1989

Mineral Summaries of Bureau of Land Management Wilderness Study Areas in Utah

Intermountain Field Operations Center; U.S. Bureau of Mines, Denver, CO

Central Mineral Resources; U.S. Geological Survey, Denver, CO

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Mineral Summaries

Bureau of Land Management

Wilderness Study Areas in

Utah

Bureau of Mines Geological Survey
MINERAL SUMMARIES

of

Bureau of Land Management
Wilderness Study Areas

in

UTAH

Prepared by:

Intermountain Field Operations Center
U.S. Bureau of Mines
Denver, Colorado

and

Central Mineral Resources
U.S. Geological Survey
Denver, Colorado

August 1989
ACKNOWLEDGEMENTS: The Bureau appreciates the cooperation of the Bureau of Land Management in providing the base map negative for plate 1.

The cover photograph, showing Labyrinth Canyon on the Green River near Horseshoe Canyon North Wilderness Study Area, is by Clay Martin, Intermountain Field Operations Center, Bureau of Mines.
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Bridger Jack Mesa (50)
Bull Canyon (87)
Bullet Canyon (41)
Bull Mountain (61)
Burning Hills (36)
Butler Wash (52)
Canaan Mountain (27)
Carcass Canyon (33)
Cedar Mountains (2)
Cheesebox Canyon (44)
Coal Canyon (79)
Cockscomb (29)
Cold Springs (90)
Conger Mountain (7)
Cottonwood Canyon (15)
Cougar Canyon (13)
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LaVerkin Creek Canyon (21)
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<td>*Blues, The</td>
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<td>Bull Canyon</td>
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<td>*Bullet Canyon</td>
<td>47</td>
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<td>Bull Mountain</td>
<td>51</td>
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<tr>
<td>*Burning Hills</td>
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<td>Cockscomb</td>
<td>87</td>
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<td>*Cold Springs</td>
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<tr>
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<td>*Cross Canyon</td>
<td>113</td>
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<td>*Daniels Canyon</td>
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<td>*Death Ridge</td>
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<td>Desolation Canyon</td>
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<td>*Devils Canyon</td>
<td>145</td>
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<td>Diamond Breaks</td>
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<td>Dirty Devil</td>
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<td>Fiddler Butte</td>
<td>155</td>
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<td>Fiddler Butte (East)</td>
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<td>Fifty Mile Mountain</td>
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<td>Fish Springs Range</td>
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<td>Flume Canyon</td>
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*Areas that have not been studied by the Bureau of Mines and U.S. Geological Survey
<table>
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<td>Horseshoe Canyon North</td>
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<td>Horseshoe Canyon South</td>
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<td>Howell Peak</td>
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<td>Indian Creek</td>
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<td>*Jack Canyon</td>
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<td>*King Top</td>
<td>229</td>
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<td>LaVerkin Creek Canyon</td>
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<td>Little Rockies</td>
<td>237</td>
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<tr>
<td>Lost Spring Canyon</td>
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<tr>
<td>Mancos Mesa</td>
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<td>Mexican Mountain</td>
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<td>*Middle Point</td>
<td>255</td>
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<td>Mill Creek Canyon</td>
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<td>*Moquith Mountain</td>
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<td>Mount Ellen-Blue Hills</td>
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<td>Mount Hillers</td>
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<td>Mount Pennell</td>
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<td>Muddy Creek</td>
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<td>*Mud Spring Canyon</td>
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<td>Negro Bill Canyon</td>
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<td>North Fork Virgin River</td>
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<td>North Stansbury Mountains</td>
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<td>Notch Peak</td>
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<td>Orderville Canyon</td>
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<td>Paria-Hackberry</td>
<td>317</td>
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<tr>
<td>Parunuweap Canyon</td>
<td>321</td>
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<td>*Pine Canyon</td>
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<td>Red Butte</td>
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<td>Red Mountain</td>
<td>333</td>
</tr>
<tr>
<td>Road Canyon</td>
<td>337</td>
</tr>
<tr>
<td>*Rockwell</td>
<td>341</td>
</tr>
<tr>
<td>San Rafael Reef</td>
<td>345</td>
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<tr>
<td>Scorpion</td>
<td>349</td>
</tr>
<tr>
<td>*Sheiks Flat</td>
<td>353</td>
</tr>
<tr>
<td>Sids Mountain/Sids Cabin</td>
<td>357</td>
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<td>*Slickhorn Canyon</td>
<td>361</td>
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<td>*South Needles</td>
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<td>Spring Creek Canyon</td>
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<td>Spruce Canyon</td>
<td>375</td>
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<tr>
<td>*Squaw and Papoose Canyons</td>
<td>379</td>
</tr>
<tr>
<td>Steep Creek</td>
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INTRODUCTION

The Branch of Resource Evaluation, Intermountain Field Operations Center, U.S. Bureau of Mines (USBM), in cooperation with the staff of Central Mineral Resources, U.S. Geological Survey (USGS), prepared the following mineral "Briefing Book" summaries on 90 proposed wilderness areas in and adjacent to the State of Utah. The areas are public lands managed by the Bureau of Land Management (BLM) as Wilderness Study Areas (WSA's). Utah's WSA's cover approximately 3 million acres of public lands.

Each summary includes a location map showing the approximate boundary of the proposed wilderness. Areas studied jointly for which reports were completed by the USBM & USGS will include a map indicating the areas with potential for undiscovered resources. Readers should use the text for each WSA in combination with the maps. Identified mineral resources were studied by the USBM; undiscovered resources were studied by the USGS. Plate 1 summarizes the mineral resources and potential of the WSA's.

Joint studies have been conducted on 66 of the 91 proposed wilderness areas. The unstudied areas are indicated in the text and table of contents. Information given for the unstudied areas was taken from available literature; no field examinations were requested by BLM. In many cases, very little reliable information was available for unstudied areas.

Table 1 lists critical and strategic materials. The lists were developed by the Bureau of Mines and Department of Defense. Table 2 lists mineral commodities occurring or having the potential to occur in the proposed wilderness areas, their import reliance, major foreign sources, and principal uses.

Table 3 summarizes the identified mineral resources and mineral resource potential (high and moderate only) for areas studied by the USBM & USGS. Nearly 80% of the areas
studied have identified resources; 92% have high or moderate potential for mineral resources.

The resource classification system used is found in U.S. Geological Survey Circular 831, p. 5.

**Definition of Mineral Resource Potential**

**LOW** mineral resource potential is assigned to areas where geologic, geochemical, and geophysical characteristics define a geologic environment in which the existence of resources is unlikely. This broad category embraces areas with dispersed but insignificantly mineralized rock as well as areas with few or no indications of having been mineralized.

**MODERATE** mineral resource potential is assigned to areas where geologic, geochemical, and geophysical characteristics indicate a geologic environment favorable for resource occurrence, where interpretations of data indicate a reasonable likelihood of resource accumulation, and (or) where an application of mineral-deposit models indicate favorable ground for the specified type(s) of deposits.

**HIGH** mineral resource potential is assigned to areas where geologic, geochemical, and geophysical characteristics indicate a geologic environment favorable for resource occurrence, where interpretations of data indicate a high degree of likelihood for resource accumulation, where data support mineral-deposit models indicating presence of resources, and where evidence indicates that mineral concentration has taken place. Assignment of high resource potential to an area requires some positive knowledge that mineral-forming processes have been active in at least part of the area.

**UNKNOWN** mineral resource potential is assigned to areas where information is inadequate to assign low, moderate, or high levels of resource potential.

**NO** mineral resource potential is a category reserved for a specific type of resource in a well-defined area.

**Levels of Certainty**

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LEVEL OF RESOURCE POTENTIAL</strong></td>
<td><strong>U/A</strong></td>
<td><strong>H/B</strong></td>
<td><strong>H/C</strong></td>
</tr>
<tr>
<td><strong>UNKNOWN</strong></td>
<td>HIGH POTENTIAL</td>
<td>HIGH POTENTIAL</td>
<td>HIGH POTENTIAL</td>
</tr>
<tr>
<td><strong>L/B</strong></td>
<td>MODERATE POTENTIAL</td>
<td>MODERATE POTENTIAL</td>
<td>MODERATE POTENTIAL</td>
</tr>
<tr>
<td><strong>LOW POTENTIAL</strong></td>
<td>LOW POTENTIAL</td>
<td>LOW POTENTIAL</td>
<td>LOW POTENTIAL</td>
</tr>
<tr>
<td><strong>NO POTENTIAL</strong></td>
<td></td>
<td>N/D</td>
<td></td>
</tr>
</tbody>
</table>

A. Available information is not adequate for determination of the level of mineral resource potential.
B. Available information suggests the level of mineral resource potential.
C. Available information gives a good indication of the level of mineral resource potential.
D. Available information clearly defines the level of mineral resource potential.
MINERAL SUMMARY FOR UTAH

Utah's nonfuel mineral production had a value of $700 million in 1987. Nationally, Utah ranked 13th in total value of nonfuel mineral production; first in native asphalt (gilsonite), gallium, and beryllium-bearing ores, second in potash, and third in copper, magnesium and vanadium.

Metal production rose from nearly one-half of the total value of the State's nonfuel minerals in 1986 to more than two-third in 1987. Utah was the only State to produce gallium and gilsonite and was one of three states to produce potash, magnesium, and vanadium. Magnesium compounds, phosphate, potassium salts, salt, construction sand and gravel, and crushed stone increased in value. (Data from Bureau of Mines Mineral Yearbook, 1987.)
Table 1.—Critical and Strategic Materials.

A) The 1987 Department of Defense’s list of high technology critical and strategic materials:

<table>
<thead>
<tr>
<th>Material</th>
<th>Material</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beryllium</td>
<td>Manganese</td>
<td>Ruthenium</td>
</tr>
<tr>
<td>Bismuth</td>
<td>Mercury</td>
<td>Scandium</td>
</tr>
<tr>
<td>Cesium</td>
<td>Osmium</td>
<td>Selenium</td>
</tr>
<tr>
<td>Chromium</td>
<td>Platinum Group (3)</td>
<td>Strontium</td>
</tr>
<tr>
<td>Gallium</td>
<td>Rare Earths</td>
<td>Tellurium</td>
</tr>
<tr>
<td>Hafnium</td>
<td>Rhenium</td>
<td>Yttrium</td>
</tr>
<tr>
<td>Indium</td>
<td>Rhodium</td>
<td>Zirconium</td>
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</table>

B) The 1988 Bureau of Mines economic study of materials that are potentially critical (USBM OFR 28-88):

<table>
<thead>
<tr>
<th>Material</th>
<th>Material</th>
<th>Material</th>
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</thead>
<tbody>
<tr>
<td>Cesium</td>
<td>Rhenium</td>
<td>Selenium</td>
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<tr>
<td>Gallium</td>
<td>Rhodium</td>
<td>Tellurium</td>
</tr>
<tr>
<td>Hafnium</td>
<td>Rubidium</td>
<td>Thallium</td>
</tr>
<tr>
<td>Indium</td>
<td>Ruthenium</td>
<td>Zirconium</td>
</tr>
<tr>
<td>Osmium</td>
<td>Scandium</td>
<td></td>
</tr>
</tbody>
</table>

C) Imported metals and minerals impacted by the Anti-Apartheid Act of 1986:

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<th>Material</th>
<th>Material</th>
<th>Material</th>
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<tr>
<td>Antimony</td>
<td>Cobalt</td>
<td>Platinum Group (6)</td>
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<tr>
<td>Andalusite</td>
<td>Diamond (industrial)</td>
<td>Rutil (titanium)</td>
</tr>
<tr>
<td>Asbestos (chrysotile)</td>
<td>Fluorspar (acid grade)</td>
<td>Vanadium</td>
</tr>
<tr>
<td>Chromium</td>
<td>Manganese</td>
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</table>

D) Stockpiled materials for which the U.S. is dependent on foreign imports for 90% or more of the annual consumption (as of 1988):

<table>
<thead>
<tr>
<th>Material</th>
<th>Material</th>
<th>Material</th>
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<tr>
<td>Columbium</td>
<td>Manganese</td>
<td>Tantalum</td>
</tr>
<tr>
<td>Graphite</td>
<td>Mica (sheet)</td>
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</table>
Table 2.—Percent of U.S. consumption from imports, major foreign sources, and principal uses for nonfuel mineral commodities occurring or recognized as having the potential to occur in the Utah BLM Wilderness Study Areas.

<table>
<thead>
<tr>
<th>Metals and Minerals</th>
<th>Major Foreign Sources</th>
<th>Principal Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Net Exports</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clays</td>
<td>United Kingdom,</td>
<td>Paper, refractories, pottery, tile fire bricks, foundry sand, drilling mud, absorbent uses, construction materials.</td>
</tr>
<tr>
<td></td>
<td>Mexico, Canada</td>
<td></td>
</tr>
<tr>
<td>Magnesium (dolomite)</td>
<td>Norway, Canada</td>
<td>Aluminum-base alloys (59%), magnesium castings (20%).</td>
</tr>
<tr>
<td>Molybdenum</td>
<td>Chile, Canada,</td>
<td>Machinery (35%), oil and gas industry (10%), transportation (15%), electrical (15%), chemical (10%).</td>
</tr>
<tr>
<td></td>
<td>Federal Republic of</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Germany, Austria</td>
<td></td>
</tr>
<tr>
<td>Sand and gravel</td>
<td>Canada, Australia,</td>
<td>Construction sand and gravel: concrete aggregate (28%), road base (15%), asphalt (10%).</td>
</tr>
<tr>
<td></td>
<td>Antigua, Japan</td>
<td>Industrial sand: glass (42%), foundry (25%), abrasive (7%), hydraulic fracturing sand (5%).</td>
</tr>
<tr>
<td><strong>0-25 Percent Net Import Reliance</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Copper</td>
<td>Canada, Chile, Peru</td>
<td>Construction (43%), electrical and electronic (22%), industrial machinery and equipment (14%), transportation (12%).</td>
</tr>
<tr>
<td>Gold</td>
<td>Canada, Switzerland,</td>
<td>Jewelry and arts (58%), electronic (35%), dental (7%).</td>
</tr>
<tr>
<td></td>
<td>Uruguay</td>
<td></td>
</tr>
<tr>
<td>Lead (metal)</td>
<td>Canada, Mexico,</td>
<td>Transportation: (70% batteries and gasoline additives).</td>
</tr>
<tr>
<td></td>
<td>Peru, Australia,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sweden</td>
<td></td>
</tr>
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</table>
Table 2.--Percent of U.S. consumption from imports, major foreign sources, and principal uses for nonfuel mineral commodities occurring or recognized as having the potential to occur in the Utah BLM Wilderness Study Areas.--Continued

<table>
<thead>
<tr>
<th>Metals and Minerals</th>
<th>Major Foreign Sources</th>
<th>Principal Uses</th>
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<tbody>
<tr>
<td>0-25 Percent Import Reliance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Salt</td>
<td>Canada, Mexico, Bahamas.</td>
<td>Chemical industry (48%), highway de-icing (25%).</td>
</tr>
<tr>
<td>Stone (crushed)</td>
<td>None</td>
<td>Construction aggregate (55%), cement and lime (9%); of the total 70% was</td>
</tr>
<tr>
<td></td>
<td></td>
<td>limestone-dolomite, 15% granite, 9% traprock, 3% sandstone.</td>
</tr>
<tr>
<td>Sulfur</td>
<td>Canada, Mexico</td>
<td>Fertilizers (74%), chemicals (10%), petroleum refining (8%), and metal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>mining (2%).</td>
</tr>
<tr>
<td>Titanium</td>
<td>Metal: Japan</td>
<td>Metal: Aerospace applications (78%).</td>
</tr>
<tr>
<td></td>
<td>Titanium oxide:</td>
<td>Titanium oxide: paint, varnish, and lacquers (50%), paper (24%), plastics</td>
</tr>
<tr>
<td></td>
<td>Federal Republic of Germany, France,</td>
<td>(17%), rubber (2%).</td>
</tr>
<tr>
<td></td>
<td>Canada, United Kingdom</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26-50 Percent Net Import Reliance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cadmium</td>
<td>Canada, Australia, Mexico, Federal</td>
<td>Batteries (32%), coating and plating (29%), pigments (15%), plastics and</td>
</tr>
<tr>
<td></td>
<td>Republic of Germany</td>
<td>synthetic products (15%).</td>
</tr>
<tr>
<td>Gypsum</td>
<td>Canada, Mexico, Spain</td>
<td>Industrial and building plaster (79%), cement and agriculture (20%).*</td>
</tr>
</tbody>
</table>
Table 2.—Percent of U.S. consumption from imports, major foreign sources, and principal uses for nonfuel mineral commodities occurring or recognized as having the potential to occur in the Utah BLM Wilderness Study Areas.—Continued

<table>
<thead>
<tr>
<th>Metals and Minerals</th>
<th>Major Foreign Sources</th>
<th>Principal Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>26-50 Percent Net Import Reliance</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silicon</td>
<td>Brazil, Canada, Norway</td>
<td>Transportation (31%), chemicals (22%), machinery (17%), construction (13%).</td>
</tr>
<tr>
<td><strong>51-90 Percent Net Import Reliance</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Antimony</td>
<td>China, Republic of South Africa, Mexico, Bolivia</td>
<td>Flame retardants (65%), transportation (11%), chemicals (9%), ceramics and glass (5%).</td>
</tr>
<tr>
<td>Barite</td>
<td>China, India, Morocco</td>
<td>Weighting agent in drilling muds (70%), paints and rubber.</td>
</tr>
<tr>
<td>Iron ore</td>
<td>Canada, Brazil, Venezuela, Liberia</td>
<td>Blast furnaces (97.7%), direct reduction plants (0.5%), steel furnaces (0.3%).</td>
</tr>
<tr>
<td>Potash</td>
<td>Canada, Israel</td>
<td>Fertilizer industry (95%), chemical industry (5%).</td>
</tr>
<tr>
<td>Silver*</td>
<td>Mexico, Canada, Peru, United Kingdom</td>
<td>Photography (50%), electrical and electronic (25%), electro-plating and jewelry (10%).</td>
</tr>
<tr>
<td>Stone (dimension)</td>
<td>Italy, Spain, Canada</td>
<td>Building construction (45%), monuments (23%), rubble (13%); of the total 52% was granite, 28% limestone, 10% sandstone.</td>
</tr>
<tr>
<td>Tin</td>
<td>Brazil, Thailand, Indonesia, Malaysia</td>
<td>Cans and containers (25%), electrical (20%), construction (14%), transportation (12%).</td>
</tr>
<tr>
<td>Tungsten</td>
<td>China, Canada, Bolivia</td>
<td>Metalworking (67%), lamps and lighting (12%), electrified machinery (7%), transportation (7%).</td>
</tr>
</tbody>
</table>
Table 2.—Percent of U.S. consumption from imports, major foreign sources, and principal uses for nonfuel mineral commodities occurring or recognized as having the potential to occur in the Utah BLM Wilderness Study Areas.—Continued

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</thead>
<tbody>
<tr>
<td>51-90 Percent Net Import Reliance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zinc</td>
<td>Canada, Peru, Honduras, Mexico</td>
<td>Construction material (45%), transportation (23%), machinery (12%), electrical (10%).</td>
</tr>
<tr>
<td>91% Percent or Greater Net Import Reliance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arsenic</td>
<td>Sweden, France, Mexico, Canada</td>
<td>Wood preservation (23%), agricultural chemicals (23%), glass (4%), nonferrous alloys (2%).</td>
</tr>
<tr>
<td>Manganese</td>
<td>Gabon, Brazil, Australia</td>
<td>Construction (24%), transportation (15%), machinery (11%).</td>
</tr>
<tr>
<td>Net Import Data Withheld or Not Available</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bismuth</td>
<td>Mexico, Belgium, Peru, United Kingdom</td>
<td>Pharmaceuticals and chemicals (47%), primary metals (31%), machinery (21%).</td>
</tr>
<tr>
<td>Mercury</td>
<td>Spain, China, Algeria, Turkey</td>
<td>Electrical (43%), electrolytic production of chlorine and caustic soda (20%), paint (11%), industrial and control instruments (6%).</td>
</tr>
<tr>
<td>Thorium</td>
<td>France, Netherlands, Canada, Australia, United Kingdom</td>
<td>Nuclear fuel, incandescent lamp mantles, alloys, refractories, ceramics, welding electrodes.</td>
</tr>
</tbody>
</table>
Table 2.--Percent of U.S. consumption from imports, major foreign sources, and principal uses for nonfuel mineral commodities occurring or recognized as having the potential to occur in the Utah BLM Wilderness Study Areas.--Continued

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<tbody>
<tr>
<td><strong>Net Import Data Withheld or Not Available</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phosphate</td>
<td>Togo, Morocco</td>
<td>Fertilizers (90%), industrial chemicals (10%).</td>
</tr>
<tr>
<td>Vanadium</td>
<td>Republic of South Africa, South America, European Communities</td>
<td>Machinery and tools (36%), transportation (27%), building and heavy construction (25%).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Minerals Not Listed in Mineral Commodity Summaries</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Uranium</td>
<td></td>
<td>Nuclear energy.</td>
</tr>
<tr>
<td>Volcanic cinders</td>
<td></td>
<td>Construction industry, landscaping, railroad ballast, road surfacing material.</td>
</tr>
</tbody>
</table>


Table 3.—Summary of identified mineral resource and mineral resource potential in the 66 areas studied by the Bureau of Mines and the U.S. Geological Survey.

