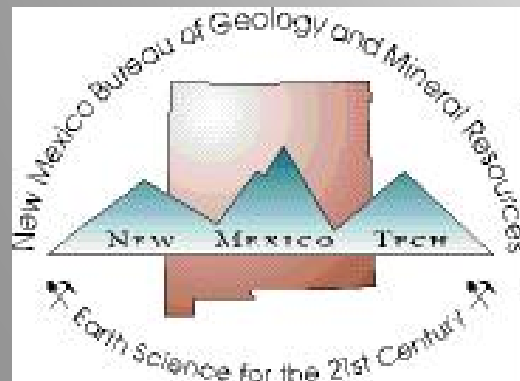


MINERAL-RESOURCE POTENTIAL IN NEW MEXICO

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Acknowledgements

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- U.S. Bureau of Land Management (BLM)
- New Mexico State Land Office (SLO)
- Data from New Mexico Mining and Minerals Division
- Assisted by Mark Mansell, Amy Trivett, Gretchen Hoffman, and Adam Read

Purpose of evaluations of mineral-resource potential

- Estimating mineral-resource availability
 - Determine potential for critical minerals
- Delineate areas requiring more geologic investigation
- Required by government officials in order to make decisions regarding use, acquisition, and restriction of public and state lands

Definitions


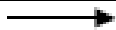
- *Minerals* refer to any rock, mineral, or other naturally occurring material of economic value, including metals, industrial minerals, energy minerals, gemstones, and aggregates
- *Mineral-resource potential* of an area is the probability or likelihood that a mineral will occur in sufficient quantities so that it can be extracted economically under current or future conditions, including the occurrence of undiscovered concentrations of metals, nonmetals, industrial materials, and energy resources
- Mineral-resource potential is not a measure of the quantities of the mineral resources, but is a measure of the *potential* of occurrence

DEFINITIONS OF LEVEL OF RESOURCE POTENTIAL

- N** No mineral-resource potential is a category reserved for a specific type of resource in a well-defined area with no evidence of mineral resources.
- L** Low mineral-resource potential is assigned to areas where geologic, geochemical, and geophysical characteristics indicate a geologic environment where the existence of economic mineral resources is unlikely and is assigned to areas of no or dispersed mineralized rocks.
- M** Moderate mineral-resource potential is assigned to areas where geologic, geochemical, and geophysical characteristics indicate a geologic environment favorable for mineral-resource occurrence.
- H** High mineral-resource potential is assigned to areas where geologic, geochemical, and geophysical characteristics indicate a geologic environment favorable for resource occurrence and development. Assignment of high mineral-resource potential to an area requires some positive knowledge that mineral-forming processes have been active in at least part of the area.

DEFINITIONS OF LEVEL OF CERTAINTY

- A** Available information is not adequate for the determination of the level of mineral-resource potential.
- B** Low, available information suggests the level of mineral-resource potential.
- C** Moderate, available information gives a good indication of the level of mineral-resource potential.
- D** High, available information clearly defines the level of mineral-resource potential.

 INCREASING LEVEL OF RESOURCE POTENTIAL	U/A Unknown Potential	H/B High Potential	H/C High Potential	H/D High Potential
		M/B Moderate Potential	M/C Moderate Potential	M/D Moderate Potential
		L/B Low Potential	L/C Low Potential	L/D Low Potential
		L/B Low Potential	L/C Low Potential	N/D No Potential
		INCREASING LEVEL OF CERTAINTY 		

Methods

- Evaluation of mineral-resource potential involves a complex process based on geologic analogy and probability of promising or favorable geologic environments with geologic settings (geologic models) that contain known economic deposits, as described in Goudarzi (1984) and McLemore (1985)
 - Mineral deposit models
 - Known mineral deposits
- Subjective assessments or judgments depend upon available information concerning the area, as well as current knowledge and understanding of known mineral deposits

Sources of data

- Mining districts
- Active and inactive mines
- Exploration areas
- Areas of mining claims
- Favorable geologic terrains for specific mineral deposit types
- Lithology, structure, alteration
- Geophysical and geochemical data
 - NURE data



Sources of data

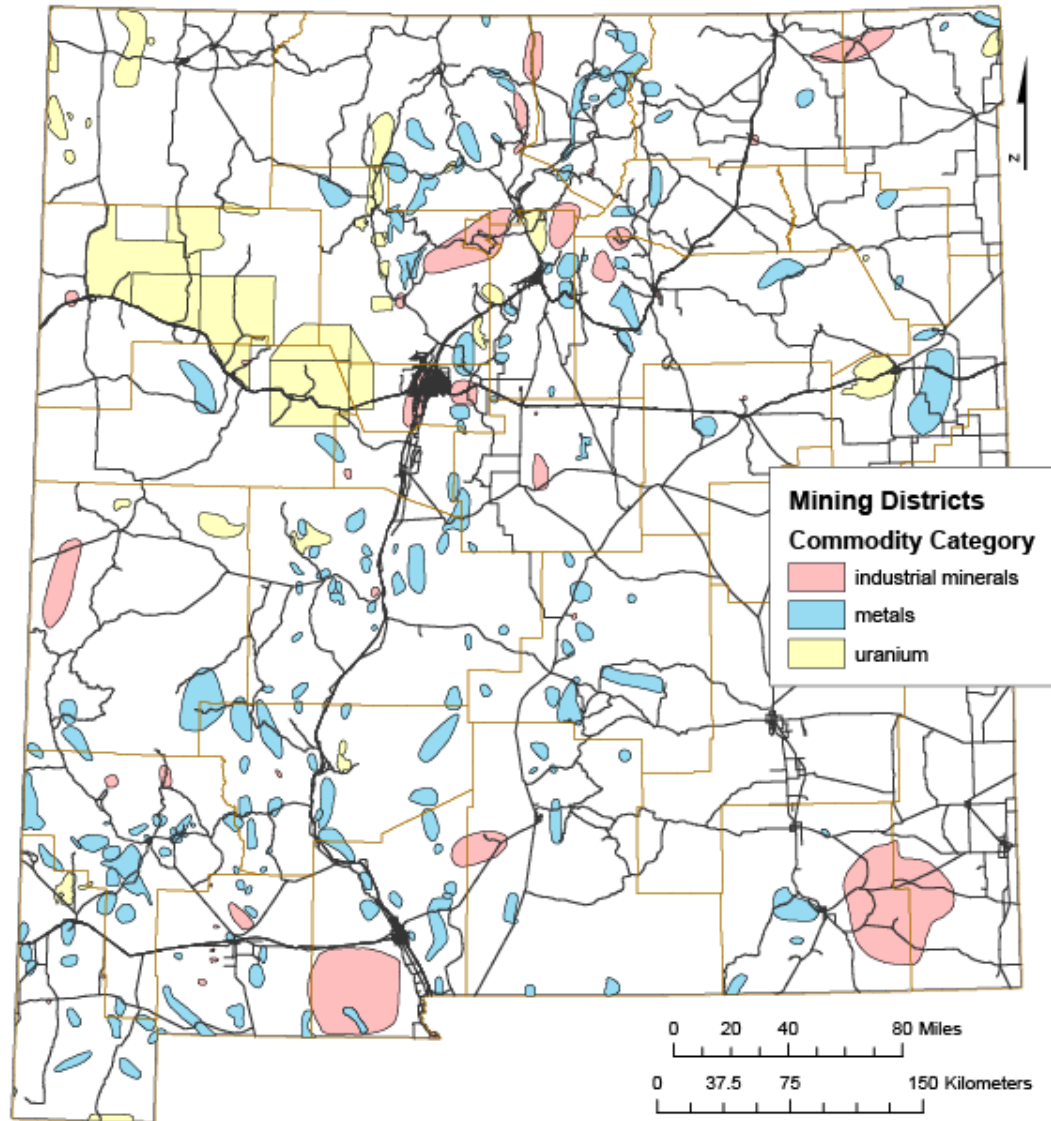
- Geologic maps
- Mining district maps
- New Mexico Mines Database
- Other mineral occurrence databases
- Chemical analyses of host rocks, altered zones, and mineralized deposits
- National geochemical databases
- Geophysical data (magnetics, radiometrics, gravity, seismic, other)



