# South Dry Valley Mine Preliminary Assessment

## Caribou County



**State of Idaho**
**Department of Environmental Quality**
May 2019

## Acknowledgments

The Idaho Department of Environmental Quality would like to thank Nu-West Industries, Inc. for permitting access to their South Dry Valley Mine property for the site visit.

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## Abbreviations, Acronyms, and Symbols

| | |
|---|---|
| **amsl** | above mean sea level |
| **BAM** | Best Available Methods |
| **BLM** | United States Bureau of Land Management |
| **BMP** | Best management practices |
| **BPM** | Best practical methods |
| **DEQ** | Idaho Department of Environmental Quality |
| **EIS** | Environmental Impact Statement |
| **EPA** | United States Environmental Protection Agency |
| **IMA** | Idaho Mining Association |
| **PA** | preliminary assessment |
| **PPE** | probable point of entry |
| **PWS** | public water system |
| **ROD** | Record of Decision |
| **SWA** | source water assessment |
| **TDL** | target distance limit |
| **USFS** | United States Forest Service |
| **USGS** | United States Geological Survey |

# 1 Introduction

This report presents the preliminary assessment (PA) results for the South Dry Valley Mine site in Caribou County, Idaho. Under a cooperative agreement with the US Environmental Protection Agency (EPA) Region 10, the Idaho Department of Environmental Quality (DEQ) provides technical support for performing the PA 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 is 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. Recently, DEQ focused 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.

In 2008, EPA's contractor, TechLaw, prepared the PA report, *Preliminary Assessment Report Dry Valley Mine Soda Springs, Idaho* (TechLaw 2008), for the entire Dry Valley Mine property. Because ownership of the mine property is split, two separate PA reports are currently being prepared to update and clarify the 2008 report. This PA addresses the South Dry Valley Mine; the North Dry Valley Mine will be assessed in a separate report.

This PA assesses the potential threat to human health and the environment posed by the site and determines the need for additional investigation or remedial action.

# 2 Site Background

Background for the South Dry Valley Mine site includes site location and description, ownership and operational history, previous investigations, and site visit.

## 2.1 Site Location

Dry Valley Mine is located in Township 8 South, Range 44 East (Sections 5, 6, 8, 9, 16, 21 and 22) and Township 7 South, Range 44 East (Section 31), approximately 14 miles northeast of Soda Springs, Idaho. The coordinates at the approximate center of the South Dry Valley Mine site are Latitude 42.750307 and Longitude -111.340034 (WGS84).

A portion of the Dry Valley Mine property is owned by Nu-West Industries, Inc. (Nu-West) and is associated with parcel numbers 07S44E300001, 07S44E295401, 07S44E320601, 08S44E050001, 08S44E042401, 08S44E047201, 08S44E080001, 08S44E090001, 08S44E092401, 08S44E170001, and 08S44E160100.

DEQ does not warrant the ownership research or location of property boundaries contained in this report. Information on ownership and property boundaries was obtained from the parcel maps for Caribou County (Idaho State Tax Commission 2018).

## 2.2 Site Description

The South Dry Valley Mine site in Caribou County, Idaho, falls within the Soda Springs Area Mining District (Figure 1). The following site description is from the Preliminary Assessment Report prepared by TechLaw (2008):

> The site is located adjacent to the Caribou National Forest, between Schmid Ridge and Dry Ridge in Idaho's Basin and Range Region (Netstate 2008). Schmid Ridge, Dry Valley, and Dry Ridge are part of the eastern Idaho/western Wyoming overthrust belt of the middle Rocky Mountain physiographic province, which is characterized by northwest trending ridges and valleys. Elevations in the area range from 6,400 to 6,700 feet above mean sea level (amsl) in the valley bottom to peaks that exceed 7,500 amsl feet on Schmid Ridge to the west (U.S. Bureau of Land Management (BLM) 2000).

## 2.3 Ownership History

The southern portion of the Dry Valley Mine site is currently owned by Nu-West Industries, Inc., a subsidiary of Nutrien Ltd. Nutrien Ltd was formed in January 2018 through a merger between Agrium and PotashCorp Inc. Nu-West Industries was a wholly-owned subsidiary of Agrium at the time of the merger.

Agrium (dba Nu-West Industries) purchased the southern portion of Dry Valley mine from Astaris Production, LLC in 2004. From June 2005 to May 2011 Nu-West extracted phosphate ore from two main pits (C Pit and D Pit) of the DVM South Extension and placed waste rock either as pit backfill or in one overburden pile (Each C Dump). Nu-West completed reclamation of the C Pit, D Pit, and associated overburden pile and haul roads by 2013.

The C and D Pits and surrounding facilities within the South Dry Valley Mine are the subject of this PA. The areas associated with the A and B Pits are not considered in this PA. Nu-West is responsible for monitoring, analyzing, and reporting on the sampling locations associated with A, B, C and D Pit areas according to the Surface and Ground Water Monitoring Plan in the US Bureau of Land Management's (BLM's) 2000 Record of Decision for the C and D South Extension Environmental Impact Statement (EIS). FMC retains responsibility for the A and B Pits, except for the monitoring and reporting component (Whetstone Associates 2018).

