.1000	0.0666	<u>4.87</u>	-0.1000	-0.1000	1.08	1.1	<u>1,645</u>
1556	-0.1000	-0.10	59.26	-0.10	-0.1000	-0.1000	<u>4.91</u>	-0.1000	-0.1000	0.06	0.7	<u>1,575</u>
1557	-0.1000	0.11	24.27	-0.10	-0.1000	0.1140	<u>5.20</u>	-0.1000	-0.1000	1.29	0.7	<u>1,045</u>
1558	-0.1000	0.08	57.00	-0.10	-0.1000	0.0836	<u>5.24</u>	-0.1000	-0.1000	0.28	1.1	<u>1,229</u>
1559	-0.1000	0.10	71.78	-0.10	-0.1000	-0.1000	<u>3.53</u>	-0.1000	-0.1000	-0.10	1.0	<u>1,058</u>
1560	-0.1000	0.20	85.01	-0.10	-0.1000	-0.1000	<u>4.58</u>	-0.1000	-0.1000	0.06	2.5	<u>1,311</u>
1561	-0.1000	0.09	<u>602.78</u>	-0.10	-0.1000	-0.1000	<u>4.15</u>	0.0620	-0.1000	-0.10	0.4	<u>3,180</u>
1562	-0.1000	0.11	47.60	-0.10	-0.1000	0.0271	<u>3.08</u>	-0.1000	-0.1000	1.34	1.4	<u>778</u>
1563	-0.1000	0.09	29.89	-0.10	-0.1000	0.0355	<u>2.33</u>	-0.1000	-0.1000	-0.10	0.8	628
1564	0.7811	0.20	<u>220.22</u>	-0.10	-0.1000	0.0582	<u>2.50</u>	-0.1000	-0.1000	4.40	0.8	<u>1,609</u>
1565	-0.1000	0.11	<u>335.01</u>	-0.10	-0.1000	-0.1000	<u>1.96</u>	-0.1000	-0.1000	0.06	1.3	<u>2,020</u>
1566	-0.1000	0.23	108.75	-0.10	-0.1000	0.0782	<u>3.45</u>	-0.1000	-0.1000	0.97	2.3	<u>1,179</u>
1567	0.1232	0.10	<u>296.94</u>	-0.10	-0.1000	-0.1000	<u>2.02</u>	-0.1000	-0.1000	0.15	1.0	<u>1,927</u>

Underlined values exceed irrigation standards. Shaded values indicate severe risks. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure.

Sample Site Test Data for Alpine District

Livestock

Id #	Al	As	B	Cd	Co	Cr	Mo	Ni	Pb	S	Se	EC umhos/cm	V	Zn
1442	-0.1000	-0.1000	0.09	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	43.58	-0.1000	663	-0.1000	-0.10
1443	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	29.49	-0.1000	649	-0.1000	-0.10
1444	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	21.67	-0.1000	389	-0.1000	0.05
1445	0.1389	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	19.47	-0.1000	515	-0.1000	-0.10
1446	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	21.95	-0.1000	527	-0.1000	0.09
1447	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	21.65	-0.1000	543	-0.1000	0.28
1448	-0.1000	-0.1000	0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	42.95	-0.1000	772	-0.1000	0.14
1449	-0.1000	-0.1000	0.15	-0.1000	-0.1000	-0.1000	<u>0.0121</u>	-0.1000	-0.1000	7.31	-0.1000	915	-0.1000	0.06
1545	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	7.75	-0.1000	660	-0.1000	0.12
1546	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	8.56	-0.1000	862	-0.1000	-0.10
1547	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	9.00	-0.1000	716	-0.1000	0.16
1548	-0.1000	-0.1000	0.17	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	16.76	-0.1000	1,208	-0.1000	0.11
1549	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	8.58	-0.1000	1,058	-0.1000	0.10
1550	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	14.55	-0.1000	878	-0.1000	0.13
1551	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	17.17	-0.1000	952	-0.1000	0.14
1553	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	12.92	-0.1000	931	-0.1000	1.94
1554	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	21.18	-0.1000	1,427	-0.1000	1.23
1555	-0.1000	-0.1000	0.09	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	31.71	-0.1000	1,645	-0.1000	1.08
1556	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	23.66	-0.1000	1,575	-0.1000	0.06
1557	-0.1000	-0.1000	0.11	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	13.27	-0.1000	1,045	-0.1000	1.29
1558	-0.1000	-0.1000	0.08	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	18.34	-0.1000	1,229	-0.1000	0.28
1559	-0.1000	-0.1000	0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	24.70	-0.1000	1,058	-0.1000	-0.10
1560	-0.1000	-0.1000	0.20	-0.1000	-0.1000	-0.1000	<u>0.0130</u>	-0.1000	-0.1000	23.81	-0.1000	1,311	0.0262	0.06
1561	-0.1000	-0.1000	0.09	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	17.23	-0.1000	3,180	0.0177	-0.10
1562	-0.1000	-0.1000	0.11	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	18.70	-0.1000	778	0.0120	1.34
1563	-0.1000	-0.1000	0.09	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	15.74	-0.1000	628	0.0146	-0.10
1564	0.7811	-0.1000	0.20	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	0.0314	24.94	-0.1000	1,609	-0.1000	4.40
1565	-0.1000	-0.1000	0.11	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	22.20	-0.1000	2,020	-0.1000	0.06
1566	-0.1000	-0.1000	0.23	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	16.73	-0.1000	1,179	-0.1000	0.97
1567	0.1232	-0.1000	0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	24.09	-0.1000	1,927	0.0120	0.15

Underlined values indicate minor health problems (particularly smaller and younger animals). Shaded values indicate a serious health risk. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure.

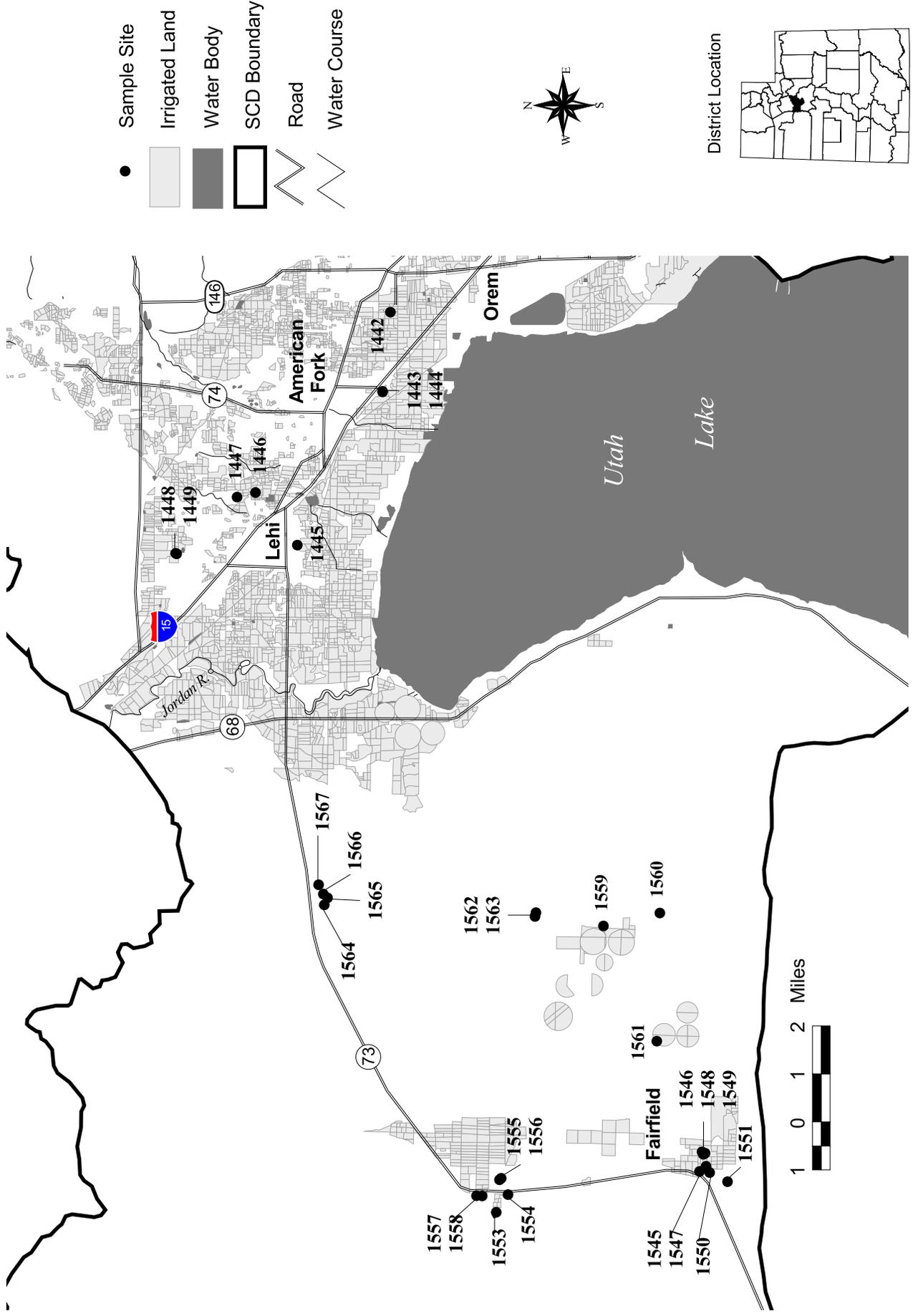
Sample Site Test Data for Alpine District

Culinary

Id #	As	Ba	Cd	Cr	Cu	Fe	Mn	NO3-N	Pb	S	Se	EC umhos/cm	Zn	pH	Col	Ecoli	Hardness gpg
1442	-0.1000	0.0398	-0.1000	-0.1000	-0.1000	0.0350	-0.1000	3.0	-0.1000	43.58	-0.1000	663	-0.10	8.31	0	0	6.6
1443	-0.1000	0.0961	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	3.6	-0.1000	29.49	-0.1000	649	-0.10	8.40	1	1	7.4
1444	-0.1000	0.0641	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.0	-0.1000	21.67	-0.1000	389	0.05	8.69	1	0	4.2
1445	-0.1000	0.1331	-0.1000	-0.1000	-0.1000	0.0996	-0.1000	3.6	-0.1000	19.47	-0.1000	515	-0.10	8.50	0	0	5.4
1446	-0.1000	0.1384	-0.1000	-0.1000	-0.1000	0.0228	-0.1000	3.9	-0.1000	21.95	-0.1000	527	0.09	8.91	0	0	5.7
1447	-0.1000	0.1781	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	3.0	-0.1000	21.65	-0.1000	543	0.28	8.31	0	0	5.8
1448	-0.1000	0.0367	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	3.9	-0.1000	42.95	-0.1000	772	0.14	8.10	0	0	6.5
1449	-0.1000	0.0434	-0.1000	-0.1000	0.0570	0.6603	0.0644	1.0	-0.1000	7.31	-0.1000	915	0.06	9.14	1	1	1.1
1545	-0.1000	0.0453	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	0.5	-0.1000	7.75	-0.1000	660	0.12	7.50	0	0	4.2
1546	-0.1000	0.1190	-0.1000	-0.1000	-0.1000	0.3114	0.0371	0.0	-0.1000	8.56	-0.1000	862	-0.10	8.00	0	0	5.4
1547	-0.1000	0.0514	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	0.4	-0.1000	9.00	-0.1000	716	0.16	7.50	0	0	4.4
1548	-0.1000	0.1126	-0.1000	-0.1000	0.0290	-0.1000	-0.1000	1.0	-0.1000	16.76	-0.1000	1,208	0.11	8.00	1	0	6.8
1549	-0.1000	0.1429	-0.1000	-0.1000	-0.1000	0.6697	0.0704	0.0	-0.1000	8.58	-0.1000	1,058	0.10	7.50	0	0	6.5
1550	-0.1000	0.0655	-0.1000	-0.1000	-0.1000	0.0223	-0.1000	0.3	-0.1000	14.55	-0.1000	878	0.13	7.50	0	0	5.5
1551	-0.1000	0.0889	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	0.2	-0.1000	17.17	-0.1000	952	0.14	8.00	0	0	5.8
1553	-0.1000	0.0497	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.4	-0.1000	12.92	-0.1000	931	1.94	8.00	0	0	6.0
1554	-0.1000	-0.1000	-0.1000	-0.1000	0.1282	-0.1000	-0.1000	5.0	-0.1000	21.18	-0.1000	1,427	1.23	7.50	0	0	3.6
1555	-0.1000	0.1236	-0.1000	-0.1000	-0.1000	0.0666	-0.1000	10.0	-0.1000	31.71	-0.1000	1,645	1.08	7.50	0	0	9.4
1556	-0.1000	0.1002	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	7.0	-0.1000	23.66	-0.1000	1,575	0.06	7.80	0	0	7.7
1557	-0.1000	0.0793	-0.1000	-0.1000	-0.1000	0.1140	-0.1000	7.0	-0.1000	13.27	-0.1000	1,045	1.29	7.80	0	0	6.5
1558	-0.1000	0.0809	-0.1000	-0.1000	-0.1000	0.0836	-0.1000	7.0	-0.1000	18.34	-0.1000	1,229	0.28	7.80	0	0	7.2
1559	-0.1000	0.0906	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	0.7	-0.1000	24.70	-0.1000	1,058	-0.10	7.50	0	0	5.5
1560	-0.1000	0.0646	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	0.4	-0.1000	23.81	-0.1000	1,311	0.06	7.80	0	0	4.2
1561	-0.1000	0.1457	-0.1000	-0.1000	-0.1000	-0.1000	0.0620	0.0	-0.1000	17.23	-0.1000	3,180	-0.10	8.00	0	0	17.2
1562	-0.1000	0.0735	-0.1000	-0.1000	-0.1000	0.0271	-0.1000	0.4	-0.1000	18.70	-0.1000	778	1.34	8.00	0	0	3.7
1563	-0.1000	0.0996	-0.1000	-0.1000	-0.1000	0.0355	-0.1000	0.1	-0.1000	15.74	-0.1000	628	-0.10	8.00	0	0	3.1
1564	-0.1000	0.1252	-0.1000	-0.1000	-0.1000	0.0582	-0.1000	4.5	0.0314	24.94	-0.1000	1,609	4.40	7.50	0	0	9.2
1565	-0.1000	0.1557	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	5.0	-0.1000	22.20	-0.1000	2,020	0.06	7.00	0	0	10.3
1566	-0.1000	0.0769	-0.1000	-0.1000	-0.1000	0.0782	-0.1000	0.1	-0.1000	16.73	-0.1000	1,179	0.97	7.50	0	0	4.4
1567	-0.1000	0.2423	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	0.1	-0.1000	24.09	-0.1000	1,927	0.15	7.80	0	0	9.3

Underlined values exceed Secondary (aesthetic) standards. Shaded values exceed Primary (health) standards. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure. For Col and Ecoli 1 = present 0 = absent.

Map 9. Alpine District



Kamas Valley District

The water in this area varies from soft to very hard, with gpg (grains per gallon) ranging from 0.1 to 26.4 with a mean of 5.15. Water temperatures range from 7.1 °C to 21.4 °C, with a mean of 11.1 °C. The pH for the area has a mean of 7.55 and ranges from 6.28 to 8.63. Sample 1238 has high pH and may cause alkalinity problems such as mineral buildup whereas samples 1148 and 1154 are acidic and may cause corrosion.

Irrigation:

Salinity is a measurement of the concentration of ionic salts dissolved in water. It is measured as electrical conductivity (EC), in $\mu\text{mhos/cm}$. Higher conductivity values indicate higher concentrations of dissolved salts. Water high in dissolved salts increases osmotic pressures, making it difficult for plants to get water necessary for growth. Generally when EC exceeds 750 $\mu\text{mhos/cm}$, salt-sensitive plants begin to be affected. When EC exceeds 3,000 $\mu\text{mhos/cm}$, most plants would be severely injured. Samples 1062, 1064, 1065, 1072, 1074, 1075, 1077, 1081, 1084, 1088, 1093, 1149, 1150, 1154, 1214, 1220, 1222 through 1225, 1237, 1239, and 1240 exceed the salinity standard of 750 $\mu\text{mhos/cm}$. Sample 1154 with a value 4,000 $\mu\text{mhos/cm}$ exceeded the severe-injury level of 3,000 $\mu\text{mhos/cm}$, which affects most plants.

SAR measures how much sodium (Na) is in solution compared to calcium (Ca) and magnesium (Mg). Excessive sodium in the soil causes soil particles to repel each other. This destroys the structure of the soil, preventing air and water movement. SAR values greater than 3 mark the beginning of problems and values greater than 9 indicate severe problems. Sample 1075 has an extremely high SAR of 32.8.

Bicarbonate (HCO_3) is an ion common to water solutions. It can be hazardous to plants in excessive amounts, especially when used in sprinkler irrigation. Bicarbonate also causes white deposits on plants and their fruits, which degrades their visual appeal. Bicarbonate also increases the effect of sodium when both are present. Special attention is needed when using water with excessive bicarbonate. With sensitive plants minor problems appear with bicarbonate concentrations in excess of 1.5 meq/l and severe problems appear when it exceeds 8.5 meq/l. All of the samples have high bicarbonate, which is common for water in Utah.

Chlorine, found in the form of chloride (Cl^-), can damage sensitive plants at concentrations above 145 ppm and concentrations exceeding 355 ppm can cause severe damage to almost all plants. Damage increases under sprinkler irrigation and is more severe in windy conditions. Samples 1075, 1214, and 1223 have elevated chlorine.

Copper (Cu) is toxic to plants when its concentration is greater than 0.2 ppm. Sample 1095 has copper above the standard. Copper interferes with iron uptake and causes chlorosis in plants.

Samples 1065, 1220, 1222, 1223, 1225, 1239, 1240, and 1241 have elevated manganese (Mn). Manganese above 0.2 ppm can injure plants and cause reduction in dry matter production. Excess manganese interferes with the plant's ability to use other nutrients such as calcium (Ca).

Sample 1084 has elevated zinc (Zn), at 5.34 ppm. Elevated zinc in irrigation water can cause growth problems in plants at concentrations greater than 2.0 ppm. High concentrations of zinc decrease root growth and leaf expansion as well as inhibit the uptake of iron and phosphorus.

No other elements were found in concentrations harmful to plants.

Livestock:

Samples 1062 through 1065, 1069 through 1075, 1077, 1081, 1084, 1088, 1093, 1150, 1151, 1154, 1214, 1220, 1222 through 1226, 1229, 1239 through 1241, and 1246 have elevated molybdenum (Mo).

Livestock eating plants irrigated with water that has molybdenum concentration greater than 0.01 ppm may be harmed. High concentrations of molybdenum interfere with copper nutrition in livestock.

No other water quality standards for livestock were exceeded.

Culinary:

Samples 1154, 1062, 1064, 1065, 1074, 1075, 1077, 1081, 1084, 1093, 1149, 1150, 1214, 1222 through 1224, 1237, 1239, and 1240 exceed the EPA aesthetic standard of 833 $\mu\text{mhos/cm}$ for electrical conductivity (EC). At this level the water may be off-flavored but it is not a health problem until the EC level reaches 3,333. Sample 1154 exceeds this level, with a value of 4,000.

Two minerals, iron (Fe) and manganese (Mn), were found to exceed the aesthetic drinking water quality standard. Samples 1065, 1077, 1088, 1148, 1150, 1154, 1220, 1222 through 1224, 1235, 1240, and 1241 have high iron. This can cause discoloration of plumbing fixtures and promote the growth of iron bacteria, which stain anything they contact. Again, this is an aesthetic issue, not a health concern.

Ten samples (1065, 1077, 1088, 1220, 1222 through 1225, and 1239 through 1241) have high manganese concentration. EPA has set an aesthetic standard of 0.05 ppm for manganese. Water with high concentrations may cause discoloration of plumbing fixtures and have poor flavor.

Two wells exceeded the primary health standard for the minerals barium (Ba) and zinc (Zn). Sample 1154 has high barium and sample 1084 has high zinc; neither should be used for drinking.

The most serious problem with drinking water from private water systems is bacterial contamination. Because disease-causing organisms are rare, non-parasitic coliform bacteria that are found in association with parasitic bacteria are used as indicators to assess whether water could be contaminated with harmful bacteria. Coliform bacteria can occur naturally in the soil, whereas *E. coli*, a type of coliform, develops only in the digestive systems of mammals. The presence of coliform bacteria indicates that surface water, soil, or other contaminants are entering the well. The presence of *E. coli* in well water, on the other hand, indicates that mammalian fecal material is entering the well. Bacterial contamination is commonly the result of well construction problems. Contamination may result from inadequate capping, a leaking well casing, improper grouting, or lack of a casing. *E. coli* contamination can come from defective septic systems, manure operations or septic systems too close to wells, leaky sewer systems, or shallow water tables.

Samples 1064, 1068, 1073, 1075, 1083, 1088 through 1090, 1093, 1213, 1214, 1216, 1221, 1223, 1236, 1238, 1245, 1307, 1319, 1475, and 1476 are contaminated with coliform. Samples 1083, 1093, 1238, and 1475 have *E. Coli*. Wells from which these samples were collected should be inspected carefully to determine the source of contamination and should not be used for culinary purposes until the problem is corrected.

Sample Site Test Data for Kamas Valley District

General

Id #	Be	Ca	K	Li	Mg	Na	P	pH	°C	TDS
1062	-0.1000	86.14	7.54	-0.1000	18.17	24.79	-0.10	7.31	11.1	626
1063	-0.1000	68.21	4.59	-0.1000	15.36	12.17	0.13	7.22	12.5	445
1064	-0.1000	86.73	6.81	-0.1000	24.91	84.30	-0.10	7.25	11.0	881
1065	-0.1000	88.50	4.83	-0.1000	21.69	54.34	-0.10	7.21	11.7	755
1066	-0.1000	62.84	1.85	-0.1000	13.95	6.33	-0.10	7.52	10.6	370
1067	-0.1000	66.03	2.69	-0.1000	14.76	7.21	-0.10	7.34	11.4	392
1068	-0.1000	66.46	2.19	-0.1000	15.24	6.82	-0.10	7.38	10.7	391
1069	-0.1000	55.54	2.25	-0.1000	11.08	11.67	-0.10	7.48	12.0	334
1070	-0.1000	75.19	1.43	-0.1000	14.78	11.00	-0.10	7.31	10.9	432
1071	-0.1000	70.18	2.13	-0.1000	12.79	20.75	-0.10	7.32	11.7	437
1072	-0.1000	81.79	1.00	-0.1000	15.99	9.92	-0.10	7.34	11.5	460
1073	-0.1000	62.65	2.73	-0.1000	14.44	16.29	-0.10	7.06	13.4	413
1074	-0.1000	94.08	2.62	-0.1000	21.55	20.35	-0.10	7.04	11.0	557
1075	-0.1000	1.76	0.57	-0.1000	0.47	189.74	-0.10	7.85	13.2	790
1076	-0.1000	45.28	0.79	-0.1000	14.72	4.12	-0.10	7.33	10.1	281
1077	-0.1000	96.31	1.11	-0.1000	18.32	15.25	-0.10	7.17	10.2	552
1078	-0.1000	75.37	0.95	-0.1000	16.70	8.69	-0.10	7.34	10.4	421
1079	-0.1000	74.37	0.67	-0.1000	12.15	5.21	-0.10	7.34	10.9	389
1080	-0.1000	72.06	0.70	-0.1000	11.23	7.58	-0.10	7.43	11.2	382
1081	-0.1000	92.97	2.76	-0.1000	23.51	24.80	-0.10	7.36	10.5	613
1083	-0.1000	65.91	0.76	-0.1000	13.08	5.02	-0.10	7.58	12.0	344
1084	-0.1000	85.87	1.86	-0.1000	16.27	14.07	-0.10	7.19	12.0	504
1085	-0.1000	74.52	0.88	-0.1000	11.30	7.16	-0.10	7.50	13.0	372
1086	-0.1000	69.76	0.68	-0.1000	10.38	7.04	-0.10	7.51	11.5	360
1087	-0.1000	56.67	0.68	-0.1000	17.70	7.39	-0.10	7.48	11.0	361
1088	-0.1000	70.13	1.38	-0.1000	23.64	13.43	-0.10	7.01	9.6	499
1089	-0.1000	66.10	0.68	-0.1000	26.26	7.04	-0.10	7.29	13.7	414
1090	-0.1000	61.17	0.88	-0.1000	13.13	10.85	-0.10	7.49	11.7	360
1091	-0.1000	63.96	1.25	-0.1000	15.68	15.39	-0.10	7.30	11.6	425
1092	-0.1000	60.99	1.02	-0.1000	14.01	13.29	-0.10	7.17	13.1	383
1093	-0.1000	86.78	5.34	-0.1000	20.64	23.24	-0.10	7.21	12.3	579
1094	-0.1000	49.65	1.74	-0.1000	11.23	15.38	-0.10	7.35	11.3	325
1095	-0.1000	27.66	1.86	-0.1000	7.28	10.28	-0.10	7.37	10.3	177
1096	-0.1000	60.63	1.17	-0.1000	18.41	7.24	-0.10	7.36	11.0	386
1097	-0.1000	41.09	2.80	-0.1000	11.55	7.05	-0.10	7.82	11.4	272
1148	-0.1000	42.68	1.54	-0.1000	10.26	16.12	-0.10	6.28	12.3	331
1149	-0.1000	80.98	0.79	-0.1000	20.40	7.96	-0.10	6.78	10.0	542

Values of -0.1 are below detection limits of testing procedure

Sample Site Test Data for Kamas Valley District

General

Id #	Be	Ca	K	Li	Mg	Na	P	pH	°C	IDS
1150	-0.1000	35.81	5.73	-0.1000	21.60	65.05	-0.10	7.68	11.6	546
1151	-0.1000	47.44	1.09	-0.1000	10.88	19.47	-0.10	6.62	11.9	349
1152	-0.1000	36.12	4.45	-0.1000	9.41	14.50	-0.10	7.18	13.5	285
1154	-0.1000	411.68	1.28	-0.1000	39.51	63.54	-0.10	6.39	10.3	2400
1213	-0.1000	61.53	0.79	-0.1000	21.12	6.41	-0.10	7.85	11.9	389
1214	-0.1000	111.43	1.50	-0.1000	36.76	123.11	-0.10	7.65	7.2	1584
1215	-0.1000	55.18	0.89	-0.1000	21.00	5.24	-0.10	7.99	7.9	356
1216	-0.1000	36.34	0.63	-0.1000	7.03	7.25	-0.10	7.98	9.9	215
1217	-0.1000	69.36	0.89	-0.1000	17.29	5.93	-0.10	8.11	8.3	400
1218	-0.1000	47.74	0.69	-0.1000	17.72	7.17	-0.10	7.94	12.2	332
1219	-0.1000	66.99	0.73	-0.1000	22.39	5.27	-0.10	7.98	10.0	407
1220	-0.1000	60.98	1.80	-0.1000	24.66	9.81	-0.10	7.71	8.1	466
1221	-0.1000	63.04	0.69	-0.1000	17.15	5.04	-0.10	8.26	7.6	360
1222	-0.1000	63.71	1.88	-0.1000	39.11	21.88	-0.10	7.95	9.0	572
1223	-0.1000	111.62	1.11	-0.1000	30.82	98.49	-0.10	8.06	8.8	1072
1224	-0.1000	61.72	1.44	-0.1000	31.67	44.02	-0.10	7.75	8.6	572
1225	-0.1000	66.38	0.97	-0.1000	19.86	29.65	-0.10	7.86	9.4	473
1226	-0.1000	62.29	1.17	-0.1000	22.93	13.88	-0.10	7.92	10.2	445
1227	-0.1000	73.28	0.71	-0.1000	24.75	6.21	-0.10	7.93	7.1	439
1229	-0.1000	55.78	0.88	-0.1000	13.16	24.83	-0.10	7.36	7.4	420
1235	-0.1000	64.02	1.30	-0.1000	19.20	14.29	-0.10	8.05	11.4	414
1236	-0.1000	82.77	0.95	-0.1000	15.32	8.95	-0.10	7.90	9.2	443
1237	-0.1000	100.60	1.10	-0.1000	20.61	16.37	-0.10	7.94	9.7	558
1238	-0.1000	73.15	0.61	-0.1000	12.87	9.26	-0.10	8.63	15.9	374
1239	-0.1000	64.98	1.16	-0.1000	23.43	35.02	-0.10	7.76	10.1	509
1240	-0.1000	64.00	1.30	-0.1000	23.31	40.25	-0.10	7.80	9.6	510
1241	-0.1000	58.05	1.23	-0.1000	25.04	10.71	-0.10	7.51	13.8	421
1242	-0.1000	52.09	1.27	-0.1000	12.79	16.03	-0.10	7.49	14.7	362
1243	-0.1000	53.21	1.77	-0.1000	16.22	9.48	-0.10	7.86	21.4	350
1244	-0.1000	70.19	1.54	-0.1000	18.26	10.10	-0.10	7.75	11.5	427
1245	-0.1000	68.41	1.29	-0.1000	17.98	13.80	-0.10	7.72	9.8	440
1246	-0.1000	55.91	1.00	-0.1000	13.78	17.55	-0.10	7.42	12.2	390
1307	-0.1000	66.49	0.59	-0.1000	14.30	5.92	-0.10	8.11	17.0	260
1311	-0.1000	70.99	1.47	-0.1000	15.33	18.10	-0.10	8.28	12.8	314
1319	-0.1000	52.60	0.75	-0.1000	20.37	4.22	-0.10	8.11	13.6	236
1320	-0.1000	137.45	0.78	-0.1000	10.01	4.40	-0.10	7.41	9.3	408
1321	-0.1000	27.79	0.35	-0.1000	11.19	1.28	-0.10	8.49	7.4	128
1475	-0.1000	51.31	0.84	-0.1000	18.29	1.99	-0.10	7.78	10.5	221
1476	-0.1000	51.43	0.77	-0.1000	17.97	2.05	-0.10	7.63	9.4	213

Values of -0.1 are below detection limits of testing procedure

Sample Site Test Data for Kamas Valley District

Irrigation

Id #	Al	B	Cl	CO3 meq/l	Cu	Fe	HCO3 meq/l	Mn	Se	Zn	SAR	EC umhos/cm
1062	-0.1000	-0.10	67.66	-0.10	-0.1000	0.1315	4.13	-0.1000	-0.1000	-0.10	0.6	1,043
1063	-0.1000	-0.10	18.98	-0.10	-0.1000	0.0521	4.25	-0.1000	-0.1000	0.07	0.3	741
1064	-0.1000	0.20	124.63	-0.10	-0.1000	0.0249	5.35	-0.1000	-0.1000	0.17	2.1	1,469
1065	-0.1000	0.14	65.20	-0.10	-0.1000	0.7758	5.84	1.9025	-0.1000	-0.10	1.3	1,258
1066	-0.1000	-0.10	7.35	-0.10	-0.1000	-0.1000	3.78	-0.1000	-0.1000	-0.10	0.2	616
1067	-0.1000	-0.10	9.16	-0.10	-0.1000	0.0206	3.90	-0.1000	-0.1000	0.11	0.2	653
1068	-0.1000	-0.10	8.94	-0.10	-0.1000	-0.1000	3.92	-0.1000	-0.1000	0.08	0.2	651
1069	-0.1000	-0.10	-0.10	-0.10	-0.1000	-0.1000	3.65	-0.1000	-0.1000	-0.10	0.4	557
1070	-0.1000	-0.10	6.90	-0.10	-0.1000	-0.1000	4.64	-0.1000	-0.1000	0.11	0.3	720
1071	-0.1000	-0.10	13.97	-0.10	0.0768	-0.1000	4.46	-0.1000	-0.1000	0.07	0.6	729
1072	-0.1000	-0.10	19.95	-0.10	-0.1000	-0.1000	4.69	-0.1000	-0.1000	0.50	0.3	766
1073	-0.1000	-0.10	31.02	-0.10	0.0234	0.0292	3.49	-0.1000	-0.1000	0.12	0.5	688
1074	-0.1000	-0.10	25.45	-0.10	-0.1000	-0.1000	5.24	-0.1000	-0.1000	0.33	0.5	928
1075	-0.1000	-0.10	155.69	-0.10	0.0303	-0.1000	3.92	-0.1000	-0.1000	-0.10	32.8	1,316
1076	-0.1000	-0.10	4.09	-0.10	-0.1000	0.0269	3.22	-0.1000	-0.1000	-0.10	0.1	468
1077	0.0427	-0.10	23.17	-0.10	-0.1000	0.8319	5.41	0.0883	-0.1000	-0.10	0.4	920
1078	-0.1000	-0.10	-0.10	-0.10	-0.1000	0.0888	4.23	-0.1000	-0.1000	0.11	0.2	702
1079	-0.1000	-0.10	-0.10	-0.10	-0.1000	-0.1000	4.21	-0.1000	-0.1000	0.60	0.1	649
1080	-0.1000	-0.10	-0.10	-0.10	-0.1000	-0.1000	4.15	-0.1000	-0.1000	0.21	0.2	636
1081	-0.1000	-0.10	39.73	-0.10	-0.1000	0.0505	5.90	0.0269	-0.1000	0.41	0.6	1,022
1083	-0.1000	-0.10	8.13	-0.10	-0.1000	-0.1000	3.71	-0.1000	-0.1000	-0.10	0.1	573
1084	-0.1000	-0.10	14.83	-0.10	0.0315	0.0294	5.57	-0.1000	-0.1000	5.34	0.4	840
1085	-0.1000	-0.10	6.08	-0.10	-0.1000	0.0509	4.15	-0.1000	-0.1000	0.13	0.2	620
1086	-0.1000	-0.10	3.93	-0.10	-0.1000	-0.1000	4.02	-0.1000	-0.1000	-0.10	0.2	600
1087	-0.1000	-0.10	15.65	-0.10	-0.1000	-0.1000	3.71	-0.1000	-0.1000	-0.10	0.2	602
1088	-0.1000	-0.10	29.32	-0.10	-0.1000	1.8432	3.36	0.1435	-0.1000	0.29	0.4	832
1089	-0.1000	-0.10	5.15	-0.10	-0.1000	-0.1000	5.45	-0.1000	-0.1000	0.23	0.2	690
1090	-0.1000	-0.10	15.02	-0.10	-0.1000	-0.1000	3.98	-0.1000	-0.1000	0.19	0.3	600
1091	-0.1000	-0.10	43.79	-0.10	-0.1000	0.0541	7.68	-0.1000	-0.1000	0.43	0.4	709
1092	-0.1000	-0.10	19.31	-0.10	-0.1000	-0.1000	4.69	-0.1000	-0.1000	0.36	0.4	638
1093	-0.1000	-0.10	88.37	-0.10	-0.1000	0.0349	4.15	-0.1000	-0.1000	0.09	0.6	965
1094	-0.1000	-0.10	17.52	-0.10	-0.1000	-0.1000	3.38	-0.1000	-0.1000	0.07	0.5	542
1095	0.0450	-0.10	6.58	-0.10	0.2130	0.0278	1.94	-0.1000	-0.1000	0.11	0.4	295
1096	-0.1000	-0.10	8.45	-0.10	-0.1000	0.0346	4.44	-0.1000	-0.1000	0.05	0.2	643
1097	-0.1000	-0.10	-0.10	-0.10	-0.1000	-0.1000	3.14	-0.1000	-0.1000	0.06	0.3	454
1148	-0.1000	-0.10	27.97	-0.10	0.0644	0.8391	1.71	0.0341	-0.1000	0.09	0.6	551
1149	-0.1000	-0.10	32.20	-0.10	-0.1000	0.0427	2.95	-0.1000	-0.1000	0.07	0.2	904

Underlined values exceed irrigation standards. Shaded values indicate severe risks. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure.

Sample Site Test Data for Kamas Valley District

Irrigation

Id #	Al	B	Cl	CO3 meq/l	Cu	Fe	HCO3 meq/l	Mn	Se	Zn	SAR	EC umhos/cm
1150	-0.1000	0.49	31.75	-0.10	-0.1000	0.7500	<u>3.41</u>	0.0300	-0.1000	-0.10	2.1	<u>910</u>
1151	-0.1000	-0.10	35.18	-0.10	-0.1000	0.0300	<u>2.58</u>	-0.1000	-0.1000	-0.10	0.7	581
1152	-0.1000	-0.10	27.65	-0.10	-0.1000	-0.1000	<u>2.15</u>	-0.1000	-0.1000	-0.10	0.6	475
1154	-0.1000	-0.10	-0.10	-0.10	-0.1000	0.7305	<u>5.57</u>	0.0469	-0.1000	-0.10	0.8	<u>4.000</u>
1213	-0.1000	-0.10	5.28	-0.10	0.0252	0.0518	<u>4.27</u>	-0.1000	-0.1000	0.39	0.2	648
1214	-0.1000	-0.10	<u>344.46</u>	-0.10	-0.1000	0.0852	<u>4.21</u>	0.0362	-0.1000	0.32	2.6	<u>2640</u>
1215	0.2101	-0.10	5.86	-0.10	-0.1000	0.1409	<u>4.04</u>	-0.1000	-0.1000	-0.10	0.2	594
1216	0.1676	-0.10	7.89	-0.10	-0.1000	0.1081	<u>2.02</u>	-0.1000	-0.1000	0.33	0.3	359
1217	0.0872	-0.10	7.21	-0.10	-0.1000	0.0473	<u>4.11</u>	-0.1000	-0.1000	0.16	0.2	666
1218	0.0624	-0.10	9.93	-0.10	-0.1000	0.0387	<u>3.24</u>	-0.1000	-0.1000	1.40	0.2	554
1219	-0.1000	-0.10	4.47	-0.10	-0.1000	-0.1000	<u>4.46</u>	-0.1000	-0.1000	0.32	0.1	678
1220	-0.1000	-0.10	5.73	-0.10	-0.1000	1.0552	<u>4.11</u>	<u>0.5932</u>	-0.1000	-0.10	0.3	<u>777</u>
1221	-0.1000	-0.10	-0.10	-0.10	-0.1000	-0.1000	<u>3.86</u>	-0.1000	-0.1000	-0.10	0.1	600
1222	-0.1000	0.13	-0.10	-0.10	-0.1000	2.4123	<u>4.17</u>	<u>0.3416</u>	-0.1000	1.63	0.5	<u>953</u>
1223	-0.1000	-0.10	<u>229.84</u>	-0.10	-0.1000	1.9144	<u>4.38</u>	<u>0.3145</u>	-0.1000	0.34	2.1	<u>1,786</u>
1224	-0.1000	0.17	6.66	-0.10	-0.1000	0.3164	<u>4.64</u>	0.1924	-0.1000	0.10	1.1	<u>953</u>
1225	-0.1000	0.07	18.88	-0.10	-0.1000	0.1282	<u>4.25</u>	<u>0.2664</u>	-0.1000	-0.10	0.8	<u>788</u>
1226	0.0454	-0.10	12.60	-0.10	0.0624	0.0531	<u>3.61</u>	0.0224	-0.1000	0.49	0.4	742
1227	0.0775	-0.10	4.96	-0.10	-0.1000	0.1323	<u>4.77</u>	-0.1000	-0.1000	0.20	0.2	731
1229	-0.1000	-0.10	29.70	-0.10	-0.1000	0.0203	<u>2.89</u>	-0.1000	-0.1000	-0.10	0.8	700
1235	-0.1000	-0.10	-0.10	-0.10	-0.1000	0.6028	<u>4.71</u>	-0.1000	-0.1000	0.13	0.4	690
1236	-0.1000	-0.10	7.95	-0.10	-0.1000	0.0289	<u>4.81</u>	-0.1000	-0.1000	0.27	0.2	738
1237	-0.1000	-0.10	17.31	-0.10	-0.1000	0.1603	<u>6.01</u>	-0.1000	-0.1000	0.05	0.4	<u>930</u>
1238	0.1332	-0.10	-0.10	-0.10	-0.1000	0.1091	<u>4.38</u>	-0.1000	-0.1000	0.06	0.3	623
1239	-0.1000	0.07	6.60	-0.10	-0.1000	0.2786	<u>3.10</u>	<u>0.2658</u>	-0.1000	0.04	0.9	<u>849</u>
1240	-0.1000	0.09	20.77	-0.10	-0.1000	0.3111	<u>4.21</u>	<u>0.2490</u>	-0.1000	0.06	1.1	<u>850</u>
1241	-0.1000	-0.10	30.50	-0.10	-0.1000	0.3937	<u>4.13</u>	<u>0.3841</u>	-0.1000	0.05	0.3	702
1242	-0.1000	-0.10	38.55	-0.10	0.0942	0.1745	<u>2.87</u>	-0.1000	-0.1000	-0.10	0.5	603
1243	-0.1000	-0.10	9.91	-0.10	0.0752	-0.1000	<u>4.11</u>	-0.1000	-0.1000	0.10	0.3	583
1244	-0.1000	-0.10	25.27	-0.10	-0.1000	0.2123	<u>2.91</u>	-0.1000	-0.1000	0.08	0.3	711
1245	-0.1000	-0.10	10.63	-0.10	-0.1000	0.0639	<u>3.59</u>	0.0223	-0.1000	0.06	0.4	734
1246	-0.1000	-0.10	9.02	-0.10	0.0216	0.1031	<u>4.04</u>	-0.1000	-0.1000	0.29	0.5	650
1307	-0.1000	-0.10	-0.10	-0.10	-0.1000	0.0736	<u>4.44</u>	-0.1000	-0.1000	-0.10	0.2	433
1311	-0.1000	-0.10	39.97	-0.10	-0.1000	0.0272	<u>4.07</u>	-0.1000	-0.1000	0.54	0.5	523
1319	-0.1000	-0.10	4.36	-0.10	-0.1000	-0.1000	<u>4.00</u>	-0.1000	-0.1000	0.06	0.1	394
1320	-0.1000	-0.10	-0.10	-0.10	-0.1000	0.0243	<u>7.29</u>	-0.1000	-0.1000	-0.10	0.1	680
1321	-0.1000	-0.10	-0.10	-0.10	-0.1000	0.0214	<u>2.11</u>	-0.1000	-0.1000	-0.10	0.1	213
1475	-0.1000	-0.10	-0.10	-0.10	-0.1000	-0.1000	<u>3.43</u>	-0.1000	-0.1000	-0.10	0.1	368
1476	-0.1000	-0.10	-0.10	-0.10	-0.1000	0.0423	<u>3.40</u>	-0.1000	-0.1000	0.23	0.1	355

Underlined values exceed irrigation standards. Shaded values indicate severe risks. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure.