Geology/Geochemistry/Geophysics/Other



Mining districts in New Mexico



Mining Districts and Prospect Areas

IN NEW MEXICO



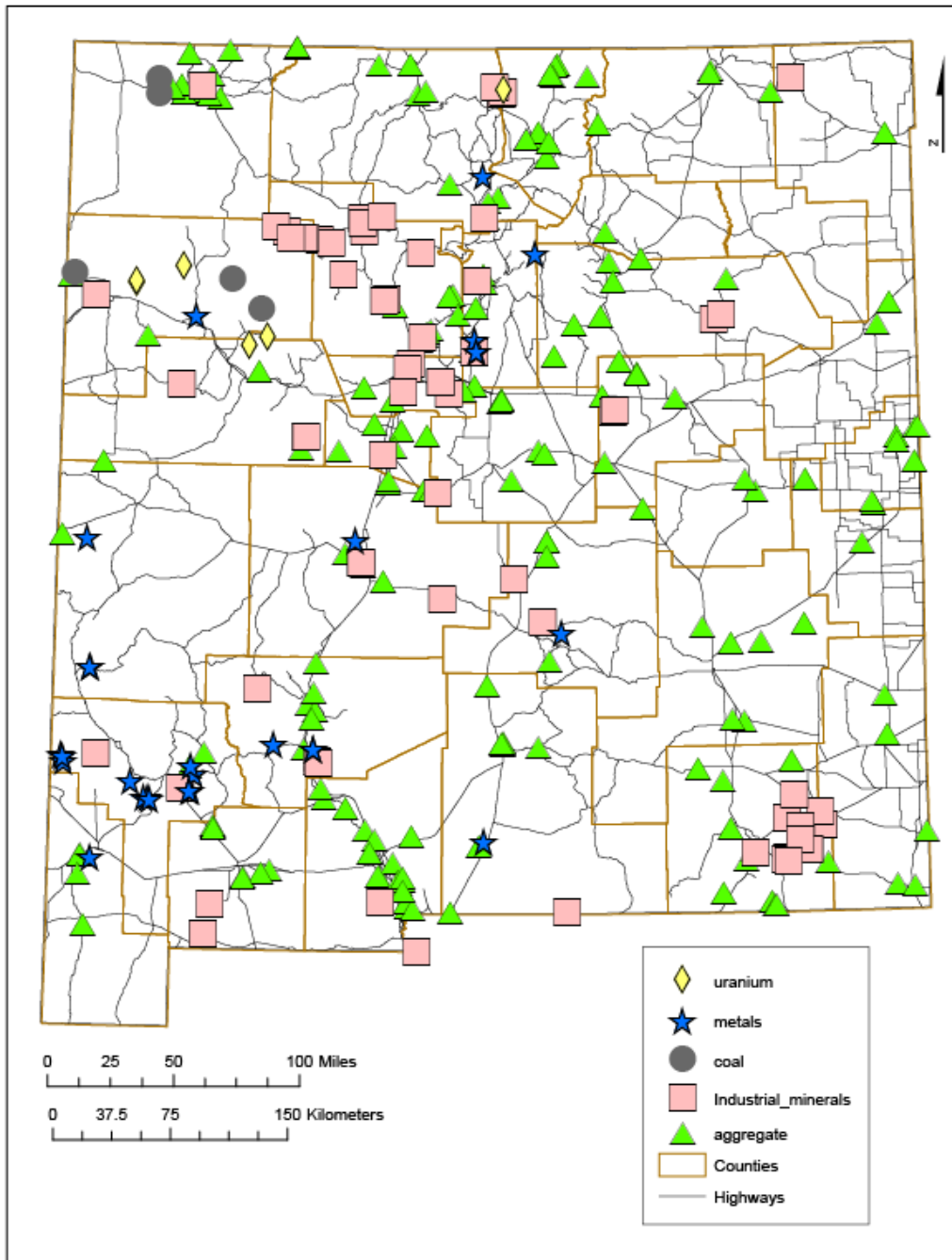
Virginia T. McLemore

New Mexico Bureau of Geology and Mineral Resources
A Division of New Mexico Institute of Mining and Technology

