

PLAN TO IDENTIFY CRITICAL MINERAL RESOURCES IN NEW MEXICO

NAME OF THE STATE GEOLOGICAL SURVEY: New Mexico Bureau of Geology and Mineral Resources (NMBGMR)

PROJECT TITLE: Data Preservation of Critical Minerals in New Mexico: Year 4

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ABSTRACT

Critical minerals are mineral resources that are essential to our economy and defense, and whose supply may be disrupted; many critical minerals are 100% imported into the United States. Mining districts in New Mexico that contain critical minerals deposits have been previously identified (McLemore, 2017, 2019), however specific data describing these districts have not been compiled or evaluated. In the past three years, the NMBGMR (New Mexico Bureau of Geology and Mineral Resources) has delivered 1) compilation of a comprehensive database with shape files of mining districts and critical mineral focus areas with critical minerals in New Mexico, 2) compilation of information on mines with selected critical mineral potential in New Mexico, 3) compilation of a database of chemical analyses of rocks and minerals from critical minerals mines and occurrences (continuation of existing database started in year 1 for rare earth elements, REE), 4) NMBGMR web pages of specific critical minerals, 5) photograph and describe cores with critical minerals potential, and 6) attended the USGS (U.S. Geological Survey) Critical Mineral Resources Workshops and provided appropriate spreadsheet and GIS shape files. Future endeavors include 1) continuing compiling and updating previous established databases, including converting the mining districts and focus areas into the USGS District_EarthMRI templates, 2) continuing compiling of a database of chemical analyses of rocks and minerals from critical minerals mines and occurrences, 3) develop a database and storage facility for archiving ore, mineralized samples, and other samples with critical mineral potential (new initiative) and 4) work on EarthMRI projects as funded. These databases and information are available online to government officials, mining companies and the general public through the NMBGMR web pages (see <https://geoinfo.nmt.edu/staff/mclemore/projects/mining/REE/REEinNM.html>), open file and published reports, or by request. Not only are these data required in order to delineate favorable geologic terranes and priority areas containing potential critical minerals deposits for the USGS mandate, but identification and examination of critical minerals is a high priority of the NMBGMR. This project also is important to the state of New Mexico because mineral resources must be identified before land exchanges, withdrawals or other land use decisions are made by government officials. Future mining of potentially economic critical minerals deposits will directly benefit the economy of New Mexico. Another aspect of this project is the training of our future workforce, and students at New Mexico Tech will be hired to work on this project. This is the fourth year that NMBGMR has participated in the USGS Earth MRI Critical Minerals Data Preservation Program.

INTRODUCTION

Critical minerals are defined by Presidential U.S. Executive Order No. 13817 (2017) as “*a mineral (1) identified to be a nonfuel mineral or mineral material essential to the economic and national security of the United States, (2) from a supply chain that is vulnerable to disruption, and (3) that serves an essential function in the manufacturing of a product, the absence of which would have substantial consequences for the U.S. economy or national security*”. Critical minerals are mineral resources that are essential to our economy, national security, and whose supply may be disrupted (Committee on Critical Mineral Impacts of the U.S. Economy, 2008; Schulz et al., 2017). Many critical minerals are 100% imported into the United States. New Mexico has a wealth of mineral resources (McLemore, 2017; McLemore and Lueth, 2017; McLemore and Austin, 2017) and some of these critical minerals are associated with numerous mineral and coal deposits in New Mexico (McLemore, 2015, 2019, 2020). Mining districts in New

Mexico that contain critical minerals have been identified (Fig. 1, 2; McLemore, 2017; McLemore and Austin, 2017; McLemore and Lueth, 2017), but additional work is needed.

