AMERICAN RARE EARTHS ABN 83 003 453 503

ASX RELEASE

7 August 2024

HALLECK CREEK EXPANSION POTENTIAL

ASSAYS RETURN TREO GRADES UP TO 5,280 PPM

Highlights

- Mapping and sampling across unsampled areas at the new Bluegrass Resource Area completed
  - 40 surface geochemical samples collected and assayed with Total Rare Earth Oxide (**"TREO"**) grades up to 4,815 ppm
  - The Bluegrass and Overton Mountain geology consists of homogenous target mineralised material
- Reconnaissance scale mapping and sampling across the Sommer's Flat Resource Area performed
  - 48 surface geochemical samples collected and assayed with TREO grades up to 5,280 ppm
- Results continue to demonstrate upside potential of the Halleck Creek district.

American Rare Earths (**ASX: ARR | OTCQX: ARRNF | ADR: AMRRY) ("ARR"** or the **"Company"**) is pleased to announce the release surface geochemistry samples across the Bluegrass, northern Overton Mountain, and Sommers Flat Area at the Halleck Creek Rare Earths project. ARR geologists collected 88 surface samples in June 2024 across previously unmapped or sparsely mapped expansion areas at Halleck Creek. ALS Global assayed the samples which contain TREO values ranging to 5,280 ppm.

Most of the surface samples at Overton Mountain and Bluegrass show TREO values exceeding 2,770 ppm with four samples exceeding 4,000 ppm TREO. The mapped geology in this area consists almost exclusively of clinopyroxene quartz monzonite (**"CQM"**), which is the chief rare earth bearing rock type within the Red Mountain Pluton (**"RMP"**).

The surface samples at the Sommers Flat area vary with changes in the geology. At Sommers Flat the biotite hornblende syenite (**"BHS"**) is the primary rock type within the RMP. The BHS rocks have lower TREO grades than the CQM. Thin dikes of higher grade CQM cross-cut the BHS rocks at Sommers Flat and range in thickness between 5 and 50 centimetres. Two CQM dike samples contained TREO values of 4,726 ppm and 5,250 ppm.

Dwight Kinnes, Chief Technical Officer, commented:

"The recent mapping and sampling from our geologists clearly show that the Bluegrass area will be a high priority exploration / expansion area for ARR. This area is contiguous to prior drilling at the Overton area, and we plan to perform expanded exploration at Bluegrass and will be updating exploration permits with the Bureau of Land Management (BLM) and Wyoming Department of Environmental Quality ("**WDEQ**") for 2024-2025. Additional field mapping and sampling at Sommers Flat will provide details on the CQM dikes and help us to determine if long-range exploration of Sommers Flat is warranted."

Technical Information

ARR geologists collected 88 surface rock samples across the northern Overton Mountain, Bluegrass and Sommers Flat resource areas at the Halleck Creek Rare Earths Project, Figure 1. 40 surface samples were collected at the Overton Mountain and Bluegrass areas, Figure 2, and 48 samples were collected at the Sommers Flat area, Figure 3. The entire list of surface sample assays resides in Appendix B below.

The average TREO values at Bluegrass are 2,770 ppm and 1,483 ppm at Sommers Flat.

Table 1 – Summary of TREO and MagREO values of 2024 Surface Samples

	TREO			MagREO		
Area	**Min**	**Max**	**Average**	**Min**	**Max**	**Average**
Bluegrass	700	4,815	2,770	210	1,231	757
Sommers Flat	133	5,280	1,483	30	1,479	412
Grand Total	**133**	**5,280**	**2,068**	**30**	**1,479**	**569**

Each rock sample was logged, photographed and submitted to ALS Global for assay. The data for each sample was then added to the DHDB database. ARR geologists updated geological maps to reflect the new surface samples.

After the current exploration drilling at the Cowboy State Mine (CSM) area concludes, ARR geologists will update exploration drilling plans for Bluegrass and northern Overton Mountain and submit applications to the BLM and the WDEQ for 2025. ARR is also working to secure long-term exploration agreements with surface owners adjacent to the Bluegrass area.

Bluegrass and northern Overton Mountain

As mentioned above, the geology of the Bluegrass area is dominated by the CQM unit of the RMP. The exposed outcrops show homogenous material across most of the Bluegrass area, Figure 2. The new surface samples tie directly into existing surface samples and exploration drilling at Overton Mountain. ARR will focus exploration at Bluegrass on the central and northwestern side of Bluegrass.

The lithology in the northeastern part of Bluegrass changes to reflect the geology of the County Line area which is dominated by low-grade RMP with higher-grade medium grained quartz monzonite dikes.

Sommers Flat

Mapping and sampling at Sommers Flat had been very limited prior to 2024. Existing surface samples were collected by Zenith prior to ARR acquiring the Halleck Creek project. The 2024 mapping and sampling shows that Sommers Flat consists of low-grade RMP cross-cut by thin higher-grade CQM dikes. As time permits, additional mapping of dikes will occur at Sommers Flat to determine if additional exploration should be conducted in the area.

Several surface samples at Sommers Flat contain TREO values of 4,726 ppm and 5,250 ppm. These samples were collected from CQM dikes approximately 20 cm thick. Samples of the surrounding RMP range from TREO of 1,500 ppm and less.

Archean rocks of Elmer's Rock Greenstone Belt (**"ERGB"**) also occur in the Sommers Flat area. The ancient ERGB is barren of rare earth minerals, but occurrences of graphite in the ERGB are known to exist in areas north of Halleck Creek. No indication of graphite was observed by ARR geologists in the ERGB at Halleck Creek.

This announcement is authorised for release by the Board of American Rare Earths.