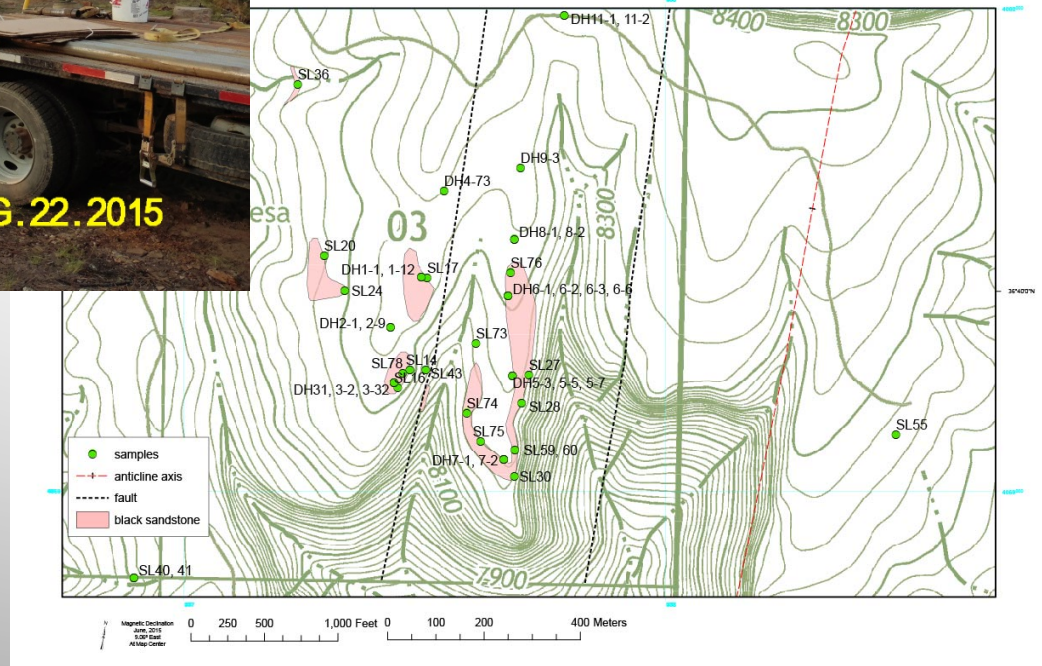
Resource Map 24

2017

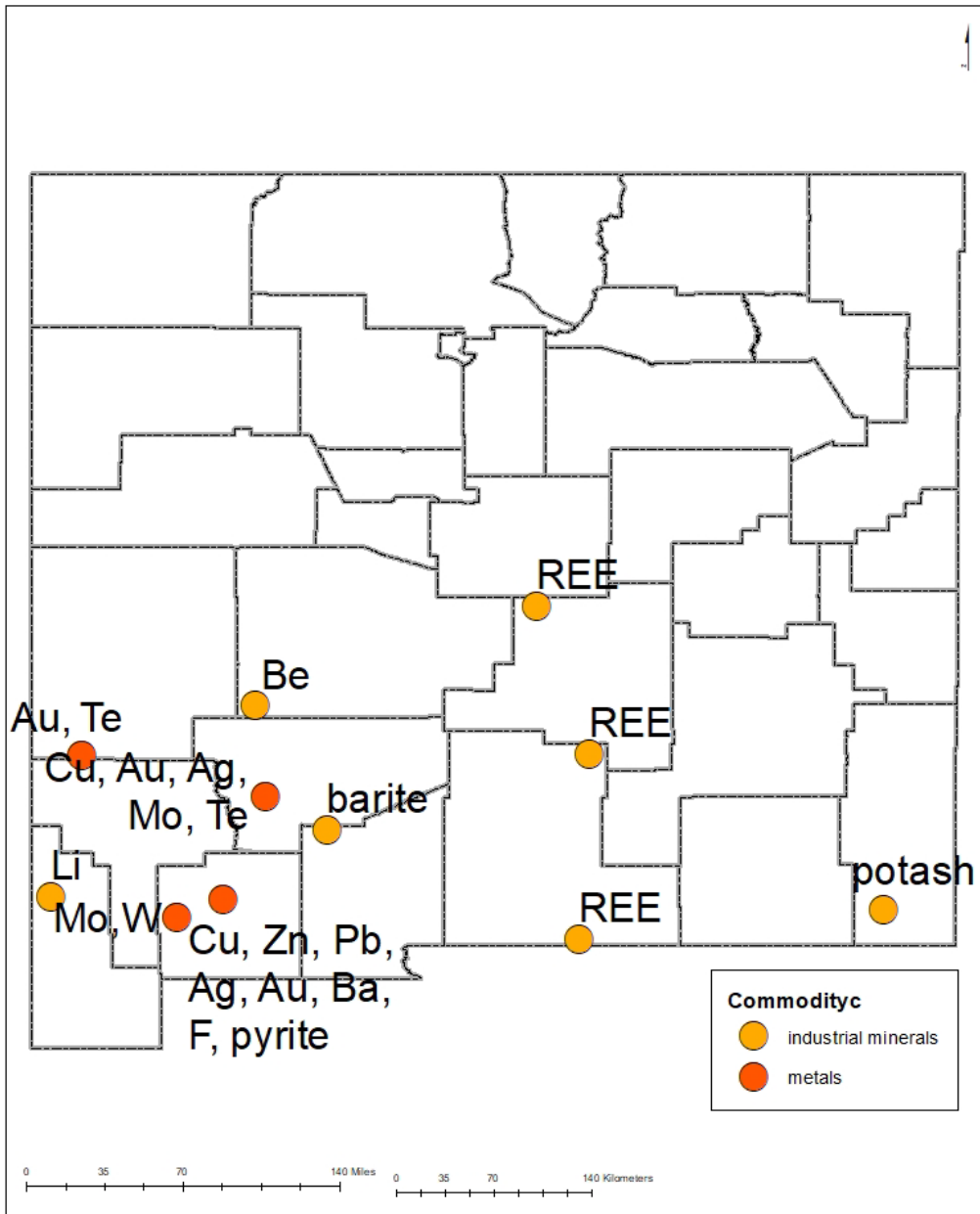
Active mines and exploration sites in New Mexico 2010-2021



Drill data

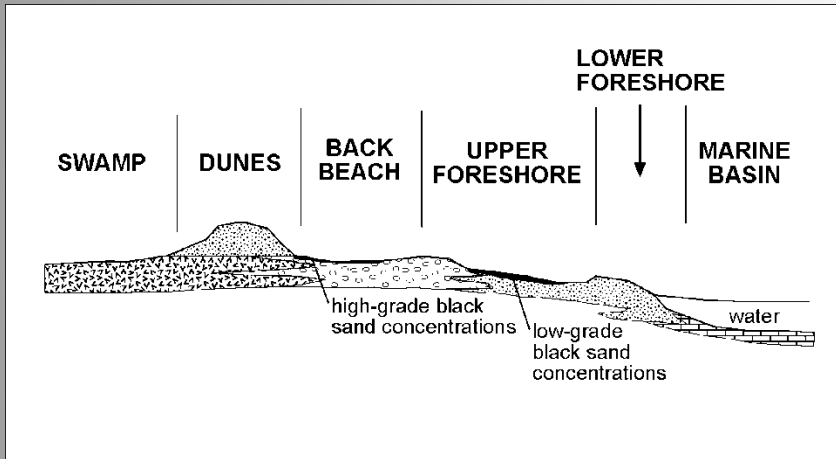


Selected exploration sites of critical minerals in New Mexico 2016-2021

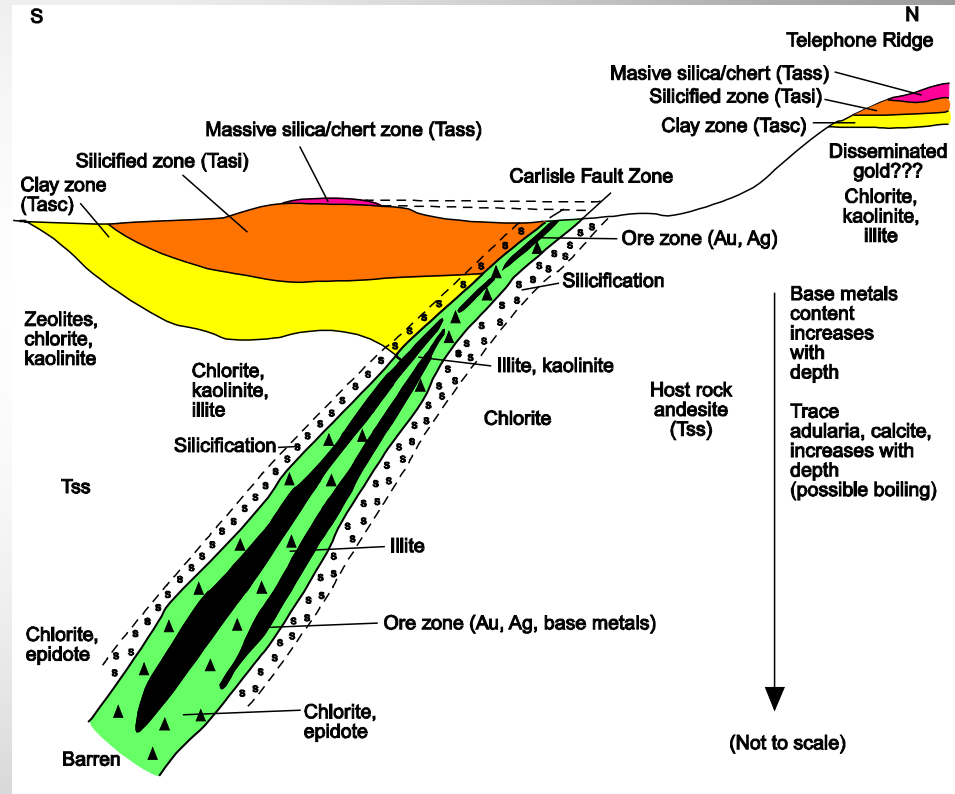


From NM Mining and Minerals Div. and NMBGMR databases, company web sites

Distribution of mineral deposits is highly dependent on the geological processes necessary for concentration of the commodity in question



REE-Zr-Ti beach-placer sandstone deposits, San Juan Basin, NM



Volcanic-epithermal gold veins, Steeple Rock, NM



Types of deposits—Memoir 50 (Energy and mineral resources of New Mexico)

A Deposit Model for Mississippi Valley-Type Lead-Zinc Ores

Chapter A of
Mineral Deposit Models for Resource Assessment



Scientific Investigations Report 2010-5070-A

U.S. Department of the Interior
U.S. Geological Survey

Occurrence Model for Volcanogenic Beryllium Deposits

Chapter F of
Mineral Deposit Models for Resource Assessment

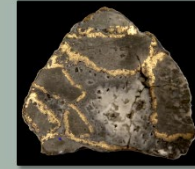


Scientific Investigation Report 2010-5070-F

U.S. Department of the Interior
U.S. Geological Survey

Descriptive Models for Epithermal Gold-Silver Deposits

Chapter Q of
Mineral Deposit Models for Resource Assessment



Scientific Investigations Report 2010-5070-Q

U.S. Department of the Interior
U.S. Geological Survey

A Deposit Model for Carbonatite and Peralkaline Intrusion-Related Rare Earth Element Deposits