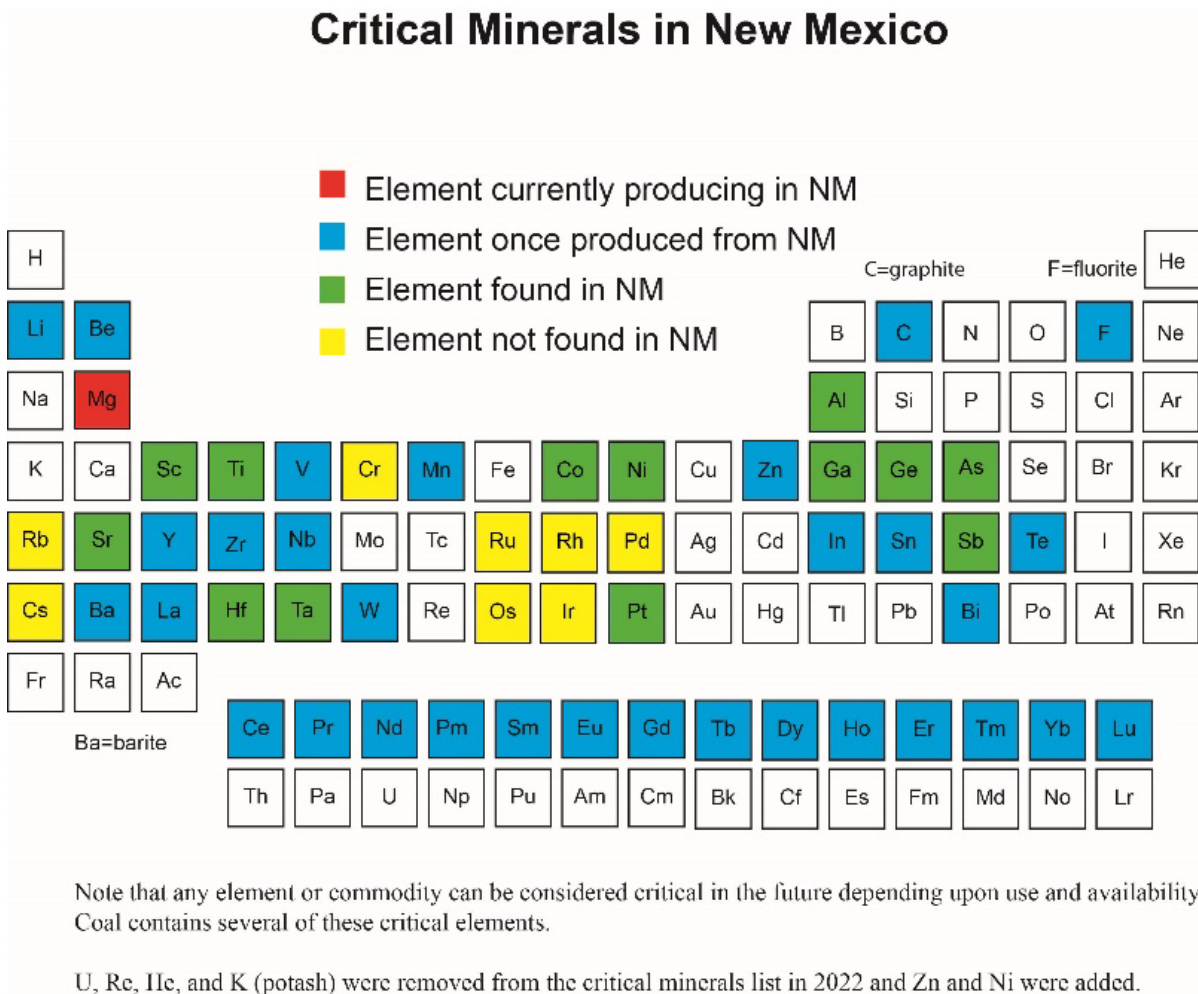


FIGURE 1. Periodic table showing critical minerals in New Mexico, as revised in 2022 (McLemore, 2019; McLemore and Gysi, 2023). U, rhenium, helium, and K (potash) were removed from the critical minerals list in 2022 and zinc and nickel were added. Summary of mining districts is in McLemore (2017).

