

# COLORADO GEOLOGICAL SURVEY

## Open-file Report OF-20-11

### **Alkaline Complexes of the Wet Mountains Area, Colorado: A Geological Summary, Bibliography, and Data Compilation of Critical Mineral Laboratory Results**

#### **HOW TO USE THIS ZIP FILE**

To open the compressed (.zip) file that you downloaded, double-click on the file. Inside the folder labeled **OF-20-11**, there are a number of files and folders. Some files are stored in Adobe Portable Document (.pdf) format. Geographic Information Systems (GIS) data are also included. These data are in ESRI's shapefile format. Two spreadsheet files are also included: one is a Microsoft Excel file (.xlsx) and one is a comma-separated values (.csv) file. These spreadsheets include the data provided in the GIS shapefile. For more about these files, see the enclosed report: *O'Keefe, Michael K., Alexander I. Peretyatko, and Asha A. Mahatma. "OF-20-11 Alkaline Complexes of the Wet Mountains Area, Colorado: A Geological Summary, Bibliography, and Data Compilation of Critical Mineral Laboratory Results." *Geology and Mineral Resources*. Golden, CO: Colorado Geological Survey, April 2021. <https://coloradogeologicalsurvey.org/publications/alkaline-complexes-critical-mineral-wet-mountains-colorado/>.*

Colorado hosts several alkaline igneous intrusions that formed in a variety of geological settings. These intrusions are associated with some mineral deposits of economic interest, including the precious metal deposits at Cripple Creek and other deposits that contain potential titanium, niobium, rare earth elements (REEs), uranium, and thorium resources. The U.S. critical minerals list recently updated (2018) by the U.S. Geological Survey (USGS) includes niobium, REE, titanium, strontium, and other elements typically associated with alkaline igneous intrusive rocks and carbonatites. An area along the western flank of the Wet Mountains located in Custer and Fremont counties, Colorado, hosts three alkaline complexes that reportedly contain elevated concentrations of these critical minerals. The Colorado Geological Survey (CGS) compiled historic sample results of select critical minerals (e.g., REEs, niobium, titanium) from this area as reported by other authors. Although thorium is not listed as a critical mineral, some of the first studies in the area concentrated on thorium exploration, therefore, it was included in the data compilation. Recent data collected by the CGS are also included in the data set. The data compilation includes sample locations, sample descriptions, concentrations, references, and other locations of associated alkaline rocks, veins, dikes, etc. in this area. A summary of the geology, mineralization, and data set, plus a bibliography, are presented in the report referenced above. The bibliography includes documents referenced in this report as well as other publications that pertain to this area. Appendix A includes documentation and the laboratory results of the samples collected by the CGS. Appendix B contains a data dictionary and explanation of data modifiers and acronyms used in the data compilation. This open-file report may be updated with additional data in the future.

#### **Legal Notice:**

*The material presented here is from a limited literature review and is intended for general information purposes only. Those making use of or relying upon the material, previous exploration results, results of this investigation, and any other information provided herein assume all risks and liability arising from such use or reliance. Any use of trade, firm, or product names is for descriptive purposes only and does not imply endorsement by the CGS. All locations and results are estimated.*

## HOW TO IDENTIFY AND READ FILES

### REPORT DOCUMENTS

- **OF-20-11-Read\_Me.pdf**  
*This file*
- **OF-20-11 Wet Mountains Critical Mineral Data Compilation.pdf**  
*The main report document including a summary of the geology of the region of interest, bibliography, lab results for CGS samples, and more.*
- **OF-20-11 Wet Mountains Critical Mineral Data Compilation.xlsx**  
*A Microsoft Excel (.xlsx) spreadsheet that includes the Wet Mountains area critical mineral data compilation and data dictionary.*
- **OF-20-11 Wet Mountains Critical Mineral Data Compilation.csv**  
*A comma-separated values (.csv) file that includes the Wet Mountains critical mineral data compilation.*
- **OF-20-11 Wet Mtns GIS metadata.pdf**  
*This file contains all metadata embedded in the GIS data files.*
- **GIS\_Data folder**  
*Contains shapefiles of the Wet Mountains area critical mineral data compilation.*

### To view .pdf files

If you don't already have Adobe Reader installed on your device, visit <https://get.adobe.com/reader/> to download a free version of the software. Then, start Adobe Reader and choose "File," "Open," and locate the .pdf files where you downloaded them, they will open in Adobe Reader.

### To view GIS files

GIS files may be viewed using Geographic Information Systems software packages such as ESRI's ArcGIS platform. Included are Shapefiles and Layer files of the locations and data associated with the locations. Within ArcGIS, it may be necessary to reset the "data source" on Layer files to ensure proper viewing. Metadata is associated with the Shapefiles and is best viewed using the Metadata tab in ESRI's ArcCatalog.

Alternatively, these files may be viewed using QGIS, a free and open-source GIS software package, available for download at <https://download.qgis.org/>.

For further information or assistance, visit or call the Colorado Geological Survey at:

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