Scientific Investigations Report 2010-5070-J

U.S. Department of the Interior
U.S. Geological Survey

Types of deposits—USGS deposit models

Alkalic-Type Epithermal Gold Deposit Model

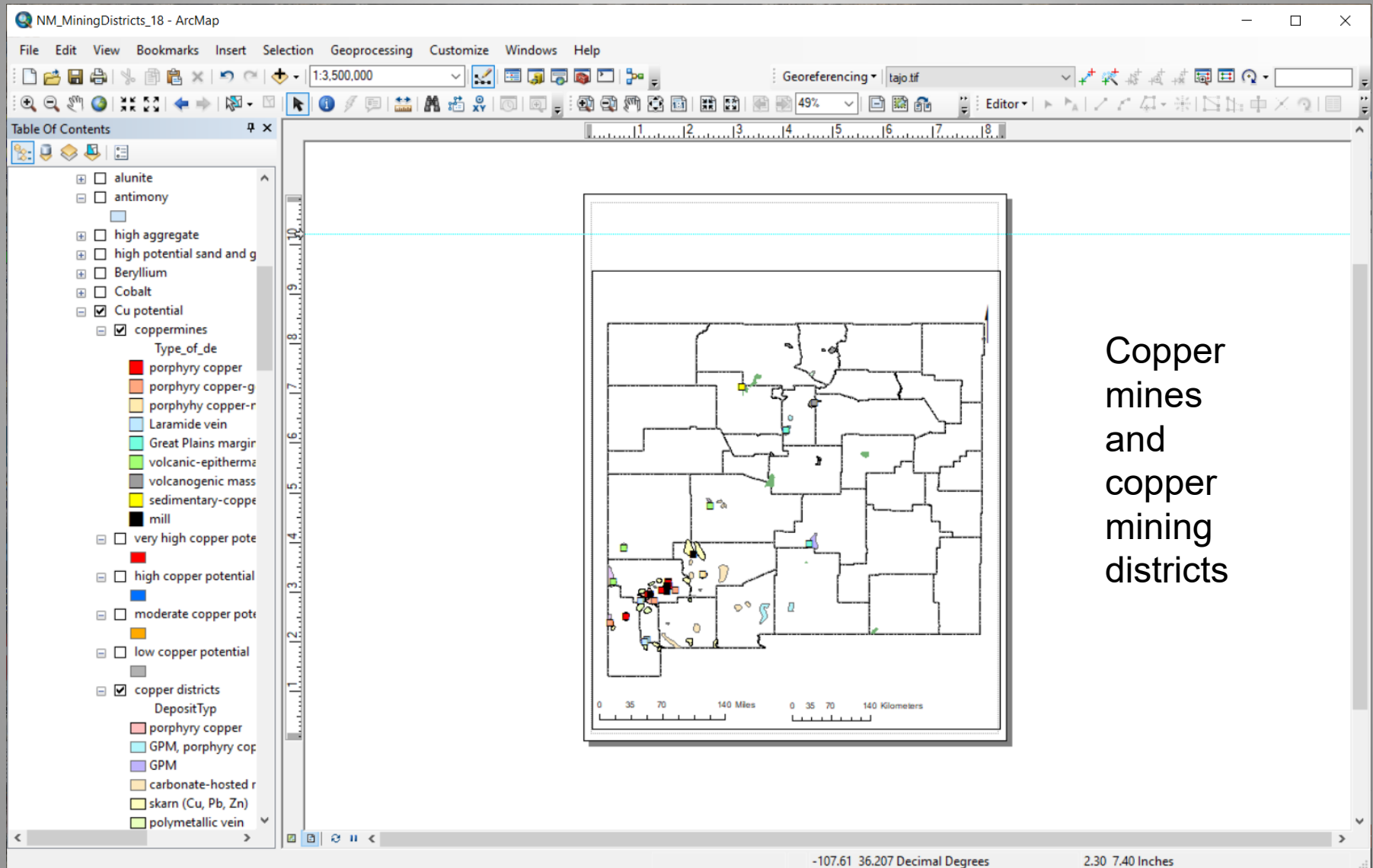
Chapter R of
Mineral Deposit Models for Resource Assessment



Scientific Investigations Report 2010-5070-R

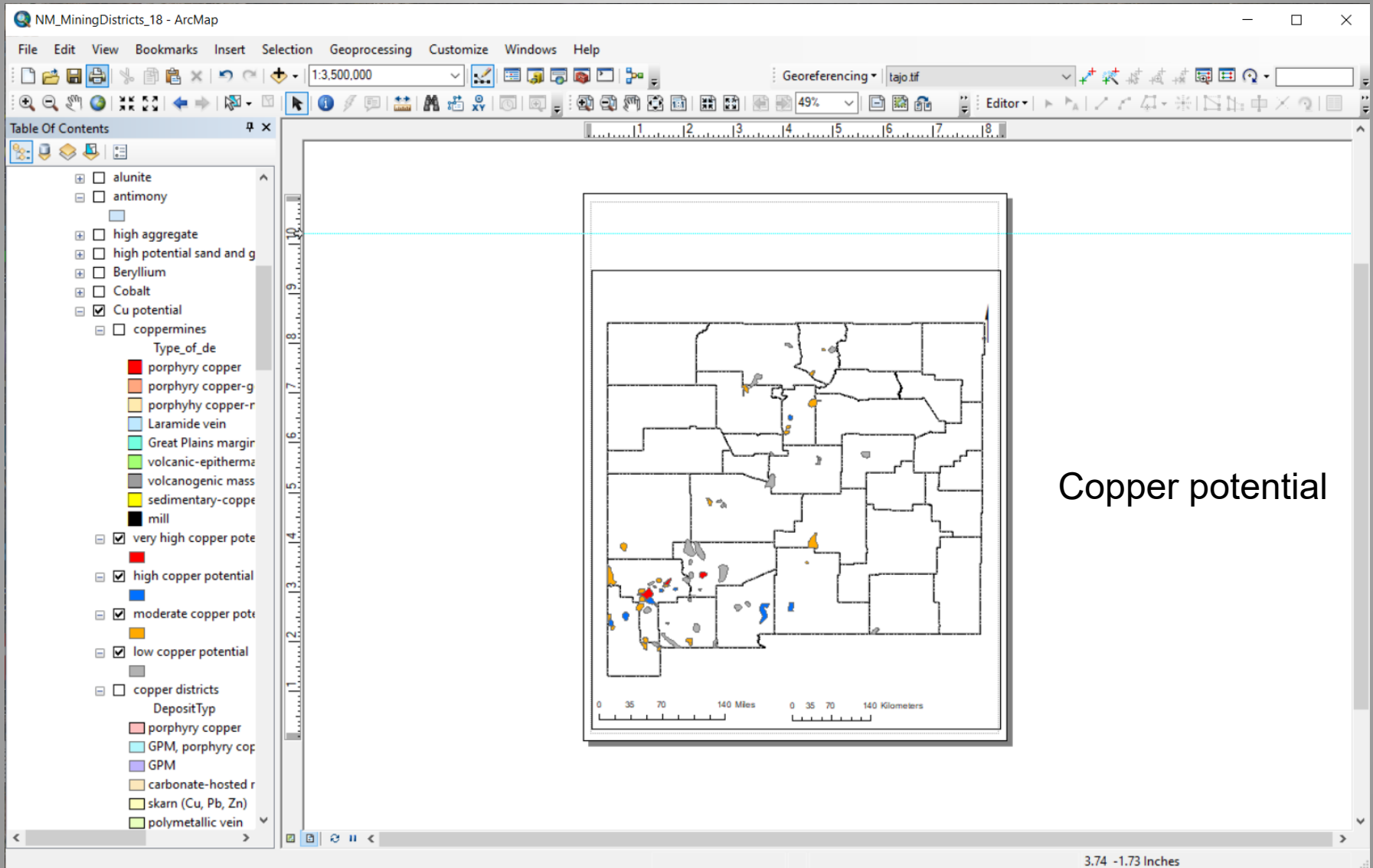
U.S. Department of the Interior
U.S. Geological Survey