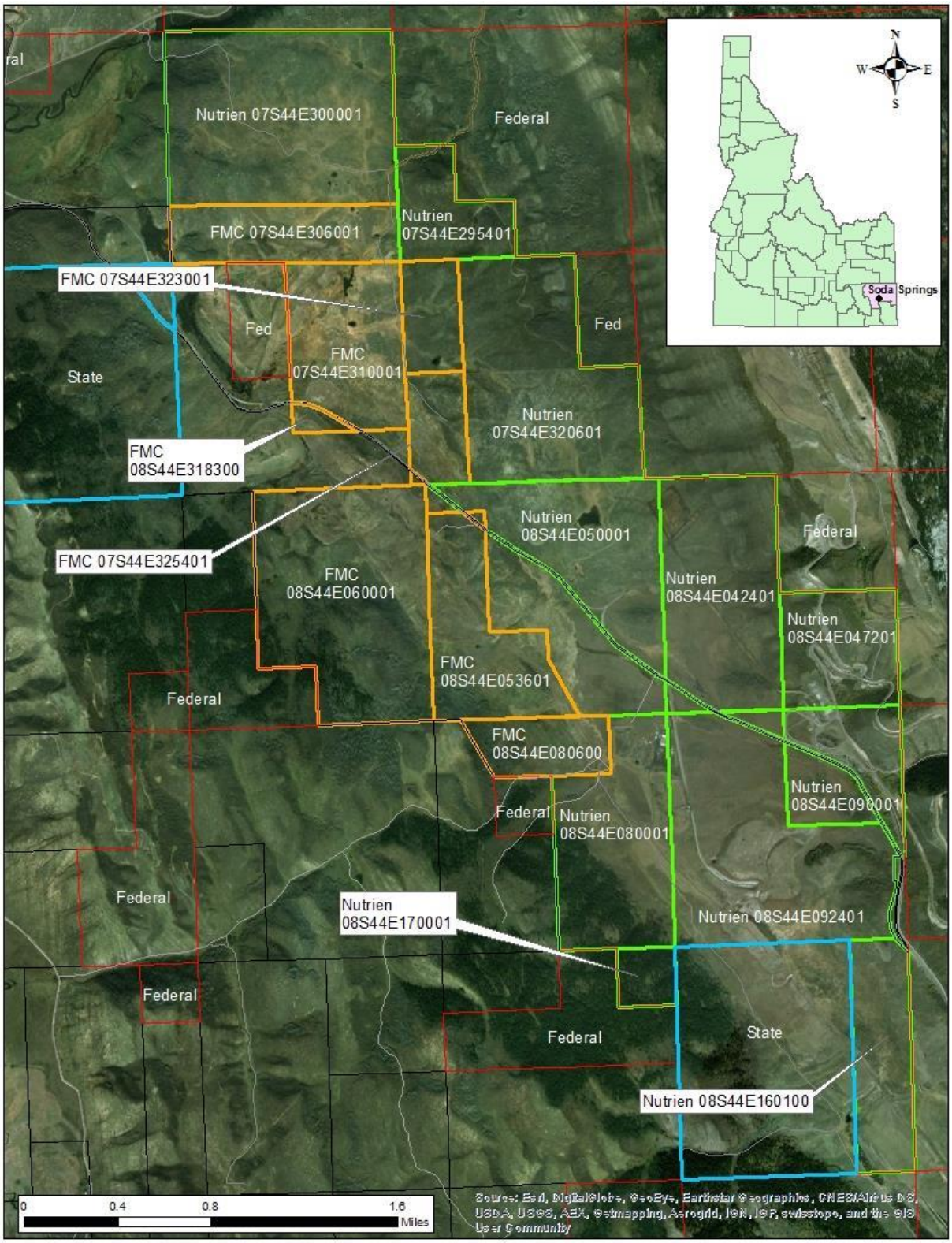



**Figure 1. Aerial overview map of the Dry Valley Mine with parcel boundaries outlined.**

## 2.4 Operational History

Information about the operational history of past mining activities helps with understanding 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 an economics, multiple land use, human health risks, and ecological risks perspective. DEQ uses historical research for several purposes: 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.

Exploration activities began at the Dry Valley Mine in 1910; however, limited mining was not initiated until the 1970s, and larger scale mining activities did not occur until the 1990s. The Dry Valley Mine provided raw materials for the FMC Elemental Phosphorus Plant in Pocatello.

The Preliminary Assessment Report (TechLaw 2008) cites the operational history:

> The bulk of phosphate ore deposits in southeastern Idaho are located in Caribou County. Phosphate ore-bearing rock belonging to the Permian age Phosphoria Formation is repeatedly exposed along large folds, which form northwest trending ridges. FMC obtained a prospecting permit for the area from the State of Idaho in 1962 and acquired its first mineral leases in 1964. Exploration began with the drilling of five exploration holes on a federal lease.
>
> The mine plan for the Dry Valley deposit was first prepared in 1974. In 1977, the U.S. Geological Survey (USGS), in conjunction with the BLM and the U.S. Forest Service (USFS), completed an EIS to address the potential environmental effects of phosphate ore mining in southeast Idaho for a number of mines that were either existing or proposed, including the Dry Valley Mine. However, no further action was taken on the Dry Valley Mine plan until 1990, when a site-specific Mine and Reclamation Plan was filed with BLM. An environmental assessment was prepared and mitigation measures formulated. The plan was approved in July 1991 by BLM and the State of Idaho, followed by initiation of mining operations at the Dry Valley Mine in 1992.
>
> Mining proceeds with the sequential opening of 1,500-foot long mining panels each representing one year of ore production. The mining sequence is initiated by clearing and grubbing vegetation and salvaging topsoil, when available, from area that will be disturbed by mine operations. If external overburden dump areas are needed, these areas are prepared in concert with preparation of the mining panel. External overburden dumps are created adjacent to the mine pits to contain initial and excess overburden created when the rock volume swells as it is mined. As ore and overburden are removed to the designated mine pit depth in a panel, mining on the next panel is initiated. Overburden from each successive panel is used to backfill the previously mined panel to an elevation that approximates the original ground surface.
>
> The tipple/loadout facility operates by using a bulldozer to push ore from the nearby stockpile through a grizzly into a hopper. From the hopper, ore is fed by a pan feeder onto a conveyor belt that transports ore to a series of screens, crusher, hoppers, and bins. Ore is then fed into railcars for transport on the rail spur to processing facilities. Phosphate ore shipping is limited to late spring through early fall due to winter conditions and the availability of Union Pacific locomotives and rail cars.
>
> Mining methods include mining deeper unaltered phosphate ore as well as the altered ore near the surface. Altered ore is typically shallow, oxidized, and has been subject to leaching by snowmelt and precipitation. These processes have removed carbonate from the rock resulting in enriched ore. Unaltered ore has not been leached. The unaltered phosphate ore is blended with the altered, near-surface shallow ore.