<table>
<thead>
<tr>
<th>AREA NAME</th>
<th>IDENTIFIED RESOURCES</th>
<th>MINERAL RESOURCE POTENTIAL (high and moderate potential only)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beartrap Canyon</td>
<td>Sandstone and limestone</td>
<td>Moderate: Oil and gas.</td>
</tr>
<tr>
<td>Behind the Rocks</td>
<td>Sandstone and potash</td>
<td>Moderate: Oil and gas.</td>
</tr>
<tr>
<td>Black Ridge Canyons West</td>
<td>None</td>
<td>High: Placer gold.</td>
</tr>
<tr>
<td>Bridger Jack Mesa</td>
<td>None</td>
<td>High: Uranium, vanadium, and copper; Moderate: Oil and gas.</td>
</tr>
<tr>
<td>Bull Canyon</td>
<td>Sandstone</td>
<td>High: Gypsum.</td>
</tr>
<tr>
<td>Bull Mountain</td>
<td>None</td>
<td>Moderate: Oil and gas.</td>
</tr>
<tr>
<td>Butler Wash</td>
<td>None</td>
<td>Moderate: Oil and gas.</td>
</tr>
<tr>
<td>Canaan Mountain</td>
<td>Sandstone, sand and gravel, and clay.</td>
<td>Moderate: Oil and gas.</td>
</tr>
<tr>
<td>Coal Canyon</td>
<td>Coal</td>
<td>High: Coal and oil and gas.</td>
</tr>
<tr>
<td>Cockscomb</td>
<td>Coal</td>
<td>Moderate: Oil and gas.</td>
</tr>
<tr>
<td>Cottonwood Canyon</td>
<td>None</td>
<td>High: Geothermal energy; Moderate: Gold, silver, copper, uranium, and vanadium.</td>
</tr>
<tr>
<td>Cougar Canyon</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Crack Canyon</td>
<td>Uranium, vanadium, copper, petroleum (tar sand) and gypsum.</td>
<td>High: Uranium and vanadium; Moderate: Oil and gas, carbon dioxide, helium gas, sulfur, bentonite, and geothermal sources.</td>
</tr>
</tbody>
</table>
Table 3.--Summary of identified mineral resource and mineral resource potential in the 66 areas studied by the Bureau of Mines and the U.S. Geological Survey.--Continued

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<th>MINERAL RESOURCE POTENTIAL (high and moderate potential only)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deep Creek</td>
<td>Sandstone, gypsum, and limestone.</td>
<td>Moderate: Oil and gas.</td>
</tr>
<tr>
<td>Deep Creek Mountains</td>
<td>Silver, limestone, and quartzite.</td>
<td>High: Gold; Moderate: Gold.</td>
</tr>
<tr>
<td>Desolation Canyon</td>
<td>Coal, oil shale, tar sand, uranium, building stone, and sand and gravel.</td>
<td>High: Oil and gas and coal; Moderate: Oil and gas and tar sand.</td>
</tr>
<tr>
<td>Diamond Breaks</td>
<td>Sand and gravel</td>
<td>Moderate: Uranium and petroleum.</td>
</tr>
<tr>
<td>Dirty Devil</td>
<td>Uranium</td>
<td>High: Tar sand; Moderate: Uranium and petroleum.</td>
</tr>
<tr>
<td>Fiddler Butte</td>
<td>Tar sand and uranium</td>
<td>Moderate: Uranium, vanadium, tar sand, silver, gold, and oil and gas.</td>
</tr>
<tr>
<td>Fiddler Butte (East)</td>
<td>Tar sand and high-magnesium dolomite.</td>
<td>High: Coal, uranium, and titanium; Moderate: Uranium, geothermal energy, oil and gas, gypsum, and carbon dioxide.</td>
</tr>
<tr>
<td>Fifty Mile Mountain</td>
<td>Coal</td>
<td>High: Coal; Moderate: Oil and gas.</td>
</tr>
<tr>
<td>Fish Creek Canyon</td>
<td>Sandstone</td>
<td>Moderate: Oil and gas.</td>
</tr>
<tr>
<td>Fish Springs Range</td>
<td>High-purity quartzite</td>
<td>High: Lead, silver, copper, zinc, gold, and molybdenum; Moderate: Lead, silver, copper, zinc, gold, molybdenum, high-purity limestone, and dolomite.</td>
</tr>
<tr>
<td>Floy Canyon</td>
<td>Coal, building stone, and sand and gravel.</td>
<td>High: Coal; Moderate: Oil and gas.</td>
</tr>
</tbody>
</table>
Table 3.—Summary of identified mineral resource and mineral resource potential in the 66 areas studied by the Bureau of Mines and the U.S. Geological Survey.—Continued

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</tr>
</thead>
<tbody>
<tr>
<td>Flume Canyon</td>
<td>Oil shale, tar sands, oil and gas</td>
<td>High: Coal, oil and gas.</td>
</tr>
<tr>
<td>French Springs/Happy</td>
<td>Tar sand</td>
<td>High: Tar sand;</td>
</tr>
<tr>
<td>Goose Creek Canyon</td>
<td>Sandstone and limestone</td>
<td>Moderate: Uranium and oil and gas.</td>
</tr>
<tr>
<td>Horseshoe Canyon North</td>
<td>None</td>
<td>Moderate: Oil and gas.</td>
</tr>
<tr>
<td>Howell Peak</td>
<td>High-purity limestone, quartzite, and sand and gravel.</td>
<td>Moderate: Lead, zinc, copper, molybdenum, silver, gold, oil and gas, high-purity limestone, and dolomite.</td>
</tr>
<tr>
<td>Indian Creek</td>
<td>Sandstone and potash</td>
<td>Moderate: Oil and gas.</td>
</tr>
<tr>
<td>LaVerkin Creek Canyon</td>
<td>Sandstone and limestone</td>
<td>Moderate: Oil and gas.</td>
</tr>
<tr>
<td>Little Rockies</td>
<td>Uranium and copper</td>
<td>High: Uranium;</td>
</tr>
<tr>
<td>Lost Spring Canyon</td>
<td>Sandstone and sand and gravel.</td>
<td>Moderate: Uranium.</td>
</tr>
<tr>
<td>Mancos Mesa</td>
<td>Sandstone</td>
<td>Moderate: Oil and gas, potash, and halite.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Moderate: Uranium, copper, oil and gas.</td>
</tr>
<tr>
<td>AREA NAME</td>
<td>IDENTIFIED RESOURCES</td>
<td>MINERAL RESOURCE POTENTIAL (high and moderate potential only)</td>
</tr>
<tr>
<td>-------------------------</td>
<td>----------------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Mexican Mountain</td>
<td>None</td>
<td>High: Uranium and vanadium; Moderate: Oil and gas, carbon dioxide, helium, bentonite, and geothermal sources.</td>
</tr>
<tr>
<td>Mill Creek Canyon</td>
<td>Sand</td>
<td>Moderate: Placer gold.</td>
</tr>
<tr>
<td>Mount Ellen-Blue Hills</td>
<td>None</td>
<td>High: Uranium and vanadium; Moderate: Copper, lead, zinc, gold, coal, uranium, and vanadium.</td>
</tr>
<tr>
<td>Mount Hillers</td>
<td>None</td>
<td>Moderate: Copper, lead, tin, molybdenum, bismuth, gold, silver, and coal.</td>
</tr>
<tr>
<td>Mount Pennell</td>
<td>Coal</td>
<td>High: Uranium and vanadium; Moderate: Oil and gas, carbon dioxide, helium, bentonite, and geothermal sources.</td>
</tr>
<tr>
<td>Muddy Creek</td>
<td>Gypsum</td>
<td>Moderate: Oil and gas</td>
</tr>
<tr>
<td>Mule Canyon</td>
<td>Sandstone</td>
<td>High: Gypsum, potash, and bentonite; Moderate: Oil and gas, carbon dioxide, and uranium.</td>
</tr>
<tr>
<td>Negro Bill Canyon</td>
<td>Sand</td>
<td>Moderate: Oil and gas</td>
</tr>
<tr>
<td>North Fork Virgin River</td>
<td>Gypsum, sandstone, and limestone.</td>
<td>Moderate: Oil and gas</td>
</tr>
<tr>
<td>North Stansbury Mountains</td>
<td>Limestone and sand and gravel.</td>
<td>Moderate: Lead, zinc, silver, gold, mercury, and geothermal energy.</td>
</tr>
<tr>
<td>Notch Peak</td>
<td>Tungsten</td>
<td>High: Tungsten; Moderate: Gold, silver, molybdenum, copper, lead, and oil and gas.</td>
</tr>
</tbody>
</table>
Table 3.—Summary of identified mineral resource and mineral resource potential in the 66 areas studied by the Bureau of Mines and the U.S. Geological Survey.—Continued

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</tr>
</thead>
<tbody>
<tr>
<td>Orderville Canyon</td>
<td>Gypsum, sandstone, and limestone.</td>
<td>Moderate: Oil and gas.</td>
</tr>
<tr>
<td>Paria-Hackberry</td>
<td>Quartz-rich sandstone</td>
<td>Moderate: Uranium.</td>
</tr>
<tr>
<td>Parunuweap Canyon</td>
<td>Gypsum, sandstone, and limestone.</td>
<td>Moderate: Oil and gas.</td>
</tr>
<tr>
<td>Red Butte</td>
<td>Sandstone</td>
<td>Moderate: Oil and gas.</td>
</tr>
<tr>
<td>Red Mountain</td>
<td>None</td>
<td>High: Geothermal energy; Moderate: Geothermal energy.</td>
</tr>
<tr>
<td>Road Canyon</td>
<td>Sandstone</td>
<td>Moderate: Oil and gas.</td>
</tr>
<tr>
<td>San Rafael Reef</td>
<td>Uranium, gypsum, petrified wood, and agate.</td>
<td>High: Uranium and vanadium; Moderate: Oil and gas, carbon dioxide, helium, bentonite, and geothermal sources.</td>
</tr>
<tr>
<td>Scorpion</td>
<td>None</td>
<td>Moderate: Oil and gas and carbon dioxide.</td>
</tr>
<tr>
<td>Sids Mountain/Sids Cabin</td>
<td>Gypsum</td>
<td>High: Uranium and vanadium; Moderate: Oil and gas, carbon dioxide, helium, bentonite, and geothermal sources.</td>
</tr>
<tr>
<td>Spring Creek Canyon</td>
<td>Sandstone and limestone</td>
<td>Moderate: Oil and gas.</td>
</tr>
<tr>
<td>Spruce Canyon</td>
<td>Oil shale, tar sand, and oil and gas.</td>
<td>High: Coal and oil and gas.</td>
</tr>
<tr>
<td>Steep Creek</td>
<td>Bentonite, petrified wood, and sandstone.</td>
<td>Moderate: Bentonite, oil and gas, carbon dioxide, and uranium.</td>
</tr>
<tr>
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<td>IDENTIFIED RESOURCES</td>
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</tr>
<tr>
<td>----------------------</td>
<td>-----------------------------------------------------------</td>
<td>---------------------------------------------------------------</td>
</tr>
<tr>
<td>Swasey Mountain</td>
<td>High-purity limestone, quartzite, sand and gravel, and fossils.</td>
<td>Moderate: Lead, zinc, copper, molybdenum, silver, gold, oil and gas, high-purity limestone, and dolomite.</td>
</tr>
<tr>
<td>Taylor Creek Canyon</td>
<td>Sandstone and limestone</td>
<td>Moderate: Oil and gas.</td>
</tr>
<tr>
<td>Turtle Canyon</td>
<td>Coal, building stone, and sand and gravel.</td>
<td>High: Coal; Moderate: Oil and gas.</td>
</tr>
<tr>
<td>Wah Wah Mountains</td>
<td>Iron ore, limestone, dolomite, sandstone, quartzite, and volcanic rock.</td>
<td>Moderate: Lead, zinc, cadmium, antimony, tungsten, molybdenum, arsenic, bismuth, gold, and oil and gas.</td>
</tr>
<tr>
<td>Wahweap</td>
<td>Coal</td>
<td>High: Sand and gravel; Moderate: Oil and gas and coal.</td>
</tr>
<tr>
<td>The Watchman</td>
<td>Sandstone</td>
<td>Moderate: Oil and gas.</td>
</tr>
<tr>
<td>Westwater Canyon</td>
<td>Placer gold</td>
<td>High: Placer gold; Moderate: Gold, silver, copper, and barite.</td>
</tr>
<tr>
<td>White Rock Range</td>
<td>None</td>
<td></td>
</tr>
</tbody>
</table>
Area Name, Classification, Number, Size

Beartrap Canyon Wilderness Study Area
UT-040-177
40 acres

BLM District
Cedar City

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

Inferred subeconmic resources of sandstone, suitable for construction, and limestone, suitable for agricultural purposes or aggregate occur in the Beartrap Canyon Wilderness Study Area (WSA).

Mineral Resource Potential

The study area has a moderate energy resource potential for small oil and gas pools in Paleozoic- and Mesozoic-age rock. A low potential exists for other resources including all metals and geothermal sources. There is no potential for coal.

Mining Activity

There has been no recorded mineral production from the WSA. No mining districts, mines, or claims are in the study area. The nearest mining district is the Silver Reef (Harrisburg) district, about 18 mi to the southwest. Oil and gas leases cover all of the study area.

Mineral Setting/Geology

The study area consists of gently-dipping Jurassic-age sedimentary rocks. These are largely sandstone and mudstone. Neither is favorable for hosting mineral deposits in this area.

Recommendations

Possibly drilling to determine the presence of petroleum at depth.
References


EXPLANATION OF IDENTIFIED RESOURCES AND MINERAL AND ENERGY RESOURCE POTENTIAL

All eight study areas have a low mineral and energy resource potential for all metals (including silver and uranium) and geothermal sources, with certainty level D. The Orderville Canyon, North Fork Virgin River, and Deep Creek study areas have a low energy resource potential for coal, with certainty level D; the other five study areas have no potential for coal, with certainty level D. Although the Orderville Canyon, North Fork Virgin River, and Deep Creek study areas have identified resources of gypsum, they have no mineral resource potential for additional gypsum, with certainty level D; the other five study areas have no potential for gypsum, with certainty level D].

Area of identified resources of gypsum

Geologic terrane having a moderate energy resource potential for oil and gas, with certainty level C—Applies to entirety of all eight study areas

Approximate boundary of wilderness study area

Certainty levels

B  Data indicate geologic environment and suggest level of resource potential

C  Data indicate geologic environment and resource potential but do not establish activity of resource-forming processes

D  Data clearly define geologic environment and level of resource potential, and indicate activity of resource-forming processes in all or part of study area

Identified resources and mineral and energy resource potential of the eight wilderness study areas, Washington and Kane Counties, Utah.
Area Name, Classification, Number, Size

Behind the Rocks Wilderness Study Area
UT-060-140A
12,635 acres

BLM District
Moab

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

Sandstone for construction purposes is the only resource at the surface in the Behind the Rocks Wilderness Study Area (WSA); however, based on geologic evidence, inferred resources of potash exist under the study area. Drilling would be required to determine the amount of and depth to the resources. If the potash is developed, solution mining techniques could be employed.

Oil and gas may be present in the Pennsylvanian-age rocks below the study area, because favorable structures are present, but drilling would be necessary to prove they are petrolierous. Uranium may exist at depth in the Chinle Formation, but drilling is required to determine its presence.

Mineral Resource Potential

The study area has a high energy resource potential for small oil and gas pools in Paleozoic- and Mesozoic-age rocks. A low potential exists for other resources including all metals and geothermal sources. There is no potential for coal.

Mining Activity

The WSA is in the Moab uranium district, but there are no mines inside the study area.

The Cane Creek Mine, operated by Texasgulf, Inc., produces potash from the Cane Creek Anticline about 3 mi west of the WSA. The estimated annual capacity from the facility is 110,000 metric tons of potassium-oxide equivalent. Within 25 mi of the study area, oil and gas fields have produced over 40 million barrels of oil and over 400 billion cubic feet of gas, mostly from the Mississippian-age Leadville Limestone. Less than 3 mi southwest of the study area, 87,000 tons of uranium ore was mined from the Morrison Formation. Within 9 mi, 400,000 tons of uranium ore was mined from the Chinle Formation. There has been no production from inside the WSA.

Sand and gravel is currently produced from the flood plain of the Colorado River, just outside the northern boundary of the study area. Gold is a by-product of the operation.
BEHIND THE ROCKS--Continued

Mining Activity--Continued

The study area contains parts of three blocks of mining claims located for uranium, but no uranium occurrences were found on the surface in the WSA. Oil and gas leases cover approximately 1,750 acres of the study area.

Mineral Setting/Geology

The study area is underlain by flat- to gently-dipping Mesozoic- and Paleozoic-age sedimentary rocks adjacent to a major collapsed salt anticline.

Recommendations

A geophysical survey should be conducted to determine regional structure and tectonic setting related to the assessment of the oil and gas potential of the WSA.

References


Doelling, H. H., 1969, Mineral resources, San Juan County, Utah, and adjacent area, Part II: uranium and other metals in sedimentary host rocks: Utah Geological and Mineralogical Survey Special Studies 24, 64 p.


EXPLANATION

[Entire wilderness study area has inferred subeconomic resources of potash and halite in the subsurface]

**H/B** Geologic terrane having high resource potential for oil and gas with certainty level B—Applies to entire study area

**L/C** Geologic terrane having low resource potential for uranium, copper, vanadium, gold, silver, other metals, and geothermal energy, with certainty level C—Applies to entire study area

**N/D** Geologic terrane having no mineral resource potential for additional potash and halite, or coal, with certainty level D—Applies to entire study area

**U/A** Geologic terrane having unknown mineral resource potential for rare-earth mineral braitschite, with certainty level A—Applies to entire study area

---

**X** Site of gold- and silver-bearing panned-concentrate sample

Levels of certainty

**A** Available information not adequate to define mineral resource potential

**B** Available information suggests level of mineral resource potential

**C** Available information gives good indication of level of mineral resource potential

**D** Available information clearly defines level of mineral resource potential

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**Behind the Rocks WSA**
Study Area, Utah.

Map showing mineral resource potential and location of the Behind the Rocks Wilderness Study Area (UT-060-140A)
Area Name, Classification, Number, Size  
Black Ridge Canyons West Wilderness Study Area  
UT-060-116/117/CO-070-113  
72,440 acres

BLM District  
Moab

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

No mineral resources were identified in the Black Ridge Canyons West Wilderness Study Area (WSA).

Mineral Resource Potential

The study area has a high potential for placer gold resources in river-deposited gravels in the northwestern tip of the part of the WSA in Utah. The WSA has a low potential for uranium, gold, mercury, copper, silver, oil, gas, carbon dioxide, and coal from sedimentary rocks, chromium, nickel, and cobalt from ultramafic rocks, and for geothermal energy.

Mining Activity

The WSA is not part of any organized mining district and there has been no known minerals-related activity within the study area.

Mineral Setting/Geology

The study area is underlain by flat-lying Mesozoic-age sedimentary rocks and poorly consolidated Quaternary-age deposits. Precambrian-age crystalline rocks crop out in canyons near the study area.

Recommendations

None
References


Black Ridge Canyons WSA
Westwater Canyon WSA

EXPLANATION OF MINERAL RESOURCE POTENTIAL

Area of identified dimension stone resource

Area of identified subeconimic placer gold, sand, and gravel resource

Geologic terrane having high mineral resource potential for placer gold, with certainty level D

Geologic terrane having moderate mineral resource potential for uranium in the Morrison Formation, with certainty level C

Geologic terrane having moderate mineral resource potential for gold, silver, copper, and barite in vein deposits, with certainty level C

Geologic terrane having low mineral resource potential for uranium, gold, mercury, copper, and silver in sedimentary rocks, for gold, silver, copper, and barite in vein deposits, for chromium, nickel, and cobalt in ultramafic rocks, and for geothermal energy and coal, with certainty level C

Geologic terrane having low mineral resource potential for geothermal energy, oil, gas, and carbon dioxide, with certainty level C

Geologic terrane having low mineral resource potential for oil, gas, and carbon dioxide, with certainty level D

Geologic terrane having no mineral resource potential for uranium in the Morrison Formation or for coal, with certainty level D
EXPLANATION
- Paved roads and maintained dirt roads
- Unmaintained dirt roads
- Sand and gravel pit
- Mine or quarry
- Adit
- Prospect pit
- Dinosaur fossil locality

Summary map showing mineral resource potential of the Black Ridge Canyons and Westwater Canyon Wilderness Study Areas, Colorado and Utah.
### Area Name, Classification, Number, Size

<table>
<thead>
<tr>
<th>Area Name</th>
<th>Classification</th>
<th>Number</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Blues Wilderness Study Area*</td>
<td></td>
<td>UT-040-268</td>
<td>19,030 acres</td>
</tr>
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### BLM District

<table>
<thead>
<tr>
<th>BLM District</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cedar City</td>
</tr>
</tbody>
</table>

### Mineral Commodity Significance

#### Identified Mineral Resources & Significant Occurrences

Coal beds, as thick as 12 ft, are in the Straight Cliffs Formation in The Blues Wilderness Study Area (WSA). An estimated 245 million tons of coal underlie the WSA.

### Mineral Resource Potential

The study area has a high potential for coal resources in the Dakota and Straight Cliffs Formations and a moderate potential for titanium resources in the Straight Cliffs Formation. The WSA also has a moderate potential for oil and gas, and carbon dioxide resources. There is a low potential for uranium, vanadium and other metals, and for geothermal energy resources.

### Mining Activity

The WSA is in the Kaiparowits Plateau Coal Field. Coal has been mined in and near the WSA: currently, there is no mining activity in the study area.

Three coal mines are in the WSA: the Davies Mine was active in 1952 and 1953, and produced about 100 tons of coal, the Pollock Mine was active in the 1920's; but no production records were found, and the Shakespear Mine was active between 1952 and 1963 and produced an average of 480 tons/yr coal.