Further information

Jane Morgan
Investor and Media Relations
jm@janemorganmanagement.com.au

Competent Persons Statement:

The information in this document is based on company work performed in June 2024. This work was reviewed and approved for release by Mr Dwight Kinnes (Society of Mining Engineers #4063295RM) who is employed by American Rare Earths and has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity which he is undertaking to qualify as a Competent Person as defined in the 2012 JORC Code. Mr Kinnes consents to the inclusion in the report of the matters based upon the information in the form and context in which it appears.

About American Rare Earths Limited:
American Rare Earths **(ASX: ARR | OTCQX: ARRNF | ADR: AMRRY)** owns the Halleck Creek, WY rare earth deposit which has the potential to become the largest and most sustainable rare earth project in North America. The Company is developing environmentally friendly and cost-effective extraction and processing methods to meet the rapidly increasing demand for resources essential to the clean energy transition and US national security. The Company continues to evaluate other exploration opportunities and is collaborating with US Government-supported R&D to develop efficient processing and separation techniques of (REEs) elements to help ensure a renewable future.

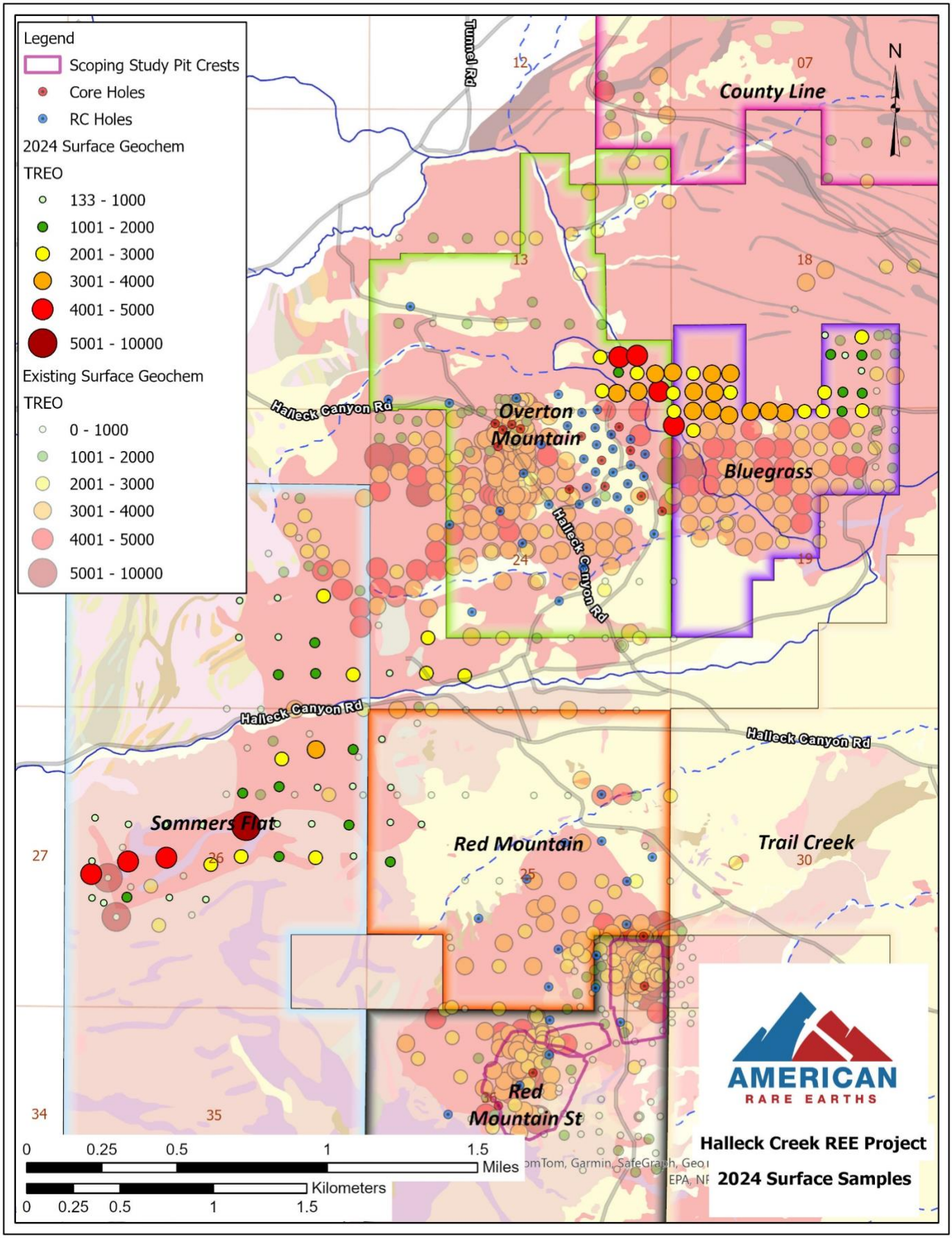

Figure 1 – 2024 Surface Sample Locations

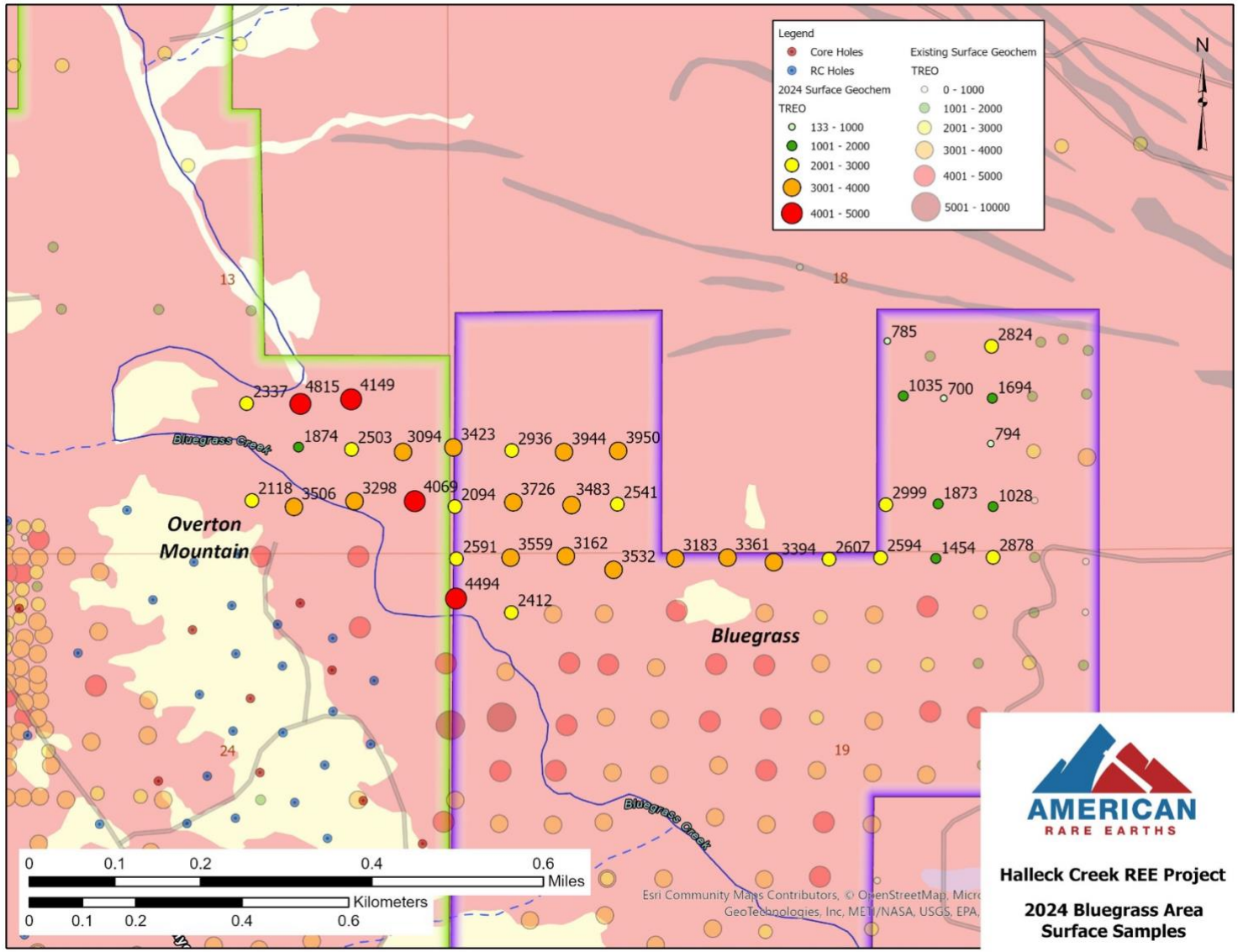

Figure 2 – 2024 Surface Samples in the Bluegrass Area

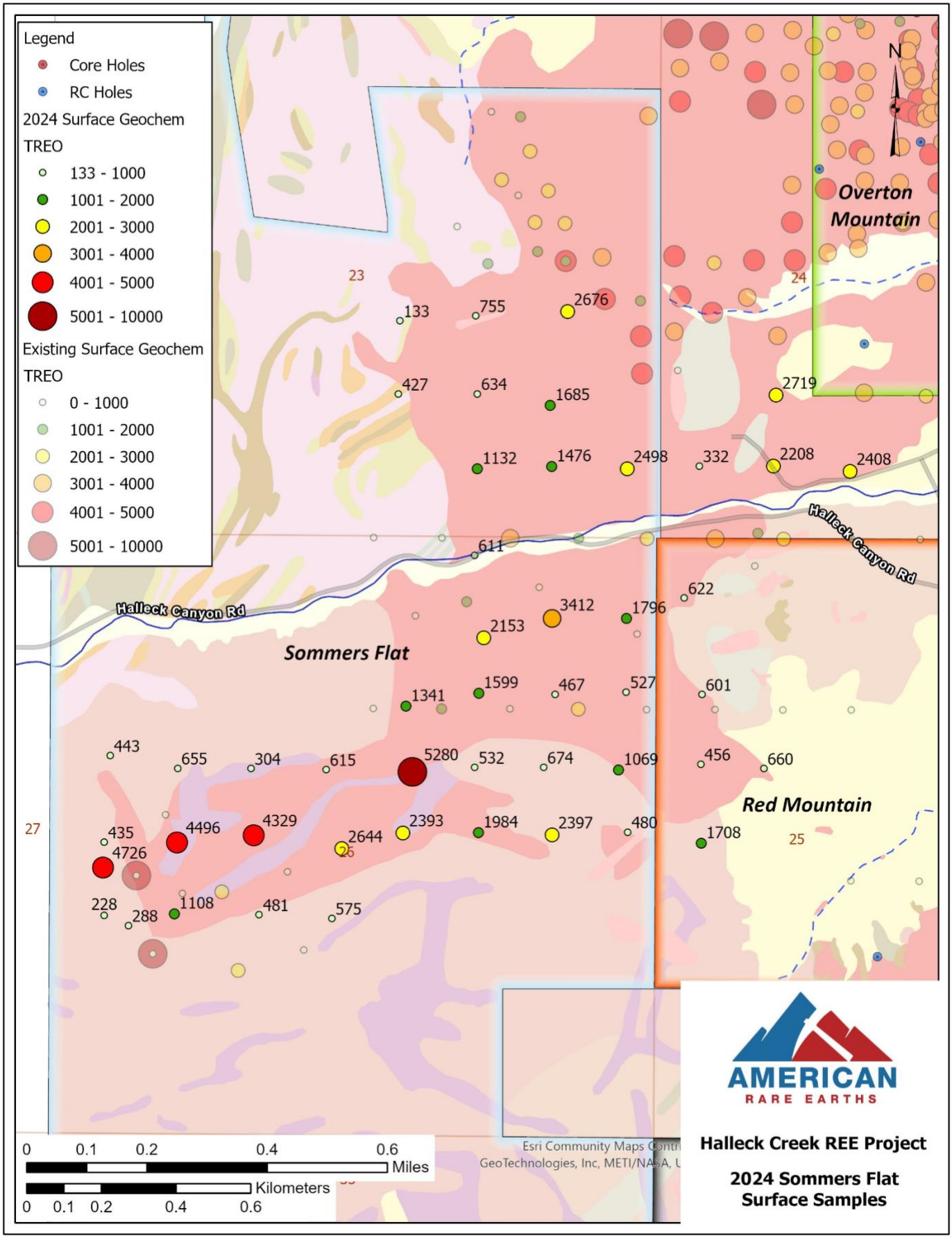

Figure 3 – 2024 Surface Samples in the Sommers Flat Area

APPENDIX A – JORC TABLE 1

Section 1 Sampling Techniques and Data		
(Criteria in this section apply to all succeeding sections.)		
Criteria	***JORC Code explanation***	**Commentary**
Sampling techniques	*Nature and quality of sampling (e.g. cut channels, random chips, or specific specialised industry standard measurement tools appropriate to the minerals under investigation, such as downhole gamma sondes, handheld XRF instruments, etc.). These examples should not be taken as limiting the broad meaning of sampling.*	ARR collected 88 surface rock samples from the northern Overton Mountain, Bluegrass, and Sommers Flat resource area. 818 surface rock samples already exist in the Halleck Creek database. Surface rock samples collected by ARR are logged, photographed and located using handheld GPS units.