> Reclamation of disturbed areas is an ongoing process that occurs concurrently with mining. Permanent revegetation is implemented when mine activities in an area are complete or where future stabilization of temporary constructed areas (e.g., road cuts and fills) is necessary.

Active mining began at the north end of C Pit in September 2000, stopped in December 2002, resumed in June 2005, and was completed in June 2008. Reclamation of C Pit was conducted from 2011 to 2012. Mining began in D Pit in 2007 and ended in 2011. During 2011, Agrium mined in D Pit and backfilled the southern portion of C Pit and the northern portion of D Pit. Ore shipment from the South Dry Valley Mine to Agrium's Conda plant ended in August 2011. The North D Dump area was stripped in 2009 and reclaimed in 2012. The South D Dump facilities were approved but not constructed. The West Elk dewatering ponds were reclaimed in 2012 (Whetstone Associates 2018).

Best management practices (BMPs) are employed at the South Dry Valley Mine to mitigate potential impacts to ground water and surface water. BMPs include erosion and sediment control, runoff management, and waste rock capping. The 2008 Consent Order indicates that the South Dry Valley Mine will be in compliance with applicable ground water quality rules if the approved BMPs, best available methods (BAMs), and best practical methods (BPMs) are implemented at the site (DEQ 2008).

### 2.4.1 Potential Sources

Historic mining activities at the Dry Valley Mine included constructing waste rock and overburden piles comprised of middle waste shales that are high in naturally-occurring concentrations of selenium and other mining-related trace metals.

The 2008 Consent Order states that mining operations at the South Dry Valley Mine could affect ground water by increased mobilization of chemical constituents from mine pit backfill, overburden dumps, retention ponds, and pit dewatering ponds (DEQ 2008).

Potential source areas at the South Dry Valley Mine site are the former mining pits (reclaimed C and D Pits ); waste rock dumps (reclaimed East C Dump and North D Dump), and the former dewatering ponds.

## 2.5 Previous Investigations

Water quality data have been collected for the Dry Valley Mine since 1989. From 1989 to 1991, TRC Mariah Associates conducted an Aquatic Monitoring Program to establish a baseline for the physical, chemical, and biological components of Dry Valley Creek and the Blackfoot River in the vicinity of the mine. Data collected during the Aquatic Monitoring Program provide a basis to evaluate potential impacts the mine has on aquatic resources. Parameters measured during the 3-year baseline study included stream discharge; water temperature; turbidity; selected water quality parameters; substrate composition; embeddedness; benthic macroinvertebrate density, species composition, and diversity; and fish species composition, density, and spawning activity (Mariah 1991).

After the baseline aquatic study, the Interagency Task Force chaired by the US Forest Service recommended continuing the monthly surface water monitoring program. The Aquatic Monitoring Program results for 1992–1998 are contained in annual reports prepared by Mariah

(1993–1998). Monitoring wells and springs were inventoried and sampled in 1994. Water quality data are presented in the Dry Valley Mine Water Monitoring Plan.

In 1996, two incidents of chronic selenosis in horses pastured below historic phosphate mines prompted concerns about potential selenium releases from phosphate-mining activities. In response, state and federal agencies, in conjunction with the Idaho Mining Association Selenium Subcommittee, a group consisting of phosphate production companies, formed the Southeast Idaho Selenium Working Group. The working group selected Montgomery Watson to conduct an interim surface water survey to generate data to accelerate response to the selenium issue. The survey assessed the surface water quality impacts of phosphate mining at selected locations, provided an initial indication about potential livestock health impacts of selenium, and obtained preliminary surface water and background data (MW 1998).

In 1999, Montgomery Watson published the Final Regional Investigation Report that concluded, during the spring sampling event, both within the mine and regionally, selenium and cadmium concentrations exceeded established cold-water aquatic criteria. Fifteen of 21 mine facilities had selenium concentrations exceeding the criteria. Waste rock dump seeps and French drains had the highest selenium concentrations. Fall sampling results for selenium and cadmium had only three exceedances. The report noted the target element concentrations in sediment samples were generally not elevated above background levels, except for sediment samples collected just downstream of mine facilities (MW 1999).

Montgomery Watson prepared a surface water and ground water monitoring plan for the mine in 1997. FMC updated the plan in November 1999, and Astaris updated the plan in November 2000. Monitoring at the South Dry Valley Mine was conducted according to the 2000 plan from 2001 to 2012. Starting in 2013, monitoring was conducted according to the 2012 Post Mining Monitoring Plan.

Surface water and ground water monitoring results for 1998 through 2017 are presented in annual reports from TRC Hydro-Geo Consultants (1999–2000) and Whetstone Associates (2001–2018).

Other investigations conducted in the Dry Valley Area included the following:

- 2001 Tetra Tech EM Inc.—Existing Data and Risk Assessment Review
- 2002 Maxim Technologies, Inc., —Biological Monitoring Report
- 2004 Maxim Technologies, Inc.—Fisheries Monitoring Report
- 2004 Tetra Tech EM Inc.—Final 2003 Supplement to 2001 Total Maximum Daily Load Baseline Monitoring Report
- 1999 Maxim Technologies, Inc.— Water Quantity and Quality Management 401 Certification Report for Idaho DEQ Dry Valley Mine–South Extension Project.
- 2000 Maxim Technologies, Inc.—Overburden Environmental Geochemistry Report for FMC Dry Valley Mine Extension EIS
- 2001 Maxim Technologies, Inc.—ASTARIS Dry Valley Mine South Extension Final Wetland Mitigation Plan LC Property Caribou County, Idaho

Descriptions of these investigations are included in the Preliminary Assessment Report (TechLaw 2008).