### Mineral Setting/Geology

The study area is underlain by the gently-folded Cretaceous-age sedimentary rocks of the Kaiparowits, Wahweap, and Straight Cliffs Formations and the Tropic Shale. The Jones Valley anticline and the Posture Canyon syncline are in the study area.

*THIS AREA HAS NOT BEEN STUDIED BY USBM & USGS*
THE BLUES—Continued

Recommendations

The study area should be examined by the U.S. Geological Survey and the Bureau of Mines. A detailed geochemical study should be conducted over the entire WSA to target specific areas for mineral resource potential. A geophysical survey should be conducted to determine regional structure and tectonic setting related to the assessment of mineral and energy resource potential.

References


The Blues Wilderness Study Area

Map showing the mineral resource potential of The Blues Wilderness Study Area, Garfield County, Utah.
Area Name, Classification, Number, Size
Bridger Jack Mesa Wilderness Study Area
UT-060-167
5,290 acres

BLM District
Moab

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

No mineral occurrences or resources were identified at the surface in the Bridger Jack Mesa Wilderness Study Area (WSA). However, a reported uranium deposit lies at depth partially within the northwest boundary.

Mineral Resource Potential

There is a high potential for uranium, vanadium, and copper in the northern quarter of the WSA. There is a moderate potential for oil and gas in the study area and a low potential for placer gold, silver, potash, halite, geothermal sources, coal, and metals other than uranium, vanadium, and copper.

Mining Activity

The northern part of the WSA is in the Indian Creek area of the Monticello uranium district; the southern part borders the northern part of the Elk Ridge area of the White Canyon uranium district. No prospects or mines are inside the study area; mining claims cover most of the Chinle Formation outcrop in and near the WSA.

Drilling by Plateau Resources in 1978, encountered a uranium deposit partially within the northwest boundary.

Mineral Setting/Geology

The study area is underlain by Late Paleozoic- and Mesozoic-age sedimentary rocks. The Bridger graben is a down-faulted block that extends into the southern part of the WSA.

Recommendations

None
References

Doelling, H. H., 1969, Mineral resources, San Juan County, Utah, and adjacent area, Part II: uranium and other metals in sedimentary host rocks: Utah Geological and Mineralogical Survey Special Studies 24, 64 p.


EXPLANATION

[The entire Indian Creek Wilderness Study Area has inferred subeconomic resources of potash and halite in the subsurface]

H/C Geologic terrane having high mineral resource potential for uranium, and by-products vanadium and copper (north quarter of Bridger Jack Mesa Wilderness Study Area) with certainty level C

M/B Geologic terrane having moderate mineral resource potential for oil and gas with certainty level B—Applies to entire area of each of the three wilderness study areas

L/C Geologic terrane having low resource potential for uranium and associated by-products vanadium and copper, potash and halite (in the subsurface), gold, silver, and all other metals, and coal and geothermal energy, with certainty level C—Applies to entire area of each of the three wilderness study areas except for uranium, vanadium, and copper in the north quarter of Bridger Jack Mesa Wilderness Study Area

U/A Geologic terrane having unknown resource potential for rare-earth elements, with certainty level A—Applies to entire area of each of the three wilderness study areas

Level of certainty

A Available information is not adequate for determination of the level of resource potential

B Available information suggests level of resource potential

C Available information gives good indication of level of mineral resource potential

Mines and prospects

Unpaved road

Bridger Jack Mesa WSA
Butler Wash WSA
Indian Creek WSA
Mineral resource potential and location of the Indian Creek, Bridger Jack Mesa, and Butler Wash Wilderness Study Areas.
Area Name, Classification, Number, Size
Bull Canyon Wilderness Study Area
UT-080-419/CO-010-001
11,700 acres

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

The Bull Canyon Wilderness Study Area (WSA) is underlain by the Glen Canyon Sandstone of Jurassic-Triassic age. Although the sandstone contains too many impurities (iron, chromium, and aluminum) to be used in the glass-making industry, it can be used as foundry, fracturing, and abrasive sand. A lack of local markets makes development highly unlikely.

The area may contain deposits of oil and gas in structural traps in the Weber Sandstone at depth.

Mineral Resource Potential

The entire study area has a low mineral resource potential for all metals, including uranium, and oil and gas.

Mining Activity

None

Mineral Setting/Geology

The WSA is underlain by mostly flat-lying Triassic- through Cretaceous-age sedimentary rocks. Two plunging folds make up the surface structure, but beds dip no more than a few degrees. A low-angle, north-trending reverse fault associated with a major fold may be present at depth.

Recommendations

None
References


Approximate boundary of the Bull Canyon Wilderness Study Area (CO-010-001/UT-080-419).

EXPLANATION

L/B Geologic terrane having low mineral resource potential with certainty level B for all metals including uranium, and oil and gas—Applies to entire study area.

Paved road
Unpaved road

Mineral resource potential and index map of the Bull Canyon Wilderness Study Area, Moffat County, Colorado, and Uintah County, Utah.
### Area Name, Classification, Number, Size

<table>
<thead>
<tr>
<th>Area Name</th>
<th>Classification</th>
<th>Number</th>
<th>Size</th>
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</thead>
<tbody>
<tr>
<td>Bullet Canyon Wilderness Study Area*</td>
<td>UT-060-196</td>
<td>8,730 acres</td>
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</tr>
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</table>

### BLM District

<table>
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<th>BLM District</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moab</td>
</tr>
</tbody>
</table>

### Mineral Commodity Significance

#### Identified Mineral Resources & Significant Occurrences

No mineral resources were identified in the Bullet Canyon Wilderness Study Area (WSA).

#### Mineral Resource Potential

The study area has a moderate mineral resource potential for oil and gas, and a low mineral resource potential for uranium, vanadium, and other metals, coal, and geothermal energy.

### Mining Activity

There are no mining claims located in the WSA. Approximately 8,500 acres are covered by oil and gas leases.

### Mineral Setting/Geology

The area is underlain by relatively flat-lying sedimentary rocks of the Permian-age Cedar Mesa Sandstone.

### Recommendations

A detailed geochemical study should be conducted over the entire area to target specific areas of mineral resource potential. A geophysical study should be conducted to determine regional structure and tectonic setting related to the assessment of resource potential.

*THIS AREA HAS NOT BEEN STUDIED BY USBM & USGS*
References


Approximate Boundary
Pine Canyon
Wilderness Study Area

Approximate Boundary
Sheiks Flat
Wilderness Study Area

Approximate Boundary
Bullet Canyon
Wilderness Study Area

Approximate Boundary
Grand Gulch Complex
Instant Study Area

Approximate Boundary
Slickhorn Canyon
Wilderness Study Area

Explanation:

M/B Moderate mineral resource potential for oil and gas.
L/B Low mineral resource potential for uranium, vanadium and other metals, coal, and geothermal energy.

Map showing the mineral resource potential of
the Bullet Canyon Wilderness Study Area, San Juan County, Utah.
Area Name, Classification, Number, Size

Bull Mountain Wilderness Study Area
UT-050-242
11,800 acres

BLM District
Richfield

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

No mineral resources were identified in the Bull Mountain Wilderness Study Area (WSA). Gypsum occurs adjacent to the northeast boundary.

Mineral Resource Potential

The northern part of the study area has a high mineral resource potential for gypsum. The entire WSA has a low mineral resource potential for copper, lead, zinc, molybdenum, silver, gold, uranium and vanadium, coal, oil and gas, and geothermal resources.

Mining Activity

There has been no recorded mineral production from within the WSA. At least 1,000 oz gold, 3,000 oz silver, and 17,500 lb copper have been produced within 3 mi of the WSA.

The East Henry Mountains uranium district is adjacent to the eastern side of the WSA. Bromide Basin, 1.5 mi south, was the source of most of the precious metal and copper production from the Henry Mountains. Placer gold mining from Crescent Creek (which originates in Bromide Basin) is intermittent.

Patented lode claims are in Bromide Basin. Unpatented lode claims, primarily for uranium, blanket much of the study area. Unpatented placer claims are along Crescent Creek.

Mineral Setting/Geology

The study area is in the northern Henry Mountains. Sedimentary rocks in the WSA range in age from Middle Jurassic to Late Cretaceous. Bull Mountain, in the center of the study area, is formed from a bysmalith, a satellite igneous body intruded from the main igneous center of Mt. Ellen, a few miles south of the WSA.
Recommendations

None

References


EXPLANATION OF MINERAL RESOURCE POTENTIAL

H/C  Geologic terrane having high mineral resource potential for gypsum, with certainty level C

H/B  Geologic terrane having high mineral resource potential for gypsum, with certainty level B

L/B  Geologic terrane having low mineral resource potential for uranium and vanadium, with certainty level B—Applies to entire study area

L/C  Geologic terrane having low mineral resource potential for copper, lead, zinc, molybdenum, silver, gold, coal, oil and gas, and geothermal energy, with certainty level C—Applies to entire study area

Levels of certainty

B  Data indicate geologic environment and suggest level of resource potential

C  Data indicate geologic environment, indicate resource potential, but do not establish activity of resource-forming processes

Bull Mountain WSA
Summary map showing mineral resource potential of the Bull Mountain Wilderness Study Area, Garfield and Wayne Counties, Utah.
Burning Hills Wilderness Study Area*
UT-040-079
61,550 acres

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

Coal beds crop out in the Burning Hills Wilderness Study Area (WSA) in the Straight Cliffs Formation and beds about 14 ft thick lie under the WSA. About 928 million tons of coal, of which 1/3 to 1/2 is recoverable, lies beneath the WSA. Uranium could exist at depths of 1,500 ft to 4,000 ft in the Morrison and Chinle Formations, respectively.

Mineral Resource Potential

The entire study area has a high mineral potential for coal in the Straight Cliffs Formation and the Dakota Sandstone and for titanium in the John Henry Member of the Straight Cliffs Formation.

The entire WSA also has a moderate mineral resource potential for oil, gas, carbon dioxide, and geothermal sources in the subsurface, and for uranium and thin beds of gypsum in the surface and subsurface. The study area has a low mineral resource potential for all metals other than titanium and uranium.

Mining Activity

There are no known mines or prospects in the WSA.

Mineral Setting/Geology

The entire WSA is underlain by Paleozoic- and Mesozoic-age sedimentary rocks that are gently folded into a series of broad anticlines and synclines. The Wahweap and Straight Cliffs Formations and the Tropic Shale are exposed. Favorable rock units and structures for oil and gas accumulations are in the subsurface of the study area, but test wells drilled near the area were dry. The Carmel Formation contains thin beds of gypsum.

*THIS AREA HAS NOT BEEN STUDIED BY USBM & USGS
Recommendations

The study area should be studied as part of a comprehensive mineral survey. Coal resources and reserves should be calculated.

References


Approximate Boundary
Burning Hills
Wilderness Study Area

-Explanation-
H/B High mineral resource potential for coal in the Straight Cliffs Formation and Dakota Sandstone and for titanium in the John Henry Member of the Straight Cliffs Formation.
M/B Moderate mineral resource potential for oil, gas, carbon dioxide, uranium, gypsum and geothermal energy.
L/B Low mineral resource potential for all metals other than uranium and titanium.

Map showing the mineral resource potential of the Burning Hills Wilderness Study Area, Kane County, Utah.
**Area Name, Classification, Number, Size**

Butler Wash Wilderness Study Area  
UT-060-169  
24,190 acres

**BLM District**  
Moab

**Mineral Commodity Significance**

**Identified Mineral Resources & Significant Occurrences**

No mineral occurrences or resources were identified at the surface in the Butler Wash Wilderness Study Area (WSA).

**Mineral Resource Potential**

There is a moderate potential for oil and gas in the study area and a low potential for uranium, vanadium, copper, placer gold, silver, and other metals, potash, halite, geothermal sources, and coal.

**Mining Activity**

The WSA borders the northern part of the Elk Ridge area of the White Canyon uranium district. No prospects or mines are present inside the study area; however, mining claims cover most of the Chinle Formation outcrops in and near the WSA.

**Mineral Setting/Geology**

The WSA is underlain by Late Paleozoic- and Mesozoic-age sedimentary rocks. The block faulted structural zone known as "the Grabens" extends into the northern part of the study area.

**Recommendations**

None

**References**

Doelling, H. H., 1969, Mineral resources, San Juan County, Utah, and adjacent areas Part II: uranium and other metals in sedimentary host rocks: Utah Geological and Mineralogical Survey Special Studies 24, 64 p.
References--Continued


EXPLANATION

[The entire Indian Creek Wilderness Study Area has inferred subeconomic resources of potash and halite in the subsurface]

**H/C** Geologic terrane having high mineral resource potential for uranium, and by-products vanadium and copper (north quarter of Bridger Jack Mesa Wilderness Study Area) with certainty level C

**M/B** Geologic terrane having moderate mineral resource potential for oil and gas with certainty level B—Applies to entire area of each of the three wilderness study areas

**L/C** Geologic terrane having low resource potential for uranium and associated by-products vanadium and copper, potash and halite (in the subsurface), gold, silver, and all other metals, and coal and geothermal energy, with certainty level C—Applies to entire area of each of the three wilderness study areas except for uranium, vanadium, and copper in the north quarter of Bridger Jack Mesa Wilderness Study Area

**U/A** Geologic terrane having unknown resource potential for rare-earth elements, with certainty level A—Applies to entire area of each of the three wilderness study areas

**Level of certainty**

**A** Available information is not adequate for determination of the level of resource potential

**B** Available information suggests level of resource potential

**C** Available information gives good indication of level of mineral resource potential

adox Mines and prospects

Unpaved road

Bridger Jack Mesa WSA
Butler Wash WSA
Indian Creek WSA
Mineral resource potential and location of the Indian Creek, Bridger Jack Mesa, and Butler Wash Wilderness Study Areas.
### Area Name, Classification, Number, Size

<table>
<thead>
<tr>
<th>Canaan Mountain Wilderness Study Area</th>
<th>BLM District</th>
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</thead>
<tbody>
<tr>
<td>UT-040-143/AZ-001-041</td>
<td>Cedar City</td>
</tr>
</tbody>
</table>

53,600 acres; 38,000 acres designated suitable for wilderness were studied.

### Mineral Commodity Significance

#### Identified Mineral Resources & Significant Occurrences

Although minor amounts of platinum and palladium were detected in four samples from near the Canaan Mountain Wilderness Study Area (WSA), the concentrations are too low to be of commercial interest and development is not economically feasible now or in the foreseeable future.

- Deposits of sandstone, sand and gravel, and clay in the study area have no unique qualities to make them more valuable than the massive quantities in the surrounding area.

### Mineral Resource Potential

The study area has a moderate energy resource potential for small oil and gas pools in Paleozoic and Mesozoic rocks. A low potential exists for copper, gold, lead, silver, zinc, manganese, uranium, coal, and geothermal resources.

### Mining Activity

As of April 1989, about 200 unpatented mining claims had been located in the study area. Assessment work on the claims has been kept up through September 1988. In the 1950's, a uranium mine was reportedly developed in the northern part of the study area, but it could not be located in 1985.

### Mineral Setting/Geology

The study area consists mainly of mudstones and sandstones of Triassic and Jurassic age. The Chinle Formation (Triassic) is known to contain uranium in many parts of Utah, and the Springdale Sandstone (Jurassic) contains silver nearby. Both the Chinle and Springdale underlie the WSA.
Recommendations

None.

References


EXPLANATION OF RESOURCE POTENTIAL

**M/C** Geologic terrane having moderate energy resource potential for oil and gas, with certainty level C—Applies to all of each area

**L/C** Geologic terrane having low resource potential for copper, gold, lead, silver, zinc, uranium, and geothermal energy, with certainty level C—Applies to all of each area

**L/D** Geologic terrane having low resource potential for coal and manganese, with certainty level D—Applies to all of each area

Levels of certainty

**C** Data indicate geologic environment and resource potential, but do not establish activity of resource-forming processes

**D** Data clearly define geologic environment and level of resource potential and indicate activity of resource-forming processes in all or part of the area

Summary map showing mineral resource potential of the Canaan Mountain and The Watchman Wilderness Study Areas, Washington and Kane Counties, Utah.
The Carcass Canyon Wilderness Study Area (WSA) is underlain by significant coal beds of the Straight Cliffs Formation and the Dakota Sandstone. The Salt Wash Member of the Morrison Formation, which underlies the WSA, has been the object of uranium exploration in the region. Titanium-bearing sandstone units are in the John Henry Member of the Straight Cliffs Formation. The Carmel Formation contains thin beds of gypsum.

Mineral Resource Potential

The entire study area has a high mineral resource potential for coal in the Straight Cliffs Formation and Dakota Sandstone and a moderate mineral resource potential for oil and gas, carbon dioxide, and geothermal sources in the subsurface and for uranium and thin beds of gypsum in the surface and subsurface.

The study area also has a low mineral resource potential for all metals other than uranium.

Mining Activity

Coal has been mined from the Straight Cliffs Formation in the Alvey Wash area within 2 mi of the WSA. Production is unknown but was small and for local use only.

No significant uranium mining has occurred within 20 mi of the WSA.

Mineral Setting/Geology

The entire WSA is underlain by Paleozoic- and Mesozoic-age sedimentary rocks that are gently folded into a series of broad anticlines and synclines. The Wahweap and Straight Cliffs Formations are exposed.

*THIS AREA HAS NOT BEEN STUDIED BY USBM & USGS
Mineral Setting/Geology--Continued

Favorable rock units and structures for oil and gas are in the subsurface of the study area, but test wells drilled near the area were dry.

Recommendations

The study area should be studied as part of a comprehensive mineral survey. A detailed geophysical survey would characterize the regional structure and tectonic setting. Coal resources and reserves should be calculated.

References


-Explanation-

**H/B** High mineral resource potential for coal in the Straight Cliffs Formation and Dakota Sandstone and for titanium in the John Henry Member of the Straight Cliffs Formation.

**M/B** Moderate mineral resource potential for oil, gas, carbon dioxide, uranium, gypsum and geothermal energy.

**L/B** Low mineral resource potential for all metals other than uranium and titanium.

Approximate Boundary
Carcass Canyon Wilderness Study Area

Map showing the mineral resource potential of the Carcass Canyon Wilderness Study Area, Kane County, Utah.
**Area Name, Classification, Number, Size**  
Cedar Mountains Wilderness Study Area*  
UT-020-094  
50,500 acres

**BLM District**  
Salt Lake

**Mineral Commodity Significance**

**Identified Mineral Resources & Significant Occurrences**

A phosphate deposit occurs over 14,000 acres in the Cedar Mountains Wilderness Study Area (WSA). The deposit contains 220 million metric tons of at least 24% $P_2O_5$ of which 130 million metric tons is recoverable in the 140-ft-thick Park City Formation. The deposit is currently considered uneconomic.

Small aragonite deposits in fracture zones for use as a decorative stone occur in the northern part of the WSA.

**Mineral Resource Potential**

There is a high resource potential for phosphate in the Park City Formation. The WSA has a moderate resource potential for oil and gas. Formations that have produced coal and uranium in other parts of the state are absent from the study area and the mineral potential for these resources is low. There is a low potential for resources of geothermal energy. Because there have been recent discoveries of metal deposits in western Utah in terranes similar to those of the WSA, and because there currently are no geochemical or geophysical data from the study area, the resource potential for metals is unknown.

**Mining Activity**

There is no known mining activity within the study area.

**Mineral Setting/Geology**

The study area consists of normal and thrust faulted Mississippian- through Permian-age sedimentary rocks, including many carbonates. There are some isolated outcrops of Tertiary-age volcanic rocks.

*THIS AREA HAS NOT BEEN STUDIED BY USBM & USGS*
Recommendations

A detailed geochemical study should be conducted over the entire area to target specific areas for mineral resource potential. A geophysical survey should be conducted to determine regional structure and tectonic setting related to the assessment of mineral and energy resource potential.

References


Approximate Boundary
Cedar Mountains
Wilderness Study Area

- Explanation -

H/B - High mineral resource potential for phosphate in the Park City Formation.
M/B - Moderate mineral resource potential for oil and gas.
L/B - Low mineral resource potential for uranium, coal, and geothermal energy.
U/A - Unknown mineral resource potential for metals, excluding uranium.

Dirt Road
Mine

Map showing the mineral resource potential of the Cedar Mountains Wilderness Study Area, Tooele County, Utah.
CHEESEBOX CANYON*

Area Name, Classification, Number, Size          BLM District
Cheesebox Canyon Wilderness Study Area*          Moab
UT-060-191
27,520 acres

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

Uranium occurs in the Chinle Formation in the Cheesebox Canyon Wilderness Study Area (WSA).

Mineral Resource Potential

The WSA has a moderate mineral resource potential for uranium and copper in the Shinarump Conglomerate of the Chinle Formation and for oil and gas. There is a low resource potential for other metals, coal, and geothermal energy.

Mining Activity

The study area is in the White Canyon uranium mining district. Most of the deposits have produced less than 10 tons of uranium oxide.

Mineral Setting/Geology

The WSA is underlain by flat-lying sedimentary rocks of Permian and Triassic age.

Recommendations

A detailed geochemical study should be conducted over the entire area to target specific areas for mineral resource potential. A geophysical study should be conducted to determine regional structure and tectonic setting related to the assessment of mineral and energy resource potential.

*THIS AREA HAS NOT BEEN STUDIED BY USBM & USGS
References


Approximate Boundary
Cheesebox Canyon
Wilderness Study Area

M/B Moderate mineral resource potential for uranium, copper, oil and gas.
L/B Low mineral resource potential for other metals, coal, and geothermal energy.