	Include reference to measures taken to ensure sample represe6ntivity and the appropriate calibration of any measurement tools or systems used.	Rock samples were collected from various rock outcrops across the Halleck Creek study areas.
	Aspects of the determination of mineralisation that are Material to the Public Report.	The Red Mountain Pluton (RMP) of the Halleck Creek Rare Earths Project is a distinctly layered monzonitic to syenitic body which exhibits significant and widespread REE enrichment. Enrichment is dependent on allanite abundance, a sorosilicate of the epidote group. Allanite occurs in all three units of the RMP, the clinopyroxene quartz monzonite, the biotite-hornblende quartz syenite, and the fayalite monzonite, in variable abundances.
	In cases where 'industry standard' work has been done, this would be relatively simple (e.g. 'reverse circulation drilling was used to obtain 1 m samples from which 3 kg was pulverised to produce a 30 g charge for fire assay'). In other cases, more explanation may be required, such as where there is coarse gold that has inherent sampling problems. Unusual commodities or mineralisation types (e.g. submarine nodules) may warrant disclosure of detailed information.	Surface samples were mapped, logged, and photographed prior to being bagged for sample analysis. The data for each sample was added to the DHDB database.
Drilling techniques	*Drill type (e.g. core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc.) and details (e.g. core diameter, triple or standard tube, depth of diamond tails, face-sampling bit or another type, whether the core is oriented and if so, by what method, etc.).*	n/a

Section 1 Sampling Techniques and Data		
(Criteria in this section apply to all succeeding sections.)		
Criteria	***JORC Code explanation***	**Commentary**
Drill sample recovery	*Method of recording and assessing core and chip sample recoveries and results assessed.*	n/a
	Measures are taken to maximise sample recovery and ensure the representative nature of the samples.	n/a
	Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred due to preferential loss/gain of fine/coarse material.	n/a
Logging	*Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies.*	All rock samples were geologically logged and photographed by ARR geologists familiar with the deposit.
	Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.	Logging of rock samples are quantitative adhering to methods established by ARR.
	The total length and percentage of the relevant intersections logged.	n/a
