

# RARE EARTH SCIENCE

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October 20, 2020

Max L. & Kathryn M. Webel  
Jones Creek Ranch, LLC  
38099 370<sup>th</sup> Street  
Baylis, Illinois 62314-2221

**Re: Mineral Assessment Report  
Jones Creek Ranch – Conservation Easement Property  
Grand County, Colorado**

Dear Max & Kathy:

At the request of the Colorado Headwaters Land Trust (CHLT), Rare Earth Science, LLC (Rare Earth) has completed this Mineral Assessment Report (MAR) for your approximately 600-acre Jones Creek Ranch – Conservation Easement (CE) property located directly east-southeast of the Town of Hot Sulphur Springs in central Grand County, Colorado (hereinafter referred to as the “Site”). It is understood that Phase 1 of the CE will encompass the west 270.08 acres of the Site; however, this MAR covers the entire Jones Creek Ranch in order to anticipate a future CE.

This MAR is part of the documentation necessary for a CE conveyance and evaluates the probability of surface mining or other mineral-extraction activities at the Site in accordance with Title 26 of the Internal Revenue Code [§ 1.170A-14(g)(4)]. In situations where the surface estate and mineral rights have been separated or where mineral rights have been reserved, the definition of a qualified conservation contribution can only be met by demonstrating that surface mining, or any mining method which is inconsistent with the particular conservation purposes of the contribution, will not likely occur at the Site.

This report presents a brief description of the Site and local geology, a review of various economic mineral resources, and a summary of our findings. Based upon our findings, we conclude that the probability of surface mining occurring at the Site is so remote as to be negligible.

## **1. Site Location and Description**

The attached figures show the boundaries of this approximately 600-acre Site, which encompasses portions of Sections 11-14, Township 1 North, Range 78 West (6<sup>th</sup> Principal Meridian) and Sections 7 and 18, Township 1 North, Range 77 West (6<sup>th</sup> Principal Meridian). The legal description for Phase 1 of this CE is attached and can also be found in the CE Deed. Figures 1 and 2 show that the adjoining lands include privately owned tracts in all directions,

along with undeveloped lands administered by the United States Forest Service ([USFS] Arapaho National Forest) to the south and a 40-acre parcel administered by the United States Bureau of Land Management (BLM) in Section 12.

The United States Geological Survey 7.5-minute series *Hot Sulphur Springs, Colorado* topographic quadrangle map (USGS, 1981) shows that the ground surface elevation averages approximately 8,100-feet above mean sea level across the Site. The Site features large expanses of undeveloped and open agricultural rangeland with irrigated hay meadows, riparian vegetation, and native shrublands and woodlands. The primary waterways include Heimbaugh (aka Himebaugh) Creek and Jones Creek, which flow across the Site in a general north-northwestward direction toward the nearby Colorado River. This area is located on the west side of the Continental Divide within the Upper Colorado/Fraser Rivers District of the larger Colorado River drainage basin.

## **2. Overview of Local Geology and Soils**

The Site lies in the rugged high-elevation terrain of the Southern Rocky Mountains physiographic province and within the smaller Middle Rocky Mountain region. In general, the Site is positioned in Middle Park between the Williams Fork and Vasquez Mountains to the south, the Gore Range to the west and southwest, and the Rabbit Ears Range to the north. Much of Grand County includes areas of Mesozoic-age sedimentary rocks along with Tertiary-age volcanic and volcanoclastic rocks in Middle Park, which is a broad synclinal region and intermontane basin bounded by several faults (CGS, 2001). The Mount Bross Fault, a major northwest-trending thrust fault, traverses the east part of the Site.

The *Geologic Map of the Craig 1° x 2° Quadrangle* (USGS, 1976) and *Geology of the Hot Sulphur Springs Quadrangle* (USGS, 1968) were reviewed for an understanding of local surface and subsurface geologic conditions. The Site consists of bedrock Paleocene-age Middle Park Formation (Map Unit Tm), Upper Cretaceous-age Windy Gap Member of the Middle Park Formation (Map Unit Kmw) and Pierre Shale (Map Unit Kp), and Upper & Lower Cretaceous-age Colorado Group (Map Unit Kc). Map Unit Tm includes arkosic conglomerate, grit, sandstone and mudstone with abundant andesitic volcanic debris and has an estimated overall thickness of about 7,000 feet. Map Unit Kmw is a dark andesitic volcanic breccia and volcanic conglomerate with a maximum thickness of 1,100 feet; Map Unit Kp is a dark-gray marine shale with a few thick beds of fine-grained sandstone and is upwards of 5,000-feet thick; and, Map Unit Kc includes the Niobrara Formation (calcareous shale and marly limestone) and Benton Shale (dark bentonitic shale) with a thickness of roughly 1,200 feet. A generalized map showing the primary geologic units at and near the Site is attached as Figure 4.

The Natural Resources Conservation Service – Web Soil Survey of the *Grand County Area, Colorado* (NRCS, 2020) identifies numerous soil types at the Site, including the dominant map units: Mayoworth clay loam, 15 to 50 percent slopes (Map Unit 53); Binco clay loam, 6 to 15 percent slopes (Map Unit 8); and, Passar family, 5 to 40 percent slopes (Map Unit 4504B). According to NRCS, a majority (more than 80 percent) of the mapped soil types at the Site are considered to be “poor” sources of gravel, sand, and roadfill for construction materials.