Map showing the mineral resource potential of
the Cheesebox Canyon Wilderness Study Area, San Juan County, Utah.
### Area Name, Classification, Number, Size

<table>
<thead>
<tr>
<th>Coal Canyon Wilderness Study Area</th>
<th>UT-060-100C</th>
</tr>
</thead>
<tbody>
<tr>
<td>61,430 acres; 20,744 acres designated suitable for wilderness were studied.</td>
<td></td>
</tr>
</tbody>
</table>

### BLM District

| Moab |

### Mineral Commodity Significance

#### Identified Mineral Resources & Significant Occurrences

Over 183 million tons of coal resources have been calculated to underlie the Coal Canyon Wilderness Study Area (WSA). The reserve base (total of measured and indicated resources) is over 22 million tons.

The study area is surrounded by producing oil and gas fields (gas is predominant). The Left Hand Canyon field is wholly in the southern part of the WSA.

### Mineral Resource Potential

There is a high potential for coal, oil, and gas for the entire study area. There is a low potential for oil shale, tar sand, uranium, metal deposits, and geothermal energy.

### Mining Activity

Although the WSA is within the Sego Coal Field, no coal production has been reported from inside the boundary, but over 2 million tons were mined at Sego, about 5 mi south.

Total production of oil and gas from the region is about 216 billion cubic feet of gas and 2 million barrels of oil. Production from the Left Hand Canyon field is about 59 million cubic feet of gas and 20,000 barrels of oil.

### Mineral Setting/Geology

Flat-lying Late Cretaceous- and Tertiary-age sedimentary rocks make up the ridges and canyons of the WSA.

### Recommendations

None
References


Kreidler, T. J., 1989, Mineral resources of parts of the Coal (UT-060-100C), Spruce (UT-060-100C1), and Flume (UT-060-100B) Canyons Wilderness Study Areas, Grand County, Utah: U.S. Bureau of Mines Open-File Report MLA-89 (in press).

Approximate Boundary
Flume Canyon
Wilderness Study Area

Approximate Boundary
Spruce Canyon
Wilderness Study Area

Approximate Boundary
Coal Canyon
Wilderness Study Area

-EXPLANATION-

H/B - High mineral resource potential for coal, oil, and gas.
L/B - Low potential for oil shale, tar sand, uranium, metals, and geothermal energy.
ISCR - Inferred subeconomic coal resources
DCRR - Demonstrated coal reserves and resources.
Mine
Dirt Road

Map showing the mineral resource potential of the Coal Canyon Wilderness Study Area, Grand County, Utah.
### Area Name, Classification, Number, Size

<table>
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<th>Area Name</th>
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<tr>
<td>Cockscomb Wilderness Study Area</td>
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<td>UT-040-275</td>
<td>5,100 acres</td>
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### BLM District

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<tbody>
<tr>
<td>Cedar City</td>
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</tbody>
</table>

### Mineral Commodity Significance

**Identified Mineral Resources & Significant Occurrences**

Minor copper occurrences and subbituminous coal in the Dakota Sandstone exist in the Cockscomb Wilderness Study Area (WSA). Coal is limited in exposures and lenticular in nature. About 1.8 million tons of subeconomic coal resources were estimated.

### Mineral Resource Potential

The study area has a moderate mineral potential for resources of oil and gas. There is a low mineral resource potential for gold, arsenic, copper, manganese, uranium, and geothermal energy.

### Mining Activity

Four adits and four prospects were found in the WSA. Five unpatented mining claims are in the southwest corner; no workings were found on the claims.

### Mineral Setting/Geology

The study area is underlain by flat- to steeply-dipping sedimentary rocks of the Moenkopi, Chinle, Moenave, Kayenta, Navajo, Carmel, Entrada, and Dakota Formations.

### Recommendations

None

### References

References—Continued


Map showing the location of the Cockscomb Wilderness Study Area, Kane County, Utah.
-Explanation-

Identified subeconmic coal resources are in the Dakota Sandstone (Kd).

Geologic terrane having high mineral resource potential for sand and gravel, with certainty level C (applies to southern part of the Wahweap Wilderness Study Area).

Geologic terrane having moderate mineral resource potential for oil and gas, with certainty level C (applies to entire study areas).

Geologic terrane having moderate mineral resource potential for coal in the Straight Cliffs Formation, with certainty level C.

Geologic terrane having low mineral resource potential for arsenic, gold, copper, manganese, uranium (western part of Cockscomb Wilderness Study Area), and geothermal energy (applies to all of the study areas).
Map showing the mineral resource potential of the Cockscomb Wilderness Study Area, Kane County, Utah.
Area Name, Classification, Number, Size

Cold Springs Wilderness Study Area*
UT-080-103/CO-010-208
14,587 acres

BLM District
Vernal

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

No mineral resources were identified in the Cold Springs Wilderness Study Area (WSA).

Mineral Resource Potential

The WSA has a low resource potential for gold, uranium, copper, lead, zinc, and other metals and no potential for coal, phosphate, or oil and gas.

Mining Activity

There has been no mineral production nor are there any mining claims or oil and gas leases in the study area. Although 3 holes have been drilled for oil or gas in and near the WSA, there has been no resulting production.

Mineral Setting/Geology

The WSA is part of the Uinta uplift and is underlain by folded and faulted Precambrian-age metasedimentary rocks and Tertiary-age sedimentary rocks.

Recommendations

The WSA should be mapped in detail, geochemical stream sediment surveys should be conducted, and geophysical gravity and magnetic surveys should be completed to further define the mineral resource potential of the WSA.

*THIS AREA HAS NOT BEEN STUDIED BY USBM & USGS
References


Map showing the mineral resource potential of the Cold Springs Wilderness Study Area, Dagget County, Utah, and Moffat County, Colorado.
**Area Name, Classification, Number, Size**

Conger Mountain Wilderness Study Area*

UT-050-035  
20,400 acres

**BLM District**

Richfield

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**Mineral Commodity Significance**

**Identified Mineral Resources & Significant Occurrences**

No mineral resources have been identified in the Conger Mountain Wilderness Study Area (WSA).

**Mineral Resource Potential**

The study area has a high potential for oil and gas and a low potential for coal and geothermal energy. The WSA has an unknown potential for sediment-hosted gold and silver deposits localized by regional faulting.

**Mining Activity**

There are 251 mining claims in the southwest corner of the WSA, but no known commercial deposits of locatable minerals.

**Mineral Setting/Geology**

The study area is underlain mainly by Devonian- to Permian-age sedimentary rocks that are mainly limestones with lesser amounts of dolomite, siltstone, sandstone, and shale. The region is also underlain by thrust faults of the Sevier orogenic belt.

**Recommendations**

Although the general geology has been mapped, detailed mapping to delineate geologic structures and to seek areas of alteration, including jasperoids, is needed. A detailed geochemical study of stream-sediment and rock samples should be conducted over the entire study area to locate anomalies that could indicate mineral deposits.

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*THIS AREA HAS NOT BEEN STUDIED BY USBM USGS*
References


Map showing the location of the Conger Mountain Wilderness Study Area, Millard County, Utah.
High mineral resource potential for oil and gas.

Low mineral resource potential for coal and geothermal energy.

Unknown mineral resource potential for sediment-hosted gold and silver.

Dirt Road

Map showing the mineral resource potential of the Conger Mountain Wilderness Study Area, Millard County, Utah.
Area Name, Classification, Number, Size

Cottonwood Canyon Wilderness Study Area
UT-040-046
11,330 acres; 9,653 acres designated suitable for wilderness were studied.

BLM District
Cedar City

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

No mineral resources were identified in the Cottonwood Canyon Wilderness Study Area (WSA). Silver, copper, and uranium could occur in the Springdale Sandstone beneath the study area.

Mineral Resource Potential

The WSA has a high potential for geothermal energy, moderate potential for gold, silver, copper, uranium, and vanadium, low potential for oil and gas, and no potential for coal.

Mining Activity

There is no known mining activity within the study area. The nearby Silver Reef mining district produced about 8 million oz silver, 30 oz gold, 60 short tons copper, and 2,500 lb uranium oxide from the Springdale Sandstone.

Part of a large block of unpatented mining claims overlaps the eastern side of the study area. The Silver Reef district overlaps the eastern side; however, none of the production came from within the WSA.

Mineral Setting/Geology

The WSA is underlain by gently-inclined Mesozoic-age sedimentary rocks and some Cenozoic-age volcanic rocks. The study area is on the northwest limb of the Virgin anticline.

Recommendations

None
References


EXPLANATION OF MINERAL AND ENERGY RESOURCE POTENTIAL

[Entire study area has low resource potential for (1) oil and gas, with certainty level B, and (2) all metallic minerals other than silver, copper, gold, uranium, and vanadium, with certainty level C. Entire study area has no energy resource potential for coal, with certainty level D]

- **H/D M/B** Geologic terrane having (1) high energy resource potential for low-temperature geothermal sources, with certainty level D, and (2) moderate mineral resource potential for silver, copper, uranium, vanadium, and gold, with certainty level B

- **Certainty levels**
  - **B** Data indicate geologic environment and suggest level of resource potential
  - **C** Data indicate geologic environment and resource potential, but do not establish activity of resource-forming processes
  - **D** Data clearly define geologic environment and level of resource potential, and indicate activity of resource-forming processes in all or part of study area

- **Unpatented mining claims**
- **Oil and gas leases**—Information from the U.S. Bureau of Land Management as of August 1985
- **Graded road**

Summary map showing mineral and energy resource potential, mining claims, and oil and gas leases in the Cottonwood Canyon Wilderness Study Area and vicinity, Washington County, Utah.
**Area Name, Classification, Number, Size**

Cougar Canyon Wilderness Study Area
UT-040-123
15,968 acres; 6,919 acres designated suitable for wilderness were studied.

**BLM District**

Cedar City

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**Mineral Commodity Significance**

**Identified Mineral Resources & Significant Occurrences**

There are no mineral resources or significant occurrences in the Cougar Canyon Wilderness Study Area (WSA).

**Mineral Resource Potential**

The geologic environment is favorable for small deposits of gold, silver, copper, and mercury, but to date there is no indication that any of these commodities are present in appreciable amounts in the WSA. There is a low mineral resource potential for gold, silver, copper, and mercury resources and a low potential for zeolite and perlite resources as well as cinders and building stone in the study area.

**Mining Activity**

There are presently no claims or mining activity in the WSA or any indications of any activity in the past.

**Mineral Setting/Geology**

The WSA is on the Nevada-Utah border. Slightly- to moderately-tilted volcanic rocks of Miocene-age, related to the nearby Caliente caldera complex, are exposed in the area.

**Recommendations**

None
COUGAR CANYON--Continued

References


L / B - a low mineral resource potential for gold, silver, copper, and mercury and a low potential for zeolites, perlite, cinders, and building stone resources.

Map showing the mineral resource potential of the Cougar Canyon Wilderness Study Area, Lincoln County, Nevada, and Washington County, Utah.
Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

Uranium is the principle mineral commodity in the Crack Canyon Wilderness Study Area (WSA). Vanadium, copper, and petroleum (tar sands) are contained in some of the uranium-bearing zones. Within and adjacent to the study area about 220,000 tons of subeconomic resources containing between 500 ppm and 2,600 ppm $U_3O_8$ and between 1,200 ppm and 5,000 ppm $V_2O_5$. About 120,000 tons are in the WSA; 100,000 tons are at the Delta Mine. Additional resources could probably be disclosed by drilling. Because of the small size and the current depressed uranium market, these resources will not be minable in the foreseeable future.

Gypsum also occurs in the WSA, but it will not be mined in the foreseeable future because adequate supplies are being produced from gypsum deposits much closer to markets.

Mineral Resource Potential

The study area has a high potential for uranium and vanadium. The potential for oil and gas, carbon dioxide, helium, sulfur, bentonite, metallic deposits excluding uranium and vanadium, and geothermal energy is moderate.

Mining Activity

The Temple Mountain mining district is on the east end of the WSA, the Delta mining district is on the west end, and the Little Wild Horse mining district is in the southwest part. Uranium is the principle mineral commodity in all three districts. Within and adjacent to the WSA are 22 mines and prospects: 13 within the WSA and 9 nearby, but hosted by rocks that extend into the WSA. Between 1950 and 1973, about 430 tons of $U_3O_8$ were produced from three mines that are in the WSA. Some $V_2O_5$ and copper were recovered during the milling of the uranium ore; however, the amounts are unknown.

Most of the study area is covered by current mining claims and oil and gas leases.
Mineral Setting/Geology

The study area forms part of a continuous ring comprising the outer, relatively steeply-dipping part of the San Rafael Swell, an eroded structural dome. Faults, folds, and solution collapse features occur in the WSA.

Recommendations

Surface exposures of the uranium-bearing Chinle Formation have been examined thoroughly, but any mineralized zones that may be contained in the part of the Chinle that underlies the WSA are untested and would require exploration drilling through thick overburden.

Little work has been done on the Little Wild Horse Mesa gypsum, as with the uranium, drilling would be required to delineate reserves and additional resources.

References


Approximate Boundary
Crack Canyon Wilderness Study Area

-Explanation-

H/B - High mineral resource potential for uranium and vanadium.
M/B - Moderate mineral resource potential for oil, gas, carbon dioxide, helium, bentonite and geothermal energy.

Dirt Road
Mine

Map showing the mineral resource potential of the Crack Canyon Wilderness Study Area, Emery County, Uta
Area Name, Classification, Number, Size

Cross Canyon Wilderness Study Area*
UT-060-299/CO-030-265
12,588 acres

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

No mineral resources have been identified in the Cross Canyon Wilderness Study Area (WSA). Jurassic-age Morrison Formation hosts uranium-vanadium deposits and occurrences at several sites adjacent to the northern boundary. The Cretaceous-age Dakota Sandstone Formation inside the WSA contains thin, discontinuous coal beds.

Stratigraphic studies by oil companies indicate that the Pennsylvanian-age Paradox Formation, which contains the producing zones in five nearby oil and gas fields, underlies the WSA. Carbon dioxide and helium have been produced from nearby wells.

Mineral Resource Potential

The study area has a high mineral resource potential for oil and gas and a moderate potential for resources of uranium and vanadium in the Morrison Formation and for coal in the Dakota Formation. The potential for all other metals and geothermal energy is low.

Mining Activity

Prospecting and exploration drilling are the only minerals-related activities that have taken place in the WSA. Large blocks of lode mining claims were located for uranium during the 1970's but nearly all claims that were inside the study area have been abandoned. No significant deposits were discovered.

Mineral Setting/Geology

The WSA is in the Paradox Basin and is underlain by flat-lying Jurassic- and Cretaceous-age sedimentary rocks that were deposited in a terrestrial environment.

*THIS AREA HAS NOT BEEN STUDIED BY USBM & USGS
Recommendations

A detailed field examination of uranium-vanadium prospects in the Morrison Formation and of coal occurrences in the Dakota Sandstone should be conducted. Industrial mineral occurrences should be evaluated.

The WSA should be mapped in detail, geochemical stream sediment surveys should be conducted, and geophysical gravity, magnetic, and seismic surveys should be undertaken to further define the potential for mineral resources.

References


Approximate Boundary Cross Canyon Wilderness Study Area

-Explanation-

H/B  High mineral resource potential for oil and gas.
M/B  Moderate mineral resource potential for uranium, vanadium, and coal.
L/B  Low mineral resource potential for all other metals and geothermal energy.

Map showing the mineral resource potential of the Cross Canyon Wilderness Study Area, San Juan County, Utah.
Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

Flagstone was produced from a placer claim in the Daniels Canyon Wilderness Study Area (WSA) from 1959 to 1982. The resource still exists but production has been curtailed in recent years. No other mineral resources are known to occur in the WSA.

Mineral Resource Potential

The entire study area has a low energy resource potential for oil and gas. Stratigraphic traps in sedimentary rocks may be present. The entire study area also has a low mineral resource potential for copper, uranium, and vanadium in the Chinle Formation and for all other metals and geothermal energy.

Mining Activity

There are lode mining claims currently being maintained in the WSA. Although copper carbonates are exposed, the claims were staked for gold and silver according to one claimant.

Mineral Setting/Geology

The entire study area is overlain by mostly flat-lying Paleozoic- and Mesozoic-age sedimentary rocks. Chinle, Moenkopi, and Park City Formations, Weber Sandstone, and Bishop Conglomerate are exposed in the WSA. The Jensen syncline is projected across the study area, but beds dip only gently away from the syncline axis. No major faults transect the area.

Recommendations

A detailed geochemical study should be conducted over the entire study area to target specific areas for mineral resource potential. A geophysical survey should be conducted

*THIS AREA HAS NOT BEEN STUDIED BY USBM & USGS

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Recommendations--Continued

to classify regional structure and tectonic setting related to assessment of oil and gas potential.

References


L/B Geologic terrane having low mineral resource potential for all metals, including uranium, vanadium, and copper, geothermal energy, oil and gas, with certainty level B - Applies to entire study area.

Map showing the mineral resource potential of the Daniels Canyon Wilderness Study Area, Uintah County, Utah.
Death Ridge Wilderness Study Area*  
UT-040-078  
62,870 acres

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

The Death Ridge Wilderness Study Area (WSA) is underlain by significant coal beds of the Straight Cliffs Formation and the Dakota Sandstone.

Mineral Resource Potential

The entire study area has a high mineral resource potential for coal in the Straight Cliffs Formation and Dakota Sandstone and for titanium in the John Henry Member of the Straight Cliffs Formation. The entire study area also has a moderate mineral resource potential for oil and gas, carbon dioxide, geothermal sources, uranium, and gypsum in the subsurface and a low mineral resource potential for all metals other than titanium and uranium.

Mining Activity

Coal has been mined from the Straight Cliffs Formation within 8 mi of the WSA in the Alvey Wash area. Production was small and for local use only.

No significant uranium mining has occurred within 20 mi of the WSA.

Mineral Setting/Geology

The entire study area is underlain by Paleozoic- and Mesozoic-age sedimentary rocks that are gently-folded into a series of broad anticlines and synclines. The Kaiparowits, Wahweap, and Straight Cliffs Formations are exposed.

Favorable rock units and structures for oil and gas accumulation are in the subsurface of the study area.

*THIS AREA HAS NOT BEEN STUDIED BY USBM & USGS
Recommendations

Coal resources and reserves should be calculated and classified.

References


Map showing the mineral resource potential of the Death Ridge Wilderness Study Area, Garfield and Kane Counties, Utah.
Area Name, Classification, Number, Size

Deep Creek Wilderness Study Area
UT-040-146
3,320 acres

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

Inferred subeconomic resources of gypsum in the Carmel Formation, suitable for building materials, fertilizer, cement, and many other products, sandstone, suitable for construction purposes, and limestone, suitable for agricultural purposes or aggregate were identified in the Deep Creek Wilderness Study Area (WSA).

Mineral Resource Potential

The study area has a moderate energy resource potential for small oil and gas pools in Paleozoic- and Mesozoic-age rock. A low potential exists for other resources including all metals, geothermal sources, and coal.

Mining Activity

There has been no known mineral production from the WSA. No mining districts, mines, or claims are in the study area. The nearest mining district is the Silver Reef (Harrisburg) district, about 22 mi to the southwest.

Mineral Setting/Geology

The study area consists of gently-dipping Jurassic- and Cretaceous-age sedimentary rock. These are largely sandstone, mudstone, limestone, and shale. None is favorable for hosting mineral deposits. Coal was mined from younger Cretaceous rock east of the WSA.

Recommendations

Deep drilling would be required to evaluate oil and gas possibilities.
References


EXPLANATION OF IDENTIFIED RESOURCES AND MINERAL AND ENERGY RESOURCE POTENTIAL

Area of identified resources of gypsum

Geologic terrane having a moderate energy resource potential for oil and gas, with certainty level C—Applies to entirety of all eight study areas

Approximate boundary of wilderness study area

Certainty levels

B  Data indicate geologic environment and suggest level of resource potential

C  Data indicate geologic environment and resource potential but do not establish activity of resource-forming processes

D  Data clearly define geologic environment and level of resource potential, and indicate activity of resource-forming processes in all or part of study area

Identified resources and mineral and energy resource potential of the eight wilderness study areas, Washington and Kane Counties, Utah.
Area Name, Classification, Number, Size

Deep Creek Mountains Wilderness Study Area
UT-020-060/UT-050-020
68,910 acres; 57,384 acres designated suitable for wilderness were studied.

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

The Goshute Canyon mineralized area, from 0.1 to 1 mi east of the Deep Creek Mountains Wilderness Study Area (WSA) contains marginally economic indicated gold resources of 290,000 short tons of 0.250 oz/st, 450,000 short tons of 0.474 oz/st, 6,700 short tons of 1.41 oz/st, and 15,000 short tons of 0.311 oz/st. The vein system at this location contains a marginally economic inferred gold resource of 5.7 million short tons of 0.4 oz/st.

The Queen of Sheba Mine, 1 mi west of the WSA contains an inferred marginally economic gold resource of 75,000 short tons of 0.218 oz/st. The Inclined Shaft working, 1 mi southeast contains an inferred marginally economic gold resource of 3,800 short tons of 0.26 oz/st. The Willow Springs mineralized area contains a subeconomic indicated silver resource of 5,000 short tons of 16.5 oz/st. This resource is at the Roy Mine, which is "cherry-stemmed" inside the northeast corner of the WSA. Mercury occurs at the Cougar Hill working, an area "cherry-stemmed" into the western boundary and is indicative of the presence of a gold resource at this location. Drilling would be necessary to determine the grade and tonnage of this resource, if present.