Sample Site Test Data for Kamas Valley District

Livestock

Id #	Al	As	B	Cd	Co	Cr	Mo	Ni	Pb	S	Se	EC umhos/cm	V	Zn
1062	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0254</u>	-0.1000	-0.1000	7.04	-0.1000	1,043	-0.1000	-0.10
1063	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0138</u>	-0.1000	-0.1000	6.04	-0.1000	741	-0.1000	0.07
1064	-0.1000	-0.1000	0.20	-0.1000	-0.1000	-0.1000	<u>0.0627</u>	-0.1000	-0.1000	19.51	-0.1000	1,469	-0.1000	0.17
1065	-0.1000	-0.1000	0.14	-0.1000	-0.1000	-0.1000	<u>0.0403</u>	-0.1000	-0.1000	18.86	-0.1000	1,258	-0.1000	-0.10
1066	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	7.72	-0.1000	616	-0.1000	-0.10
1067	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	7.59	-0.1000	653	-0.1000	0.11
1068	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	8.23	-0.1000	651	-0.1000	0.08
1069	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0151</u>	-0.1000	-0.1000	4.31	-0.1000	557	-0.1000	-0.10
1070	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0142</u>	-0.1000	-0.1000	8.19	-0.1000	720	-0.1000	0.11
1071	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0165</u>	-0.1000	-0.1000	6.12	-0.1000	729	-0.1000	0.07
1072	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0158</u>	-0.1000	-0.1000	4.46	-0.1000	766	-0.1000	0.50
1073	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0159</u>	-0.1000	-0.1000	5.89	-0.1000	688	-0.1000	0.12
1074	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0149</u>	-0.1000	-0.1000	15.28	-0.1000	928	-0.1000	0.33
1075	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0108</u>	-0.1000	-0.1000	5.23	-0.1000	1,316	-0.1000	-0.10
1076	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	3.70	-0.1000	468	-0.1000	-0.10
1077	<u>0.0427</u>	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0148</u>	-0.1000	-0.1000	9.52	-0.1000	920	-0.1000	-0.10
1078	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	7.74	-0.1000	702	-0.1000	0.11
1079	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	5.33	-0.1000	649	-0.1000	0.60
1080	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	5.76	-0.1000	636	-0.1000	0.21
1081	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0165</u>	-0.1000	-0.1000	7.28	-0.1000	1,022	0.0104	0.41
1083	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	6.11	-0.1000	573	-0.1000	-0.10
1084	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0121</u>	-0.1000	-0.1000	7.50	-0.1000	840	-0.1000	5.34
1085	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	6.31	-0.1000	620	-0.1000	0.13
1086	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	5.72	-0.1000	600	-0.1000	-0.10
1087	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	4.53	-0.1000	602	-0.1000	-0.10
1088	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0199</u>	-0.1000	-0.1000	28.58	-0.1000	832	-0.1000	0.29
1089	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	4.80	-0.1000	690	-0.1000	0.23
1090	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	6.26	-0.1000	600	-0.1000	0.19
1091	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	6.77	-0.1000	709	-0.1000	0.43
1092	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	4.24	-0.1000	638	-0.1000	0.36
1093	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0122</u>	-0.1000	-0.1000	7.44	-0.1000	965	-0.1000	0.09
1094	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	5.15	-0.1000	542	-0.1000	0.07
1095	<u>0.0450</u>	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	4.67	-0.1000	295	-0.1000	0.11
1096	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	4.96	-0.1000	643	-0.1000	0.05
1097	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	4.27	-0.1000	454	-0.1000	0.06
1148	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	18.62	-0.1000	551	-0.1000	0.09
1149	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	44.01	-0.1000	904	-0.1000	0.07

Underlined values indicate minor health problems (particularly smaller and younger animals). Shaded values indicate a serious health risk. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure.

Sample Site Test Data for Kamas Valley District

Livestock

Id #	Al	As	B	Cd	Co	Cr	Mo	Ni	Pb	S	Se	EC umhos/cm	V	Zn
1150	-0.1000	-0.1000	0.49	-0.1000	-0.1000	-0.1000	<u>0.0878</u>	-0.1000	-0.1000	34.42	-0.1000	910	-0.1000	-0.10
1151	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0228</u>	-0.1000	-0.1000	4.97	-0.1000	581	-0.1000	-0.10
1152	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	2.96	-0.1000	475	-0.1000	-0.10
1154	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0182</u>	-0.1000	-0.1000	21.43	-0.1000	4,000	-0.1000	-0.10
1213	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	4.24	-0.1000	648	-0.1000	0.39
1214	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0172</u>	-0.1000	-0.1000	13.86	-0.1000	2,640	-0.1000	0.32
1215	0.2101	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	3.49	-0.1000	594	-0.1000	-0.10
1216	0.1676	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	2.73	-0.1000	359	-0.1000	0.33
1217	0.0872	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	4.47	-0.1000	666	-0.1000	0.16
1218	0.0624	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	3.28	-0.1000	554	-0.1000	1.40
1219	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	3.87	-0.1000	678	-0.1000	0.32
1220	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0285</u>	-0.1000	-0.1000	24.00	-0.1000	777	-0.1000	-0.10
1221	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	6.01	-0.1000	600	-0.1000	-0.10
1222	-0.1000	-0.1000	0.13	-0.1000	-0.1000	-0.1000	<u>0.0752</u>	-0.1000	-0.1000	46.16	-0.1000	953	-0.1000	1.63
1223	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0152</u>	-0.1000	-0.1000	13.17	-0.1000	1,786	-0.1000	0.34
1224	-0.1000	-0.1000	0.17	-0.1000	-0.1000	-0.1000	<u>0.0645</u>	-0.1000	-0.1000	39.13	-0.1000	953	-0.1000	0.10
1225	-0.1000	-0.1000	0.07	-0.1000	-0.1000	-0.1000	<u>0.0217</u>	-0.1000	-0.1000	15.80	-0.1000	788	-0.1000	-0.10
1226	0.0454	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0204</u>	-0.1000	-0.1000	21.83	-0.1000	742	-0.1000	0.49
1227	0.0775	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	4.81	-0.1000	731	-0.1000	0.20
1229	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0190</u>	-0.1000	-0.1000	8.80	-0.1000	700	-0.1000	-0.10
1235	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	6.51	-0.1000	690	-0.1000	0.13
1236	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	7.72	-0.1000	738	-0.1000	0.27
1237	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	11.28	-0.1000	930	-0.1000	0.05
1238	0.1332	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	5.49	-0.1000	623	-0.1000	0.06
1239	-0.1000	-0.1000	0.07	-0.1000	-0.1000	-0.1000	<u>0.0319</u>	-0.1000	-0.1000	18.57	-0.1000	849	-0.1000	0.04
1240	-0.1000	-0.1000	0.09	-0.1000	-0.1000	-0.1000	<u>0.0390</u>	-0.1000	-0.1000	21.41	-0.1000	850	-0.1000	0.06
1241	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0279</u>	-0.1000	-0.1000	17.68	-0.1000	702	-0.1000	0.05
1242	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	5.25	-0.1000	603	-0.1000	-0.10
1243	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	4.74	-0.1000	583	-0.1000	0.10
1244	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	4.82	-0.1000	711	-0.1000	0.08
1245	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	4.46	-0.1000	734	-0.1000	0.06
1246	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0166</u>	-0.1000	-0.1000	6.36	-0.1000	650	-0.1000	0.29
1307	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	3.21	-0.1000	433	-0.1000	-0.10
1311	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	4.44	-0.1000	523	-0.1000	0.54
1319	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	3.15	-0.1000	394	-0.1000	0.06
1320	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	4.34	-0.1000	680	-0.1000	-0.10
1321	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.53	-0.1000	213	-0.1000	-0.10
1475	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	6.71	-0.1000	368	-0.1000	-0.10
1476	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	6.66	-0.1000	355	-0.1000	0.23

Underlined values indicate minor health problems (particularly smaller and younger animals). Shaded values indicate a serious health risk. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure.

Sample Site Test Data for Kamas Valley District

Culinary

Id #	As	Ba	Cd	Cr	Cu	Fe	Mn	NO3-N	Pb	S	Se	EC umhos/cm	Zn	pH	Col	Ecoli	Hardness gpg
1062	-0.1000	0.2815	-0.1000	-0.1000	-0.1000	0.1315	-0.1000	1.1	-0.1000	7.04	-0.1000	1,043	-0.10	7.31	0	0	6.1
1063	-0.1000	0.1847	-0.1000	-0.1000	-0.1000	0.0521	-0.1000	1.0	-0.1000	6.04	-0.1000	741	0.07	7.22	0	0	4.9
1064	-0.1000	0.0725	-0.1000	-0.1000	-0.1000	0.0249	-0.1000	0.9	-0.1000	19.51	-0.1000	1,469	0.17	7.25	1	0	6.5
1065	-0.1000	0.1611	-0.1000	-0.1000	-0.1000	0.7758	1.9025	1.1	-0.1000	18.86	-0.1000	1,258	-0.10	7.21	0	0	6.4
1066	-0.1000	0.1043	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.3	-0.1000	7.72	-0.1000	616	-0.10	7.52	0	0	4.5
1067	-0.1000	0.1150	-0.1000	-0.1000	-0.1000	0.0206	-0.1000	1.3	-0.1000	7.59	-0.1000	653	0.11	7.34	0	0	4.7
1068	-0.1000	0.1036	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.4	-0.1000	8.23	-0.1000	651	0.08	7.38	1	0	4.8
1069	-0.1000	0.1450	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	0.9	-0.1000	4.31	-0.1000	557	-0.10	7.48	0	0	3.9
1070	-0.1000	0.2019	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.0	-0.1000	8.19	-0.1000	720	0.11	7.31	0	0	5.3
1071	-0.1000	0.2044	-0.1000	-0.1000	0.0768	-0.1000	-0.1000	1.5	-0.1000	6.12	-0.1000	729	0.07	7.32	0	0	4.9
1072	-0.1000	0.1901	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	0.8	-0.1000	4.46	-0.1000	766	0.50	7.34	0	0	5.7
1073	-0.1000	0.2078	-0.1000	-0.1000	0.0234	0.0292	-0.1000	1.0	-0.1000	5.89	-0.1000	688	0.12	7.06	1	0	4.5
1074	-0.1000	0.3320	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	0.9	-0.1000	15.28	-0.1000	928	0.33	7.04	0	0	6.8
1075	-0.1000	-0.1000	-0.1000	-0.1000	0.0303	-0.1000	-0.1000	1.1	-0.1000	5.23	-0.1000	1,316	-0.10	7.85	1	0	0.1
1076	-0.1000	0.0607	-0.1000	-0.1000	-0.1000	0.0269	-0.1000	1.5	-0.1000	3.70	-0.1000	468	-0.10	7.33	0	0	3.5
1077	-0.1000	0.0772	-0.1000	-0.1000	-0.1000	0.8319	0.0883	1.7	-0.1000	9.52	-0.1000	920	-0.10	7.17	0	0	6.7
1078	-0.1000	0.0629	-0.1000	-0.1000	-0.1000	0.0888	-0.1000	1.2	-0.1000	7.74	-0.1000	702	0.11	7.34	0	0	5.4
1079	-0.1000	0.0873	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.0	-0.1000	5.33	-0.1000	649	0.60	7.34	0	0	5.1
1080	-0.1000	0.0400	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.0	-0.1000	5.76	-0.1000	636	0.21	7.43	0	0	4.9
1081	-0.1000	0.1401	-0.1000	-0.1000	-0.1000	0.0505	0.0269	1.3	0.0104	7.28	-0.1000	1,022	0.41	7.36	0	0	6.8
1083	-0.1000	0.1197	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.3	-0.1000	6.11	-0.1000	573	-0.10	7.58	1	1	4.6
1084	-0.1000	0.1527	-0.1000	-0.1000	0.0315	0.0294	-0.1000	1.0	-0.1000	7.50	-0.1000	940	5.34	7.19	0	0	6.0
1085	-0.1000	0.0441	-0.1000	-0.1000	-0.1000	0.0509	-0.1000	1.1	-0.1000	6.31	-0.1000	620	0.13	7.50	0	0	5.0
1086	-0.1000	0.0363	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	0.6	-0.1000	5.72	-0.1000	600	-0.10	7.51	0	0	4.7
1087	-0.1000	0.0824	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.3	-0.1000	4.53	-0.1000	602	-0.10	7.48	0	0	4.3
1088	-0.1000	0.0532	-0.1000	-0.1000	-0.1000	1.8432	0.1435	3.2	-0.1000	28.58	-0.1000	832	0.29	7.01	1	0	5.5
1089	-0.1000	0.0531	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.0	-0.1000	4.80	-0.1000	690	0.23	7.29	1	0	5.4
1090	-0.1000	0.0591	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.1	-0.1000	6.26	-0.1000	600	0.19	7.49	1	0	4.3
1091	-0.1000	0.0938	-0.1000	-0.1000	-0.1000	0.0541	-0.1000	2.0	-0.1000	6.77	-0.1000	709	0.43	7.30	0	0	4.7
1092	-0.1000	0.1080	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	2.3	-0.1000	4.24	-0.1000	638	0.36	7.17	0	0	4.4
1093	-0.1000	0.1781	-0.1000	-0.1000	-0.1000	0.0349	-0.1000	1.6	-0.1000	7.44	-0.1000	965	0.09	7.21	1	1	6.3
1094	-0.1000	0.0590	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.4	-0.1000	5.15	-0.1000	542	0.07	7.35	0	0	3.6
1095	-0.1000	0.0456	-0.1000	-0.1000	0.2130	0.0278	-0.1000	2.1	-0.1000	4.67	-0.1000	295	0.11	7.37	0	0	2.0
1096	-0.1000	0.1291	-0.1000	-0.1000	-0.1000	0.0346	-0.1000	0.8	-0.1000	4.96	-0.1000	643	0.05	7.36	0	0	4.6
1097	-0.1000	0.1471	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.3	-0.1000	4.27	-0.1000	454	0.06	7.82	0	0	3.1
1148	-0.1000	0.1358	-0.1000	-0.1000	0.0644	0.8391	0.0341	1.7	-0.1000	18.62	-0.1000	551	0.09	6.28	0	0	3.1
1149	-0.1000	0.0804	-0.1000	-0.1000	-0.1000	0.0427	-0.1000	2.2	-0.1000	44.01	-0.1000	904	0.07	6.78	0	0	5.9

Underlined values exceed Secondary (aesthetic) standards. Shaded values exceed Primary (health) standards. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure. For Col and Ecoli 1 = present 0 = absent.

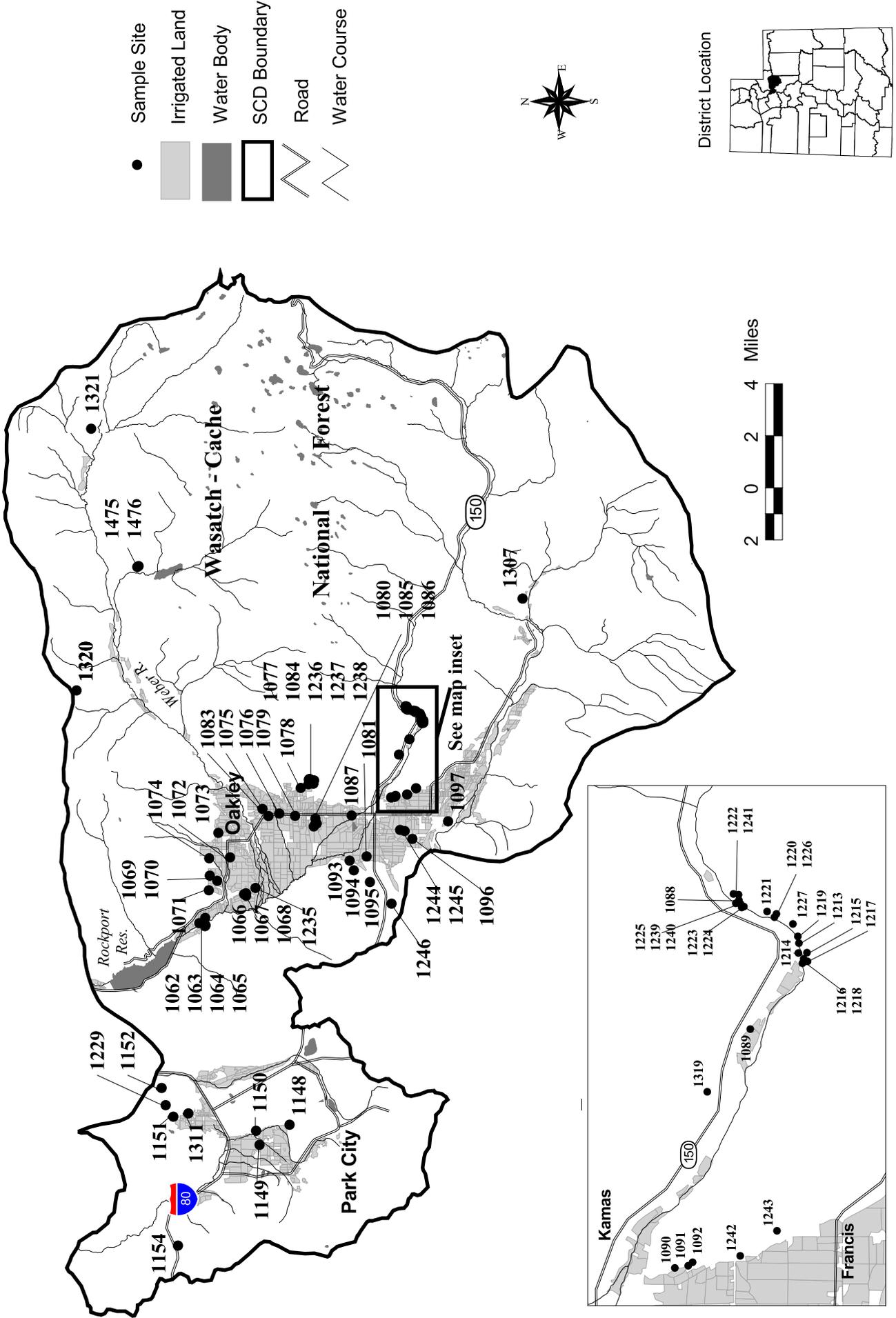
Sample Site Test Data for Kamas Valley District

Culinary

Id #	As	Ba	Cd	Cr	Cu	Fe	Mn	NO3-N	Pb	S	Se	EC umhos/cm	Zn	pH	Col	Ecoli	Hardness gpg
1150	-0.1000	0.0554	-0.1000	-0.1000	-0.1000	<u>0.7514</u>	0.0267	1.3	-0.1000	34.42	-0.1000	<u>910</u>	-0.10	7.68	0	0	3.4
1151	-0.1000	0.1926	-0.1000	-0.1000	-0.1000	0.0268	-0.1000	1.3	-0.1000	4.97	-0.1000	581	-0.10	6.62	0	0	3.4
1152	-0.1000	0.1229	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.7	-0.1000	2.96	-0.1000	475	-0.10	7.18	0	0	2.7
1154	-0.1000	<u>1.1528</u>	-0.1000	-0.1000	-0.1000	<u>0.7305</u>	0.0469	1.3	-0.1000	21.43	-0.1000	<u>4.000</u>	-0.10	<u>6.39</u>	0	0	26.4
1213	-0.1000	0.0777	-0.1000	-0.1000	0.0252	0.0518	-0.1000	0.1	-0.1000	4.24	-0.1000	648	0.39	7.85	<u>1</u>	0	4.8
1214	-0.1000	0.1639	-0.1000	-0.1000	-0.1000	0.0852	0.0362	0.5	-0.1000	13.86	-0.1000	<u>2.640</u>	0.32	7.65	<u>1</u>	0	8.7
1215	-0.1000	0.0833	-0.1000	-0.1000	-0.1000	0.1409	-0.1000	0.5	-0.1000	3.49	-0.1000	594	-0.10	7.99	0	0	4.5
1216	-0.1000	0.0555	-0.1000	-0.1000	-0.1000	0.1081	-0.1000	1.2	-0.1000	2.73	-0.1000	359	0.33	7.98	<u>1</u>	0	2.5
1217	-0.1000	0.0755	-0.1000	-0.1000	-0.1000	0.0473	-0.1000	4.6	-0.1000	4.47	-0.1000	666	0.16	8.11	0	0	5.1
1218	-0.1000	0.0709	-0.1000	-0.1000	-0.1000	0.0387	-0.1000	2.3	-0.1000	3.28	-0.1000	554	1.40	7.94	0	0	3.8
1219	-0.1000	0.0617	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	0.9	-0.1000	3.87	-0.1000	678	0.32	7.98	0	0	5.2
1220	-0.1000	0.0370	-0.1000	-0.1000	-0.1000	<u>1.0552</u>	<u>0.5932</u>	0.0	-0.1000	24.00	-0.1000	777	-0.10	7.71	0	0	5.0
1221	-0.1000	0.0406	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	0.1	-0.1000	6.01	-0.1000	600	-0.10	8.26	<u>1</u>	0	4.7
1222	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	<u>2.4123</u>	<u>0.3416</u>	0.0	-0.1000	46.16	-0.1000	<u>953</u>	1.63	7.95	0	0	6.0
1223	-0.1000	0.2257	-0.1000	-0.1000	-0.1000	<u>1.9144</u>	<u>0.3145</u>	0.1	-0.1000	13.17	-0.1000	<u>1.786</u>	0.34	8.06	<u>1</u>	0	8.3
1224	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	<u>0.3164</u>	<u>0.1924</u>	0.0	-0.1000	39.13	-0.1000	<u>953</u>	0.10	7.75	0	0	5.5
1225	-0.1000	0.0827	-0.1000	-0.1000	-0.1000	<u>0.1282</u>	<u>0.2664</u>	0.0	-0.1000	15.80	-0.1000	788	-0.10	7.86	0	0	5.0
1226	-0.1000	0.0621	-0.1000	-0.1000	0.0624	0.0531	0.0224	0.1	-0.1000	21.83	-0.1000	742	0.49	7.92	0	0	5.0
1227	-0.1000	0.1420	-0.1000	-0.1000	-0.1000	0.1323	-0.1000	0.0	-0.1000	4.81	-0.1000	731	0.20	7.93	0	0	5.7
1229	-0.1000	0.1352	-0.1000	-0.1000	-0.1000	0.0203	-0.1000	0.1	-0.1000	8.80	-0.1000	700	-0.10	7.36	0	0	4.0
1235	-0.1000	0.0492	-0.1000	-0.1000	-0.1000	<u>0.6028</u>	-0.1000	0.0	-0.1000	6.51	-0.1000	690	0.13	8.05	0	0	4.9
1236	-0.1000	0.0391	-0.1000	-0.1000	-0.1000	0.0289	-0.1000	0.0	-0.1000	7.72	-0.1000	738	0.27	7.90	<u>1</u>	0	5.7
1237	-0.1000	0.0387	-0.1000	-0.1000	-0.1000	0.1603	-0.1000	0.0	-0.1000	11.28	-0.1000	<u>930</u>	0.05	7.94	0	0	7.1
1238	-0.1000	0.0308	-0.1000	-0.1000	-0.1000	0.1091	-0.1000	0.0	-0.1000	5.49	-0.1000	623	0.06	<u>8.63</u>	<u>1</u>	<u>1</u>	5.0
1239	-0.1000	0.0342	-0.1000	-0.1000	-0.1000	0.2786	<u>0.2658</u>	0.0	-0.1000	18.57	-0.1000	<u>849</u>	0.04	7.76	0	0	5.2
1240	-0.1000	0.0266	-0.1000	-0.1000	-0.1000	<u>0.3111</u>	<u>0.2490</u>	0.0	-0.1000	21.41	-0.1000	<u>850</u>	0.06	7.80	0	0	5.1
1241	-0.1000	0.0321	-0.1000	-0.1000	-0.1000	<u>0.3937</u>	<u>0.3841</u>	0.0	-0.1000	17.68	-0.1000	702	0.05	7.51	0	0	4.9
1242	-0.1000	0.0960	-0.1000	-0.1000	0.0942	0.1745	-0.1000	0.8	-0.1000	5.25	-0.1000	603	-0.10	7.49	0	0	3.8
1243	-0.1000	0.1051	-0.1000	-0.1000	0.0752	-0.1000	-0.1000	1.2	-0.1000	4.74	-0.1000	583	0.10	7.86	0	0	4.1
1244	-0.1000	0.1225	-0.1000	-0.1000	-0.1000	0.2123	-0.1000	0.0	-0.1000	4.82	-0.1000	711	0.08	7.75	0	0	5.2
1245	-0.1000	0.1147	-0.1000	-0.1000	-0.1000	0.0639	0.0223	0.0	-0.1000	4.46	-0.1000	734	0.06	7.72	<u>1</u>	0	5.1
1246	-0.1000	0.0417	-0.1000	-0.1000	0.0216	0.1031	-0.1000	1.9	-0.1000	6.36	-0.1000	650	0.29	7.42	0	0	4.1
1307	-0.1000	0.0642	-0.1000	-0.1000	-0.1000	0.0736	-0.1000	0.7	-0.1000	3.21	-0.1000	433	-0.10	8.11	<u>1</u>	0	4.7
1311	-0.1000	0.1573	-0.1000	-0.1000	-0.1000	0.0272	-0.1000	0.8	-0.1000	4.44	-0.1000	523	0.54	8.28	0	0	5.0
1319	-0.1000	0.0601	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	0.4	-0.1000	3.15	-0.1000	394	0.06	8.11	<u>1</u>	0	4.3
1320	-0.1000	0.3897	-0.1000	-0.1000	-0.1000	0.0243	-0.1000	0.2	-0.1000	4.34	-0.1000	680	-0.10	7.41	0	0	8.6
1321	-0.1000	0.0423	-0.1000	-0.1000	-0.1000	0.0214	-0.1000	0.2	-0.1000	1.53	-0.1000	213	-0.10	8.49	0	0	2.3
1475	-0.1000	0.0406	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	0.2	-0.1000	6.71	-0.1000	368	-0.10	7.78	<u>1</u>	<u>1</u>	4.1
1476	-0.1000	0.0424	-0.1000	-0.1000	-0.1000	0.0423	-0.1000	0.1	-0.1000	6.66	-0.1000	355	0.23	7.63	<u>1</u>	0	4.1

Underlined values exceed Secondary (aesthetic) standards. Shaded values exceed Primary (health) standards. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure. For Col and Ecol 1 = present 0 = absent.

Map 10. Kamas Valley District



Summit District

The water in this area varies from soft to very hard, with gpg (grains per gallon) ranging from 1.2 to 17.7 with a mean of 6.9. Water temperatures range from 7.9 °C to 14.2 °C, with a mean of 11.74 °C. The pH for the area has a mean of 7.58 and ranges from 7.01 to 7.95.

Irrigation:

Salinity is a measurement of the concentration of ionic salts dissolved in water. It is measured as electrical conductivity (EC), in $\mu\text{mhos/cm}$. Higher conductivity values indicate higher concentrations of dissolved salts. Water high in dissolved salts increases osmotic pressures, making it difficult for plants to get water necessary for growth. Generally when EC exceeds 750 $\mu\text{mhos/cm}$, salt-sensitive plants begin to be affected. When EC exceeds 3,000 $\mu\text{mhos/cm}$, most plants would be severely injured.

Five samples have EC values greater than 750 $\mu\text{mhos/cm}$. Samples 1230 through 1235 exceed the salinity standard of 750. One sample – 1233, with a value 3,250 $\mu\text{mhos/cm}$ - exceeds the severe-injury level of 3,000 $\mu\text{mhos/cm}$, which affects most plants.

SAR measures how much sodium (Na) is in solution compared to calcium (Ca) and magnesium (Mg). Excessive sodium in the soil causes soil particles to repel each other. This destroys the structure of the soil, preventing air and water movement. SAR values greater than 3 mark the beginning of problems and values greater than 9 indicate severe problems. None of the water sampled in this district has elevated SAR values.

Bicarbonate (HCO_3) is an ion common to water solutions. It can be hazardous to plants in excessive amounts, especially when used in sprinkler irrigation. Bicarbonate also causes white deposits on plants and their fruits, which degrades their visual appeal. Bicarbonate also increases the effect of sodium when both are present. Special attention is needed when using water with excessive bicarbonate. With sensitive plants minor problems appear with bicarbonate concentrations in excess of 1.5 meq/l and severe problems appear when it exceeds 8.5 meq/l.

All of the samples have high bicarbonate except for 1473. High bicarbonate levels are common for water in Utah.

Chlorine, found in the form of chloride (Cl^-), can damage sensitive plants at concentrations above 145 ppm and concentrations exceeding 355 ppm can cause severe damage to almost all plants. Damage increases under sprinkler irrigation and is more severe in windy conditions. Samples 1230 and 1233 have elevated chlorine. Sample 1233 has chlorine at 449.8 ppm, which will most likely cause injury when used with any type of irrigation.

Sample 1473 has elevated zinc (8.16 ppm) that can cause growth problems in plants at concentrations greater than 2.0 ppm in water. High concentrations of zinc decrease root growth and leaf expansion as well as inhibit the uptake of iron and phosphorus.

No other elements were found in concentrations harmful to plants.

Livestock:

Samples 1153, 1230, 1231, 1233, and 1234 have elevated molybdenum (Mo). Livestock eating plants irrigated with water that has molybdenum concentration greater than 0.01 ppm may be harmed. High concentrations of molybdenum interfere with copper nutrition in livestock.

No other water quality standards for livestock were exceeded.

Culinary:

Sample 1233 has high sulfur (S). Sulfate is a soluble form of sulfur that can cause flavor problems in drinking water if there is more than 83 ppm sulfur. Bacteria in the water metabolize sulfur and produce hydrogen sulfide gas (rotten egg gas). The bacteria that produce this compound can live in plumbing fixtures and even hot water heaters. It is not uncommon to get strong odors when the hot water is turned on in areas where there is high sulfate. Generally, people cannot tolerate the odor from this gas. Even if the gas is not present, high sulfate concentrations can cause diarrhea in people not used to drinking it.

Well 1473 exceeded the primary health standard for zinc (Zn) and should not be used for drinking.

The most serious problem with drinking water from private water systems is bacterial contamination. Because disease-causing organisms are rare, non-parasitic coliform bacteria that are found in association with parasitic bacteria are used as indicators to assess whether water could be contaminated with harmful bacteria. Coliform bacteria can occur naturally in the soil, whereas *E. coli*, a type of coliform, develops only in the digestive systems of mammals. The presence of coliform bacteria indicates that surface water, soil, or other contaminants are entering the well. The presence of *E. coli* in well water, on the other hand, indicates that mammalian fecal material is entering the well. Bacterial contamination is commonly the result of well construction problems. Contamination may result from inadequate capping, a leaking well casing, improper grouting, or lack of a casing. *E. coli* contamination can come from defective septic systems, manure operations or septic systems too close to wells, leaky sewer systems, or shallow water tables.

No samples from this district were found to have bacterial contamination.

Sample Site Test Data for Summit District

General

Id #	Be	Ca	K	Li	Mg	Na	P	pH	°C	TDS
1153	-0.1000	55.34	2.35	-0.1000	14.42	23.77	-0.10	7.01	10.5	403
1230	-0.1000	109.92	3.03	-0.1000	38.28	41.36	-0.10	7.89	14.2	968
1231	-0.1000	114.97	2.17	-0.1000	18.87	27.93	-0.10	7.59	12.8	671
1232	-0.1000	72.97	1.42	-0.1000	21.10	18.19	-0.10	7.79	9.6	470
1233	-0.1000	206.90	4.48	-0.1000	94.92	122.58	-0.10	7.40	13.9	1950
1234	-0.1000	83.61	1.94	-0.1000	29.49	38.66	-0.10	7.95	14.1	655
1473	-0.1000	17.25	1.16	-0.1000	3.52	9.12	-0.10	7.30	7.9	99
1474	-0.1000	54.44	0.84	-0.1000	12.96	4.04	-0.10	7.68	10.9	190

Values of -0.1 are below detection limits of testing procedure

Irrigation

Id #	Al	B	Cl	CO3 meq/l	Cu	Fe	HCO3 meq/l	Mn	Se	Zn	SAR	EC umhos/cm
1153	-0.1000	-0.10	19.99	-0.10	-0.1000	0.0261	3.98	-0.1000	-0.1000	0.09	0.7	671
1230	-0.1000	-0.10	211.05	-0.10	-0.1000	-0.1000	4.13	-0.1000	-0.1000	-0.10	0.9	1.613
1231	-0.1000	-0.10	48.72	-0.10	-0.1000	-0.1000	5.94	-0.1000	-0.1000	0.04	0.6	1.118
1232	-0.1000	-0.10	21.97	-0.10	-0.1000	-0.1000	4.50	-0.1000	-0.1000	-0.10	0.5	783
1233	-0.1000	0.12	449.81	-0.10	-0.1000	0.0739	4.91	-0.1000	-0.1000	-0.10	1.8	3.250
1234	-0.1000	-0.10	67.36	-0.10	-0.1000	0.1480	4.87	-0.1000	-0.1000	0.29	0.9	1.092
1473	-0.1000	-0.10	12.06	-0.10	-0.1000	0.1515	1.05	0.0258	-0.1000	8.16	0.5	165
1474	-0.1000	-0.10	3.82	-0.10	0.0216	0.0305	3.16	-0.1000	-0.1000	0.09	0.1	317

Underlined values exceed irrigation standards. Shaded values indicate severe risks. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure.

Sample Site Test Data for Summit District

Livestock

Id #	Al	As	B	Cd	Co	Cr	Mo	Ni	Pb	S	Se	EC umhos/cm	V	Zn
1153	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0250</u>	-0.1000	-0.1000	3.36	-0.1000	671	-0.1000	0.09
1230	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0424</u>	-0.1000	-0.1000	15.38	-0.1000	1,613	-0.1000	-0.10
1231	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0184</u>	-0.1000	-0.1000	10.08	-0.1000	1,118	-0.1000	0.04
1232	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	6.84	-0.1000	783	-0.1000	-0.10
1233	-0.1000	-0.1000	0.12	-0.1000	-0.1000	-0.1000	<u>0.0440</u>	-0.1000	-0.1000	108.20	-0.1000	3,250	-0.1000	-0.10
1234	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0171</u>	-0.1000	-0.1000	12.62	-0.1000	1,092	-0.1000	0.29
1473	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	3.62	-0.1000	165	-0.1000	8.16
1474	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	2.63	-0.1000	317	-0.1000	0.09

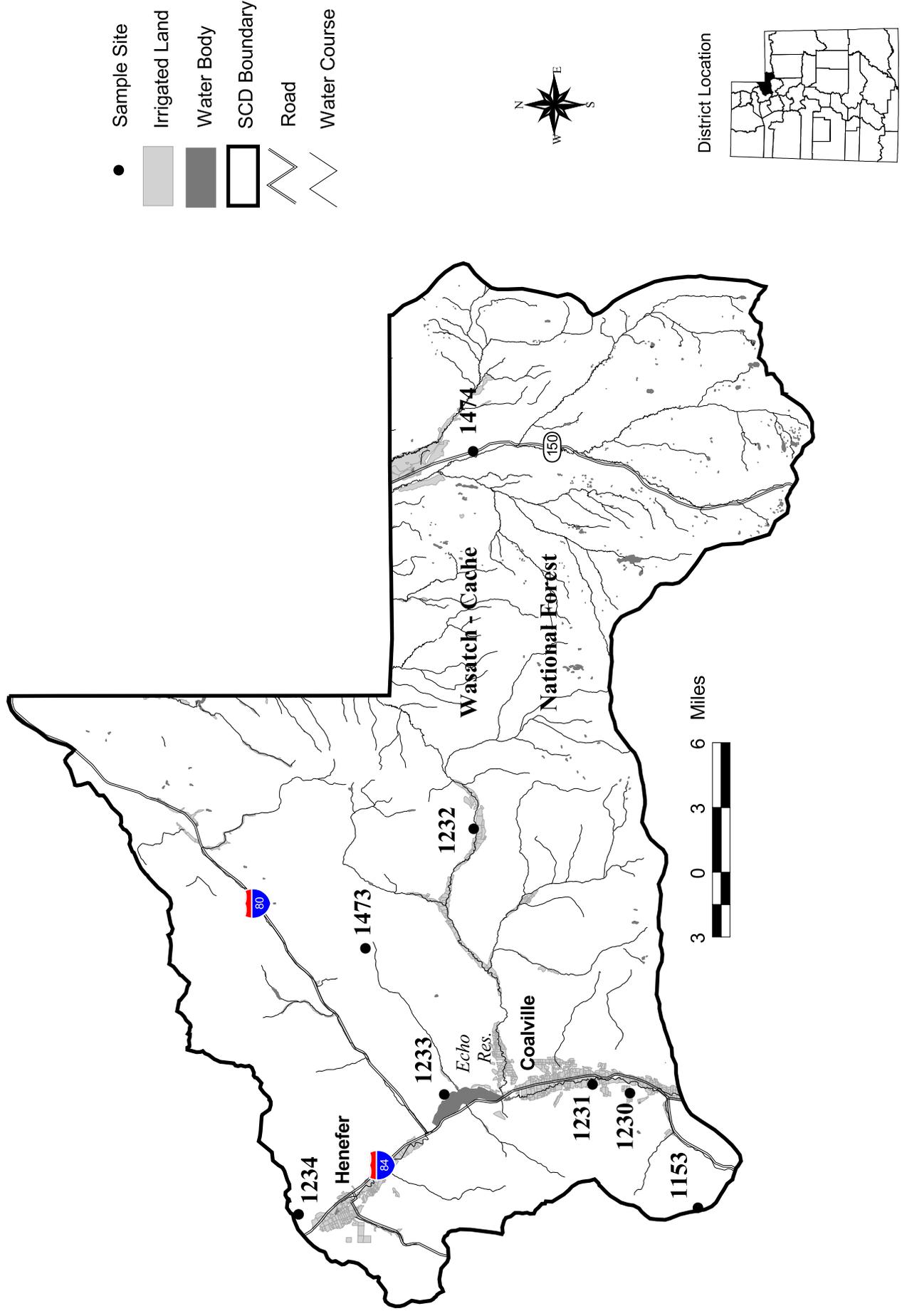
Underlined values indicate minor health problems (particularly smaller and younger animals). Shaded values indicate a serious health risk. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure.

Culinary

Id #	As	Ba	Cd	Cr	Cu	Fe	Mn	NO3-N	Pb	S	Se	EC umhos/cm	Zn	pH	Col	Ecoli	Hardness gpg
1153	-0.1000	0.1099	-0.1000	-0.1000	-0.1000	0.0261	-0.1000	1.2	-0.1000	3.36	-0.1000	671	0.09	7.01	0	0	4.1
1230	-0.1000	0.2271	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	4.3	-0.1000	15.38	-0.1000	<u>1,613</u>	-0.10	7.89	0	0	8.7
1231	-0.1000	0.2059	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	5.0	-0.1000	10.08	-0.1000	<u>1,118</u>	0.04	7.59	0	0	7.8
1232	-0.1000	0.2149	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	0.0	-0.1000	6.84	-0.1000	783	-0.10	7.79	0	0	5.5
1233	-0.1000	0.0400	-0.1000	-0.1000	-0.1000	0.0739	-0.1000	9.8	-0.1000	<u>108.20</u>	-0.1000	<u>3,250</u>	-0.10	7.40	0	0	17.7
1234	-0.1000	0.3670	-0.1000	-0.1000	-0.1000	0.1480	-0.1000	7.1	-0.1000	12.62	-0.1000	<u>1,092</u>	0.29	7.95	0	0	6.6
1473	-0.1000	0.2676	-0.1000	-0.1000	-0.1000	0.1515	0.0258	0.5	-0.1000	3.62	-0.1000	165	<u>8.16</u>	7.30	0	0	1.2
1474	-0.1000	0.3486	-0.1000	-0.1000	-0.1000	0.0305	-0.1000	0.6	-0.1000	2.63	-0.1000	317	0.09	7.68	0	0	3.9

detection limits of testing procedure. For Col and Ecoli 1 = present 0 = absent.

Map 11. Summit District



Timp-Nebo District

The water in this area varies from soft to hard, with gpg (grains per gallon) ranging from 2.5 to 7.3 with a mean of 4.7. Water temperatures range from 10.7 °C to 19.3 °C, with a mean of 16.1 °C. The pH for the area has a mean of 8.36 and ranges from 8.0 to 8.77. Samples 1293 through 1296, 1299, and 1435 have high pH and may cause alkalinity problems such as mineral buildup.

Irrigation:

Salinity is a measurement of the concentration of ionic salts dissolved in water. It is measured as electrical conductivity (EC), in $\mu\text{mhos/cm}$. Higher conductivity values indicate higher concentrations of dissolved salts. Water high in dissolved salts increases osmotic pressures, making it difficult for plants to get water necessary for growth. Generally when EC exceeds 750 $\mu\text{mhos/cm}$, salt-sensitive plants begin to be affected. When EC exceeds 3,000 $\mu\text{mhos/cm}$, most plants would be severely injured.

Sample 1552, at 2,290 $\mu\text{mhos/cm}$ exceeds the salinity standard of 750 $\mu\text{mhos/cm}$. None of the samples exceeded the severe-injury level of 3,000 $\mu\text{mhos/cm}$, which would affect most plants.

SAR measures how much sodium (Na) is in solution compared to calcium (Ca) and magnesium (Mg). Excessive sodium in the soil causes soil particles to repel each other. This destroys the structure of the soil, preventing air and water movement. SAR values greater than 3 mark the beginning of problems and values greater than 9 indicate severe problems. Sample 1552 has elevated SAR.

Bicarbonate (HCO_3) is an ion common to water solutions. It can be hazardous to plants in excessive amounts, especially when used in sprinkler irrigation. Bicarbonate also causes white deposits on plants and their fruits, which degrades their visual appeal. Bicarbonate also increases the effect of sodium when both are present. Special attention is needed when using water with excessive bicarbonate. With sensitive plants minor problems appear with bicarbonate concentrations in excess of 1.5 meq/l and severe problems appear when it exceeds 8.5 meq/l. All of the samples have high bicarbonate, which is common for water in Utah.

Sample 1288 has elevated zinc, at 5.34 ppm, that can cause growth problems in plants at concentrations greater than 2.0 ppm in water. High concentrations of zinc decrease root growth and leaf expansion as well as inhibit the uptake of iron and phosphorus.

No other elements were found in concentrations harmful to plants.

Livestock:

Samples 1291, 1293 through 1301, and 1552 have elevated molybdenum (Mo). Livestock eating plants irrigated with water that has molybdenum concentration greater than 0.01 ppm may be harmed. High concentrations of molybdenum interfere with copper nutrition in livestock.

No other water quality standards for livestock were exceeded.

Culinary:

Sample 1552 exceeded the EPA aesthetic standard of 833 $\mu\text{mhos/cm}$ for EC. At this level the water may be off-flavored but it is not a health problem until the EC level reaches 3,333.

Three elements, iron (Fe), manganese (Mn), and sulfur (S) were found to exceed the aesthetic drinking water quality standard. Samples 1293, 1295, and 1552 have high iron. This can cause discoloration of plumbing fixtures and promote the growth of iron bacteria, which stain anything they contact. Again, this is an aesthetic issue, not a health concern.

Eleven samples, including 1292 through 1298, 1300, 1301, 1435, and 1552, have high manganese concentrations, above the EPA aesthetic standard of 0.05 ppm. Water with high concentrations may cause discoloration of plumbing fixtures and have poor flavor.

Sample 1552 also has high sulfur. Sulfate is a soluble form of sulfur that can cause flavor problems in drinking water if there is more than 83 ppm sulfur. Bacteria in the water metabolize sulfur and produce hydrogen sulfide gas (rotten egg gas). The bacteria that produce this compound can live in plumbing fixtures and even hot water heaters. It is not uncommon to get strong odors when the hot water is turned on in areas where there is high sulfate. Generally, people cannot tolerate the odor from this gas. Even if the gas is not present, high sulfate concentrations can cause diarrhea in people not used to drinking it.

The most serious problem with drinking water from private water systems is bacterial contamination. Because disease-causing organisms are rare, non-parasitic coliform bacteria that are found in association with parasitic bacteria are used as indicators to assess whether water could be contaminated with harmful bacteria. Coliform bacteria can occur naturally in the soil, whereas *E. coli*, a type of coliform, develops only in the digestive systems of mammals. The presence of coliform bacteria indicates that surface water, soil, or other contaminants are entering the well. The presence of *E. coli* in well water, on the other hand, indicates that mammalian fecal material is entering the well. Bacterial contamination is commonly the result of well construction problems. Contamination may result from inadequate capping, a leaking well casing, improper grouting, or lack of a casing. *E. coli* contamination can come from defective septic systems, manure operations or septic systems too close to wells, leaky sewer systems, or shallow water tables.

Samples 1288, 1289, 1292 through 1294, 1298, 1299, 1301, 1401, 1402, and 1552 are contaminated with coliform bacteria. Wells from which these samples were collected should be inspected carefully to determine the source of contamination and should not be used for culinary purposes until the problem is corrected.