## 2.6 Site Visit

DEQ staff visited the South Dry Valley Mine site on November 6, 2018. DEQ did not purposely or knowingly trespass on any private holdings during field work. The mine is no longer operating, and currently, no permanent residents live on the property. The site is accessible by public roads. Site photographs are included in Appendix A.

Current land uses include livestock grazing and recreational activities such as hiking, camping, hunting, fishing, swimming, boating, horseback riding, biking, and all-terrain vehicle touring. These current uses are likely to continue into the future.

# 3 Migration/Exposure Pathways

This section discusses the pathways and exposure routes from the South Dry Valley Mine that may lead to human or ecological receptors, including ground water and surface water migration, soil exposure, and air migration.

## 3.1 Ground Water Migration Pathway

The target distance limit (TDL) for the ground water migration pathways is a 4-mile radius extending from the potential sources at the South Dry Valley Mine.

### 3.1.1 Geologic Setting

A map of the major lithology for the South Dry Valley Mine is shown in Figure 2. The Preliminary Assessment Report (TechLaw 2008), describes the geologic information:

> Southeast Idaho was the site of massive accumulations of sediment during the Paleozoic era. During Permian time, the Phosphoria Formation was deposited over a large area of eastern Idaho, northern Utah, western Wyoming, and southwestern Montana. The Phosphoria Formation forms the western phosphate field, which contains one of the world's largest known reserves of phosphate.
>
> The region lies within the middle Rocky Mountain and Basin and Range physiographic provinces. During Cretaceous and early Cenozoic time, the Laramide Orogeny resulted in extensive folding and thrusting of Paleozoic and Mesozoic sediments. This produced a series of north to northwest trending topographic and structure features. Thrust faults developed parallel to folding, resulting in crustal shortening with the direction of movement from west to east. Basin and Range block faulting began about 17 million years ago and continues to the present.
>
> The oldest formation encountered on-site during exploration drilling is the Pennsylvanian-age Wells Formation. The Wells Formation is mapped as two members, including a lower member consisting of interbedded limestone and sandy limestone, and an upper member consisting of calcareous quartz sandstone with subordinate limestone and chert.
>
> The Permian-age Phosphoria Formation conformably overlies the Wells Formation. The Phosphoria Formation ranges between 250 and 450 feet in thickness and consists of several members from base to top, including the lower chert, the Meade Peak phosphatic shale, the Rex chert, cherry shale, Retort shale, and Tosi chert Members.
>
> The Meade Peak Member is approximately 180 to 200 feet thick, and consists of interbedded phosphorite, mudstone and pelletal phosphorite, mudstone, and argillite. The Meade Peak Member contains the

> phosphate ore targeted for mining at the Dry Valley Mine site. Phosphorite is located in four distinct beds (A, B, C, and D), each ranging in thickness from 3 to 20 feet and separated by shale and mudstone beds.
>
> The Rex chert conformably overlies the Meade Peak Member and consists of 155 to 160 feet of cherty mudstone and limestone. The Rex chert is highly resistant to weathering and serves as a market bed for the less resistant phosphatic shales. The top of the Rex chert consists of a cherty shale member that includes thinly bedded argillaceous chert and siliceous mudstone beds.
>
> The Retort Member overlies the Rex chert. This member is about 60 feet in thickness and is divided into a lower phosphatic zone, a middle calcareous mudstone, and an upper phosphatic zone. The Retort Member is overlain by the Tosi chert Member, consisting of interbedded sandstone, mudstone, carbonates, and phosphorites.
>
> On Schmid and Dry Ridges, located west and east of the Dry Valley Mine site, respectively, the Phosphoria Formation is overlain by the Triassic-age Dinwoody Formation, which consists of interceded siltsone, shale and limestone. In the Dry Valley Mine area, the Dinwoody Formation has been eroded away, and the Phosphoria Formation is either exposed at ground surface, or is unconformably covered by varying thicknesses of unconsolidated Quaternary-age alluvium and/or colluvium (BLM 2000).

Climate information was obtained from the Western Regional Climate Center (WRCC 2018). The climatological data were collected at the Soda Springs Airport, Idaho, Station (108535) (elevation 5,842 feet above mean sea level), located 17 miles southwest of the Dry Valley Mine.

Based on data collected from 1978 to 2012, total annual precipitation averages 15.62 inches with a total annual snowfall average of 50.0 inches. The driest month of the year is July. The average annual high temperature is 55.9°F and the average annual low temperature is 26.4°F. July is the hottest month with an average high temperature of 84.7°F. January is the coldest month with an average low temperature of 8.6°F.

### 3.1.2 Aquifer System

The Preliminary Assessment Report (TechLaw 2008) documents the following aquifer system information:

> Ground water is recharged by rainfall and snowmelt percolating downward from the land surface. Most of the recharge occurs at the higher elevations where snowfall and rainfall are the greatest. Two ground water bearing units are identified in Dry Valley, a shallow alluvial aquifer and a deeper bedrock aquifer. Ground water in the shallow alluvial aquifer is typically under water table conditions with measured depths ranging from about 10 to 30 feet below ground surface. The bedrock aquifer is detached from the alluvial aquifer. Depths to ground water in bedrock are typically much deeper than in alluvium, and range from about 100 to 300 feet below ground surface. Silt and clay deposits in portions of the alluvium/colluvium apparently restrict the downward movement of water and may account for the unsaturated zone in the top of the underlying Wells Formation (Whetstone Associates 2007).

