Preliminary Assessment and Site Inspection Report for the Gilmore Townsite Common Use Areas and Surrounding Lands

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Lemhi County

State of Idaho
Department of Environmental Quality

and

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Lemhi County

February 2017

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List of Acronyms

amsl	above mean sea level
ATSDR	Agency for Toxic Substances and Disease Registry
ATV	all-terrain vehicle
BLM	United States Bureau of Land Management
CDC	Centers for Disease Control and Prevention
CWA	Clean Water Act
DEQ	Idaho Department of Environmental Quality
EPA	United States Environmental Protection Agency
ft	feet
GIS	geographic information system
IDHW	Idaho Department of Health and Welfare
IDL	Idaho Department of Lands
IDWR	Idaho Department of Water Resources
µm	micrometers
MCDC	Missouri Census Data Center
mg/kg	milligram per kilogram
PA	preliminary assessment
PPE	probable point of entry
ppm	parts per million
PWS	public water system
QAPP	Quality Assurance Project Plan
QA/QC	quality assurance/quality control
RPD	relative percent difference
RSD	relative standard deviation
RSLs	regional screening levels
RV	recreational vehicle
SAP	Sampling Analysis Plan
SI	site inspection
SVL	SVL Analytical, Inc.
SWA	source water assessment
TDL	target distance limit
TMDL	total maximum daily load
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WRCC	Western Regional Climate Center

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1 Introduction

This report presents the preliminary assessment and site inspection (PA/SI) results for the Gilmore townsite common use areas and surrounding lands located in Lemhi County, Idaho. Under a cooperative agreement with the United States Environmental Protection Agency, Region 10 (EPA), the Idaho Department of Environmental Quality (DEQ) provides technical support for performing the PA/SI process at various mine and industrial sites located on private, state, or mixed ownership (public and private) lands. Additional information about DEQ's PA program can be found at: *http://www.deq.idaho.gov/preliminary-assessments*.

DEQ initiated the PA program in February 2002 to prioritize and assess potentially contaminated sites. Due to accessibility and funding considerations, priority is given to sites where potential contamination poses the most substantial threat to human health or the environment. In recent years, this priority focuses DEQ's efforts in areas where residential and recreational developments are encroaching on historic mining districts. Priority is also given to mining districts where groups or clusters of sites can be cost-effectively assessed on a watershed basis. The purpose of this PA/SI is to assess the threat posed to human health and the environment and determine the need for additional investigation.

The PA/SI process is presented in the following sections:

- Section 2, **Site Description**, compiles desktop research information to present the location, ownership, general geology, operational history of past mining activities, climatology, and current and potential future land uses for the site.
- Section 3, **Sample Collection and Analysis**, describes the sampling locations and presents the analytical results.
- Section 4, **Migration/Exposure Pathways and Targets**, presents observations and potential targets for the surface water pathways, ground water pathways, and soil exposures and air pathways.
- Section 5, **Conclusions and Recommendations**, presents health and safety information from Idaho Department of Health and Welfare (IDHW) and next steps for the Gilmore townsite and surrounding lands.
- Appendix A, **Site Photographs**, includes photos referenced within this PA/SI report.

2 Site Description

The site description for the Gilmore townsite includes the following information: location and ownership (Section 2.1), general geology and operational history of past mining activities (Section 2.2), climatology (Section 2.3), and current and potential future land uses (Section 2.4). As part of the desktop research, DEQ uses references from historic reports which often have different spellings for claim names, town sites, and/or geographic features. DEQ retains the spelling and usage from the original source documents.

2.1 Location and Ownership

Site Name:	Gilmore Townsite Common Use Areas and Surrounding Lands
Location:	Approximately 16 miles south of Leadore, Idaho. Can be accessed via Gilmore Road (002) from State Highway 28.
County:	Lemhi
Latitude/Longitude:	44°27'33.31"N, 113° 16'11.59"W

Sampling for this assessment was conducted on common use areas within the Gilmore townsite and surrounding lands owned by the United States Bureau of Land Management (BLM). An aerial overview of the area is shown in Figure 1. A map of property ownership surrounding the Gilmore townsite is shown in Figure 2. DEQ does not warrant the ownership research or location of property boundaries contained in this report. It should be noted that parcel boundaries shown on maps within this PA/SI report are approximate and are not a substitute for survey data. Information regarding ownership and property boundaries was obtained from the parcel maps for Lemhi County (Idaho State Tax Commission 2016).

2.2 General Geology and Operational History of Past Mining Activities

Information about the geology and operational history of past mining activities helps to understand the levels of production, commodities, and potential waste types at the site. This information documents the relative importance of historic mining districts and workings as they are reevaluated from the perspective of economics, multiple land use, human health risks, and ecological risks. Historical research is used for several purposes: to identify the potential contaminants of concern, estimate the magnitude of waste at the site, locate potentially dangerous physical hazards such as open adits and shafts, and identify historical land uses that coincide with mining. This information is necessary to prepare for the SI field work.

Numerous sources were used during desktop research prior to visiting the site. A map of the major lithology for the Gilmore townsite and surrounding area is shown in Figure 3. DEQ completed preliminary assessments of these abandoned mines in 2010 and 2015 (DEQ 2011 and 2016). Mining took place from the 1880’s through 1930’s. A railroad located in Leadore was shut down in the 1930’s, and the town of Gilmore was abandoned in 1965. Commodities included lead, silver, copper, zinc, and gold. A summary of geology and history of past mining activities is included in the *Gilmore Division of the Texas Mining District Preliminary Assessment and Site Inspection Report* (DEQ 2011).

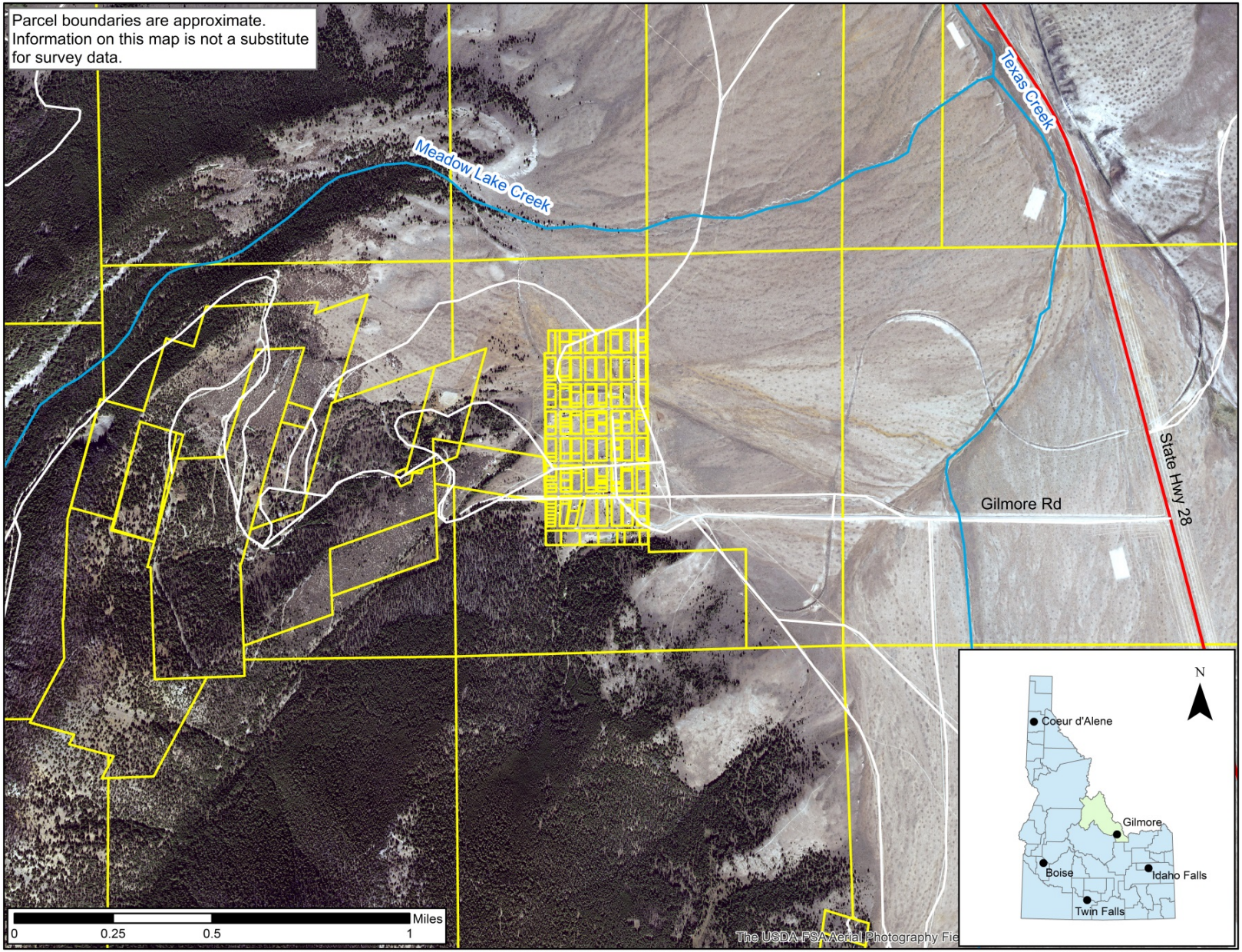

Figure 1. Map of the Gilmore townsite and surrounding lands.