Sample Site Test Data for Timp-Nebo District

General

Id #	Be	Ca	K	Li	Mg	Na	P	pH	°C	TDS
1288	-0.1000	69.55	1.31	-0.1000	16.62	7.88	-0.10	8.46	16.7	283
1289	-0.1000	67.29	1.53	-0.1000	16.36	8.04	-0.10	8.11	16.0	280
1290	-0.1000	66.28	1.34	-0.1000	15.50	7.88	-0.10	8.19	10.7	268
1291	-0.1000	57.23	2.66	-0.1000	25.67	9.92	-0.10	8.27	19.3	292
1292	-0.1000	57.05	2.09	-0.1000	23.29	10.97	-0.10	8.24	18.8	287
1293	-0.1000	30.35	7.52	-0.1000	26.40	18.62	-0.10	8.51	17.5	251
1294	-0.1000	32.53	7.79	-0.1000	22.51	17.41	-0.10	8.55	17.3	246
1295	-0.1000	34.80	8.98	-0.1000	23.20	16.59	-0.10	8.52	17.0	254
1296	-0.1000	32.29	7.28	-0.1000	21.99	24.90	-0.10	8.63	18.3	265
1297	-0.1000	51.49	4.06	-0.1000	21.16	14.75	-0.10	8.50	18.7	271
1298	-0.1000	35.83	8.16	-0.1000	17.33	24.88	-0.10	8.40	18.0	249
1299	-0.1000	30.57	3.34	-0.1000	12.43	32.01	-0.10	8.66	16.4	221
1300	-0.1000	52.56	4.46	-0.1000	25.78	21.92	-0.10	8.39	16.7	317
1301	-0.1000	51.69	3.32	-0.1000	22.86	17.20	-0.10	8.31	17.3	295
1401	-0.1000	66.95	7.13	-0.1000	11.48	15.20	-0.10	8.38	15.7	293
1402	-0.1000	69.48	5.25	-0.1000	22.49	44.34	-0.10	8.22	12.0	411
1403	-0.1000	74.97	5.55	-0.1000	23.84	43.50	-0.10	8.19	11.8	407
1435	-0.1000	54.64	3.84	-0.1000	25.62	15.36	0.18	8.77	15.7	286
1436	-0.1000	66.24	2.29	-0.1000	20.34	19.07	-0.10	8.17	16.0	293
1437	-0.1000	47.43	2.63	-0.1000	23.93	11.97	-0.10	8.50	18.2	257
1438	-0.1000	81.01	3.41	-0.1000	31.24	17.70	-0.10	8.20	15.1	376
1439	-0.1000	79.68	4.52	-0.1000	31.39	11.38	-0.10	8.28	15.4	361
1440	-0.1000	92.11	8.11	-0.1000	33.18	17.12	-0.10	8.19	15.6	406
1441	-0.1000	71.47	3.72	-0.1000	22.91	17.94	0.15	8.45	14.5	314
1552	-0.1000	38.53	20.13	0.1839	79.75	180.45	-0.10	8.00	13.0	1374

Values of -0.1 are below detection limits of testing procedure

Sample Site Test Data for Timp-Nebo District

Irrigation

Id #	Al	B	Cl	CO3 meq/l	Cu	Fe	HCO3 meq/l	Mn	Se	Zn	SAR	EC umhos/cm
1288	-0.1000	-0.10	-0.10	-0.10	-0.1000	0.0374	<u>4.04</u>	-0.1000	-0.1000	<u>2.84</u>	0.2	471
1289	-0.1000	-0.10	4.29	-0.10	-0.1000	-0.1000	<u>3.88</u>	-0.1000	-0.1000	0.31	0.2	467
1290	-0.1000	-0.10	6.99	-0.10	-0.1000	-0.1000	<u>3.78</u>	-0.1000	-0.1000	-0.10	0.2	446
1291	-0.1000	-0.10	10.20	-0.10	-0.1000	-0.1000	<u>4.44</u>	-0.1000	-0.1000	-0.10	0.3	486
1292	-0.1000	-0.10	13.81	-0.10	-0.1000	0.1073	<u>4.33</u>	0.0659	-0.1000	-0.10	0.3	478
1293	-0.1000	-0.10	9.27	-0.10	-0.1000	0.3307	<u>3.74</u>	0.0502	-0.1000	-0.10	0.6	419
1294	-0.1000	0.07	11.95	-0.10	-0.1000	0.0949	<u>3.49</u>	0.0614	-0.1000	-0.10	0.6	410
1295	-0.1000	-0.10	14.44	-0.10	-0.1000	0.7047	<u>3.32</u>	0.0668	-0.1000	-0.10	0.5	424
1296	-0.1000	0.08	28.38	-0.10	-0.1000	0.0791	<u>3.26</u>	0.0547	-0.1000	-0.10	0.8	441
1297	-0.1000	-0.10	11.35	-0.10	-0.1000	0.0783	<u>4.35</u>	0.0771	-0.1000	-0.10	0.4	452
1298	-0.1000	0.09	9.05	-0.10	-0.1000	0.2129	<u>4.35</u>	0.0942	-0.1000	-0.10	0.9	415
1299	-0.1000	0.09	8.20	-0.10	-0.1000	0.1964	<u>3.78</u>	0.0487	-0.1000	-0.10	1.2	369
1300	-0.1000	0.07	14.36	-0.10	-0.1000	0.0821	<u>5.20</u>	0.1025	-0.1000	-0.10	0.6	528
1301	-0.1000	-0.10	12.63	-0.10	-0.1000	0.0838	<u>4.75</u>	0.0970	-0.1000	-0.10	0.5	491
1401	-0.1000	-0.10	28.77	-0.10	-0.1000	-0.1000	<u>3.71</u>	-0.1000	-0.1000	-0.10	0.5	489
1402	-0.1000	0.10	71.84	-0.10	-0.1000	0.0243	<u>4.13</u>	-0.1000	-0.1000	0.08	1.2	685
1403	-0.1000	0.09	74.56	-0.10	-0.1000	0.0686	<u>3.96</u>	-0.1000	-0.1000	-0.10	1.1	678
1435	-0.1000	-0.10	11.51	-0.10	-0.1000	0.2646	<u>3.94</u>	0.0865	-0.1000	-0.10	0.4	476
1436	-0.1000	-0.10	18.04	-0.10	0.0411	-0.1000	<u>4.46</u>	-0.1000	-0.1000	0.18	0.5	489
1437	-0.1000	-0.10	26.05	-0.10	-0.1000	0.1237	<u>3.94</u>	-0.1000	-0.1000	0.60	0.4	429
1438	-0.1000	-0.10	17.86	-0.10	-0.1000	-0.1000	<u>5.74</u>	-0.1000	-0.1000	-0.10	0.4	626
1439	-0.1000	-0.10	18.73	-0.10	-0.1000	0.0563	<u>5.32</u>	-0.1000	-0.1000	1.43	0.3	601
1440	-0.1000	-0.10	18.73	-0.10	-0.1000	0.0258	<u>5.43</u>	-0.1000	-0.1000	0.05	0.4	677
1441	-0.1000	-0.10	16.35	-0.10	-0.1000	0.0646	<u>3.90</u>	0.0309	-0.1000	0.06	0.5	524
1552	0.0687	0.59	137.73	-0.10	-0.1000	0.3039	<u>6.23</u>	0.0637	-0.1000	0.06	<u>3.8</u>	<u>2,290</u>

Underlined values exceed irrigation standards. Shaded values indicate severe risks. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure.

Sample Site Test Data for Timp-Nebo District

Livestock

Id #	Al	As	B	Cd	Co	Cr	Mo	Ni	Pb	S	Se	EC umhos/cm	V	Zn
1288	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	14.73	-0.1000	471	-0.1000	2.84
1289	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	14.78	-0.1000	467	-0.1000	0.31
1290	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	13.87	-0.1000	446	-0.1000	-0.10
1291	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	<u>0.0108</u>	-0.1000	-0.1000	9.68	-0.1000	486	-0.1000	-0.10
1292	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	8.32	-0.1000	478	-0.1000	-0.10
1293	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	<u>0.0290</u>	-0.1000	-0.1000	9.97	-0.1000	419	-0.1000	-0.10
1294	-0.1000	-0.1000	0.0726	-0.1000	-0.1000	-0.1000	<u>0.0419</u>	-0.1000	-0.1000	10.10	-0.1000	410	-0.1000	-0.10
1295	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	<u>0.0357</u>	-0.1000	-0.1000	12.52	-0.1000	424	-0.1000	-0.10
1296	-0.1000	-0.1000	0.0793	-0.1000	-0.1000	-0.1000	<u>0.0605</u>	-0.1000	-0.1000	9.19	-0.1000	441	-0.1000	-0.10
1297	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	<u>0.0182</u>	-0.1000	-0.1000	6.77	-0.1000	452	-0.1000	-0.10
1298	-0.1000	-0.1000	0.0932	-0.1000	-0.1000	-0.1000	<u>0.0231</u>	-0.1000	-0.1000	1.35	-0.1000	415	-0.1000	-0.10
1299	-0.1000	-0.1000	0.0921	-0.1000	-0.1000	-0.1000	<u>0.0206</u>	-0.1000	-0.1000	0.85	-0.1000	369	-0.1000	-0.10
1300	-0.1000	-0.1000	0.0723	-0.1000	-0.1000	-0.1000	<u>0.0144</u>	-0.1000	-0.1000	3.97	-0.1000	528	-0.1000	-0.10
1301	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	<u>0.0114</u>	-0.1000	-0.1000	4.96	-0.1000	491	-0.1000	-0.10
1401	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	5.13	-0.1000	489	-0.1000	-0.10
1402	-0.1000	-0.1000	0.1007	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	11.67	-0.1000	685	-0.1000	0.08
1403	-0.1000	-0.1000	0.0894	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	12.45	-0.1000	678	-0.1000	-0.10
1435	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	11.55	-0.1000	476	-0.1000	-0.10
1436	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	7.54	-0.1000	489	-0.1000	0.18
1437	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	5.76	-0.1000	429	-0.1000	0.60
1438	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	14.43	-0.1000	626	-0.1000	-0.10
1439	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	14.35	-0.1000	601	-0.1000	1.43
1440	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	19.30	-0.1000	677	-0.1000	0.05
1441	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	20.54	-0.1000	524	-0.1000	0.06
1552	0.0687	-0.1000	0.5916	-0.1000	-0.1000	-0.1000	<u>0.0540</u>	-0.1000	-0.1000	105.04	-0.1000	2,290	-0.1000	0.06

Underlined values indicate minor health problems (particularly smaller and younger animals). Shaded values indicate a serious health risk. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure.

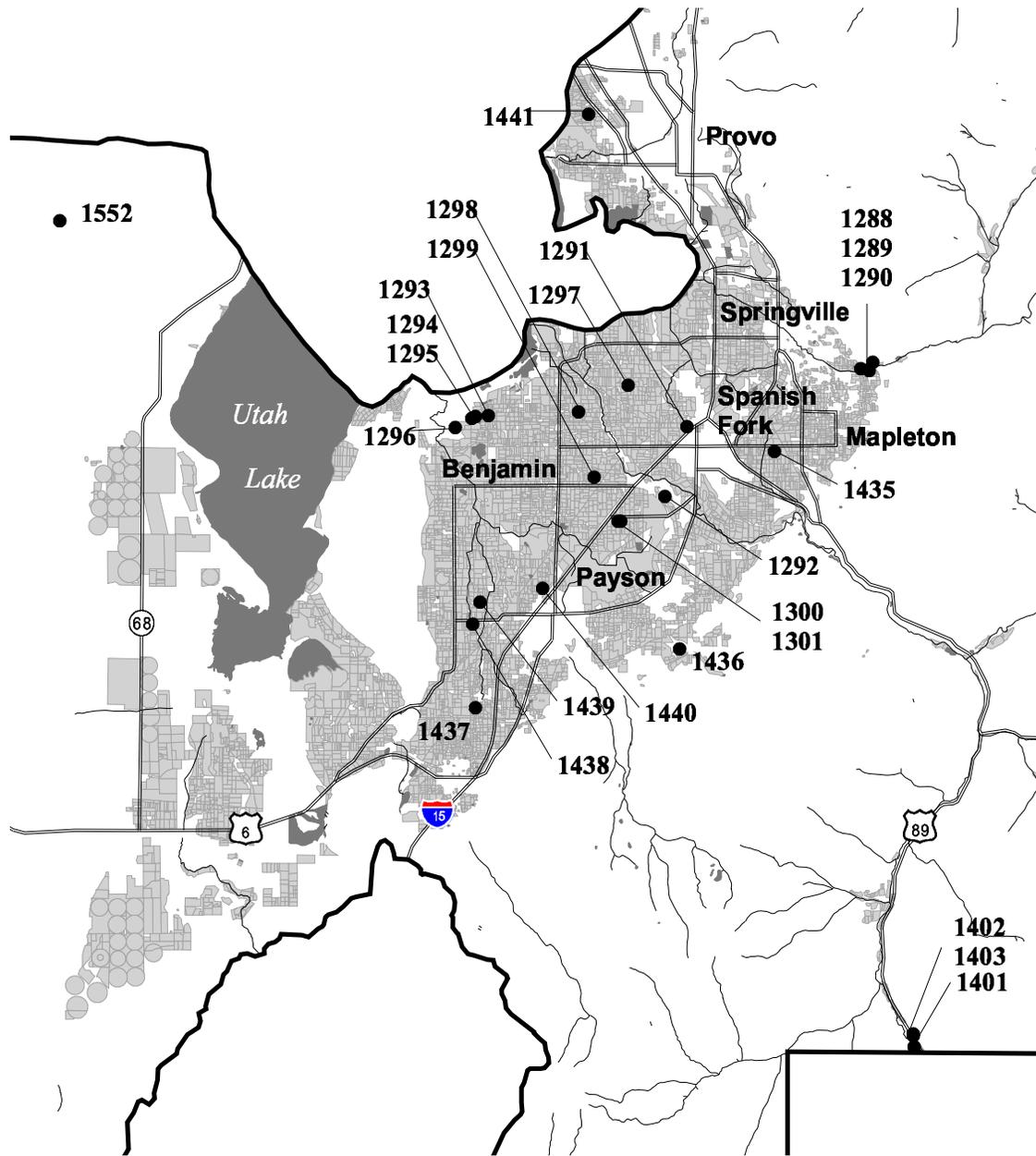
Sample Site Test Data for Timp-Nebo District

Culinary

Id #	As	Ba	Cd	Cr	Cu	Fe	Mn	NO3-N	Pb	S	Se	EC umhos/cm	Zn	pH	Col	Ecoli	Hardness gpg
1288	-0.1000	0.0907	-0.1000	-0.1000	-0.1000	0.0374	-0.1000	0.1	-0.1000	14.73	-0.1000	471	2.84	8.46	1	0	5.0
1289	-0.1000	0.0946	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	0.7	-0.1000	14.78	-0.1000	467	0.31	8.11	1	0	4.9
1290	-0.1000	0.0973	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	0.2	-0.1000	13.87	-0.1000	446	-0.10	8.19	0	0	4.8
1291	-0.1000	0.1759	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	0.4	-0.1000	9.68	-0.1000	486	-0.10	8.27	0	0	4.8
1292	-0.1000	0.2065	-0.1000	-0.1000	-0.1000	0.1073	<u>0.0659</u>	-0.1	-0.1000	8.32	-0.1000	478	-0.10	8.24	1	0	4.7
1293	-0.1000	0.1245	-0.1000	-0.1000	-0.1000	<u>0.3307</u>	<u>0.0502</u>	-0.1	-0.1000	9.97	-0.1000	419	-0.10	<u>8.51</u>	1	0	3.3
1294	-0.1000	0.1840	-0.1000	-0.1000	-0.1000	0.0949	<u>0.0614</u>	-0.1	-0.1000	10.10	-0.1000	410	-0.10	<u>8.55</u>	1	0	3.2
1295	-0.1000	0.1378	-0.1000	-0.1000	-0.1000	<u>0.7047</u>	<u>0.0668</u>	-0.1	-0.1000	12.52	-0.1000	424	-0.10	<u>8.52</u>	0	0	3.4
1296	-0.1000	0.1638	-0.1000	-0.1000	-0.1000	0.0791	<u>0.0547</u>	-0.1	-0.1000	9.19	-0.1000	441	-0.10	<u>8.63</u>	0	0	3.2
1297	-0.1000	0.2392	-0.1000	-0.1000	-0.1000	0.0783	<u>0.0771</u>	0.2	-0.1000	6.77	-0.1000	452	-0.10	8.50	0	0	4.2
1298	-0.1000	0.5820	-0.1000	-0.1000	-0.1000	0.2129	<u>0.0942</u>	-0.1	-0.1000	1.35	-0.1000	415	-0.10	8.40	1	0	3.1
1299	-0.1000	0.2239	-0.1000	-0.1000	-0.1000	0.1964	0.0487	-0.1	-0.1000	0.85	-0.1000	369	-0.10	<u>8.66</u>	1	0	2.5
1300	-0.1000	0.5287	-0.1000	-0.1000	-0.1000	0.0821	<u>0.1025</u>	-0.1	-0.1000	3.97	-0.1000	528	-0.10	8.39	0	0	4.6
1301	-0.1000	0.4293	-0.1000	-0.1000	-0.1000	0.0838	<u>0.0970</u>	-0.1	-0.1000	4.96	-0.1000	491	-0.10	8.31	1	0	4.4
1401	-0.1000	0.1560	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	0.6	-0.1000	5.13	-0.1000	489	-0.10	8.38	1	0	4.6
1402	-0.1000	0.2886	-0.1000	-0.1000	-0.1000	0.0243	-0.1000	2.4	-0.1000	11.67	-0.1000	685	0.08	8.22	1	0	5.4
1403	-0.1000	0.2968	-0.1000	-0.1000	-0.1000	0.0686	-0.1000	2.1	-0.1000	12.45	-0.1000	678	-0.10	8.19	0	0	5.8
1435	-0.1000	0.1966	-0.1000	-0.1000	-0.1000	0.2646	<u>0.0865</u>	0.1	-0.1000	11.55	-0.1000	476	-0.10	<u>8.77</u>	0	0	4.7
1436	-0.1000	0.1099	-0.1000	-0.1000	0.0411	-0.1000	-0.1000	1.9	-0.1000	7.54	-0.1000	489	0.18	8.17	0	0	5.1
1437	-0.1000	0.1881	-0.1000	-0.1000	-0.1000	0.1237	-0.1000	1.5	-0.1000	5.76	-0.1000	429	0.60	8.50	0	0	4.2
1438	-0.1000	0.1446	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	5.0	-0.1000	14.43	-0.1000	626	-0.10	8.20	0	0	6.6
1439	-0.1000	0.1524	-0.1000	-0.1000	-0.1000	0.0563	-0.1000	5.6	-0.1000	14.35	-0.1000	601	1.43	8.28	0	0	6.5
1440	-0.1000	0.2059	-0.1000	-0.1000	-0.1000	0.0258	-0.1000	4.9	-0.1000	19.30	-0.1000	677	0.05	8.19	0	0	7.3
1441	-0.1000	0.1056	-0.1000	-0.1000	-0.1000	0.0646	0.0309	0.3	-0.1000	20.54	-0.1000	524	0.06	8.45	0	0	5.5
1552	-0.1000	0.0324	-0.1000	-0.1000	-0.1000	<u>0.3039</u>	<u>0.0637</u>	0.0	-0.1000	<u>105.04</u>	-0.1000	<u>2,290</u>	0.06	8.00	1	0	6.9

Underlined values exceed Secondary (aesthetic) standards. Shaded values exceed Primary (health) standards. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure. For Col and Ecoli 1 = present 0 =absent.

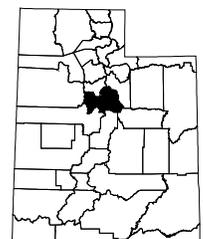
Map 12. Timp-Nebo District



- Sample Site
- Irrigated Land
- Water Body
- SCD Boundary
- ⚡ Road
- ⚡ Water Course



District Location



Wasatch District

The water in this area varies from soft to moderate, with gpg (grains per gallon) ranging from 0.7 to 5.9 with a mean of 3.99. Water temperatures range from 6.0 °C to 17.4 °C, with a mean of 13.2 °C. The pH for the area has a mean of 7.61 and ranges from 6.77 to 8.75. Sample 1314 has high pH and may cause alkalinity problems such as mineral buildup.

Irrigation:

Salinity is a measurement of the concentration of ionic salts dissolved in water. It is measured as electrical conductivity (EC), in $\mu\text{mhos/cm}$. Higher conductivity values indicate higher concentrations of dissolved salts. Water high in dissolved salts increases osmotic pressures, making it difficult for plants to get water necessary for growth. Generally when EC exceeds 750 $\mu\text{mhos/cm}$, salt-sensitive plants begin to be affected. When EC exceeds 3,000 $\mu\text{mhos/cm}$, most plants would be severely injured. No samples in this district exceed the 750 $\mu\text{mhos/cm}$ standard.

SAR measures how much sodium (Na) is in solution compared to calcium (Ca) and magnesium (Mg). Excessive sodium in the soil causes soil particles to repel each other. This destroys the structure of the soil, preventing air and water movement. SAR values greater than 3 mark the beginning of problems and values greater than 9 indicate severe problems. None of the water sampled in this district has elevated SAR values.

Bicarbonate (HCO_3) is an ion common to water solutions. It can be hazardous to plants in excessive amounts, especially when used in sprinkler irrigation. Bicarbonate also causes white deposits on plants and their fruits, which degrades their visual appeal. Bicarbonate also increases the effect of sodium when both are present. Special attention is needed when using water with excessive bicarbonate. With sensitive plants minor problems appear with bicarbonate concentrations in excess of 1.5 meq/l and severe problems appear when it exceeds 8.5 meq/l. All of the samples have high bicarbonate, which is common for water in Utah.

No other elements were found in concentrations harmful to plants.

Livestock:

No water quality standards for livestock were exceeded.

Culinary:

The most serious problem with drinking water from private water systems is bacterial contamination. Because disease-causing organisms are rare, non-parasitic coliform bacteria that are found in association with parasitic bacteria are used as indicators to assess whether water could be contaminated with harmful bacteria. Coliform bacteria can occur naturally in the soil, whereas E. coli, a type of coliform, develops only in the digestive systems of mammals. The presence of coliform bacteria indicates that surface water, soil, or other contaminants are entering the well. The presence of E. coli in well water, on the other hand, indicates that mammalian fecal material is entering the well. Bacterial contamination is commonly the result of well construction problems. Contamination may result from inadequate capping, a leaking well casing, improper grouting, or lack of a casing. E. coli contamination can come from defective septic systems, manure operations or septic systems too close to wells, leaky sewer systems, or shallow water tables. Samples 1247, 1315, 1317, 1318, 1477, and 1478 are contaminated with coliform. Wells from which these samples were collected should be inspected carefully to determine the source of contamination and should not be used for culinary purposes until the problem is corrected. No E. coli was found in any samples from this area.

Sample Site Test Data for Wasatch District

General

Id #	Be	Ca	K	Li	Mg	Na	P	pH	°C	TDS
1247	-0.1000	65.29	2.63	-0.1000	9.85	9.80	-0.10	7.18	16.8	367
1248	-0.1000	64.18	1.17	-0.1000	24.19	10.28	-0.10	7.70	11.5	450
1312	-0.1000	9.32	0.51	-0.1000	2.53	3.09	-0.10	7.87	8.9	50
1313	-0.1000	32.44	0.99	-0.1000	8.47	6.12	0.13	8.41	8.9	148
1314	-0.1000	43.43	1.20	-0.1000	8.02	4.43	-0.10	8.75	6.0	167
1315	-0.1000	63.56	1.83	-0.1000	19.41	19.41	-0.10	8.06	13.7	320
1316	-0.1000	58.90	3.13	-0.1000	13.09	13.76	-0.10	7.64	13.2	259
1317	-0.1000	55.11	2.39	-0.1000	7.39	8.60	-0.10	7.48	13.6	208
1318	-0.1000	71.78	2.23	-0.1000	20.01	25.07	-0.10	7.80	14.5	392
1322	-0.1000	85.25	0.78	-0.1000	9.85	17.94	-0.10	7.96	15.0	302
1477	-0.1000	82.36	1.80	-0.1000	18.57	19.68	-0.10	7.48	15.4	332
1478	-0.1000	64.38	1.79	-0.1000	14.22	11.67	-0.10	7.25	15.4	254
1537	-0.1000	29.60	2.08	-0.1000	6.96	9.30	-0.10	6.77	17.4	225
1538	-0.1000	55.30	1.25	-0.1000	11.57	16.63	-0.10	6.90	15.1	364
1539	-0.1000	56.34	0.83	-0.1000	12.22	8.00	-0.10	6.89	12.1	347

Values of -0.1 are below detection limits of testing procedure

Irrigation

Id #	Al	B	Cl	CO3 meq/l	Cu	Fe	HCO3 meq/l	Mn	Se	Zn	SAR	EC umhos/cm
1247	-0.1000	-0.10	-0.10	-0.10	0.0429	0.0224	4.91	-0.1000	-0.1000	0.12	0.3	611
1248	-0.1000	-0.10	27.75	-0.10	-0.1000	0.0435	4.85	-0.1000	-0.1000	-0.10	0.3	750
1312	-0.1000	-0.10	-0.10	-0.10	-0.1000	0.0734	0.58	-0.1000	-0.1000	0.05	0.2	83
1313	-0.1000	-0.10	-0.10	-0.10	-0.1000	0.0675	1.80	-0.1000	-0.1000	-0.10	0.2	246
1314	-0.1000	-0.10	-0.10	-0.10	-0.1000	0.1279	2.62	-0.1000	-0.1000	0.16	0.2	278
1315	-0.1000	-0.10	43.52	-0.10	-0.1000	0.0297	3.98	-0.1000	-0.1000	-0.10	0.5	534
1316	-0.1000	-0.10	11.64	-0.10	-0.1000	-0.1000	3.67	-0.1000	-0.1000	0.10	0.4	432
1317	-0.1000	-0.10	12.11	-0.10	-0.1000	0.0217	2.99	-0.1000	-0.1000	-0.10	0.3	347
1318	-0.1000	-0.10	43.67	-0.10	-0.1000	-0.1000	5.10	-0.1000	-0.1000	0.05	0.7	653
1322	-0.1000	-0.10	7.48	-0.10	-0.1000	-0.1000	4.81	-0.1000	-0.1000	0.04	0.5	503
1477	-0.1000	-0.10	7.93	-0.10	-0.1000	0.0495	4.87	0.0364	-0.1000	0.23	0.5	554
1478	-0.1000	-0.10	14.76	-0.10	0.0514	0.0914	3.32	0.0319	-0.1000	0.09	0.3	423
1537	0.1009	-0.10	7.23	-0.10	0.0450	0.0939	1.92	0.0308	-0.1000	0.52	0.4	375
1538	-0.1000	-0.10	16.06	-0.10	0.1371	-0.1000	3.24	-0.1000	-0.1000	0.15	0.5	607
1539	-0.1000	-0.10	17.23	-0.10	-0.1000	-0.1000	2.62	-0.1000	-0.1000	-0.10	0.3	578

testing procedure.

Sample Site Test Data for Wasatch District

Livestock

Id #	Al	As	B	Cd	Co	Cr	Mo	Ni	Pb	S	Se	EC umhos/cm	V	Zn
1247	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	5.71	-0.1000	611	-0.1000	0.12
1248	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	6.98	-0.1000	750	-0.1000	-0.10
1312	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	3.66	-0.1000	83	-0.1000	0.05
1313	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	11.05	-0.1000	246	-0.1000	-0.10
1314	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	2.54	-0.1000	278	-0.1000	0.16
1315	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	5.12	-0.1000	534	-0.1000	-0.10
1316	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	7.15	-0.1000	432	-0.1000	0.10
1317	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	2.35	-0.1000	347	-0.1000	-0.10
1318	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	11.36	-0.1000	653	-0.1000	0.05
1322	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	8.35	-0.1000	503	-0.1000	0.04
1477	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	12.31	-0.1000	554	-0.1000	0.23
1478	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	11.49	-0.1000	423	-0.1000	0.09
1537	0.1009	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	2.84	-0.1000	375	-0.1000	0.52
1538	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	4.92	-0.1000	607	-0.1000	0.15
1539	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	10.86	-0.1000	578	-0.1000	-0.10

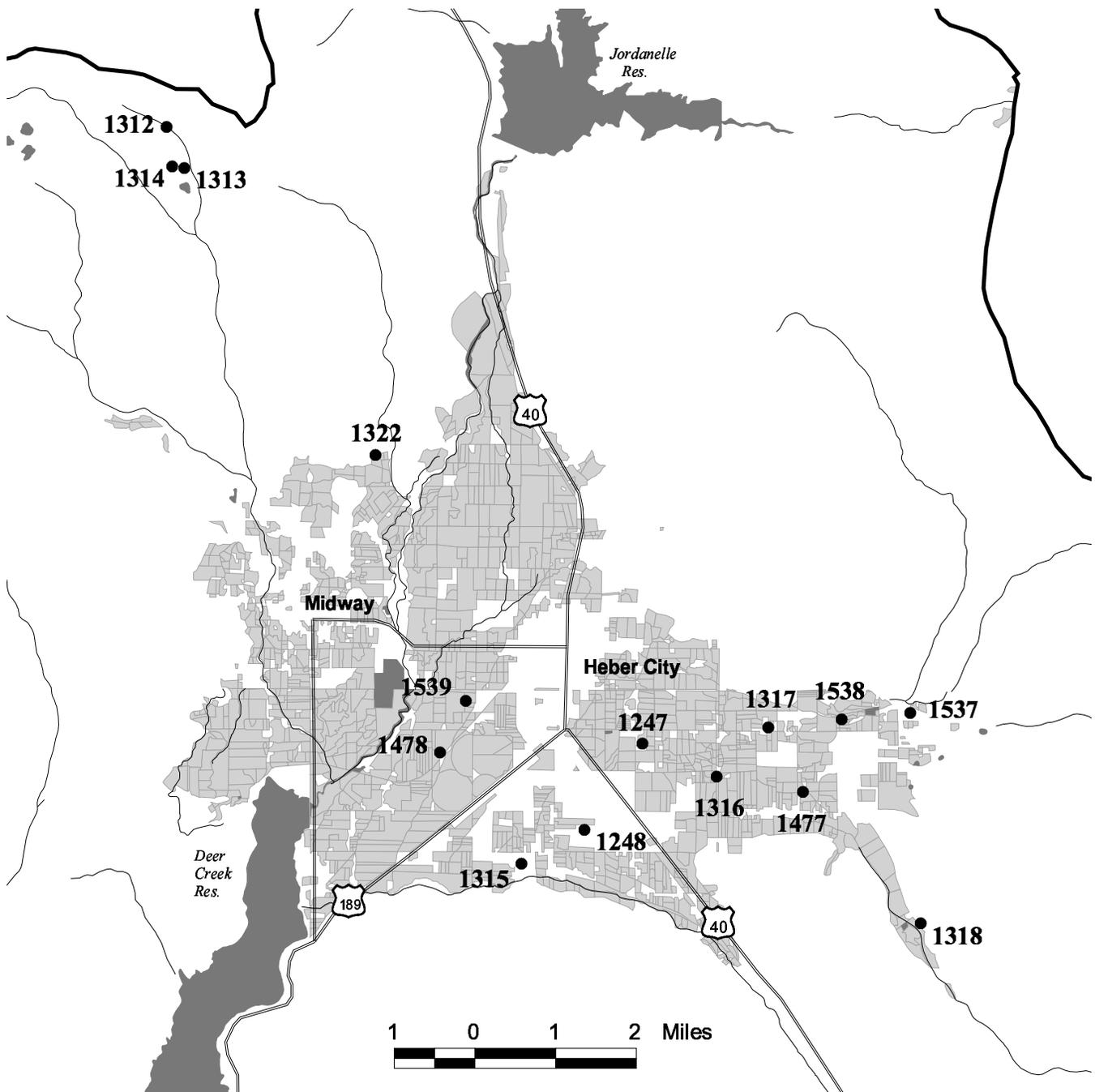
Underlined values indicate minor health problems (particularly smaller and younger animals). Shaded values indicate a serious health risk. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure.

Culinary

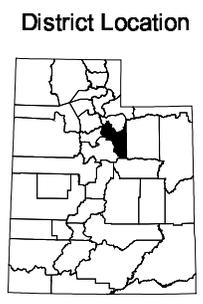
Id #	As	Ba	Cd	Cr	Cu	Fe	Mn	NO3-N	Pb	S	Se	EC umhos/cm	Zn	pH	Col	Ecoli	Hardness gpg
1247	-0.1000	0.2208	-0.1000	-0.1000	0.0429	0.0224	-0.1000	1.5	-0.1000	5.71	-0.1000	611	0.12	7.18	1	0	4.4
1248	-0.1000	0.0937	-0.1000	-0.1000	-0.1000	0.0435	-0.1000	2.5	-0.1000	6.98	-0.1000	750	-0.10	7.70	0	0	5.2
1312	-0.1000	0.0363	-0.1000	-0.1000	-0.1000	0.0734	-0.1000	0.2	-0.1000	3.66	-0.1000	83	0.05	7.87	0	0	0.7
1313	-0.1000	0.0617	-0.1000	-0.1000	-0.1000	0.0675	-0.1000	0.2	-0.1000	11.05	-0.1000	246	-0.10	8.41	0	0	2.4
1314	-0.1000	0.0307	-0.1000	-0.1000	-0.1000	0.1279	-0.1000	1.0	-0.1000	2.54	-0.1000	278	0.16	8.75	0	0	3.0
1315	-0.1000	0.1222	-0.1000	-0.1000	-0.1000	0.0297	-0.1000	0.6	-0.1000	5.12	-0.1000	534	-0.10	8.06	1	0	4.9
1316	-0.1000	0.2221	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.0	-0.1000	7.15	-0.1000	432	0.10	7.64	0	0	4.2
1317	-0.1000	0.2006	-0.1000	-0.1000	-0.1000	0.0217	-0.1000	1.6	-0.1000	2.35	-0.1000	347	-0.10	7.48	1	0	3.7
1318	-0.1000	0.2145	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.2	-0.1000	11.36	-0.1000	653	0.05	7.80	1	0	5.4
1322	-0.1000	0.0219	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	0.8	-0.1000	8.35	-0.1000	503	0.04	7.96	0	0	5.6
1477	-0.1000	0.1791	-0.1000	-0.1000	-0.1000	0.0495	0.0364	1.3	-0.1000	12.31	-0.1000	554	0.23	7.48	1	0	5.9
1478	-0.1000	0.1414	-0.1000	-0.1000	0.0514	0.0914	0.0319	2.9	-0.1000	11.49	-0.1000	423	0.09	7.25	1	0	4.6
1537	-0.1000	0.1975	-0.1000	-0.1000	0.0450	0.0939	0.0308	0.1	-0.1000	2.84	-0.1000	375	0.52	6.77	0	0	2.1
1538	-0.1000	0.4733	-0.1000	-0.1000	0.1371	-0.1000	-0.1000	1.0	-0.1000	4.92	-0.1000	607	0.15	6.90	0	0	3.9
1539	-0.1000	0.1983	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.8	-0.1000	10.86	-0.1000	578	-0.10	6.89	0	0	4.0

detection limits of testing procedure. For Col and Ecoli 1 = present 0 =absent.

Map 13. Wasatch District



- Sample Site
- Irrigated Land
- Water Body
- SCD Boundary
- ⚡ Road
- ⚡ Water Course



Zone 4

UACD Zone 4 consists of six districts in six counties including Juab, Millard, Piute, Sanpete, Sevier, and Wayne counties.

Eighty-eight sites were sampled in Zone 4 during the spring, summer, and fall of 2001. These include 6 in the Delta District, 4 in the Fremont District, 12 in the Juab County District, 44 in the Millard District, 17 in the Sanpete County District, and 5 in the Sevier County District. Many of the Millard District wells were sampled as part of an ongoing agreement with the Division of Water Rights and Utah Department of Natural Resources. A narrative report is presented for these areas together with data tables and maps showing approximate locations of sampling sites. The report covers three categories of water quality criteria—irrigation, livestock and culinary.

Delta District

The water in this area varies from soft to very hard with gpg (grains per gallon) ranging from 0.5 to 13.2 with a mean of 3.2. Water temperatures range from 14.2 °C to 21.7 °C, with a mean of 16.17 °C. The pH for the area has a mean of 8.12 and ranges from 7.12 to 8.70.

Samples 1507 and 1511 have high pH and may cause alkalinity problems such as mineral buildup.

Irrigation:

Salinity is a measurement of the concentration of ionic salts dissolved in water. It is measured as electrical conductivity (EC), in $\mu\text{mhos/cm}$. Higher conductivity values indicate higher concentrations of dissolved salts. Water high in dissolved salts increases osmotic pressures, making it difficult for plants to get water necessary for growth. Generally when EC exceeds 750 $\mu\text{mhos/cm}$, salt-sensitive plants begin to be affected. When EC exceeds 3,000 $\mu\text{mhos/cm}$, most plants would be severely injured. Sample 1510 exceeds the severe-injury level of 3,000 $\mu\text{mhos/cm}$, which would affect most plants.

The sodium absorption ratio (SAR) measures how much sodium (Na) is in solution compared to calcium (Ca) and magnesium (Mg). Excessive sodium in the soil causes soil particles to repel each other. This destroys the structure of the soil, preventing air and water movement. SAR values greater than 3 mark the beginning of problems and values greater than 9 indicate severe problems. Samples 1507 and 1509 through 1512 have elevated SAR values. Samples 1510 and 1511 have SAR values that exceed 9.

Bicarbonate (HCO_3^-) is an ion common to water solutions. It can be hazardous to plants in excessive amounts, especially when used in sprinkler irrigation. Bicarbonate also causes white deposits on plants and their fruits, which degrades their visual appeal. Bicarbonate also increases the effect of sodium when both are present. Special attention is needed when using water with excessive bicarbonate. With sensitive plants minor problems appear with bicarbonate concentrations in excess of 1.5 meq/l and severe problems appear when it exceeds 8.5 meq/l. All of the samples have high bicarbonate, which is common for water in Utah. Sample 1510 exceeds the 8.5 meq/l level.

Sample 1510 has elevated boron (B), which is toxic to sensitive plants when concentration exceeds 0.7 ppm. It causes severe injury at 10.0 ppm. However, Boron in trace amounts is required for proper plant growth. It is important to monitor this element because the margin separating safe health from toxicity is small.

Chlorine found in the form of chloride (Cl^-) can damage sensitive plants at concentrations above 145 ppm and concentrations exceeding 355 ppm can cause severe damage to almost all plants. Damage increases under sprinkler irrigation and is more severe in windy conditions. Sample 1510 has very high chlorine, which at 566 ppm exceeds the 355 ppm level.

No other elements were found in concentrations harmful to plants.

Livestock:

Sample 1510 has a sulfur (S) concentration of 207.7 ppm which exceeds the livestock standard for sulfur. Sulfur in the form of sulfate in water can cause water to be off flavored and diarrhea in animals not used to drinking it. Problems start when the sulfur level in water exceeds 167 ppm.

Sample 1510 has elevated molybdenum (Mo). Livestock eating plants irrigated with water that has molybdenum concentrations greater than 0.01 ppm may be harmed. High concentrations of molybdenum interfere with copper nutrition in livestock.

Culinary:

The EPA aesthetic standard for salinity is 833 $\mu\text{mhos/cm}$. At this level the water may be off-flavored, but it is not a health problem until the EC level reaches 3,333 $\mu\text{mhos/cm}$. Sample 1510 has an EC of 3,310 $\mu\text{mhos/cm}$, close to the level at which it would be considered a health problem.

Sample 1510 has high sulfur (S) with a value of 207.7 ppm. Sulfate is a soluble form of sulfur that can cause flavor problems in drinking water if there is more than 83 ppm sulfur. Bacteria in the water use sulfur and produce hydrogen sulfide gas (rotten egg gas). The bacteria that produce this compound can live in plumbing fixtures and even hot water heaters. It is not uncommon to get strong odors when the hot water is turned on in areas where there is high sulfate. Generally people cannot tolerate the odor from this gas. Even if the gas is not present high sulfate concentrations can cause diarrhea in people not used to drinking it.

Sample 1510 exceeds the EPA standard for Arsenic (As) and should not be used for drinking water.

The most serious problem with drinking water from private water systems is bacterial contamination. Because disease-causing organisms are rare, non-parasitic coliform bacteria that are found in association with parasitic bacteria are used as indicators to assess whether water could be contaminated with harmful bacteria. Coliform bacteria can occur naturally in the soil, whereas *E. coli*, a type of coliform, develops only in the digestive systems of mammals. The presence of coliform bacteria indicates that surface water, soil, or other contaminants are entering the well. The presence of *E. coli* in well water, on the other hand, indicates that mammalian fecal material is entering the well. Bacterial contamination is commonly the result of well construction problems. Contamination may result from inadequate capping, a leaking well casing, improper grouting, or lack of a casing. *E. coli* contamination can come from defective septic systems, manure operations or septic systems too close to wells, leaky sewer systems, or shallow water tables.

Sample 1510 is contaminated with coliform. Sample 1510 is also contaminated with *E. coli*. The well from which this sample was collected should be inspected carefully to determine the source of contamination and should not be used for culinary purposes until the problem is corrected.

Sample Site Test Data for Delta District

General

Id #	Be	Ca	K	Li	Mg	Na	P	pH	°C	TDS
1507	-0.1000	9.09	2.41	-0.1000	6.17	90.54	-0.10	8.55	15.2	272
1508	-0.1000	17.37	4.11	-0.1000	13.14	55.19	-0.10	8.10	15.5	239
1509	-0.1000	16.72	2.28	-0.1000	7.74	61.91	-0.10	8.01	21.7	236
1510	-0.1000	113.94	134.68	0.1539	111.92	580.23	0.35	7.12	14.7	1986
1511	-0.1000	6.77	1.45	0.0582	2.61	113.70	-0.10	8.70	14.2	286
1512	-0.1000	18.31	1.47	-0.1000	5.75	90.49	-0.10	8.22	15.7	285

Values of -0.1 are below detection limits of testing procedure

Irrigation

Id #	Al	B	Cl	CO3 meq/l	Cu	Fe	HCO3 meq/l	Mn	Se	Zn	SAR	EC umhos/cm
1507	-0.1000	0.15	48.01	-0.10	-0.1000	0.2637	2.17	-0.1000	-0.1000	-0.10	5.7	454
1508	-0.1000	0.11	38.55	-0.10	-0.1000	0.0489	2.23	-0.1000	-0.1000	-0.10	2.4	398
1509	0.0414	0.11	36.29	-0.10	-0.1000	0.0640	2.10	0.0232	-0.1000	-0.10	3.1	394
1510	-0.1000	0.73	566.45	-0.10	-0.1000	-0.1000	10.38	0.0357	-0.1000	-0.10	9.2	3,310
1511	-0.1000	0.16	31.63	-0.10	-0.1000	0.1457	3.49	-0.1000	-0.1000	-0.10	9.4	476
1512	-0.1000	0.14	55.74	-0.10	-0.1000	0.2498	2.04	0.0315	-0.1000	-0.10	4.7	475

Underlined values exceed irrigation standards. Shaded values indicate severe risks. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure.