Water-level data indicate ground water in the shallow aquifer flows towards the northwest, parallel to the axis of Dry Valley, while ground water in the deep (bedrock) aquifer flows toward the southwest (Whetstone Associates 2018).

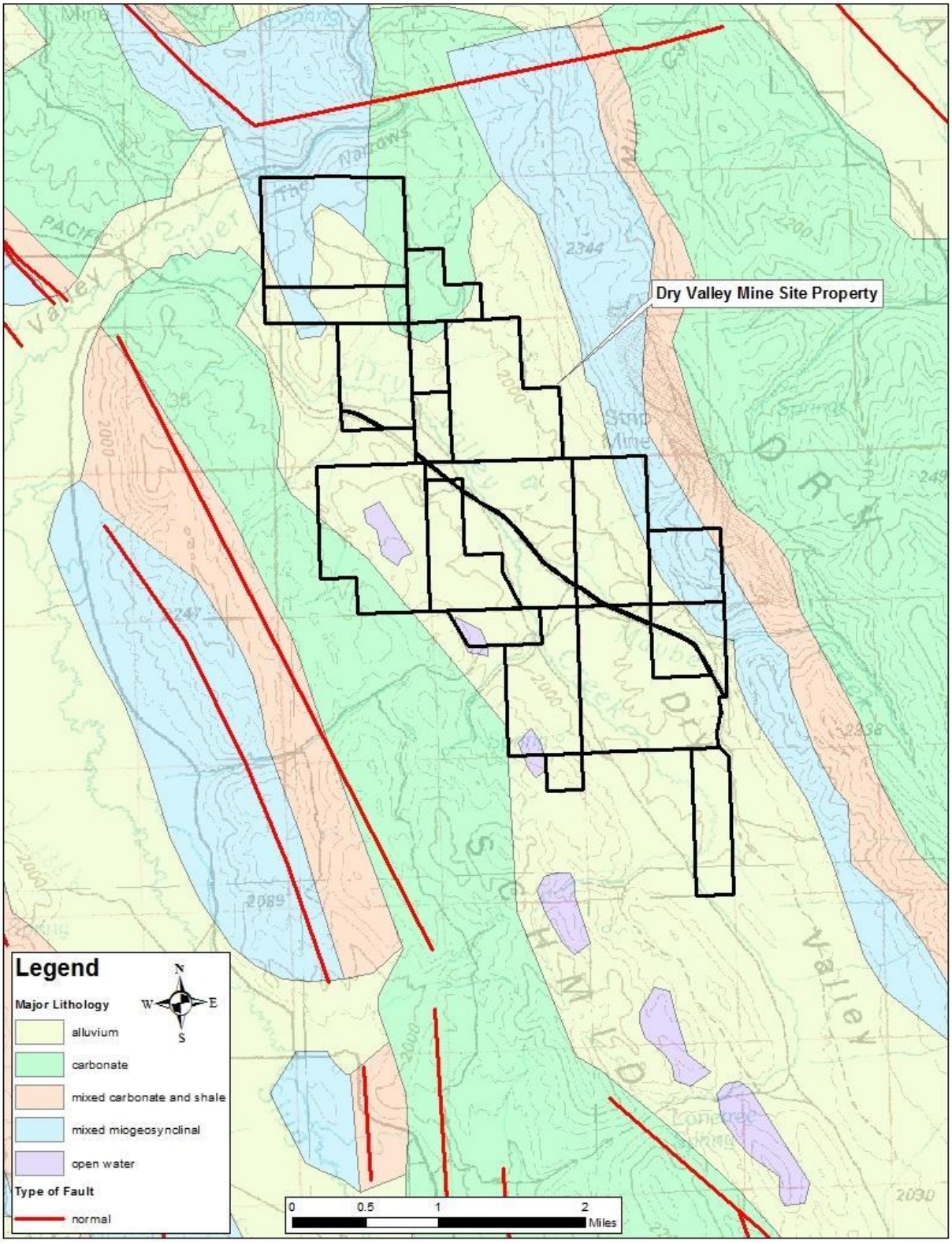



**Figure 2. Map of major lithology in the vicinity of the Dry Valley Mine.**

### 3.1.3 Drinking Water Targets

In areas where historic mines are close to residential areas, contamination of drinking water systems may come from two types of mine sources (ore bodies and waste dumps) and along three ground water pathway scenarios:

1. Metals and other contaminants can leach from tailing piles and waste rock dumps, enter ephemeral or perennial drainages, and contaminate the area's shallow ground water system.
2. Metals and other contaminants can leach from the local ore bodies and be transported through the geologic structure to the shallow ground water.
3. Metals and other contaminants can leach out of the ore bodies and be discharged from underground workings as adit water, which is then conveyed through ephemeral and perennial drainages to the shallow ground water system.

Potential drinking water systems within the 4-mile radius of the South Dry Valley Mine site include two public water systems (PWS) and 79 domestic wells (Figure 3) (DEQ 2019). Source water assessment (SWA) summary reports are available for the Rasmussen Ridge Mine wells (PWS# ID6150018) and the inactive Agrium Dry Valley Mine Well #1 (PWS# ID6150040).

The SWA contains the population served by each PWS and notes susceptibility rankings for potential contaminants. The rankings can be high, moderate, or low for inorganic, volatile organic, synthetic organic, and microbial contaminants based on system construction, potential contaminant inventory, land use, and hydrologic sensitivity (i.e., likelihood the water supply will become contaminated based on the hydrologic and geologic conditions surrounding the PWS).