### **3. Evaluation of Potential Mineral Resources**

A number of information sources were reviewed for documented historic, or currently permitted, mining activities at the Site or adjoining properties, and for determining the likelihood that mineral resources could be surface mined at the Site. For purposes of this report, “minerals” do not include surface water or groundwater. Potentially valuable minerals are typically organized according to a “disposition class” as *locatable*, *leasable*, or *salable*. Each of these categories is described in detail below, including a ranking (i.e., none, low, moderate, or high) of the *resource potential* at the Site. The term *resource potential* is used to describe the likelihood of the presence of mineral resources (either solid, liquid, or gaseous materials) within a defined geographic area, and is not a measure of the amount of those resources or their economic value or profitability.

Mineral disposition classes are broad, and deposits of a given mineral may fall into more than one class depending upon their location, geologic setting, composition and other factors such as case law, and land and/or mineral tenure. For example, clays and zeolite can be considered locatable, leasable, or salable. Pumice, depending upon its type, may be considered locatable or salable (pumicite, volcanic ash, volcanic dust, and scoria) or it may be considered salable only (for example, volcanic cinders). Gypsum may be considered locatable or leasable (in the form of rock gypsum or anhydrite) or it may be salable only (in the form of gypsite) (USGS, 2011).

Selected data sources reviewed for this MAR include:

- *Mineral and Surface Management Status Map – Steamboat Springs, Colorado* (BLM, 2012).
- BLM Colorado database for mineral leasing and mining claims. Website available at <https://www.blm.gov/colorado> (BLM, 2020).
- Colorado Geological Survey (CGS). *Colorado’s Hydrothermal Resource Base – An Assessment*. Resource Series 6 (CGS, 1979).
- *Inventory of Nonmetallic Mining and Processing Operations in Colorado*. Map Series 17 (CGS, 1981).
- *Evaluation of Mineral and Mineral Fuel Potential of Grand and Summit Counties State Mineral Lands Administered by the Colorado State Land Board*. Open-File Report 01-06 (CGS, 2001).
- *Radioactive Mineral Occurrences of Colorado*. Bulletin 40 (CGS, 2005).
- Colorado Oil and Gas Conservation Commission (COGCC) database for oil & gas wells. Website available at <http://cogcc.state.co.us/#/home> (COGCC, 2020).
- Colorado Division of Reclamation, Mining and Safety (DRMS) database for active and inactive mines. Website available at <https://colorado.gov/drms> (DRMS, 2020).

- United States Department of Agriculture – Natural Resources Conservation Service (NRCS). Website at <https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm> (NRCS, 2020).
- Colorado State Land Board (SLB) database for land status and leasing information. Website available at <https://www.colorado.gov/statelandboard> (SLB, 2020).
- *Geology of the Hot Sulphur Springs Quadrangle, Grand County, Colorado*. Professional Paper 586 (USGS, 1968).
- *Geologic Map of the Craig 1° x 2° Quadrangle, Northwestern Colorado*. Miscellaneous Investigations Series Map I-972 (USGS, 1976).
- 7.5-minute series *Hot Sulphur Springs, Colorado* topographic quadrangle map (USGS, 1981).
- *Mineral Resource Potential and Geology of the Routt National Forest and the Middle Park Ranger District of the Arapaho National Forest, Colorado*. Bulletin 1610 (USGS, 2000).
- *Development of Industrial Minerals in Colorado*. Circular 1368 (USGS, 2011).
- *Draft Critical Mineral List – Summary of Methodology and Background Information – U.S. Geological Survey Technical Input Document in Response to Secretarial Order No. 3359*. Open-File Report 2018-1021 (USGS, 2018).
- *Mineral Resources Data System*. Website available at <http://tin.er.usgs.gov/mrds/> (USGS, 2020).

The historic topographic map does not show any underground or surface mining (or drilling) features at the Site and adjoining lands. The BLM Mineral Management Status Map indicates that the Federal government has not reserved the rights to any minerals at the Site (refer to Figure 5 also). Title commitment information provided by the Title Company of the Rockies (effective August 17, 2020) for the Phase 1 CE parcel at Jones Creek Ranch indicates three private mineral reservations for varying percentages of mineral rights by Joanne Fuchs, Hollis & Joanne Fuchs, and Cheap-Easy and Co., LLC in deeds recorded in 1972, 1973 and 1997, respectively. The title commitment does not indicate any Federal or State mineral reservations, current/active mineral leases, or mining claims. However, a detailed review of the Site's title work, exception documents, mineral reservations, and mineral-leasing status is beyond the scope of this initial MAR.

**Locatable Minerals** (*Resource Potential = Low*): this category includes all minerals for which exploration, production, and development are regulated by the General Mining Law of 1872, as amended (30 U.S.C. § 21 *et seq.*) and includes most of the metallic minerals (e.g., gold, silver, copper, molybdenum, rare-earth elements, uranium, etc.) and also certain industrial minerals such as high-calcium limestone and gypsum, vermiculite, pegmatite-hosted non-metallics, gemstones, etc. This category also includes the final list of 35 “critical minerals” and mineral materials published in Federal Executive Order 13817 (dated May 18, 2018). Locatable minerals are typically considered “hard-rock minerals” found in lode, vein, disseminated, or

placer deposits. The known metallic-mineral deposits in Colorado have been widely studied and are well documented in the literature.