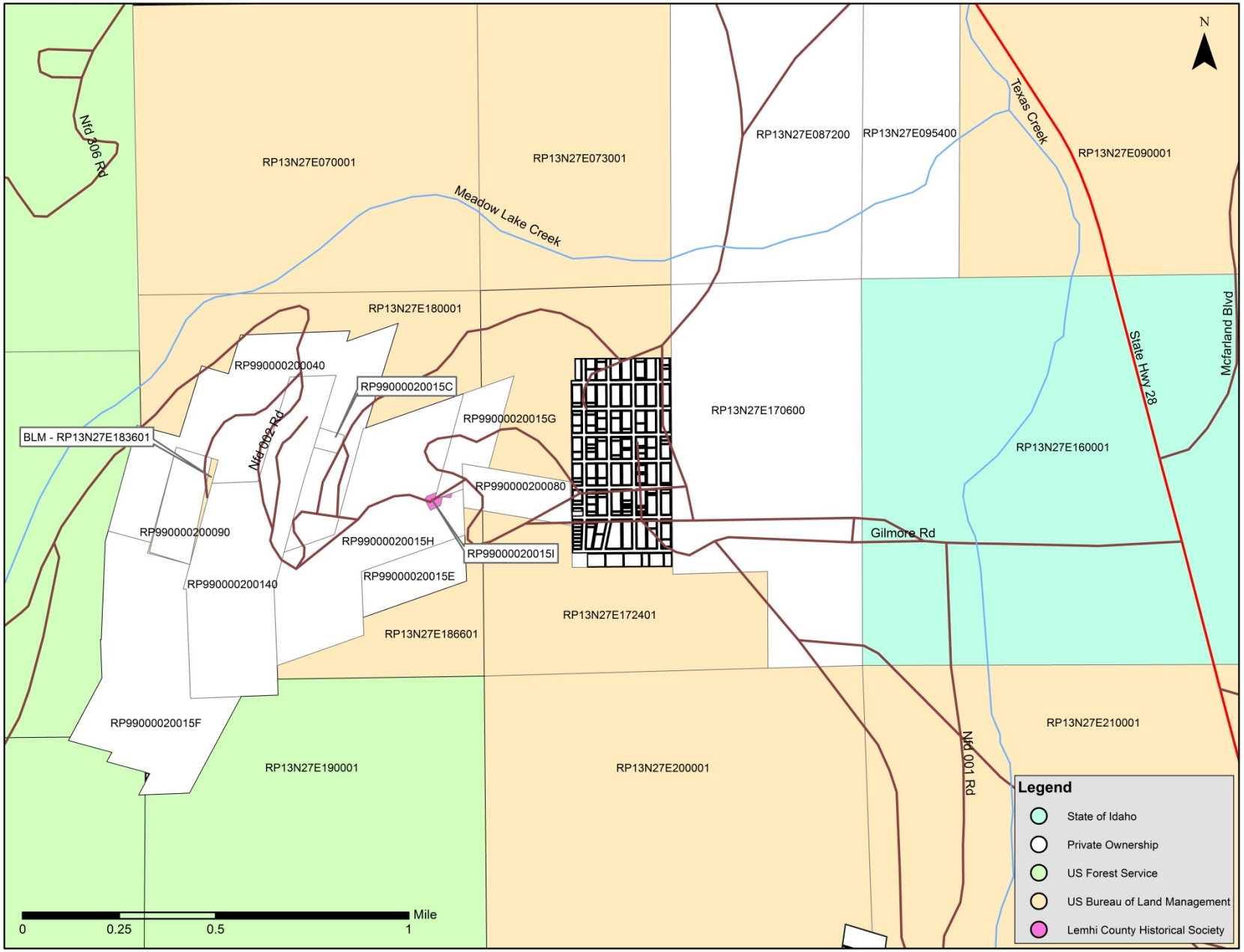

Figure 2. Map of property ownership surrounding the Gilmore townsite.

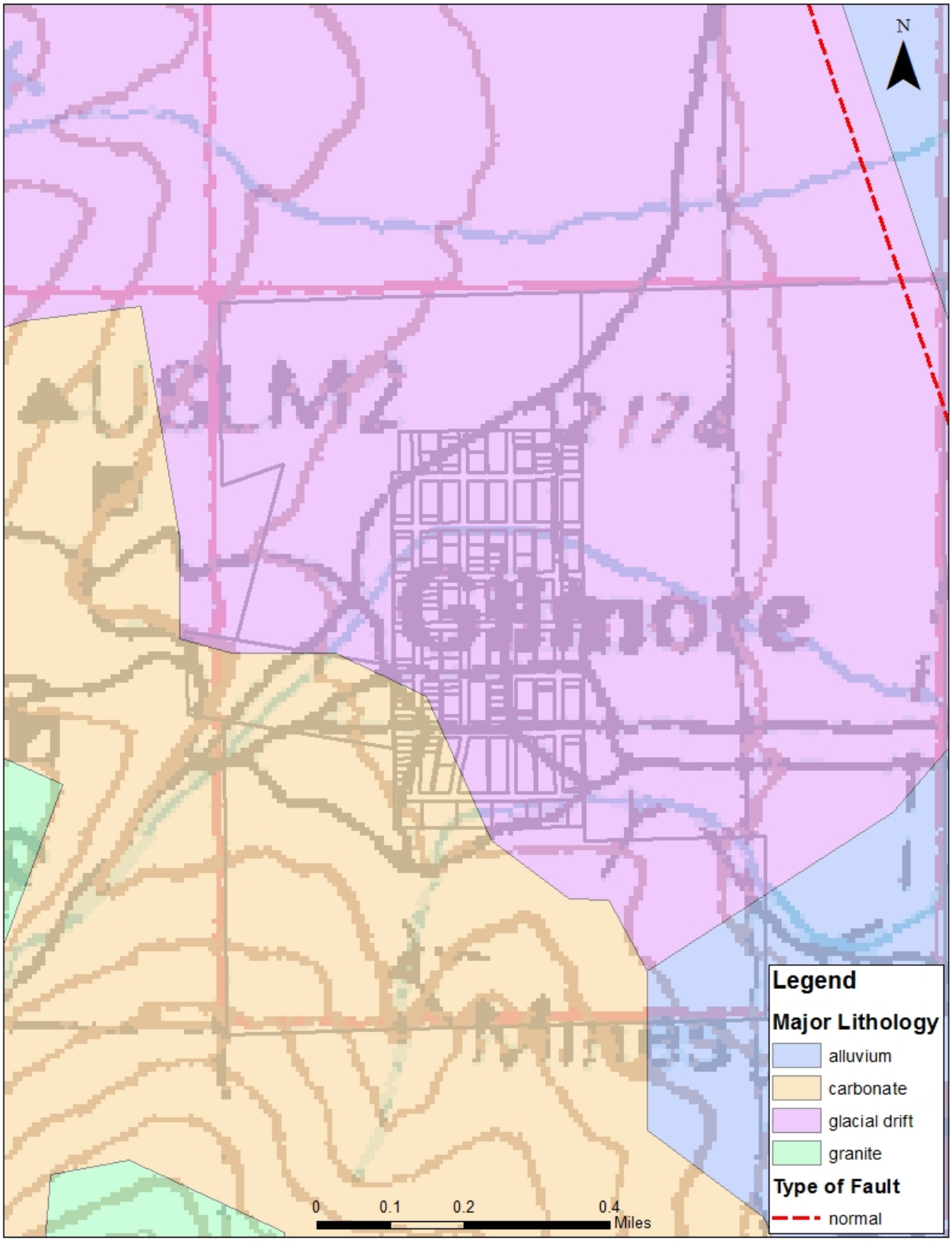

Figure 3. Map of major lithology in the vicinity of the Gilmore townsite.