The Rasmussen Ridge Mine well is located north of the Dry Valley Mine and Blackfoot River. The well serves approximately 50 people through two connections. For this well, a final susceptibility ranking of high was assigned for the inorganic, volatile organic, and synthetic organic categories. The Agrium Dry Valley Mine Well #1 is inactive and does not currently meet the PWS definition. The SWA completed for the well in 2002 assigned a final susceptibility ranking of moderate for the inorganic, volatile organic, and synthetic organic categories (DEQ 2019).

### 3.1.4 Ground Water Quality

DEQ reviewed available ground water quality data provided in annual reports from 1999 to 2018. A summary of the most recent ground water data from the *Dry Valley Mine South Extension Surface Water and Ground water Monitoring Results Year 2017* (Whetstone Associates 2018) is provided below:

- Shallow ground water met site-specific ground water standards, except for the spring 2017 aluminum concentration in well GW-25S and the field pH in wells GW-20S, GW-24S, and GW-25S.
- Deep ground water met site-specific ground water standards, except for pH in the spring 2017 samples collected from wells GW-13D and GW-14D.

Ground water quality data are compared to site-specific ground water quality levels developed for the Active Mineral Extraction area of the South Dry Valley Mine (DEQ 2008). DEQ is

reviewing the proposed background water quality concentrations calculated in 2017 for the South Dry Valley Mine.

## 3.2 Surface Water Migration Pathway

The surface water migration pathway TDL begins at the probable point of entry (PPE) of surface water runoff from a site to a surface water body and extends downstream for 15 miles.

No surface water or sediment samples were collected for this PA.

### 3.2.1 Overland Route and Target Distance Limit

The Preliminary Assessment Report (TechLaw 2008) documents the overland route and identifies the TDL for the Dry Valley Mine:

> Lower Dry Valley covers an area of approximately 24 square miles and is comprised of a relatively flat valley floor surrounded by mountainous terrain and drained by Dry Valley Creek. This creek originates at Lonetree Spring and drains northwest to the Blackfoot River. Dry Valley Creek flows through and around the mine area. Tributaries of Dry Valley Creek flowing into the mine area include Young Ranch Creek, Stewart North and South Creeks, Maybe Creek, and Chicken Creek.
>
> Multiple PPEs are present on the site. Dry Valley Creek and its tributaries flow through the site. The farthest upstream PPE is south of the Pit C Dewatering Ponds on Dry Valley Creek. Seeps SP-2 and NBD-1 are located along Chicken Creek and adjacent to the Reclaimed North and South B Dumps. Chicken Creek then flows into Dry Valley Creek.
>
> The farthest downstream PPE for the site located just north of Reclaimed Pit A. This is the beginning of the 15-mile surface water TDL. The TDL continues along Dry Valley Creek for approximately 1.36 miles, where the creek joins the Blackfoot River. The Blackfoot River flows northwest towards the Blackfoot Reservoir. The TDL ends 13.64 miles downstream.
>
> The area in which the Dry Valley Mine site lies has not been printed on any Federal Emergency Management Agency (FEMA) flood-plain map. According to FEMA representatives, a non-printed panel results from no data in the panel area, which indicates that flooding "probably has not" occurred in the area.

The 15-mile surface water TDL for the South Dry Valley Mine is shown on Figure 3.

### 3.2.2 Drinking Water Targets

The Preliminary Assessment Report (TechLaw 2008) documents there are no drinking water intakes along the 15-mile TDL.