Integrate datasets with ArcGis



Copper
mines
and
copper
mining
districts

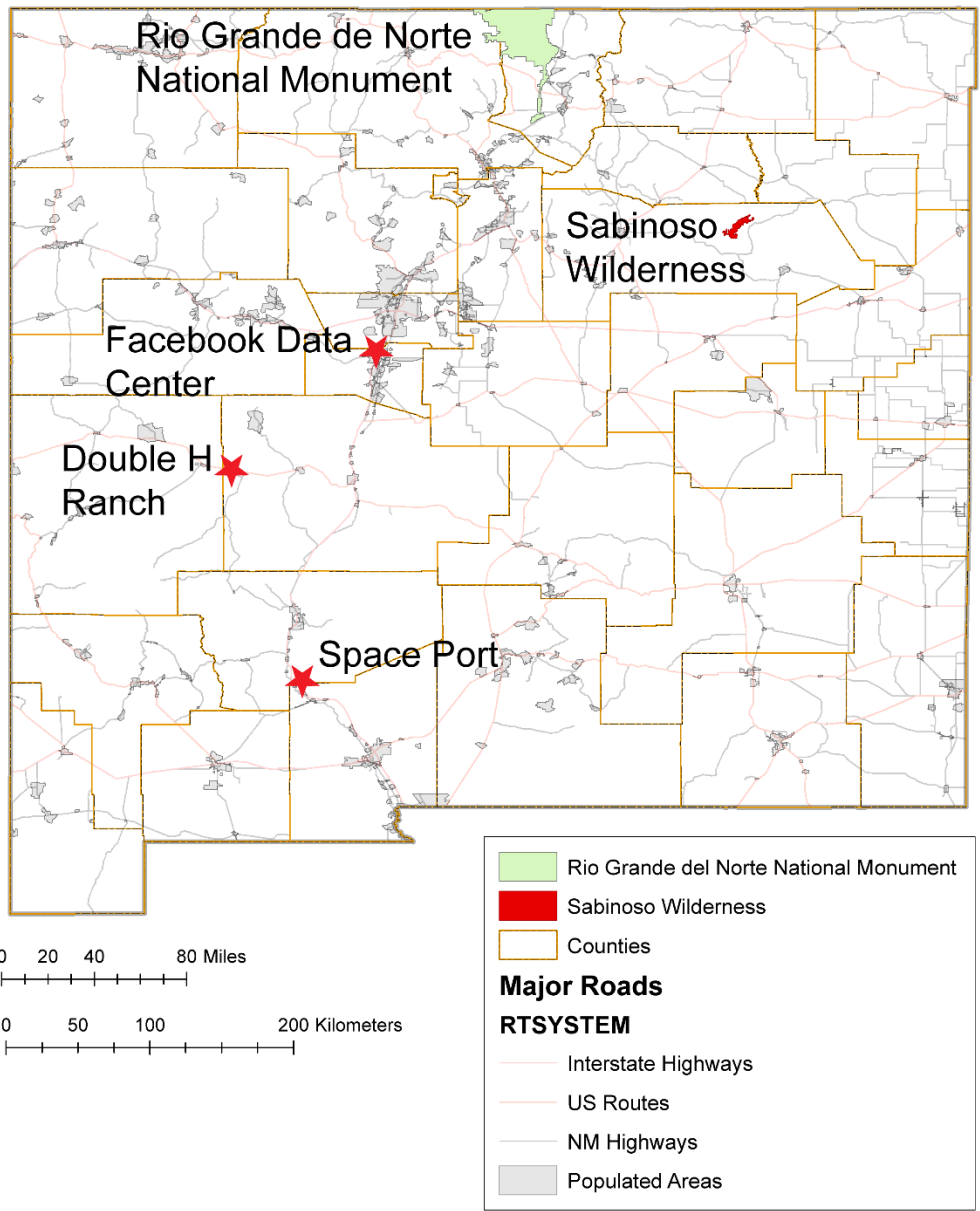
Mineral-potential maps



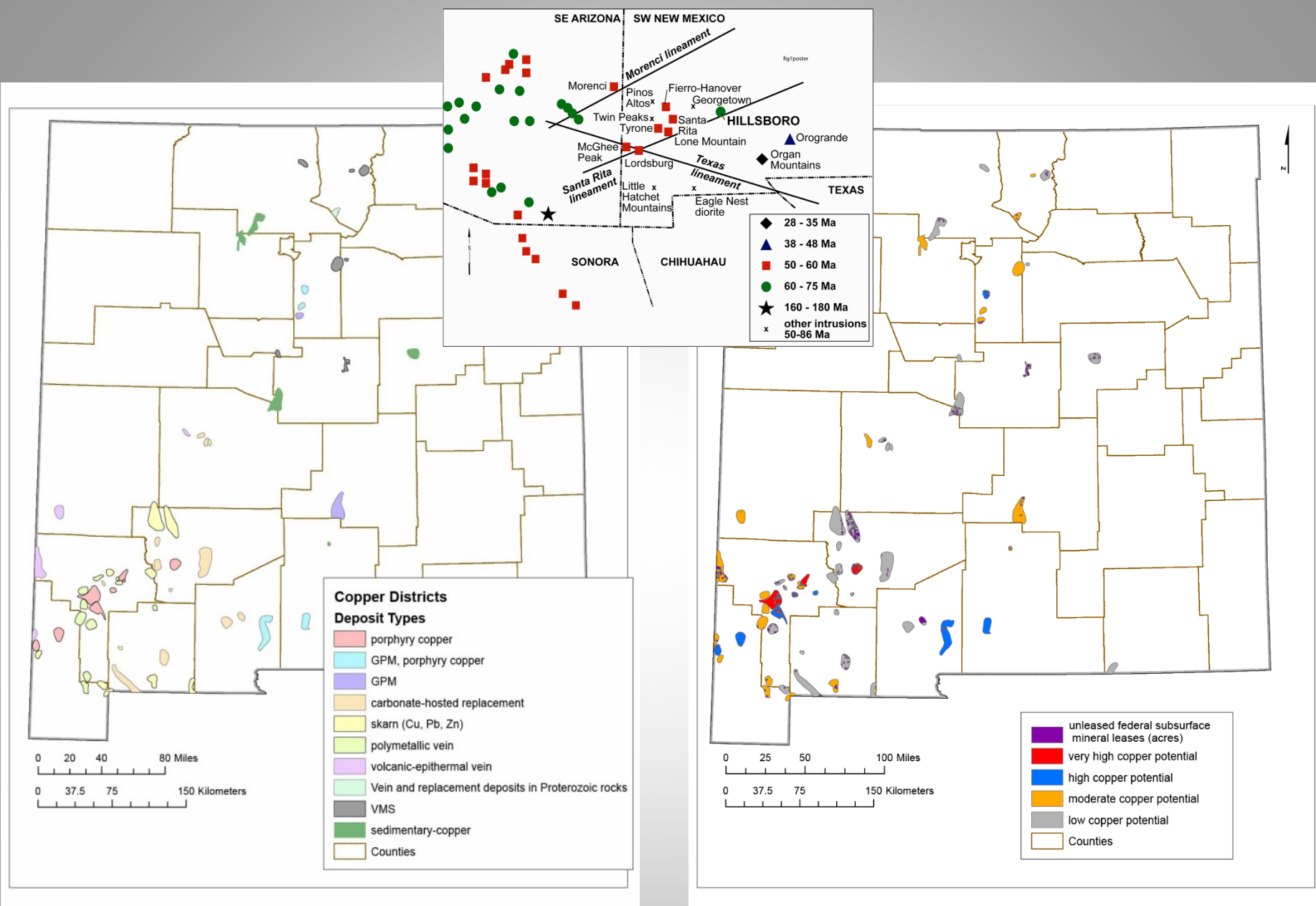
Reasonably foreseeable development (RFD)

- Reasonably foreseeable development (RFD) is defined as the potential for the occurrence and likelihood for future development (i.e. mining) of mineral resources.
- The evaluation of RFD involves the evaluation of the potential of the occurrence of the resource based on geologic factors (i.e. mineral resource classification described above) and the evaluation of the potential for future exploitation of that resource based upon economic factors.