2.3 Climatology

Climate information is based on a summary for Leadore, Idaho obtained from the Western Regional Climate Center (WRCC, 2016). The climatological data was collected at the Leadore #2, Idaho Station (105177) (elevation 6,000 feet [ft] above mean sea level [amsl]) which is located in the town of Leadore, Idaho. Based on data collected from 1965 to 2016, total annual precipitation averages 8.05 inches with a total annual snowfall average of 18.0 inches. The driest months of the year are August and October. The average annual high temperature is 54.9°F and the average annual low temperature is 23.5°F. July is the hottest month with an average temperature of 84.2°F. January is the coldest month with an average temperature of 3.7°F.

2.4 Current and Potential Future Land Uses

Residential dwellings are present within the Gilmore townsite; however, the overall number of residences and duration of occupancy is unknown. Since multiple parcels within the Gilmore townsite (Photo 1) are currently for sale, continued and possible increases in residential living and recreational visits is likely.

Photo 1. Overview of the Gilmore townsite. Photo taken from hillside to the west of the townsite, looking to the southeast.

Current land uses for the Gilmore townsite, primarily during the summer months, could include residential living, recreational occupancy (cabins, camping, RVs [recreational vehicle]), picnicking, scenic walking and driving, biking, horseback riding, and all-terrain vehicle (ATV) touring. These uses are also likely within the surrounding lands and could also include backpacking, wildlife viewing, hunting, cattle grazing, and foraging for plants. All of these current uses are likely to continue into the future.

Recreationalists may visit the townsite when traveling to Meadow Lake Campground. Interpretive mining history signage is present in the townsite (Photo 2). Open holes (shafts, adits, etc…) and accessible roads and paths to historic mining sites are present along the main road as visitors travel to the Meadow Lake Campground. The abandoned mines in the Gilmore area are located on private property.

As an effort to make visitors aware of the physical hazards and metals in soil within this area, a panel with 'Play Safe' messaging has been added to the display in the Gilmore townsite (Photos 3 and 4). Funding and creation of this panel was possible through collaboration with IDHW, BLM (BLM 2014), and the Lemhi County Historical Society (Lemhi County Historical Society and Museum 2016).

Photo 2. Interpretative mining history signage at the Gilmore townsite in 2015.

Photo 3. Play safe signage added at the Gilmore townsite in 2016.

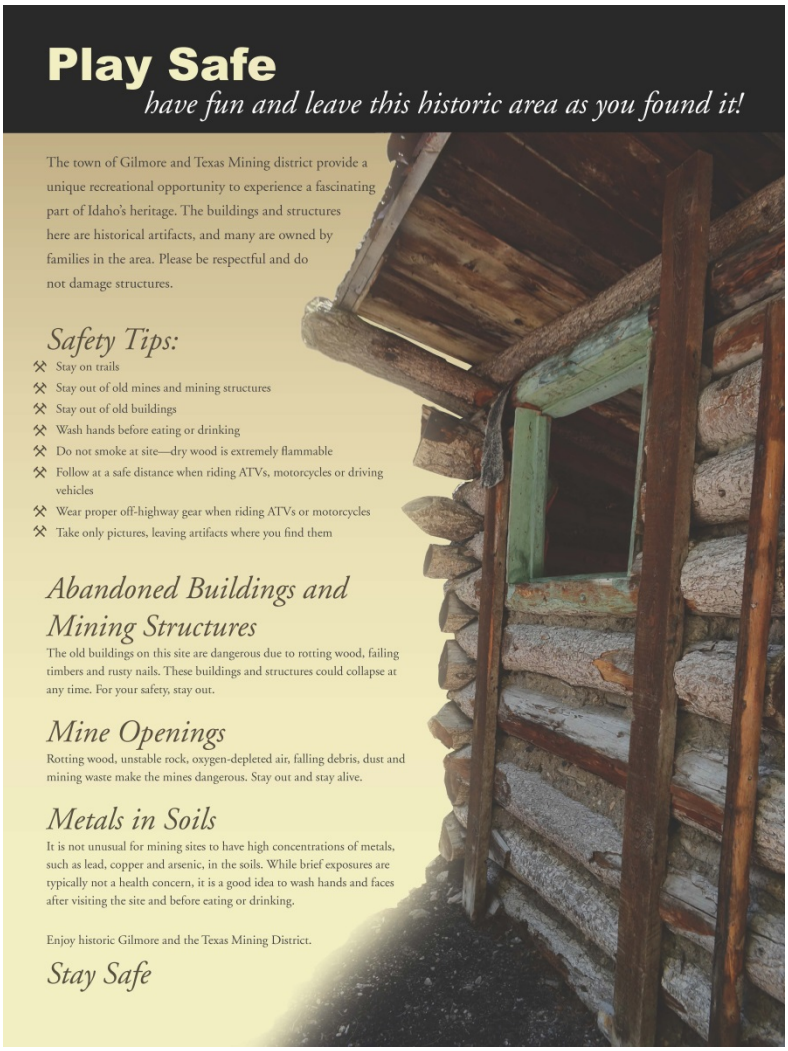

Photo 4. Play safe messaging.

3 Sample Collection and Analysis

DEQ, BLM, and TerraGraphics staff visited the Gilmore area and collected samples during the week of August 15, 2016. Sample collection information and analytical results are presented in this section. Site photographs are presented in Appendix A. The field crew did not purposely or knowingly trespass on any private holdings during field work.

Sampling and laboratory analysis was conducted in accordance with the Sampling Analysis Plan (SAP)/Quality Assurance Project Plan (QAPP) for Gilmore Townsite Preliminary Assessment Activities (TerraGraphics 2016a). All samples were collected, handled, and stored in accordance with the SAP/QAPP and submitted to SVL Analytical, Inc. (SVL) in Kellogg, Idaho.

Composite surface soil samples were collected to consist of soil within the top two inches combined from 30 locations randomly distributed over the sample area. Soil and sediment grab samples consisted of collecting two to three trowel scoops from one soil location. Subsurface

samples were collected by scraping the sidewall of a hand excavated hole from the desired depth interval.

Laboratory sample preparation included sieving the soil prior to analysis. Samples collected from the Gilmore townsite were sieved to retain particles smaller than 60 mesh (250 µm) to represent the size of soil particles that adhere to skin (<100 to 200 µm; EPA 2000). Samples collected from BLM property were sieved to retain particles smaller than 10 mesh (2,000 µm) to represent larger particle sizes that could eventually break down to smaller particle sizes. One sample from the northern loop of the roads (GT-03-RD-SS1) was sieved to both 60 and 10 mesh for comparison of analytical results for different sieve sizes.

A summary of the sample location descriptions and laboratory analytical results are presented in Tables 1 and 2. A map showing the sample locations and lead concentrations for these locations is shown in Figure 4. All samples were analyzed for 13 total metals: antimony, arsenic, barium, cadmium, chromium, copper, iron, lead, manganese, selenium, silver, zinc, and mercury. Field observations and laboratory results are discussed in the context of migration/exposure pathways and targets in Section 4.

Quality control samples included collecting duplicate and replicate (triplicate) samples to evaluate sample precision to measure variability or total error in the data set. A duplicate sample is an independent sample collected as close as possible to the original sample using the same sample collection methods. Replicate samples are collected following the same sample methods as the original sample with subsample locations systematically offset from the original sample location. Samples collected for evaluating quality assurance/quality control (QA/QC) included: duplicate sample pairs GT-03-RD-SS1/GT-03-RD-SS2 and BLM-SS1/BLM-SS2; and BLM-SS11 and BLM-SS12 which were replicates of BLM-SS10.