No significant metallic mineral districts have been identified in Grand County (CGS, 2001). None of these commodities are shown to occur, nor have they been mined historically at the Site according to the data reviewed for this MAR. No mines, prospects, or mineralized zones were identified at the Site or adjoining lands. The Site is located outside of the Colorado Mineral Belt, a 10- to 60-mile-wide southwest-northeast-trending zone of hydrothermal mineral deposits that extends roughly from the La Plata Mountains near Durango to the Front Range north of Boulder. No veins or lodes are known to intersect the Site and the underlying sediments and geologic structure do not favor the occurrence of commercial locatable mineral deposits. No currently permitted locatable mineral mines are listed in the DRMS database for this area of Grand County.

The only locatable minerals that have been historically mined in the Site vicinity include small amounts of uranium and vanadium ore at the *CPG Claims* and *Undecided Claims*. The *Undecided Claims* ([aka *Beaver Group*] located roughly 2 miles southwest of the Site in Section 15, T1N, R78W) was the largest deposit where 161 tons of ore at a grade of 0.18-percent  $U_3O_8$  were produced in 1957 (CGS, 2005). The mineralization occurs in Map Unit Tm at the contact with, and in joint and cracks within, the Precambrian-age Boulder Creek Granite. Uranium production from Grand County has historically been limited; however, Map Unit Tm, the Tertiary-age Troublesome and Coalmont Formations, and the Precambrian-age Idaho Springs Formation are known to contain sandstone-hosted, unconformity-related, or contact-metamorphic uranium resources. However, no active uranium or vanadium mines are listed in the DRMS database for Grand County.

No proposed or actively permitted rare-earth element (REE) mines were identified anywhere near the Site. The geology at the Site does not fit the USGS profile for REE occurrences on a commercially minable scale, and the nearest viable REE deposits are found in Fremont and Gunnison counties. According to the USGS, commodities qualifying as “critical minerals” are identified as: A) a non-fuel mineral or mineral material essential to the economic and national security of the United States; B) from a supply chain vulnerable to disruption; and, C) that serves an essential function in the manufacturing of a product, the absence of which would have significant consequences for the economy or national security (USGS, 2018). No commercial critical mineral deposits or resources have been identified at or near the Site.

**Leasable Minerals** (*Resource Potential = Low*): this category includes oil, gas, coal, coalbed methane, oil shale, geothermal energy, and several other minerals (e.g., potash, sodium, phosphate, native asphalt, bitumen or bituminous rock, etc.). These minerals are defined as “leasable commodities” and governed by the Mineral Leasing Act of 1920, as amended (30 U.S.C. § 181 *et seq.*). The Geothermal Steam Act of 1970, as amended (30 U.S.C. § 1001 *et seq.*) also authorizes and governs the lease of geothermal steam and related resources on public lands. No historic leasable-mineral mining or drilling activities were identified in the CGS, DRMS, or USGS literature for the Site and adjoining lands.

### ***Oil & Gas Resources***

There are no oil or gas fields in Grand County (CGS, 2001). No current (or historic) oil & gas drilling activities, or pending drilling or seismic permits, were identified in the COGCC or BLM databases for the Site (COGCC, 2020 and BLM, 2020). Adjoining lands with Federal mineral

ownership were neither included in BLM's most recent (September 24<sup>th</sup>) competitive oil & gas lease sale, nor proposed for the upcoming December 17<sup>th</sup> lease sale. Additionally, no active oil & gas leases are indicated on lands with State Land Board-administered mineral estates in the Site vicinity (SLB, 2020).

A search of the COGCC database revealed four historic dry & abandoned wildcat wells that were drilled within a 5-mile radius of the Site. The nearest well was the *Linke No. 1* drilled in 1957 by Monsanto Chemical Company (Denver, CO) in the SE ¼ of the NW ¼ of Section 16, T1N, R77W. This dry & abandoned well was located approximately 2 miles southeast of the Site on private land (with State-owned mineral rights) with a total depth reported as 5,367 feet into the Middle Cretaceous-age Lakota Formation. The nearest recent oil and/or gas exploration & production activities occur more than 30 miles northwest of the Site in neighboring Jackson County where several horizontal oil wells have been drilled in the Upper Cretaceous-age Niobrara Formation.

According to COGCC, none of the Site is mapped as a "Restricted Surface Occupancy" (RSO) area; however, a portion of the west parcel at the Site in Section 11 (Phase 1 CE) is mapped as "Sensitive Wildlife Habitat" (SWH) to protect elk winter-concentration areas. These areas are defined and regulated by the COGCC 1200-Series Rules, which require oil & gas operators to consult with Colorado Parks and Wildlife, the surface owner, and the COGCC Director whenever a new oil & gas location is proposed in a SWH or RSO area.

### **Coal Resources**

There are no known coal-bearing formations in Grand County (CGS, 2001). No on-Site or nearby coal mines, coal fields, or coalbed methane (CBM) operations were identified in the CGS, DRMS, or USGS literature reviewed for this report. The Site is located in the southern extent of the North Park Coal Region, which includes the Middle Park Field. However, the Middle Park Field has never produced commercial amounts of coal.

The nearest producing mine (i.e., Peabody Energy Inc.'s *Twentymile Mine*) is located in the Green River Coal Region (Yampa Coal Field) more than 50 miles northwest of the Site, to the west of the Town of Oak Creek in Routt County. Coal production is from the Upper Cretaceous-age Mesaverde Group, which is not present at the Site. CBM is not known to occur at the Site as these reservoirs also occur mostly in the Williams Fork and Iles Formations of the Mesaverde Group. Most of the known CBM resources are found in the Piceance Creek Basin more than 85 miles southwest of the Site, although a moderate resource potential for CBM accumulations has been identified northwest of the City of Steamboat Springs.