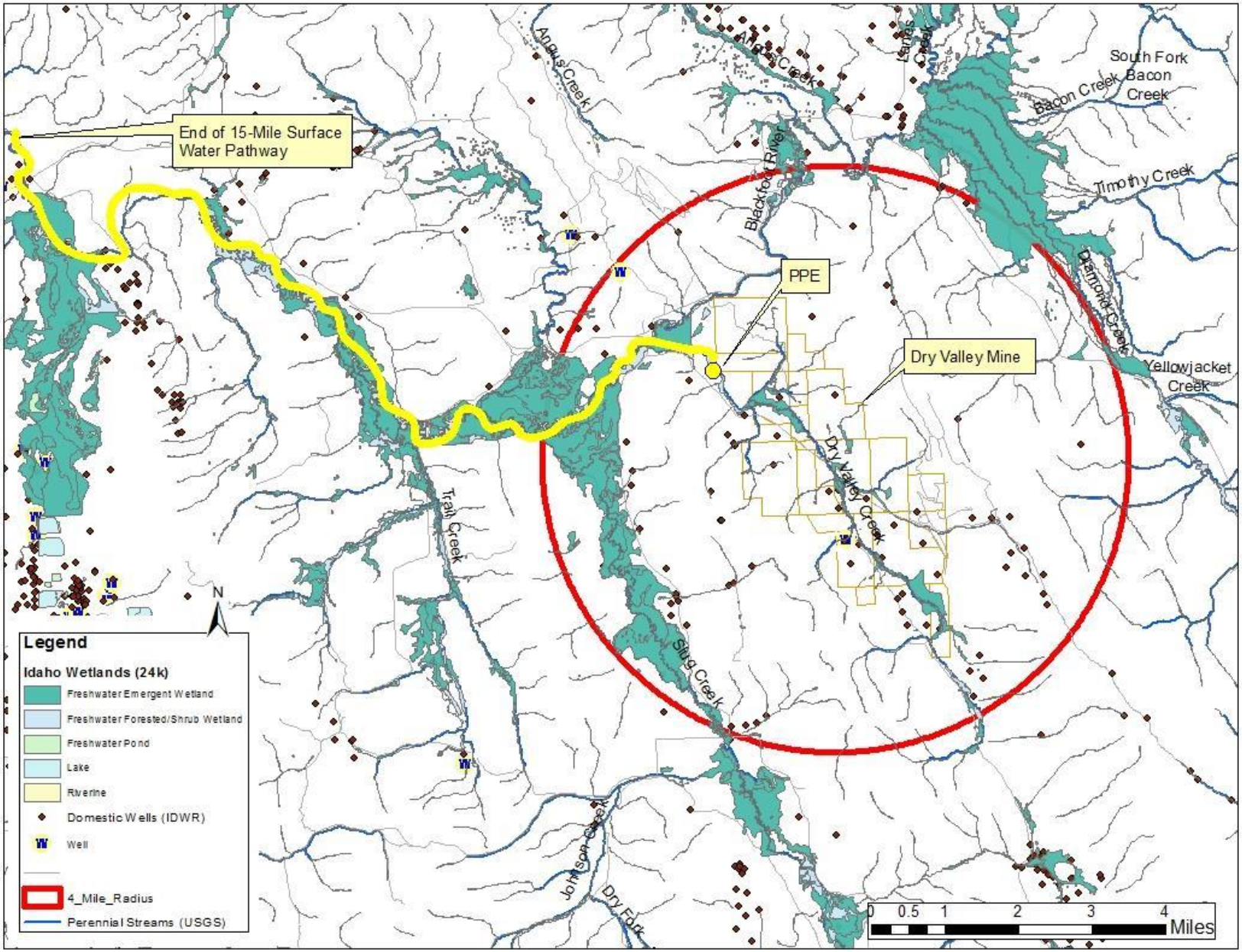



**Figure 3. Map of the surface water and ground water pathways in the vicinity of the Dry Valley Mine.**

### 3.2.3 Human Food Chain Targets

The human food chain information is described in the Preliminary Assessment Report (TechLaw 2008):

> The Blackfoot River and its major tributaries are one of the most important fisheries in southeast Idaho. Brook trout have been extensively stocked in the watershed. The quality of the fishery in the lower Dry Valley is limited. However, the Blackfoot River is considered a high quality fishery. Currently, fish species inhabiting the streams in the watershed include dace (*Rhinichthys osculus*), sculpin (*Cottus cognatos*), rainbow trout (*Oncorhynchus mykiss ssp*.), cutthroat trout (*Oncorhynchus clarki*), Yellowstone cutthroat trout (*Oncorhynchus clarki bouvieri*), brook trout (*Salvelinus fontinalis*), and cutthroat/rainbow hybrids (BLM 2000, Appendix F).

### 3.2.4 Environmental Targets

Extensive wetlands are located along both the Dry Valley Creek and the Blackfoot River (TechLaw 2008). On the site, 9.12 miles of wetlands are located along the surface water pathway. Downstream of the site, 1.52 miles of wetlands are located along Dry Valley Creek and 22.6 miles of wetlands are located along the Blackfoot River. A total of 33.24 miles of wetlands are located along the on-site portion and 15-mile TDL. Figure 3 shows the wetlands in the vicinity of the South Dry Valley Mine.

The Clean Water Act requires the State of Idaho to 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 (§303(d) list). The §305(b)-listed streams are shown on Figure 4. Dry Valley Creek (ID17040207SK013_02a and ID17040207SK013_03) and Chicken Creek (ID17040207SK013_02b) are tributaries to the Blackfoot River (Blackfoot River subbasin hydrologic unit code 17040207).

As listed in the final 2014 Integrated Report, Dry Valley and Chicken Creeks are identified as not supporting for both cold water aquatic life and salmonid spawning (DEQ 2017).

### 3.2.5 Surface Water Quality

DEQ reviewed available surface water quality data provided in annual reports from 1999–2018. A summary of recent surface water data is provided in the *Dry Valley Mine South Extension Surface Water and Ground water Monitoring Results Year 2017* (Whetstone Associates 2018):

- Surface water in Dry Valley Creek met aquatic standards, except for the spring 2017 cadmium concentration in surface water station DV-7, located upstream of mining activities.
- All other surface water stations met aquatic standards, except for spring 2017 concentrations of dissolved oxygen in Stewart South Creek (station SS-1) and selenium in the South Sedimentation Pond (PD-2).

Activities at the South Dry Valley Mine affecting surface water must comply with the approved BMPs for the site.