Livestock

Id #	Al	As	B	Cd	Co	Cr	Mo	Ni	Pb	S	Se	EC umhos/cm	V	Zn
1507	-0.1000	-0.1000	0.15	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	17.44	-0.1000	454	-0.1000	-0.10
1508	-0.1000	-0.1000	0.11	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	12.23	-0.1000	398	0.0123	-0.10
1509	0.0414	-0.1000	0.11	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	12.39	-0.1000	394	-0.1000	-0.10
1510	-0.1000	0.0875	0.73	-0.1000	-0.1000	-0.1000	0.0156	-0.1000	-0.1000	207.67	-0.1000	3,310	0.0762	-0.10
1511	-0.1000	-0.1000	0.16	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	9.27	-0.1000	476	-0.1000	-0.10
1512	-0.1000	-0.1000	0.14	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	18.83	-0.1000	475	-0.1000	-0.10

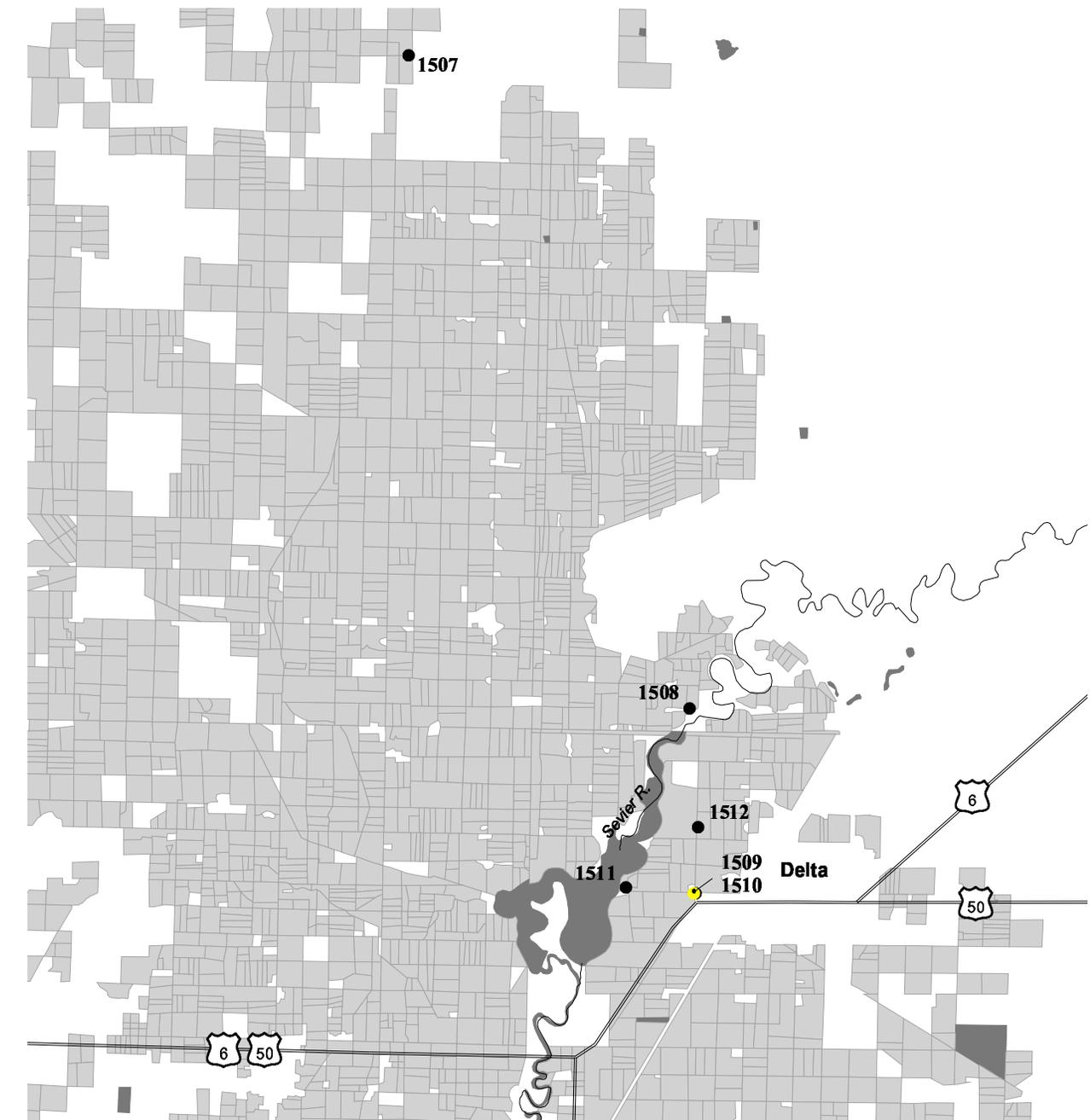
Underlined values indicate minor health problems (particularly smaller and younger animals). Shaded values indicate a serious health risk. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure.

Culinary

Id #	As	Ba	Cd	Cr	Cu	Fe	Mn	NO3-N	Pb	S	Se	EC umhos/cm	Zn	pH	Col	Ecoli	Hardness gpg
1507	-0.1000	0.0479	-0.1000	-0.1000	-0.1000	0.2637	-0.1000	0.0	-0.1000	17.44	-0.1000	454	-0.10	8.55	0	0	0.9
1508	-0.1000	0.1258	-0.1000	-0.1000	-0.1000	0.0489	-0.1000	0.2	-0.1000	12.23	-0.1000	398	-0.10	8.10	0	0	1.8
1509	-0.1000	0.0510	-0.1000	-0.1000	-0.1000	0.0640	0.0232	0.0	-0.1000	12.39	-0.1000	394	-0.10	8.01	0	0	1.4
1510	0.0875	0.0449	-0.1000	-0.1000	-0.1000	-0.1000	0.0357	5.9	-0.1000	207.67	-0.1000	3,310	-0.10	7.12	1	1	13.2
1511	-0.1000	0.0273	-0.1000	-0.1000	-0.1000	0.1457	-0.1000	0.0	-0.1000	9.27	-0.1000	476	-0.10	8.70	0	0	0.5
1512	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	0.2498	0.0315	0.0	-0.1000	18.83	-0.1000	475	-0.10	8.22	0	0	1.4

Underlined values exceed Secondary (aesthetic) standards. Shaded values exceed Primary (health) standards. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure. For Col and Ecoli 1 = present 0 = absent.

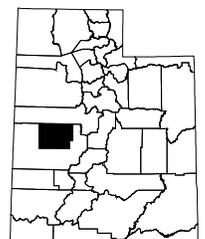
Map 14. Delta District



- Sample Site
- Irrigated Land
- Water Body
- SCD Boundary
- ∩ Road
- ∩ Water Course



District Location



Fremont River District

The water in this area varies from soft to moderate, with gpg (grains per gallon) ranging from 2.4 to 5.3 with a mean of 4.07. Water temperatures range from 10.6 °C to 13.7 °C, with a mean of 11.60 °C. The pH for the area has a mean of 6.77 and ranges from 5.85 to 7.65. The pH for sample 1520 is acidic. The water may be corrosive to plumbing.

Irrigation:

Salinity is a measurement of the concentration of ionic salts dissolved in water. It is measured as electrical conductivity (EC), in $\mu\text{mhos/cm}$. Higher conductivity values indicate higher concentrations of dissolved salts. Water high in dissolved salts increases osmotic pressures, making it difficult for plants to get water necessary for growth. Generally when EC exceeds 750 $\mu\text{mhos/cm}$, salt-sensitive plants begin to be affected. When EC exceeds 3,000 $\mu\text{mhos/cm}$, most plants would be severely injured. No samples in this district exceed the 750 $\mu\text{mhos/cm}$ standard.

SAR measures how much sodium (Na) is in solution compared to calcium (Ca) and magnesium (Mg). Excessive sodium in the soil causes soil particles to repel each other. This destroys the structure of the soil, preventing air and water movement. SAR values greater than 3 mark the beginning of problems and values greater than 9 indicate severe problems. None of the water sampled in this district has elevated SAR values.

Bicarbonate (HCO_3) is an ion common to water solutions. It can be hazardous to plants in excessive amounts, especially when used in sprinkler irrigation. Bicarbonate also causes white deposits on plants and their fruits, which degrades their visual appeal. Bicarbonate also increases the effect of sodium when both are present. Special attention is needed when using water with excessive bicarbonate. With sensitive plants minor problems appear with bicarbonate concentrations in excess of 1.5 meq/l, and severe problems appear when it exceeds 8.5 meq/l. All of the samples have high bicarbonate, which is common for water in Utah.

No other elements were found in concentrations harmful to plants.

Livestock:

No water quality standards for livestock were exceeded.

Culinary:

The most serious problem with drinking water from private water systems is bacterial contamination. Because disease-causing organisms are rare, non-parasitic coliform bacteria that are found in association with parasitic bacteria are used as indicators to assess whether water could be contaminated with harmful bacteria. Coliform bacteria can occur naturally in the soil, whereas *E. coli*, a type of coliform, develops only in the digestive systems of mammals. The presence of coliform bacteria indicates that surface water, soil, or other contaminants are entering the well. The presence of *E. coli* in well water, on the other hand, indicates that mammalian fecal material is entering the well. Bacterial contamination is commonly the result of well construction problems. Contamination may result from inadequate capping, a leaking well casing, improper grouting, or lack of a casing. *E. coli* contamination can come from defective septic systems, manure operations or septic systems too close to wells, leaky sewer systems, or shallow water tables.

No coliform or *E. coli* bacteria were found in any samples from this area.

Sample Site Test Data for Fremont River District

General

Id #	Be	Ca	K	Li	Mg	Na	P	pH	°C	TDS
1503	-0.1000	33.85	3.86	-0.1000	7.73	16.74	-0.10	7.65	10.6	176
1504	-0.1000	52.41	6.02	-0.1000	13.61	36.80	-0.10	6.82	10.9	284
1505	-0.1000	65.58	5.77	-0.1000	14.98	34.61	-0.10	6.74	11.2	311
1520	-0.1000	58.38	15.05	-0.1000	31.50	39.99	-0.10	5.85	13.7	398

Values of -0.1 are below detection limits of testing procedure

Irrigation

Id #	Al	B	Cl	CO3 meq/l	Cu	Fe	HCO3 meq/l	Mn	Se	Zn	SAR	EC umhos/cm
1503	-0.1000	-0.10	9.43	-0.10	-0.1000	0.0282	<u>2.10</u>	-0.1000	-0.1000	-0.10	0.7	294
1504	-0.1000	0.13	20.95	-0.10	0.0262	0.0295	<u>3.78</u>	-0.1000	-0.1000	0.06	1.2	473
1505	-0.1000	0.12	16.14	-0.10	0.0394	0.0675	<u>4.38</u>	-0.1000	-0.1000	-0.10	1.0	519
1520	-0.1000	0.23	15.14	-0.10	0.0243	0.0760	<u>4.93</u>	-0.1000	-0.1000	0.66	1.0	663

Underlined values exceed irrigation standards. Shaded values indicate severe risks. All values are mg/l unless labeled differently.

Values of -0.1 are below detection limits of testing procedure.

Livestock

Id #	Al	As	B	Cd	Co	Cr	Mo	Ni	Pb	S	Se	EC umhos/cm	V	Zn
1503	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	5.14	-0.1000	294	-0.1000	-0.10
1504	-0.1000	-0.1000	0.13	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	7.24	-0.1000	473	-0.1000	0.06
1505	-0.1000	-0.1000	0.12	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	6.88	-0.1000	519	-0.1000	-0.10
1520	-0.1000	-0.1000	0.23	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	21.92	-0.1000	663	0.0236	0.66

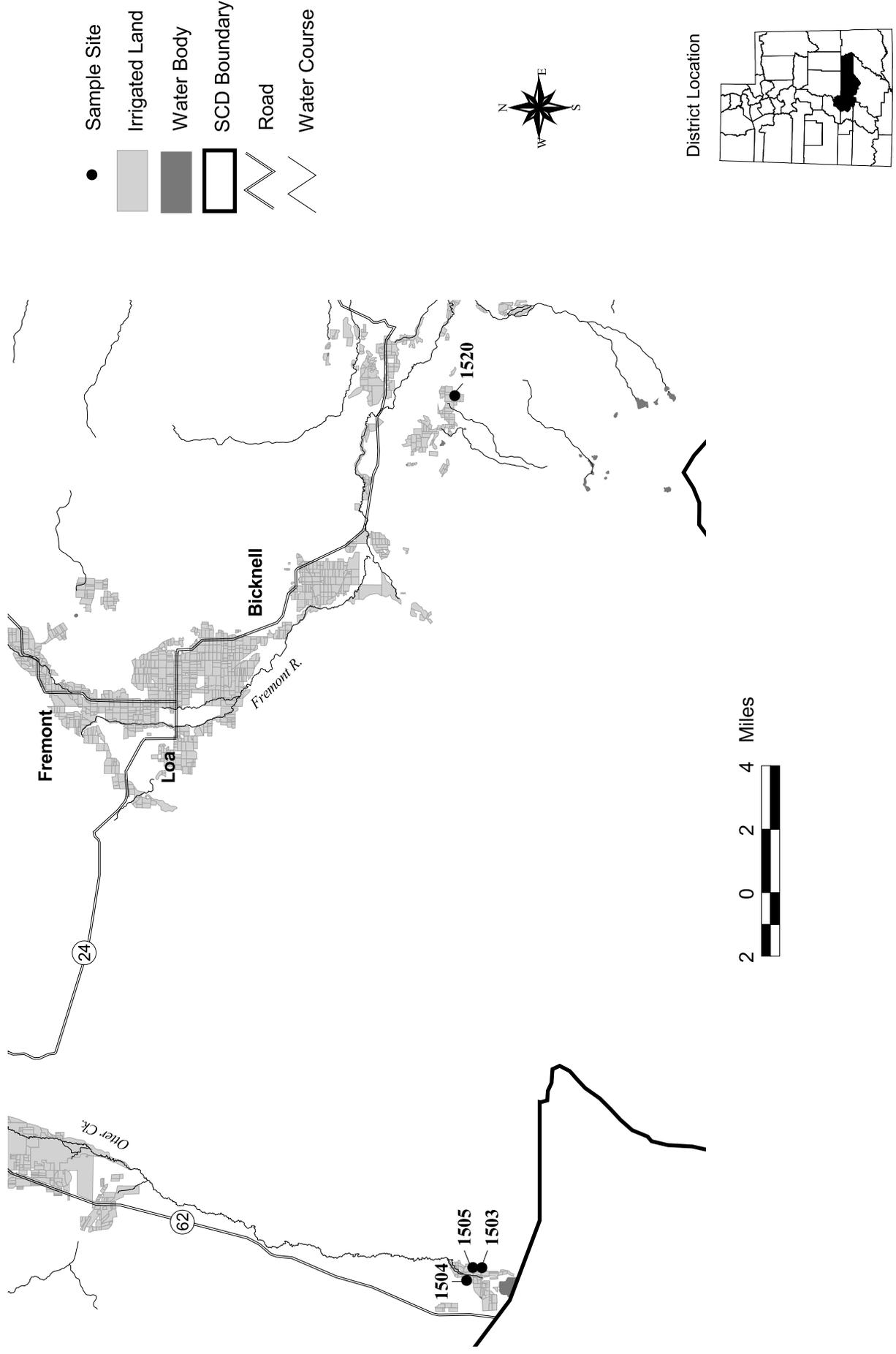
Underlined values indicate minor health problems (particularly smaller and younger animals). Shaded values indicate a serious health risk. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure.

Culinary

Id #	As	Ba	Cd	Cr	Cu	Fe	Mn	NO3-N	Pb	S	Se	EC umhos/cm	Zn	pH	Col	Ecoli	Hardness gpg
1503	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	0.0282	-0.1000	0.3	-0.1000	5.14	-0.1000	294	-0.10	7.65	0	0	2.4
1504	-0.1000	0.0328	-0.1000	-0.1000	0.0262	0.0295	-0.1000	0.1	-0.1000	7.24	-0.1000	473	0.06	6.82	0	0	3.9
1505	-0.1000	0.0309	-0.1000	-0.1000	0.0394	0.0675	-0.1000	1.4	-0.1000	6.88	-0.1000	519	-0.10	6.74	0	0	4.7
1520	-0.1000	0.0641	-0.1000	-0.1000	0.0243	0.0760	-0.1000	2.5	-0.1000	21.92	-0.1000	663	0.66	5.85	0	0	5.3

detection limits of testing procedure. For Col and Ecoli 1 = present 0 = absent.

Map 15. Fremont River District



Juab County District

The water in this area varies from moderate-hard to very hard, with gpg (grains per gallon) ranging from 3.6 to 15.1 with a mean of 8.6. Water temperatures range from 11.5 °C to 27.2 °C, with a mean of 16.95 °C. The pH for the area has a mean of 7.49 and ranges from 6.56 to 8.22.

Irrigation:

Salinity is a measurement of the concentration of ionic salts dissolved in water. It is measured as electrical conductivity (EC), in $\mu\text{mhos/cm}$. Higher conductivity values indicate higher concentrations of dissolved salts. Water high in dissolved salts increases osmotic pressures, making it difficult for plants to get water necessary for growth. Generally when EC exceeds 750 $\mu\text{mhos/cm}$, salt-sensitive plants begin to be affected. When EC exceeds 3,000 $\mu\text{mhos/cm}$, most plants would be severely injured. All samples have EC values greater than 750 $\mu\text{mhos/cm}$.

SAR measures how much sodium (Na) is in solution compared to calcium (Ca) and magnesium (Mg). Excessive sodium in the soil causes soil particles to repel each other. This destroys the structure of the soil, preventing air and water movement. SAR values greater than 3 mark the beginning of problems and values greater than 9 indicate severe problems. Samples 1267, 1268, and 1279 have elevated SAR values.

Bicarbonate (HCO_3) is an ion common to water solutions. It can be hazardous to plants in excessive amounts, especially when used in sprinkler irrigation. Bicarbonate also causes white deposits on plants and their fruits, which degrades their visual appeal. Bicarbonate also increases the effect of sodium when both are present. Special attention is needed when using water with excessive bicarbonate. With sensitive plants minor problems appear with bicarbonate concentrations in excess of 1.5 meq/l and severe problems appear when it exceeds 8.5 meq/l. All of the samples have high bicarbonate, which is common for water in Utah. None of the samples exceed the 8.5 level.

Chlorine, found in the form of chloride (Cl^-), can damage sensitive plants at concentrations above 145 ppm, and concentrations exceeding 355 ppm can cause severe damage to almost all plants. Damage increases under sprinkler irrigation and is more severe in windy conditions. All samples except 1280 and 1524 have elevated chlorine. Sample 1281 has a chloride level of 562.4 ppm, which can cause problems under all irrigation methods.

No other elements were found in concentrations harmful to plants.

Livestock:

All samples except 1524 have elevated molybdenum (Mo). Livestock eating plants irrigated with water that has molybdenum concentration greater than 0.01 ppm may be harmed. High concentrations of molybdenum interfere with copper nutrition in livestock.

No other water quality standards for livestock were exceeded.

Culinary:

The EPA aesthetic standard for salinity is 833 $\mu\text{mhos/cm}$. At this level the water may be off-flavored but it is not a health problem until the EC level reaches 3,333. All samples except for 1524 exceed the aesthetic standard for salinity.

Sample 1279 has a high manganese (Mn) concentration. EPA has set an aesthetic standard of 0.05 ppm for manganese. Water with high concentrations of manganese may cause discoloration of plumbing fixtures and have poor flavor.

Sample 1281 exceeds the EPA nitrate (NO_3) standard of 10 ppm nitrate expressed as nitrogen ($\text{NO}_3\text{-N}$). NO_3 is an important nutrient for plant growth. It is found in nitrogen fertilizers, manure, septic systems, and some minerals. NO_3 is toxic to young infants (usually less than 6 months of age) and causes "blue baby syndrome." NO_3 can only be removed from water by reverse osmosis or distillation.

Well 1271 exceeded the primary health standard for the mineral zinc (Zn) at 10.2 ppm. Water from this well should not be used for drinking.

The most serious problem with drinking water from private water systems is bacterial contamination. Because disease-causing organisms are rare, non-parasitic coliform bacteria that are found in association with parasitic bacteria are used as indicators to assess whether water could be contaminated with harmful bacteria. Coliform bacteria can occur naturally in the soil, whereas *E. coli*, a type of coliform, develops only in the digestive systems of mammals. The presence of coliform bacteria indicates that surface water, soil, or other contaminants are entering the well. The presence of *E. coli* in well water, on the other hand, indicates that mammalian fecal material is entering the well. Bacterial contamination is commonly the result of well construction problems. Contamination may result from inadequate capping, a leaking well casing, improper grouting, or lack of a casing. *E. coli* contamination can come from defective septic systems, manure operations or septic systems too close to wells, leaky sewer systems, or shallow water tables.

Samples 1267, 1271, 1279, 1281, and 1524 are contaminated with coliform. Sample 1279, from a spring used by range cattle, is contaminated with *E. coli*. Wells and the spring from which these samples were taken should be inspected carefully to determine the source of contamination and should not be used for culinary purposes until the problem is corrected.

Sample Site Test Data for Juab County District

General

Id #	Be	Ca	K	Li	Mg	Na	P	pH	°C	TDS
1267	-0.1000	56.49	12.81	-0.1000	27.68	189.41	-0.10	8.22	19.6	953
1268	-0.1000	41.03	10.83	-0.1000	20.72	125.17	-0.10	7.93	21.3	593
1269	-0.1000	116.44	5.94	-0.1000	37.56	126.67	-0.10	7.29	13.9	830
1270	-0.1000	112.78	5.83	-0.1000	37.08	123.68	-0.10	7.21	18.7	814
1271	-0.1000	115.90	5.29	-0.1000	31.34	121.05	-0.10	7.24	13.3	785
1272	-0.1000	115.74	5.31	-0.1000	32.97	123.52	-0.10	7.18	17.2	796
1277	-0.1000	125.86	5.70	-0.1000	42.45	133.62	-0.10	7.24	16.4	953
1278	-0.1000	120.72	6.00	-0.1000	44.96	129.83	-0.10	7.82	14.5	944
1279	-0.1000	115.26	7.60	-0.1000	58.71	160.37	-0.10	7.82	27.2	1088
1280	-0.1000	64.73	3.46	-0.1000	69.00	69.83	-0.10	7.64	14.9	627
1281	-0.1000	171.52	3.66	-0.1000	86.55	84.89	-0.10	7.70	14.9	1272
1524	-0.1000	76.58	1.64	-0.1000	40.44	66.45	-0.10	6.56	11.5	460

Values of -0.1 are below detection limits of testing procedure

Irrigation

Id #	Al	B	Cl	CO3 meq/l	Cu	Fe	HCO3 meq/l	Mn	Se	Zn	SAR	EC umhos/cm
1267	-0.1000	0.11	<u>332.40</u>	-0.10	-0.1000	-0.1000	<u>3.53</u>	-0.1000	-0.1000	-0.10	<u>5.2</u>	<u>1.588</u>
1268	-0.1000	0.10	<u>192.16</u>	-0.10	-0.1000	-0.1000	<u>3.16</u>	-0.1000	-0.1000	-0.10	<u>4.0</u>	<u>988</u>
1269	-0.1000	-0.10	<u>191.50</u>	-0.10	-0.1000	0.0225	<u>7.08</u>	-0.1000	-0.1000	-0.10	2.6	<u>1.384</u>
1270	-0.1000	-0.10	<u>187.65</u>	-0.10	0.0856	0.0898	<u>6.96</u>	0.0219	-0.1000	0.17	2.6	<u>1.356</u>
1271	-0.1000	0.08	<u>175.92</u>	-0.10	-0.1000	0.0678	<u>6.91</u>	0.0352	-0.1000	<u>10.02</u>	2.6	<u>1.308</u>
1272	-0.1000	-0.10	<u>179.40</u>	-0.10	-0.1000	0.0250	<u>7.06</u>	-0.1000	-0.1000	0.45	2.6	<u>1.326</u>
1277	-0.1000	0.09	<u>247.45</u>	-0.10	-0.1000	-0.1000	<u>6.98</u>	-0.1000	-0.1000	0.11	2.6	<u>1.588</u>
1278	-0.1000	0.09	<u>258.85</u>	-0.10	-0.1000	0.0278	<u>6.29</u>	-0.1000	-0.1000	-0.10	2.6	<u>1.574</u>
1279	0.2062	0.12	<u>327.75</u>	-0.10	-0.1000	0.2977	<u>6.89</u>	0.1638	-0.1000	-0.10	<u>3.0</u>	<u>1.813</u>
1280	-0.1000	0.11	74.45	-0.10	-0.1000	0.0408	<u>7.06</u>	-0.1000	-0.1000	0.53	1.4	<u>1.045</u>
1281	-0.1000	-0.10	<u>562.40</u>	-0.10	-0.1000	0.0245	<u>2.52</u>	-0.1000	-0.1000	-0.10	1.3	<u>2.120</u>
1524	-0.1000	-0.10	21.76	-0.10	-0.1000	-0.1000	<u>8.15</u>	-0.1000	-0.1000	0.05	1.5	<u>766</u>

Underlined values exceed irrigation standards. Shaded values indicate severe risks. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure.

Sample Site Test Data for Juab County District

Livestock

Id #	Al	As	B	Cd	Co	Cr	Mo	Ni	Pb	S	Se	EC umhos/cm	V	Zn
1267	-0.1000	-0.1000	0.11	-0.1000	-0.1000	-0.1000	<u>0.0266</u>	-0.1000	-0.1000	27.32	-0.1000	1,588	-0.1000	-0.10
1268	-0.1000	-0.1000	0.10	-0.1000	-0.1000	-0.1000	<u>0.0219</u>	-0.1000	-0.1000	12.81	-0.1000	988	-0.1000	-0.10
1269	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0150</u>	-0.1000	-0.1000	31.14	-0.1000	1,384	-0.1000	-0.10
1270	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0132</u>	-0.1000	-0.1000	30.28	-0.1000	1,356	-0.1000	0.17
1271	-0.1000	-0.1000	0.08	-0.1000	-0.1000	-0.1000	<u>0.0145</u>	-0.1000	-0.1000	30.49	-0.1000	1,308	-0.1000	10.02
1272	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0137</u>	-0.1000	-0.1000	30.09	-0.1000	1,326	-0.1000	0.45
1277	-0.1000	-0.1000	0.09	-0.1000	-0.1000	-0.1000	<u>0.0167</u>	-0.1000	-0.1000	40.84	-0.1000	1,588	-0.1000	0.11
1278	-0.1000	-0.1000	0.09	-0.1000	-0.1000	-0.1000	<u>0.0179</u>	-0.1000	-0.1000	43.20	-0.1000	1,574	-0.1000	-0.10
1279	0.2062	-0.1000	0.12	-0.1000	-0.1000	-0.1000	<u>0.0267</u>	-0.1000	-0.1000	55.91	-0.1000	1,813	-0.1000	-0.10
1280	-0.1000	-0.1000	0.11	-0.1000	-0.1000	-0.1000	<u>0.0404</u>	-0.1000	-0.1000	43.04	-0.1000	1,045	-0.1000	0.53
1281	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0191</u>	-0.1000	-0.1000	33.50	-0.1000	2,120	-0.1000	-0.10
1524	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	5.57	-0.1000	766	-0.1000	0.05

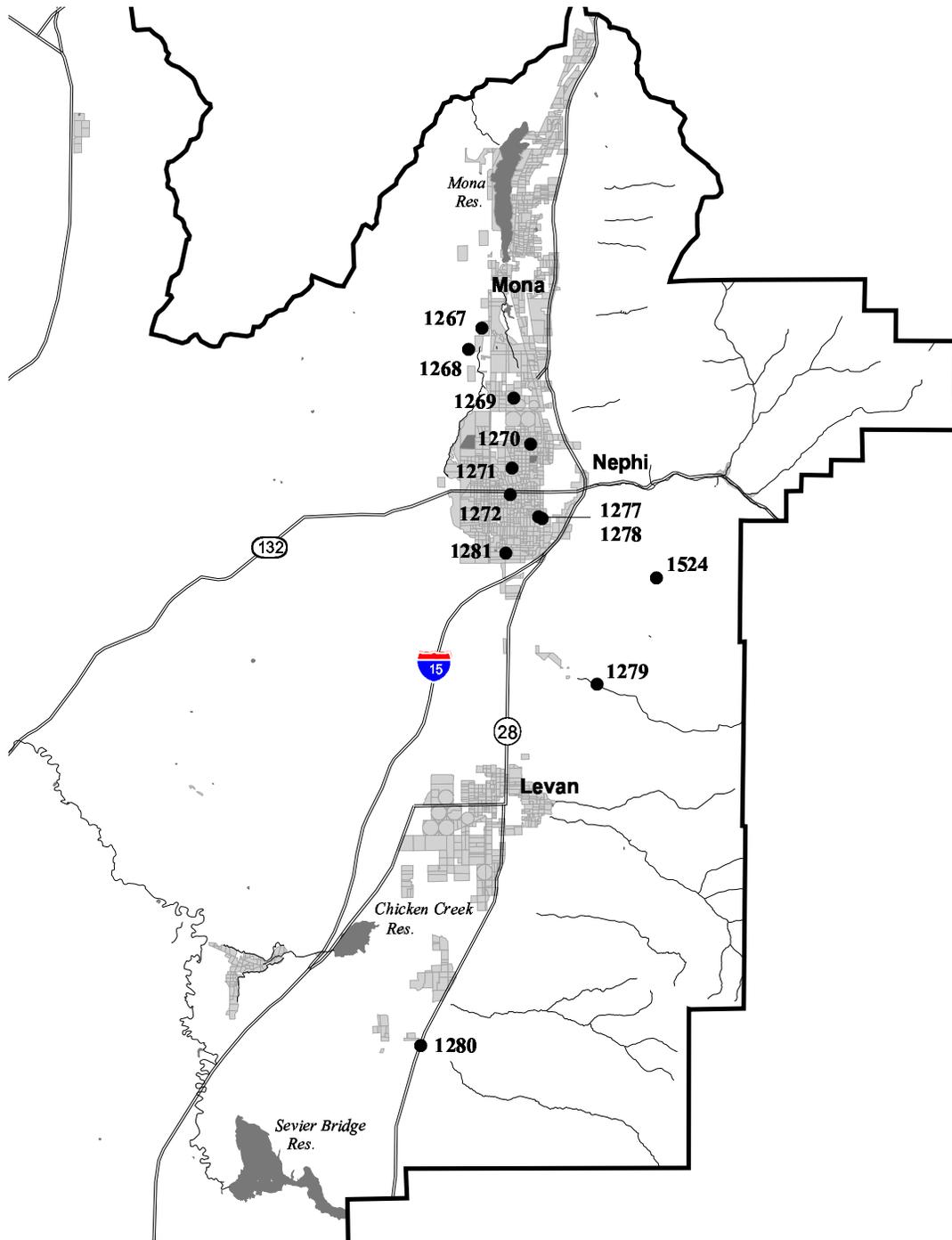
Underlined values indicate minor health problems (particularly smaller and younger animals). Shaded values indicate a serious health risk. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure.

Culinary

Id #	As	Ba	Cd	Cr	Cu	Fe	Mn	NO3-N	Pb	S	Se	EC umhos/cm	Zn	pH	Col	Ecoli	Hardness gpg
1267	-0.1000	0.0619	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.2	-0.1000	27.32	-0.1000	<u>1,588</u>	-0.10	8.22	<u>1</u>	0	4.9
1268	-0.1000	0.0984	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.2	-0.1000	12.81	-0.1000	<u>988</u>	-0.10	7.93	0	0	3.6
1269	-0.1000	0.1164	-0.1000	-0.1000	-0.1000	0.0225	-0.1000	3.7	-0.1000	31.14	-0.1000	<u>1,384</u>	-0.10	7.29	0	0	9.0
1270	-0.1000	0.0874	-0.1000	-0.1000	0.0856	0.0898	0.0219	1.2	-0.1000	30.28	-0.1000	<u>1,356</u>	0.17	7.21	0	0	8.8
1271	-0.1000	0.1016	-0.1000	-0.1000	-0.1000	0.0678	0.0352	3.7	-0.1000	30.49	-0.1000	<u>1,308</u>	<u>10.02</u>	7.24	<u>1</u>	0	8.6
1272	-0.1000	0.1319	-0.1000	-0.1000	-0.1000	0.0250	-0.1000	1.2	-0.1000	30.09	-0.1000	<u>1,326</u>	0.45	7.18	0	0	8.7
1277	-0.1000	0.0722	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	8.7	-0.1000	40.84	-0.1000	<u>1,588</u>	0.11	7.24	0	0	9.8
1278	-0.1000	0.0682	-0.1000	-0.1000	-0.1000	0.0278	-0.1000	6.2	-0.1000	43.20	-0.1000	<u>1,574</u>	-0.10	7.82	0	0	9.7
1279	-0.1000	0.1214	-0.1000	-0.1000	-0.1000	0.2977	<u>0.1638</u>	0.0	-0.1000	55.91	-0.1000	<u>1,813</u>	-0.10	7.82	<u>1</u>	<u>1</u>	10.2
1280	-0.1000	0.0432	-0.1000	-0.1000	-0.1000	0.0408	-0.1000	0.0	-0.1000	43.04	-0.1000	<u>1,045</u>	0.53	7.64	0	0	7.8
1281	-0.1000	0.0647	-0.1000	-0.1000	-0.1000	0.0245	-0.1000	<u>16.3</u>	-0.1000	33.50	-0.1000	<u>2,120</u>	-0.10	7.70	<u>1</u>	0	15.1
1524	-0.1000	0.2230	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	0.4	-0.1000	5.57	-0.1000	766	0.05	6.56	<u>1</u>	0	6.8

detection limits of testing procedure. For Col and Ecoli 1 = present 0 =absent.

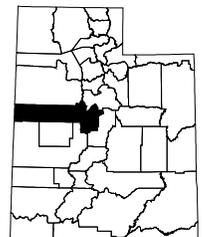
Map 16. Juab County District



- Sample Site
- Irrigated Land
- Water Body
- ▭ SCD Boundary
- Road
- Water Course



District Location



Millard District

The water in this area varies from moderate-hard to very hard, with gpg (grains per gallon) ranging from 3.9 to 47.2 with a mean of 10.7. Water temperatures range from 10.2 °C to 23.2 °C, with a mean of 17.7 °C. The pH for the area has a mean of 8.06 and ranges from 5.58 to 9.41.

Irrigation:

Salinity is a measurement of the concentration of ionic salts dissolved in water. It is measured as electrical conductivity (EC), in $\mu\text{mhos/cm}$. Higher conductivity values indicate higher concentrations of dissolved salts. Water high in dissolved salts increases osmotic pressures, making it difficult for plants to get water necessary for growth. Generally when EC exceeds 750 $\mu\text{mhos/cm}$, salt-sensitive plants begin to be affected. When EC exceeds 3,000 $\mu\text{mhos/cm}$, most plants would be severely injured.

Only fourteen of the 44 samples have EC values less than 750 $\mu\text{mhos/cm}$ (1339, 1340, 1342, 1344, 1352, 1353, 1363, 1364, 1366 through 1371, 1374, 1376, 1379, 1380, 1382, 1506, and 1523). Samples 1366 through 1371 and 1382 exceed the severe-injury level of 3,000 $\mu\text{mhos/cm}$.

SAR measures how much sodium (Na) is in solution compared to calcium (Ca) and magnesium (Mg). Excessive sodium in the soil causes soil particles to repel each other. This destroys the structure of the soil, preventing air and water movement. SAR values greater than 3 mark the beginning of problems and values greater than 9 indicate severe problems. Samples 1366 through 1371, 1381, and 1382 have elevated SAR values. Samples 1366 and 1367 exceed 9 and can indicate severe problems.

Bicarbonate (HCO_3) is an ion common to water solutions. It can be hazardous to plants in excessive amounts, especially when used in sprinkler irrigation. Bicarbonate also causes white deposits on plants and their fruits, which degrades their visual appeal. Bicarbonate also increases the effect of sodium when both are present. Special attention is needed when using water with excessive bicarbonate. With sensitive plants minor problems appear with bicarbonate concentrations in excess of 1.5 meq/l and severe problems appear when it exceeds 8.5 meq/l. All of the samples have high bicarbonate, which is common for water in Utah. None of the samples exceed the 8.5 level.

Samples 1366 through 1371 have elevated boron (B), which is toxic to sensitive plants when concentration exceeds 0.7 ppm. It will cause severe injury at 10.0 ppm. However, boron in trace amounts is required for proper plant growth. It is important to monitor this element because the margin separating safe health from toxicity is small.

Chlorine found in the form of chloride (Cl^-) can damage sensitive plants at concentrations above 145 ppm and concentrations exceeding 355 ppm can cause severe damage to almost all plants. Damage increases under sprinkler irrigation and is more severe in windy conditions. Samples 1335 through 1337, 1343, 1345, 1347, 1350, 1355, 1372, 1378, and 1381 have elevated chlorine. Sample 1381 exceeds the 355 ppm level, indicating the likelihood of damage with any irrigation method.

Samples 1366 and 1367 have elevated concentrations of manganese (Mn). Manganese above 0.2 ppm can injure plants and cause reduction in dry matter production. Excess manganese interferes with the plant's ability to use other nutrients such as calcium (Ca).

Samples 1364 and 1381 have elevated zinc (Zn) that can cause growth problems in plants at concentrations greater than 2.0 ppm in water. High concentrations of zinc decrease root growth and leaf expansion as well as inhibit the uptake of iron and phosphorus.

No other elements were found in concentrations harmful to plants.

Livestock:

Samples 1345, 1368 through 1371, 1381, and 1382 have sulfur (S) exceeding the livestock standard for sulfur. Sulfur in the form of sulfate can cause water to be off flavored and may cause diarrhea in animals not used to drinking it. Problems start when the sulfur level in water exceeds 167 ppm. Sample 1370 has very high sulfur (347.6 ppm) and could cause serious problems for livestock.

No other water quality standards for livestock were exceeded..

Culinary:

Samples 1340, 1366, and 1367 have high pH and may cause alkalinity problems such as mineral buildup. For sample 1523, pH is acidic and may be corrosive to plumbing.

Salinity (EC) for 23 samples exceed the EPA aesthetic standard of 833 $\mu\text{mhos/cm}$. At this level the water may be off-flavored but it is not a health problem until the EC level reaches 3,333 $\mu\text{mhos/cm}$. Samples 1335 through 1338, 1345 through 1351, 1355 1366 through 1373, 1378, 1381, and 1382 all exceed the aesthetic standard for salinity. Samples 1366 through 1371 and 1382 exceed the health standard and should not be used for drinking.

Three minerals, iron (Fe), manganese (Mn), and sulfur (S) were found to exceed the aesthetic drinking water quality standard. Sample 1366 has high iron. This can cause discoloration of plumbing fixtures and promote the growth of iron bacteria that stain anything they contact. Again, this is an aesthetic issue, not a health concern.

Samples 1366 and 1367 have high manganese concentration. EPA has set an aesthetic standard of 0.05 ppm for manganese. Water with high concentrations may cause discoloration of plumbing fixtures and have poor flavor.

Samples 1345, 1367 through 1371, 1381, and 1382 also have high sulfur. Sulfate is a soluble form of sulfur that can cause flavor problems in drinking water if there is more than 83 ppm sulfur. Bacteria in the water metabolize sulfur and produce hydrogen sulfide gas (rotten egg gas). The bacteria that produce this compound can live in plumbing fixtures and even hot water heaters. It is not uncommon to get strong odors when the hot water is turned on in areas where there is high sulfate. Generally, people cannot tolerate the odor from this gas. Even if the gas is not present, high sulfate concentrations can cause diarrhea in people not used to drinking it.

Samples 1335, 1338, and 1371 exceed the EPA nitrate (NO_3) standard of 10 ppm nitrate expressed as nitrogen ($\text{NO}_3\text{-N}$). NO_3 is an important nutrient for plant growth. It is found in nitrogen fertilizers, manure, septic systems, and some minerals. NO_3 is toxic to young infants (usually less than 6 months of age) and causes "blue baby syndrome." NO_3 can only be removed from water by reverse osmosis or distillation.

Samples 1339 and 1347 exceed the EPA primary standard for Selenium (Se) and should not be used for drinking.

The most serious problem with drinking water from private water systems is bacterial contamination. Because disease-causing organisms are rare, non-parasitic coliform bacteria that are found in association with parasitic bacteria are used as indicators to assess whether water could be contaminated with harmful bacteria. Coliform bacteria can occur naturally in the soil, whereas E. coli, a type of coliform, develops only in the digestive systems of mammals. The presence of coliform bacteria indicates that surface water, soil, or other contaminants are entering the well. The presence of E. coli in well water, on the other hand, indicates that mammalian fecal material is entering the well. Bacterial contamination is commonly the result of well construction problems. Contamination may result from inadequate capping, a leaking well casing, improper grouting, or lack of a casing. E. coli contamination can come from defective septic

systems, manure operations or septic systems too close to wells, leaky sewer systems, or shallow water tables.

Samples 1335 through 1338, 1340, 1341, 1344, 1347, 1351, 1354, 1355, 1366, 1371, 1374, 1377, 1380, 1382, and 1506 are contaminated with coliform. Samples 1340 and 1506 are contaminated with E. coli. Wells from which these samples were taken should be inspected carefully to determine the source of contamination and should not be used for culinary purposes until the problem is corrected.