Sub-sampling techniques and sample preparation	*If core, whether cut or sawn and whether quarter, half or all core taken.*	Sub-samples were not prepared.
	If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.	n/a
	For all sample types, the nature, quality and appropriateness of the sample preparation technique.	All core samples were dry. Sample preparation: 1kg samples split to 250g for pulverising to -75 microns. Sample analysis: 0.5g charge assayed by ICP-MS technique.
	Quality control procedures adopted for all sub-sampling stages to maximise the representivity of samples.	Quality control measures from ALS Global were used for these samples.

Section 1 Sampling Techniques and Data		
(Criteria in this section apply to all succeeding sections.)		
Criteria	***JORC Code explanation***	**Commentary**
	Measures are taken to ensure that the sampling is representative of the in situ material collected, including, for instance, results for field duplicate/second-half sampling.	n/a
	Whether sample sizes are appropriate to the grain size of the material being sampled.	Allanite is generally well distributed across the core and the sample sizes are representative of the fine grain size of the Allanite.
Quality of assay data and laboratory tests	*The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.*	ALS uses a 5-acid digestion and 32 elements by lithium borate fusion and ICP-MS (ME-MS71h). For quantitative results of all elements, including those encapsulated in resistive minerals. These assays include all rare earth elements.
	For geophysical tools, spectrometers, handheld XRF instruments, etc., the parameters used in determining the analysis including instrument make and model, reading times, calibrations factors applied and their derivation, etc.	n/a
	Nature of quality control procedures adopted (e.g. standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (i.e. lack of bias) and precision have been established.	Quality control measures from ALS Global were used for these samples.
Verification of sampling and assaying	*The verification of significant intersections by either independent or alternative company personnel.*	Surface samples have not yet been verified by independent personnel.
	The use of twinned holes.	n/a
	Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.	Data entry was performed by ARR personnel and checked by ARR geologists. All field logs were scanned and uploaded to company file servers. All photographs were also uploaded to the file server daily. All scanned documents are cross-referenced and directly available from the database.