### **Other Leasable Mineral Resources**

Accumulations of organic marlstone (also known as "oil shale") occur exclusively in the Tertiary-age Green River Formation, which is not found at the Site. The nearest geologically-prospective commercial oil shale deposits are found more than 100 miles northwest (Washakie Basin in Wyoming) and southwest (Piceance Creek Basin in Colorado) of the Site.

The Site is not located in a known geothermal leasing area; however, geothermal resources are documented about 1 mile northwest at Hot Sulphur Springs on the north side of the Colorado River. The springs are believed to occur due to deep circulation of groundwater along fault zones related to the nearby Mount Bross Fault. CGS estimated that the Hot Sulphur Springs

reservoir has an areal extent of about 1.35 square-miles in portions of Sections 2, 3, 10 and 11, T1N, R78W (CGS, 1979).

**Salable Minerals** (*Resource Potential = Low*): this category includes both nonmetallic and several industrial minerals (e.g., dimension stone, sand & gravel, clay, petrified wood, volcanic cinders, etc.) falling under the purview of the Materials Act of 1947, as amended (30 U.S.C. § 601 *et seq.*). None of these commodities has been historically mined at the Site according to the CGS, DRMS, and USGS literature reviewed for this report. The local geology does not favor commercial sand & gravel deposits at the Site.

According to the DRMS database, the nearest active commercial sand & gravel mine is located about 4 miles southeast of the Site in the SW ¼ of Section 23, T1N, R77W. The pit is identified as Kilgore Companies, LLC's (dba Peak Materials) 94-acre *Cottonwood Quarry*, which was permitted by DRMS in 2005 (Permit No. M2004-061) near Eightmile Creek. Mining at this pit appears to occur in a Holocene-age landslide deposit (Map Unit QI), which is not found at the Site. The majority of commercial sand & gravel mining in the regional area occurs in recent stream-channel and floodplain alluvium deposits along the Colorado River and its major tributaries. Salable mineral commodities like aggregate generally have a low unit-value (i.e., value per ton), and their exploitation is dependent on the quality of the material and easy access to transportation and local markets. It is unlikely that future sand & gravel mining would be a commercially viable activity at the Site.

No clay, building/dimension stone, limestone, marble, fluorite, peat, pumice, perlite, cinder, pegmatite or other salable mineral locales, or historic mining activities, were identified at or near the Site.

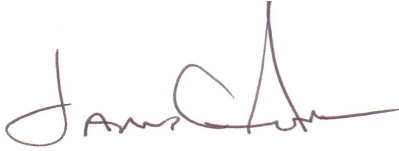
#### **4. Opinion and Conclusion**

Rare Earth reviewed a number of public documents related to current and historic mining operations and the associated mineral-resource potential for the Site and surrounding area. It is our opinion that the *resource potential* is considered to be low for the occurrence of locatable, leasable, and salable minerals. It is also our opinion that the *development potential* for locatable, leasable, and salable minerals is considered to be low at the time of preparing this report for the Site. For purposes of this MAR, the term *development potential* is used to describe the likelihood that economic extraction of a specific mineral resource is currently or potentially feasible based upon factors such as today's mineral-commodity marketplace, technologic limitations, permitting restrictions, access and terrain, etc.

Based upon our review of the aforementioned documents, and given current surface-mining techniques and our understanding of local geologic conditions and technologic & economic constraints, it is our opinion that the probability of extraction or removal of minerals by any surface mining method at the 600-acre Jones Creek Ranch – Conservation Easement property is so remote as to be negligible.

Respectfully Submitted,

**Rare Earth Science, LLC**



James C. Armstrong  
Principal Geologist

cc: J. Krones (CHLT)  
D. Reeder (Rare Earth)