Sample Site Test Data for Millard District

General

Id#	Be	Ca	K	Li	Mg	Na	P	pH	°C	TDS
1334	-0.1000	66.18	1.96	-0.1000	34.40	82.76	-0.10	8.01	19.6	497
1335	-0.1000	105.78	3.54	-0.1000	46.93	54.55	-0.10	7.74	15.8	704
1336	-0.1000	123.13	4.04	0.0607	51.67	53.45	-0.10	8.03	17.7	803
1337	-0.1000	117.48	2.70	-0.1000	71.23	62.25	-0.10	7.85	14.4	927
1338	-0.1000	90.52	1.56	-0.1000	45.89	32.30	-0.10	7.94	14.7	565
1339	-0.1000	36.50	2.13	-0.1000	29.86	33.66	-0.10	8.46	17.1	331
1340	-0.1000	67.36	1.48	-0.1000	31.95	29.10	-0.10	8.52	18.5	448
1341	-0.1000	66.72	1.61	-0.1000	47.01	33.87	-0.10	8.26	17.8	452
1342	-0.1000	74.53	1.95	-0.1000	30.55	32.98	-0.10	8.24	17.2	446
1343	-0.1000	75.77	2.24	-0.1000	34.90	35.62	-0.10	8.32	18.5	491
1344	-0.1000	52.32	1.69	-0.1000	31.90	20.02	-0.10	8.10	17.9	335
1345	-0.1000	139.10	5.11	0.1198	105.13	71.80	-0.10	7.87	18.7	1094
1346	-0.1000	85.93	3.50	0.0737	64.64	32.76	-0.10	8.05	17.1	624
1347	-0.1000	79.74	12.22	0.3005	58.92	87.08	-0.10	8.26	19.4	758
1348	-0.1000	70.37	12.26	0.2719	23.01	75.50	-0.10	7.97	15.8	548
1349	-0.1000	95.97	3.64	0.0651	32.51	40.59	-0.10	7.95	14.2	518
1350	-0.1000	114.09	3.15	-0.1000	31.86	56.61	-0.10	7.90	14.6	617
1351	-0.1000	109.92	5.30	0.0685	33.47	62.23	-0.10	8.11	18.6	649
1352	-0.1000	77.37	2.08	-0.1000	26.14	28.81	-0.10	8.26	18.9	403
1353	-0.1000	75.47	2.02	-0.1000	25.12	27.68	-0.10	8.30	20.4	401
1354	-0.1000	91.85	2.32	-0.1000	34.50	31.23	-0.10	8.10	13.7	490
1355	-0.1000	110.58	3.03	-0.1000	39.19	99.05	-0.10	7.93	14.7	726
1363	-0.1000	72.20	2.55	-0.1000	24.75	27.54	-0.10	8.00	20.5	380
1364	-0.1000	85.43	1.67	-0.1000	29.05	21.00	-0.10	8.04	22.2	389
1365	-0.1000	81.09	2.56	0.0829	28.84	62.06	-0.10	8.06	23.2	487
1366	-0.1000	44.72	74.67	2.1908	86.13	825.31	-0.10	8.98	15.3	3114
1367	-0.1000	80.55	100.76	3.1355	63.75	881.93	-0.10	9.41	22.9	2988
1368	-0.1000	325.61	38.39	1.0947	201.59	457.79	-0.10	7.89	18.5	2808
1369	-0.1000	367.97	55.71	1.8826	155.76	692.03	-0.10	7.61	16.5	3252
1370	-0.1000	498.07	28.70	1.0394	309.76	608.43	-0.10	7.66	16.3	3816
1371	-0.1000	380.36	12.01	1.1384	299.73	538.79	-0.10	7.78	15.2	3360
1372	-0.1000	97.26	11.17	0.2281	37.68	83.77	-0.10	8.13	23.1	636
1373	-0.1000	80.63	5.59	0.1325	34.38	60.25	-0.10	8.00	19.8	503
1374	-0.1000	72.81	4.87	0.1068	31.15	48.94	-0.10	8.49	17.7	435
1375	-0.1000	90.90	2.70	-0.1000	37.07	25.29	-0.10	7.95	18.3	475
1376	-0.1000	80.53	4.18	0.0724	32.77	27.13	-0.10	8.01	18.3	413
1377	-0.1000	87.13	4.05	0.0890	36.26	41.00	-0.10	8.25	18.5	488
1378	-0.1000	106.88	2.54	0.0544	60.68	53.43	-0.10	7.83	16.4	670
1379	-0.1000	70.41	2.03	-0.1000	32.37	24.37	-0.10	7.98	17.9	376
1380	-0.1000	71.22	2.31	-0.1000	33.67	21.13	-0.10	8.16	16.7	373
1381	-0.1000	167.88	20.49	0.7554	106.51	331.51	-0.10	8.25	18.7	1782
1382	-0.1000	292.07	28.08	0.8180	216.87	382.95	-0.10	7.96	23.2	2610
1506	-0.1000	51.17	0.48	-0.1000	22.41	6.26	-0.10	8.23	10.2	217
1523	-0.1000	78.91	0.48	-0.1000	29.65	12.83	-0.10	5.58	13.6	318

Values of -0.1 are below detection limits of testing procedure

Sample Site Test Data for Millard District

Irrigation

Id #	Al	B	Cl	CO3 meq/l	Cu	Fe	HCO3 meq/l	Mn	Se	Zn	SAR	EC umhos/cm
1334	-0.1000	0.18	23.18	-0.10	-0.1000	0.0389	6.73	-0.1000	-0.1000	-0.10	2.1	828
1335	-0.1000	0.11	175.52	-0.10	-0.1000	0.0228	4.91	-0.1000	-0.1000	-0.10	1.1	1,174
1336	-0.1000	0.11	197.84	-0.10	-0.1000	-0.1000	4.68	-0.1000	-0.1000	-0.10	1.0	1,339
1337	-0.1000	0.08	303.22	-0.10	-0.1000	-0.1000	4.09	-0.1000	-0.1000	-0.10	1.1	1,545
1338	-0.1000	-0.10	143.88	-0.10	-0.1000	-0.1000	4.38	-0.1000	-0.1000	-0.10	0.7	942
1339	-0.1000	0.07	75.29	-0.10	-0.1000	-0.1000	3.12	-0.1000	-0.1000	-0.10	1.0	552
1340	-0.1000	-0.10	119.13	-0.10	-0.1000	-0.1000	3.08	-0.1000	-0.1000	0.09	0.7	746
1341	-0.1000	0.10	66.09	-0.10	-0.1000	0.0228	5.53	0.0367	-0.1000	0.08	0.8	754
1342	-0.1000	0.07	136.13	-0.10	-0.1000	0.0328	3.32	0.0353	-0.1000	0.09	0.8	743
1343	0.0423	-0.10	170.29	-0.10	-0.1000	0.0672	2.19	0.0411	-0.1000	0.13	0.8	819
1344	-0.1000	-0.10	41.04	-0.10	-0.1000	-0.1000	4.25	-0.1000	-0.1000	-0.10	0.5	559
1345	-0.1000	0.19	220.08	-0.10	-0.1000	-0.1000	3.36	-0.1000	-0.1000	-0.10	1.1	1,823
1346	-0.1000	0.12	119.77	-0.10	-0.1000	0.0285	3.32	-0.1000	-0.1000	-0.10	0.7	1,040
1347	-0.1000	0.23	171.64	-0.10	-0.1000	0.0341	3.71	-0.1000	-0.1000	-0.10	1.8	1,263
1348	-0.1000	0.42	122.53	-0.10	-0.1000	-0.1000	4.54	-0.1000	-0.1000	-0.10	2.0	914
1349	-0.1000	0.14	91.11	-0.10	-0.1000	-0.1000	4.81	-0.1000	-0.1000	-0.10	0.9	863
1350	-0.1000	0.15	152.84	-0.10	-0.1000	0.0357	3.80	-0.1000	-0.1000	-0.10	1.2	1,029
1351	-0.1000	0.21	123.27	-0.10	-0.1000	-0.1000	5.24	-0.1000	-0.1000	-0.10	1.3	1,082
1352	-0.1000	0.10	50.45	-0.10	-0.1000	0.0465	4.69	-0.1000	-0.1000	-0.10	0.7	672
1353	-0.1000	0.09	50.56	-0.10	-0.1000	-0.1000	4.64	-0.1000	-0.1000	-0.10	0.7	669
1354	-0.1000	0.11	57.71	-0.10	-0.1000	-0.1000	5.99	-0.1000	-0.1000	-0.10	0.7	816
1355	-0.1000	0.40	146.54	-0.10	-0.1000	-0.1000	5.90	-0.1000	-0.1000	-0.10	2.1	1,210
1363	-0.1000	0.11	28.01	-0.10	-0.1000	-0.1000	5.22	-0.1000	-0.1000	1.45	0.7	634
1364	-0.1000	0.08	30.18	-0.10	-0.1000	0.1683	5.43	0.0485	-0.1000	2.30	0.5	649
1365	-0.1000	0.28	81.63	-0.10	-0.1000	0.0220	4.64	0.0225	-0.1000	-0.10	1.5	811
1366	-0.1000	2.13	-0.10	-0.10	-0.1000	0.3324	8.01	0.2798	-0.1000	-0.10	16.6	5,190
1367	-0.1000	2.45	-0.10	-0.10	-0.1000	0.0761	4.04	0.4311	-0.1000	-0.10	17.8	4,980
1368	-0.1000	1.19	-0.10	-0.10	-0.1000	-0.1000	3.94	-0.1000	-0.1000	-0.10	4.9	4,680
1369	-0.1000	2.75	-0.10	-0.10	-0.1000	-0.1000	5.51	-0.1000	-0.1000	-0.10	7.6	5,420
1370	-0.1000	1.44	-0.10	-0.10	-0.1000	-0.1000	4.04	-0.1000	-0.1000	-0.10	5.3	6,360
1371	-0.1000	1.27	-0.10	-0.10	-0.1000	-0.1000	3.10	-0.1000	-0.1000	-0.10	5.0	5,600
1372	-0.1000	0.42	200.92	-0.10	0.0487	0.0413	4.21	0.0212	-0.1000	0.32	1.8	1,060
1373	-0.1000	0.26	86.96	-0.10	-0.1000	-0.1000	4.60	-0.1000	-0.1000	-0.10	1.4	838
1374	-0.1000	0.21	62.09	-0.10	-0.1000	0.0404	4.56	-0.1000	-0.1000	0.16	1.2	725
1375	-0.1000	0.08	118.59	-0.10	-0.1000	0.0277	4.27	-0.1000	-0.1000	-0.10	0.6	792
1376	-0.1000	0.11	84.15	-0.10	-0.1000	0.0347	4.38	-0.1000	-0.1000	-0.10	0.6	688
1377	-0.1000	0.13	114.69	-0.10	-0.1000	-0.1000	4.31	-0.1000	-0.1000	-0.10	0.9	814
1378	-0.1000	0.21	171.04	-0.10	-0.1000	-0.1000	6.11	-0.1000	-0.1000	0.04	1.0	1,116
1379	-0.1000	-0.10	42.39	-0.10	-0.1000	-0.1000	4.97	-0.1000	-0.1000	-0.10	0.6	627
1380	-0.1000	-0.10	35.21	-0.10	-0.1000	-0.1000	5.28	-0.1000	-0.1000	0.06	0.5	622
1381	0.0637	0.55	688.79	-0.10	-0.1000	0.1514	3.67	0.0237	-0.1000	2.19	4.9	2,970
1382	-0.1000	0.62	-0.10	-0.10	-0.1000	0.1212	2.83	-0.1000	-0.1000	0.09	4.1	4,350
1506	-0.1000	-0.10	5.78	-0.10	0.0206	0.0436	3.67	-0.1000	-0.1000	-0.10	0.2	362
1523	-0.1000	-0.10	6.00	-0.10	-0.1000	-0.1000	5.57	0.0485	-0.1000	-0.10	0.3	530

Underlined values exceed irrigation standards. Shaded values indicate severe risks. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure.

Sample Site Test Data for Millard District

Livestock

Id #	Al	As	B	Cd	Co	Cr	Mo	Ni	Pb	S	Se	EC umhos/cm	V	Zn
1334	-0.1000	-0.1000	0.18	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	16.15	-0.1000	828	-0.1000	-0.10
1335	-0.1000	-0.1000	0.11	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	33.04	-0.1000	1,174	-0.1000	-0.10
1336	-0.1000	-0.1000	0.11	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	61.51	-0.1000	1,339	-0.1000	-0.10
1337	-0.1000	-0.1000	0.08	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	46.13	-0.1000	1,545	-0.1000	-0.10
1338	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	11.27	-0.1000	942	-0.1000	-0.10
1339	-0.1000	-0.1000	0.07	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	6.83	-0.1000	552	0.0108	-0.10
1340	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	13.19	-0.1000	746	-0.1000	0.09
1341	-0.1000	-0.1000	0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	15.79	-0.1000	754	-0.1000	0.08
1342	-0.1000	-0.1000	0.07	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	15.91	-0.1000	743	-0.1000	0.09
1343	0.0423	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	16.82	-0.1000	819	-0.1000	0.13
1344	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	5.43	-0.1000	559	-0.1000	-0.10
1345	-0.1000	-0.1000	0.19	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	<u>177.97</u>	-0.1000	1,823	-0.1000	-0.10
1346	-0.1000	-0.1000	0.12	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	73.45	-0.1000	1,040	-0.1000	-0.10
1347	-0.1000	-0.1000	0.23	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	76.45	-0.1000	1,263	0.0105	-0.10
1348	-0.1000	-0.1000	0.42	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	21.10	-0.1000	914	-0.1000	-0.10
1349	-0.1000	-0.1000	0.14	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	26.04	-0.1000	863	-0.1000	-0.10
1350	-0.1000	-0.1000	0.15	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	41.44	-0.1000	1,029	-0.1000	-0.10
1351	-0.1000	-0.1000	0.21	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	42.35	-0.1000	1,082	-0.1000	-0.10
1352	-0.1000	-0.1000	0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	14.79	-0.1000	672	-0.1000	-0.10
1353	-0.1000	-0.1000	0.09	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	14.14	-0.1000	669	-0.1000	-0.10
1354	-0.1000	-0.1000	0.11	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	17.10	-0.1000	816	-0.1000	-0.10
1355	-0.1000	-0.1000	0.40	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	47.55	-0.1000	1,210	-0.1000	-0.10
1363	-0.1000	-0.1000	0.11	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	10.50	-0.1000	634	-0.1000	1.45
1364	-0.1000	-0.1000	0.08	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	9.33	-0.1000	649	-0.1000	2.30
1365	-0.1000	-0.1000	0.28	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	28.09	-0.1000	811	-0.1000	-0.10
1366	-0.1000	-0.1000	2.13	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	3.28	-0.1000	5,190	-0.1000	-0.10
1367	-0.1000	-0.1000	2.45	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	113.02	-0.1000	4,980	-0.1000	-0.10
1368	-0.1000	-0.1000	1.19	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	244.14	-0.1000	4,680	-0.1000	-0.10
1369	-0.1000	-0.1000	2.75	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	<u>322.11</u>	-0.1000	5,420	-0.1000	-0.10
1370	-0.1000	-0.1000	1.44	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	<u>347.63</u>	-0.1000	6,360	-0.1000	-0.10
1371	-0.1000	-0.1000	1.27	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	<u>292.29</u>	-0.1000	5,600	-0.1000	-0.10
1372	-0.1000	-0.1000	0.42	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	37.63	-0.1000	1,060	-0.1000	0.32
1373	-0.1000	-0.1000	0.26	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	36.51	-0.1000	838	-0.1000	-0.10
1374	-0.1000	-0.1000	0.21	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	25.17	-0.1000	725	-0.1000	0.16
1375	-0.1000	-0.1000	0.08	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	11.47	-0.1000	792	-0.1000	-0.10
1376	-0.1000	-0.1000	0.11	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	11.83	-0.1000	688	-0.1000	-0.10
1377	-0.1000	-0.1000	0.13	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	19.67	-0.1000	814	-0.1000	-0.10
1378	-0.1000	-0.1000	0.21	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	17.45	-0.1000	1,116	-0.1000	0.04
1379	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	9.20	-0.1000	627	-0.1000	-0.10
1380	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	9.43	-0.1000	622	-0.1000	0.06
1381	0.0637	-0.1000	0.55	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	<u>203.22</u>	-0.1000	2,970	-0.1000	2.19
1382	-0.1000	-0.1000	0.62	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	<u>224.92</u>	-0.1000	4,350	-0.1000	0.09
1506	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	4.53	-0.1000	362	-0.1000	-0.10
1523	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	5.05	-0.1000	530	-0.1000	-0.10

Underlined values indicate minor health problems (particularly smaller and younger animals). Shaded values indicate a serious health risk. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure.

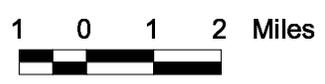
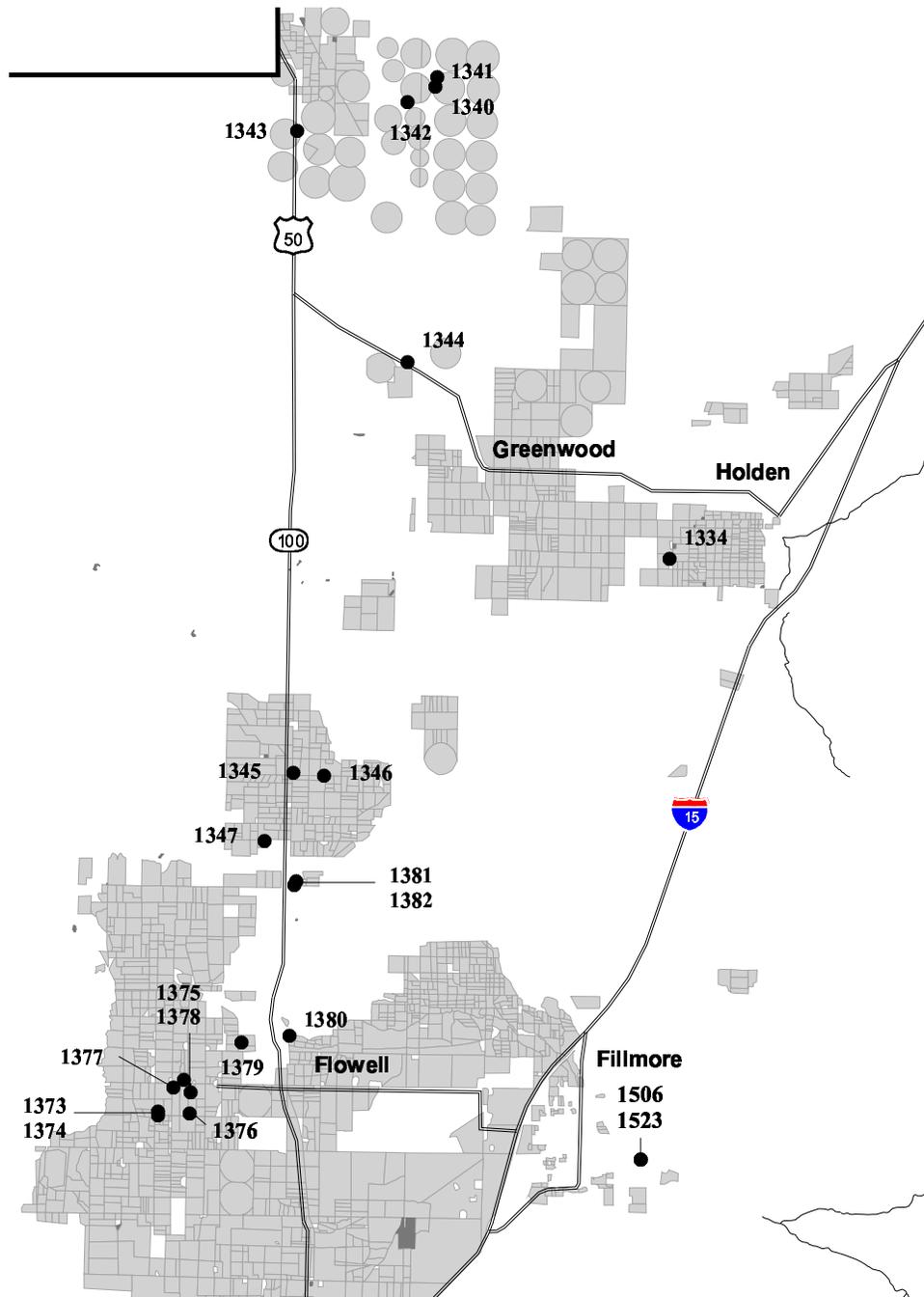
Sample Site Test Data for Millard Section

Culinary

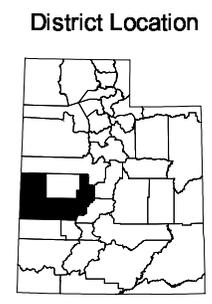
Id #	As	Ba	Cd	Cr	Cu	Fe	Mn	NO3-N	Pb	S	Se	EC umhos/cm	Zn	pH	Col	Ecoli	Hardness gpg
1334	-0.1000	0.0812	-0.1000	-0.1000	-0.1000	0.0389	-0.1000	5.0	-0.1000	16.15	-0.1000	828	-0.10	8.01	0	0	5.9
1335	-0.1000	0.0392	-0.1000	-0.1000	-0.1000	0.0228	-0.1000	12.3	-0.1000	33.04	-0.1000	1,174	-0.10	7.74	1	0	8.9
1336	-0.1000	0.0380	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	9.5	-0.1000	61.51	-0.1000	1,339	-0.10	8.03	1	0	10.2
1337	-0.1000	0.0762	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	7.5	-0.1000	46.13	-0.1000	1,545	-0.10	7.85	1	0	11.0
1338	-0.1000	0.1588	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	11.1	-0.1000	11.27	-0.1000	942	-0.10	7.94	1	0	8.0
1339	-0.1000	0.2233	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.6	-0.1000	6.83	0.0108	552	-0.10	8.46	0	0	3.9
1340	-0.1000	0.1483	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.6	-0.1000	13.19	-0.1000	746	0.09	8.52	1	1	5.8
1341	-0.1000	0.1592	-0.1000	-0.1000	-0.1000	0.0228	0.0367	1.2	-0.1000	15.79	-0.1000	754	0.08	8.26	1	0	6.7
1342	-0.1000	0.1494	-0.1000	-0.1000	-0.1000	0.0328	0.0353	2.2	-0.1000	15.91	-0.1000	743	0.09	8.24	0	0	6.1
1343	-0.1000	0.1349	-0.1000	-0.1000	-0.1000	0.0672	0.0411	2.2	-0.1000	16.82	-0.1000	819	0.13	8.32	0	0	6.5
1344	-0.1000	0.1356	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	2.0	-0.1000	5.43	-0.1000	559	-0.10	8.10	1	0	4.9
1345	-0.1000	0.0225	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.8	-0.1000	177.97	-0.1000	1,823	-0.10	7.87	0	0	14.3
1346	-0.1000	0.0339	-0.1000	-0.1000	-0.1000	0.0285	-0.1000	2.4	-0.1000	73.45	-0.1000	1,040	-0.10	8.05	0	0	8.8
1347	-0.1000	0.0424	-0.1000	-0.1000	-0.1000	0.0341	-0.1000	0.8	-0.1000	76.45	0.0105	1,263	-0.10	8.26	1	0	8.1
1348	-0.1000	0.0934	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	2.6	-0.1000	21.10	-0.1000	914	-0.10	7.97	0	0	5.5
1349	-0.1000	0.1939	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	5.2	-0.1000	26.04	-0.1000	863	-0.10	7.95	0	0	7.5
1350	-0.1000	0.1229	-0.1000	-0.1000	-0.1000	0.0357	-0.1000	3.4	-0.1000	41.44	-0.1000	1,029	-0.10	7.90	0	0	8.5
1351	-0.1000	0.0767	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	8.7	-0.1000	42.35	-0.1000	1,082	-0.10	8.11	1	0	8.4
1352	-0.1000	0.1443	-0.1000	-0.1000	-0.1000	0.0465	-0.1000	2.8	-0.1000	14.79	-0.1000	672	-0.10	8.26	0	0	6.1
1353	-0.1000	0.1305	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	6.9	-0.1000	14.14	-0.1000	669	-0.10	8.30	0	0	5.9
1354	-0.1000	0.1659	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	3.8	-0.1000	17.10	-0.1000	816	-0.10	8.10	1	0	7.4
1355	-0.1000	0.0531	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	6.9	-0.1000	47.55	-0.1000	1,210	-0.10	7.93	1	0	8.8
1363	-0.1000	0.0766	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	0.5	-0.1000	10.50	-0.1000	634	1.45	8.00	0	0	5.7
1364	-0.1000	0.2242	-0.1000	-0.1000	-0.1000	0.1683	0.0485	0.0	-0.1000	9.33	-0.1000	649	2.30	8.04	0	0	6.7
1365	-0.1000	0.0783	-0.1000	-0.1000	-0.1000	0.0220	0.0225	2.5	-0.1000	28.09	-0.1000	811	-0.10	8.06	0	0	6.4
1366	-0.1000	0.0545	-0.1000	-0.1000	-0.1000	0.3324	0.2798	0.1	-0.1000	3.28	-0.1000	5,190	-0.10	8.98	1	0	7.7
1367	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	0.0761	0.4311	0.0	-0.1000	113.02	-0.1000	4,980	-0.10	9.41	0	0	8.4
1368	-0.1000	0.0703	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.7	-0.1000	244.14	-0.1000	4,680	-0.10	7.89	0	0	30.8
1369	-0.1000	0.0388	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	2.5	-0.1000	322.11	-0.1000	5,420	-0.10	7.61	0	0	30.6
1370	-0.1000	0.0522	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.7	-0.1000	347.63	-0.1000	6,360	-0.10	7.66	0	0	47.2
1371	-0.1000	0.0533	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	36.0	-0.1000	292.29	-0.1000	5,600	-0.10	7.78	1	0	39.8
1372	-0.1000	0.1277	-0.1000	-0.1000	0.0487	0.0413	0.0212	3.2	-0.1000	37.63	-0.1000	1,060	0.32	8.13	0	0	7.9
1373	-0.1000	0.0562	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	3.3	-0.1000	36.51	-0.1000	838	-0.10	8.00	0	0	6.7
1374	-0.1000	0.1425	-0.1000	-0.1000	-0.1000	0.0404	-0.1000	3.7	-0.1000	25.17	-0.1000	725	0.16	8.49	1	0	6.1
1375	-0.1000	0.2363	-0.1000	-0.1000	-0.1000	0.0277	-0.1000	4.3	-0.1000	11.47	-0.1000	792	-0.10	7.95	0	0	7.5
1376	-0.1000	0.1688	-0.1000	-0.1000	-0.1000	0.0347	-0.1000	4.1	-0.1000	11.83	-0.1000	688	-0.10	8.01	0	0	6.6
1377	-0.1000	0.1208	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.7	-0.1000	19.67	-0.1000	814	-0.10	8.25	1	0	7.2
1378	-0.1000	0.1350	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	5.4	-0.1000	17.45	-0.1000	1,116	0.04	7.83	0	0	9.8
1379	-0.1000	0.1888	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	3.5	-0.1000	9.20	-0.1000	627	-0.10	7.98	0	0	6.0
1380	-0.1000	0.1987	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	3.2	-0.1000	9.43	-0.1000	622	0.06	8.16	1	0	6.1
1381	-0.1000	0.0336	-0.1000	-0.1000	-0.1000	0.1514	0.0237	2.2	-0.1000	203.22	-0.1000	2,970	2.19	8.25	0	0	16.0
1382	-0.1000	0.0321	-0.1000	-0.1000	-0.1000	0.1212	-0.1000	7.2	-0.1000	224.92	-0.1000	4,350	0.09	7.96	1	0	29.8
1506	-0.1000	0.0717	-0.1000	-0.1000	0.0206	0.0436	-0.1000	0.0	-0.1000	4.53	-0.1000	362	-0.10	8.23	1	1	4.3
1523	-0.1000	0.1225	-0.1000	-0.1000	-0.1000	-0.1000	0.0485	0.0	-0.1000	5.05	-0.1000	530	-0.10	5.58	0	0	6.3

detection limits of testing procedure. For Col and Ecoli 1 = present 0 =absent.

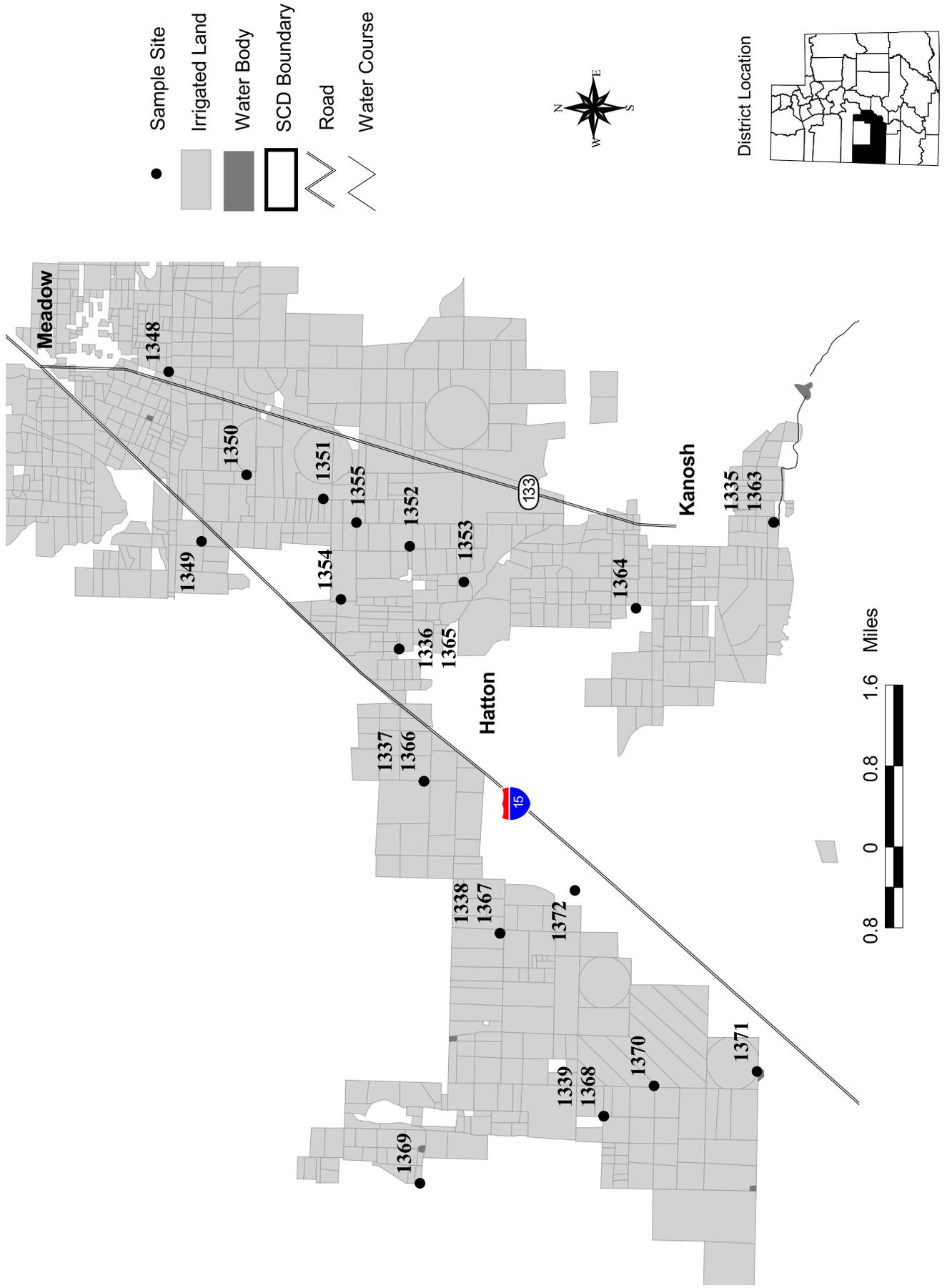
Map 17. Millard District, North Section



- Sample Site
- Irrigated Land
- Water Body
- ▭ SCD Boundary
- ⚡ Road
- ⚡ Water Course



Map 18. Millard District, South Section



Sanpete County District

The water in this area varies from soft to very hard, with gpg (grains per gallon) ranging from 0.6 to 19.3 with a mean of 8.2. Water temperatures range from 11.1 °C to 18.9 °C, with a mean of 13.33 °C. The pH for the area has a mean of 8.31 and ranges from 7.53 to 9.45. Samples 1391 and 1396 have high pH and may cause alkalinity problems such as mineral buildup.

Irrigation:

Salinity is a measurement of the concentration of ionic salts dissolved in water. It is measured as electrical conductivity (EC), in $\mu\text{mhos/cm}$. Higher conductivity values indicate higher concentrations of dissolved salts. Water high in dissolved salts increases osmotic pressures, making it difficult for plants to get water necessary for growth. Generally when EC exceeds 750 $\mu\text{mhos/cm}$, salt-sensitive plants begin to be affected. When EC exceeds 3,000 $\mu\text{mhos/cm}$, most plants would be severely injured. All but four samples have EC values greater than 750 $\mu\text{mhos/cm}$, including samples 1390, 1391, 1397 and 1399. No samples exceed the severe-injury level of 3,000 $\mu\text{mhos/cm}$.

SAR measures how much sodium (Na) is in solution compared to calcium (Ca) and magnesium (Mg). Excessive sodium in the soil causes soil particles to repel each other. This destroys the structure of the soil, preventing air and water movement. SAR values greater than 3 mark the beginning of problems and values greater than 9 indicate severe problems. Samples 1393 and 1396 have elevated SAR; sample 1396 has a SAR value of 16.0, making it a very high risk to use for irrigation.

Bicarbonate (HCO_3) is an ion common to water solutions. It can be hazardous to plants in excessive amounts, especially when used in sprinkler irrigation. Bicarbonate also causes white deposits on plants and their fruits, which degrades their visual appeal. Bicarbonate also increases the effect of sodium when both are present. Special attention is needed when using water with excessive bicarbonate. With sensitive plants minor problems appear with bicarbonate concentrations in excess of 1.5 meq/l and severe problems appear when it exceeds 8.5 meq/l. All of the samples have high bicarbonate, which is common for water in Utah. Sample 1400 exceeds the 8.5 level.

Chlorine, found in the form of chloride (Cl^-), can damage sensitive plants at concentrations above 145 ppm and concentrations exceeding 355 ppm can cause severe damage to almost all plants. Damage increases under sprinkler irrigation and is more severe in windy conditions. Samples 1393, 1394, and 1400 have elevated chlorine. Samples 1387, 1389, 1391, 1393, 1394, and 1397 have elevated zinc (Zn) that can cause growth problems in plants at concentrations greater than 2.0 ppm in water. High concentrations of zinc decrease root growth and leaf expansion as well as inhibit the uptake of iron and phosphorus.

No other elements were found in concentrations harmful to plants.

Livestock:

Samples 1393, 1394, and 1400 have sulfur (S) concentrations which exceed the livestock standard for sulfur. Sulfur as sulfate can cause water to be off flavored and can cause diarrhea in animals not used to drinking it. Problems start when the sulfur level in water exceeds 167 ppm. Sample 1393 has very high sulfur that could cause serious problems if given to livestock.

Culinary:

Salinity (EC) for eight samples exceed the EPA aesthetic standard of 833 $\mu\text{mhos/cm}$. At this level the water may be off-flavored but it is not a health problem until the EC level reaches 3,333. Samples 1385, 1389, 1393 through 1396, 1400, and 1434 exceed the aesthetic standard for salinity.

Three minerals, iron (Fe), manganese (Mn), and sulfur (S), were found in certain samples to exceed the aesthetic drinking water quality standard. Samples 1396 and 1400 have high iron (Fe). This can cause discoloration of plumbing fixtures and promote the growth of iron bacteria, which stain anything they contact. Again, this is an aesthetic issue, not a health concern. Sample 1395 has high manganese (Mn) concentration. EPA has set an aesthetic standard of 0.05 ppm for manganese. Water with high concentrations may cause discoloration of plumbing fixtures and have poor flavor.

Samples 1393, 1394, and 1400 have high sulfur (S). Sulfate is a soluble form of sulfur that can cause flavor problems in drinking water if there is more than 83 ppm sulfur. Bacteria in the water metabolize sulfur and produce hydrogen sulfide gas (rotten egg gas). The bacteria that produce this compound can live in plumbing fixtures and even hot water heaters. It is not uncommon to get strong odors when the hot water is turned on in areas where there is high sulfate. Generally, people cannot tolerate the odor from this gas. Even if the gas is not present, high sulfate concentrations can cause diarrhea in people not used to drinking it. Sample 1393 exceeded the primary health standard for the mineral zinc (Zn) at 5.11 ppm. Water from this well should not be used for drinking.

The most serious problem with drinking water from private water systems is bacterial contamination. Because disease-causing organisms are rare, non-parasitic coliform bacteria that are found in association with parasitic bacteria are used as indicators to assess whether water could be contaminated with harmful bacteria. Coliform bacteria can occur naturally in the soil, whereas *E. coli*, a type of coliform, develops only in the digestive systems of mammals. The presence of coliform bacteria indicates that surface water, soil, or other contaminants are entering the well. The presence of *E. coli* in well water, on the other hand, indicates that mammalian fecal material is entering the well. Bacterial contamination is commonly the result of well construction problems. Contamination may result from inadequate capping, a leaking well casing, improper grouting, or lack of a casing. *E. coli* contamination can come from defective septic systems, manure operations or septic systems too close to wells, leaky sewer systems, or shallow water tables.

Samples 1386, 1387, and 1434 are contaminated with coliform. Wells from which these samples were collected should be inspected carefully to determine the source of contamination and should not be used for culinary purposes until the problem is corrected.

Sample Site Test Data for Sanpete County District

General

Id #	Be	Ca	K	Li	Mg	Na	P	pH	°C	TDS
1385	-0.1000	93.75	1.39	0.0580	65.16	75.04	-0.10	8.09	12.8	668
1386	-0.1000	68.56	2.70	0.0990	48.99	29.91	-0.10	8.18	11.9	469
1387	-0.1000	86.22	2.46	-0.1000	35.13	46.76	-0.10	8.15	11.2	473
1388	-0.1000	67.33	2.37	-0.1000	41.31	50.61	-0.10	8.21	13.7	466
1389	-0.1000	92.99	1.69	-0.1000	48.27	39.21	-0.10	8.32	11.7	539
1390	-0.1000	42.52	2.09	-0.1000	34.39	59.33	-0.10	8.39	12.4	406
1391	-0.1000	52.33	1.80	-0.1000	51.75	26.13	-0.10	8.67	11.1	433
1392	-0.1000	86.36	2.19	-0.1000	36.08	45.54	-0.10	8.27	13.2	496
1393	-0.1000	145.09	3.63	0.1770	98.77	438.88	-0.10	8.29	12.7	1656
1394	-0.1000	171.29	2.58	0.0766	107.01	173.25	-0.10	8.46	11.6	1184
1395	-0.1000	80.29	1.77	-0.1000	61.03	40.33	-0.10	8.24	13.5	527
1396	-0.1000	6.66	2.31	0.1115	3.54	205.68	-0.10	9.45	17.1	579
1397	-0.1000	51.72	1.13	-0.1000	32.72	11.03	-0.10	8.43	14.3	274
1398	-0.1000	67.68	1.76	0.0722	61.44	31.96	-0.10	8.15	12.3	456
1399	-0.1000	66.83	1.23	-0.1000	25.66	15.78	-0.10	8.13	18.9	311
1400	-0.1000	157.10	5.34	0.2449	172.67	60.78	-0.10	7.53	16.0	1185
1434	-0.1000	73.74	2.47	-0.1000	43.23	49.80	-0.10	8.30	12.2	514

Values of -0.1 are below detection limits of testing procedure

Sample Site Test Data for Sanpete County District

Irrigation

Id #	Al	B	Cl	CO3 meq/l	Cu	Fe	HCO3 meq/l	Mn	Se	Zn	SAR	EC umhos/cm
1385	-0.1000	0.12	128.89	-0.10	-0.1000	0.0262	6.54	-0.1000	-0.1000	0.26	1.5	1,113
1386	-0.1000	0.09	73.52	-0.10	-0.1000	0.2296	5.18	-0.1000	-0.1000	0.42	0.7	782
1387	-0.1000	0.10	86.65	-0.10	-0.1000	-0.1000	4.93	-0.1000	-0.1000	4.51	1.1	789
1388	-0.1000	0.09	79.20	-0.10	0.0435	-0.1000	5.01	-0.1000	-0.1000	0.43	1.2	777
1389	-0.1000	0.09	89.33	-0.10	-0.1000	0.0225	4.99	-0.1000	-0.1000	3.78	0.8	899
1390	-0.1000	0.08	62.10	-0.10	-0.1000	0.0277	4.69	-0.1000	-0.1000	-0.10	1.6	677
1391	-0.1000	-0.10	85.55	-0.10	-0.1000	0.0532	3.55	-0.1000	-0.1000	2.19	0.6	721
1392	-0.1000	0.08	85.40	-0.10	-0.1000	0.0437	4.99	-0.1000	-0.1000	0.72	1.0	826
1393	-0.1000	0.30	296.33	-0.10	-0.1000	-0.1000	4.09	-0.1000	-0.1000	5.11	6.9	2,760
1394	-0.1000	0.13	177.42	-0.10	-0.1000	0.0303	4.93	-0.1000	-0.1000	3.78	2.6	1,973
1395	-0.1000	0.07	93.15	-0.10	-0.1000	0.1999	5.08	0.0584	-0.1000	0.06	0.8	878
1396	1.0470	0.24	138.78	-0.10	-0.1000	0.5095	3.69	-0.1000	-0.1000	0.07	16.0	965
1397	-0.1000	-0.10	6.81	-0.10	-0.1000	0.1161	4.50	-0.1000	-0.1000	2.48	0.3	457
1398	-0.1000	0.09	16.51	-0.10	-0.1000	0.0212	6.09	-0.1000	-0.1000	-0.10	0.7	760
1399	-0.1000	-0.10	5.17	-0.10	-0.1000	0.1942	5.06	0.0328	-0.1000	0.49	0.4	518
1400	-0.1000	0.16	247.67	-0.10	-0.1000	1.7079	8.98	0.0386	-0.1000	0.62	0.8	1,975
1434	-0.1000	0.09	50.22	-0.10	-0.1000	0.0463	4.81	-0.1000	-0.1000	0.70	1.1	856

Underlined values exceed irrigation standards. Shaded values indicate severe risks. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure.

Sample Site Test Data for Sanpete County District

Livestock

Id #	Al	As	B	Cd	Co	Cr	Mo	Ni	Pb	S	Se	EC umhos/cm	V	Zn
1385	-0.1000	-0.1000	0.12	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	41.22	-0.1000	1,113	-0.1000	0.26
1386	-0.1000	-0.1000	0.09	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	29.30	-0.1000	782	-0.1000	0.42
1387	-0.1000	-0.1000	0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	17.60	-0.1000	789	-0.1000	4.51
1388	-0.1000	-0.1000	0.09	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	20.44	-0.1000	777	-0.1000	0.43
1389	-0.1000	-0.1000	0.09	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	41.05	-0.1000	899	-0.1000	3.78
1390	-0.1000	-0.1000	0.08	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	12.48	-0.1000	677	-0.1000	-0.10
1391	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	28.61	-0.1000	721	-0.1000	2.19
1392	-0.1000	-0.1000	0.08	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	24.09	-0.1000	826	-0.1000	0.72
1393	-0.1000	-0.1000	0.30	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	364.78	-0.1000	2,760	-0.1000	5.11
1394	-0.1000	-0.1000	0.13	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	273.67	-0.1000	1,973	-0.1000	3.78
1395	-0.1000	-0.1000	0.07	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	37.89	-0.1000	878	-0.1000	0.06
1396	1.0470	-0.1000	0.24	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	28.71	-0.1000	965	-0.1000	0.07
1397	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	4.84	-0.1000	457	-0.1000	2.48
1398	-0.1000	-0.1000	0.09	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	35.79	-0.1000	760	-0.1000	-0.10
1399	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	8.10	-0.1000	518	-0.1000	0.49
1400	-0.1000	-0.1000	0.16	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	171.96	-0.1000	1,975	-0.1000	0.62
1434	-0.1000	-0.1000	0.09	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	34.66	-0.1000	856	-0.1000	0.70

Underlined values indicate minor health problems (particularly smaller and younger animals). Shaded values indicate a serious health risk. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure.