Section 1 Sampling Techniques and Data		
(Criteria in this section apply to all succeeding sections.)		
Criteria	***JORC Code explanation***	**Commentary**
		Assay data from the surface samples was imported into the database directly from electronic spreadsheets sent to ARR from ALS.
	Discuss any adjustment to assay data.	Assay data is stored in the database in elemental form. Reporting of oxide values are calculated in the database using the molar mass of the element and the oxide.
Location of data points	*Accuracy and quality of surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation.*	Surface samples have been located using handheld GPS units. Sample locations are based on GPS coordinates +/- 10 ft (3 m) accuracy.
	Specification of the grid system used.	The grid system used to compile data was NAD83 Zone 13N.
	Quality and adequacy of topographic control.	Topography control is +/- 10 ft (3 m).
Data spacing and distribution	*Data spacing for reporting of Exploration Results.*	Surface samples vary between 200 metre spacing and 100m spacing depending on area.
	Whether the data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and classifications applied.	These data will not be sued for resource estimates.
	Whether sample compositing has been applied.	Composite have not been applied.
Orientation of data in relation to geological structure	*Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.*	Mineralization at Halleck Creek is a function of fractional crystallization of allanite in syenitic rocks of the Red Mountain Pluton. Mineralization is not structurally controlled and exploration drilling to date does not reveal any preferential mineralization related to geologic structures.
	If the relationship between the drilling orientation and the orientation of key mineralised structures is considered to have introduced a sampling bias, this should be assessed and reported if material.	n/a
Sample security	*The measures are taken to ensure sample security.*	All rock samples were in the direct control of company geologists until dispatched to American Assay Labs.

Section 1 Sampling Techniques and Data		
(Criteria in this section apply to all succeeding sections.)		
Criteria	***JORC Code explanation***	**Commentary**
Audits or reviews	*The results of any audits or reviews of sampling techniques and data.*	No external audits or reviews have been conducted to date. However, sampling techniques are consistent with industry standards.

Section 2 Reporting of Exploration Results		
(Criteria listed in the preceding section also apply to this section.)		
Criteria	***JORC Code explanation***	**Commentary**
Mineral tenement and land tenure status	*Type, reference name/number, location and ownership, including agreements or material issues with third parties such as joint ventures, partnerships, overriding royalties, native title interests, historical sites, wilderness or national park and environmental settings.*	ARR acquired 5 unpatented federal lode claims on BLM US Federal Land totalling 71.6 acres (29 has) from Zenith Minerals, Ltd (Zenith). in 2021. 67 unpatented federal lode claims were staked by ARR that totalled 1193.3 acres (482 ha) in summer 2021. ARR staked 182 unpatented federal lode claims in March 2022 covering an area of approximately 3,088 acres (1,250 ha). ARR staked 118 unpatented federal lode claims in November 2022 covering an area of approximately 2,113 acres (855 ha). As of December 31, 2022, ARR controlled 367 unpatented federal lode claims and 4 Wyoming State mineral licenses covering 8,165 acres (3,304 ha).
	The security of the tenure held at the time of reporting and any known impediments to obtaining a licence to operate in the area.	No impediments to holding the claims exist. To maintain the claims an annual holding fee of $165/claim is payable to the BLM. To maintain the State leases minimum rental payments of $1/acre for 1-5 years; $2/acre for 6-10 years; and $3/acre if held for 10 years or longer.
Exploration done by other parties	*Acknowledgment and appraisal of exploration by other parties.*	Prior to sampling by WIM on behalf of Blackfire Minerals and Zenith there was no previous sampling by any other groups within the ARR claim and Wyoming State Lease blocks.
Geology	*Deposit type, geological setting and style of mineralisation.*	The REE's occur within Allanite which occurs as a variable constituent of the Red Mountain Pluton. The occurrence can be characterised as a disseminated type rare earth deposit.
Drill hole Information	*A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes:*	n/a
	easting and northing of the drill hole collar	n/a Drilling information from the Fall 2023 campaign was published in the report "Summary of 2023 Infill Drilling at the Halleck Creek Project Area", November 2023.
	elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar	
	dip and azimuth of the hole	
	downhole length and interception depth	

Section 2 Reporting of Exploration Results		
(Criteria listed in the preceding section also apply to this section.)		
Criteria	***JORC Code explanation***	**Commentary**
	Hole length.	
	If the exclusion of this information is justified on the basis that the information is not Material and this exclusion does not detract from the understanding of the report, the Competent Person should clearly explain why this is the case.	n/a
Data aggregation methods	*In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (e.g. cutting of high grades) and cut-off grades are usually Material and should be stated.*	No cut-offs have been applied to the data
	Where aggregate intercepts incorporate short lengths of high-grade results and longer lengths of low-grade results, the procedure used for such aggregation should be stated and some typical examples of such aggregations should be shown in detail.	Assays are representative of each sample.
	The assumptions used for any reporting of metal equivalent values should be clearly stated.	No metal equivalents used.
Relationship between mineralisation widths and intercept lengths	*These relationships are particularly important in the reporting of Exploration Results.* *If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.* *If it is unknown and only the downhole lengths are reported, there should be a clear statement to this effect (e.g. 'down hole length, true width not known').*	Allanite mineralization observed at Halleck Creek occurs uniformly throughout the CQM and BHS rocks of within the Red Mountain Pluton. Therefore, the geometry of mineralisation does not vary with drill hole orientation or angle within homogeneous rock types.
Diagrams	*Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported. These should include, but not be limited to, a plan view of drill hole collar locations and appropriate sectional views.*	Location information is presented the text above
Balanced reporting	*Where comprehensive reporting of all Exploration Results is not practicable, representative reporting of both low and high grades and/or widths should be practised to avoid misleading reporting of Exploration Results.*	All samples collected during this program are listed in Appendix B
Other substantive exploration data	*Other exploration data, if meaningful and material, should be reported, including (but not limited to): geological observations; geophysical survey results; geochemical survey results; bulk samples – size and*	In hand specimen this rock is a red colored, hard and dense granite with areas of localised fracturing. The rock shows significant iron staining and deep weathering.