**Attachments**

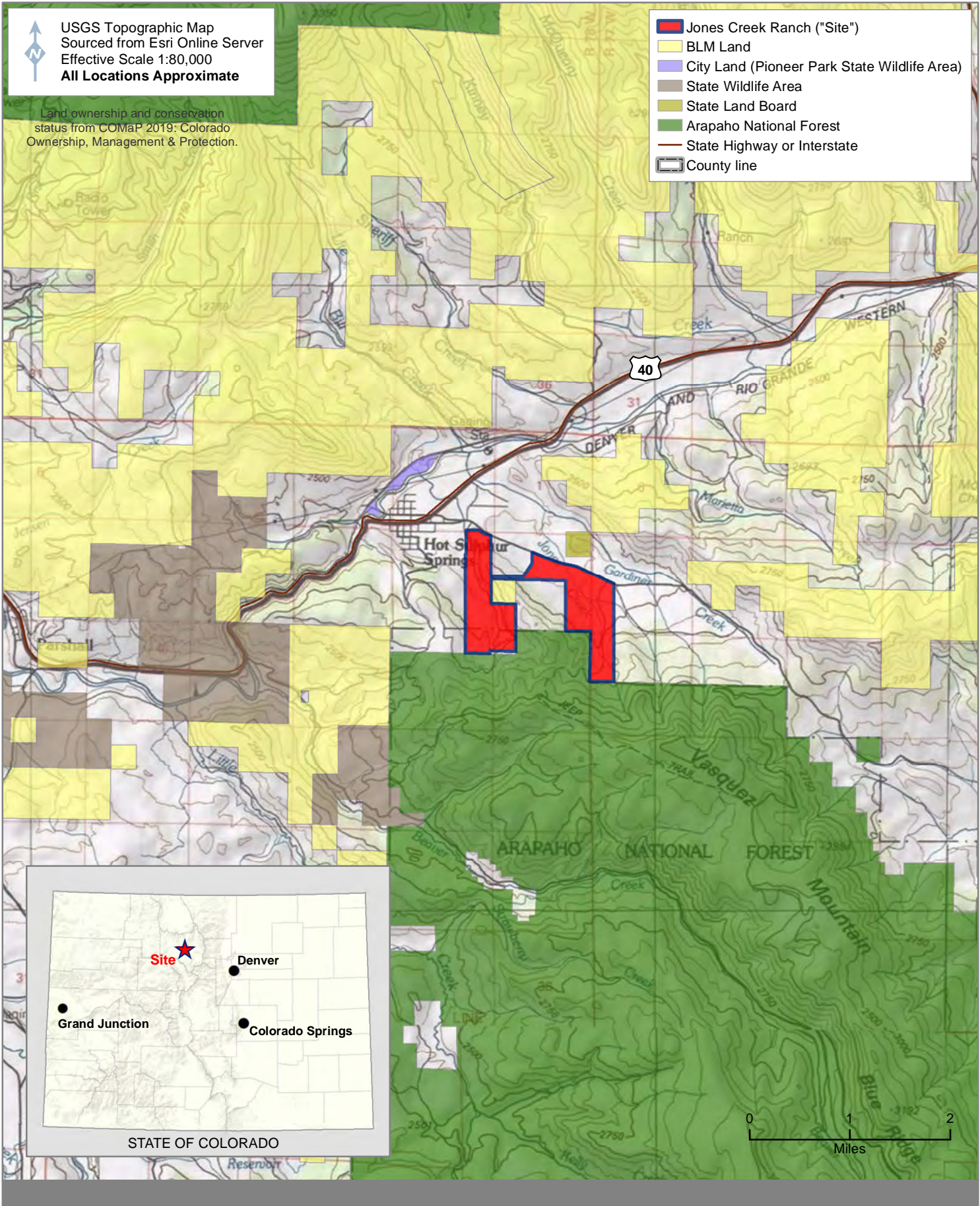
- Preparer's Qualifications
- Figure 1 – Context & Location Maps
- Figure 2 – Topographic Map
- Figure 3 – Aerial Photograph
- Figure 4 – Geologic Map
- Figure 5 – Mineral Ownership Status & Development Map
- Legal Description (CE Phase 1)