The results for duplicate samples show that all of the analytes measured met the relative percent difference (RPD) goal of 20 percent except for the lead duplicate results for GT-03-RD-SS1 and GT-03-RD-SS2 which is 29 percent. The maximum RPD allowed from this project is 50 percent; therefore, all data are acceptable. The results for replicate (triplicate) samples show that all of the analytes measured met the relative standard deviation (RSD) goal of 20 percent. TerraGraphics performed a data quality review based on the requirements stated in the SAP/QAPP (TerraGraphics 2016b). The data are determined to be of acceptable quality and meet the data quality objectives for representativeness and comparability; no data were rejected. Completeness for this sampling event is calculated at 100 percent. Final data and assigned qualifiers are included in Table 2.

Table 1. Sample collection location descriptions.

Location	Sample ID	Description
Samples from the Gilmore Townsite Common Use Areas		
North-South Road to the East	GT-01-RD-SS1	North-south road that passes along the east side of the historic information signage. Composite sample collected between the road intersection with the forest service road on the south end to the north end of the road before the road drops into a noticeable depression. Road is a dirt road and no capping material is evident on the road surface (Appendix A, Photos 1 and 2).
North-South Road to the West	GT-02-RD-SS1	North-south road approximately 300 feet west of GT-01-RD-SS1. Composite sample collected between the road intersection with the forest service road on the south end to the north end of the road before the road drops into a noticeable depression. Road is a dirt road and no capping material is evident on the road surface (Appendix A, Photo 1).
Northern Loop of the Roads	GT-03-RD-SS1 (-10 mesh) GT-03-RD-SS1 (-60 mesh) GT-03-RD-SS2	Horseshoe shaped section of road that is located within the noticeable depression toward the north end of the townsite and connects the two north-south roads. The low lying area is characterized by very fine, almost powdery soils that are dark brown in color. Road is graded across the top of the dark brown soils and no capping material is evident on the road surface. Sample GT-03-RD-SS2 is a duplicate of GT-03-RD-SS1 (Appendix A, Photo 1).
	GT-03-RD-SS3 GT-03-RD-SS4	Subsurface samples collected in the horseshoe shaped road at the north end of the townsite. Sample GT-03-RD-SS3 was collected from the 2 to 12 inch depth interval, and GT-03-RD-SS4 was collected from the 12 to 24 inch depth interval (Appendix A, Photos 1 and 3).
Southern Forest Service Road	GT-04-RD-SS1	Forest Service Road 002 runs east-west across the south end of the townsite. Composite sample was collected from the east edge of the townsite to the west edge of the townsite. Road is a gravel road that appears to be capped with imported material.
Samples from Surrounding Lands – Collected on BLM Property		
Tailings Material Eroded onto BLM Property	BLM-SS1 BLM-SS2	Grab sample of tailings that has eroded onto BLM property. Tailings are dark brown and very fine grained/powdery. Sample BLM-SS2 is a duplicate of BLM-SS1. (Appendix A, Photo: 4)
East-West Ditch	BLM-SS3	Composite sample collected from ditch line that runs east-west. Sample was collected on BLM property between the private property and the west edge of the townsite.
East-West Wedge	BLM-SS10 BLM-SS11 BLM-SS12	Composite samples collected in a wedge shaped area bounded to the north and south by ditch lines, bounded to the west by private property and bounded to the east by the townsite. BLM-SS11 and BLM-SS12 are field replicates of BLM-SS10. (Appendix A, Photos: 5 and 6).
Stained Soil North of Townsite	BLM-SS4	Composite sample collected from an area of stained soil north of the townsite and below an old ditch line that crosses BLM property (Appendix A, Photo 7).
North Edge of Townsite	BLM-SS8	Composite sample collected from a 30-foot wide strip along the north edge of the townsite on BLM property (Appendix A, Photo 8).
West Edge of Townsite	BLM-SS9	Composite sample collected from a 30-foot wide strip along the west edge of the townsite on BLM property. (Appendix A, Photos: 9 and 10)
Downstream Sediment within North-South Ditch	BLM-SS5	Grab sample of sediment from dry creek bed located northwest of the townsite. Sample was collected downstream of where the creek cuts across an old ditch line (Appendix A, Photo 11).
Upstream Sediment within North-South Ditch	BLM-SS6	Grab sample of sediment from dry creek bed located northwest of the townsite. Sample was collected upstream of where the creek cuts across an old ditch line (Appendix A, Photo 12).
Background	BLM-SS7	Background grab sample collected from the top of a rocky knob located northwest of the townsite (Appendix A, Photo 13).

Table 2. Laboratory analytical results.

Location Description	Sample ID	Sample Type	Date	Analyte (mg/kg)												
				antimony	arsenic	barium	cadmium	chromium	copper	iron	lead	manganese	selenium	silver	zinc	mercury
Samples from the Gilmore Townsite Common Use Areas																
North-South Road to the East	GT-01-RD-SS1	Composite	8/15/2016	**12.7**	**35.9**	150	**8.21**	13.0	**62.8 *J+***	16,800	**2,930**	1,020	**1.29**	**4.38**	**1,970**	0.080
North-South Road to the West	GT-02-RD-SS1	Composite	8/15/2016	**11.2**	**34.2**	211	**9.13**	16.4	**67.5 *J+***	20,800	**2,340**	1,500	**1.71**	**3.22**	**1,810**	0.098
Northern Loop of the Roads	GT-03-RD-SS1 (-10 mesh)	Composite	8/15/2016	**168**	**321**	327	**57.5**	13.9	**638 *J+***	**69,800**	**25,000**	**7,230**	**0.94**	**17.9**	**16,000**	**0.902**
	GT-03-RD-SS1 (-60 mesh)	Composite	8/15/2016	**173**	**323**	360	**51.7**	13.3	**557 *J+***	**65,500**	**32,300**	**7,600**	0.89	**16.5**	**13,300**	**0.847**
	GT-03-RD-SS2	Composite (Duplicate)	8/15/2016	**170**	**302**	349	**48.6**	13.2	**514 *J+***	**61,400**	**19,900**	**7,170**	0.89	**15.3**	**12,500**	**0.798**
	GT-03-RD-SS3	Subsurface (2-12 inch depth)	8/15/2016	**246**	**383**	366	**73.3**	13.3	**710 *J+***	**74,700**	**26,400**	**8,950**	0.79	**21.5**	**17,400**	**1.14**
	GT-03-RD-SS4	Subsurface (12-24 inch depth)	8/15/2016	**242**	**419**	283	**81.8**	10.9	**769 *J+***	**78,600**	**42,900**	**7,080**	0.79	**25.1**	**21,100**	**0.912**
Southern Forest Service Road	GT-04-RD-SS1	Composite	8/15/2016	<2.0	10.9	45.9	0.74	6.04	8.81 *J+*	5,120	151	236	**0.91**	0.74	149	<0.033
Samples from Surrounding Lands - Collected on BLM Property																
Tailings Material Eroded onto BLM Property	BLM-SS1	Grab	8/16/2016	**350**	**546**	372 *J*	**106**	16.5	**1,090**	**131,000**	**40,400**	**9,690 *J***	0.49 *J*	**48.3 *J***	**38,000**	**1.04**
	BLM-SS2	Grab (Duplicate)	8/16/2016	**326**	**508**	417 *J*	**98.0**	17.7	**1,080**	**127,000**	**45,100**	**9,960 *J***	0.43 *J*	**54.3 *J***	**35,900**	**1.21**
East-West Ditch	BLM-SS3	Composite	8/16/2016	**287**	**289**	339 *J*	**55.8**	21.5	**669**	**86,900**	**23,000**	**8,040 *J***	0.38 *J*	**29.2 *J***	**18,700**	**0.662**
East-West Wedge	BLM-SS10	Composite	8/16/2016	**157**	**267**	413 *J*	**74.7**	20.4	**597**	**89,300**	**22,700**	**8,020 *J***	0.34 *J*	**23.8 *J***	**18,600**	**0.590**
	BLM-SS11	Composite (Triplicate)	8/16/2016	**188**	**260**	339 *J*	**52.7**	19.6	**519**	**79,900**	**16,900**	**6,820 *J***	0.32 *J*	**15.7 *J***	**14,600**	**0.738**
	BLM-SS12	Composite (Triplicate)	8/16/2016	**177**	**308**	292 *J*	**43.2**	14.2	**429**	**63,800**	**22,600**	**6,090 *J***	0.32 *J*	**17.9 *J***	**17,600**	**0.547**
Stained Soil North of Townsite	BLM-SS4	Composite	8/16/2016	**28.1**	**56.8**	180 *J*	**15.0**	12.1	**83.0**	20,600	**3,030**	1,720 *J*	<0.30 *UJ*	**2.64 *J***	**3,290**	0.170
North Edge of Townsite	BLM-SS8	Composite	8/16/2016	**55.2**	**110**	177 *J*	**14.9**	12.4	**178**	25,100	**5,440**	2,000 *J*	<0.30 *UJ*	**4.88 *J***	**7,700**	0.190
West Edge of Townsite	BLM-SS9	Composite	8/16/2016	**110**	**180**	259 *J*	**24.0**	16.4	**250**	40,300	**8,400**	**3,630 *J***	0.33 *J*	**7.64 *J***	**10,800**	**0.367**
Downstream Sediment within North-South Ditch	BLM-SS5	Grab	8/16/2016	5.2	12.7	113 *J*	1.43	8.69	19.2	11,300	**456**	705 *J*	<0.30 *UJ*	<0.50 *UJ*	**480**	0.037
Upstream Sediment within North-South Ditch	BLM-SS6	Grab	8/16/2016	<2.0	8.04	106 *J*	0.54	8.98	8.60	10,700	65.7	586 *J*	<0.30 *UJ*	<0.50 *UJ*	96.3	<0.033
Background	BLM-SS7	Grab	8/16/2016	2.8	10.6	195 *J*	1.02	14.3	20.7	15,600	129	899 *J*	<0.30 *UJ*	<0.50 *UJ*	157	0.065
EPA RSL for Resident Soil[a] (mg/kg)				31	0.68	15,000	71	NA	3,100	55,000	400	1,800	390	390	23,000	11
EPA RSL for Industrial Soil[a] (mg/kg)				470	3	220,000	980	NA	47,000	820,000	800	26,000	5,800	5,800	350,000	46
Mean Concentrations in Lemhi County[b] (ppm)				NA	14	NA	NA	NA	30	NA	69	604	0.65	NA	109	0.047