The rocks exposed on Red Mountain, inside the WSA, contain hematite, limonite, and pyrite. The presence of these minerals indicate the possibility of base or precious metal concentrations at depth. Drilling would be necessary to determine these metals are present.

Vast inferred subeconomic resources of limestone, suitable for agriculture uses, and quartzite, suitable for the production of eighth and ninth quality amber glass, are present in the WSA. The high bulk, low unit value of the limestone and quartzite, in conjunction with the high transportation cost resulting from the remoteness of the area would limit their development to all but local uses.

Mineral Resource Potential

The study area contains regions of moderate and high potential for metallic mineral resources, specifically gold, in veins and replacement deposits. Further determination
Mineral Resource Potential--Continued

of areas of moderate and high potential will be made after analysis of geochemical data. The WSA has a low potential for oil and gas, coal, uranium.

Mining Activity

The Willow Springs, Spring Creek, Granite Creek, and Trout Creek (Johnson Peak) mining districts are in or near the WSA. Mining activity has occurred at 11 mineralized areas and prospecting has taken place throughout the Deep Creek Range. Sporadic production from the 1890's to the early 1980's yielded about 25,000 oz of gold, 11,500 oz of silver, 8,700 lb lead, less than 200 flasks mercury, 400 stu tungsten, and 29,000 lb zinc. This production was from mines within 1 mi of the WSA.

According to Bureau of Land Management records, as of 1985, 28 patented mining claims and 118 unpatented mining claims are in or within 1 mi of the study area.

Presently (April/89), there is no mineral-related activity in or near the WSA other than assessment work on claims. The Kibbe Co. (Salt Lake City, Utah) and the Queen of Sheba Mining Co. (Salt Lake City, Utah) have expressed strong interest in the sale or reactivation of their properties.

Mineral Setting/Geology

The study area is underlain predominantly by Proterozoic-age metasedimentary rocks and Paleozoic-age quartzite, carbonates, shales, and a Tertiary-age pluton. Locally, a Cretaceous-age stock(s) cuts older rocks.

Recommendations

Additional exploration work, especially drilling, is recommended to further delineate resources in the Goshute Canyon area and to determine if resources are present in the Cougar Hill and Red Mountain areas.

References


References—Continued


Map showing the location of the Deep Creek Mountains Wilderness Study Area, Juab and Tooele Counties, Utah.
Approximate Boundary Deep Creek Mountains Wilderness Study Area

-Explanation-

H,M/B - Moderate and high resource potential for gold in vein and replacement deposits

L/B1 - Low resource potential for oil, gas, coal, and uranium

L/B2 - Low resource potential for gold, silver, copper, lead and zinc

Map showing the mineral resource potential of the Deep Creek Mountains Wilderness Study Area, Juab and Tooele Counties, Utah.
Area Name, Classification, Number, Size

Desolation Canyon Wilderness Study Area
UT-060-068A
289,650 acres; 242,000 acres designated suitable for wilderness were studied.

BLM District
Moab

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

The southwestern part of the Desolation Canyon Wilderness Study Area (WSA) is underlain by the Sunnyside coal zone at depths from less than 100 ft to about 2,000 ft. The coal rank is high-volatile A or B bituminous and is metallurgical grade north of the study area. Analyses of coal outcrop samples collected by the Bureau from the southwestern part of the WSA show higher sulfur and ash content, which suggests that the grade of coal is lower than that to the north, and that it may not be suitable for metallurgical use. However, coal that is not suitable for metallurgical use can use for making steam, or burned for heating and cooking.

A reserve base of about 4.6 million tons of coal is estimated to be in the Sunnyside zone in the southwestern part of the WSA. By using beds greater than 3.5 ft thick with less than 2,000 ft of overburden, 22 million tons of total coal resources (measured, indicated, and inferred) are estimated to be in the area; the following table shows a breakdown of coal resources by bed thickness and depth of overburden. However, economic and logistic constraints render the coal subeconomic to marginally economic for commercial development.

<table>
<thead>
<tr>
<th>Coal thickness in feet</th>
<th>Category</th>
<th>1.2-2.3</th>
<th>2.3-3.5</th>
<th>3.5-7.0</th>
<th>7.0-14.0</th>
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<tbody>
<tr>
<td>less than 1,000 ft of overburden</td>
<td>Measured</td>
<td>591</td>
<td>761</td>
<td>374</td>
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<tr>
<td></td>
<td>Indicated</td>
<td>6,493</td>
<td>3,442</td>
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<tr>
<td></td>
<td>Inferred</td>
<td>47,466</td>
<td>18,965</td>
<td>551</td>
<td>0</td>
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<td></td>
<td>Hypothetical</td>
<td>62,518</td>
<td>1,755</td>
<td>389</td>
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<tr>
<td>1,000-2,000 ft of overburden</td>
<td>Measured</td>
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<td>0</td>
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<tr>
<td></td>
<td>Indicated</td>
<td>0</td>
<td>0</td>
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<td>0</td>
</tr>
<tr>
<td></td>
<td>Inferred</td>
<td>1,930</td>
<td>15,703</td>
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</tbody>
</table>
Identified Mineral Resources & Significant Occurrences—Continued

The southeastern part of the study area is underlain by the Chesterfield, Ballard, and Palisade coal zones at depth, but subsurface data are lacking, which precludes any resource estimation.

Oil and gas discoveries in proximity to the WSA accumulated in traps within structural and stratigraphic feature that are reported to extend beneath the study area, suggesting that additional oil and gas accumulations could be present. Drilling would be necessary to evaluate the possibility of commercial development within the study area.

Oil shale beds are found in strata that underlie about 13,150 acres of the northern end of the WSA. It is estimated that 2,220 acres are underlain by shale 15-50 ft thick with a potential oil yield of 15-25 gal/st. At present (1987), oil shale within the WSA is subeconmic and is not likely to be developed in the near future.

Bituminous sandstone (tar sand) has been quarried about 10 mi west of the northern end of the WSA for use as paving material. The bituminous deposits occur in strata that are less than 1,000 ft beneath the study area, but the extent of the developable beds is not known. Additional exploratory drilling would be necessary to appraise the bitumen content of the sandstone that underlies the study area.

Uranium minerals have been produced from and prospected for in the southeastern part of the WSA. The uranium mineralization is localized and irregularly scattered within paleochannels near the base of the Wasatch Formation. No quantitative uranium resource estimate was possible. Available surface and subsurface information suggest that any future uranium discoveries in the WSA would be small or deeply buried.

Building stone and sand and gravel are found in the study area but have no unique qualities. Material derived from sedimentary rocks, like those in the area, are generally limited use, have high transportation cost, and a low unit value, which restricts the use to local markets. Nearby communities are small and a sufficient supply of similar material exists outside the WSA.

Mineral Resource Potential

The study area has a high potential for oil and gas in the northern part, and a moderate potential for oil and gas in the central and southern parts. The WSA has a high potential for additional coal resources, a moderate potential for bituminous sandstone, and a low potential for uranium.
Mining Activity

The WSA is within the Book Cliffs and Sego Coal Fields. There are no coal mines in the study area, but the Sunnyside coal mine is about 8 to 35 mi northwest. The Kaiser Coal Co. was operating the mine in 1987.

Uranium has been mined and prospected in the southeastern part of the study area on the Joker claims. Ninety-two lb of U₃O₈ were produced from a deposit on the Joker claims. Mining claims are located south along the study area boundary and several mi west of the study area following the trend of channels that have been mineralized 8-10 mi southwest of the WSA.

Mineral Setting/Geology

Geologic units exposed in the study area were deposited principally in marine, fluvial, and lacustrine environments and are of Cretaceous and Tertiary age. The terrain of the area is rugged and characterized by deeply incised canyons separated by benches and mesas.

Recommendations

Surface mapping and sampling should be done along outcrops of bituminous sandstone to gain a better understanding of the character and extent of bitumen-bearing beds. A seismic survey should be conducted to determine regional structure and allow a better assessment oil and gas potential.

References


References--Continued


References--Continued


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Map showing the location of the Desolation Canyon Wilderness Study Area, Carbon, Emery, and Grand Counties, Utah.
Geologic terrane underlain by identified coal resources - Resources west of the Green River are in the Sunnyside coal zone of the Blackhawk Formation and resources east of the Green River are in the Chesterfield, Ballard and Palisade coal zones of the Neslen Formation.

Geologic terrane underlain by identified resources of subecononic oil shale in the Green River Formation.

Geologic terrane having high resource potential for coal with certainty level B - In the Blackhawk Formation west of the Green River and in the Neslen Formation east of the Green River.

Geologic terrane having high potential for oil and gas with certainty level C - In rocks of Tertiary age.

Geologic terrane having moderate potential for oil and gas with certainty level B - In rocks of Mesozoic age.

Geologic terrane having high potential for bituminous sandstone with certainty level C - In upper part of Colton Formation and lower part of Green River Formation.
Map showing the mineral resource potential of the Desolation Canyon Wilderness Study Area, Carbon, Emery, and Grand Co.
Area Name, Classification, Number, Size

Devils Canyon Wilderness Study Area*
UT-060-025
9,610 acres

BLM District
Moab

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

No mineral resources have been identified in the Devils Canyon Wilderness Study Area (WSA).

Mineral Resource Potential

The study area has a high potential for uranium and vanadium. The potential for oil and gas, carbon dioxide, helium, bentonite, and geothermal sources is moderate.

Mining Activity

The WSA is within the southern San Rafael uranium-vanadium belt. Uranium and vanadium have been mined within 5 mi from the Chinle Formation, which is buried 700 to 2,000 ft below the surface of the WSA. Weakly uraniferous copper deposits have been prospected within 2 mi of the WSA at the Copper Globe Mine, but no significant production has taken place.

Mineral Setting/Geology

The study area forms part of a continuous ring comprising the outer, relatively steeply-dipping part of the San Rafael Swell, an eroded structural dome. Several faults cut through the arched sedimentary rock units.

Recommendations

The area should have a field investigation. Any resources identified should be calculated.

*THIS AREA HAS NOT BEEN STUDIED BY USBM & USGS
DEVILS CANYON--Continued

References


Mine

Map showing the mineral resource potential of the Devils Canyon Wilderness Study Area, Emery County, Utah.
mineral commodity significance

Identified Mineral Resources & Significant Occurrences

There are no base- or precious-metal resources in the Diamond Breaks Wilderness Study Area (WSA). There are inferred subeconomically significant resources of sand and gravel.

mineral resource potential

The WSA has a low potential for gold, copper, lead, zinc, oil and gas, and geothermal energy. The potential for barite and commercial-grade barite is unknown.

mining activity

There is no known mineral production, mining claims, or oil and gas leases in the WSA.

mineral setting/geology

Geologic units are quartzite of the Precambrian-age Uinta Mountain Group and sandy alluvium of Recent age.

recommendations

None

references


L / B - Low potential for gold, copper, lead, zinc, oil and gas, and geothermal energy.
U / A - Unknown potential for barite.

Map showing the mineral resource potential of the Diamond Breaks Wilderness Study Area, Moffat County, Colorado, and Daggett County, Utah.
Dirty Devil Wilderness Study Area
UT-050-236A
124,800 acres

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

A small, low-grade uranium deposit has been drilled in the southwestern part of the Dirty Devil Wilderness Study Area (WSA). Cotter Corporation estimated a resource of 39,000 tons of 0.04% U₃O₈. The development potential is considered low.

Mineral Resource Potential

The WSA has a moderate potential for uranium and petroleum resources, a low potential for metallic and nonmetallic resources, and an unknown potential for tar sands.

Mining Activity

From 1975 through 1980, Cotter Corp. drilled approximately 65 holes in the southwestern part of the study area. As of February 1983, mining claims staked for uranium had been located over most of the study area.

Mineral Setting/Geology

Sedimentary rocks exposed in the WSA range in age from Early Permian to Middle Jurassic. These rocks are on the gently-dipping northwest flank of the Monument upwarp and are bordered on the northwest by the steeply-dipping east flank of the San Rafael Swell.

Recommendations

None

References

References--Continued


Approximate Boundary
Dirty Devil
Wilderness Study Area

Approximate Boundary
Horseshoe Canyon South
Wilderness Study Area

Approximate Boundary
French Springs-Happy Canyon
Wilderness Study Area

110°07'00" 110°07'35"

Robbers Roost
Flat

Wayne County
Garfield County

0 5 MILES

-Description-

Area having moderate potential for uranium resources—remaining
map area has low potential for uranium resources.

Area having high potential for tar sand resources—remaining map
area has unknown potential for tar sand resources.

Area having moderate potential for oil and gas resources.

Map showing the mineral resource potential of the
the Dirty Devil Wilderness Study Area, Wayne County, Utah.
Area Name, Classification, Number, Size

Fiddler Butte Wilderness Study Area
UT-050-241
26,400 acres

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

Oil-impregnated sandstones (tar sand) underlie the Fiddler Butte Wilderness Study Area (WSA). It is estimated that 2% or 260 to 320 million barrels of oil occur in the WSA. Uranium occurs in channel deposits at the base of the Monitor Butte Member of the Triassic-age Chinle Formation in and near the WSA.

Mineral Resource Potential

Investigations indicate that the northeastern part of the WSA has a high potential for tar sand resources. Two areas in the northeastern and southwestern part have a moderate potential for uranium resources. The entire study area has a moderate potential for petroleum resources. The entire WSA has a low potential for metallic and nonmetallic resources.

Mining Activity

The WSA is in the Henry Mountains mining district. Approximately 1,300 claims have been staked for uranium along the WSA's perimeter. An estimated 7,500 tons of uranium ore were produced from workings at Buckacre and Cedar Points just outside the study area.

Attempts have been made to develop tar sand deposits in North and South Hatch Canyons along the northeast corner of the WSA. In November 1980, the U.S. Geological Survey designated the Tar Sand Triangle Deposit, including Hatch Canyon in the WSA, as a Special Tar Sand Area.

Mineral Setting/Geology

Sedimentary rocks in the study area range in age from Early Permian to Middle Jurassic and include both marine and continental deposits. Rocks are on the gently-dipping northwest edge of the Monument upwarp and are bordered on the west by the Henry basin.
FIDDLER BUTTE--Continued

Recommendations
None

References


Map showing the location of the Fiddler Butte Wilderness Study Area, Garfield County, Utah.
Approximate Boundary
Fiddler Butte
Wilderness Study Area

-Explanation-

Area having moderate potential for uranium resources
Area having high potential for tar sands resources

Map showing the mineral resource potential of
the Fiddler Butte Wilderness Study Area, Garfield County, Utah.
### Area Name, Classification, Number, Size

<table>
<thead>
<tr>
<th>Area Name, Classification, Number, Size</th>
<th>BLM District</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fiddler Butte (East) Wilderness Study Area UT-050-241 5,700 acres</td>
<td>Richfield</td>
</tr>
</tbody>
</table>

### Mineral Commodity Significance

#### Identified Mineral Resources & Significant Occurrences

Approximately 70% of the Fiddler Butte (East) Wilderness Study Area (WSA) is within the Tar Sand Triangle Special Tar Sand Area (STSA), an oil-impregnated sandstone deposit containing an estimated 12.5 to 16 billion barrels of oil in place. Assuming a uniform distribution of the oil throughout the deposit, approximately 375 to 480 million barrels of oil could exist beneath the WSA.

An inferred subeconomically high-magnesium dolomite (greater than 43% MgCO₃) resource does exist within the study area; however, subsurface data would be needed to calculate a tonnage with accuracy. The dolomite is a high-tonnage, low-value commodity whose value is dependent on the distance to a market place. The extreme remoteness of the dolomite makes development very unlikely.

### Mineral Resource Potential

The southwestern part of the WSA has a moderate mineral resource potential for tar sand as localized deposits within the White Rim Sandstone. The entire study area has a moderate mineral resource potential for uranium and vanadium, for small isolated occurrences of precious (silver and gold) metals, and for oil and gas, and a low mineral resource potential for geothermal resources.

### Mining Activity

The study area is in the Orange Cliffs area of the Henry Mountains mining district. No mines were found in the WSA, although claims staked on the Chinle Formation partially encircle the study area. Approximately 5 mi northwest of the WSA, the Buckacre Point and Cedar Point Mines have recorded a production of about 7,500 tons of uranium ore.

The Cove Gold claim group, on the south boundary of the WSA, is the site of recent silver and gold exploration activity. Bureau sampling in this area showed that the gold and silver occurred too sporadically and in concentrations too low to constitute a resource.
**Mineral Setting/Geology**

The WSA is on the gently-dipping northwest flank of the Monument upwarp, which merges to the west into the Henry basin. Sedimentary rocks in the study area range in age from Pennsylvanian to Early Jurassic.

**Recommendations**

None

**References**


Map showing the location of the Fiddler Butte (East) Wilderness Study Area, Garfield County, Utah.
Approximate Boundary
Fiddler Butte (East)
Wilderness Study Area

-Explanation-

Moderate mineral resource potential for uranium, vanadium, and tar sand

Moderate mineral resource potential for uranium and vanadium

Moderate mineral resource potential for oil and gas, and small isolated paleo-placer deposits of gold and silver in the Shinarump Conglomerate of the Chinle Formation

Low mineral resource potential for geothermal energy

Identified resources of tar sand

Map showing the mineral resource potential of the Fiddler Butte (East) Wilderness Study Area, Garfield County, Utah.
Area Name, Classification, Number, Size

Fifty Mile Mountain Wilderness Study Area
UT-040-080
92,441 acres

BlM District
Cedar City

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

Coal occurs in the Straight Cliffs Formation, but beds in the Fifty Mile Mountain Wilderness Study Area (WSA) are thin with high ash content and low heat value.

The Salt Wash Member of the Morrison Formation shows indications of favorability for uranium deposits; exploratory drilling would be necessary for a full evaluation.

Test holes for oil and gas drilled in and near the WSA have been unproductive, but several promising structures remain untested.

Mineral Resource Potential

The potential for coal and titanium resources is high, except in the southwesternmost part of the study area, which has no potential for either commodity. The potential for uranium is high in the north-central part and southeastern tip of the study area, and moderate elsewhere. The potential for geothermal, oil and gas, gypsum, and carbon dioxide resources is moderate. The potential for metals, excluding uranium and titanium, is low.

Mining Activity

The WSA is on the eastern edge of the Kaiparowits Coal Field, but no coal mining has occurred within the study area. About 320 acres in the study area have been leased for coal, 6,400 acres are under oil and gas lease, and about 180 mining claims are partially or wholly within the WSA.

Exxon Mineral Company and Gulf Mineral Company staked numerous lode claims in the area in the late 1970's. Exxon drilled several uranium exploration holes just west of the WSA in 1979-1981. No exploration work has been done since, and claims in the WSA have lapsed.
Mineral Setting/Geology

The WSA is in a region of broad, north-south-trending folds in Paleozoic- and Mesozoic-age rocks. Paleozoic rocks are dominantly marine shelf sediments, and Mesozoic sequences are primarily continental sediments covered in places by younger terrace and pediment deposits.

Recommendations

The Salt Wash Member is a logical target for exploratory drilling for uranium.

References


EXPLANATION

H/C  Geologic terrane having high mineral resource potential for coal beds less than 5 feet thick, and for titanium, with certainty level C—Applies to all but southwesternmost (pink) part of study area

B/B  Geologic terrane having high mineral resource potential for uranium in the subsurface, with certainty level B

M/B  Geologic terrane having moderate mineral and energy resource potential for oil, gas, carbon dioxide, and geothermal sources in the subsurface and for uranium and thin beds of gypsum in the surface and subsurface, with certainty level B—Applies to the entire study area for all listed commodities except uranium, which has moderate potential only outside the areas of high potential described above

L/B  Geologic terrane having low mineral resource potential for metals other than titanium and uranium, with certainty level B—Applies to entire study area

N/D  Geologic terrane having no mineral resource potential for coal or titanium, with certainty level D—Applies only to southwesternmost (pink) part of study area

--- Paved road
--- Unpaved road

Levels of certainty:

B  Data indicate geologic environment and suggest the level of mineral resource potential

C  Data indicate geologic environment and give a good indication of the level of mineral resource potential

D  Data clearly define geologic environment and level of mineral resource potential

Fifty Mile Mountain WSA
Mineral resource potential and location of the Fifty Mile Mountain Wilderness Study Area, Kane County, Utah.
Area Name, Classification, Number, Size
Fish Creek Canyon Wilderness Study Area
UT-060-204
46,440 acres

BLM District
Moab

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

Inferred subeconimic resources of sandstone are present in the Fish Creek Canyon Wilderness Study Area (WSA).

Mineral Resource Potential

The study area has a moderate resource potential for oil and gas, and a low resource potential for metals, including uranium and thorium, coal, and geothermal energy.

Mining Activity

There are no mines, prospects, or mining claims located in or near the WSA. Most of the study area is under oil and gas leases.

Mineral Setting/Geology

The study area is underlain by the broadly-folded sedimentary rocks of the Monument upwarp. Pennsylvanian- through Triassic-age limestones, sandstone, and shale crop out in the WSA.

Recommendations

Strata that underlie the WSA contain productive oil and gas zones elsewhere in the Paradox Basin but they have not been adequately explored here.

References

References--Continued


Map showing the mineral resource potential of the Fish Creek Canyon Wilderness Study Area, San Juan County, Utah.
FISH SPRINGS RANGE

Area Name, Classification, Number, Size

Fish Springs Range Wilderness Study Area
UT-050-127
33,840 acres

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

Inferred subeconomic resources of high-purity quartzite occur in the Fish Springs Range Wilderness Study Area (WSA).

Geochemical and structural surveys indicate that a silver-lead-zinc resource may occur at depth near the north boundary. A fault extending from the Fish Springs mining district into the WSA adjacent to the northern boundary contains anomalous arsenic concentrations. Similar faults outside the WSA in the Fish Springs district contain arsenic and have replacement silver-lead-zinc deposits adjacent to them.