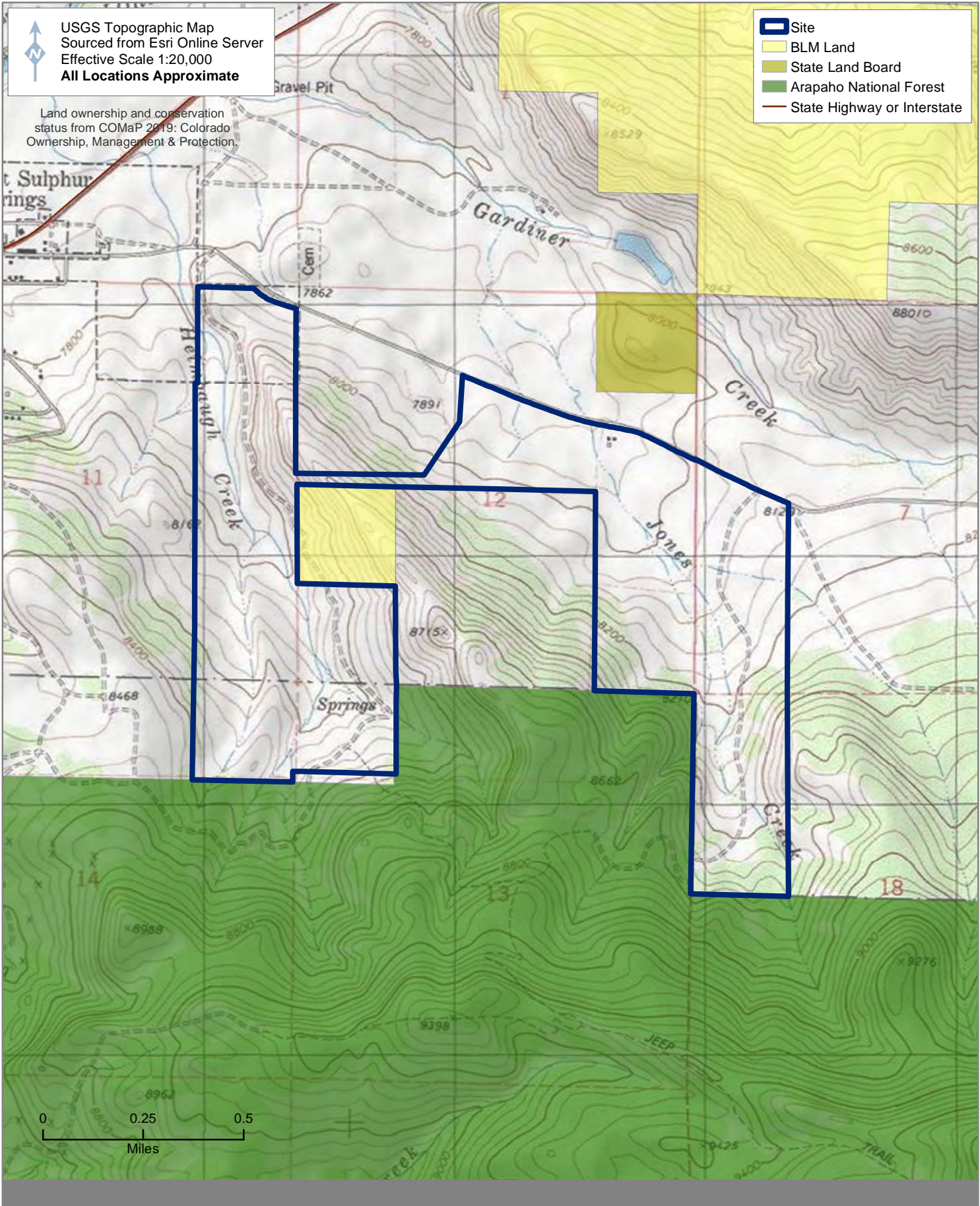


### ***Preparer's Qualifications***

James Armstrong is a geologist and environmental scientist with 27 years of residency in Colorado, who has lived in Grand Junction and Gunnison since 1998. He meets the qualifications of a Professional Geologist as defined by Colorado Revised Statute 34-1-201. Mr. Armstrong received a B.S. degree in Geology from Kansas State University in 1983 and completed additional graduate-level coursework in environmental and natural-resource studies at the University of Alaska Anchorage. He spent 7 years working in various private-industry technical positions related to oil & gas exploration and production, geophysical consulting, and petroleum refining & marketing operations in the central United States, south Texas, and the Gulf of Mexico.

Since 1990, he has been employed as a consulting geologist and environmental scientist serving private-sector, non-profit, and government-agency clients primarily in the western and central United States including Alaska and Hawaii. Mr. Armstrong is accomplished in field studies, mineral evaluations, project management and regulatory compliance, and has prepared numerous Mineral Assessment Reports for conservation-easement and habitat-protection projects in Colorado, Florida, Kansas, Minnesota, Nebraska, New Mexico, Oklahoma, Texas, and Wyoming. He is the founder of (and a partner in) Rare Earth Science, LLC. Mr. Armstrong also co-authored and edited the revised edition of *Mineral Development and Land Conservation: A Handbook for Conservation Professionals*, published in 2011 by the Colorado Coalition of Land Trusts.