Notes:

Gray shaded values exceed regional screening levels (RSLs) for residential soils.

Orange shaded values exceed RSLs for both residential and industrial soils.

Bold = Three times greater than background concentrations when comparing: 1) the soil and sediment sample to the background value at BLM-SS7. Where the background value is not-detected the limit of detection was used as the background value for calculation purposes.

[a]Based on a target hazard quotient of 1.0. http://www2.epa.gov/risk/risk-based-screening-table-generic-tables

[b]Significant digits shown as reported by USGS. Mean concentrations are not available for Sb, Ba, Cd, Cr, Fe, and Ag. http://mrdata.usgs.gov/geochem/county.php?place=f16059&el=Pb&rf=northwestern

mg/kg = milligrams per kilogram

ppm = parts per million

< = Result is below the detection limit.

J = The result is an estimated quantity.

J+ = The result is an estimated quantity and is biased high.

UJ = Concentration was not detected and is qualified as an estimate.

NA = not available

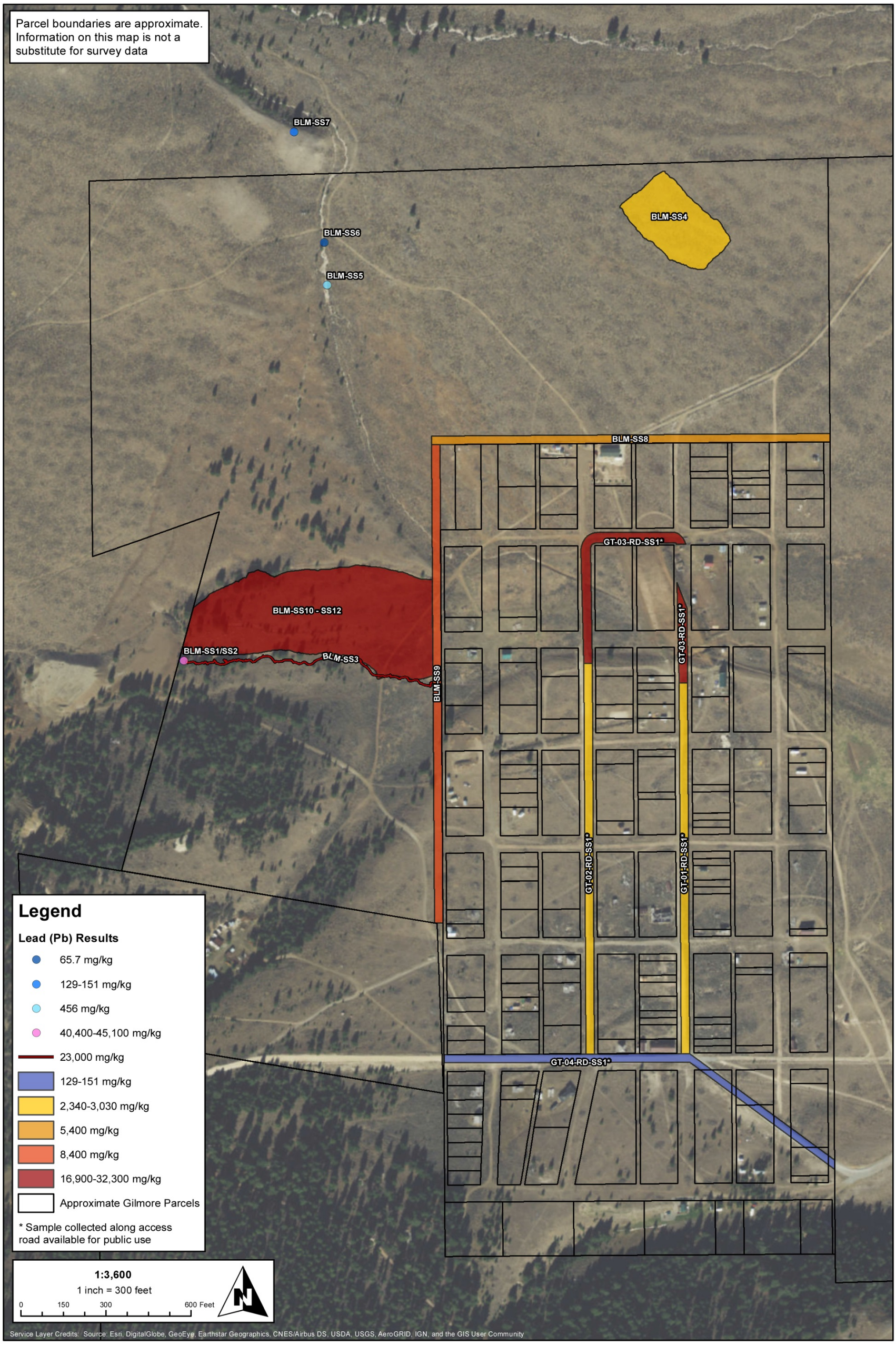

Figure 4. Sample locations and results map.

4 Migration/Exposure Pathways and Targets

The purpose of this PA/SI is to identify if any releases or potentials for release are present to pathways and targets. Pathways and exposure routes that may lead to human or ecological receptors include: surface water pathways (Section 4.1), ground water pathways (Section 4.2), and soil exposure and air pathways (Section 4.3).

4.1 Surface Water Pathways

The surface water migration pathway target distance limit (TDL) begins at the probable point of entry (PPE) of source water runoff from the site to the nearest surface water body and extends downstream for 15 miles. During the site visit, no surface water was observed around the townsite or surrounding lands; however, soil and sediment samples were collected from two local drainage ditches with pathways toward the townsite (sample BLM-SS3, from a ditch line that runs east-west, and samples BLM-SS5 and BLM-SS6, from a dry creek bed located northwest of the townsite). The presence of a surface water pathway may be seasonal (e.g., during snow melt) or only present during high precipitation events.