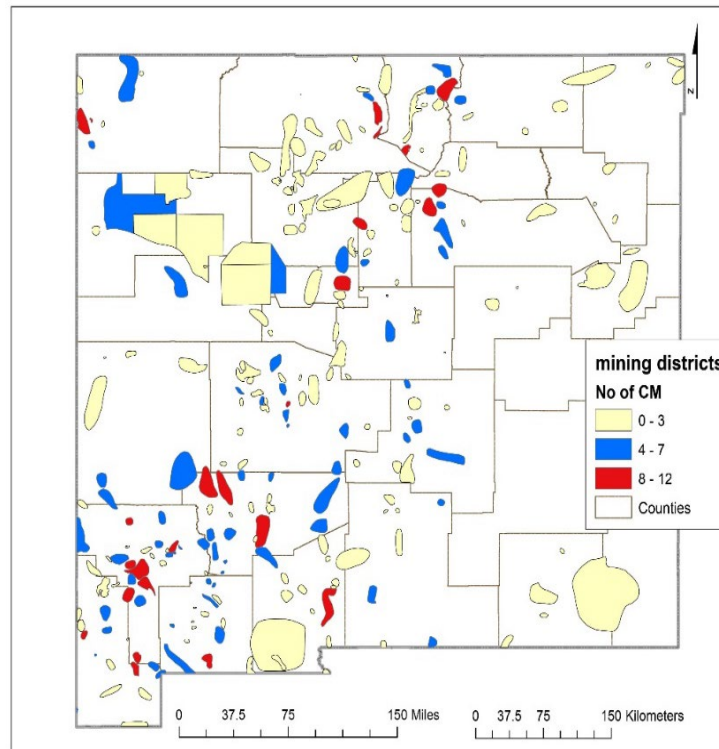


FIGURE 2. Mining districts in New Mexico with critical minerals. Summary of mining districts is in McLemore (2017).

NMBGMR has been funded for four years by the National Geological and Geophysical Data Preservation Program (NGGDPP) to identify critical minerals in New Mexico (deliverables summarized in Appendix 1). The 2019 USGS contract with NMBGMR (G19AP00098) identified REE resources in New Mexico (year 1). The 2020 USGS contract (G20AS00008) identified known tungsten, aluminum (alunite), gallium, tin, and lithium deposits in New Mexico (year 2). The 2021 USGS contract (G21AP10434) identified known indium, rhenium, scandium, strontium, and tellurium occurrences in New Mexico (year 3). In year 4, we revised some of the deliverables in 2019-2021 by utilizing the newly developed USGS standard template and Minerals Systems approach to defining mineral deposits with critical minerals in New Mexico. We also focused on zinc and nickel, commodities added to the list in 2022, as well as mine wastes.

In addition to the USGS data preservation funding, the USGS has funded previous critical minerals projects with the NMBGMR. One of the earliest projects before the Presidential order was a Mineral Resources External Research Program (award number G12AP20051) to examine the REE in episyenites in New Mexico (McLemore et al., 2021). In 2015, the Jicarilla Tribe provided funding to examine the resource potential of Late Cretaceous beach-placer sandstone deposits at Apache Mesa that contain critical minerals. In 2019, the USGS funded the first EARTH-MRI project, “Rare earth elements (REE) deposits in the Gallinas Mountains, Lincoln and Torrance Counties, central New Mexico” (McLemore et al., 2021) (award number G19AC00258). In 2020, the USGS funded the “Geology and mineral deposits of the Cornudas Mountains, Otero County, New Mexico” (McLemore et al., 2022) (award number

G20AC00170). New projects funded by the USGS include “Geochemistry of the Laramide Porphyry Belt, Arizona and New Mexico” (USGS award number G23AC00054-00, subcontracted with Arizona Geological Survey award number 689204), “Geochemistry of critical minerals in mine wastes in New Mexico” (award number G22AC00510), “Geochemistry and detailed mapping of the Black Hawk arsenide-5 element vein system” (contract pending), and “Geochemical reanalysis of NURE samples from the Colorado Plateau, New Mexico, Utah, Colorado, and Arizona” (contract pending), cooperative with Arizona, Utah, and Colorado State Surveys. The DOE (Department of Energy) also has funded NMBGMR another project “Carbon ore, rare earth, and critical minerals (CORE-CM) assessment of San Juan River-Raton Coal Basins, New Mexico” (award number DE-FOA-0002364).

Students have been funded by these projects. In addition, one M.S. student on the Gallinas Mountains project was supported through a NSF CAREER grant EAR-2039674. Several DOE Basic Energy Sciences grants (DE-SC0022269 and DE-SC0021106) were also acquired at the NMBGMR to conduct experiments and preserve a thermodynamic database for critical minerals relevant to the interpretation of these geologic systems that employed students. Although project deliverables have and are being met for these projects, this long range plan outlines future efforts to archive and preserve the tremendous amount of data and physical samples from past projects and archives, current projects, and future projects at the NMBGMR examining critical minerals in New Mexico.