Section 2 Reporting of Exploration Results		
(Criteria listed in the preceding section also apply to this section.)		
Criteria	***JORC Code explanation***	**Commentary**
	method of treatment; metallurgical test results; bulk density, groundwater, geotechnical and rock characteristics; potential deleterious or contaminating substances.	Microscopic description: In hand specimen the samples represent light colored, fairly coarse-grained granitic rock composed of visible secondary iron oxide, amphibole, opaques, clear quartz and pink to white colored feldspar. All of the specimens show moderate to strong weathering and fracturing. Allanite content is variable from trace to 2%. Rare Earths are found within the Allanite. Historical metallurgical testing consisted of concentrating the Allanite by both gravity and magnetic separation. The current program employs sequential high gradient magnetic separation and flotation to produce a concentrate suitable for downstream rare earth elements extraction.
Further work	*The nature and scale of planned further work (e.g. tests for lateral extensions or depth extensions or large-scale step-out drilling).*	Further drilling is planned to increase the area of the project, and to increase confidence levels of resources. Geological mapping and surface sampling will also be performed to define and prioritize drilling targets.
	Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.	Additional drilling is planned in new exploration areas and to increase resource confidence levels.

Appendix B – Summary of 2024 Surface Samples at Halleck Creek

2024 Surface Geochemistry Samples																						
Area	Sample_ID	Lat	Long	TREO	MREO	LREO	HREO	Ce	Dy	Er	Eu	Gd	Ho	La	Lu	Nd	Pr	Sc	Sm	Tb	Tm	Y	Yb
Bluegrass	HC24-024	41.8718	-105.2787	2,878	806	2,565	313	1,175	40	18	11	59	7	615	2	540	137	5	82	8	2	163	15
Bluegrass	HC24-025	41.8727	-105.2787	1,028	313	843	185	347	22	11	12	29	4	193	2	202	49	5	36	4	1	103	10
Bluegrass	HC24-026	41.8737	-105.2788	794	238	652	142	282	17	8	7	22	3	139	1	155	36	7	28	3	1	79	7
Bluegrass	HC24-027	41.8745	-105.2787	1,694	444	1,489	206	738	26	12	5	36	5	325	2	291	75	7	47	5	2	110	10
Bluegrass	HC24-028	41.8754	-105.2788	2,824	775	2,572	252	1,215	32	14	10	51	5	609	2	525	136	2	75	6	2	127	12
Bluegrass	HC24-029	41.8745	-105.2798	700	210	570	130	240	15	8	12	21	3	117	1	137	31	9	25	3	1	72	7
Bluegrass	HC24-030	41.8755	-105.2811	785	242	626	160	258	19	9	13	24	3	120	1	156	35	14	30	3	1	89	9
Bluegrass	HC24-031	41.8745	-105.2808	1,035	317	834	201	356	24	12	12	32	4	173	2	204	46	6	38	4	2	110	11
Bluegrass	HC24-032	41.8727	-105.2800	1,873	542	1,594	279	720	34	16	10	47	6	355	2	357	86	7	59	6	2	151	14
Bluegrass	HC24-033	41.8727	-105.2811	2,999	852	2,690	309	1,240	38	17	13	59	7	625	3	578	145	5	84	7	2	161	16
Bluegrass	HC24-034	41.8717	-105.2837	3,394	900	3,079	315	1,555	40	18	11	62	7	657	2	610	153	4	90	8	2	161	15
Bluegrass	HC24-035	41.8718	-105.2824	2,607	716	2,343	264	1,150	33	15	12	50	6	500	2	484	122	4	72	6	2	136	13
Bluegrass	HC24-036	41.8718	-105.2813	2,594	745	2,311	283	1,070	35	16	12	53	6	521	2	506	123	5	74	7	2	148	14
Bluegrass	HC24-037	41.8718	-105.2800	1,454	421	1,251	203	545	24	12	12	33	4	297	2	283	68	4	43	4	2	112	10
Bluegrass	HC24-038	41.8718	-105.2884	3,162	859	2,879	283	1,395	36	16	12	58	6	652	2	584	149	3	83	7	2	143	14
Bluegrass	HC24-039	41.8708	-105.2896	2,412	614	2,163	250	1,140	32	14	10	47	6	433	2	410	103	3	64	6	2	129	13
Bluegrass	HC24-040	41.8711	-105.2909	4,494	1,215	4,101	393	2,030	50	22	12	84	9	899	3	827	209	4	120	10	3	194	19
Bluegrass	HC24-041	41.8718	-105.2908	2,591	663	2,329	261	1,225	33	15	9	48	6	468	2	444	112	3	68	6	2	136	14
Bluegrass	HC24-042	41.8718	-105.2896	3,559	994	3,246	313	1,520	39	17	13	65	7	764	2	676	174	3	97	8	2	158	15
Bluegrass	HC24-043	41.8727	-105.2872	2,541	712	2,299	242	1,055	30	13	11	47	5	553	2	485	123	3	69	6	2	126	12
Bluegrass	HC24-044	41.8727	-105.2882	3,483	955	3,160	323	1,520	40	18	13	63	7	716	3	649	166	4	93	8	2	166	16
Bluegrass	HC24-045	41.8727	-105.2896	3,726	1,026	3,400	326	1,605	41	18	13	66	7	801	3	702	179	4	97	8	2	166	16
Bluegrass	HC24-046	41.8726	-105.2909	2,094	591	1,816	278	814	34	16	7	48	6	440	2	390	99	4	62	6	2	151	14
Bluegrass	HC24-047	41.8727	-105.2918	4,069	1,119	3,724	345	1,725	42	19	12	70	7	915	3	767	199	4	104	8	2	177	16
Bluegrass	HC24-048	41.8727	-105.2932	3,298	892	3,030	268	1,460	32	15	11	53	6	702	2	600	167	4	87	6	2	139	13
Bluegrass	HC24-049	41.8736	-105.2944	1,874	512	1,709	164	818	20	9	10	30	3	389	1	348	93	3	48	4	1	88	9
Bluegrass	HC24-050	41.8744	-105.2956	2,337	713	2,104	233	862	28	13	12	44	5	545	2	481	130	5	69	5	2	123	12
Bluegrass	HC24-051	41.8744	-105.2944	4,815	1,231	4,448	368	2,300	45	20	14	72	8	949	3	831	230	7	117	9	3	191	18
Bluegrass	HC24-052	41.8744	-105.2932	4,149	1,147	3,803	346	1,785	41	19	13	68	7	901	2	776	213	6	109	8	3	182	17
Bluegrass	HC24-053	41.8736	-105.2932	2,503	685	2,267	236	1,080	28	13	10	44	5	522	2	461	123	3	68	5	2	126	12
Bluegrass	HC24-054	41.8736	-105.2921	3,094	846	2,791	303	1,355	38	17	11	56	7	619	2	564	152	5	85	7	2	159	15
Bluegrass	HC24-055	41.8736	-105.2909	3,423	920	3,148	275	1,495	33	15	11	54	6	758	2	620	173	3	88	6	2	145	13
Bluegrass	HC24-056	41.8736	-105.2896	2,936	783	2,663	273	1,320	33	15	11	50	6	583	2	524	143	4	77	6	2	146	14
Bluegrass	HC24-057	41.8736	-105.2884	3,944	997	3,648	296	1,910	36	16	12	60	6	767	2	673	184	5	97	7	2	151	15
Bluegrass	HC24-058	41.8736	-105.2872	3,950	1,061	3,647	304	1,760	37	16	13	62	6	853	2	715	200	5	102	7	2	156	15
Bluegrass	HC24-059	41.8716	-105.2873	3,532	921	3,246	286	1,645	35	16	11	56	6	707	2	619	170	4	91	7	2	148	15