For the Gilmore townsite and surrounding lands, the selected PPE for the surface water migration pathway is Meadow Lake Creek. Meadow Lake Creek flows into Texas Creek to the east of the Gilmore townsite. The 15-mile TDL is completed near the confluence of Texas Creek and Eighteen Mile Creek outside of Leadore, Idaho (Figure 5). A freshwater emergent wetland is located within a 2-mile radius north of the Gilmore townsite (Figure 5).

4.1.1 Sensitive Waterways

The Clean Water Act (CWA) requires that the State of Idaho prepare an Integrated Report listing: (1) current conditions of all state waters (§305(b) list) and (2) waters that are impaired and need a total maximum daily load (TMDL; §303(d) list). §305(b)-listed streams, are shown on Figure 6. Meadow Lake Creek (ID17060204SL039_02) and Texas Creek (ID17060204SL036_03, ID17060204SL038_02, ID170204SL038_03, and ID17060204SL040_02) were not sampled as part of this PA/SI. Texas Creek is a tributary to the Lemhi River (Lemhi River subbasin hydrologic unit code 17060204) and contained in the Lemhi River hydrologic unit code.

As listed in the final 2012 Integrated Report, Meadow Lake Creek has not been assessed; Texas Creek to the confluence with Deer Creek has not been assessed; Texas Creek from Deer Creek to the Lemhi River has been identified as not supporting for cold water aquatic life, salmonid spawning, and secondary contact recreation.

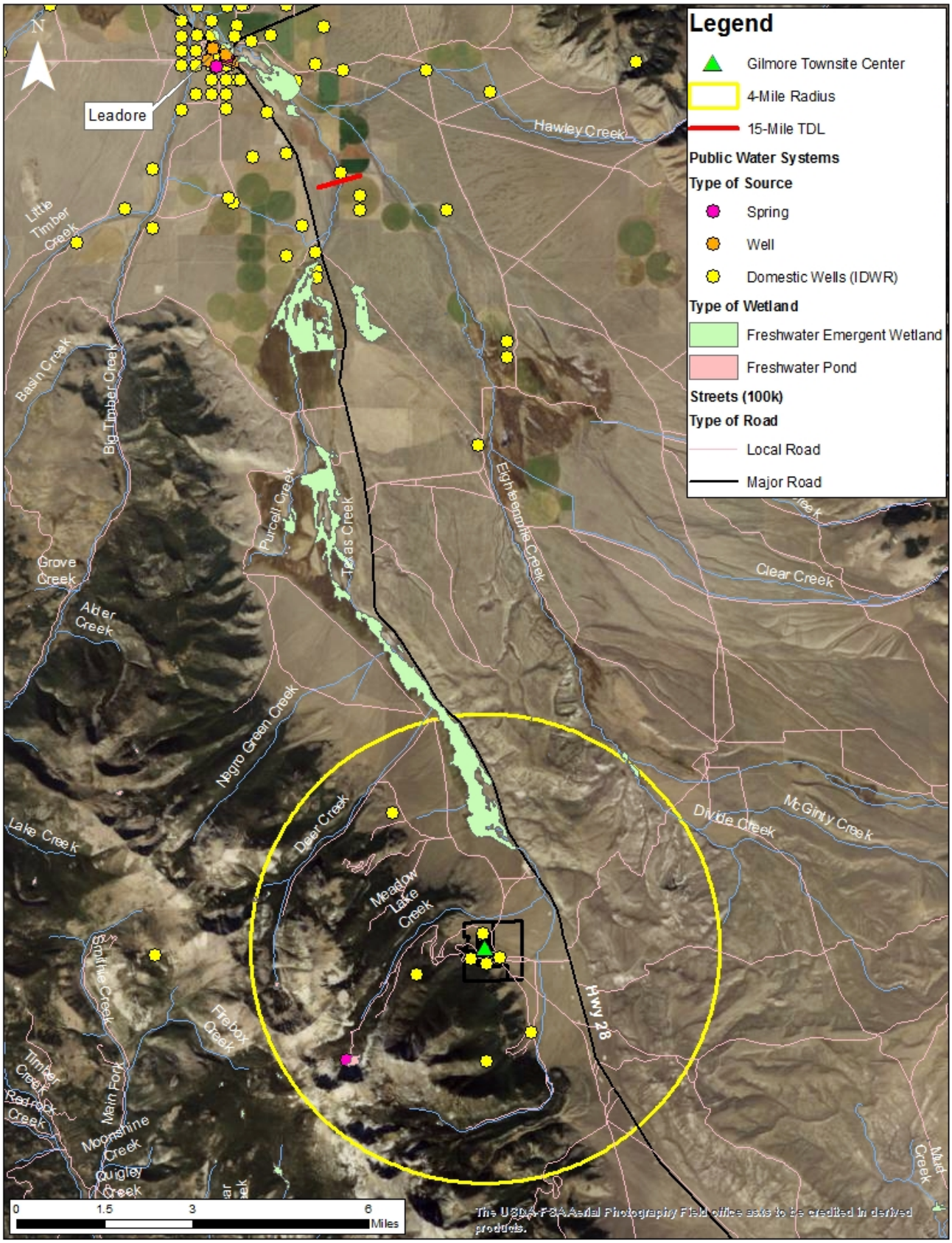

Figure 5. Map of the features supporting evaluation of the surface water and ground water pathways near the Gilmore townsite.

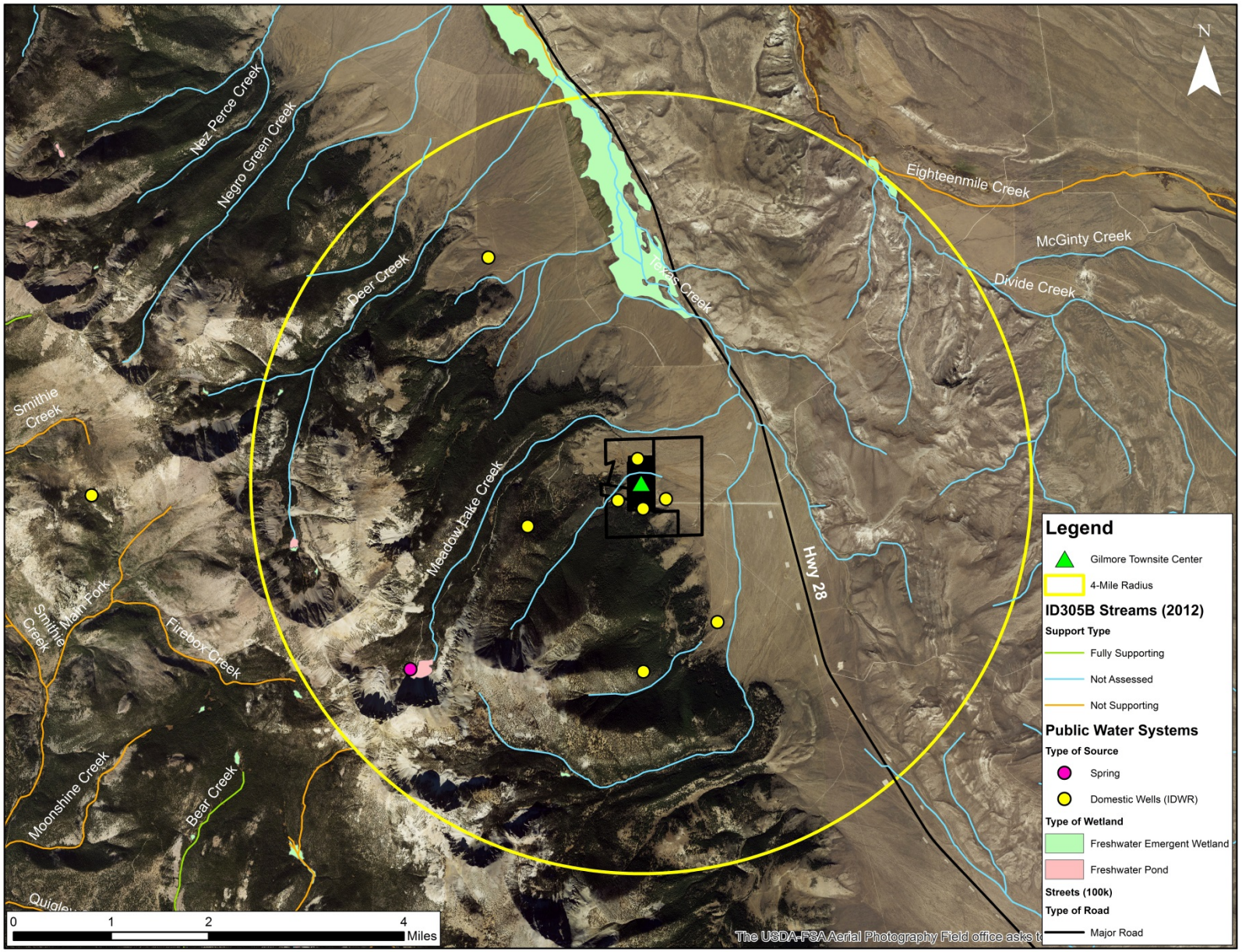

Figure 6. Gilmore townsite PWS, wetlands, and State of Idaho §305(b)-listed streams.