Not only are these data required in order to delineate favorable geologic terranes and priority areas (i.e. focus areas) containing potential critical minerals deposits for the USGS mandate, but identification and examination of critical minerals is a high priority of the NMBGMR. This project is important to the state of New Mexico because mineral resources must be identified before land exchanges, withdrawals or other land use decisions are made by government officials. Future mining of potentially economic critical minerals deposits will directly benefit the economy of New Mexico. Another aspect of this project is the training of our future workforce, and students at New Mexico Tech will be hired to work on this project. Future grants will continue to hire and train students.

NMBGMR CRITICAL MINERALS PLAN

Deliverables in 2022-2023 (Year 4) (current funding, contract award number G22AS00033)

1. Long range plan on compiling information on critical minerals in New Mexico
A long range plan on compiling information on critical minerals was developed in 2021 (year 3) and revised this year
https://geoinfo.nmt.edu/staff/mclemore/projects/mining/REE/documents/NMBGMR_CM_Plan22v3.pdf.
2. Comprehensive database of mining districts with critical minerals in NM
Table and shapefiles of mining districts in New Mexico are available online; we will start using the USGS Districts_EarthMRI template in future years. See Figure 1, <https://geoinfo.nmt.edu/repository/index.cfm?rid=20170001>, and <https://geoinfo.nmt.edu/staff/mclemore/REEinCoalWeb.html>
3. Compile information on mine wastes with critical mineral potential in NM (mine dumps, tailings)
USGS template was not developed, so we designed a form. Maps and reports were compiled for several districts. Summary of mills at <https://geoinfo.nmt.edu/staff/mclemore/projects/mining/REE/mills.xlsx>
4. Compilation of a database of chemical analyses of rocks and minerals from critical minerals mines and occurrences in NM

A database of chemical analyses was started in year 1 and new data has been regularly added, including data from Earth MRI projects (https://geoinfo.nmt.edu/staff/mclemore/projects/mining/REE/McLemoreMasterChem_altered_v8.xlsx).

5. Develop a database and archive samples with critical mineral potential
Samples from USGS, DOE, and other NMBGMR projects are being cataloged and archived in a facility at the NMBGMR. See <https://geoinfo.nmt.edu/staff/mclemore/projects/mining/REE/SampleStorageSpreadsheet.xlsx>
6. Photograph and describe core with critical minerals potential
Drill core from several locations (Lemitar carbonatites, Tajo granite, Gallinas Mountains, Cornudas Mountains, Black Hawk district, San Juan Basin coal) have been logged, photographed, and locally sampled. Some logs are online (see Table 1) and others are being archived as part of the openfile and other reports. Photographs are uploaded to the Logs are available online (see next column), photographs are on NMBGMR Photograph and Document Archives (<https://photoarchive.nmt.edu/>).
7. Regional 2-day Critical Minerals Resources Workshop
Virginia T. McLemore, Mark Leo-Russell, and Evan Owen attended the USGS Critical Minerals Workshop Earth MRI Phase 4 virtual Workshop October 3-4, 2022. Data requested before and after the workshop was downloaded onto the USGS Confluence Website and included 1) mineral deposit information spread sheet (a below), 2) GIS shape files of focus areas (b below), and 3) detailed write-up of primary focus areas and areas for geophysical surveys. The requested USGS templates were submitted to the USGS and will be part of a future USGS report. McLemore presented at the workshop:

PROPOSED DELIVERABLES IN 2023-2024 (Year 5) (contract pending)