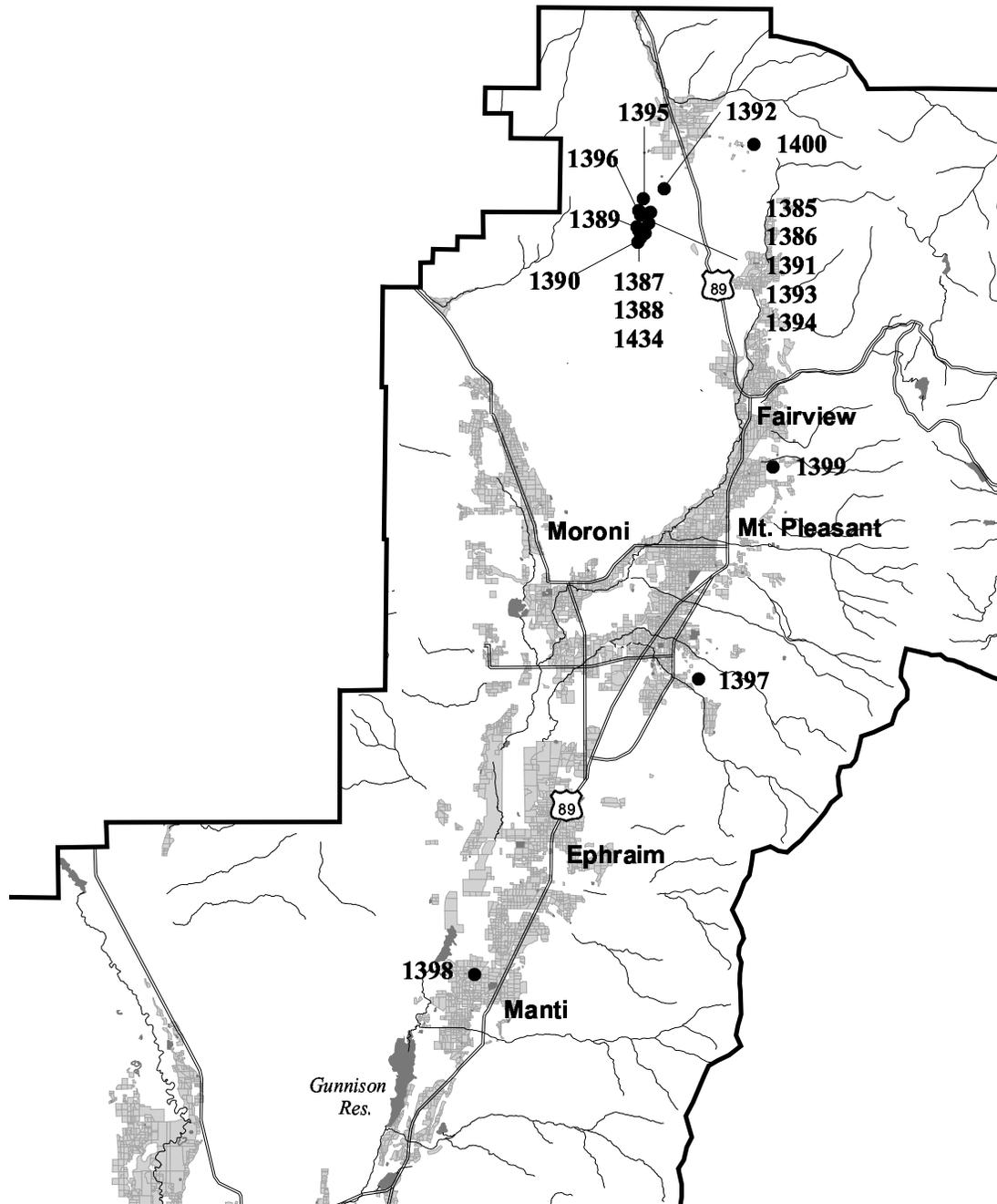
Sample Site Test Data for Sanpete County District

Culinary

Id #	As	Ba	Cd	Cr	Cu	Fe	Mn	NO3-N	Pb	S	Se	EC umhos/cm	Zn	pH	Col	Ecoli	Hardness gpg
1385	-0.1000	0.0804	-0.1000	-0.1000	-0.1000	0.0262	-0.1000	0.2	-0.1000	41.22	-0.1000	1,113	0.26	8.09	0	0	9.3
1386	-0.1000	0.0942	-0.1000	-0.1000	-0.1000	0.2296	-0.1000	0.0	-0.1000	29.30	-0.1000	782	0.42	8.18	1	0	6.9
1387	-0.1000	0.1198	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	0.1	-0.1000	17.60	-0.1000	789	4.51	8.15	1	0	7.1
1388	-0.1000	0.1413	-0.1000	-0.1000	0.0435	-0.1000	-0.1000	0.0	-0.1000	20.44	-0.1000	777	0.43	8.21	0	0	6.4
1389	-0.1000	0.0656	-0.1000	-0.1000	-0.1000	0.0225	-0.1000	0.4	-0.1000	41.05	-0.1000	899	3.78	8.32	0	0	8.3
1390	-0.1000	0.1022	-0.1000	-0.1000	-0.1000	0.0277	-0.1000	0.0	-0.1000	12.48	-0.1000	677	-0.10	8.39	0	0	4.5
1391	-0.1000	0.0901	-0.1000	-0.1000	-0.1000	0.0532	-0.1000	0.0	-0.1000	28.61	-0.1000	721	2.19	8.67	0	0	6.1
1392	-0.1000	0.2881	-0.1000	-0.1000	-0.1000	0.0437	-0.1000	0.7	-0.1000	24.09	-0.1000	826	0.72	8.27	0	0	7.2
1393	-0.1000	0.0243	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	0.0	-0.1000	364.78	-0.1000	2,760	5.11	8.29	0	0	14.3
1394	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	0.0303	-0.1000	0.0	-0.1000	273.67	-0.1000	1,973	3.78	8.46	0	0	16.3
1395	-0.1000	0.0541	-0.1000	-0.1000	-0.1000	0.1999	0.0584	0.0	-0.1000	37.89	-0.1000	878	0.06	8.24	0	0	8.3
1396	-0.1000	0.0311	-0.1000	-0.1000	-0.1000	0.5095	-0.1000	0.5	-0.1000	28.71	-0.1000	965	0.07	9.45	0	0	0.6
1397	-0.1000	0.2278	-0.1000	-0.1000	-0.1000	0.1161	-0.1000	0.7	-0.1000	4.84	-0.1000	457	2.48	8.43	0	0	4.9
1398	-0.1000	0.0499	-0.1000	-0.1000	-0.1000	0.0212	-0.1000	3.3	-0.1000	35.79	-0.1000	760	-0.10	8.15	0	0	7.6
1399	-0.1000	0.1509	-0.1000	-0.1000	-0.1000	0.1942	0.0328	0.7	-0.1000	8.10	-0.1000	518	0.49	8.13	0	0	5.4
1400	-0.1000	0.0258	-0.1000	-0.1000	-0.1000	1.7079	0.0386	0.0	-0.1000	171.96	-0.1000	1,975	0.62	7.53	0	0	19.3
1434	-0.1000	0.0868	-0.1000	-0.1000	-0.1000	0.0463	-0.1000	0.4	-0.1000	34.66	-0.1000	856	0.70	8.30	1	0	6.8

detection limits of testing procedure. For Col and Ecoli 1 = present 0 = absent.

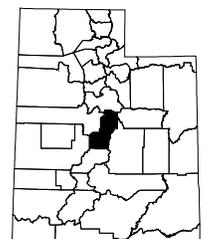
Map 19. Sanpete County District



- Sample Site
- Irrigated Land
- Water Body
- ▭ SCD Boundary
- ══ Road
- Water Course



District Location



Sevier County District

The water in this area varies from moderate-hard to very hard, with gpg (grains per gallon) ranging from 6.65 to 15.23 with a mean of 9.62. Water temperatures range from 12.3 °C to 18.9 °C, with a mean of 14.32 °C. The pH for the area has a mean of 7.06 and ranges from 6.63 to 7.78.

Irrigation:

Salinity is a measurement of the concentration of ionic salts dissolved in water. It is measured as electrical conductivity (EC), in $\mu\text{mhos/cm}$. Higher conductivity values indicate higher concentrations of dissolved salts. Water high in dissolved salts increases osmotic pressures, making it difficult for plants to get water necessary for growth. Generally when EC exceeds 750 $\mu\text{mhos/cm}$, salt-sensitive plants begin to be affected. When EC exceeds 3,000 $\mu\text{mhos/cm}$, most plants would be severely injured. Two samples have EC values greater than 750 $\mu\text{mhos/cm}$ (1498 and 1500). No samples exceed the severe-injury level of 3,000 $\mu\text{mhos/cm}$.

SAR measures how much sodium (Na) is in solution compared to calcium (Ca) and magnesium (Mg). Excessive sodium in the soil causes soil particles to repel each other. This destroys the structure of the soil, preventing air and water movement. SAR values greater than 3 mark the beginning of problems and values greater than 9 indicate severe problems. None of the water sampled in this district has elevated SAR values.

Bicarbonate (HCO_3) is an ion common to water solutions. It can be hazardous to plants in excessive amounts, especially when used in sprinkler irrigation. Bicarbonate also causes white deposits on plants and their fruits, which degrades their visual appeal. Bicarbonate also increases the effect of sodium when both are present. Special attention is needed when using water with excessive bicarbonate. With sensitive plants minor problems appear with bicarbonate concentrations in excess of 1.5 meq/l and severe problems appear when it exceeds 8.5 meq/l. All of the samples have high bicarbonate, which is common for water in Utah. Sample 1500 exceeds the 8.5 level.

Sample 1500 has elevated boron (B), which is toxic to sensitive plants when concentration exceeds 0.7 ppm. It will cause severe injury at 10.0 ppm. However, Boron in trace amounts is required for proper plant growth. It is important to monitor this element because the margin separating safe health from toxicity is small.

No other elements were found in concentrations harmful to plants.

Livestock:

Sample 1500 has elevated molybdenum (Mo). Livestock eating plants irrigated with water that has molybdenum concentration greater than 0.01 ppm may be harmed. High concentrations of molybdenum interfere with copper nutrition in livestock.

No other water quality standards for livestock were exceeded.

Culinary:

Salinity (EC) for two samples, 1498 and 1500, exceeds the EPA aesthetic standard of 833 $\mu\text{mhos/cm}$. At this level the water may be off-flavored but it is not a health problem until the EC level reaches 3,333.

Samples 1498 and 1500 have high sulfur. Sulfate is a soluble form of sulfur that can cause flavor problems in drinking water if there is more than 83 ppm sulfur. Bacteria in the water metabolize sulfur and produce hydrogen sulfide gas (rotten egg gas). The bacteria that produce this compound can live in plumbing fixtures and even hot water heaters. It is not uncommon to get strong odors when the hot water

is turned on in areas where there is high sulfate. Generally, people cannot tolerate the odor from this gas. Even if the gas is not present, high sulfate concentrations can cause diarrhea in people not used to drinking it.

The most serious problem with drinking water from private water systems is bacterial contamination. Because disease-causing organisms are rare, non-parasitic coliform bacteria that are found in association with parasitic bacteria are used as indicators to assess whether water could be contaminated with harmful bacteria. Coliform bacteria can occur naturally in the soil, whereas *E. coli*, a type of coliform, develops only in the digestive systems of mammals. The presence of coliform bacteria indicates that surface water, soil, or other contaminants are entering the well. The presence of *E. coli* in well water, on the other hand, indicates that mammalian fecal material is entering the well. Bacterial contamination is commonly the result of well construction problems. Contamination may result from inadequate capping, a leaking well casing, improper grouting, or lack of a casing. *E. coli* contamination can come from defective septic systems, manure operations or septic systems too close to wells, leaky sewer systems, or shallow water tables.

Neither coliform nor *E. coli* were found in any of these samples.

Sample Site Test Data for Sevier County District

General

Id #	Be	Ca	K	Li	Mg	Na	P	pH	°C	TDS
1498	-0.1000	187.12	7.31	-0.1000	73.97	34.64	-0.10	6.63	12.3	743
1499	-0.1000	67.24	2.49	-0.1000	60.78	43.55	-0.10	7.78	18.9	30
1500	-0.1000	86.02	3.61	0.0602	113.34	156.47	-0.10	6.75	14.3	875
1501	-0.1000	86.47	3.64	-0.1000	27.19	21.55	-0.10	7.14	12.8	359
1502	-0.1000	93.52	3.36	-0.1000	27.06	19.92	-0.10	7.02	13.3	373

Values of -0.1 are below detection limits of testing procedure

Irrigation

Id #	Al	B	Cl	CO3 meq/l	Cu	Fe	HCO3 meq/l	Mn	Se	Zn	SAR	EC umhos/cm
1498	-0.1000	0.16	106.35	-0.10	-0.1000	0.1612	4.27	0.0470	-0.1000	0.07	0.5	1,239
1499	-0.1000	0.16	22.30	-0.10	-0.1000	0.0287	6.91	-0.1000	-0.1000	0.12	0.9	50
1500	-0.1000	0.87	128.92	-0.10	0.0281	0.0357	9.91	0.0214	-0.1000	0.11	2.6	1,458
1501	-0.1000	0.14	23.18	-0.10	-0.1000	0.0314	4.60	-0.1000	-0.1000	-0.10	0.5	598
1502	-0.1000	0.16	31.57	-0.10	-0.1000	0.0258	4.69	-0.1000	-0.1000	0.05	0.5	621

Underlined values exceed irrigation standards. Shaded values indicate severe risks. All values are mg/l unless labeled differently.

Values of -0.1 are below detection limits of testing procedure.

Livestock

Id #	Al	As	B	Cd	Co	Cr	Mo	Ni	Pb	S	Se	EC umhos/cm	V	Zn
1498	-0.1000	-0.1000	0.16	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	133.22	-0.1000	1,239	-0.1000	0.07
1499	-0.1000	-0.1000	0.16	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	22.84	-0.1000	50	-0.1000	0.12
1500	-0.1000	-0.1000	0.87	-0.1000	-0.1000	-0.1000	0.0170	-0.1000	-0.1000	89.97	-0.1000	1,458	-0.1000	0.11
1501	-0.1000	-0.1000	0.14	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	19.92	-0.1000	598	-0.1000	-0.10
1502	-0.1000	-0.1000	0.16	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	22.30	-0.1000	621	-0.1000	0.05

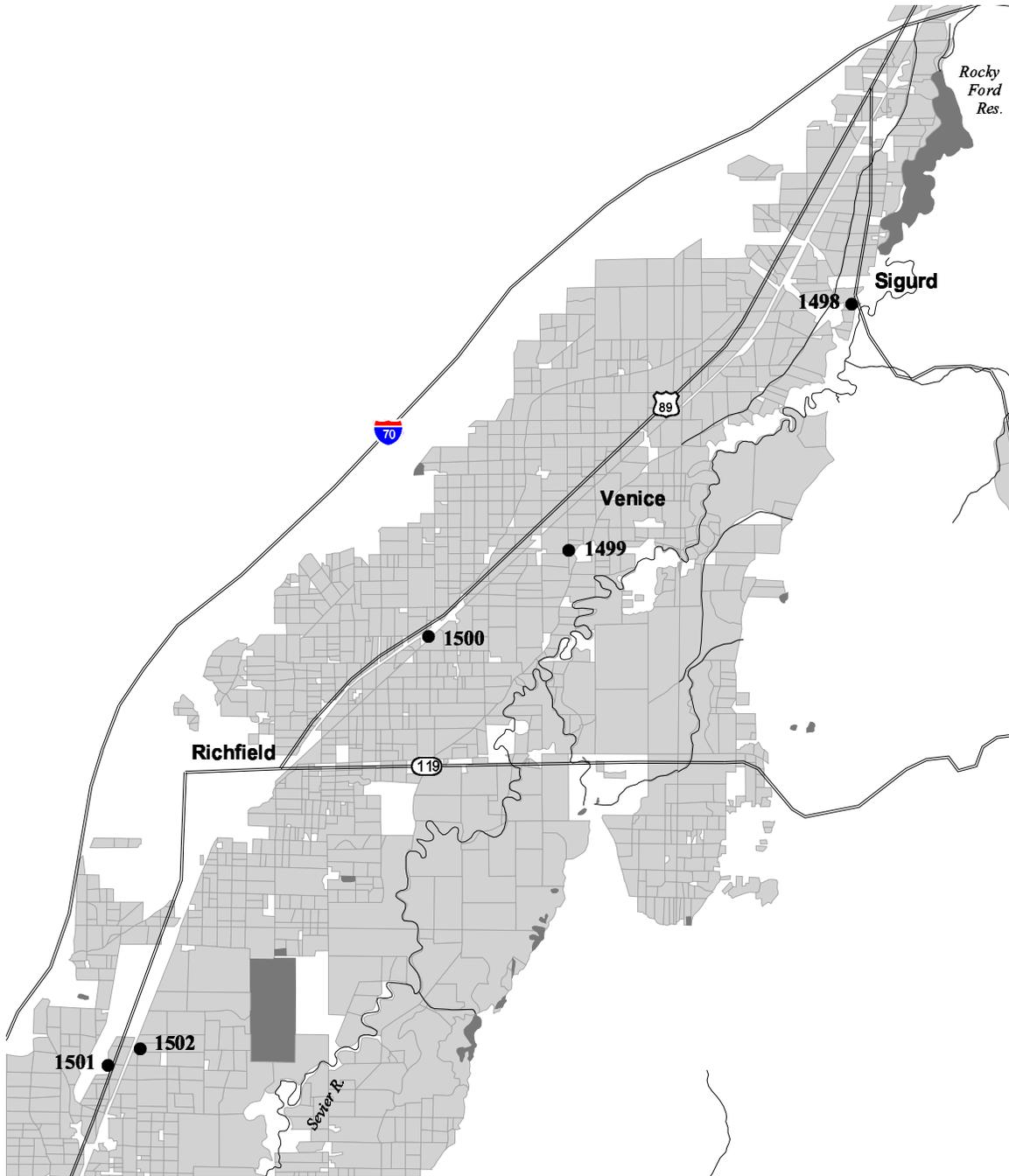
Underlined values indicate minor health problems (particularly smaller and younger animals). Shaded values indicate a serious health risk. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure.

Culinary

Id #	As	Ba	Cd	Cr	Cu	Fe	Mn	NO3-N	Pb	S	Se	EC umhos/cm	Zn	pH	Col	Ecoli	Hardness gpg
1498	-0.1000	0.0388	-0.1000	-0.1000	-0.1000	0.1612	0.0470	3.9	-0.1000	133.22	-0.1000	1,239	0.07	6.63	0	0	15.3
1499	-0.1000	0.0692	-0.1000	-0.1000	-0.1000	0.0287	-0.1000	3.6	-0.1000	22.84	-0.1000	50	0.12	7.78	0	0	7.5
1500	-0.1000	0.0299	-0.1000	-0.1000	-0.1000	0.0357	0.0214	0.8	-0.1000	89.97	-0.1000	1,458	0.11	6.75	0	0	11.7
1501	-0.1000	0.0748	-0.1000	-0.1000	-0.1000	0.0314	-0.1000	1.8	-0.1000	19.92	-0.1000	598	-0.10	7.14	0	0	6.6
1502	-0.1000	0.0722	-0.1000	-0.1000	-0.1000	0.0258	-0.1000	2.0	-0.1000	22.30	-0.1000	621	0.05	7.02	0	0	7.1

detection limits of testing procedure. For Col and Ecoli 1 = present

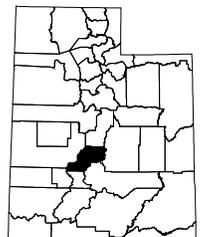
Map 20. Sevier County District



- Sample Site
- Irrigated Land
- Water Body
- SCD Boundary
- ∩ Road
- ∩ Water Course



District Location



Zone 5

UACD Zone 5 consists of seven districts in five counties, including Beaver, Iron, Garfield, Kane, and Washington counties.

Thirty-three sites were sampled in four districts of Zone 5 during the spring, summer, and fall of 2001. Three wells were sampled in the Beaver District, twenty-six in the Dixie District, two in the Enterprise & Iron (E & I) District, and two in the Upper Sevier District. A separate narrative report is presented for each district. These reports include data tables and maps showing locations of sample sites. Each report covers three categories of water quality criteria—Irrigation, livestock and culinary. Since water use may overlap among these categories for a single well, analytical results are compared to all three sets of criteria.

Beaver District

The water in this area varies from soft to moderate with gpg (grains per gallon) ranging from 1.4 to 2.2 with a mean of 1.8. Water temperatures range from 11.2 °C to 18.3 °C, with a mean of 14.63 °C. The pH for the area has a mean of 7.80 and ranges from 7.2 to 8.19.

Irrigation:

Salinity is a measurement of the concentration of ionic salts dissolved in water. It is measured as electrical conductivity (EC), in $\mu\text{mhos/cm}$. Higher conductivity values indicate higher concentrations of dissolved salts. Water high in dissolved salts increases osmotic pressures, making it difficult for plants to get water necessary for growth. Generally when EC exceeds 750 $\mu\text{mhos/cm}$, salt-sensitive plants begin to be affected. When EC exceeds 3,000 $\mu\text{mhos/cm}$, most plants would be severely injured. No samples have EC values greater than 750 $\mu\text{mhos/cm}$.

The sodium absorption ratio (SAR) measures how much sodium (Na) is in solution compared to calcium (Ca) and magnesium (Mg). Excessive sodium in the soil causes soil particles to repel each other. This destroys the structure of the soil, preventing air and water movement. SAR values greater than 3 mark the beginning of problems and values greater than 9 indicate severe problems. None of the water sampled in this district has elevated SAR values.

Bicarbonate (HCO_3) is an ion common to water solutions. It can be hazardous to plants in excessive amounts, especially when used in sprinkler irrigation. Bicarbonate also causes white deposits on plants and their fruits, which degrades their visual appeal. Bicarbonate also increases the effect of sodium when both are present. Special attention is needed when using water with excessive bicarbonate. With sensitive plants minor problems appear with bicarbonate concentrations in excess of 1.5 meq/l and severe problems appear when it exceeds 8.5 meq/l. Only sample 1185 has high bicarbonate.

No other elements were found in concentrations harmful to plants.

Livestock:

No water quality standards for livestock were exceeded.

Culinary:

Sample 1187 has high iron (Fe). This can cause discoloration of plumbing fixtures and promote the growth of iron bacteria, which stain anything they contact. This is an aesthetic issue, not a health concern.

The most serious problem with drinking water from private water systems is bacterial contamination. Because disease-causing organisms are rare, non-parasitic coliform bacteria that are found in association with parasitic bacteria are used as indicators to assess whether water could be contaminated with harmful bacteria. Coliform bacteria can occur naturally in the soil, whereas *E. coli*, a type of coliform, develops only in the digestive systems of mammals. The presence of coliform bacteria indicates that surface water, soil, or other contaminants are entering the well. The presence of *E. coli* in well water, on the other hand, indicates that mammalian fecal material is entering the well. Bacterial contamination is commonly the result of well construction problems. Contamination may result from inadequate capping, a leaking well casing, improper grouting, or lack of a casing. *E. coli* contamination can come from defective septic systems, manure operations or septic systems too close to wells, leaky sewer systems, or shallow water tables.

No samples are contaminated with coliform or *E. coli*.

Sample Site Test Data for Beaver District

General

Id #	Be	Ca	K	Li	Mg	Na	P	pH	°C	TDS
1185	-0.1000	31.07	0.82	-0.1000	6.86	12.17	-0.10	8.00	14.4	226
1186	-0.1000	25.39	0.64	-0.1000	2.95	14.55	-0.10	8.19	18.3	182
1187	-0.1000	16.67	2.38	-0.1000	7.56	4.51	-0.10	7.20	11.2	139

Values of -0.1 are below detection limits of testing procedure

Irrigation

Id #	Al	B	Cl	CO3 meq/l	Cu	Fe	HCO3 meq/l	Mn	Se	Zn	SAR	EC umhos/cm
1185	-0.1000	-0.10	13.24	-0.10	-0.1000	-0.1000	1.51	-0.1000	-0.1000	-0.10	0.5	376
1186	-0.1000	-0.10	11.61	-0.10	-0.1000	-0.1000	1.28	-0.1000	-0.1000	0.04	0.7	303
1187	0.1043	-0.10	-0.10	-0.10	0.0254	0.7022	1.36	-0.1000	-0.1000	0.04	0.2	232

Underlined values exceed irrigation standards. Shaded values indicate severe risks. All values are mg/l unless labeled differently.

Values of -0.1 are below detection limits of testing procedure.

Livestock

Id #	Al	As	B	Cd	Co	Cr	Mo	Ni	Pb	S	Se	EC umhos/cm	V	Zn
1185	-0.1000	-0.10	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	10.05	-0.1000	376	-0.1000	-0.10
1186	-0.1000	-0.10	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	5.73	-0.1000	303	-0.1000	0.04
1187	0.1043	-0.10	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	2.12	-0.1000	232	-0.1000	0.04

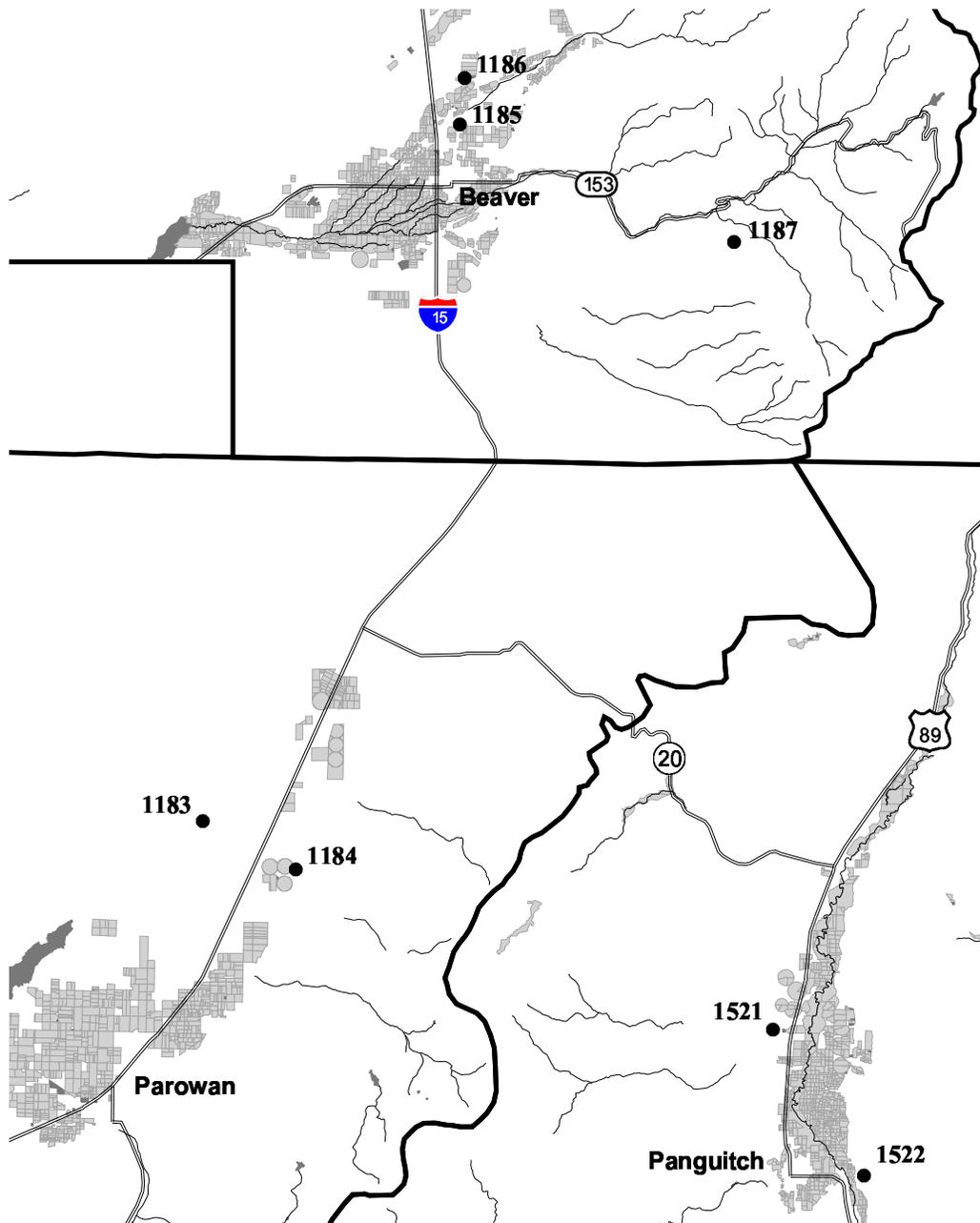
Underlined values indicate minor health problems (particularly smaller and younger animals). Shaded values indicate a serious health risk. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure.

Culinary

Id #	As	Ba	Cd	Cr	Cu	Fe	Mn	NO3-N	Pb	S	Se	EC umhos/cm	Zn	pH	Col	Ecoli	Hardness gpg
1185	-0.1000	0.0496	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.1	-0.1000	10.0531	-0.1000	376	-0.10	8.00	0	0	2.2
1186	-0.1000	0.0297	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.0	-0.1000	5.7336	-0.1000	303	0.04	8.19	0	0	1.7
1187	-0.1000	-0.1000	-0.1000	-0.1000	0.0254	0.7022	-0.1000	1.6	-0.1000	2.1164	-0.1000	232	0.04	7.20	0	0	1.4

Underlined values exceed Secondary (aesthetic) standards. Shaded values exceed Primary (health) standards. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure. For Col and Ecoli 1 = present 0 =absent.

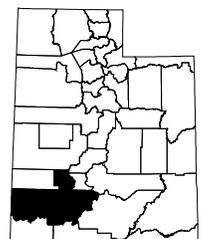
Map 21. Beaver, E&I, and Upper Sevier Districts



- Sample Site
- Irrigated Land
- Water Body
- ▭ SCD Boundary
- ══ Road
- Water Course



District Location



Dixie District

The water in this area varies from moderate-hard to very hard, with gpg (grains per gallon) ranging from 7.0 to 31.6, with a mean of 15.1. Water temperatures range from 1.7 °C to 26.9 °C, with a mean of 19.82 °C. The pH for the area has a mean of 7.28 and ranges from 6.50 to 7.73.

Irrigation:

Salinity is a measurement of the concentration of ionic salts dissolved in water. It is measured as electrical conductivity (EC), in $\mu\text{mhos/cm}$. Higher conductivity values indicate higher concentrations of dissolved salts. Water high in dissolved salts increases osmotic pressures, making it difficult for plants to get water necessary for growth. Generally when EC exceeds 750 $\mu\text{mhos/cm}$, salt-sensitive plants begin to be affected. When EC exceeds 3,000 $\mu\text{mhos/cm}$, most plants would be severely injured. No samples in this district exceed the 750 $\mu\text{mhos/cm}$ standard or exceed the severe injury level of 3,000 $\mu\text{mhos/cm}$.

SAR measures how much sodium (Na) is in solution compared to calcium (Ca) and magnesium (Mg). Excessive sodium in the soil causes soil particles to repel each other. This destroys the structure of the soil, preventing air and water movement. SAR values greater than 3 mark the beginning of problems and values greater than 9 indicate severe problems. None of the water sampled in this district has elevated SAR values.

Bicarbonate (HCO_3) is an ion common to water solutions. It can be hazardous to plants in excessive amounts, especially when used in sprinkler irrigation. Bicarbonate also causes white deposits on plants and their fruits, which degrades their visual appeal. Bicarbonate also increases the effect of sodium when both are present. Special attention is needed when using water with excessive bicarbonate. With sensitive plants minor problems appear with bicarbonate concentrations in excess of 1.5 meq/l and severe problems appear when it exceeds 8.5 meq/l. All of the samples have high bicarbonate except for 1182. High bicarbonate concentrations are common for water in Utah.

Some specific elements can be toxic to plants. Sample 1176 has elevated Boron (B) which is toxic to sensitive plants when it exceeds 0.7 ppm. It will cause severe injury at 10.0 ppm. However, Boron in trace amounts is required for proper plant growth. It is important to monitor this element because the margin separating safe health from toxicity is small.

Chlorine found in the form of chloride (Cl^-) can damage sensitive plants at concentrations above 145 ppm and concentrations exceeding 355 ppm can cause severe damage to almost all plants. Damage increases under sprinkler irrigation and is more severe in windy conditions. Samples 1170, 1176, and 1181 have elevated chlorine.

Samples 1157 and 1168 have elevated concentrations of manganese (Mn). Manganese above 0.2 ppm can injure plants and cause reduction in dry matter production. Excess manganese interferes with the plant's ability to use other nutrients such as calcium (Ca).

No other elements were found in concentrations harmful to plants.

Livestock:

Sulfate (SO_4) is shown on chemical analyses as sulfur (S). Sulfur as sulfate can cause water to be off flavored and diarrhea in animals not used to drinking it. Problems start when the sulfur level in water exceeds 167 ppm. Samples 1162, 1163, 1165, 1168, and 1171 through 1181 have elevated sulfur. Samples 1165, 1175, and 1176 have very high sulfur and should not be used to water livestock.

No other water quality standards for livestock were exceeded.

Culinary:

Salinity (EC) for all samples exceeds the EPA aesthetic standard of 833 $\mu\text{mhos/cm}$. At this level the water may be off-flavored, but it is not a health problem until the EC level reaches 3,333. Samples 1175 and 1176 exceed the health standard.

Sample 1181 exceeds the EPA standard for Arsenic (As) and should not be used for drinking water.

Three minerals, iron (Fe), manganese (Mn), and sulfur (S) were found to exceed the aesthetic drinking water quality standard in some samples. Samples 1157 and 1167 have high iron. This can cause discoloration of plumbing fixtures and promote the growth of iron bacteria, which stain anything they contact. Again, this is an aesthetic issue, not a health concern.

Samples 1157, 1167, and 1168 have high manganese concentration. EPA has set an aesthetic standard of 0.05 ppm for manganese. Water with high concentrations may cause discoloration of plumbing fixtures and have poor flavor.

All samples except 1158 and 1164 have high sulfur. Sulfate is a soluble form of sulfur that can cause flavor problems in drinking water if there is more than 83 ppm sulfur. Bacteria in the water use sulfur and produce hydrogen sulfide gas (rotten egg gas). The bacteria that produce this compound can live in plumbing fixtures and even hot water heaters. It is not uncommon to get strong odors when the hot water is turned on in areas where there is high sulfate. Generally people can not tolerate the odor from this gas. Even if the gas is not present, high sulfate concentrations can cause diarrhea in people not used to drinking it.

The most serious problem with drinking water from private water systems is bacterial contamination. Because disease-causing organisms are rare, non-parasitic coliform bacteria that are found in association with parasitic bacteria are used as indicators to assess whether water could be contaminated with harmful bacteria. Coliform bacteria can occur naturally in the soil, whereas *E. coli*, a type of coliform, develops only in the digestive systems of mammals. The presence of coliform bacteria indicates that surface water, soil, or other contaminants are entering the well. The presence of *E. coli* in well water, on the other hand, indicates that mammalian fecal material is entering the well. Bacterial contamination is commonly the result of well construction problems. Contamination may result from inadequate capping, a leaking well casing, improper grouting, or lack of a casing. *E. coli* contamination can come from defective septic systems, manure operations or septic systems too close to wells, leaky sewer systems, or shallow water tables. Samples 1167, 1168, 1171, 1175, and 1180 are contaminated with coliform. Wells from which these samples were collected should be inspected carefully to determine the source of contamination and should not be used for culinary purposes until the problem is corrected.

No samples were contaminated with *E. coli*.

Sample Site Test Data for Dixie District

General

Id #	Be	Ca	K	Li	Mg	Na	P	pH	°C	TDS
1157	-0.1000	132.09	3.44	-0.1000	48.40	47.67	-0.10	7.26	17.0	957
1158	-0.1000	98.53	1.90	-0.1000	21.56	21.33	-0.10	7.32	17.2	602
1159	-0.1000	128.26	2.09	-0.1000	58.11	36.06	-0.10	7.47	17.7	976
1160	-0.1000	116.96	2.06	-0.1000	57.56	37.95	-0.10	7.39	17.0	942
1161	-0.1000	126.52	2.16	-0.1000	59.12	36.87	-0.10	7.36	17.6	979
1162	-0.1000	255.71	2.33	-0.1000	71.80	36.31	-0.10	7.20	18.1	1446
1163	-0.1000	228.97	2.45	-0.1000	74.48	36.88	-0.10	7.20	18.4	1362
1164	-0.1000	102.27	1.87	-0.1000	43.26	30.14	-0.10	7.36	17.2	789
1165	-0.1000	308.20	2.66	-0.1000	90.54	41.59	-0.10	7.23	19.9	1632
1166	-0.1000	132.60	1.81	-0.1000	66.37	42.35	-0.10	7.17	16.5	1050
1167	-0.1000	136.58	2.09	-0.1000	67.43	48.06	-0.10	7.15	17.5	1078
1168	-0.1000	168.15	4.25	-0.1000	61.78	88.79	-0.10	7.04	22.8	1314
1169	-0.1000	155.01	1.13	-0.1000	67.08	35.12	-0.10	7.24	16.6	1088
1170	-0.1000	137.96	2.51	-0.1000	82.43	169.05	-0.10	7.64	25.6	1644
1171	-0.1000	177.33	10.97	-0.1000	88.92	68.28	-0.10	7.00	22.6	1368
1172	-0.1000	148.90	8.91	-0.1000	71.96	55.93	-0.10	7.60	22.2	1133
1173	-0.1000	154.99	7.20	-0.1000	88.25	73.50	-0.10	7.49	20.5	1344
1174	-0.1000	175.86	8.16	-0.1000	91.99	75.25	-0.10	7.63	23.5	1434
1175	-0.1000	338.66	9.23	-0.1000	117.11	118.72	-0.10	7.67	26.1	2064
1176	-0.1000	375.52	10.54	-0.1000	164.62	190.32	-0.10	7.50	26.2	2694
1177	-0.1000	203.00	7.96	-0.1000	103.02	82.81	-0.10	7.00	26.9	1602
1178	-0.1000	198.29	8.06	-0.1000	104.74	82.60	-0.10	7.00	20.6	1596
1179	-0.1000	172.66	8.23	-0.1000	89.95	71.93	-0.10	6.50	26.4	1404
1180	-0.1000	189.19	11.81	-0.1000	89.99	103.32	-0.10	7.00	20.0	1518
1181	-0.1000	169.24	11.00	-0.1000	117.05	112.00	-0.10	7.00	19.5	1620
1182	-0.1000	139.74	3.30	-0.1000	24.77	49.93	-0.10	7.73	1.7	885

Values of -0.1 are below detection limits of testing procedure

Sample Site Test Data for Dixie District

Irrigation

Id #	Al	B	Cl	CO3 meq/l	Cu	Fe	HCO3 meq/l	Mn	Se	Zn	SAR	EC umhos/cm
1157	-0.1000	-0.10	36.65	-0.10	-0.1000	0.6115	4.81	0.2736	-0.1000	0.81	0.9	1.595
1158	-0.1000	-0.10	23.96	-0.10	-0.1000	0.0777	4.25	0.0245	-0.1000	-0.10	0.5	1.004
1159	-0.1000	-0.10	54.57	-0.10	-0.1000	0.0276	3.41	-0.1000	-0.1000	-0.10	0.7	1.627
1160	-0.1000	-0.10	47.59	-0.10	-0.1000	0.0263	3.49	-0.1000	-0.1000	-0.10	0.7	1.570
1161	-0.1000	-0.10	48.75	-0.10	-0.1000	0.0253	3.36	-0.1000	-0.1000	0.06	0.7	1.631
1162	-0.1000	0.08	41.90	-0.10	-0.1000	0.1511	3.41	0.0352	-0.1000	-0.10	0.5	2.410
1163	-0.1000	-0.10	39.39	-0.10	-0.1000	-0.1000	3.32	-0.1000	-0.1000	0.04	0.5	2.270
1164	-0.1000	-0.10	50.67	-0.10	-0.1000	0.0237	3.01	-0.1000	-0.1000	-0.10	0.6	1.315
1165	-0.1000	0.11	39.31	-0.10	-0.1000	0.0474	3.20	-0.1000	-0.1000	-0.10	0.5	2.720
1166	-0.1000	0.07	71.17	-0.10	-0.1000	-0.1000	3.80	-0.1000	-0.1000	-0.10	0.7	1.750
1167	-0.1000	0.09	78.55	-0.10	-0.1000	0.4635	3.82	0.1721	-0.1000	0.33	0.8	1.796
1168	-0.1000	-0.10	76.93	-0.10	-0.1000	0.1418	4.83	0.4339	-0.1000	0.11	1.5	2.190
1169	-0.1000	-0.10	51.89	-0.10	-0.1000	0.0220	4.19	-0.1000	-0.1000	0.18	0.6	1.814
1170	-0.1000	0.50	228.20	-0.10	-0.1000	0.0337	4.60	-0.1000	-0.1000	0.04	2.8	2.740
1171	-0.1000	0.16	63.12	-0.10	-0.1000	-0.1000	3.03	-0.1000	-0.1000	-0.10	1.0	2.280
1172	-0.1000	0.12	56.36	-0.10	-0.1000	-0.1000	2.87	-0.1000	-0.1000	-0.10	0.9	1.889
1173	-0.1000	0.19	74.11	-0.10	-0.1000	-0.1000	2.81	-0.1000	-0.1000	0.08	1.2	2.240
1174	-0.1000	0.21	97.68	-0.10	-0.1000	0.1714	2.95	-0.1000	-0.1000	-0.10	1.1	2.390
1175	-0.1000	0.53	128.22	-0.10	-0.1000	0.1193	2.19	-0.1000	-0.1000	0.27	1.4	3.440
1176	-0.1000	1.14	197.30	-0.10	-0.1000	0.0399	2.21	-0.1000	-0.1000	0.63	2.1	4.490
1177	-0.1000	0.25	115.32	-0.10	-0.1000	-0.1000	2.93	-0.1000	-0.1000	0.11	1.2	2.670
1178	-0.1000	0.24	112.83	-0.10	-0.1000	0.0330	2.99	-0.1000	-0.1000	0.11	1.2	2.660
1179	-0.1000	0.20	81.46	-0.10	-0.1000	0.0611	3.05	-0.1000	-0.1000	0.39	1.1	2.340
1180	-0.1000	0.29	88.92	-0.10	-0.1000	0.0637	3.03	-0.1000	-0.1000	0.13	1.5	2.530
1181	-0.1000	0.47	152.07	-0.10	-0.1000	-0.1000	3.69	-0.1000	-0.1000	0.05	1.6	2.700
1182	0.0434	-0.10	60.39	-0.10	-0.1000	-0.1000	0.47	-0.1000	-0.1000	0.58	1.0	1.475

Underlined values exceed irrigation standards. Shaded values indicate severe risks. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure.

Sample Site Test Data for Dixie District

Livestock

Id #	Al	As	B	Cd	Co	Cr	Mo	Ni	Pb	S	Se	EC umhos/cm	V	Zn
1157	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0293</u>	-0.10	-0.1000	115.19	-0.1000	1,595	-0.1000	0.81
1158	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0152</u>	-0.10	-0.1000	40.85	-0.1000	1,004	-0.1000	-0.10
1159	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0197</u>	-0.10	-0.1000	118.49	-0.1000	1,627	-0.1000	-0.10
1160	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0228</u>	-0.10	-0.1000	114.61	-0.1000	1,570	-0.1000	-0.10
1161	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0208</u>	-0.10	-0.1000	125.27	-0.1000	1,631	-0.1000	0.06
1162	-0.1000	-0.1000	0.08	-0.1000	-0.1000	-0.1000	<u>0.0228</u>	-0.10	-0.1000	<u>272.25</u>	-0.1000	2,410	-0.1000	-0.10
1163	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0230</u>	-0.10	-0.1000	<u>245.83</u>	-0.1000	2,270	-0.1000	0.04
1164	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0139</u>	-0.10	-0.1000	80.98	-0.1000	1,315	-0.1000	-0.10
1165	-0.1000	-0.1000	0.11	-0.1000	-0.1000	-0.1000	<u>0.0303</u>	-0.10	-0.1000	<u>339.36</u>	-0.1000	2,720	-0.1000	-0.10
1166	-0.1000	-0.1000	0.07	-0.1000	-0.1000	-0.1000	<u>0.0216</u>	-0.10	-0.1000	<u>126.45</u>	-0.1000	1,750	-0.1000	-0.10
1167	-0.1000	-0.1000	0.09	-0.1000	-0.1000	-0.1000	<u>0.0209</u>	-0.10	-0.1000	133.32	-0.1000	1,796	-0.1000	0.33
1168	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0360</u>	-0.10	-0.1000	<u>168.60</u>	-0.1000	2,190	-0.1000	0.11
1169	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0137</u>	-0.10	-0.1000	155.22	-0.1000	1,814	-0.1000	0.18
1170	-0.1000	-0.1000	0.50	-0.1000	-0.1000	-0.1000	<u>0.0149</u>	-0.10	-0.1000	146.42	-0.1000	2,740	-0.1000	0.04
1171	-0.1000	-0.1000	0.16	-0.1000	-0.1000	-0.1000	<u>0.0365</u>	-0.10	-0.1000	<u>235.72</u>	-0.1000	2,280	-0.1000	-0.10
1172	-0.1000	-0.1000	0.12	-0.1000	-0.1000	-0.1000	<u>0.0273</u>	-0.10	-0.1000	<u>179.72</u>	-0.1000	1,889	-0.1000	-0.10
1173	-0.1000	-0.1000	0.19	-0.1000	-0.1000	-0.1000	<u>0.0380</u>	-0.10	-0.1000	<u>208.65</u>	-0.1000	2,240	-0.1000	0.08
1174	-0.1000	-0.1000	0.21	-0.1000	-0.1000	-0.1000	<u>0.0482</u>	-0.10	-0.1000	<u>239.46</u>	-0.1000	2,390	-0.1000	-0.10
1175	-0.1000	-0.1000	0.53	-0.1000	-0.1000	-0.1000	<u>0.0791</u>	-0.10	-0.1000	<u>430.52</u>	-0.1000	3,440	-0.1000	0.27
1176	-0.1000	-0.1000	1.14	-0.1000	-0.1000	-0.1000	<u>0.1226</u>	-0.10	-0.1000	<u>581.70</u>	-0.1000	4,490	-0.1000	0.63
1177	-0.1000	-0.1000	0.25	-0.1000	-0.1000	-0.1000	<u>0.0513</u>	-0.10	-0.1000	<u>260.16</u>	-0.1000	2,670	-0.1000	0.11
1178	-0.1000	-0.1000	0.24	-0.1000	-0.1000	-0.1000	<u>0.0503</u>	-0.10	-0.1000	<u>268.63</u>	-0.1000	2,660	-0.1000	0.11
1179	-0.1000	-0.1000	0.20	-0.1000	-0.1000	-0.1000	<u>0.0421</u>	-0.10	-0.1000	<u>230.02</u>	-0.1000	2,340	-0.1000	0.39
1180	-0.1000	-0.1000	0.29	-0.1000	-0.1000	-0.1000	<u>0.0800</u>	-0.10	-0.1000	<u>259.66</u>	-0.1000	2,530	0.0100	0.13
1181	-0.1000	0.0501	0.47	-0.1000	-0.1000	-0.1000	<u>0.1005</u>	-0.10	-0.1000	<u>260.12</u>	-0.1000	2,700	0.0135	0.05
1182	0.0434	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0305</u>	0.03	-0.1000	<u>162.23</u>	-0.1000	1,475	-0.1000	0.58

Underlined values indicate minor health problems (particularly smaller and younger animals). Shaded values indicate a serious health risk. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure.