4.1.2 Sensitive, Rare, and Threatened Plant and Animal Species

Sensitive species can have large habitat ranges that overlap the vicinity of the Gilmore townsite and surrounding lands. Based on the resource list obtained during a search of the Information for Planning and Conservation System (USFWS 2016), the following species are identified for Lemhi County:

- Birds: Yellow-Billed Cuckoo, *Coccyzus americanus*, threatened species.
- Mammals: Canada Lynx, *Lynx canadensis*, threatened species and North American Wolverine, *Gulo gulo luscus*, proposed threatened species.
- Fish: Bull Trout, *Salvelinus confluentus*, threatened species-designated critical habitat and Steelhead, *Oncorhynchus mykiss*, designated critical habitat.
- Plants: Whitebark Pine, *Pinus albicaulis*, candidate species.

4.2 Ground Water Pathways

Ground water within a four mile radius of the Gilmore townsite supplies eight domestic wells (Figures 5 and 6). Idaho Department of Water Resources (IDWR) drillers' logs indicate that the approximate static water level measured in wells within the Gilmore townsite ranges between 220 to 380 feet below land surface. A source water assessment (SWA) summary report has not been completed for the public water system (PWS) within this 4-mile radius (USFS Meadow Lake Campground public water system, PWS#ID7300083); however, this PWS is from a spring and located upgradient and segregated from the mine sites by structural geology.

Given the depth to ground water for the domestic wells and the lack of PWS using ground water in the immediate vicinity or downgradient of the townsite, the ground water pathway was not assessed as part of this PA/SI.

4.3 Soil Exposure and Air Pathways

The soil exposure pathway is evaluated based on the threat of direct-contact exposure to contaminated soil and includes onsite residents, onsite workers, nearby residents within a one-mile radius of the site, and visitors to the site. The estimated population within a 1-mile radius of the Gilmore townsite is three people (MCDC 2016); however this information does not take into consideration short-term residential dwellings and recreational occupancy and frequency of use. Soil laboratory analytical results were compared to the following criteria: 1) EPA regional screening levels (RSLs) for residential and industrial soil and 2) background concentrations (Table 2).

The following subsections include observations about metal concentrations within soil and sediment samples. Sampling conducted for this PA/SI is used to determine if there is a concern with the presence of contamination. Additional characterization and sampling is necessary in areas not sampled during this PA/SI to determine the extent of contamination sources and distribution.

The air migration pathway is evaluated based on the threat to onsite and nearby populations within a 4-mile radius TDL from releases to air. The estimated population within a 4-mile radius of the Gilmore townsite is three people (MCDC 2016); however this information does not take into consideration short-term residential dwellings and recreational occupancy and frequency of use. No schools or day care facilities are located within four miles of the Gilmore townsite.

Given the observations of metals detections in soil, the soil exposure pathway is complete for residential and recreational uses within the Gilmore townsite and surrounding lands. The air pathway was not assessed as part of this PA/SI; however, the presence of fugitive dust from contaminated soil should be considered in future evaluations.

4.3.1 Lead

- Lead is a contaminant of concern in soil with detections above the residential (400 mg/kg) and industrial (800 mg/kg) RSLs in multiple locations. In addition to RSLs, EPA has set two hazard standards for lead in bare (uncovered) residential soil: 400 mg/kg in bare soil in child play areas and 1,200 mg/kg in all other bare soil yard areas (40 CFR 745, 2001).

- Highest lead detections are observed: 1) where tailings material has eroded onto BLM property (40,400 and 45,100 mg/kg) and 2) where drainage and erosion pathways have likely resulted in migration of tailings materials across BLM property and to the northern area of the Gilmore townsite (lead concentrations range from 16,900 to 42,900 mg/kg in these areas).

- Elevated lead detections are also present in soils within the following areas:

    - Along the west edge (8,400 mg/kg) and north edge (5,440 mg/kg) of the townsite on BLM property.

    - Within a stained soil area north of the townsite on BLM property (3,030 mg/kg).

    - Along the north-south roads within the Gilmore townsite (2,340 and 2,930 mg/kg).

4.3.2 Arsenic

- Arsenic is also a contaminant of concern in soil with detections above the residential (0.68 mg/kg) and industrial (3 mg/kg) RSLs in multiple locations. Higher arsenic concentrations appear to correlate with locations with higher levels of lead. It should also be noted that naturally occurring arsenic is present in this region as the site background (10.6 mg/kg) and mean concentration for Lemhi County (14 mg/kg) are both above the RSLs.

- Similar to lead detections, highest arsenic detections are observed: 1) where tailings material has eroded onto BLM property (546 and 508 mg/kg) and 2) where drainage pathways have likely resulted in migration of tailings materials across BLM property to the northern area of the Gilmore townsite (arsenic concentrations range from 321 to 419 mg/kg in these areas).

- Elevated arsenic detections are also present in soils within the following areas:
    - Along the west edge (180 mg/kg) and north edge (110 mg/kg) of the townsite on BLM property.
    - Within a stained soil area north of the townsite on BLM property (56.8 mg/kg).
    - Along the north-south roads within the Gilmore townsite (35.9 and 34.2 mg/kg).

4.3.3 Other Metals

- Other than lead and arsenic, no other metals had detections above the industrial RSLs.
- Other metals with detections above the residential RSLs include: antimony, cadmium, iron, manganese, and zinc.

5 Conclusions and Recommendations

Conducting this PA/SI for the Gilmore townsite and surrounding lands is important to provide the property owners, residents, and recreational users of this area with information about the levels of metals in soil; possible exposure pathways when living, visiting, and recreating in the area; and health and safety education about how to reduce exposures. Health and safety information prepared by IDHW is presented in Section 5.1 and next steps for the Gilmore townsite and surrounding lands are stated in Section 5.2.

5.1 Health and Safety Information

IDHW has prepared the following Gilmore Townsite Health and Safety Factsheet to provide actions to take to reduce your family's exposures to metals. Based upon the available data, the contaminants of greatest health concern are lead and arsenic.

Lead

There is no "safe" blood lead level, especially for children or women who are pregnant or plan to become pregnant. The Centers for Disease Control and Prevention (CDC) has identified exposure to lead-based paint and in-home dust from lead-based paint decay as the most widespread and dangerous high-dose source of lead exposure for young children (CDC 2015). The health risks of lead contamination in soils will depend on the lead source. Soil lead contamination from industrial/refining sources, such as degraded paint or ore smelting, is more hazardous to health than lead originating from unrefined ore (ATSDR 2007a).

Compared to adults, children's growing bodies absorb more lead and their growing brains, bones, and nervous systems are more sensitive to its damaging effects. Children with high blood lead levels may experience lower IQ, slowed growth, anemia, damage to the brain and nervous system, behavior and learning problems, and hearing problems. Adults with high blood lead levels may experience reproductive problems, high blood pressure, and weakness in fingers, wrists, or ankles (ATSDR 2007a).

All sources of lead in the environment of children should be effectively controlled or eliminated. EPA has set two "hazard standards" for lead in bare (uncovered) residential soil. For bare soil in "child play areas", the standard is 400 parts per million (ppm)[1] lead. In all other bare soil yard areas, the standard is 1,200 ppm lead (40 CFR 745, 2001). If soil lead exceeds these respective levels, property owners and decision makers should take effective measures to reduce or prevent children's exposure to lead in those soils.