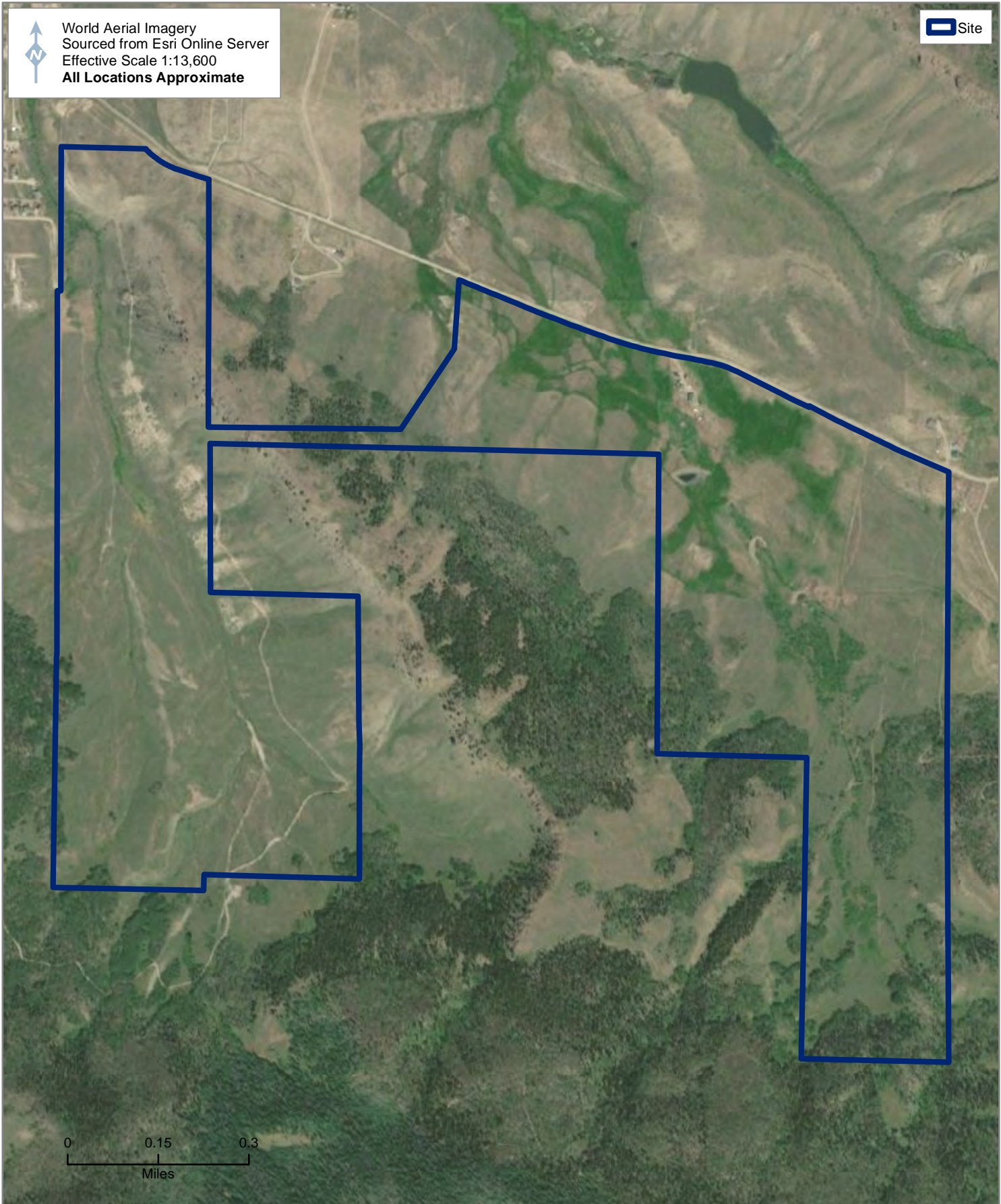






World Aerial Imagery  
Sourced from Esri Online Server  
Effective Scale 1:13,600  
All Locations Approximate