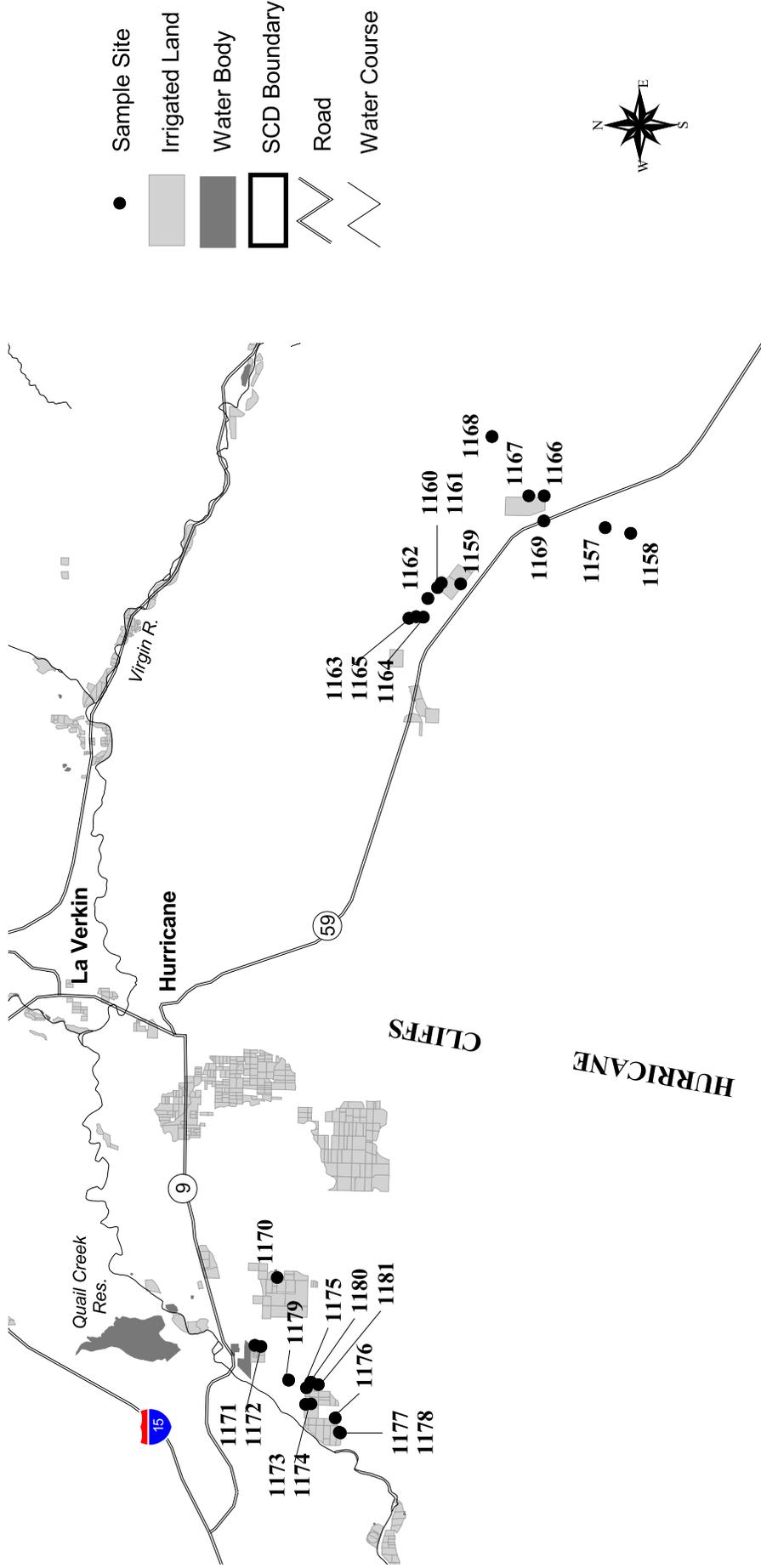
Sample Site Test Data for Dixie District

Culinary

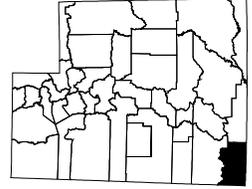
Id #	As	Ba	Cd	Cr	Cu	Fe	Mn	NO3-N	Pb	S	Se	EC mhos/cf	Zn	pH	Col	Ecoli	Hardness gpg
1157	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	<u>0.6115</u>	<u>0.2736</u>	0.6	-0.1000	<u>115.19</u>	-0.1000	<u>1.595</u>	0.81	7.26	0	0	10.6
1158	-0.1000	0.0333	-0.1000	-0.1000	-0.1000	0.0777	0.0245	1.6	-0.1000	40.85	-0.1000	<u>1.004</u>	-0.10	7.32	0	0	7.0
1159	-0.1000	0.0366	-0.1000	-0.1000	-0.1000	0.0276	-0.1000	3.5	-0.1000	<u>118.49</u>	-0.1000	<u>1.627</u>	-0.10	7.47	0	0	10.9
1160	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	0.0263	-0.1000	5.2	-0.1000	<u>114.61</u>	-0.1000	<u>1.570</u>	-0.10	7.39	0	0	10.2
1161	-0.1000	0.0218	-0.1000	-0.1000	-0.1000	0.0253	-0.1000	3.3	-0.1000	<u>125.27</u>	-0.1000	<u>1.631</u>	0.06	7.36	0	0	10.9
1162	-0.1000	0.0221	-0.1000	-0.1000	-0.1000	0.1511	0.0352	3.7	-0.1000	<u>272.25</u>	-0.1000	<u>2.410</u>	-0.10	7.20	0	0	19.2
1163	-0.1000	0.0227	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.8	-0.1000	<u>245.83</u>	-0.1000	<u>2.270</u>	0.04	7.20	0	0	17.7
1164	-0.1000	0.0238	-0.1000	-0.1000	-0.1000	0.0237	-0.1000	4.4	-0.1000	80.98	-0.1000	<u>1.315</u>	-0.10	7.36	0	0	8.5
1165	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	0.0474	-0.1000	4.0	-0.1000	<u>339.36</u>	-0.1000	<u>2.720</u>	-0.10	7.23	0	0	23.3
1166	-0.1000	0.0215	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.4	-0.1000	<u>126.45</u>	-0.1000	<u>1.750</u>	-0.10	7.17	0	0	11.6
1167	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	<u>0.4635</u>	<u>0.1721</u>	2.6	-0.1000	<u>133.32</u>	-0.1000	<u>1.796</u>	0.33	7.15	<u>1</u>	0	11.9
1168	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	0.1418	<u>0.4339</u>	2.7	-0.1000	<u>168.60</u>	-0.1000	<u>2.190</u>	0.11	7.04	<u>1</u>	0	13.4
1169	-0.1000	0.0216	-0.1000	-0.1000	-0.1000	0.0220	-0.1000	1.0	-0.1000	<u>155.22</u>	-0.1000	<u>1.814</u>	0.18	7.24	0	0	13.0
1170	-0.1000	0.1008	-0.1000	-0.1000	-0.1000	0.0337	-0.1000	4.0	-0.1000	<u>146.42</u>	-0.1000	<u>2.740</u>	0.04	7.64	0	0	12.9
1171	-0.1000	0.0226	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	3.3	-0.1000	<u>235.72</u>	-0.1000	<u>2.280</u>	-0.10	7.00	<u>1</u>	0	15.6
1172	-0.1000	0.0228	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	4.5	-0.1000	<u>179.72</u>	-0.1000	<u>1.889</u>	-0.10	7.60	0	0	12.9
1173	-0.1000	0.0223	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	3.7	-0.1000	<u>208.65</u>	-0.1000	<u>2.240</u>	0.08	7.49	0	0	14.2
1174	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	0.1714	-0.1000	3.3	-0.1000	<u>239.46</u>	-0.1000	<u>2.390</u>	-0.10	7.63	0	0	15.7
1175	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	0.1193	-0.1000	3.1	-0.1000	<u>430.52</u>	-0.1000	<u>3.440</u>	0.27	7.67	<u>1</u>	0	26.7
1176	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	0.0399	-0.1000	5.0	-0.1000	<u>581.70</u>	-0.1000	<u>4490.00</u>	0.63	7.50	0	0	31.6
1177	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	5.5	-0.1000	<u>260.16</u>	-0.1000	<u>2.670</u>	0.11	7.00	0	0	17.9
1178	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	0.0330	-0.1000	3.1	-0.1000	<u>268.63</u>	-0.1000	<u>2.660</u>	0.11	7.00	0	0	17.7
1179	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	0.0611	-0.1000	4.1	-0.1000	<u>230.02</u>	-0.1000	<u>2.340</u>	0.39	6.50	0	0	15.4
1180	-0.1000	0.0230	-0.1000	-0.1000	-0.1000	0.0637	-0.1000	2.5	-0.1000	<u>259.66</u>	-0.1000	<u>2.530</u>	0.13	7.00	<u>1</u>	0	16.3
1181	<u>0.0501</u>	0.0396	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	2.9	-0.1000	<u>260.12</u>	-0.1000	<u>2.700</u>	0.05	7.00	0	0	16.7
1182	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	2.5	-0.1000	<u>162.23</u>	-0.1000	<u>1.475</u>	0.58	7.73	0	0	9.6

Underlined values exceed Secondary (aesthetic) standards. Shaded values exceed Primary (health) standards. All values are mg/l unless labeled differently. Values of 0.1 are below detection limits of testing procedure. For Col and Ecoli 1 = present 0 = absent.

Map 22. Dixie District



District Location



Utah
Arizona



1182

Enterprise and Iron (E&I) District

The water in this area varies from soft to moderate-hard with gpg (grains per gallon) ranging from 1.7 to 3.9 °C with a mean of 2.8 °C. Water temperatures range from 16.1 to 17.0, with a mean of 16.55 °C. The pH for the area has a mean of 7.9 and ranges from 7.5 to 8.3. (See the Beaver District Map for well locations.)

Irrigation:

Salinity is a measurement of the concentration of ionic salts dissolved in water. It is measured as electrical conductivity (EC), in $\mu\text{mhos/cm}$. Higher conductivity values indicate higher concentrations of dissolved salts. Water high in dissolved salts increases osmotic pressures, making it difficult for plants to get water necessary for growth. Generally when EC exceeds 750 $\mu\text{mhos/cm}$, salt-sensitive plants begin to be affected. Sample 1184 exceeds the 750 standard. When EC exceeds 3,000 $\mu\text{mhos/cm}$, most plants would be severely injured. None of the samples exceed the severe injury level of 3,000 $\mu\text{mhos/cm}$.

SAR measures how much sodium (Na) is in solution compared to calcium (Ca) and magnesium (Mg). Excessive sodium in the soil causes soil particles to repel each other. This destroys the structure of the soil, preventing air and water movement. SAR values greater than 3 mark the beginning of problems and values greater than 9 indicate severe problems. None of the water sampled in this district has elevated SAR values.

Bicarbonate (HCO_3) is an ion common to water solutions. It can be hazardous to plants in excessive amounts, especially when used in sprinkler irrigation. Bicarbonate also causes white deposits on plants and their fruits, which degrades their visual appeal. Bicarbonate also increases the effect of sodium when both are present. Special attention is needed when using water with excessive bicarbonate. With sensitive plants minor problems appear with bicarbonate concentrations in excess of 1.5 meq/l and severe problems appear when it exceeds 8.5 meq/l. Both samples have high bicarbonate, which is common for water in Utah. Neither sample exceeds the 8.5 level.

No other elements were found in concentrations harmful to plants.

Livestock:

Sample 1184 has elevated molybdenum (Mo). Livestock eating plants irrigated with water that has molybdenum concentration greater than 0.01 ppm may be harmed. High concentrations of molybdenum interfere with copper nutrition in livestock.

Culinary:

The most serious problem with drinking water from private water systems is bacterial contamination. Because disease-causing organisms are rare, non-parasitic coliform bacteria that are found in association with parasitic bacteria are used as indicators to assess whether water could be contaminated with harmful bacteria. Coliform bacteria can occur naturally in the soil, whereas *E. coli*, a type of coliform, develops only in the digestive systems of mammals. The presence of coliform bacteria indicates that surface water, soil, or other contaminants are entering the well. The presence of *E. coli* in well water, on the other hand, indicates that mammalian fecal material is entering the well. Bacterial contamination is commonly the result of well construction problems. Contamination may result from inadequate capping, a leaking well casing, improper grouting, or lack of a casing. *E. coli* contamination can come from defective septic systems, manure operations or septic systems too close to wells, leaky sewer systems, or shallow water tables.

No samples were contaminated with coliform or *E. coli*.

Sample Site Test Data for Enterprise and Iron District

General

Id #	Be	Ca	K	Li	Mg	Na	P	pH	°C	TDS
1183	-0.1000	21.60	4.42	-0.1000	7.27	22.72	-0.10	8.30	16.1	226
1184	-0.1000	41.05	2.32	-0.1000	25.07	44.64	-0.10	7.50	17.0	461

Values of -0.1 are below detection limits of testing procedure

Irrigation

Id #	Al	B	Cl	CO3 meq/l	Cu	Fe	HCO3 meq/l	Mn	Se	Zn	SAR	EC umhos/cm
1183	-0.1000	-0.10	13.43	-0.10	-0.1000	0.1298	<u>1.94</u>	-0.1000	-0.1000	-0.10	1.1	377
1184	-0.1000	-0.10	29.31	-0.10	-0.1000	-0.1000	<u>4.38</u>	-0.1000	-0.1000	0.14	1.4	<u>769</u>

Underlined values exceed irrigation standards. Shaded values indicate severe risks. All values are mg/l unless labeled differently.

Values of -0.1 are below detection limits of testing procedure.

Livestock

Id #	Al	As	B	Cd	Co	Cr	Mo	Ni	Pb	S	Se	EC umhos/cm	V	Zn
1183	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	3.17	-0.1000	377	0.0302	-0.10
1184	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0122</u>	-0.1000	-0.1000	6.92	-0.1000	769	0.0208	0.14

Underlined values indicate minor health problems (particularly smaller and younger animals). Shaded values indicate a serious health risk. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure.

Culinary

Id #	As	Ba	Cd	Cr	Cu	Fe	Mn	NO3-N	Pb	S	Se	EC umhos/cm	Zn	pH	Col	Ecoli	Hardness gpg
1183	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	0.1298	-0.1000	1.4	-0.1000	3.17	-0.1000	377	-0.10	8.30	0	0	1.7
1184	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	0.9	-0.1000	6.92	-0.1000	769	0.14	7.50	0	0	3.9

detection limits of testing procedure. For Col and Ecoli 1 = present 0 =absent.

Upper Sevier District

The water in this area varies from moderate-hard to hard with gpg (grains per gallon) ranging from 2.2 to 4.2 with a mean of 3.2. Water temperatures range from 10.5 °C to 13.3 °C, with a mean of 11.9 °C. The pH for the area has a mean of 6.46 and ranges from 6.04 to 6.88. Sample 1522 pH is acidic and may be corrosive to plumbing. (See the Beaver District Map for well locations.)

Irrigation:

Salinity is a measurement of the concentration of ionic salts dissolved in water. It is measured as electrical conductivity (EC), in $\mu\text{mhos/cm}$. Higher conductivity values indicate higher concentrations of dissolved salts. Water high in dissolved salts increases osmotic pressures, making it difficult for plants to get water necessary for growth. Generally when EC exceeds 750 $\mu\text{mhos/cm}$, salt-sensitive plants begin to be affected. When EC exceeds 3,000 $\mu\text{mhos/cm}$, most plants would be severely injured. No samples in this district exceed the 750 $\mu\text{mhos/cm}$ standard.

SAR measures how much sodium (Na) is in solution compared to calcium (Ca) and magnesium (Mg). Excessive sodium in the soil causes soil particles to repel each other. This destroys the structure of the soil, preventing air and water movement. SAR values greater than 3 mark the beginning of problems and values greater than 9 indicate severe problems. None of the water sampled in this district has elevated SAR values.

Bicarbonate (HCO_3) is an ion common to water solutions. It can be hazardous to plants in excessive amounts, especially when used in sprinkler irrigation. Bicarbonate also causes white deposits on plants and their fruits, which degrades their visual appeal. Bicarbonate also increases the effect of sodium when both are present. Special attention is needed when using water with excessive bicarbonate. With sensitive plants minor problems appear with bicarbonate concentrations in excess of 1.5 meq/l and severe problems appear when it exceeds 8.5 meq/l. Both of the samples have high bicarbonate, which is common for water in Utah.

No other elements were found in concentrations harmful to plants.

Livestock:

No water quality standards for livestock were exceeded.

Culinary:

The most serious problem with drinking water from private water systems is bacterial contamination. Because disease-causing organisms are rare, non-parasitic coliform bacteria that are found in association with parasitic bacteria are used as indicators to assess whether water could be contaminated with harmful bacteria. Coliform bacteria can occur naturally in the soil, whereas *E. coli*, a type of coliform, develops only in the digestive systems of mammals. The presence of coliform bacteria indicates that surface water, soil, or other contaminants are entering the well. The presence of *E. coli* in well water, on the other hand, indicates that mammalian fecal material is entering the well. Bacterial contamination is commonly the result of well construction problems. Contamination may result from inadequate capping, a leaking well casing, improper grouting, or lack of a casing. *E. coli* contamination can come from defective septic systems, manure operations or septic systems too close to wells, leaky sewer systems, or shallow water tables.

Sample 1522 is contaminated with coliform. The well from which this sample was collected should be inspected carefully to determine the source of contamination and should not be used for culinary purposes until the problem is corrected. No samples are contaminated with *E. coli*.

Sample Site Test Data for Upper Sevier District

General

Id #	Be	Ca	K	Li	Mg	Na	P	pH	°C	TDS
1521	-0.1000	30.20	1.55	-0.1000	7.62	17.04	-0.10	6.88	13.3	149
1522	-0.1000	57.21	1.17	-0.1000	14.22	7.55	-0.10	6.04	10.5	223

Values of -0.1 are below detection limits of testing procedure

Irrigation

Id #	Al	B	Cl	CO3 meq/l	Cu	Fe	HCO3 meq/l	Mn	Se	Zn	SAR	EC umhos/cm
1521	-0.1000	-0.10	8.62	-0.10	-0.1000	0.0599	2.04	-0.1000	-0.1000	-0.10	0.7	249
1522	-0.1000	-0.10	-0.10	-0.10	-0.1000	0.0264	2.75	-0.1000	-0.1000	0.77	0.2	372

Underlined values exceed irrigation standards. Shaded values indicate severe risks. All values are mg/l unless labeled differently.

Values of -0.1 are below detection limits of testing procedure.

Livestock

Id #	Al	As	B	Cd	Co	Cr	Mo	Ni	Pb	S	Se	umhos/cm	V	Zn
1521	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	2.03	-0.1000	249	-0.1000	-0.10
1522	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	3.02	-0.1000	372	0.0107	0.77

Underlined values indicate minor health problems (particularly smaller and younger animals). Shaded values indicate a serious health risk. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure.

Culinary

Id #	As	Ba	Cd	Cr	Cu	Fe	Mn	NO3-N	Pb	S	Se	umhos/cm	Zn	pH	Col	Ecoli	Hardness gpg
1521	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	0.0599	-0.1000	0.3	-0.1000	2.03	-0.1000	249	-0.10	6.88	0	0	2.2
1522	-0.1000	0.0281	-0.1000	-0.1000	-0.1000	0.0264	-0.1000	0.0	-0.1000	3.02	-0.1000	372	0.77	6.04	1	0	4.2

detection limits of testing procedure. For Col and Ecoli 1 = present 0 =absent.

Zone 6

UACD Zone 6 consists of three districts in four counties including Daggett, Duchesne, Summit, and Uintah counties.

Four sample sites were sampled in the Duchesne District of Zone 6 during the spring, summer, and fall of 2001. A narrative report is presented for this district. In addition to a narrative report, tables listing measured results and maps showing locations of sample sites are included. Each report covers three categories of water quality criteria—irrigation, livestock and culinary. Since water use may overlap among these categories for a single well, analytical results are compared to all three sets of criteria.

Duchesne County District

The water in this area varies from moderate to very hard with gpg (grains per gallon) ranging from 4.8 to 13.5, with a mean of 8.1. Water temperatures range from 9.1 °C to 19.2 °C, with a mean of 14.0 °C. The pH for the area has a mean of 8.1 and ranges from 7.91 to 8.39.

Irrigation:

Salinity is a measurement of the concentration of ionic salts dissolved in water. It is measured as electrical conductivity (EC), in $\mu\text{mhos/cm}$. Higher conductivity values indicate higher concentrations of dissolved salts. Water high in dissolved salts increases osmotic pressures, making it difficult for plants to get water necessary for growth. Generally when EC exceeds 750 $\mu\text{mhos/cm}$, salt-sensitive plants begin to be affected. When EC exceeds 3,000 $\mu\text{mhos/cm}$, most plants would be severely injured. Samples 1303 and 1304 have EC values greater than 750 $\mu\text{mhos/cm}$. None of the samples exceed the severe injury level of 3,000 $\mu\text{mhos/cm}$.

The sodium absorption ratio (SAR) measures how much sodium (Na) is in solution compared to calcium (Ca) and magnesium (Mg). Excessive sodium in the soil causes soil particles to repel each other. This destroys the structure of the soil, preventing air and water movement. SAR values greater than 3 mark the beginning of problems and values greater than 9 indicate severe problems. None of the water sampled in this district has elevated SAR values.

Bicarbonate (HCO_3) is an ion common to water solutions. It can be hazardous to plants in excessive amounts, especially when used in sprinkler irrigation. Bicarbonate also causes white deposits on plants and their fruits, which degrades their visual appeal. Bicarbonate also increases the effect of sodium when both are present. Special attention is needed when using water with excessive bicarbonate. With sensitive plants minor problems appear with bicarbonate concentrations in excess of 1.5 meq/l and severe problems appear when it exceeds 8.5 meq/l. All of the samples collected in this area have high bicarbonate, which is common for water in Utah.

No other elements were found in concentrations harmful to plants.

Livestock:

Sulfate (SO_4) is shown on chemical analyses for sulfur (S). Sulfur as sulfate can cause water to be off flavored and diarrhea in animals not used to drinking it. Problems start when the sulfur level in water exceeds 167 ppm. Sample 1303 has high sulfur (S) with a concentration of 206.27 ppm.

No other water quality standards for livestock were exceeded.

Culinary:

Salinity levels for samples 1303 and 1304 exceed the EPA aesthetic standard of 833. At this level the water may be off-flavored but it is not a health problem until the EC level reaches 3,333.

Sample 1303 has high sulfur (S) with a concentration of 206.3 ppm which exceeds the EPA aesthetic standard of 83 ppm. Sulfate is a soluble form of sulfur that can cause flavor problems in drinking water at concentrations greater than 83 ppm sulfur. Bacteria in the water metabolize sulfur and produce hydrogen sulfide gas (rotten egg gas). The bacteria that produce this compound can live in plumbing fixtures and even hot water heaters. It is not uncommon to get strong odors when the hot water is turned on in areas where there is high sulfate. Generally people cannot tolerate the odor from this gas. Even if the gas is not present, high sulfate concentrations can cause diarrhea in people not used to drinking it.

The most serious problem with drinking water from private water systems is bacterial contamination. Because disease-causing organisms are rare, non-parasitic coliform bacteria that are found in association with parasitic bacteria are used as indicators to assess whether water could be contaminated with harmful bacteria. Coliform bacteria can occur naturally in the soil, whereas E. coli, a type of coliform, develops only in the digestive systems of mammals. The presence of coliform bacteria indicates that surface water, soil, or other contaminants are entering the well. The presence of E. coli in well water, on the other hand, indicates that mammalian fecal material is entering the well. Bacterial contamination is commonly the result of well construction problems. Contamination may result from inadequate capping, a leaking well casing, improper grouting, or lack of a casing. E. coli contamination can come from defective septic systems, manure operations or septic systems too close to wells, leaky sewer systems, or shallow water tables.

No samples in this district are contaminated with coliform or E. coli.

Sample Site Test Data for Duchesne County District

General

Id #	Be	Ca	K	Li	Mg	Na	P	pH	°C	TDS
1303	-0.1000	158.51	2.50	-0.1000	71.99	110.29	-0.10	7.93	19.2	960
1304	-0.1000	93.04	1.55	-0.1000	60.15	28.19	-0.10	7.91	17.6	577
1305	-0.1000	65.13	0.88	-0.1000	17.38	5.76	-0.10	8.39	9.1	275
1306	-0.1000	72.00	0.88	-0.1000	19.15	5.92	-0.10	8.19	10.0	301

Values of -0.1 are below detection limits of testing procedure

Irrigation

Id #	Al	B	Cl	CO3 meq/l	Cu	Fe	HCO3 meq/l	Mn	Se	Zn	SAR	EC umhos/cm
1303	-0.1000	0.17	34.47	-0.10	-0.1000	0.0310	<u>7.08</u>	-0.1000	-0.1000	-0.10	1.8	<u>1,600</u>
1304	-0.1000	0.23	59.04	-0.10	-0.1000	0.0409	<u>7.95</u>	-0.1000	-0.1000	-0.10	0.6	<u>961</u>
1305	-0.1000	-0.10	-0.10	-0.10	-0.1000	0.0418	<u>3.86</u>	-0.1000	-0.1000	-0.10	0.2	458
1306	-0.1000	-0.10	-0.10	-0.10	-0.1000	0.1004	<u>3.86</u>	0.0255	-0.1000	0.20	0.2	502

Underlined values exceed irrigation standards. Shaded values indicate severe risks. All values are mg/l unless labeled differently.

Values of -0.1 are below detection limits of testing procedure.

Livestock

Id #	Al	As	B	Cd	Co	Cr	Mo	Ni	Pb	S	Se	EC umhos/cm	V	Zn
1303	-0.1000	-0.1000	0.17	-0.1000	-0.1000	-0.1000	<u>0.0146</u>	-0.1000	-0.1000	<u>206.27</u>	-0.1000	1,600	-0.1000	-0.10
1304	-0.1000	-0.1000	0.23	-0.1000	-0.1000	-0.1000	<u>0.0413</u>	-0.1000	-0.1000	21.64	-0.1000	961	0.0260	-0.10
1305	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	19.28	-0.1000	458	-0.1000	-0.10
1306	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	27.62	-0.1000	502	-0.1000	0.20

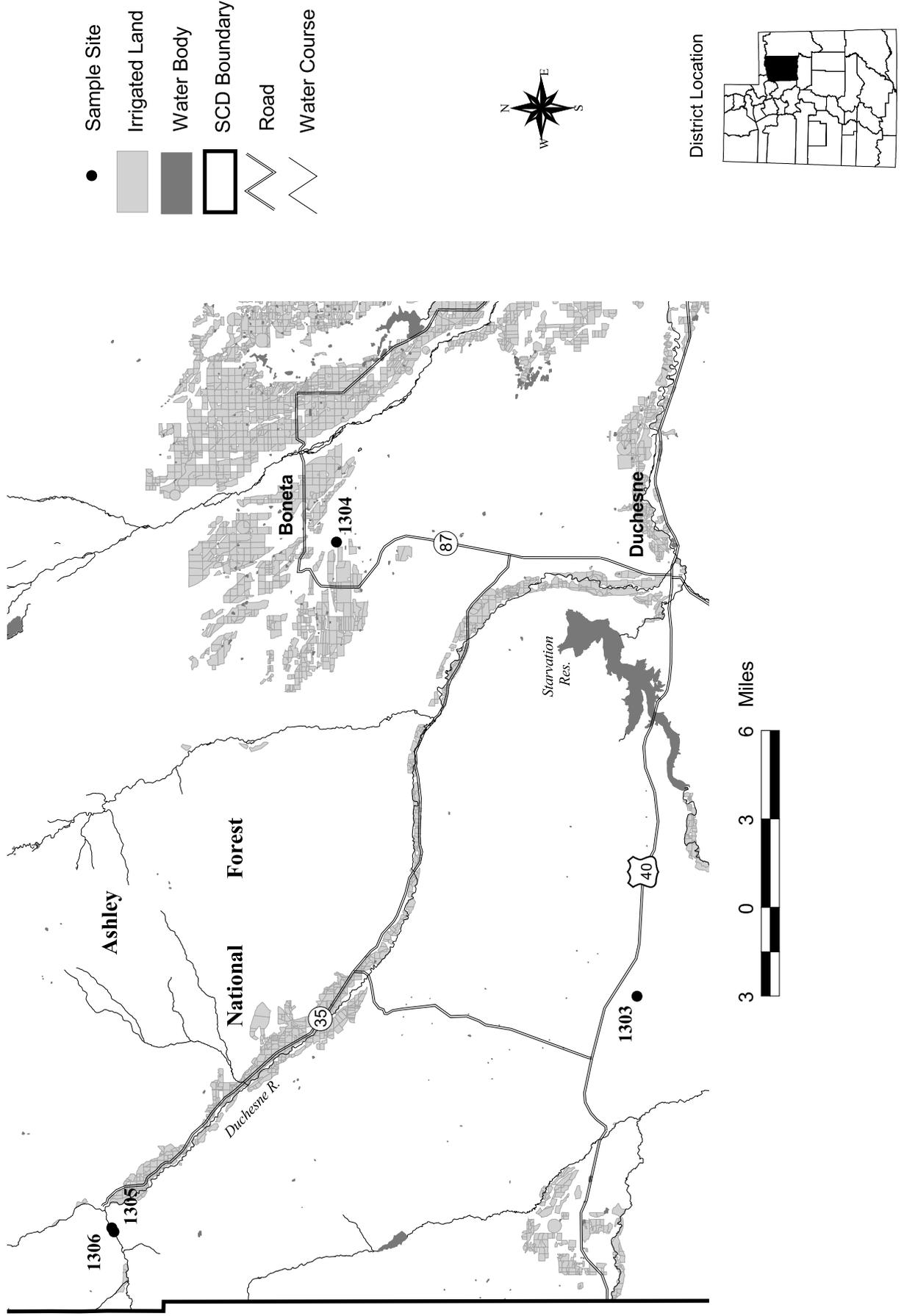
Underlined values indicate minor health problems (particularly smaller and younger animals). Shaded values indicate a serious health risk. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure.

Culinary

Id #	As	Ba	Cd	Cr	Cu	Fe	Mn	NO3-N	Pb	S	Se	EC umhos/cm	Zn	pH	Col	Ecoli	Hardness gpg
1303	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	0.0310	-0.1000	-0.1	-0.1000	<u>206.27</u>	-0.1000	<u>1,600</u>	-0.10	7.93	0	0	13.5
1304	-0.1000	0.1843	-0.1000	-0.1000	-0.1000	0.0409	-0.1000	1.4	-0.1000	21.64	-0.1000	<u>961</u>	-0.10	7.91	0	0	9.0
1305	-0.1000	0.0960	-0.1000	-0.1000	-0.1000	0.0418	-0.1000	0.2	-0.1000	19.28	-0.1000	458	-0.10	8.39	0	0	4.8
1306	-0.1000	0.0729	-0.1000	-0.1000	-0.1000	0.1004	0.0255	0.2	-0.1000	27.62	-0.1000	502	0.20	8.19	0	0	5.3

Underlined values exceed Secondary (aesthetic) standards. Shaded values exceed Primary (health) standards. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure. For Col and Ecoli 1 = present 0 = absent.

Map 23. Duchesne County District



Zone 7

UACD Zone 7 consists of five districts in four counties: Carbon, Emery, Grand, and San Juan counties.

Forty-four sites were sampled in three districts of Zone 7 during the spring, summer, and fall of 2001. These include one site in the Green River District, four in the Price River District, and thirty-nine in the San Juan County District. A separate narrative report is presented for each district sampled. Each report includes data tables and maps showing approximate locations of sample sites. Each report covers three categories of water quality criteria—irrigation, livestock and culinary. Since water use may overlap among these categories for a single well, analytical results are compared to all three sets of criteria.

Green River District

One sample, number 1519, was collected in the Green River District. The water in this sample is very hard, with gpg (grains per gallon) of 20.6. Water temperature was measured at 16.8 °C.

Irrigation:

Salinity is a measurement of the concentration of ionic salts dissolved in water. It is measured as electrical conductivity (EC), in $\mu\text{mhos/cm}$. Higher conductivity values indicate higher concentrations of dissolved salts. Water high in dissolved salts increases osmotic pressures, making it difficult for plants to get water necessary for growth. Generally when EC exceeds 750 $\mu\text{mhos/cm}$, salt-sensitive plants begin to be affected. Sample 1519 has an EC value of 1,771 $\mu\text{mhos/cm}$, much greater than the threshold value. When EC exceeds 3,000 $\mu\text{mhos/cm}$, most plants would be severely injured.

The sodium absorption ratio (SAR) measures how much sodium (Na) is in solution compared to calcium (Ca) and magnesium (Mg). Excessive sodium in the soil causes soil particles to repel each other. This destroys the structure of the soil, preventing air and water movement. SAR values greater than 3 mark the beginning of problems and values greater than 9 indicate severe problems. The SAR standard was not exceeded, with a value of 1.9 for sample 1519.

Bicarbonate (HCO_3) is an ion common to water solutions. It can be hazardous to plants in excessive amounts, especially when used in sprinkler irrigation. Bicarbonate also causes white deposits on plants and their fruits, which degrades their visual appeal. Bicarbonate also increases the effect of sodium when both are present. Special attention is needed when using water with excessive bicarbonate. With sensitive plants minor problems appear with bicarbonate concentrations in excess of 1.5 meq/l and severe problems appear when it exceeds 8.5 meq/l. Sample 1519 has high bicarbonate, which is common for water in Utah.

Manganese (Mn) above 0.2 ppm can injure plants and cause reduction in dry matter production. Excess manganese interferes with the plant's ability to use other nutrients such as calcium (Ca). This sample exceeds the manganese standard, with a measured value of 0.34 ppm.

No other elements were found in concentrations harmful to plants.

Livestock:

Sample 1519 has a sulfur (S) level of 343.8 ppm, which exceeds the livestock standard for sulfur. Sulfur as sulfate can cause water to be off flavored and can cause diarrhea in animals not used to drinking it. Problems start when the sulfur level in water exceeds 167 ppm.

No other water quality standards for livestock were exceeded.

Culinary:

Salinity (EC) for sample 1519 exceeds the EPA aesthetic standard of 833 $\mu\text{mhos/cm}$ with a value of 1,771 $\mu\text{mhos/cm}$. At this level the water may be off-flavored, but it is not a health problem until the EC level reaches 3,333 $\mu\text{mhos/cm}$.

Sample 1519 has a high manganese (Mn) concentration at 0.34 ppm, which exceeds the EPA aesthetic drinking water quality standard of 0.05 ppm. Water with high manganese concentrations may cause discoloration of plumbing fixtures and have poor flavor.

Sample 1519 has high sulfur with a concentration of 343.8 ppm which exceeds the EPA aesthetic standard of 83 ppm. Sulfate is a soluble form of sulfur that can cause flavor problems in drinking water at concentrations greater than 83 ppm sulfur. Bacteria in the water use sulfur and produce hydrogen sulfide gas (rotten egg gas). The bacteria that produce this compound can live in plumbing fixtures and even hot water heaters. It is not uncommon to get strong odors when the hot water is turned on in areas where there is high sulfate. Generally people cannot tolerate the odor from this gas. Even if the gas is not present, high sulfate concentrations can cause diarrhea in people not used to drinking it.

The most serious problem with drinking water from private water systems is bacterial contamination. Because disease-causing organisms are rare, non-parasitic coliform bacteria that are found in association with parasitic bacteria are used as indicators to assess whether water could be contaminated with harmful bacteria. Coliform bacteria can occur naturally in the soil, whereas *E. coli*, a type of coliform, develops only in the digestive systems of mammals. The presence of coliform bacteria indicates that surface water, soil, or other contaminants are entering the well. The presence of *E. coli* in well water, on the other hand, indicates that mammalian fecal material is entering the well. Bacterial contamination is commonly the result of well construction problems. Contamination may result from inadequate capping, a leaking well casing, improper grouting, or lack of a casing. *E. coli* contamination can come from defective septic systems, manure operations or septic systems too close to wells, leaky sewer systems, or shallow water tables. These bacteria were not detected in this well.

Sample Site Test Data for Green River District

General

Id #	Be	Ca	K	Li	Mg	Na	P	pH	°C	TDS
1519	-0.1000	243.83	4.46	-0.1000	107.86	141.07	-0.10	N/A	16.8	1063

Values of -0.1 are below detection limits of testing procedure

Irrigation

Id #	Al	B	Cl	CO3 meq/l	Cu	Fe	HCO3 meq/l	Mn	Se	Zn	SAR	EC umhos/cm
1519	-0.1000	0.34	40.96	-0.10	-0.1000	0.2713	6.77	0.3417	-0.1000	0.08	1.9	1,771

Underlined values exceed irrigation standards. Shaded values indicate severe risks. All values are mg/l unless labeled differently.

Values of -0.1 are below detection limits of testing procedure.

Livestock

Id #	Al	As	B	Cd	Co	Cr	Mo	Ni	Pb	S	Se	EC umhos/cm	V	Zn
1519	-0.1000	-0.1000	0.34	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	343.79	-0.1000	1,771	-0.1000	0.08

Underlined values indicate minor health problems (particularly smaller and younger animals). Shaded values indicate a serious health risk. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure.

Culinary

Id #	As	Ba	Cd	Cr	Cu	Fe	Mn	NO3-N	Pb	S	Se	EC umhos/cm	Zn	pH	Col	Ecoli	Hardness gpg
1519	-0.1000	0.0362	-0.1000	-0.1000	-0.1000	0.2713	0.3417	0.0	-0.1000	343.79	-0.1000	1,771	0.08	N/A	0	0	20.6

Underlined values indicate minor health problems (particularly smaller and younger animals). Shaded values indicate a serious health risk. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure.

Price River Watershed District

The water in this area is hard, with gpg (grains per gallon) ranging from 9.5 to 10.4 with a mean of 10.1. Water temperatures range from 12 °C to 15.5 °C, with a mean of 13.5 °C.

Irrigation:

Salinity is a measurement of the concentration of ionic salts dissolved in water. It is measured as electrical conductivity (EC), in $\mu\text{mhos/cm}$. Higher conductivity values indicate higher concentrations of dissolved salts. Water high in dissolved salts increases osmotic pressures, making it difficult for plants to get water necessary for growth. Generally when EC exceeds 750 $\mu\text{mhos/cm}$, salt-sensitive plants begin to be affected. All four samples have EC values greater than 750 $\mu\text{mhos/cm}$ with values ranging from 1,286 $\mu\text{mhos/cm}$ to 1,374 $\mu\text{mhos/cm}$. When EC exceeds 3,000 $\mu\text{mhos/cm}$, most plants would be severely injured. None of the samples exceeded the severe-injury level of 3,000 $\mu\text{mhos/cm}$.

SAR measures how much sodium (Na) is in solution compared to calcium (Ca) and magnesium (Mg). Excessive sodium in the soil causes soil particles to repel each other. This destroys the structure of the soil, preventing air and water movement. SAR values greater than 3 mark the beginning of problems and values greater than 9 indicate severe problems. None of the water sampled in this district has elevated SAR values.

Bicarbonate (HCO_3) is an ion common to water solutions. It can be hazardous to plants in excessive amounts, especially when used in sprinkler irrigation. Bicarbonate also causes white deposits on plants and their fruits, which degrades their visual appeal. Bicarbonate also increases the effect of sodium when both are present. Special attention is needed when using water with excessive bicarbonate. With sensitive plants minor problems appear with bicarbonate concentrations in excess of 1.5 meq/l and severe problems appear when it exceeds 8.5 meq/l. All of the samples have high bicarbonate ranging from 5.96 to 7.08 meq/l, which is common for water in Utah. None of the samples exceed the 8.5 meq/l level.

No other elements were found in concentrations harmful to plants.

Livestock:

Only sample 1515 is not suitable for livestock because of elevated sulfur (S) with a value of 187.7 ppm. Sulfur as sulfate may cause water to be off flavored and may cause diarrhea in animals not used to drinking it. Problems start when the sulfur level in water exceeds 167 ppm.

No other water quality standards for livestock were exceeded.

Culinary:

Salinity (EC) exceeds the EPA aesthetic standard of 833 $\mu\text{mhos/cm}$ for all of the samples, which have values ranging from 1,286 to 1,374 $\mu\text{mhos/cm}$. At this level the water may be off-flavored, but it is not a health problem until the EC level reaches 3,333 $\mu\text{mhos/cm}$.

All of the samples from this district also have high sulfur (S), ranging from 148.2 to 187.7 ppm. Sulfate is a soluble form of sulfur that can cause flavor problems in drinking water at concentrations greater than 83 ppm sulfur. Bacteria in the water use sulfur and produce hydrogen sulfide gas (rotten egg gas). The bacteria that produce this compound can live in plumbing fixtures and even hot water heaters. It is not uncommon to get strong odors when the hot water is turned on in areas where there is high sulfate. Generally people cannot tolerate the odor from this gas. Even if the gas is not present high sulfate concentrations can cause diarrhea in people not used to drinking it.

The most serious problem with drinking water from private water systems is bacterial contamination. Because disease-causing organisms are rare, non-parasitic coliform bacteria that are found in association with parasitic bacteria are used as indicators to assess whether water could be contaminated with harmful bacteria. Coliform bacteria can occur naturally in the soil, whereas *E. coli*, a type of coliform, develops only in the digestive systems of mammals. The presence of coliform bacteria indicates that surface water, soil, or other contaminants are entering the well. The presence of *E. coli* in well water, on the other hand, indicates that mammalian fecal material is entering the well. Bacterial contamination is commonly the result of well construction problems. Contamination may result from inadequate capping, a leaking well casing, improper grouting, or lack of a casing. *E. coli* contamination can come from defective septic systems, manure operations or septic systems too close to wells, leaky sewer systems, or shallow water tables. All of the samples collected in this district have coliform bacteria. These sample sites should be inspected carefully to determine the source of contamination and should not be used for culinary purposes until the problem is corrected.

Sample Site Test Data for Price River Watershed District

General

Id #	Be	Ca	K	Li	Mg	Na	P	pH	°C	TDS
1515	-0.1000	69.35	3.75	-0.1000	107.70	147.31	-0.10	N/A	15.5	824
1516	-0.1000	64.00	3.57	-0.1000	97.97	133.03	-0.10	N/A	12.0	788
1517	-0.1000	69.15	3.35	-0.1000	106.43	123.83	-0.10	N/A	13.3	772
1518	-0.1000	68.06	4.68	-0.1000	109.99	128.88	-0.10	N/A	13.2	818

Values of -0.1 are below detection limits of testing procedure

Irrigation

Id #	Al	B	Cl	CO3 meq/l	Cu	Fe	HCO3 meq/l	Mn	Se	Zn	SAR	EC umhos/cm
1515	-0.1000	0.20	23.00	-0.10	-0.1000	0.0637	<u>5.96</u>	-0.1000	-0.1000	-0.10	2.6	<u>1,374</u>
1516	-0.1000	0.16	60.62	-0.10	-0.1000	-0.1000	<u>6.63</u>	-0.1000	-0.1000	-0.10	2.4	<u>1,314</u>
1517	-0.1000	0.15	56.42	-0.10	-0.1000	-0.1000	<u>6.79</u>	-0.1000	-0.1000	-0.10	2.2	<u>1,286</u>
1518	-0.1000	0.17	67.35	-0.10	-0.1000	-0.1000	<u>7.08</u>	-0.1000	-0.1000	-0.10	2.2	<u>1,364</u>

Underlined values exceed irrigation standards. Shaded values indicate severe risks. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure.