1. Revise this long range plan started in 2022 (year 4), on compiling information on critical minerals in New Mexico, with assistance from other NMBGMR staff members. This plan will guide future endeavors.
2. Continue compilation of a comprehensive database (using the USGS Districts Earth-MRI template with GIS shape files) of mining districts with critical minerals in New Mexico. There are 274 mining districts and coal fields in New Mexico, and most of them contain at least one critical mineral (Fig. 2). Furthermore, some critical minerals are found in brines, playa lakes, and sedimentary rocks not covered by mining districts. In 2023-2024 (year 5), we will incorporate additional districts with critical minerals, including zinc and nickel. We plan to have at least 50% of the mining districts in New Mexico completed by year 5.
3. Continue to compile a database of chemical analyses of rocks and minerals from critical minerals mines and occurrences and mine wastes in New Mexico (see https://geoinfo.nmt.edu/staff/mclemore/projects/mining/REE/McLemoreMasterChem_v5.xlsx).
4. Continue to photograph and describe core with critical minerals potential. See https://geoinfo.nmt.edu/staff/mclemore/projects/mining/REE/documents/Tajo_Drilllog2.pdf for examples.
5. Continue to inventory existing NMBGMR physical samples (i.e. hand samples, powders used for chemical analyses, other samples related to ore, mineralized samples, and other samples with critical mineral potential, including thin sections and electron microprobe mounts) and enter into the database developed in year 4. A container (temporary building) has been purchased and shelves constructed to store samples. A database is being developed to inventory the samples and provide locational and other information on each sample.

6. Begin identification and collection of samples and submit them to USGS laboratories for chemical analyses for the identification of critical minerals to build a comprehensive chemical database of critical minerals in mineral deposits in New Mexico. Funding for the chemical analyses is outside this contract and funded by the USGS. These samples will also be archived in the container described in no. 5. This is a new initiative.
7. Preparation of a comprehensive report of “Rare earth elements (REE) in New Mexico” that will be published as a NMBGMR open-file report. This is a new initiative.
8. Begin to upload field and sample photographs of USGS-funded mapping projects to the web. This is a new initiative.
9. Continue with outreach programs to teach critical minerals to public and NMT students. This is a new initiative.

EARTH MRI AND OTHER FUNDED CRITICAL MINERALS PROJECTS

Mineral Resources External Research Program (award number G12AP20051) to examine the REE in episyenites in New Mexico (McLemore et al., 2021).

In 2019, the USGS funded the first EARTH-MRI project, “Rare earth elements (REE) deposits in the Gallinas Mountains, Lincoln and Torrance Counties, central New Mexico” (McLemore et al., 2021) (award number G19AC00258).

In 2020, the USGS funded the “Geology and mineral deposits of the Cornudas Mountains, Otero County, New Mexico” (McLemore et al., 2022) (award number G20AC00170).

In 2022, the USGS funded “Geochemistry of the Laramide Porphyry Belt, Arizona and New Mexico” (USGS award number G23AC00054-00, subcontracted with Arizona geological Survey award number 689204)

In 2022, the USGS funded “Geochemistry of critical minerals in mine wastes in New Mexico” (award number G22AC00510).

In 2023, the USGS funded “Geochemistry and detailed mapping of the Black Hawk arsenide-5 element vein system” (contract pending), and “Geochemical reanalysis of NURE samples from the Colorado Plateau, New Mexico, Utah, Colorado, and Arizona” (contract pending), cooperative with Arizona, Utah, and Colorado State Surveys.

The DOE (Department of Energy) also has funded NMBGMR another project “Carbon ore, rare earth, and critical minerals (CORE-CM) assessment of San Juan River-Raton Coal Basins, New Mexico” (award number DE-FOA-0002364).

Additional proposal submitted to the USGS includes “Inventory of mills, tailings, slags, and smelters in New Mexico”.

PROJECTS FOR FUTURE YEARS

1. Move the New Mexico Mines Database online.
2. Preparation of comprehensive reports for lithium, tellurium, magnesium, and other critical minerals in New Mexico that will be published as NMBGMR open-file reports or journal papers.
3. Continue compiling patented mining claims information, including GIS shape files, location, and historical information, which is stored in the New Mexico Mines Database.
4. Identify AML (abandoned mine lands) and other legacy mines that have mine wastes with potential critical minerals (compile bibliography, geochemistry and mineralogy of mine and mill wastes).
5. Put summary of mining districts and mines for each critical mineral online.