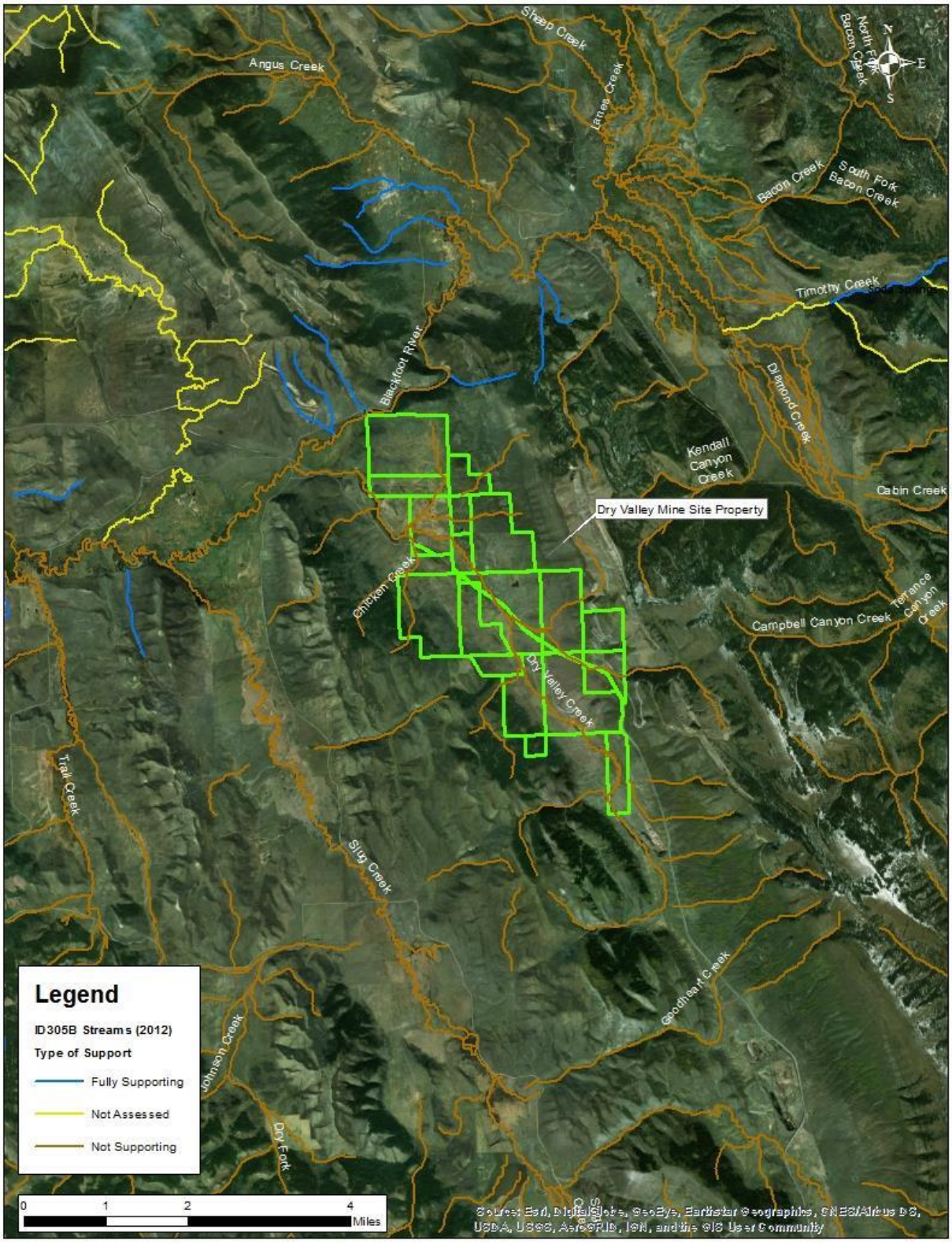



**Figure 4. State of Idaho §305(b)-listed streams in the vicinity of the Dry Valley Mine.**

## 3.3 Soil Exposure Pathway

The Preliminary Assessment Report (TechLaw 2008) documents the following soil exposure pathway information:

> The soil exposure pathway is evaluated based on the threat to resident and nearby populations from soil contamination within the upper 2 feet of the surface. No on-site soil sampling or soil sample results are reported in the available file material.
>
> There are no schools are daycare centers located on the property. There are no known endangered or threated species known to inhabit the property. Portions of the property are fenced to limit access by cattle, however, the Blackfoot River drainage and the Dry Valley are known to be areas where fishing occurs, so limited use of the area is anticipated.

No soil samples were collected for this PA.

## 3.4 Air Migration Pathway

The Preliminary Assessment Report (TechLaw 2008) documents the following air migration pathway information:

> The air migration pathway is evaluated based on the threat to on-site and nearby populations within a 4-mile radius TDL from releases to air. No air samples have been collected on the property and there have been no reports of releases to air from the property.

The air pathway was not assessed for this PA.

### 3.4.1 Human Targets

The South Dry Valley Mine site is located in a sparsely populated region of Idaho. No schools or daycare facilities are located within the 4-mile TDL of the site. According to the Preliminary Assessment Report (TechLaw 2008), five people live within 2 to 3 miles of the site.

### 3.4.2 Environmental Targets

Multiple wetlands are present within the 4-mile TDL (Figure 3), including freshwater emergent wetlands, freshwater forested/shrub wetlands, freshwater ponds, and riverine areas.

Sensitive species can have large habitat ranges overlapping the vicinity of the South Dry Valley Mine. Based on the resource list obtained during a search of the Information for Planning and Conservation System (USFWS 2018), the following mammal species are identified for Caribou County—Canada Lynx, *Lynx canadensis*, threatened species-designated critical habitat and North American Wolverine, *Gulo gulo luscus*, a proposed threatened species.

# 4 Summary and Conclusions

This PA assesses the potential threat to human health and the environment posed by the South Dry Valley Mine and determines the need for additional investigation or remedial action.

Approved BMPs, BAMs, and BPMs are being implemented at the South Dry Valley Mine, and the site is being managed under the regulatory requirements of the 2008 Consent Order and the 2000 Final EIS. DEQ expects that proper site monitoring and management will continue at the South Dry Valley Mine.

Based on the existing conditions, current site management, and uses; historic information; observations made during the site visit; available surface water and ground water quality data; potential pathways of contaminants to receptors; and potential exposures to ecological and human receptors, DEQ has made a No Remedial Action Planned determination for the South Dry Valley Mine. This determination means, based on current conditions at the site, DEQ did not find any significant evidence indicating the potential for adverse toxicological effects to human or ecological receptors on the property, and no additional work is necessary to manage those potential effects.

# 5 References

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# Appendix A. Site Photographs



**Photo 1. Overview of Dry Valley, looking southwest from Maybe Canyon access road.**



**Photo 2. Overview of C and D Pits, looking southwest.**



**Photo 3. Reclaimed C Pit, looking south.**



**Photo 4. Reclaimed C Pit, looking southwest.**



**Photo 5. Overview of Dry Valley (facility building on right, tipple on the left), looking west.**



**Photo 6. Facility building, looking southeast.**



**Photo 7. Back of facility building, looking northwest.**



**Photo 8. Tipple, looking east.**



**Photo 9. D Pit, partially backfilled, looking northwest.**



**Photo 10. D Pit, looking north-northwest.**