Mineral Resource Potential

There is a high potential for lead, silver, copper, zinc, gold, and molybdenum in the northern part of the WSA and a moderate potential for these metals in the southern part. There is a moderate potential for high-purity limestone and dolomite and a low potential for oil, gas, and geothermal energy in the study area.

Mining Activity

The Fish Springs mining district is adjacent to the study area northern boundary and approximately 50 unpatented mining claims extend into the WSA. No mines are within the study area. There is no recorded production from within the WSA, but 20,303 tons of ore yielding: 17,292,796 lb lead, 2,800 lb zinc, 5,366 lb copper, 507.97 oz gold, and 2,658,220 oz silver was mined near the northern boundary.

Drilling, geophysical surveys, and claim staking in the Fish Springs district was done in the mid 1970's.

Mineral Setting/Geology

The study area is in the Fish Springs Range, one of the many fault block mountain ranges in the Basin and Range province. The rocks in the WSA consist of faulted and
Mineral Setting/Geology--Continued

tilted Paleozoic-age sedimentary rocks and small amounts of Tertiary-age intrusive igneous rocks.

Recommendations

Further investigations in the vicinity of the fault on the northern boundary using geophysical methods such as VLF (very-low-frequency electromagnetics) and a magnetometer are needed to identify drilling targets and to verify the existence of mineral deposits. Also, a structural analysis of seismic data to determine if detachment faults exist in the subsurface.

References


Identified resources and mineral resource potential of the Fish Springs Range Wilderness Study Area, Juab County, Utah.
Area Name, Classification, Number, Size

Floy Canyon Wilderness Study Area
UT-060-068B
72,605 acres; 23,140 acres designated suitable for wilderness were studied.

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

No coal beds are exposed within the Floy Canyon Wilderness Study Area (WSA), but the Chesterfield, Ballard, and Palisade coal zones of the Neslen Formation underlie the area at depths from about 900 ft to over 3,000 ft. The coal rank is high-volatile C bituminous, but individual coal beds are lenticular, generally less than 5 ft thick, and degraded by partings and splits of shale. Beds are thickest east of the WSA, thin westward, and eventually pinch out near the Green River. Drill hole and surface data are lacking within the study area but by projecting average bed thicknesses and using beds thicker than 3.5 ft with less than 2,000 ft of overburden, 45 million tons of indicated and inferred coal resources are estimated for the area. The following table shows the total resource estimate, which includes indicated, inferred, and hypothetical resources (about 50% of the estimates are hypothetical). Coal resources beneath the study area are considered subeconomic and are not likely to be developed in the near future.

<table>
<thead>
<tr>
<th>Coal zone</th>
<th>Average thickness (ft)</th>
<th>Overburden thickness (ft)</th>
<th>Area (acres)</th>
<th>Tonnage (x 10^6 short tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chesterfield</td>
<td>2.0</td>
<td>500-1,000</td>
<td>640</td>
<td>2.3</td>
</tr>
<tr>
<td></td>
<td>2.0</td>
<td>1,000-2,000</td>
<td>11,885</td>
<td>42.7</td>
</tr>
<tr>
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<td>2.0</td>
<td>2,000-3,000</td>
<td>8,540</td>
<td>30.7</td>
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<tr>
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<td>2.0</td>
<td>&gt;3,000</td>
<td>2,075</td>
<td>7.5</td>
</tr>
<tr>
<td>Ballard</td>
<td>4.0</td>
<td>500-1,000</td>
<td>640</td>
<td>4.6</td>
</tr>
<tr>
<td></td>
<td>4.0</td>
<td>1,000-2,000</td>
<td>11,885</td>
<td>85.6</td>
</tr>
<tr>
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<td>8,540</td>
<td>61.5</td>
</tr>
<tr>
<td></td>
<td>4.0</td>
<td>&gt;3,000</td>
<td>2,075</td>
<td>14.9</td>
</tr>
<tr>
<td>Palisade</td>
<td>3.0</td>
<td>500-1,000</td>
<td>640</td>
<td>3.5</td>
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<td>2,000-3,000</td>
<td>8,540</td>
<td>46.1</td>
</tr>
<tr>
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<td>3.0</td>
<td>&gt;3,000</td>
<td>2,075</td>
<td>11.2</td>
</tr>
</tbody>
</table>
Identified Mineral Resources & Significant Occurrences--Continued

Uranium minerals have been prospected for in the study area. The uranium mineralization localized and is irregularly scattered within paleochannels near the base of the Wasatch Formation. Results of the Bureau’s study of workings and prospects indicate that the mineralization was not disseminated into the host sandstone, and no quantitative resources estimate was possible. Regional studies by the National Uranium Resource Evaluation (NURE) program, which included the study area, found no anomalous concentrations of uranium in stream sediment or water samples. Available information suggests that any future uranium discoveries in the WSA would be small or deeply buried.

Oil and gas discoveries in proximity to the WSA accumulated in traps within structural and stratigraphic features that are reported to extend beneath the study area, suggesting that additional oil and gas accumulations could be present. Drilling would be necessary to evaluate the possibility of commercial development within the study area.

Building stone and sand and gravel are found in the study area but have no unique qualities. Material derived from sedimentary rocks, like those in the area, are generally limited in use, have high transportation cost, and a low unit value, which restricts the use to local markets. Nearby communities are small and a sufficient supply of similar material exists outside the WSA.

Mineral Resource Potential

The study area has a high potential for the occurrence of coal resources and a moderate potential for oil and gas.

Mining Activity

The WSA is within the Sego Coal Field. There are no coal mines within the study area, but several inactive mines are 3-10 mi south of the area. The mines have been historically active but produced only small amounts of coal, and supplied mostly local needs.

Uranium has been prospected for on the Pine Tree and Ute claims in the western part of the study area. Workings consist of two adits, 18 and 30 ft long. As of January 22, 1987, no claims were on file with the Bureau of Land Management to cover the previously claimed areas.

Tenneco Oil drilled an oil and gas well less than 1 mi from the northern boundary in 1981.
Mineral Setting/Geology

Geologic units exposed in the study area are of sedimentary origin deposited principally in near-shore marine and fluvial environments. The units are of Cretaceous and Tertiary age. The terrain of the area is rugged and characterized by narrow steep-walled canyons.

Recommendations

Core drilling should be done in parts of the area to gather more information concerning thickness and extent of coal beds.

References


References--Continued


Id. Res. – Identified Resources

Geologic terrane underlain by identified coal resources – Resources west of the Green River are in the Sunnyside coal zone of the Blackhawk Formation and resources east of the Green River are in the Chesterfield, Ballard and Palisade coal zones of the Neslen Formation.

Geologic terrane underlain by identified resources of subecononomic oil shale in the Green River Formation.

Geologic terrane having high resource potential for coal with certainty level B – In the Blackhawk Formation west of the Green River and in the Neslen Formation east of the Green River.

Geologic terrane having high potential for oil and gas with certainty level C – In rocks of Tertiary age.

Geologic terrane having moderate potential for oil and gas with certainty level B – In rocks of Mesozoic age.

Geologic terrane having high potential for bituminous sandstone with certainty level C – In upper part of Colton Formation and lower part of Green River Formation.
Map showing the mineral resource potential of the Floy Canyon Wilderness Study Area, Grand County, Utah.
Flume Canyon Wilderness Study Area
UT-060-100B
50,800 acres; 16,495 acres designated suitable for wilderness were studied.

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

The Mahogany oil shale bed underlies the Flume Canyon Wilderness Study Area (WSA), but cover prevents quantification. It averages less than 3 ft thick, much thinner than the generally accepted minimum exploitable thickness of 15 ft.

About 10 ft to 50 ft below the Mahogany, oil-impregnated, lenticular sandstone and siltstone beds of the P. R. Spring tar sand deposit occur in the Douglas Creek Member of the Green River Formation. The tar sands underlying the WSA average 8.4 gallons per ton; those in the main part of the P. R. Spring deposit average 25 gallons per ton. At present, no oil is commercially produced from tar sands in the U.S.

The study area is surrounded by producing oil and gas fields (gas is by far predominant). About half of the Diamond Ridge field lies inside the WSA boundary.

Mineral Resource Potential

There is a high potential for coal, oil, and gas for the entire study area. There is a low potential for oil shale, tar sand, uranium, metal deposits, and geothermal energy in the WSA.

Mining Activity

No coal production has been reported from inside the WSA, but over 2 million tons was mined at Sego, about 20 mi south of the study area.

Total production of oil and gas from the region is about 216 billion cubic ft of gas and 2 million barrels of oil. Production from the Diamond Ridge field lies inside the WSA boundary.

The study area is in the central part of the Sego Coal Field, but no mining has taken place inside the boundary. A few claims have been staked along the northern boundary, but the mineral sought is not known.
Mineral Setting/Geology

Flat-lying Late Cretaceous- and Tertiary-age sedimentary rocks make up the ridges and canyons of the study area.

Recommendations

None

References


Map showing the mineral resource potential of the Flume Canyon Wilderness Study Area, Grand County, Utah.
Area Name, Classification, Number, Size
Fremont Gorge Wilderness Study Area*
UT-050-221
2,640 acres

BLM District
Richfield

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences
No identified mineral resources or significant occurrences are known to exist in the Fremont Gorge Wilderness Study Area (WSA).

Mineral Resource Potential
The entire study area has a low potential for all metals, including uranium, vanadium, and copper in the Moenkopi Formation and for oil and gas.

Mining Activity
The WSA is not within or adjacent to any established mining districts and no minerals have been produced from the area. No recent mining activity or claim staking has taken place in the study area.

Mineral Setting/Geology
The study area is underlain by Paleozoic-age sedimentary rocks; the Triassic-age Moenkopi Formation is the major rock unit exposed. Several west- to northwest-trending faults are just outside the northern boundary of the study area. The Moenkopi Formation has been explored for uranium in the region.

Recommendations
The area should have a field investigation. Any resources identified should be calculated.

*THIS AREA HAS NOT BEEN STUDIED BY USBM & USGS
References


Approximate Boundary
Fremont Gorge
Wilderness Study Area

Map showing the mineral resource potential of the
Fremont Gorge Wilderness Study Area, Wayne Counties, Utah.

L/B - Low mineral resource potential for metals, including uranium, vanadium, and copper from the Moenkopi Formation and for oil and gas.
Area Name, Classification, Number, Size

French Springs/Happy Canyon Wilderness Study Area
UT-050-2368
25,000 acres

BLM District
Richfield

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

A large deposit of oil-impregnated sandstone, the Tar Sand Triangle, contains an estimated 12.5 to 16 billion barrels of heavy crude oil. Approximately 25% of the French Springs/Happy Canyon Wilderness Study Area (WSA) is underlain by part of this resource. Assuming a uniform distribution of oil in the estimated resource area, approximately 10% of this hydrocarbon resource or 1.25 to 1.6 billion barrels of oil underlie about 25% of the WSA. Approximately 70% to 80% of the WSA is in a designated Tar Sand Triangle Special Tar Sand Area, which may contain additional resources. Attempts to recover this oil by enhanced recovery techniques have not been tried due to leasing complications and prices. Enhanced recovery techniques appear to be available to recover this oil and foreseeable price increases could make this deposit economically viable. The potential for the development of this resource is considered high.

Mineral Resource Potential

The WSA has a high mineral potential for tar sand, the extreme southwestern part has a moderate mineral resource potential for uranium; the remaining part has a low mineral resource potential for uranium. The study area has a moderate potential for oil and gas and a low mineral resource potential for metallic and nonmetallic resources.

Mining Activity

A few prospect pits, trenches, opencuts, and short adits were found in and near the southwestern part of the study area.

Mineral Setting/Geology

The WSA is on the gently-dipping northwest flank of the Monument upwarp and is bordered on the northwest by the steeply-dipping east flank of the San Rafael Swell. Sedimentary rocks range in age from Early Permian to middle Jurassic.
FRENCH SPRINGS/HAPPY CANYON--Continued

Recommendations

None

References


References—Continued

Map showing the location of the French Springs/Happy Canyon Wilderness Study Area, Wayne County, Utah.
Approximate Boundary
Dirty Devil
Wilderness Study Area

Approximate Boundary
Horseshoe Canyon South
Wilderness Study Area

Approximate Boundary
French Springs-Happy Canyon
Wilderness Study Area

-Explanation-

Area having moderate potential for uranium resources—remaining map area has low potential for uranium resources.

Area having high potential for tar sand resources—remaining map area has unknown potential for tar sand resources.

Area having moderate potential for oil and gas resources.

Map showing the mineral resource potential of the French Springs/Happy Canyon Wilderness Study Area, Wayne County, Utah.

197
Area Name, Classification, Number, Size

Goose Creek Canyon Wilderness Study Area
UT-040-176
89 acres

BLM District
Cedar City

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

Inferred subeconmic resources of sandstone, suitable for construction, and limestone, suitable for agricultural purposes or aggregate occur in the Goose Creek Canyon Wilderness Study Area (WSA).

Mineral Resource Potential

The study area has a moderate energy resource potential for small oil and gas pools in Paleozoic- and Mesozoic-age rock. A low potential exists for other resources including all metals and geothermal sources. There is no potential for coal.

Mineral Activity

There has been no production recorded from this area. No mining districts, mines, or claims are in the WSA. The nearest mining district is the Silver Reef (Harrisburg) district, about 21 mi to the southwest.

Mineral Setting/Geology

The study area consists of gently-dipping Jurassic-age sedimentary rocks. These are largely sandstone, mudstone, and limestone. None is favorable for hosting mineral deposits in this area.

Recommendations

Possibly drilling to determine the presence of petroleum at depth.
References


EXPLANATION OF IDENTIFIED RESOURCES AND MINERAL AND ENERGY RESOURCE POTENTIAL

Summary of identified resources and resource potential for each of the eight study areas. All eight study areas have a low mineral and energy resource potential for all metals (including silver and uranium) and geothermal sources, with certainty level D. The Orderville Canyon, North Fork Virgin River, and Deep Creek study areas have a low energy resource potential for coal, with certainty level D; the other five study areas have no potential for coal, with certainty level D. Although the Orderville Canyon, North Fork Virgin River, and Deep Creek study areas have identified resources of gypsum, they have no mineral resource potential for additional gypsum, with certainty level D; the other five study areas have no potential for gypsum, with certainty level D.

Area of identified resources of gypsum

Geologic terrane having a moderate energy resource potential for oil and gas, with certainty level C—Applies to entirety of all eight study areas

Approximate boundary of wilderness study area

Certainty levels

B Data indicate geologic environment and suggest level of resource potential
C Data indicate geologic environment and resource potential but do not establish activity of resource-forming processes
D Data clearly define geologic environment and level of resource potential, and indicate activity of resource-forming processes in all or part of study area

Identified resources and mineral and energy resource potential of the eight wilderness study areas, Washington and Kane Counties, Utah.
HORSESHOE CANYON NORTH

Area Name, Classification, Number, Size
Horseshoe Canyon North Wilderness Study Area
UT-060-045
20,500 acres

BLM District
Moab

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

The Horseshoe Canyon North Wilderness Study Area (WSA) is underlain by the Chinle Formation, a principal uranium-vanadium host rock of the region, but no resources have been identified.

The Paradox Member of the Hermosa Formation beneath the northern part of the WSA could be a target for exploration and possible solution mining of potash, but it is likely that larger, more accessible potash resources elsewhere would be developed before any attempt would be made to recover potash in the WSA.

Mineral Resource Potential

The entire study area has a moderate mineral resource potential for uranium, vanadium, and copper in the Moss Back Member of the Chinle Formation and for oil and gas. The northernmost part of the WSA has a moderate resource potential for potash. The entire study area also has a low mineral resource potential for all other metals and geothermal energy.

Mining Activity

Production of uranium and vanadium has probably occurred from small mines in the eastern part of the WSA. Six blocks of lode claims for uranium and vanadium are in or near the study area. Most of the study area is under lease for oil and gas; approximately 1 sq mi is under lease application for potash.

Mineral Setting/Geology

The study area is adjacent to Canyonlands National Park and is on the northwestern edge of the Paradox Basin. Mostly flat-lying Paleozoic-age sedimentary rocks are exposed in the study area (Chinle Formation, Wingate Sandstone, Kayenta Formation, 203
Mineral Setting/Geology--Continued

Navajo Sandstone, Carmel Formation). Mississippian- and Pennsylvanian-age rocks in subsurface may be source and reservoir rocks for oil and gas.

Recommendations

None

References


EXPLANATION

M/B Geologic terrane having moderate mineral resource potential for uranium, vanadium, and copper in the Moss Back Member of the Chinle Formation and for oil and gas, with certainty level B—Applies to entire study area

M/B Geologic terrane having moderate mineral resource potential for uranium, vanadium, and copper in the Moss Back Member of the Chinle Formation and for oil and gas and potash, with certainty level B

L/C Geologic terrane having low mineral resource potential for all metals, except as noted above, and for geothermal energy, with certainty level C—Applies to entire study area

Certainty levels:

B Data indicate geologic environment and suggest level of resource potential
C Data indicate geologic environment and indicate resource potential, but do not establish activity of resource-forming processes

Mineral resource potential and location of the Horseshoe Canyon North Wilderness Study Area, Emery and Wayne Counties, Utah
<table>
<thead>
<tr>
<th>Area Name, Classification, Number, Size</th>
<th>BLM District</th>
</tr>
</thead>
<tbody>
<tr>
<td>Horseshoe Canyon South Wilderness Study Area</td>
<td>Richfield</td>
</tr>
<tr>
<td>UT-050-237</td>
<td></td>
</tr>
<tr>
<td>38,800 acres</td>
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</table>

**Mineral Commodity Significance**

**Identified Mineral Resources & Significant Occurrences**

No mineral resources or occurrences were identified at the surface of the Horseshoe Canyon South Wilderness Study Area (WSA).

**Mineral Resource Potential**

The study area has a moderate resource potential for oil and gas, a low mineral resource potential for uranium and metallic and nonmetallic resources, and an unknown potential for tar sand.

**Mining Activity**

As of February 1983, mining claims staked for uranium had been located in the northern half of the WSA.

**Mineral Setting/Geology**

The study area is on the gently-dipping northwest flank of the Monument upwarp and is bordered on the northwest by the steeply-dipping east flank of the San Rafael Swell. Sedimentary rocks range in age from Early Permian- to Middle Jurassic-age.

**Recommendations**

None

**References**

References—Continued


Map showing the location of the Horseshoe Canyon South Wilderness Study Area, Wayne County, Utah.
Map showing the mineral resource potential of the Horseshoe Canyon South Wilderness Study Area, Wayne County, Utah.
Area Name, Classification, Number, Size

Howell Peak Wilderness Study Area
UT-050-077
24,800 acres; 14,800 acres designated suitable as wilderness were studied.

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

Inferred subeconomic resources of high-purity limestone, quartzite, and sand and gravel were identified in the Howell Peak Wilderness Study Area (WSA).

Mineral Resource Potential

There is a moderate potential for lead, zinc, copper, molybdenum, silver, and gold in the western part of the study area and a moderate potential for oil and gas and high-purity limestone and dolomite for the entire WSA. There is a low potential for geothermal energy and no potential for coal.

Mining Activity

About 1,000 acres are covered by placer claims and 500 acres by lode claims. Four prospect pits are on quartz veins and fault zones in the northern part of the WSA. A shaft and prospect pit are on a fault-vein system in the southwest corner of the study area.

Mineral Setting/Geology

The WSA is in the House Range, one of the many fault block mountain ranges in the Basin and Range province. The rocks in the study area consist of faulted and tilted Paleozoic-age sedimentary rocks.

Recommendations

A structural analysis of seismic data and test drilling is recommended to test rocks and structures beneath a buried detachment fault for oil and gas.
References


Tuftin, S. E., 1987, Mineral resources of a part of the Swasey Mountain Wilderness Study Area (UT-050-061) and a part of the Howell Peak Wilderness Study Area (UT-050-077), Millard County, Utah: U.S. Bureau of Mines Open-File Report MLA 71-87, 28 p.
EXPLANATION

[Both study areas contain inferred subeconomic resources of high-purity limestone (Howell Limestone), quartzite (Prospect Mountain Quartzite), sand and gravel (in washes and along flanks), and fossils (in the Wheeler Shale and the Marjum Formation). Both study areas have moderate mineral resource potential for high-purity limestone and dolomite, with certainty level B, except for the Prospect Mountain Quartzite, the Howell Limestone, and units of Tertiary and Quaternary age.]

<table>
<thead>
<tr>
<th>Rating</th>
<th>Description</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>M/B</td>
<td>Geologic terrane having moderate mineral resource potential for lead, zinc, copper, molybdenum, silver, and gold, with certainty level B</td>
<td>Applies to entire study areas</td>
</tr>
<tr>
<td>M/B</td>
<td>Geologic terrane having moderate mineral resource potential for oil and gas, with certainty level B</td>
<td>Applies to entire study areas</td>
</tr>
<tr>
<td>L/C</td>
<td>Geologic terrane having low resource potential for geothermal energy, with certainty level C</td>
<td>Applies to entire study areas</td>
</tr>
<tr>
<td>N/D</td>
<td>Geologic terrane having no resource potential for coal, with certainty level D</td>
<td>Applies to entire study areas</td>
</tr>
</tbody>
</table>

Levels of certainty:

B Data indicate geologic environment and suggest level of mineral resource potential
C Data indicate geologic environment, give good indication of level of resource potential, but do not establish activity of resource-forming processes

Road Boundary of House Range

Howell Peak WSA
Swasey Mountain WSA
Map showing mineral resource potential of the Swasey Mountain and Howell Peak Wilderness Study Areas, Utah.
Indian Creek Wilderness Study Area
UT-060-164
6,870 acres

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

Sandstone for construction purposes is the only resource at the surface; however, based on geologic evidence, inferred resources of potash exist under the Indian Creek Wilderness Study Area (WSA). Drilling would be required to determine the amount of, and depth to, the resources.