6. Put existing uranium GIS maps showing mined deposits and remaining reserves in the Grants uranium district online. Even though uranium is no longer a critical mineral (Fig. 1), critical minerals are found in the sandstone uranium deposits in the Grants district (vanadium, REE, possibly Re). A paper is planned for a special journal issue of Mining, Metallurgy & Mining, Inc. on “Critical and energy minerals in the Grants sandstone-uranium deposits, New Mexico”.
7. Continue compiling whole rock geochemical analyses, online (https://geoinfo.nmt.edu/staff/mclemore/projects/mining/REE/McLemoreMasterChem_altered_v6.xlsx).
8. Determine detail spatial mineral-resource potential for critical and other commodities, online (see <https://geoinfo.nmt.edu/publications/openfile/details.cfml?Volume=598>).
9. Develop web pages of individual critical minerals (for example <https://geoinfo.nmt.edu/resources/minerals/industrial/barite-flourite/home.html>).
10. Continue to photograph and log drill core with critical minerals potential, store on NMBGMR servers (include drill information and data that we do not have actual core). Samples can be collected and sent to USGS laboratories. Move data online (see https://geoinfo.nmt.edu/staff/mclemore/projects/mining/REE/documents/Tajo_Drilllog2.pdf).
11. Continue to develop the patented mining claims database in GIS and New Mexico Mines Database.
12. Update the active mines and exploration in New Mexico, online (see <https://geoinfo.nmt.edu/staff/mclemore/activemines19.xlsx>).
13. Get all the different data required to do mineral-resource assessments (geophysics, mines, chemistry, stream data, geology, etc).
14. Compile production statistics by county, mining district, mine, commodity, and put online.
15. Compile resource/reserve data of New Mexico mineral deposits, put online.
16. Develop prospectivity maps for critical mineral deposits in New Mexico.
17. Scan McLemore and Weber field books.

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APPENDIX 1 SUMMARY OF CRITICAL MINERALS DELIVERABLES 2019-2022 (4 YEARS)

Deliverables in 2019-2020 (Year 1)

1. Earth MRI—Database of REE deposits in New Mexico
Database of REE mines, occurrences, and deposits in New Mexico with descriptions (fields) were entered into the New Mexico Mines Database, which is similar but more detailed in form to the USGS MIN format (https://geoinfo.nmt.edu/staff/mclemore/projects/mining/REE/documents/NM_REE_mines_deposits_occurrences.pdf).

An excel spreadsheet of the data is at

<https://geoinfo.nmt.edu/staff/mclemore/projects/mining/REE/REEinNM.html>.

2. Earth MRI—Map of REE deposits in New Mexico

Map of REE deposits in New Mexico, is at

https://geoinfo.nmt.edu/staff/mclemore/projects/mining/REE/documents/NM_REE.pdf and <https://maps.nmt.edu/>

The table summarizing the districts with REE shown in the map is at

https://geoinfo.nmt.edu/staff/mclemore/projects/mining/REE/documents/NM_REE_dist.pdf or <https://geoinfo.nmt.edu/staff/mclemore/projects/mining/REE/REEinNM.html> for an excel sheet.

3. Earth MRI—Interactive map layer for depth to Precambrian surface in New Mexico

A map showing the contours on top of the Precambrian surface was uploaded onto the NMBGMR interactive map web site (<https://maps.nmt.edu/>). The structure contour map on top of the Precambrian was prepared by R. Broadhead as part of a report on the statewide distribution of natural CO₂ gases in the subsurface (Broadhead et al., 2009).

4. Earth MRI—Database of chemical analyses of REE deposits in New Mexico

A spreadsheet of chemical analyses whole-rock geochemical analyses of areas of REE mines, occurrences and deposits in New Mexico and Colorado obtained from published and unpublished reports and existing NMBGMR unpublished data

(https://geoinfo.nmt.edu/staff/mclemore/projects/mining/REE/documents/McLemoreMasterChem_7_20.pdf). This file includes the geochemical data and locations of samples, where known. Additional data will be added to this spreadsheet in future Earth MRI contracts. The data are found at <https://geoinfo.nmt.edu/staff/mclemore/projects/mining/REE/REEinNM.html>.

5. Earth MRI—Scans of reports on REE deposits in New Mexico

Students were employed to work on the various tasks.