Livestock

Id #	Al	As	B	Cd	Co	Cr	Mo	Ni	Pb	S	Se	EC umhos/cm	V	Zn
1515	-0.1000	-0.1000	0.20	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	<u>187.68</u>	-0.1000	1,374	-0.1000	-0.10
1516	-0.1000	-0.1000	0.16	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	149.28	-0.1000	1,314	-0.1000	-0.10
1517	-0.1000	-0.1000	0.15	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	148.18	-0.1000	1,286	-0.1000	-0.10
1518	-0.1000	-0.1000	0.17	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	149.08	-0.1000	1,364	-0.1000	-0.10

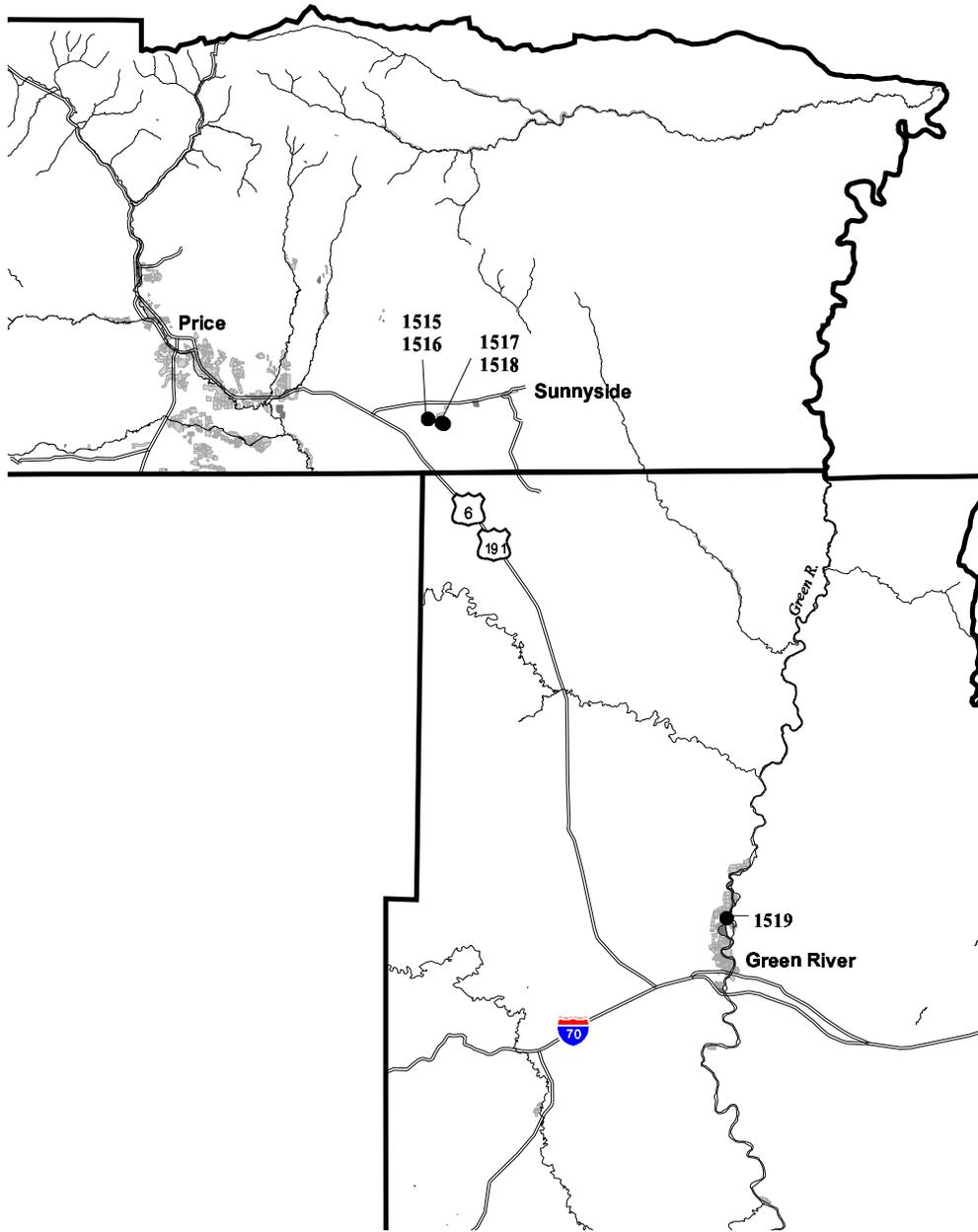
Underlined values indicate minor health problems (particularly smaller and younger animals). Shaded values indicate a serious health risk. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure.

Culinary

Id #	As	Ba	Cd	Cr	Cu	Fe	Mn	NO3-N	Pb	S	Se	EC umhos/cm	Zn	pH	Col	Ecoli	Hardness gpg
1515	-0.1000	0.0256	-0.1000	-0.1000	-0.1000	0.0637	-0.1000	1.3	-0.1000	<u>187.68</u>	-0.1000	<u>1,374</u>	-0.10	N/A	<u>1</u>	0	10.4
1516	-0.1000	0.0249	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.5	-0.1000	<u>149.28</u>	-0.1000	<u>1,314</u>	-0.10	N/A	<u>1</u>	0	9.5
1517	-0.1000	0.0352	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	2.2	-0.1000	<u>148.18</u>	-0.1000	<u>1,286</u>	-0.10	N/A	<u>1</u>	0	10.3
1518	-0.1000	0.0282	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.0	-0.1000	<u>149.08</u>	-0.1000	<u>1,364</u>	-0.10	N/A	<u>1</u>	0	10.4

detection limits of testing procedure. For Col and Ecoli 1 = present 0 =absent.

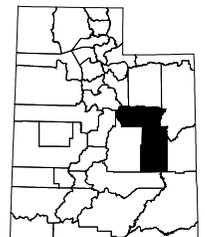
Map 24. Green River and Price River Watershed Districts



- Sample Site
- Irrigated Land
- Water Body
- ▭ SCD Boundary
- ⚡ Road
- ⚡ Water Course



District Location



San Juan County District

The water in this area varies from soft to very hard with gpg (grains per gallon) ranging from 0.3 to 23.3 gpg with a mean of 6.4 gpg. Water temperatures range from 8.3 °C to 17.2 °C, with a mean of 14.1 °C. The pH for the area has a mean of 7.38 and ranges from 6.86 to 9.17. Sample 1106 has a very high pH and may cause mineral deposits on pipes and fixtures.

Irrigation:

Salinity is a measurement of the concentration of ionic salts dissolved in water. It is measured as electrical conductivity (EC), in $\mu\text{mhos/cm}$. Higher conductivity values indicate higher concentrations of dissolved salts. Water high in dissolved salts increases osmotic pressures, making it difficult for plants to get water necessary for growth. Generally when EC exceeds 750 $\mu\text{mhos/cm}$, salt-sensitive plants begin to be affected. When EC exceeds 3,000 $\mu\text{mhos/cm}$, most plants would be severely injured. All but nine samples (1106, 1121, 1122, and 1127 through 1132) have EC values greater than 750 $\mu\text{mhos/cm}$. Samples 1123 and 1125 exceed the severe-injury level of 3,000 $\mu\text{mhos/cm}$.

SAR measures how much sodium (Na) is in solution compared to calcium (Ca) and magnesium (Mg). Excessive sodium in the soil causes soil particles to repel each other. This destroys the structure of the soil, preventing air and water movement. SAR values greater than 3 mark the beginning of problems and values greater than 9 indicate severe problems. Sample 1105 exceeds the lower standard whereas samples 1106, 1123, and 1125 exceed the higher standard.

Bicarbonate (HCO_3) is an ion common to water solutions. It can be hazardous to plants in excessive amounts, especially when used in sprinkler irrigation. Bicarbonate also causes white deposits on plants and their fruits, which degrades their visual appeal. Bicarbonate also increases the effect of sodium when both are present. Special attention is needed when using water with excessive bicarbonate. With sensitive plants minor problems appear with bicarbonate concentrations in excess of 1.5 meq/l and severe problems appear when it exceeds 8.5 meq/l. All of the samples have high bicarbonate, which is common for water in Utah, except for samples 1131 and 1132. Samples 1119, 1123 and 1125 exceed the 8.5 level.

Chlorine, found in the form of chloride (Cl), can damage sensitive plants at concentrations above 145 ppm and concentrations exceeding 355 ppm can cause severe damage to almost all plants. Damage increases under sprinkler irrigation and is more severe in windy conditions. Samples 1123 and 1125 have elevated chlorine.

Manganese above 0.2 ppm can injure plants and cause reduction in dry matter production. Excess manganese interferes with the plant's ability to use other nutrients such as calcium (Ca). Sample 1122 has elevated concentrations of manganese (Mn).

Sample 1117 has elevated zinc (Zn). Zinc is a micro-nutrient and is required for plant growth. However, in excess of 2 ppm it can injure plants.

No other elements were found in concentrations harmful to plants.

Livestock:

All samples except, 1119, 1127 through 1129, 1131, and 1132 have elevated molybdenum (Mo). Livestock eating plants irrigated with water that has molybdenum concentration greater than 0.01 ppm may be harmed. High concentrations of molybdenum interfere with copper nutrition in livestock.

Samples 1125 and 1136 are not suitable for livestock because of elevated sulfur (S) with values greater than 167 ppm sulfur. Sample 1125 has extremely high sulfur and should not be used for livestock.

watering. Sulfur as sulfate may cause water to be off flavored and may cause diarrhea in animals not used to drinking it. Problems start when the sulfur level in water exceeds 167 ppm.

Sample 1130 also exceeds the livestock water quality standard for selenium (Se) and vanadium (V).

Culinary:

Salinity (EC) for all samples except 1104, 1106, 1107, 1121, 1122, and 1127 through 1133 exceed the EPA aesthetic standard of 833 $\mu\text{mhos/cm}$. At this level the water may be off-flavored but it is not a health problem until the EC level reaches 3,333 $\mu\text{mhos/cm}$. Samples 1123 and 1125 exceed the health standard of 3,333 $\mu\text{mhos/cm}$.

Samples 1107, 1108, 1112, 1121, and 1122 have high manganese (Mn) levels. EPA has set an aesthetic standard of 0.05 ppm for manganese. Water with high concentrations may cause discoloration of plumbing fixtures and have poor flavor.

Samples 1108, 1124, 1125, 1135, and 1136 have high sulfur (S). Sulfate is a soluble form of sulfur that can cause flavor problems in drinking water if there is more than 83 ppm sulfur. Bacteria in the water use sulfur and produce hydrogen sulfide gas (rotten egg gas). The bacteria that produce this compound can live in plumbing fixtures and even hot water heaters. It is not uncommon to get strong odors when the hot water is turned on in areas where there is high sulfate. Generally people cannot tolerate the odor from this gas. Even if the gas is not present high sulfate concentrations can cause diarrhea in people not used to drinking it.

Sample 1130 exceeds the EPA primary standard for arsenic (As) and selenium (Se). This water should not be used for drinking without special treatment. Sample 1123 exceeds the primary standard for barium (Ba) and poses a health threat if used for drinking.

The most serious problem with drinking water from private water systems is bacterial contamination. Because disease-causing organisms are rare, non-parasitic coliform bacteria that are found in association with parasitic bacteria are used as indicators to assess whether water could be contaminated with harmful bacteria. Coliform bacteria can occur naturally in the soil, whereas *E. coli*, a type of coliform, develops only in the digestive systems of mammals. The presence of coliform bacteria indicates that surface water, soil, or other contaminants are entering the well. The presence of *E. coli* in well water, on the other hand, indicates that mammalian fecal material is entering the well. Bacterial contamination is commonly the result of well construction problems. Contamination may result from inadequate capping, a leaking well casing, improper grouting, or lack of a casing. *E. coli* contamination can come from defective septic systems, manure operations or septic systems too close to wells, leaky sewer systems, or shallow water tables.

All samples except 1105 through 1108, 1110, 1115 through 1119, 1122, 1123, 1125, and 1133 through 1138 are contaminated with coliform. No samples were contaminated with *E. coli*. These wells should be inspected carefully to determine the source of contamination and should not be used for culinary purposes until the problem is corrected.

Sample Site Test Data for San Juan County District

General

Id #	Be	Ca	K	Li	Mg	Na	P	pH	°C	TDS
1099	-0.1000	90.65	1.82	-0.1000	13.88	33.35	-0.10	7.21	17.1	579
1100	-0.1000	91.55	1.81	-0.1000	13.57	25.59	-0.10	7.00	17.1	562
1101	-0.1000	91.93	1.82	-0.1000	13.61	25.62	-0.10	6.93	17.1	556
1102	-0.1000	93.43	1.63	-0.1000	13.81	25.89	-0.10	6.91	17.1	566
1103	-0.1000	97.20	1.86	-0.1000	14.88	31.10	-0.10	6.86	17.2	596
1104	-0.1000	71.43	1.43	-0.1000	11.30	27.13	-0.10	6.97	17.1	458
1105	-0.1000	29.42	2.41	-0.1000	14.42	220.91	-0.10	7.81	16.8	997
1106	-0.1000	4.48	1.41	-0.1000	1.13	108.23	-0.10	9.17	16.8	415
1107	-0.1000	70.58	2.03	-0.1000	15.49	25.37	-0.10	6.97	12.8	498
1108	-0.1000	126.20	2.06	-0.1000	29.55	22.13	-0.10	7.02	14.7	800
1109	-0.1000	69.18	1.93	-0.1000	17.45	53.35	-0.10	7.38	13.9	595
1110	-0.1000	93.24	1.96	-0.1000	25.94	44.34	-0.10	7.39	13.6	712
1111	-0.1000	100.18	2.30	-0.1000	32.67	59.85	-0.10	7.35	14.1	868
1112	-0.1000	81.25	2.20	-0.1000	18.66	53.29	-0.10	6.95	15.0	664
1113	-0.1000	98.42	2.30	-0.1000	22.82	53.44	-0.10	6.98	13.8	742
1114	-0.1000	117.90	2.02	-0.1000	35.50	57.90	-0.10	7.29	14.4	1180
1115	-0.1000	120.01	1.59	-0.1000	19.58	34.35	-0.10	7.39	13.3	786
1116	-0.1000	124.45	2.20	-0.1000	22.86	48.31	-0.10	7.15	14.8	821
1117	-0.1000	104.57	2.53	-0.1000	23.06	40.93	-0.10	6.88	14.0	736
1118	-0.1000	126.54	1.57	-0.1000	19.32	44.16	-0.10	7.24	13.8	803
1119	-0.1000	134.61	0.57	-0.1000	22.13	69.67	-0.10	7.10	12.3	970
1120	-0.1000	85.52	3.29	-0.1000	46.87	36.26	-0.10	7.68	14.0	745
1121	-0.1000	25.18	2.08	-0.1000	6.95	61.40	-0.10	7.78	13.3	377
1122	-0.1000	51.44	1.08	-0.1000	6.70	13.75	-0.10	7.53	12.2	312
1123	-0.1000	7.50	8.71	-0.1000	4.22	925.69	-0.10	7.66	14.0	3042
1124	-0.1000	153.73	2.22	-0.1000	48.27	70.43	-0.10	7.00	11.5	1206
1125	-0.1000	295.43	10.81	-0.1000	102.91	740.09	-0.10	6.90	11.9	3816
1127	-0.1000	63.76	0.87	-0.1000	13.28	15.71	-0.10	7.49	11.0	416
1128	-0.1000	62.72	0.61	-0.1000	11.64	13.46	-0.10	7.61	12.6	387
1129	-0.1000	23.83	1.80	-0.1000	13.81	7.20	-0.10	7.06	14.5	223
1130	-0.1000	22.78	8.38	0.1665	28.38	47.24	-0.10	8.47	8.3	443
1131	-0.1000	11.95	0.70	-0.1000	8.98	4.28	-0.10	8.02	15.8	129
1132	-0.1000	12.09	0.65	-0.1000	9.07	4.20	-0.10	8.06	15.1	127
1133	-0.1000	76.79	1.56	-0.1000	18.18	16.45	-0.10	7.45	12.5	492
1134	-0.1000	57.47	6.16	-0.1000	23.74	45.33	-0.10	7.63	12.9	570
1135	-0.1000	131.80	3.17	-0.1000	35.55	38.12	-0.10	7.31	13.1	849
1136	-0.1000	207.52	1.56	-0.1000	35.90	108.23	-0.10	7.26	14.1	1314
1137	-0.1000	65.04	5.30	-0.1000	32.20	17.79	-0.10	7.52	12.4	547
1138	-0.1000	75.70	1.86	-0.1000	30.83	25.51	-0.10	7.61	14.1	581

Values of -0.1 are below detection limits of testing procedure

Sample Site Test Data for San Juan County District

Irrigation

Id #	Al	B	Cl	CO3 meq/l	Cu	Fe	HCO3 meq/l	Mn	Se	Zn	SAR	EC umhos/cm
1099	-0.1000	-0.10	18.38	-0.10	-0.1000	-0.1000	3.65	-0.1000	-0.1000	-0.10	0.9	965
1100	-0.1000	-0.10	42.59	-0.10	-0.1000	0.1184	2.72	-0.1000	-0.1000	-0.10	0.7	937
1101	-0.1000	-0.10	43.09	-0.10	-0.1000	-0.1000	2.66	-0.1000	-0.1000	-0.10	0.7	926
1102	-0.1000	-0.10	44.17	-0.10	-0.1000	0.0413	2.75	-0.1000	-0.1000	-0.10	0.7	943
1103	-0.1000	-0.10	43.76	-0.10	-0.1000	-0.1000	3.08	-0.1000	-0.1000	-0.10	0.8	994
1104	-0.1000	-0.10	18.03	-0.10	-0.1000	-0.1000	2.99	-0.1000	-0.1000	0.05	0.8	764
1105	-0.1000	0.13	39.38	-0.10	-0.1000	-0.1000	4.68	-0.1000	-0.1000	-0.10	8.3	1,661
1106	0.0956	-0.10	3.48	0.78	-0.1000	0.1802	3.32	0.0255	-0.1000	-0.10	11.8	692
1107	-0.1000	-0.10	21.37	-0.10	-0.1000	0.0750	2.74	0.1069	-0.1000	-0.10	0.7	830
1108	-0.1000	-0.10	32.26	-0.10	-0.1000	0.0252	3.05	0.0728	-0.1000	0.12	0.5	1,334
1109	-0.1000	0.10	28.57	-0.10	-0.1000	0.0266	4.07	-0.1000	-0.1000	0.17	1.5	992
1110	-0.1000	-0.10	54.92	-0.10	-0.1000	-0.1000	3.84	-0.1000	-0.1000	-0.10	1.0	1,186
1111	-0.1000	0.09	54.98	-0.10	0.0223	0.0678	4.35	-0.1000	-0.1000	0.17	1.3	1,446
1112	-0.1000	-0.10	30.65	-0.10	-0.1000	0.0465	3.53	0.1787	-0.1000	-0.10	1.4	1,107
1113	-0.1000	0.07	45.78	-0.10	-0.1000	0.0415	4.13	0.0445	-0.1000	0.47	1.3	1,236
1114	-0.1000	0.09	82.20	-0.10	-0.1000	0.0235	4.60	-0.1000	-0.1000	0.04	1.2	1,967
1115	-0.1000	-0.10	71.08	-0.10	-0.1000	0.0223	3.32	-0.1000	-0.1000	-0.10	0.8	1,310
1116	-0.1000	-0.10	41.06	-0.10	-0.1000	0.0258	5.45	-0.1000	-0.1000	-0.10	1.0	1,368
1117	-0.1000	-0.10	30.00	-0.10	-0.1000	0.0343	3.49	-0.1000	-0.1000	3.79	0.9	1,227
1118	-0.1000	0.08	18.06	-0.10	-0.1000	-0.1000	6.75	-0.1000	-0.1000	-0.10	1.0	1,339
1119	-0.1000	-0.10	77.99	-0.10	-0.1000	0.0491	8.52	-0.1000	-0.1000	0.07	1.5	1,616
1120	-0.1000	-0.10	24.04	-0.10	-0.1000	0.0459	5.14	-0.1000	-0.1000	0.43	0.8	1,242
1121	-0.1000	-0.10	-0.10	-0.10	-0.1000	0.0849	3.53	0.0648	-0.1000	0.21	2.8	628
1122	-0.1000	-0.10	-0.10	-0.10	-0.1000	0.0625	2.74	0.2895	-0.1000	-0.10	0.5	520
1123	-0.1000	0.32	213.52	-0.10	-0.1000	0.1090	34.14	-0.1000	-0.1000	-0.10	67.0	5,070
1124	-0.1000	0.08	111.22	-0.10	-0.1000	0.0346	5.26	-0.1000	-0.1000	-0.10	1.3	2,010
1125	-0.1000	0.26	215.01	-0.10	-0.1000	0.0722	10.17	0.0260	-0.1000	-0.10	9.4	6,360
1127	-0.1000	-0.10	-0.10	-0.10	-0.1000	-0.1000	2.48	-0.1000	-0.1000	0.04	0.5	693
1128	-0.1000	-0.10	-0.10	-0.10	-0.1000	0.0354	2.77	-0.1000	-0.1000	0.05	0.4	645
1129	-0.1000	-0.10	-0.10	-0.10	-0.1000	0.0277	2.15	0.0260	-0.1000	-0.10	0.3	372
1130	-0.1000	-0.10	-0.10	-0.10	-0.1000	-0.1000	4.46	-0.1000	0.3449	-0.10	1.6	739
1131	-0.1000	-0.10	-0.10	-0.10	-0.1000	-0.1000	1.24	-0.1000	-0.1000	-0.10	0.2	215
1132	-0.1000	-0.10	-0.10	-0.10	-0.1000	-0.1000	1.26	-0.1000	-0.1000	-0.10	0.2	212
1133	-0.1000	-0.10	4.97	-0.10	-0.1000	0.0207	3.90	-0.1000	-0.1000	-0.10	0.4	820
1134	-0.1000	-0.10	10.82	-0.10	-0.1000	0.1153	3.38	-0.1000	-0.1000	-0.10	1.3	950
1135	-0.1000	0.11	17.88	-0.10	-0.1000	-0.1000	4.31	-0.1000	-0.1000	0.09	0.8	1,415
1136	-0.1000	0.12	32.32	-0.10	-0.1000	-0.1000	5.26	-0.1000	-0.1000	0.75	1.8	2,190
1137	-0.1000	0.08	9.07	-0.10	-0.1000	-0.1000	5.28	0.0216	-0.1000	0.04	0.5	912
1138	-0.1000	-0.10	8.30	-0.10	-0.1000	-0.1000	3.53	-0.1000	-0.1000	0.35	0.6	968

testing procedure.

Sample Site Test Data for San Juan County District

Livestock

Id #	Al	As	B	Cd	Co	Cr	Mo	Ni	Pb	S	Se	EC umhos/cm	V	Zn
1099	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0265</u>	-0.1000	-0.1000	38.83	-0.1000	965	-0.1000	-0.10
1100	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0194</u>	-0.1000	-0.1000	44.62	-0.1000	937	-0.1000	-0.10
1101	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0169</u>	-0.1000	-0.1000	44.82	-0.1000	926	-0.1000	-0.10
1102	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0150</u>	-0.1000	-0.1000	45.31	-0.1000	943	-0.1000	-0.10
1103	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0164</u>	-0.1000	-0.1000	48.38	-0.1000	994	-0.1000	-0.10
1104	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0116</u>	-0.1000	-0.1000	32.36	-0.1000	764	-0.1000	0.05
1105	-0.1000	-0.1000	0.13	-0.1000	-0.1000	-0.1000	<u>0.0920</u>	-0.1000	-0.1000	49.97	-0.1000	1,661	0.0103	-0.10
1106	0.0956	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0657</u>	-0.1000	-0.1000	19.04	-0.1000	692	-0.1000	-0.10
1107	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0227</u>	-0.1000	-0.1000	42.85	-0.1000	830	-0.1000	-0.10
1108	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0292</u>	-0.1000	-0.1000	101.03	-0.1000	1,334	-0.1000	0.12
1109	-0.1000	-0.1000	0.10	-0.1000	-0.1000	-0.1000	<u>0.0288</u>	-0.1000	-0.1000	30.84	-0.1000	992	-0.1000	0.17
1110	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0220</u>	-0.1000	-0.1000	45.51	-0.1000	1,186	-0.1000	-0.10
1111	-0.1000	-0.1000	0.09	-0.1000	-0.1000	-0.1000	<u>0.0299</u>	-0.1000	-0.1000	72.03	-0.1000	1,446	-0.1000	0.17
1112	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0400</u>	-0.1000	-0.1000	58.66	-0.1000	1,107	-0.1000	-0.10
1113	-0.1000	-0.1000	0.07	-0.1000	-0.1000	-0.1000	<u>0.0320</u>	-0.1000	-0.1000	57.19	-0.1000	1,236	-0.1000	0.47
1114	-0.1000	-0.1000	0.09	-0.1000	-0.1000	-0.1000	<u>0.0280</u>	-0.1000	-0.1000	67.72	-0.1000	1,967	-0.1000	0.04
1115	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0204</u>	-0.1000	-0.1000	62.51	-0.1000	1,310	-0.1000	-0.10
1116	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0270</u>	-0.1000	-0.1000	60.80	-0.1000	1,368	-0.1000	-0.10
1117	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0421</u>	-0.1000	-0.1000	77.53	-0.1000	1,227	-0.1000	3.79
1118	-0.1000	-0.1000	0.08	-0.1000	-0.1000	-0.1000	<u>0.0226</u>	-0.1000	-0.1000	44.65	-0.1000	1,339	-0.1000	-0.10
1119	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	20.49	-0.1000	1,616	-0.1000	0.07
1120	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0214</u>	-0.1000	-0.1000	58.56	-0.1000	1,242	-0.1000	0.43
1121	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0315</u>	-0.1000	-0.1000	14.87	-0.1000	628	-0.1000	0.21
1122	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0171</u>	-0.1000	-0.1000	15.53	-0.1000	520	-0.1000	-0.10
1123	-0.1000	-0.1000	0.32	-0.1000	-0.1000	-0.1000	<u>0.3352</u>	-0.1000	-0.1000	8.65	-0.1000	5,070	-0.1000	-0.10
1124	-0.1000	-0.1000	0.08	-0.1000	-0.1000	-0.1000	<u>0.0325</u>	-0.1000	-0.1000	108.06	-0.1000	2,010	-0.1000	-0.10
1125	-0.1000	-0.1000	0.26	-0.1000	-0.1000	-0.1000	<u>0.3078</u>	-0.1000	-0.1000	671.69	-0.1000	6,360	-0.1000	-0.10
1127	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	39.93	-0.1000	693	-0.1000	0.04
1128	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	28.19	-0.1000	645	-0.1000	0.05
1129	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	6.35	-0.1000	372	-0.1000	-0.10
1130	-0.1000	0.1286	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0669</u>	-0.1000	-0.1000	14.42	<u>0.3449</u>	739	<u>1.0756</u>	-0.10
1131	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	3.25	-0.1000	215	-0.1000	-0.10
1132	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	3.26	-0.1000	212	-0.1000	-0.10
1133	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0134</u>	-0.1000	-0.1000	30.19	-0.1000	820	-0.1000	-0.10
1134	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0410</u>	-0.1000	-0.1000	56.24	-0.1000	950	-0.1000	-0.10
1135	-0.1000	-0.1000	0.11	-0.1000	-0.1000	-0.1000	<u>0.0264</u>	-0.1000	-0.1000	110.45	-0.1000	1,415	-0.1000	0.09
1136	-0.1000	-0.1000	0.12	-0.1000	-0.1000	-0.1000	<u>0.0176</u>	-0.1000	-0.1000	<u>200.07</u>	-0.1000	2,190	-0.1000	0.75
1137	-0.1000	-0.1000	0.08	-0.1000	-0.1000	-0.1000	<u>0.0306</u>	-0.1000	-0.1000	41.00	-0.1000	912	-0.1000	0.04
1138	-0.1000	-0.1000	-0.10	-0.1000	-0.1000	-0.1000	<u>0.0132</u>	-0.1000	-0.1000	63.89	-0.1000	968	-0.1000	0.35

Underlined values indicate minor health problems (particularly smaller and younger animals). Shaded values indicate a serious health risk. All values are mg/l unless labeled differently. Values of -0.1 are below detection limits of testing procedure.

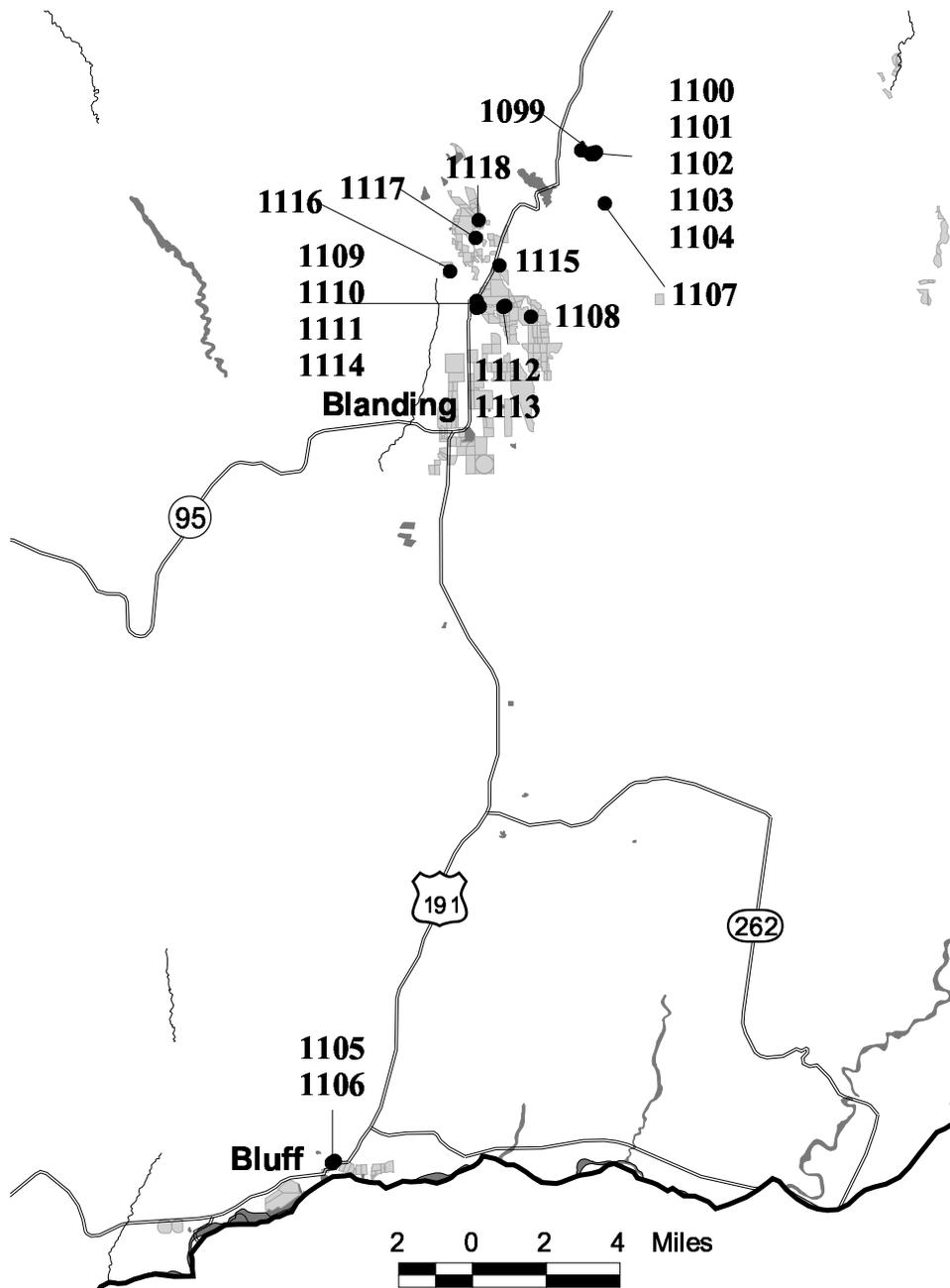
Sample Site Test Data for San Juan County District

Culinary

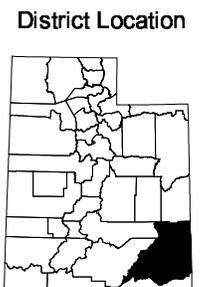
Id #	As	Ba	Cd	Cr	Cu	Fe	Mn	NO3-N	Pb	S	Se	EC umhos/cm	Zn	pH	Col	Ecoli	Hardness gpg
1099	-0.1000	0.0990	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	2.4	-0.1000	38.83	-0.1000	965	-0.10	7.21	1	0	6.1
1100	-0.1000	0.1204	-0.1000	-0.1000	-0.1000	0.1184	-0.1000	2.3	-0.1000	44.62	-0.1000	937	-0.10	7.00	1	0	6.1
1101	-0.1000	0.1202	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.7	-0.1000	44.82	-0.1000	926	-0.10	6.93	1	0	6.2
1102	-0.1000	0.1229	-0.1000	-0.1000	-0.1000	0.0413	-0.1000	0.6	-0.1000	45.31	-0.1000	943	-0.10	6.91	1	0	6.3
1103	-0.1000	0.0979	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.9	-0.1000	48.38	-0.1000	994	-0.10	6.86	1	0	6.6
1104	-0.1000	0.0916	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.8	-0.1000	32.36	-0.1000	764	0.05	6.97	1	0	4.8
1105	-0.1000	0.0825	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.7	-0.1000	49.97	-0.1000	1661	-0.10	7.81	0	0	2.6
1106	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	0.1802	0.0255	0.0	-0.1000	19.04	-0.1000	692	-0.10	9.17	0	0	0.3
1107	-0.1000	0.0429	-0.1000	-0.1000	-0.1000	0.0750	0.1069	1.1	-0.1000	42.85	-0.1000	830	-0.10	6.97	0	0	5.0
1108	-0.1000	0.0363	-0.1000	-0.1000	-0.1000	0.0252	0.0728	2.1	-0.1000	101.03	-0.1000	1334	0.12	7.02	0	0	9.1
1109	-0.1000	0.0523	-0.1000	-0.1000	-0.1000	0.0266	-0.1000	0.7	-0.1000	30.84	-0.1000	992	0.17	7.38	1	0	5.1
1110	-0.1000	0.0642	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	4.8	-0.1000	45.51	-0.1000	1186	-0.10	7.39	0	0	7.0
1111	-0.1000	0.0679	-0.1000	-0.1000	0.0223	0.0678	-0.1000	5.2	-0.1000	72.03	-0.1000	1446	0.17	7.35	1	0	7.8
1112	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	0.0465	0.1787	1.7	-0.1000	58.66	-0.1000	1107	-0.10	6.95	1	0	5.8
1113	-0.1000	0.0309	-0.1000	-0.1000	-0.1000	0.0415	0.0445	3.0	-0.1000	57.19	-0.1000	1236	0.47	6.98	1	0	7.1
1114	-0.1000	0.0985	-0.1000	-0.1000	-0.1000	0.0235	-0.1000	3.3	-0.1000	67.72	-0.1000	1967	0.04	7.29	1	0	9.0
1115	-0.1000	0.0819	-0.1000	-0.1000	-0.1000	0.0223	-0.1000	3.9	-0.1000	62.51	-0.1000	1310	-0.10	7.39	0	0	8.2
1116	-0.1000	0.1694	-0.1000	-0.1000	-0.1000	0.0258	-0.1000	1.8	-0.1000	60.80	-0.1000	1368	-0.10	7.15	0	0	8.6
1117	-0.1000	0.0272	-0.1000	-0.1000	-0.1000	0.0343	-0.1000	2.3	-0.1000	77.53	-0.1000	1227	3.79	6.88	0	0	7.5
1118	-0.1000	0.0833	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	2.9	-0.1000	44.65	-0.1000	1339	-0.10	7.24	0	0	8.5
1119	-0.1000	0.1085	-0.1000	-0.1000	-0.1000	0.0491	-0.1000	1.0	-0.1000	20.49	-0.1000	1616	0.07	7.10	0	0	9.2
1120	-0.1000	0.1570	-0.1000	-0.1000	-0.1000	0.0459	-0.1000	2.5	-0.1000	58.56	-0.1000	1242	0.43	7.68	1	0	7.7
1121	-0.1000	0.0430	-0.1000	-0.1000	-0.1000	0.0849	0.0648	1.3	-0.1000	14.87	-0.1000	628	0.21	7.78	1	0	1.9
1122	-0.1000	0.0476	-0.1000	-0.1000	-0.1000	0.0625	0.2895	0.7	-0.1000	15.53	-0.1000	520	-0.10	7.53	0	0	3.4
1123	-0.1000	3.0354	-0.1000	-0.1000	-0.1000	0.1090	-0.1000	3.3	-0.1000	8.65	-0.1000	5070	-0.10	7.66	0	0	0.7
1124	-0.1000	0.0504	-0.1000	-0.1000	-0.1000	0.0346	-0.1000	1.7	-0.1000	108.06	-0.1000	2010	-0.10	7.00	1	0	11.8
1125	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	0.0722	0.0260	1.0	-0.1000	671.69	-0.1000	6360	-0.10	6.90	0	0	23.3
1127	-0.1000	0.0281	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.0	-0.1000	39.93	-0.1000	693	0.04	7.49	1	0	4.5
1128	-0.1000	0.0320	-0.1000	-0.1000	-0.1000	0.0354	-0.1000	0.9	-0.1000	28.19	-0.1000	645	0.05	7.61	1	0	4.3
1129	-0.1000	0.0555	-0.1000	-0.1000	-0.1000	0.0277	0.0260	0.9	-0.1000	6.35	-0.1000	372	-0.10	7.06	1	0	2.2
1130	0.1286	0.1783	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.4	-0.1000	14.42	0.3449	739	-0.10	8.47	1	0	3.0
1131	-0.1000	0.0820	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.1	-0.1000	3.25	-0.1000	215	-0.10	8.02	1	0	1.2
1132	-0.1000	0.0822	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.0	-0.1000	3.26	-0.1000	212	-0.10	8.06	1	0	1.2
1133	-0.1000	0.0326	-0.1000	-0.1000	-0.1000	0.0207	-0.1000	1.5	-0.1000	30.19	-0.1000	820	-0.10	7.45	0	0	5.6
1134	-0.1000	0.0594	-0.1000	-0.1000	-0.1000	0.1153	-0.1000	0.9	-0.1000	56.24	-0.1000	950	-0.10	7.63	0	0	4.7
1135	-0.1000	0.0330	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	1.0	-0.1000	110.45	-0.1000	1415	0.09	7.31	0	0	9.8
1136	-0.1000	0.0405	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	2.5	-0.1000	200.07	-0.1000	2190	0.75	7.26	0	0	14.2
1137	-0.1000	0.0374	-0.1000	-0.1000	-0.1000	-0.1000	0.0216	1.3	-0.1000	41.00	-0.1000	912	0.04	7.52	0	0	5.7
1138	-0.1000	0.0308	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	0.9	-0.1000	63.89	-0.1000	968	0.35	7.61	0	0	6.2

detection limits of testing procedure. For Col and Ecoli 1 = present 0 =absent.

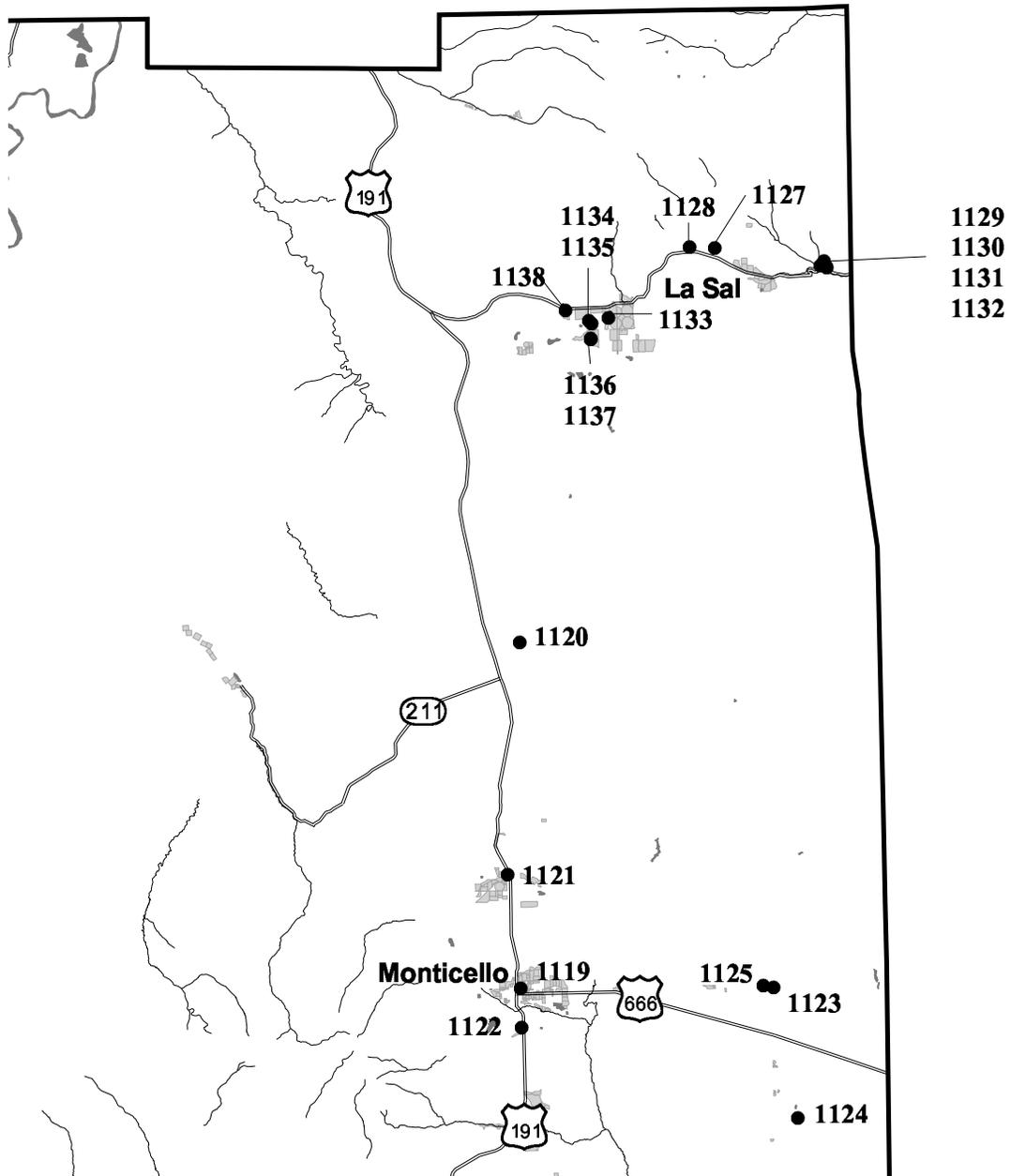
Map 25. San Juan County District, Southern Section



- Sample Site
- Irrigated Land
- Water Body
- ▭ SCD Boundary
- ══ Road
- 〰 Water Course



Map 26. San Juan County District, Northern Section



1129
1130
1131
1132



- Sample Site
- Irrigated Land
- Water Body
- ▭ SCD Boundary
- ⚡ Road
- ⚡ Water Course