Oil and gas may be present in the Paleozoic-age rocks below the WSA, because favorable structures are present, but drilling would be necessary to prove if they are petroliferous. Uranium occurs in a bed of the Cutler Group, just outside the eastern boundary, but no uranium resources were found inside the WSA.

Mineral Resource Potential

There is a moderate potential for oil and gas in the study area and a low potential for uranium, vanadium, copper and other metals, placer gold and silver, geothermal energy, and coal.

Mining Activity

The Cane Creek Mine produces potash from the Cane Creek anticline, about 21 mi north of the WSA. Within 25 mi of the study area, oil and gas fields have produced over 40,000 barrels of oil and over 400 billion cubic ft of gas, mostly from the Mississippian-age Leadville Limestone.

The WSA is in the Indian Creek uranium district, but there are no mines within the study area. Within 10 mi, nearly 2 million tons of uranium ore were mined; more than 98% was from the Chinle Formation, and the rest from the Cutler Group. The study area contains part of one block of mining claims, but scintillator readings in the area were low. Oil and gas leases cover approximately 2,720 acres and oil and gas lease applications cover about 1,000 acres of the WSA.
Mineral Setting/Geology

The study area is underlain by Late Paleozoic- and Mesozoic-age sedimentary rocks. The Gibson and Rustler domes are salt domes in and near the study area.

Recommendations

None

References


Doelling, H. H., 1969, Mineral resources, San Juan County, Utah, and adjacent area, Part II: uranium and other metals in sedimentary host rocks: Utah Geological and Mineralogical Survey Special Studies 24, 64 p.


EXPLANATION

[The entire Indian Creek Wilderness Study Area has inferred subecononomic resources of potash and halite in the subsurface]

H/C Geologic terrane having high mineral resource potential for uranium, and by-products vanadium and copper (north quarter of Bridger Jack Mesa Wilderness Study Area) with certainty level C

M/B Geologic terrane having moderate mineral resource potential for oil and gas with certainty level B—Applies to entire area of each of the three wilderness study areas

L/C Geologic terrane having low resource potential for uranium and associated by-products vanadium and copper, potash and halite (in the subsurface), gold, silver, and all other metals, and coal and geothermal energy, with certainty level C—Applies to entire area of each of the three wilderness study areas except for uranium, vanadium, and copper in the north quarter of Bridger Jack Mesa Wilderness Study Area

U/A Geologic terrane having unknown resource potential for rare-earth elements, with certainty level A—Applies to entire area of each of the three wilderness study areas

Level of certainty
A Available information is not adequate for determination of the level of resource potential
B Available information suggests level of resource potential
C Available information gives good indication of level of mineral resource potential

Mines and prospects
Unpaved road

Bridger Jack Mesa WSA
Butler Wash WSA
Indian Creek WSA
Mineral resource potential and location of the Indian Creek, Bridger Jack Mesa, and Butler Wash Wilderness Study Areas.
Area Name, Classification, Number, Size

Jack Canyon Wilderness Study Area*
UT-060-068
7,500 acres

BLM District
Moab

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

Oil and gas discoveries in proximity to the Jack Canyon Wilderness Study Area (WSA) accumulated in traps within structural and stratigraphic features that may extend beneath the study area and additional oil and gas accumulations are likely to be present. Drilling would be necessary to evaluate the possibility of commercial development in the WSA.

Oil shale beds are found in strata that underlie about 5,000 acres of the study area. The beds are estimated to be about 15 ft thick and have an oil yield of 15 gallons per short ton. Commercial development of oil shale in the United States is not currently economic.

Bituminous sandstone (tar sand) has been quarried about 12 mi southwest of the WSA for use as paving material. The bituminous deposits occur in strata that are more than 1,000 ft beneath the study area, and are not likely to be developed in the near future.

Coal is produced nearby from strata that underlie the study area. The coal is under more than 6,000 ft of overburden and is not considered recoverable.

Building stone has been produced from within the WSA and, in 1983, about 600 acres of the area were included in a tract designated as a common use area for building stone sales.

Mineral Resource Potential

The study area has a high potential for oil and gas in rocks of Tertiary age and for bituminous sandstones in the upper part of the Colton Formation and the lower part of the Green River Formation.

*THIS AREA HAS NOT BEEN STUDIED BY USBM & USGS
Mining Activity

In 1979, 120 tons of building stone were produced from the study area.

The WSA is not included in any mining district and, as of April 1989, no mining claims were on file with the BLM for land within the study area.

The study area is partly in the Peter's Point Known Geologic Structure and most of the acreage is covered by the Peter's Point unit oil and gas lease agreement.

Mineral Setting/Geology

Geologic units exposed in the study area are of sedimentary origin and were deposited principally in lacustrine and fluvial environments. The rocks are of Tertiary age.

Recommendations

Surface mapping and sampling of bituminous sandstones (tar sands) should be conducted to determine extent and grade of tar sands and oil shale.

References


References--Continued


-EXPLANATION-

Id. Res. – Identified Resources

Geologic terrane underlain by identified coal resources – Resources west of the Green River are in the Sunnyside coal zone of the Blackhawk Formation and resources east of the Green River are in the Chesterfield, Ballard and Palisade coal zones of the Neslen Formation.

Geologic terrane underlain by identified resources of subeconmic oil shale in the Green River Formation.

Geologic terrane having high resource potential for coal with certainty level B – In the Blackhawk Formation west of the Green River and in the Neslen Formation east of the Green River.

Geologic terrane having high potential for oil and gas with certainty level C – In rocks of Tertiary age.

Geologic terrane having moderate potential for oil and gas with certainty level B – In rocks of Mesozoic age.

Geologic terrane having high potential for bituminous sandstone with certainty level C – In upper part of Colton Formation and lower part of Green River Formation.
Map showing the mineral resource potential of the Jack Canyon Wilderness Study Area, Carbon County, Utah.
Area Name, Classification, Number, Size

King Top Wilderness Study Area*
UT-050-070
84,770 acres

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

Sand, gravel, and limestone are present in the King Top Wilderness Study Area (WSA), but there is no commercial interest in them because of their remote location.

Mineral Resource Potential

The study area has a high potential for sediment-hosted gold and silver deposits localized by regional faulting. The WSA also has a moderate potential for oil and gas and a low potential for coal and geothermal energy.

Mining Activity

About 205 mining claims (approximately 4,000 acres) are in the extreme southern part of the WSA.

Mineral Setting/Geology

The study area is underlain mainly by Ordovician- to Permian-age sedimentary rocks that are chiefly dolomite with lesser amounts of limestone and clastic sediments. The region is also underlain by thrust faults of the Sevier orogenic belt.

Recommendations

The WSA should be examined by the U.S. Geological Survey and the Bureau of Mines. Although the general geology has been mapped, detailed mapping to delineate geologic structures and seek areas of alteration, including jasperoids, is needed. A detailed geochemical study should be conducted over the entire study area to locate anomalies that could indicated mineralization.

*THIS AREA HAS NOT BEEN STUDIED BY USBM & USGS
References


Approximate Boundary
King Top Wilderness Study Area

-Explanation-

H/B - High mineral resource potential for gold and silver
M/B - Moderate mineral resource potential for oil and gas.
L/B - Low mineral resource potential for coal and geothermal energy.

Map showing the mineral resource potential of the King Top Wilderness Study Area, Millard County, Utah.
LaVerkin Creek Canyon Wilderness Study Area
UT-040-153
440 acres

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

Inferred subeconomic resources of sandstone, suitable for construction, and limestone, suitable for agricultural purposes or aggregate occur in the LaVerkin Creek Canyon Wilderness Study Area (WSA).

Mineral Resource Potential

The study area has a moderate energy resource potential for small oil and gas pools in Paleozoic- and Mesozoic-age rock. A low potential exists for other resources including all metals and geothermal sources. There is no potential for coal.

Mining Activity

There has been no recorded production from the WSA. No mining districts, mines, or claims are in the study area. The nearest mining district is the Silver Reef (Harrisburg) district, about 18 mi to the southwest.

Mineral Setting/Geology

The study area consists of gently-dipping Jurassic-age sedimentary rocks. These are largely sandstone, limestone, and mudstone. None is favorable for hosting mineral deposits in this area.

Recommendations

Possibly drilling to determine the presence of petroleum at depth.
References


EXPLANATION OF IDENTIFIED RESOURCES AND MINERAL AND ENERGY RESOURCE POTENTIAL

Summary of identified resources and resource potential for each of the eight study areas: All eight study areas have a low mineral and energy resource potential for all metals (including silver and uranium) and geothermal sources, with certainty level D. The Orderville Canyon, North Fork Virgin River, and Deep Creek study areas have a low energy resource potential for coal, with certainty level D; the other five study areas have no potential for coal, with certainty level D. Although the Orderville Canyon, North Fork Virgin River, and Deep Creek study areas have identified resources of gypsum, they have no mineral resource potential for additional gypsum, with certainty level D; the other five study areas have no potential for gypsum, with certainty level D.

Area of identified resources of gypsum

Geologic terrane having a moderate energy resource potential for oil and gas, with certainty level C—Applies to entirety of all eight study areas

Approximate boundary of wilderness study area

Certainty levels

B Data indicate geologic environment and suggest level of resource potential
C Data indicate geologic environment and resource potential but do not establish activity of resource-forming processes
D Data clearly define geologic environment and level of resource potential, and indicate activity of resource-forming processes in all or part of study area

Identified resources and mineral and energy resource potential of the eight wilderness study areas, Washington and Kane Counties, Utah.
### Area Name, Classification, Number, Size

<table>
<thead>
<tr>
<th>Area Name, Classification, Number, Size</th>
<th>BLM District</th>
</tr>
</thead>
<tbody>
<tr>
<td>Little Rockies Wilderness Study Area UT-050-247 38,700 acres</td>
<td>Richfield</td>
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</table>

### Mineral Commodity Significance

**Identified Mineral Resources & Significant Occurrences**

A uranium-copper orebody containing a minimum of 200,000 tons of ore averaging 0.2% $\text{U}_3\text{O}_8$ (uranium-oxide) and 100,000 tons of ore averaging 0.5% copper was discovered in the Four Mile Canyon area inside the Little Rockies Wilderness Study Area (WSA) by Texasgulf, Inc., in the late 1970's. The orebody has no surface exposures and lies along the projected channel trend of the White Canyon mining district about 15 mi east of the WSA.

### Mineral Resource Potential

The southern part of the study area has a high mineral resource potential for uranium in sandstone beds of the Chinle Formation, except for two small areas comprising the igneous stocks of Mt. Holmes and Mt. Ellsworth, which have a low mineral resource potential for uranium. The northern part has a moderate mineral resource potential for uranium in sandstone beds of the Chinle Formation. The entire WSA has a low mineral resource potential for base (copper and lead) and precious (silver and gold) metals, nonmetals (sand, gravel, and stone), oil and gas, and geothermal energy.

### Mining Activity

No mining has taken place in the study area and no mining districts are included within the boundary; however, it is near two uranium mining districts: the White Canyon and the Little Rockies, adjacent to the WSA on the west.

The Shootering Canyon Mine, about 3 mi west of the WSA, was being mined by Plateau Resources at the time of the field study (April 1983); it is currently (April 1989) inactive due to low uranium prices. The orebody contains at least 6 million lb of $\text{U}_3\text{O}_8$.

A much smaller mine, the Del Monte, is less than 1 mi west of the WSA. It has been worked intermittently by the owner (as of April 1983).
Mining Activity--Continued

BLM records show a few scattered claims throughout the southern part of the WSA (January 1989).

In the early 1980's, Texasgulf dropped all interest in the Four Mile Canyon orebody.

Mineral Setting/Geology

Sedimentary rocks in the study area range in age from Early Permian to Late Cretaceous. The rocks were intruded by intrusive igneous centers that form Mt. Holmes and Mt. Ellsworth. Numerous subsidiary laccoliths, dikes, and satellite bodies radiate from the igneous center of Mt. Holmes.

Recommendations

None

References


EXPLANATION

[Entire study area has low mineral resource potential for base (copper and lead) and precious (silver and gold) metals, nonmetals, oil and gas, and geothermal energy, with certainty level B]

- **Area of Identified uranium resource**
- **M/C** Geologic terrane having moderate mineral resource potential for uranium, with certainty level C
- **H/D** Geologic terrane having high mineral resource potential for uranium, with certainty level D
- **L/C** Geologic terrane having low mineral resource potential for uranium, with certainty level C

Summary map showing mineral resource potential of the Little Rockies Wilderness Study Area, Garfield County, Utah.
Mining Activity—Continued

BLM records show a low level of mining throughout the southern part of the WWA (January 1969).

In the early 1960's, Teiphone dropped all interest in the Little Rockies orebody.

Mineral Setting/Geology

Sedimentary rocks in the study area range in age from Early Permian to Upper Cretaceous. The rocks are intruded by numerous igneous centers that form Mt. Holmes and Mt. Ellsworth. Numerous subterrane igneousasser, dikes, and satellite bodies radiate from the igneous center of Mt. Ellsworth.

Recommendations

None

References


Larson, M. J., Bromfield, C. S., Beatel, R. F., Patterson, G. S., and Peterson, Fred, 1985, Geologic map of the Little Rockies Wilderness Study Area and the Mt. Ellen and Mt. Pohall study areas, Garfield County, Utah: U.S. Geological Survey Miscellaneous Field Studies Map MF-77-1E, 1 sheet, 30 x 40".

Lost Spring Canyon Wilderness Study Area

UT-060-131B
3,880 acres

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

Inferred subeconomic resources of sandstone and sand and gravel were identified within the Lost Spring Canyon Wilderness Study Area (WSA).

Mineral Resource Potential

The study area has a moderate resource potential for undiscovered oil and gas, potash, and halite and a low resource potential for undiscovered geothermal resources and all metals, including uranium and manganese.

Mining Activity

Uranium, vanadium, and radium have been mined from 1911 until around the mid-1960's from the Thompson (Yellow Cat) mining district approximately 2 mi northwest of the WSA.

Manganese has been mined in the region; the closest prospect is about 1 mi northeast.

Mineral Setting/Geology

The WSA is adjacent to Arches National Park and is on the northwestern edge of the Paradox Basin. The area is underlain by Paleozoic-age sedimentary rocks; the Paradox Member of the Hermosa Formation is important as a reservoir for oil and gas and has been mined locally for potash and halite. Members of the Entrada Formation crop out in the study area. The Morrison Formation, a known uranium and manganese host, is not present in the study area.

Recommendations

None
References


EXPLANATION

**M/B** Geologic terrane having moderate energy resource potential for oil and gas, potash, and halite, with certainty level B—Applies to the entire study area.

**L/C** Geologic terrane having low mineral resource potential for all metals, including uranium, and geothermal energy, with certainty level C—Applies to entire study area.

**L/B** Geologic terrane having low mineral resource potential for manganese, with certainty level B—Applies to entire study area.

Qa Alluvium (Quaternary)

Qs Eolian sand deposits (Quaternary)

Jmt Tidwell Member of the Morrison Formation (Jurassic)

Jem Moab Tongue of the Entrada Sandstone (Jurassic)

Je Main body of the Entrada Sandstone (Jurassic)

Contact

Fault, bar and ball on downthrown side

Syncline

Strike and dip of beds

Levels of certainty

**B** Data indicate geologic environment and suggest level of resource potential

**C** Data indicate geologic environment and resource potential, but do not establish activity of resource-forming processes

Lost Spring Canyon WSA
Area Name, Classification, Number, Size

Mancos Mesa Wilderness Study Area
UT-060-181
51,440 acres

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

Uranium has been mined in Red Canyon southeast of the Mancos Mesa Wilderness Study Area (WSA). Uranium occurrences are in the Shinarump Member of the Chinle Formation. The Chinle Formation crops out in Red Canyon and dips gently westward beneath Mancos Mesa; uranium occurrences could be present at depth.

Oil and gas deposits could occur near the Permian-age White Rim Sandstone pinch-out at depth beneath the WSA. Sandstone occurrences in the WSA are suitable for decorative and building stone.

Mineral Resource Potential

The study area has a moderate potential for uranium, copper, oil and gas and a low potential for other metals and geothermal energy.

Mining Activity

The Red Canyon uranium area, in the White Canyon uranium mining district, is adjacent to the study area. The Markey Mine was probably the largest producer in Red Canyon and total production exceeded 200,000 lb uranium oxide. The mine portal is about 4,000 ft outside the boundary. Workings extend southward on a N. 25° E.-trending Shinarump Sandstone-filled paleochannel for about 5,600 ft, 1,600 ft of which are beneath the WSA.

Mineral Setting/Geology

The WSA is on the eastern flank of the Monument upwarp within the Colorado Plateau province. It is underlain by flat- to gently-dipping Permian- to Jurassic-age sedimentary rocks.
Recommendations

None

References


Map showing the location of the Mancos Mesa Wilderness Study Area, San Juan County, Utah.
Approximate Boundary
Mancos Mesa Wilderness
Study Area

Map showing the mineral resource potential of the
Mancos Mesa Wilderness Study Area, San Juan County, Utah.

Explanation:
- M/C: Geologic terrane having moderate mineral resource potential for copper, uranium, oil and gas with certainty level C.
- L/C: Geologic terrane having low mineral resource potential for other metals, and geothermal energy, all with certainty level C.

- Applies to entire study area.
### Area Name, Classification, Number, Size

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<td>UT-060-054</td>
<td>Moab</td>
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<td>59,600 acres</td>
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### Mineral Commodity Significance

#### Identified Mineral Resources & Significant Occurrences

No mineral resources were identified in the Mexican Mountain Wilderness Study Area (WSA). Uranium, tar sands, copper, lead, zinc, silver, gold, sulfur, silica, gypsum, and sand and gravel occur in the study area.

### Mineral Resource Potential

The WSA has a high mineral resource potential for uranium and vanadium. The potential for oil and gas, carbon dioxide, helium gas, bentonite, and geothermal sources is moderate.

### Mining Activity

Two small uranium prospects are within the WSA, three copper-silver prospects are just east of the WSA, and several active claim groups totalling 247 mining claims for uranium, copper-silver, and sulfur are in the vicinity.

### Mineral Setting/Geology

The study area forms part of a continuous ring comprising the outer, relatively steeply-dipping part of the San Rafael Swell, an eroded structural dome. Faults and folds cut through the arched sedimentary rock units. Solution collapse features exist within the study area.

### Recommendations

Detailed mapping and sampling of a copper-silver prospect, 1/4 mi east of the WSA, may be warranted. Two mineralized areas in the Chinle Formation within the WSA should also be sampled and mapped in more detail to determine their size and grade.
References


Map showing the location of the Mexican Mountain Wilderness Study Area, Emery County, Utah.
Approximate Boundary
Mexican Mountain
Wilderness Study Area

-Explanation-

**H/B**
High mineral resource potential for uranium and vanadium.

**M/B**
Moderate mineral resource potential for oil, gas, carbon
dioxide, helium, bentonite, and geothermal sources.

**Mine**

**Dirt Road**

Map showing the mineral resource potential of the
Mexican Mountain Wilderness Study Area, Emery County, Utah.
Middle Point Wilderness Study Area*
UT-060-175
5,990 acres

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

No mineral resources were identified in the Middle Point Wilderness Study Area (WSA).

Mineral Resource Potential

There is a moderate potential for oil and gas in the study area, a low potential for metals, including uranium, and geothermal energy, and no potential for coal.

Mining Activity

None

Mineral Setting/Geology

This study area is underlain by flat-lying Late Paleozoic-age sedimentary rocks of the Paradox basin in the Colorado Plateau province.

Recommendations

None

References


*THIS AREA HAS NOT BEEN STUDIED BY USBM & USGS
Map showing the mineral resource potential of the Middle Point Wilderness Study Area, San Juan County, Utah.
Area Name, Classification, Number, Size

Mill Creek Canyon Wilderness Study Area
UT-060-139A
9,780 acres

BLM District
Moab

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

No mineral resources are known to exist in the Mill Creek Canyon Wilderness Study Area (WSA); however, placer gold resources could exist in alluvium on the canyon rim along the eastern boundary. Additional field work, including detailed sampling and possibly trenching, would be needed to determine if resources do exist. Subeconomic eolian sand deposits are abundant throughout the WSA, but their development is unlikely.

Mineral Resource Potential

The study area has a moderate mineral resource potential for placer gold on the canyon rim in the eastern part of the WSA. There is a low mineral resource potential for small deposits of uranium in strata that are present at depth in the study area. The WSA has a low mineral resource potential for potash and oil and gas.

Mining Activity

No mining districts or mines are in the WSA. The nearest mining district is in the La Sal Mountains east of the study area. Placer claims cover most of the North Fork of Mill Creek and Burkholder Draw. There are few lode claims.

Mineral Setting/Geology

Rocks present below the surface consist of Mississippian-age strata, the Pennsylvanian-age Hermosa Group, the Permian-age Cutler Group, and Triassic-age Moenkopi and Chinle Formations. Units exposed at the surface consist of the Triassic Wingate Sandstone and Kayenta Formation, the Jurassic-age and Triassic Navajo Sandstone, and Jurassic San Rafael Group and Morrison Formation. There are glacial outwash deposits derived from plutonic rocks in the nearby La Sal Mountains among the Quaternary-age deposits in the WSA.
Recommendations

Additional field work, including more detailed sampling and possibly trenching, may determine placer gold resources in the eastern part.