- An annotated bibliography of REE occurrences and deposits in New Mexico was compiled (found at <https://geoinfo.nmt.edu/staff/mclemore/projects/mining/REE/documents/REEinNMBibliography.pdf>).
- Additional reports and presentations completed as part of this project
 - McLemore, V.T., 2020, Rare Earth Elements (REE) in Proterozoic peralkaline igneous rocks (Pajarito Mountain) and pegmatites in New Mexico: SME Annual Meeting, Preprint 20-97, 9 p., <https://geoinfo.nmt.edu/staff/mclemore/documents/SME20McLemore.pdf>
 - Presentation <https://geoinfo.nmt.edu/staff/mclemore/projects/mining/REE/documents/SME20McLemore2.pdf>
- Drill core from the Arroyo project was described in detail and photographed. The logs can be found at https://geoinfo.nmt.edu/staff/mclemore/projects/mining/REE/documents/Tajo_Drilllog2.pdf. Photographs of the drill core are available upon request.

6. Regional 2-day Critical Minerals Resources Workshop

Virginia T. McLemore and Shari Kelley attended the USGS Critical Minerals Workshop Earth MRI Phase 2 Workshop no. 1: Western States and Alaska at the Powell Center, Fort Collins, Colorado, September 17-19, 2019. Data requested before and after the workshop was downloaded onto the USGS Confluence Website and included 1) mineral deposit information spread sheet (1 below), 2) GIS shape files of focus areas, and 3) detailed write-up of three

primary focus areas (2-4 below). A spreadsheet of major REE deposits in New Mexico was compiled and submitted to the USGS in January 2020 (1 below). An additional, more detailed database of REE occurrences in New Mexico was compiled and is available on the Bureau web site (see no. 1 above, <https://geoinfo.nmt.edu/staff/mclemore/projects/mining/REE/REEinNM.html>). The requested USGS templates were submitted to the US. GS and will be part of a future USGS report.

Deliverables in 2020-2021 (Year 2)

1. Earth MRI—Database of tungsten, alunite, gallium, tin and lithium deposits in NM (including other files requested by USGS)
New Mexico Mines Database Mines and Districts with [Alunite](https://geoinfo.nmt.edu/staff/mclemore/AluniteMines2_21_2021.xlsx) Occurrences
https://geoinfo.nmt.edu/staff/mclemore/AluniteMines2_21_2021.xlsx
New Mexico Mines Database Mines and Districts with [Lithium](https://geoinfo.nmt.edu/staff/mclemore/LithiumMines4_16_21.xlsx) occurrences
https://geoinfo.nmt.edu/staff/mclemore/LithiumMines4_16_21.xlsx
New Mexico Mines Database Mines and Districts [Potash](https://geoinfo.nmt.edu/staff/mclemore/PotashMines2_16_2021.xlsx) mines, reserves, and production, Carlsbad potash district
https://geoinfo.nmt.edu/staff/mclemore/PotashMines2_16_2021.xlsx
New Mexico Mines Database Mines and Districts with [Tin](https://geoinfo.nmt.edu/staff/mclemore/TinMines5_29_2021.xlsx) occurrences
https://geoinfo.nmt.edu/staff/mclemore/TinMines5_29_2021.xlsx
New Mexico Mines Database Mines and Districts with [Gallium](https://geoinfo.nmt.edu/staff/mclemore/GalliumMines7_9_2021.xlsx) occurrences (7/11/2021)
https://geoinfo.nmt.edu/staff/mclemore/GalliumMines7_9_2021.xlsx
New Mexico Mines Database Mines and Districts with tungsten mines and occurrences (9/20/21)
https://geoinfo.nmt.edu/staff/mclemore/projects/mining/REE/TungstenMines9_20_2021.xlsx
Manganese production by district in New Mexico
https://geoinfo.nmt.edu/staff/mclemore/documents/Mn_distr_prod.xls
Tungsten production in New Mexico
<https://geoinfo.nmt.edu/staff/mclemore/documents/tungsten.xls>
Barite and fluorite production in New Mexico
https://geoinfo.nmt.edu/staff/mclemore/documents/barite_fluorite.xls
Tin production in New Mexico
https://geoinfo.nmt.edu/staff/mclemore/TinMines5_29_2021.xlsx
[Attachment E New Mexico alunite tungsten lithium tin \(sent by email 12/4/2020 and attached\)](#)
Mines and occurrences in the Laughlin Peak district, Colfax County (REE district)
https://geoinfo.nmt.edu/staff/mclemore/MinesLaughlinPeakDist4_19_2021.xlsx
Mines and occurrences in the Taylor Creek district, Catron and Sierra Counties (tin)
https://geoinfo.nmt.edu/staff/mclemore/TaylorCreek5_29_2021.xlsx
Mines and occurrences in the Fluorite Ridge district, Luna County (fluorite)
https://geoinfo.nmt.edu/staff/mclemore/FluoriteRodige6_6_2021.xlsx
2. Maps for tungsten, alunite, gallium, tin and lithium mines and occurrences in New Mexico
<https://geoinfo.nmt.edu/resources/minerals/critical/documents/districtsLiGa.pdf>
3. Database of chemical analyses of REE, tungsten, alunite, gallium, and lithium mines and occurrences (locations of samples and chemical data)
https://geoinfo.nmt.edu/staff/mclemore/projects/mining/REE/McLemoreMasterChem_v5.xlsx
[x](#)
4. NMBGMR web pages summarizing the commodities