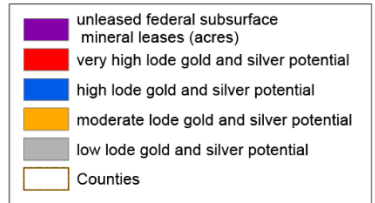
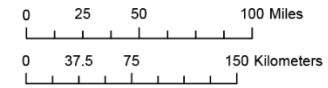
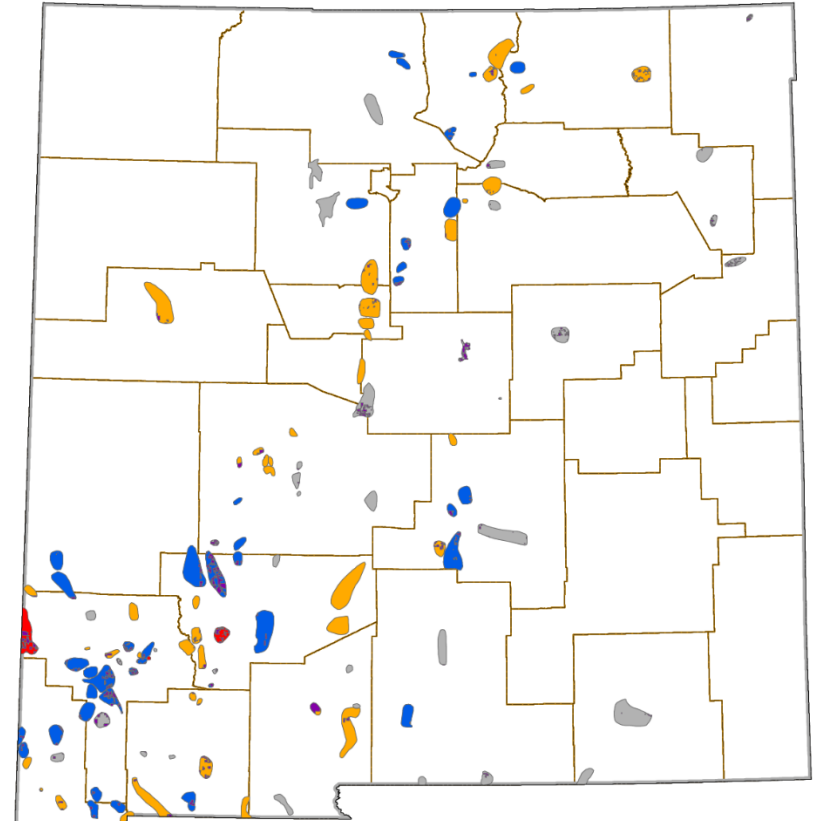
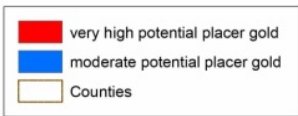
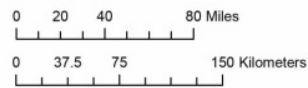
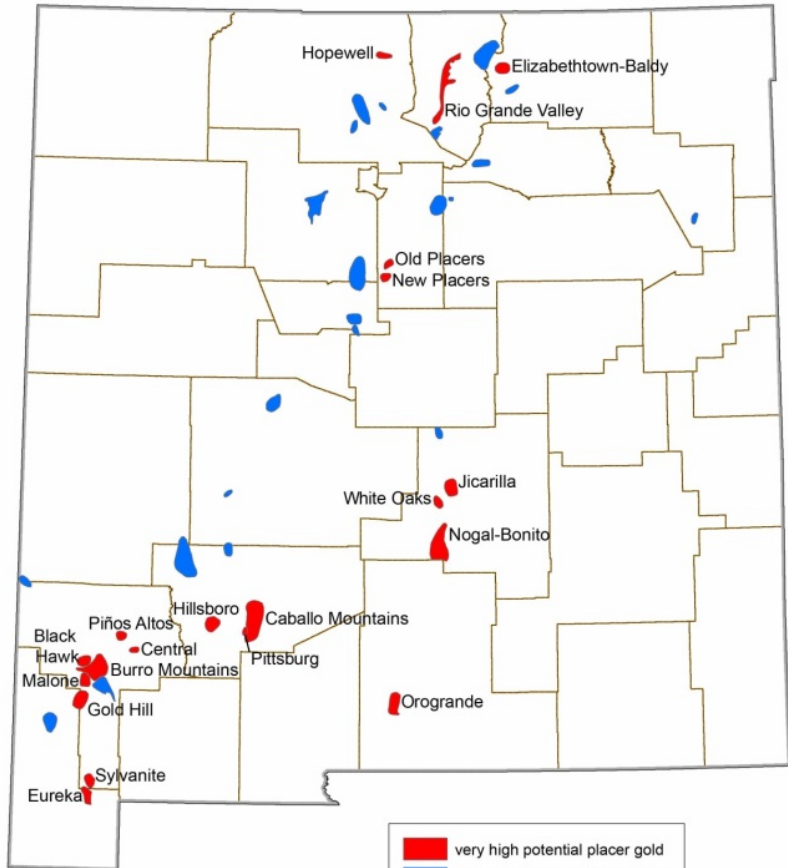
Recent Projects requiring Mineral-Resource Assessments



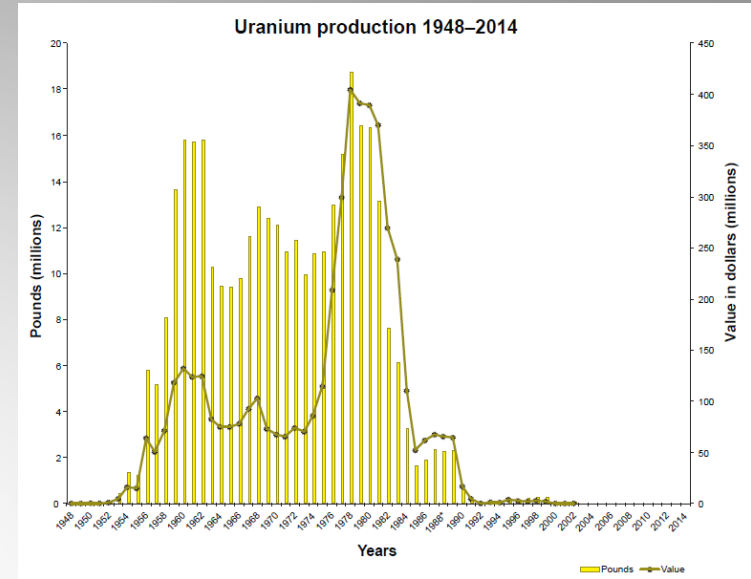
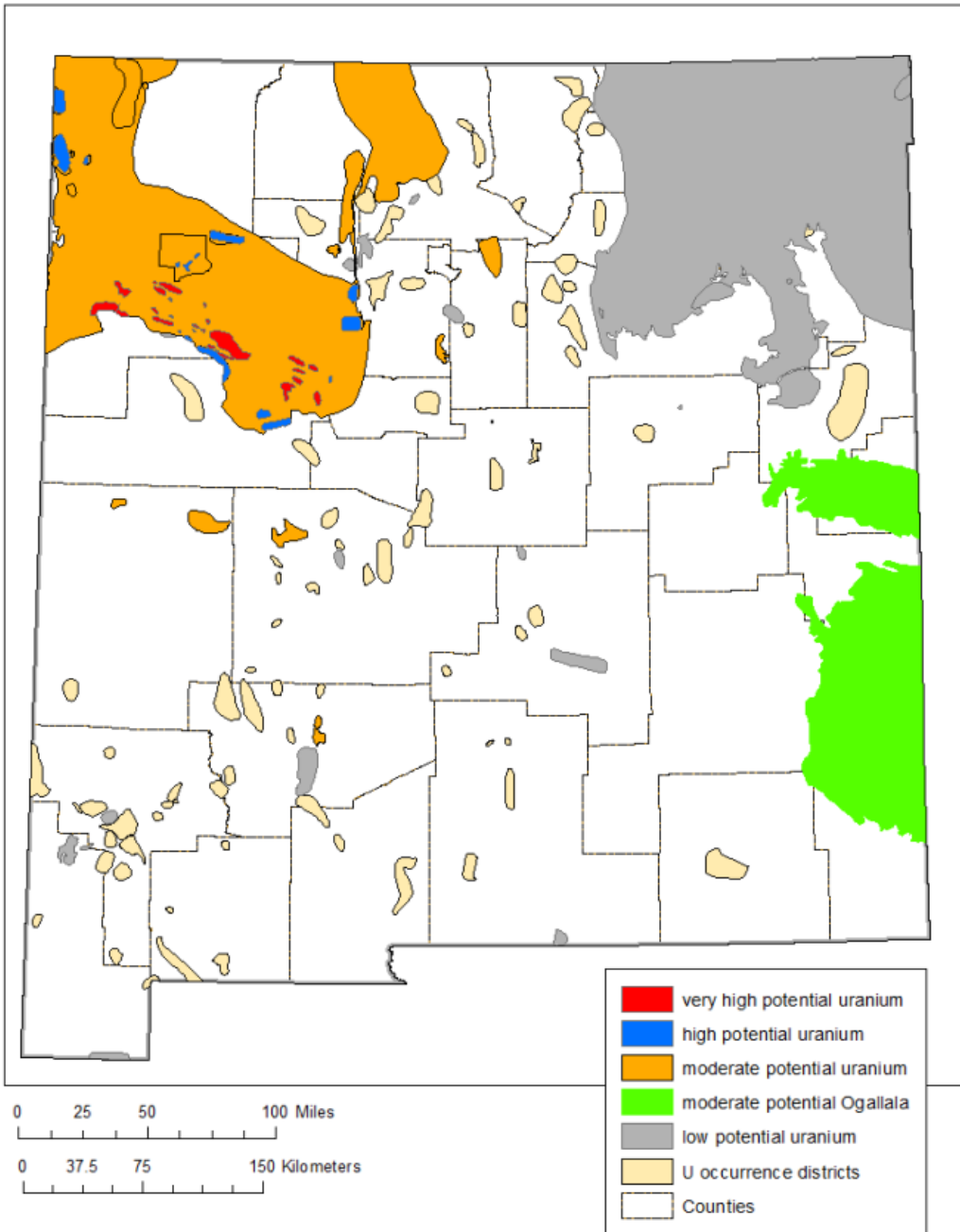
Mineral-Resource Potential