Arsenic

Arsenic is a known human carcinogen. Arsenic exposures may result in bladder, skin, lung, or liver cancers. Arsenic exposures may also result in non-cancer effects such as stomachache, nausea, vomiting, diarrhea, blood disorders, abnormal heart rhythm, and nerve disorders (ATSDR 2007b).

In areas where people live all-year round, recommended soil action levels (the levels where removal or land use controls are necessary) for arsenic may range from 70 ppm to 200 ppm. This variability depends upon the chemical nature of the arsenic (this is called bioavailability). In areas of limited use (occasionally visited through the year), recommended action levels will be higher.

5.2 Next Steps for the Gilmore Townsite and Surrounding Lands

The purpose of this PA/SI is to assess the threat posed to human health and the environment and determine the need for additional investigation at the Gilmore townsite and surrounding lands. The detections of lead, arsenic, and other metals in soil, shown and discussed in Sections 3 and 4 of this PA/SI report, identify a concern for the soil exposure pathway for residential and recreational users. These sample results do not represent the extent of contamination; therefore, additional characterization and sampling is necessary to: 1) determine the extent of contamination sources and distribution and 2) identify potential alternatives to address contamination.

Several agencies, including DEQ, EPA, IDHW, BLM, and Idaho Department of Lands (IDL), are currently discussing federal and state programs and funding available to perform additional sampling and characterization for this area. Future information will be used to determine potential alternatives to address soil contamination within the townsite and surrounding lands.

[1] Parts per million (ppm) equals milligram per kilogram (mg/kg).

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GILMORE TOWNSITE HEALTH AND SAFETY FACTSHEET

METALS IN SOILS

It is not unusual for historical mining sites to have high levels of metals. Lead, arsenic, antimony, cadmium, manganese, and zinc were detected at levels of concern in the soil within the Gilmore townsite and surrounding areas. Exposure to lead and arsenic are the greatest health concern for this area.

These metals can get into your body in several ways: recreating or playing in contaminated soil, putting your hands or other objects covered with dust into your mouth, and breathing in contaminated dust.

ACTIONS YOU CAN TAKE TO REDUCE EXPOSURE TO METALS WHEN RECREATING AND VISITING GILMORE.

Recreation activities at and near Gilmore:

- Wash hands after any outdoor activity and before eating or drinking. Use a nail scrub brush to get dirt out of fingernails.
- Do not let children play in loose soil, dust, and muddy areas.
- Eat on a clean table or blanket, not on the ground. Do not eat food that has been dropped on the ground.
- Keep children's cuts and scrapes clean and covered.
- Wash children's toys after playing outside.
- When riding ATVs or other off-highway vehicles, wear protective gear such as a bandana, follow at a safe riding distance, and avoid riding through extremely dusty areas to avoid breathing in large amounts of dust.

Using homes, cabins, and camping at Gilmore:

- Remove shoes and dusty clothes before going inside.
- For homes and cabins, regularly damp-wipe floors and surfaces indoors and vacuum carpets.

Leaving Gilmore and returning home:

- After outdoor activity, remove shoes, dust off clothing, and wash separately from other laundry.
- Wash or dust off any camping or recreational items (tents, bicycles, etc…).
- Wash your dogs, horses, and other animals that accompanied you.
- Avoid tracking dust into your garage by washing vehicles and ATVs.

Nutrition:

- Make sure children have plenty of calcium, iron, and vitamin C in their diets. Taking in these minerals will greatly reduce the amount of lead the body absorbs.
- Although the Gilmore area has a short growing season, if you grow a garden consider bringing in clean soil and use a raised bed. Soak and wash your produce to remove dirt.

GILMORE TOWNSITE FACTSHEET

ATSDR ToxFAQs:

The Agency for Toxic Substances and Disease Registry (ATSDR) ToxFAQs is a series of summaries about hazardous substances. Each fact sheet serves as a quick and easy to understand guide.
Visit: www.atsdr.cdc.gov/toxfaqs for a complete list of ToxFAQs or see the following for more information about the specified metals:

ToxFAQs for Lead: www.atsdr.cdc.gov/toxfaqs/tfacts13.pdf

ToxFAQs for Arsenic: www.atsdr.cdc.gov/toxfaqs/tfacts2.pdf

ToxFAQs for Antimony: www.atsdr.cdc.gov/toxfaqs/tfacts23.pdf

ToxFAQs for Cadmium: www.atsdr.cdc.gov/toxfaqs/tfacts5.pdf

ToxFAQs for Manganese: www.atsdr.cdc.gov/toxfaqs/tfacts151.pdf

ToxFAQs for Zinc: www.atsdr.cdc.gov/toxfaqs/tfacts60.pdf

ABANDONED BUILDINGS AND MINING STRUCTURES

Every year dozens of people are injured or killed in recreational accidents on mine property. Hazards associated with abandoned mines are not always apparent to recreationalists. For example, cell phones may not have service in a mine shaft, so it may be impossible to call for help in an emergency.

Common hazards associated with mines:

- **Open shafts** are vertical mine openings that can extend hundreds of feet to the lower level of a mine. Open shafts can be concealed by mine debris, dirt, rock, and even water.
- **Unstable and decayed support** includes once solid beams and frameworks that have been decaying for more than a hundred years. In many cases, there may be no support at all and the fractured roof or walls of the mine tunnel may eventually collapse in response to vibrations and/or the force of gravity.
- **Deadly gases and lack of oxygen** can be present in abandoned mines that are not ventilated. Pockets of methane, carbon dioxide, and other deadly gases can form or displace oxygen with no visible sign. When these gases enter the body, muscles stop responding normally, thinking becomes clouded, and unconsciousness and death can occur.
- **Horizontal and vertical openings** can extend for miles. Within a short distance of the entrance there is no light, making it easy to become lost and disoriented inside a mine.

Safety Tips:

- Stay on developed roads and trails.
- Stay out of old mines, mining structures, waste piles, or dumps.
- Do not camp or recreate near mining structures, waste piles, or dumps.

STAY OUT AND STAY ALIVE

For more information visit: www.abandonedmines.gov

Or call the Idaho Department of Health and Welfare at:

1-800-445-8647

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2/16/2017

IDAHO DEPARTMENT OF HEALTH & WELFARE
DIVISION OF PUBLIC HEALTH

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Appendix A. Site Photographs

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Photo 1: Overview of Gilmore townsite. Photo taken from hillside to the west of the townsite, looking to the southeast. Picture shows two main north-south running roads (samples GT-01-RD-SS1 and GT-02-RD-SS1); depressed area with dark brown soils at north end of townsite where horseshoe shaped road was sampled (GT-03-RD-SS1; left side of picture).

Photo 2: North-south road on east side of townsite (looking northeast, sample GT-01-RD-SS1 collected along this road).

Photo 3: Part of the northern loop of roads (looking south). Depth samples (GT-03-RD-SS3/SS4) collected within this area.

Photo 4: Area where tailings material has eroded onto BLM property; site of samples BLM-SS1/SS2.

Photo 5: Wedge shaped area sampled (looking west); site of samples BLM-SS10, BLM-SS11, and BLM-SS12.

Photo 6: Wedge shaped area sampled (looking east); site of samples BLM-SS10, BLM-SS11, and BLM-SS12.

Photo 7: Photo taken from hillside to the north of the townsite, looking to the south. Typical vegetation on BLM property north of townsite. BLM-SS4 collected from orange stained soils in this general area.

Photo 8: BLM property along north edge of townsite (looking south). Sample BLM-SS8 was collected from a 30-foot wide strip along the north edge of town on BLM land.

Photo 9: Sample area along west edge of townsite (looking northeast); site of sample BLM-SS9.

Photo 10: Sample area along west edge of townsite (looking southeast); site of sample BLM-SS9.

Photo 11: Dry creek downstream of ditch crossing (looking southeast). BLM-SS5 collected from dry stream sediment.

Photo 12: Dry creek bed upstream of ditch crossing (looking northwest). BLM-SS6 collected from dry stream sediment.

Photo 13: Background sample BLM-SS7 collected from top of knob (looking northwest).

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