2024 Surface Geochemistry Samples																						
Area	Sample_ID	Lat	Long	TREO	MREO	LREO	HREO	Ce	Dy	Er	Eu	Gd	Ho	La	Lu	Nd	Pr	Sc	Sm	Tb	Tm	Y	Yb
Bluegrass	HC24-060	41.8718	-105.2859	3,183	874	2,911	272	1,375	33	15	10	53	6	686	2	591	160	4	84	6	2	142	13
Bluegrass	HC24-061	41.8718	-105.2847	3,361	911	3,029	332	1,465	41	19	11	60	7	686	2	607	165	4	91	8	3	176	17
Bluegrass	HC24-087	41.8727	-105.2955	2,118	560	1,916	202	942	23	11	9	37	4	428	2	376	103	4	54	4	2	109	10
Bluegrass	HC24-088	41.8726	-105.2945	3,506	946	3,235	272	1,570	33	15	12	57	6	742	2	642	176	4	90	7	2	139	13
Sommers Flat	HC24-001	41.8500	-105.3090	1,708	524	1,360	348	597	41	20	9	56	8	261	2	332	79	18	64	8	3	194	16
Sommers Flat	HC24-002	41.8503	-105.3114	480	125	416	64	207	8	4	3	11	1	82	1	80	22	8	15	2	0	34	3
Sommers Flat	HC24-003	41.8502	-105.3139	2,397	705	1,916	481	880	60	28	10	74	10	357	3	441	108	34	86	10	4	268	23
Sommers Flat	HC24-004	41.8502	-105.3162	1,984	538	1,660	324	760	37	19	10	49	7	372	3	343	91	24	60	7	3	184	17
Sommers Flat	HC24-005	41.8502	-105.3187	2,393	647	2,022	371	970	44	22	9	58	8	430	3	414	110	17	72	8	3	207	18
Sommers Flat	HC24-006	41.8498	-105.3206	2,644	728	2,227	417	1,030	51	25	10	66	9	505	3	463	124	15	81	9	3	231	20
Sommers Flat	HC24-007	41.8482	-105.3209	575	166	466	109	199	13	6	5	17	2	94	1	105	25	19	20	2	1	61	6
Sommers Flat	HC24-008	41.8482	-105.3233	481	133	392	90	177	10	5	3	12	2	81	1	85	21	9	15	2	1	52	5
Sommers Flat	HC24-009	41.8483	-105.3260	1,108	240	738	370	411	44	26	1	34	9	136	2	124	34	0	32	7	3	225	20
Sommers Flat	HC24-010	41.8480	-105.3275	288	79	223	65	95	7	4	4	9	1	43	1	49	11	10	10	1	1	38	4
Sommers Flat	HC24-011	41.8482	-105.3283	228	64	175	53	73	6	3	5	8	1	32	0	39	9	8	9	1	0	30	3
Sommers Flat	HC24-012	41.8494	-105.3283	4,726	1,338	4,058	668	1,890	87	38	12	116	16	919	4	862	226	3	147	16	5	360	27
Sommers Flat	HC24-013	41.8500	-105.3283	435	117	362	72	164	9	4	5	11	2	76	1	74	19	11	14	2	1	40	4
Sommers Flat	HC24-014	41.8500	-105.3259	4,496	1,265	3,904	591	1,850	77	34	13	106	13	865	4	820	217	3	137	14	4	314	25
Sommers Flat	HC24-015	41.8502	-105.3235	4,329	1,210	3,737	592	1,810	78	35	12	105	13	794	3	779	204	3	135	14	4	315	25
Sommers Flat	HC24-016	41.8517	-105.3211	615	161	517	98	237	11	6	3	13	2	120	1	104	28	8	17	2	1	58	5
Sommers Flat	HC24-017	41.8517	-105.3184	5,280	1,479	4,582	698	2,130	89	39	14	121	15	1,060	4	973	243	3	158	16	5	379	30
Sommers Flat	HC24-018	41.8518	-105.3163	532	132	472	61	220	7	4	3	9	1	122	0	87	23	3	13	1	0	34	3
Sommers Flat	HC24-019	41.8518	-105.3141	674	174	558	116	255	13	7	3	15	2	130	1	113	28	10	19	2	1	70	6
Sommers Flat	HC24-020	41.8518	-105.3117	1,069	337	853	215	344	26	13	11	34	5	184	2	217	50	7	40	5	2	120	11
Sommers Flat	HC24-021	41.8521	-105.3281	443	117	362	82	160	9	5	4	11	2	82	1	75	18	10	13	2	1	47	5
Sommers Flat	HC24-022	41.8518	-105.3259	655	187	421	234	179	30	15	1	29	6	89	2	101	24	0	27	5	2	132	13
Sommers Flat	HC24-023	41.8518	-105.3236	304	85	237	67	104	8	4	4	9	1	45	1	53	12	8	11	1	1	39	4
Sommers Flat	HC24-062	41.8536	-105.3090	601	165	495	107	219	12	6	9	14	2	108	1	106	27	8	19	2	1	63	6
Sommers Flat	HC24-063	41.8536	-105.3115	527	155	388	139	167	15	8	5	18	3	70	1	93	23	9	21	3	1	82	8
Sommers Flat	HC24-064	41.8536	-105.3138	467	123	378	89	175	10	5	3	12	2	83	1	77	20	6	14	2	1	52	5
Sommers Flat	HC24-065	41.8536	-105.3162	1,599	442	1,382	216	665	25	13	11	34	5	288	2	289	76	6	47	5	2	121	12
Sommers Flat	HC24-066	41.8533	-105.3186	1,341	384	1,133	209	519	24	12	11	31	4	235	2	250	64	12	42	4	2	118	11
Sommers Flat	HC24-067	41.8549	-105.3161	2,153	593	1,896	257	925	30	15	12	44	6	397	2	391	103	6	63	6	2	140	14
Sommers Flat	HC24-068	41.8554	-105.3139	3,412	949	3,124	288	1,355	33	15	10	57	6	844	2	647	175	5	88	7	2	154	13
Sommers Flat	HC24-069	41.8554	-105.3115	1,796	499	1,574	222	718	25	12	10	35	5	366	2	332	88	10	50	5	2	125	12
Sommers Flat	HC24-070	41.8559	-105.3096	622	164	533	89	251	10	5	10	14	2	112	1	105	29	8	19	2	1	50	5
Sommers Flat	HC24-071	41.8518	-105.3070	660	185	547	113	234	13	6	11	17	2	123	1	118	31	10	21	2	1	65	6