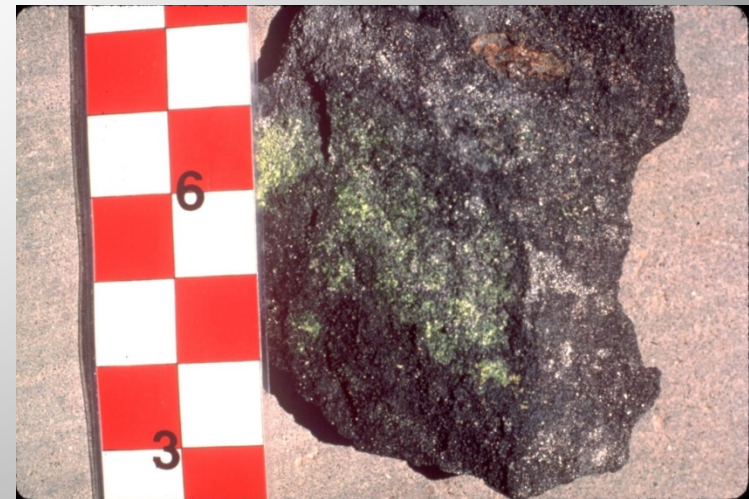
Copper



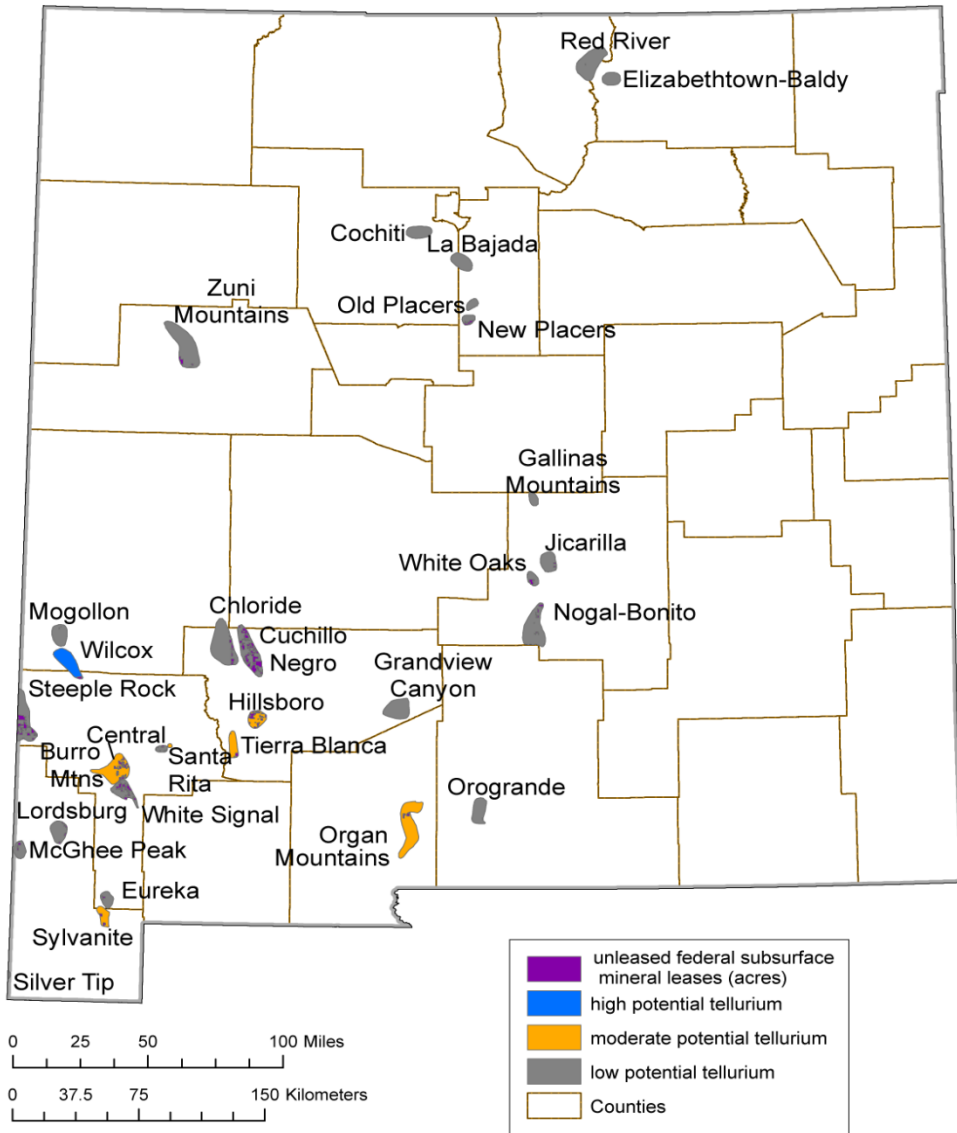
Gold



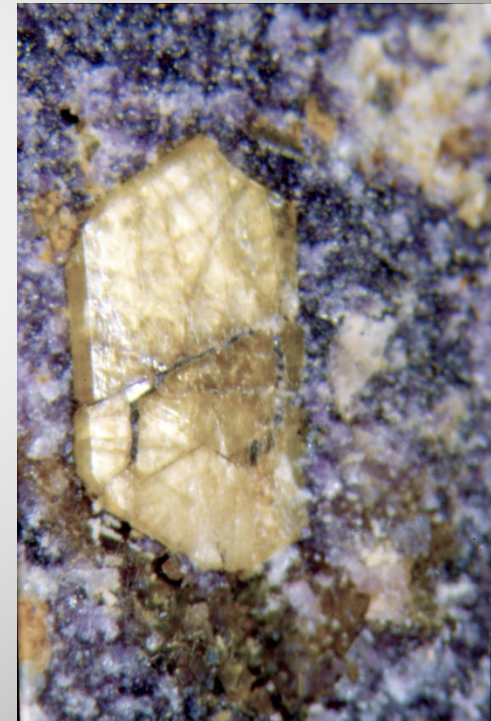
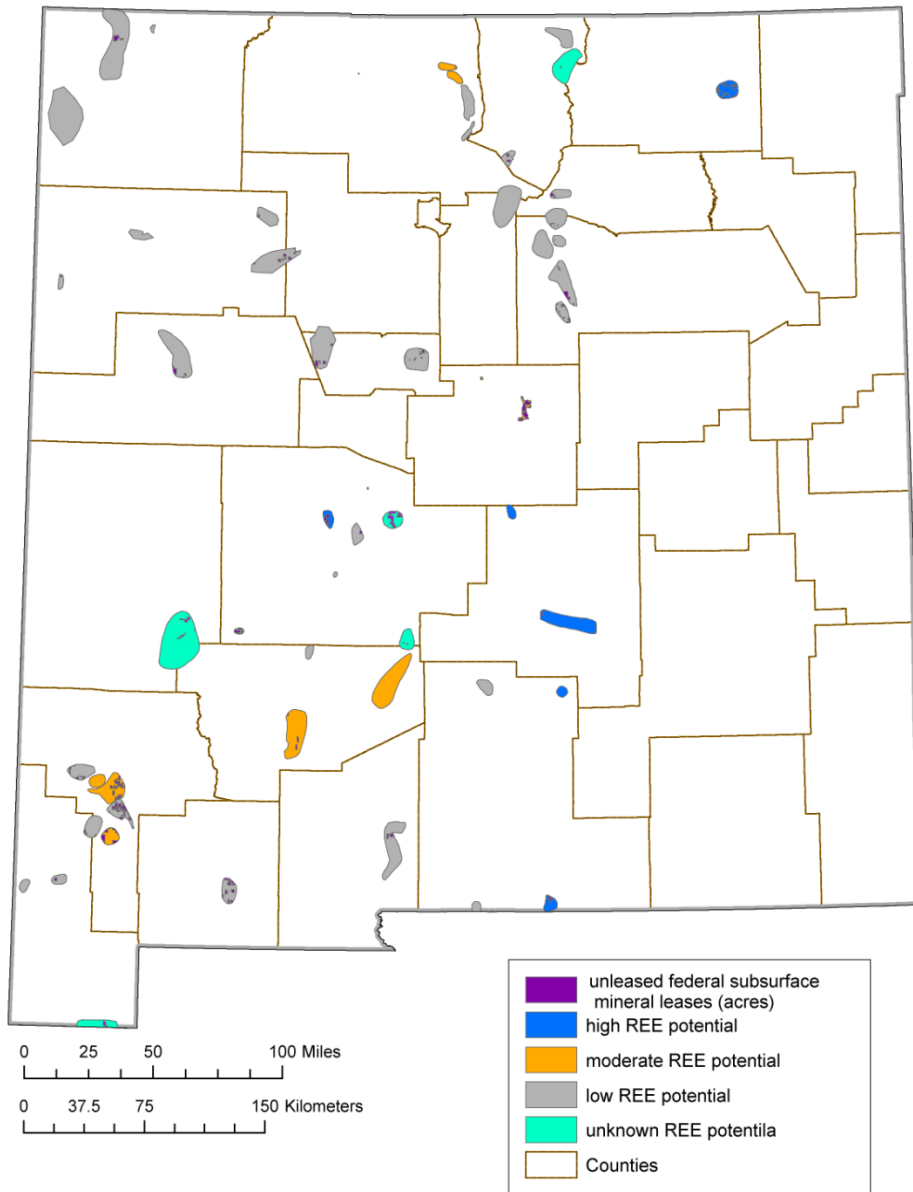
Uranium



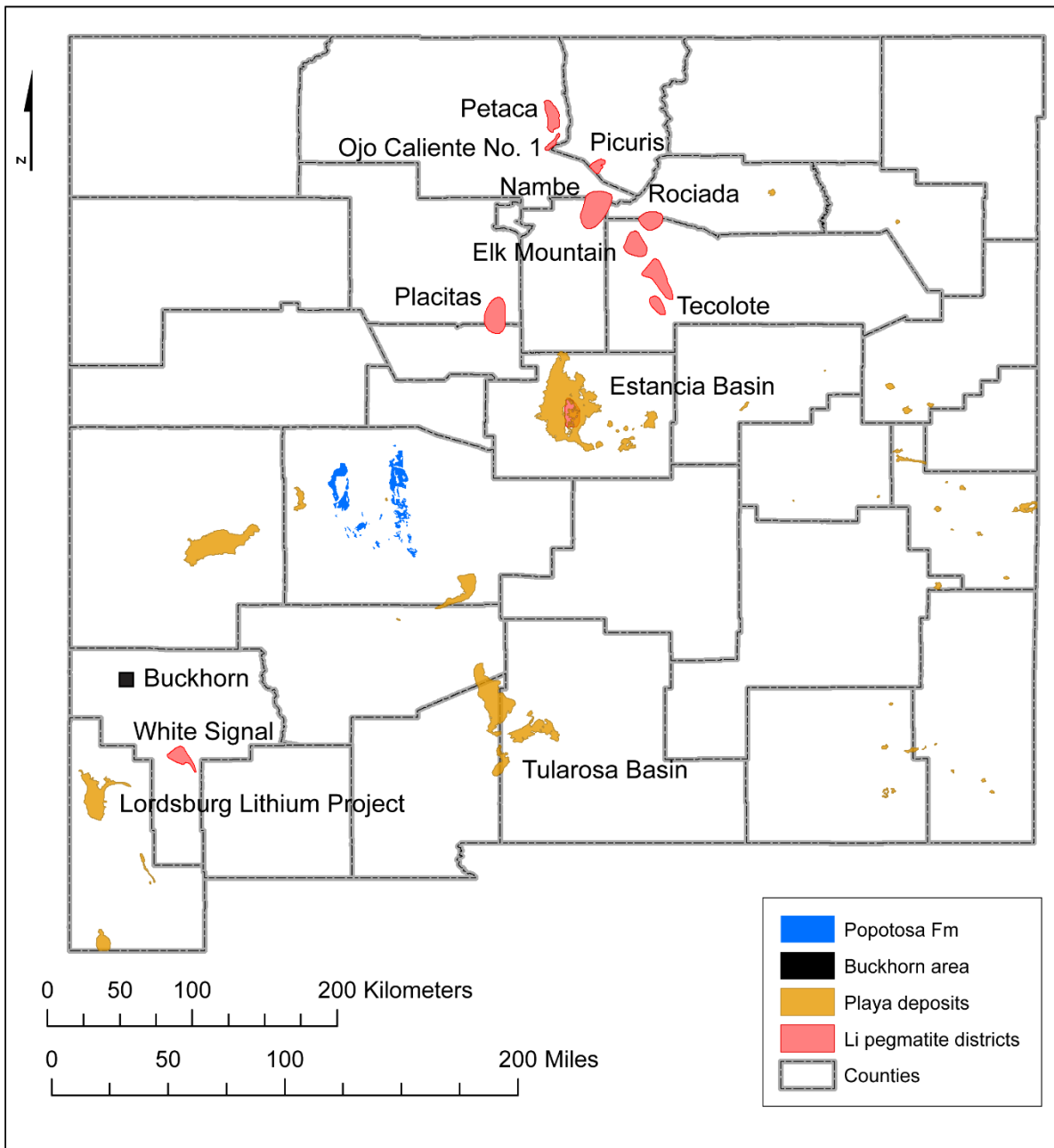
Tellurium



Rare earth elements



Lithium



Summary

- New Mexico has a wealth of mineral resources
- Using ArcGis, geologic and mineral deposit data, we can evaluate the mineral-resource potential of an area
- The evaluation process is complex and is based upon geologic analogy of promising or favorable geologic environments with geologic settings of known economic deposits
- Enables decision makers the ability to make decisions on land use and can be used to identify areas requiring additional study