Site

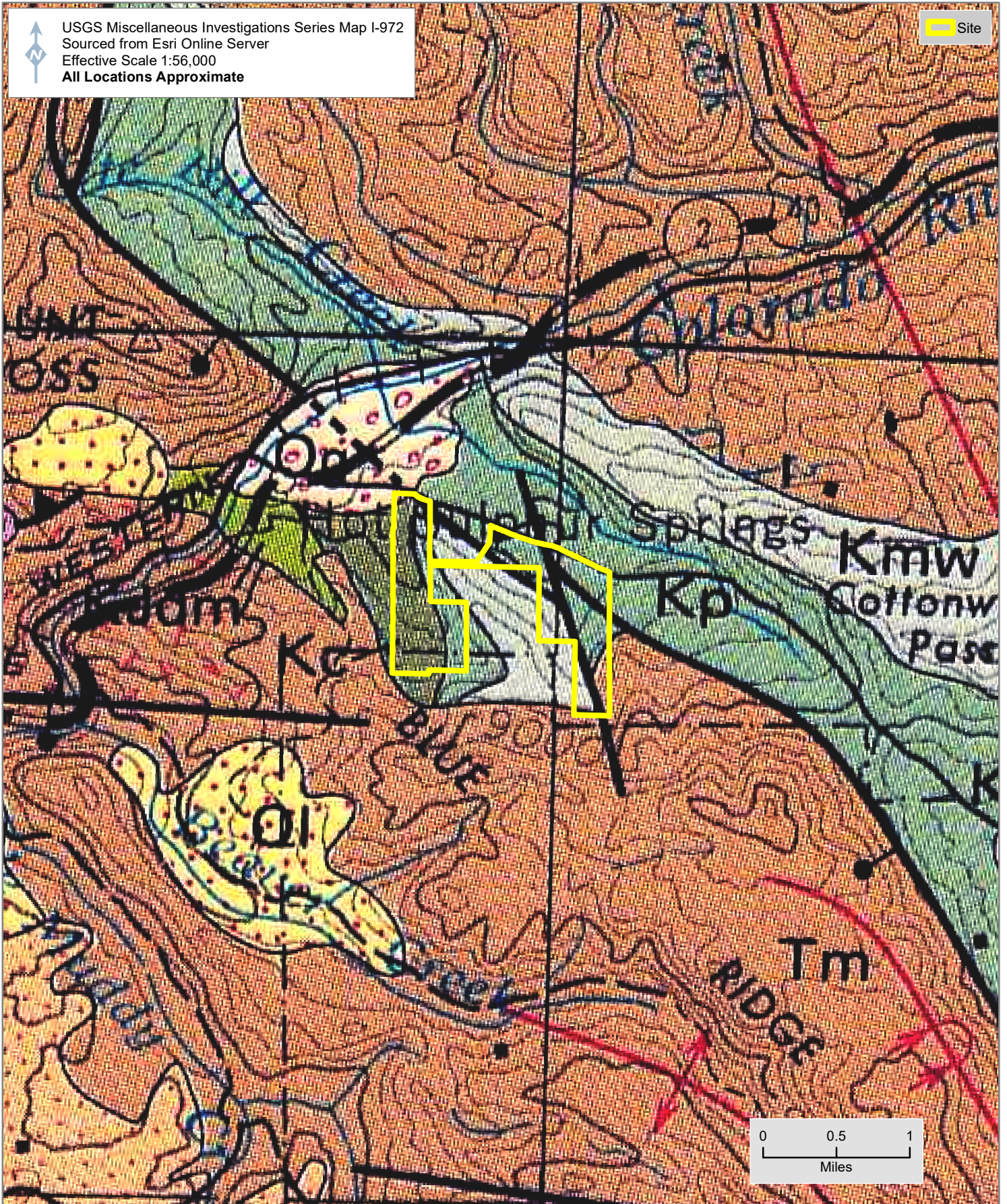


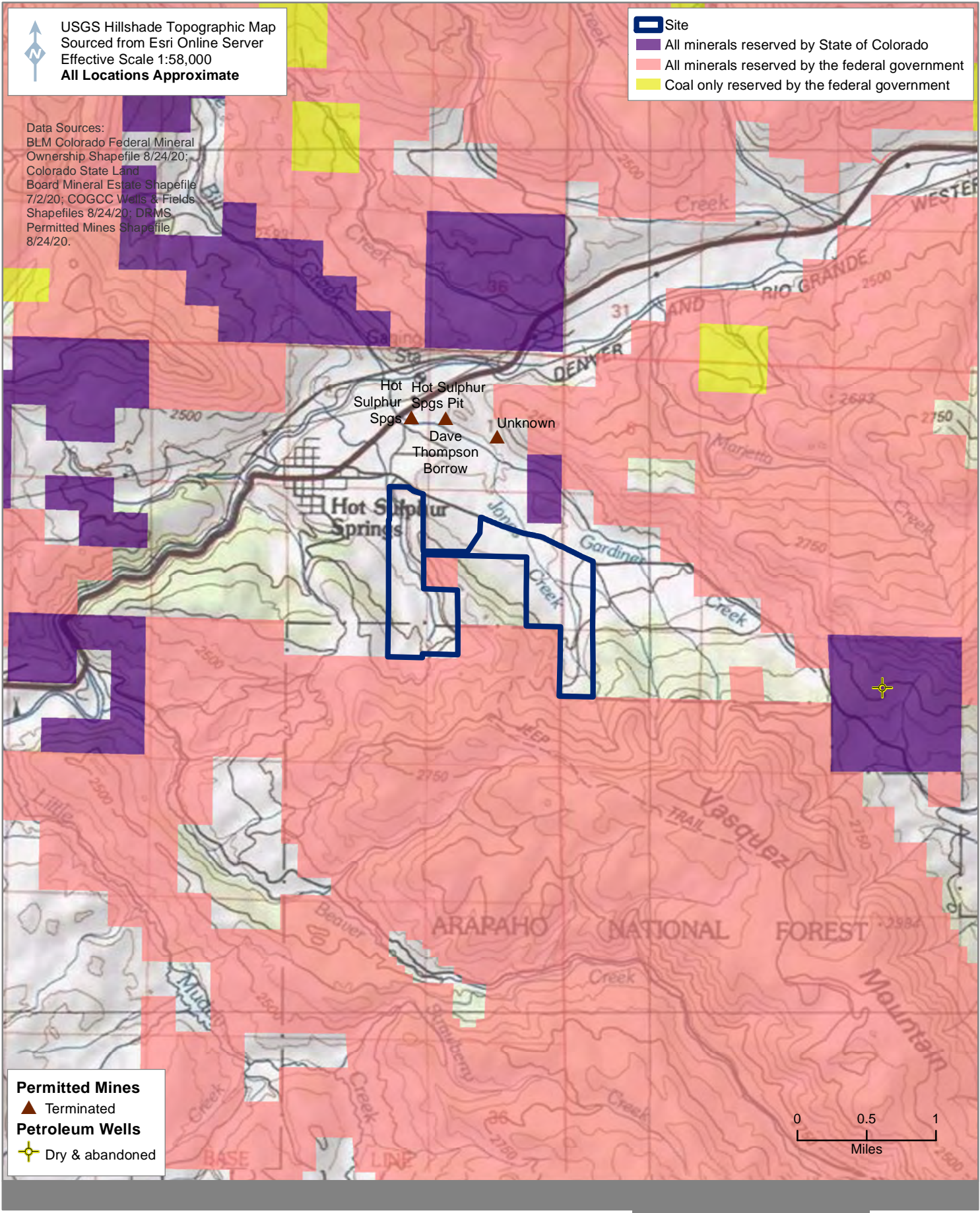
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USGS Miscellaneous Investigations Series Map I-972  
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 Effective Scale 1:56,000  
 All Locations Approximate

Site





USGS Hillshade Topographic Map  
 Sourced from Esri Online Server  
 Effective Scale 1:58,000  
**All Locations Approximate**

  Site  
 All minerals reserved by State of Colorado  
 All minerals reserved by the federal government  
 Coal only reserved by the federal government

Data Sources:  
 BLM Colorado Federal Mineral  
 Ownership Shapefile 8/24/20;  
 Colorado State Land  
 Board Mineral Estate Shapefile  
 7/2/20; COGCC Wells & Fields  
 Shapefiles 8/24/20; DRMS  
 Permitted Mines Shapefile  
 8/24/20.

**Permitted Mines**  
▲ Terminated  
**Petroleum Wells**  
⊕ Dry & abandoned

0      0.5      1  
 Miles

**EXHIBIT A**  
Legal Description of the Property

The following property located in the County of Grand, State of Colorado, described as follows:

Parcel A:

SE1/4SE1/4 of Section 11; the SW1/4SW1/4 of Section 12; the NW1/4NW1/4 of Section 13; and the NE1/4NE1/4 of Section 14, in Township 1 North, Range 78 West of the 6<sup>th</sup> P.M., including all lots contained within the subdivision known as IDEAL PARK, according to the plat thereof recorded March 11, 1912 as Reception No.17029.

Parcel C:

TOWNSHIP 1 NORTH, RANGE 78 WEST OF THE 6<sup>TH</sup> P.M.

Section 11: SE1/4NE1/4, NE1/4SE1/4

Parcel D:

TOWNSHIP 1 NORTH, RANGE 78 WEST OF THE 6<sup>TH</sup> P.M.

Section 11: That portion of the NE1/4NE1/4 lying southwesterly of County Road No. 55 (aka Cottonwood Pass Road)