2024 Surface Geochemistry Samples																						
Area	Sample_ID	Lat	Long	TREO	MREO	LREO	HREO	Ce	Dy	Er	Eu	Gd	Ho	La	Lu	Nd	Pr	Sc	Sm	Tb	Tm	Y	Yb
Sommers Flat	HC24-072	41.8519	-105.3091	456	137	335	121	140	13	7	6	16	3	60	1	83	19	8	19	2	1	71	7
Sommers Flat	HC24-073	41.8569	-105.3164	611	156	481	130	223	14	8	4	15	3	104	1	96	26	10	18	2	1	79	8
Sommers Flat	HC24-074	41.8591	-105.3091	332	62	201	131	111	15	10	1	8	3	44	1	29	9	0	8	2	2	81	9
Sommers Flat	HC24-075	41.8590	-105.3115	2,498	671	2,248	250	1,080	30	14	11	44	5	517	2	446	124	5	66	6	2	135	13
Sommers Flat	HC24-076	41.8591	-105.3139	1,476	424	1,271	205	582	24	12	11	33	4	277	2	278	72	6	46	4	2	113	11
Sommers Flat	HC24-077	41.8590	-105.3163	1,132	327	948	184	430	21	11	10	28	4	200	1	211	55	6	36	4	2	105	10
Sommers Flat	HC24-078	41.8608	-105.3189	427	108	315	112	144	12	7	2	12	2	72	1	64	17	3	14	2	1	69	6
Sommers Flat	HC24-079	41.8626	-105.3188	133	30	108	25	41	3	1	1	3	1	18	0	18	5	21	4	0	0	15	1
Sommers Flat	HC24-080	41.8627	-105.3164	755	247	555	200	234	24	12	9	29	4	88	2	151	35	5	33	4	2	112	11
Sommers Flat	HC24-081	41.8628	-105.3134	2,676	738	2,383	293	1,125	35	17	10	50	7	548	2	488	134	4	74	7	2	158	15
Sommers Flat	HC24-082	41.8605	-105.3140	1,685	447	1,469	216	686	24	13	7	31	5	353	2	293	82	4	44	4	2	123	12
Sommers Flat	HC24-083	41.8608	-105.3163	634	223	442	192	133	22	11	10	27	4	98	1	135	31	5	31	4	2	110	10
Sommers Flat	HC24-084	41.8608	-105.3067	2,719	718	2,492	227	1,195	26	12	9	42	5	596	2	485	137	5	66	5	2	123	11
Sommers Flat	HC24-085	41.8591	-105.3068	2,208	619	1,934	274	887	31	16	8	46	6	447	2	409	109	9	65	6	2	152	13
Sommers Flat	HC24-086	41.8590	-105.3043	2,408	656	2,179	230	1,030	27	13	9	45	5	511	2	436	122	5	66	5	2	121	11