Critical minerals in New Mexico

<https://geoinfo.nmt.edu/resources/minerals/critical/home.html>

5. Regional 2-day Critical Minerals Resources Workshop

Virginia T. McLemore and Alex Gysi attended the USGS Critical Minerals Workshop Earth MRI Phase 3 virtual Workshop September 14-18, 2020. Data requested before and after the workshop was downloaded onto the USGS Confluence Website and included 1) mineral deposit information spread sheet (1 below), 2) GIS shape files of focus areas, and 3) detailed write-up of primary focus areas (2-4 below, submitted on December 8, 2020). The requested USGS templates were submitted to the USGS and will be part of a future USGS report.

Deliverables in 2021-2022 (Year 3)

1. Long range plan on compiling information on critical minerals in New Mexico (this plan).
2. Database and shape files of mining districts with critical minerals in NM using the USGS Districts_EarthMRI template (<https://geoinfo.nmt.edu/repository/index.cfm?rid=20170001>) Information on mines with indium, rhenium, scandium, strontium, and tellurium potential in NM
https://geoinfo.nmt.edu/staff/mclemore/projects/mining/REE/IndiumOccurrences6_18_2022.xlsx,
https://geoinfo.nmt.edu/staff/mclemore/projects/mining/REE/RheniumOccurrences8_21_2022.xlsx,
https://geoinfo.nmt.edu/staff/mclemore/projects/mining/REE/TelluriumOccurrences8_21_2022.xlsx
https://geoinfo.nmt.edu/staff/mclemore/projects/mining/REE/StrontiumOccurrences8_21_2022.xlsx
https://geoinfo.nmt.edu/staff/mclemore/projects/mining/REE/ScandiumOccurrences8_21_2022.xlsx
3. Database of chemical analyses of critical minerals mines and occurrences (locations of samples and chemical data)
https://geoinfo.nmt.edu/staff/mclemore/projects/mining/REE/McLemoreMasterChem_altered_v6.xlsx
4. NMBGMR web pages of critical minerals
<https://geoinfo.nmt.edu/staff/mclemore/CriticalMineralsinNewMexico.html>
5. Photograph and describe core with critical minerals potential
https://geoinfo.nmt.edu/staff/mclemore/projects/mining/REE/Lemitar_DrillLog_Haft_2020_revVTM.xlsx,
<https://geoinfo.nmt.edu/staff/mclemore/projects/mining/REE/documents/LemitarMountainsdocs.pdf>
6. Regional 2-day Critical Mineral Resources Workshop
Virginia T. McLemore, Mark Leo-Russel, and Alex Gysi attended the USGS Critical Minerals Workshop Earth MRI Phase 3 virtual Workshop October 4-8, 2021. Data requested before and after the workshop was downloaded onto the USGS Confluence Website and included 1) mineral deposit information spread sheet (a below), 2) GIS shape files of focus areas (b below), and 3) detailed write-up of primary focus areas and areas for geophysical surveys (c-d below). The requested USGS templates were submitted to the USGS and will be part of a future USGS report.