References


Map showing the location of the Mill Creek Canyon Wilderness Study Area, Grand County, Utah.
Approximate Boundary
Mill Creek Canyon
Wilderness Study Area

-M/Bl Moderate mineral resource potential
for placer gold.

L/B Low mineral resource potential for
oil and gas, uranium in the Chinle
Formation, and potash.

Map showing the mineral resource potential of the
Mill Creek Canyon Wilderness Study Area, Grand County, Utah.
Area Name, Classification, Number, Size

Moquith Mountain Wilderness Study Area*
UT-040-217
14,830 acres

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

No uranium occurrences are known in either the Chinle or Moenave Formation in the Moquith Mountain Wilderness Study Area (WSA).

The deposits of sandstone, sand and gravel, and clay in the WSA have no unique qualities to make them more valuable than the massive quantities in the surrounding area.

Mineral Resource Potential

The study area has a moderate potential for oil and gas resources. There is a low potential for gypsum and coal, as the formations that contain these in adjacent areas do not exist in the WSA. The study area also has a low resource potential for metals, including uranium and vanadium, and for geothermal energy.

Mining Activity

As of April 1989, a block of 52 unpatented placer mining claims has been located on the plain extending from the northern tip of the study area northward for about 5 mi. A small part of the northern tip is included in two of the claims. Assessment work on the claims has been kept up through September 1988.

Mineral Setting/Geology

The study area is underlain by flat-lying Triassic- and Jurassic-age sedimentary rocks of the Chinle Formation and Glen Canyon Group, as well as recent deposits including sand dunes. There are some normal faults in the western part.

*THIS AREA HAS NOT BEEN STUDIED BY USBM & USGS
Recommendations

The WSA should have a field investigation. A detailed geochemical study should be conducted over the entire WSA to target specific areas for mineral resource potential. A geophysical survey should be conducted to characterize regional structure and tectonic setting related to the assessment of mineral and energy resource potential.

References


Approximate Boundary Moquith Mountain Wilderness Study Area

-Explanation-

M/B - Moderate mineral resource potential for oil and gas.

L/B - Low mineral resource potential for gypsum, coal, metals, including uranium and vanadium, and geothermal energy.

Map showing the mineral resource potential of the Moquith Mountain Wilderness Study Area, Kane County, Utah.
Recommendations

The WSA should have a site investigation. A detailed geophysical survey should be conducted over the entire WSA to target specific areas for mineral resource potential. A geophysical survey should be conducted to characterize regional structure and tectonic settings related to the assessment of mineral and energy resource potential.

References


Area Name, Classification, Number, Size
Mount Ellen-Blue Hills Wilderness Study Area
UT-050-238
54,480 acres

BLM District
Richfield

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

No mineral resources have been identified in the Mount Ellen-Blue Hills Wilderness Study Area (WSA). Coal, uranium-vanadium, gold, silver, and copper occur in or near the WSA.

Mineral Resource Potential

The study area has a low mineral resource potential for coal, uranium, base metals, oil and gas, and geothermal resources.

Mining Activity

The WSA is in the Henry Mountains mining district. The only producing mines are the Bromide and Kimble-Turner mines in Bromide Basin, 1 mi south of the WSA. Approximately 700 oz gold, 3,000 oz silver, and 9 tons copper have been produced from the mines in the Bromide Basin area since 1889.

Most of the study area is in the Henry Mountains coal field. Only two of the 14 coal drill holes and prospects in the WSA have a coal thickness of over 4 ft, the minimum minable thickness for coal in this region.

Large blocks of land underlain by the Salt Wash Member of the Jurassic-age Morrison Formation along the west boundary have been staked for uranium.

Mining activity in the WSA consists of assessment work on various lode and placer claims. Five miles west of the study area, Meadowlark Farms, Inc. has been involved in a coal exploration drilling program.

Mineral Setting/Geology

The study area is in the northern Henry basin. Sedimentary rocks ranging in age from Late Triassic to Late Cretaceous are arched into structural domes by igneous intrusive rocks that form igneous centers and satellite bodies of laccoliths, bysmaliths, and sills.

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Recommendations

None

References


L / B - Low potential for coal, metals, including uranium, oil and gas, and geothermal energy.

Map showing the mineral resource potential of the Blue Hills-Mount Ellen Wilderness Study Area, Garfield and Wayne Counties, Utah.
Area Name, Classification, Number, Size

Mount Hillers Wilderness Study Area
UT-050-249
20,000 acres; 17,000 acres designated suitable for wilderness were studied.

BLM District
Richfield

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

No resources were identified in the Mount Hillers Wilderness Study Area (WSA). Uranium, vanadium, base- and precious-metals occur in the study area.

Mineral Resource Potential

The eastern part of the study area has a high mineral resource potential for uranium and vanadium and a low mineral resource potential for all other metals and coal. The central part has a moderate mineral resource potential for base (copper, lead, and zinc) and precious (gold) metals and a low mineral resource potential for uranium, vanadium, and coal. The western part has a moderate mineral resource potential for coal, uranium, and vanadium, and a low mineral resource potential for all other metals. The entire WSA has a low mineral resource potential for oil and gas and geothermal energy.

Mining Activity

There has been no recorded production from within the WSA. At least 13,000 lb of \( U_3O_8 \) and 37,000 lb of \( V_2O_5 \) have been produced within 3 mi of the WSA.

The East Henry Mountains uranium district is adjacent to the eastern side of the WSA. The Trachyte area, 2.5 mi north, and workings near Woodruff Springs, 2 mi east had production. The Star Mine, within the study area, is a 30-ft-deep shaft on a quartz vein containing gold and copper.

Unpatented lode claims, staked primarily for uranium, blanket much of the study area.

Mineral Setting/Geology

The study area encompasses one of the igneous intrusions of the Henry Mountains within the Henry basin. Sedimentary rocks surrounding the intrusion range in age from Permian to Cretaceous and have been deformed by the intrusion of the stock and smaller satellite bodies.
Recommendations

None

References


EXPLANATION OF MINERAL RESOURCE POTENTIAL

Geologic terrane having high mineral resource potential for commodity 2, with certainty level C; geologic terrane having low mineral resource potential for commodities 3 and 4, with certainty level B; geologic terrane having low mineral resource potential for commodity 1, with certainty level C.

Geologic terrane having moderate mineral resource potential for commodity 3, with certainty level B; geologic terrane having low mineral resource potential for commodity 4, with certainty level B; geologic terrane having low mineral resource potential for commodities 1 and 2 with certainty level C.

Geologic terrane having moderate mineral resource potential for commodity 2, with certainty level C; geologic terrane having low mineral resource potential for commodities 3 and 4, with certainty level B; geologic terrane having low mineral resource potential for commodity 1, with certainty level C.

Geologic terrane having moderate mineral resource potential for commodities 1 and 2, with certainty level C; geologic terrane having low mineral resource potential for commodities 3 and 4, with certainty level B.

Commodities
1. Coal
2. Uranium and vanadium
3. Base (copper, lead, zinc) and precious (gold) metals
4. Oil and gas and geothermal energy

Levels of certainty
A Available information not adequate
B Available information suggests level of resource potential
C Available information clearly defines the level of resource potential
D Available information clearly defines the level of resource potential

Mount Hillers WSA
Summary map showing mineral resource potential of the Mt. Hillers Wilderness Study Area, Garfield County, Utah.
EXPLANATION OF MINERAL RESOURCE POTENTIAL

Commodities:
1. Coal
2. Uranium and vanadium
3. Base (copper, lead, zinc) and precious (gold) metals
4. Oil and gas and geothermal energy

Levels of certainty:

A: Available information not adequate
B: Available information suggests level of resource potential
C: Available information clearly defines the level of resource potential
D: Available information clearly defines the level of economic potential
Area Name, Classification, Number, Size
Mount Pennell Wilderness Study Area
UT-050-248
74,300 acres; 25,800 acres designated suitable for wilderness were studied.

BLM District
Richfield

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

A subeconmic measured coal resource of 1.3 million tons from the Emery coal zone was identified in the Mount Pennell Wilderness Study Area (WSA). Apparent rank of the coal ranges from subbituminous C to high-volatile C bituminous.

Mineral Resource Potential

The central part of the study area underlain by the intrusive igneous stock appears to have a moderate resource potential for base (copper, lead, tin, molybdenum, and bismuth) and precious (gold and silver) metals. The remainder of the WSA appears to have a low mineral resource potential for all metals. The southern part, excluding the area of the central area underlain by the igneous stock and the small area immediately to the north of the stock, has a moderate mineral resource potential for coal. The remaining area has a low mineral resource potential for uranium, oil and gas, and geothermal resources.

Mining Activity

The study area is in the Henry Mountains mining district. The Mount Pennell Mine, a 70-ft-long adit, and the Viola V Mine, a 150-ft-long adit and a 72-ft-deep shaft, are in the WSA, but both mines were inaccessible at the time of the Bureau's investigation (August 1988). Two one-cubic-ft placer samples from the gravels along Straight Creek contained equivalent gold values of $0.02 and $0.025/cubic yard.

The Baby Ruth (Rico) claim has a recorded production of 17 tons of ore yielding 12.8 oz gold and 1 oz silver in 1925 and 1927. The ore was most likely from the Mount Pennell Mine.

In 1988, a claimant was drilling on a lode claim on the south side of Mount Pennell, but the extent and results of this exploration work are unknown. Placer and lode claims cover the south side of Mount Pennell and Straight Creek.
Mineral Setting/Geology

The study area encompasses one of the igneous intrusions of the Henry Mountains in the central Henry basin. Sedimentary rocks surrounding the igneous stock range in age from Late Jurassic to Late Cretaceous and are deformed by the igneous intrusion.

Recommendations

Systematic and extensive drilling of the intrusive igneous stock may confirm or deny the presence of porphyry copper mineralization at depth.

References


Map showing the location of the Mount Pennell Wilderness Study Area, Garfield County, Utah.
Map showing the mineral resource potential of the Mount Pennell Wilderness Study Area, Garfield County, Utah.
Muddy Creek Wilderness Study Area
UT-060-007
31,400 acres

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

Eleven million tons of inferred subeconomically significant gypsum has been identified in the Muddy Creek Wilderness Study Area (WSA). Uranium-vanadium, limestone, petrified wood, and sandstone also occur in the WSA.

Mineral Resource Potential

The study area has a high potential for uranium and vanadium. The potential for oil and gas, carbon dioxide, helium, bentonite, and geothermal sources is moderate.

Mining Activity

The Delta mining district is 2 mi south of the WSA; the San Rafael district is 2 mi north. There has been no significant production from properties within the WSA. Between 1949 and 1973, about 1 million lb of $U_3O_8$ were produced from 15 mines within 1 mi of the WSA.

Over 300 unpatented mining claims covering 6,000 acres have been located in the WSA; less than 100 are currently active. Four oil and gas leases covering 1,600 acres are in the WSA.

Mineral Setting/Geology

The WSA forms part of a continuous ring comprising the outer, relatively steeply-dipping part of the San Rafael Swell, an eroded structural dome. Faults and folds cut through the arched sedimentary rock units.

Recommendations

Surface exposures of the uranium-bearing Chinle Formation have been explored thoroughly. Any additional uranium would be in the subsurface Chinle that underlies the study area. The discovery and delineation of uranium at depth would require closely...
MUDDY CREEK--Continued

Recommendations--Continued

-spaced drilling through thick overburden. A drilling program using 50-ft-centers would be needed in the Chimney Canyon and Reds Canyon areas to fully evaluate the uranium potential in the WSA.

References


Map showing the location of the Muddy Creek Wilderness Study Area, San Juan County, Utah.
Map showing the mineral resource potential of the Muddy Creek Wilderness Study Area, San Juan County, Utah.
**MUD SPRING CANYON***

**Area Name, Classification, Number, Size**

Mud Spring Canyon Wilderness Study Area*  
UT-040-077  
38,075 acres

**BLM District**  
Cedar City

**Mineral Commodity Significance**

**Identified Mineral Resources & Significant Occurrences**

Coal beds, as thick as 4 ft, crop out in the western part of the Mud Spring Canyon Wilderness Study Area (WSA) in Cretaceous-age sedimentary rocks. Most of the study area is underlain by coal beds. About 250 million tons of coal are estimated to underlie the WSA.

**Mineral Resource Potential**

The study area has a high potential for coal resources in the Dakota and Straight Cliffs Formations and a moderate potential for titanium resources in the Straight Cliffs Formation. The study area also has a moderate potential for oil and gas and carbon dioxide resources. There is a low potential for uranium, vanadium, and other metals and for geothermal resources.

**Mining Activity**

There are no known mines or prospects in the WSA.

**Mineral Setting/Geology**

The WSA is underlain by gently-folded Cretaceous- and Tertiary-age sedimentary rocks, including the Canaan Peak, Kaiparowits, Wahweap, and Straight Cliffs Formations, and the Tropic Shale. Several synclines and an anticline exist in the study area.

**Recommendations**

The study area should be examined by the U.S. Geological Survey and the Bureau of Mines. A detailed geochemical study should be conducted over the entire area to target specific areas for mineral resource potential. A geophysical survey should be

***THIS AREA HAS NOT BEEN STUDIED BY USBM & USGS***
Recommendations--Continued

Conducted to determine regional structure and tectonic setting related to the assessment of mineral and energy resource potential.

References


Map showing the location of the Mud Spring Canyon Wilderness Study Area, Garfield and Kane Counties, Utah.
Approximate Boundary
Mud Spring Canyon
Wilderness Study Area

Map showing the mineral resource potential of the
Mud Spring Canyon Wilderness Study Area, Garfield and Kane Counties, Utah.
<table>
<thead>
<tr>
<th>Area Name, Classification, Number, Size</th>
<th>BLM District</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mule Canyon Wilderness Study Area</td>
<td>Moab</td>
</tr>
<tr>
<td>UT-060-205B</td>
<td></td>
</tr>
<tr>
<td>5,990 acres</td>
<td></td>
</tr>
</tbody>
</table>

**Mineral Commodity Significance**

**Identified Mineral Resources & Significant Occurrences**

Inferred subeconomic resources of sandstone are present in the Mule Canyon Wilderness Study Area (WSA).

**Mineral Resource Potential**

The study area has a moderate resource potential for oil and gas, and a low resource potential for metals, including uranium and thorium, coal, and geothermal energy.

**Mining Activity**

There are no mines, prospects, or mining claims located in or near the study area. All of the WSA is covered with oil and gas leases.

**Mineral Setting/Geology**

The study area is underlain by the broadly-folded sedimentary rocks of the Monument upwarp. Pennsylvanian- through Triassic-age limestones, sandstone, and shales crop out in the study area.

**Recommendations**

Strata that underlie the WSA contain productive oil and gas zones elsewhere in the Paradox Basin, but they have not been adequately explored here.

**References**


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References—Continued


Approximate Boundary
Mule Canyon
Wilderness Study Area

Geologic terrane having moderate mineral resource potential for oil and gas with a certainty level of B

Approximate Boundary
Fish Creek Canyon
Wilderness Study Area

Map showing the mineral resource potential of the Mule Canyon Wilderness Study Area, San Juan County, Utah.
Area Name, Classification, Number, Size
Negro Bill Canyon Wilderness Study Area  
UT-060-138  
7,620 acres

BLM District
Moab

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

Abundant subeconomic resources of eolian sand are present in the Negro Bill Canyon Wilderness Study Area (WSA), but are not likely to be developed.

Mineral Resource Potential

The mineral resource potential is high for gypsum, potash, and bentonite beneath the wilderness study area, moderate for oil and gas, carbon dioxide, and uranium, and low for helium.

Mining Activity

No mining districts or mines are within the WSA. Mining has taken place in the La Sal Mountains east of the study area. Unpatented mining claims have been located inside the WSA.

Mineral Setting/Geology

The study area is in a region of very gently-folded, generally flat-lying Mesozoic-age sedimentary rocks. The rocks have been folded into very gentle, northwest-trending folds of the Grand River-Castle Valley anticline on the east, and the La Sal Creek Syncline and the Moab Anticline on the west.

Recommendations

None

References


293
References--Continued


Approximate Boundary
Negro Bill Canyon
Wilderness Study Area

Explanation:

H/C - High mineral resource potential for gypsum, potash, and bentonite.
M/B - Moderate mineral resource potential for oil, gas, carbon dioxide, and uranium.
L/C - Low mineral resource potential for helium.

Map showing the mineral resource potential of the Negro Bill Canyon Wilderness Study Area, Grand County, Utah.
North Fork Virgin River Wilderness Study Area
UT-040-150
1,040 acres

**Mineral Commodity Significance**

**Identified Mineral Resources & Significant Occurrences**

Inferred subeconomic resources of gypsum (about 20 million tons), suitable for use in building materials, fertilizer, cement, and many other products were identified in the North Fork Virgin River Wilderness Study Area (WSA). Inferred subeconomic resources of sandstone, suitable for construction purposes, and limestone, suitable for agricultural purposes also occur in the WSA.

**Mineral Resource Potential**

The study area has a moderate energy resource potential for small oil and gas pools in Paleozoic- and Mesozoic-age rocks. A low potential exists for other resources including all metals, geothermal sources, and coal.

**Mining Activity**

There has been no mineral production recorded from this area. No mining districts, mines, or patented claims are in the WSA. The nearest mining district is the Silver Reef (Harrisburg) district, about 25 mi to the southwest. Eight unpatented lode claims are mostly within the northern part of the study area. These claims were apparently staked for gypsum in the Jurassic-age Carmel Formation; there is no evidence of exploration work.

**Mineral Setting/Geology**

The study area consists of gently-dipping Jurassic and Cretaceous-age sedimentary rocks. These are largely sandstones, limestones, and shales. None is favorable for hosting mineral deposits. Coal was mined from younger Cretaceous rock east of the study area.

**Recommendations**

Deep drilling would be required to evaluate oil and gas possibilities.
References


EXPLANATION OF IDENTIFIED RESOURCES AND MINERAL AND ENERGY RESOURCE POTENTIAL

Summary of identified resources and resource potential for each of the eight study areas: All eight study areas have a low mineral and energy resource potential for all metals (including silver and uranium) and geothermal sources, with certainty level D. Theorderville Canyon, North Fork Virgin River, and Deep Creek study areas have a low energy resource potential for coal, with certainty level D; the other five study areas have no potential for coal, with certainty level D. Although the Orderville Canyon, North Fork Virgin River, and Deep Creek study areas have identified resources of gypsum, they have no mineral resource potential for additional gypsum, with certainty level D; the other five study areas have no potential for gypsum, with certainty level D.

Certainty levels

B Data indicate geologic environment and suggest level of resource potential
C Data indicate geologic environment and resource potential but do not establish activity of resource-forming processes
D Data clearly define geologic environment and level of resource potential, and indicate activity of resource-forming processes in all or part of study area


Area Name, Classification, Number, Size

North Stansbury Mountains Wilderness Study Area
UT-020-089
10,480 acres; 10,000 acres designated suitable for wilderness were studied.

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

Mississippian-age carbonate rocks exposed along the eastern boundary of the North Stansbury Mountains Wilderness Study Area (WSA) host occurrences of lead, zinc, copper, silver, and gold and may extend west beneath older Paleozoic-age rocks exposed in the WSA. Development of one nearby lead-zinc deposit reached the eastern boundary; the deposit was dipping west at its lowest accessible point in underground workings. Similar deposits could occur at depth in the WSA.

Limestone exposed in the extreme southeast corner of the study area is similar in quality to commercial limestone in an active quarry located nearby, but it would not be utilized in favor of sources located closer to processing facilities. Inferred subeconomic sand and gravel resources exist in Muskrat Canyon.

Mineral Resource Potential

There is a moderate potential for lead, zinc, silver, gold, and mercury in vein deposits, and for gold in sediment-hosted disseminated gold deposits in the southern and eastern parts of the study area, and a low potential for these metals in the rest of the study area. The WSA has a moderate potential for geothermal energy and a low potential for oil and gas.

Mining Activity

Recorded production for the Free Coinage mining district, which includes the study area, totalled 449,244 lb lead, 5,400 lb zinc, 1,458 lb copper, 6,160 oz silver, and 5.17 oz gold between 1917 and 1948. None of the past-producing deposits are in the study area.
Mineral Setting/Geology

The study area is underlain by thrust-faulted and block-faulted Paleozoic- and Mesozoic-age sedimentary rocks. These rocks were intruded by Tertiary-age igneous rocks and mineralizing hydrothermal fluids.

Recommendations

Detailed geologic mapping and geophysical and geochemical studies would be useful in determining if the Mississippian carbonate rocks exposed along the eastern boundary extend westward beneath older Paleozoic-age rocks in the study area. If they do, an exploration target for lead-zinc deposits similar to the one developed at the Monte Carlo Mine could extend into the study area.

References


U.S. Bureau of Mines, 1924-31, Mineral resources of the United States (annual volumes for the years indicated).


U.S. Geological Survey, 1917-1923, Mineral resources of the United States (annual volumes for the years indicated).
**EXPLANATION OF MINERAL RESOURCE POTENTIAL**

- **Area having inferred subeconomic resource of sand and gravel**
- **Area having inferred subeconomic resource of limestone suitable for use in cement**—Resource is in the Mississippian Great Blue Limestone, which crops out only in the southeast corner of the study area.
- **Geologic terrane having moderate mineral resource potential for vein and replacement deposits of lead, zinc, silver, gold, and mercury, with certainty level C**—Applies to all areas shown in pink, with and without stripes.
- **Geologic terrane having moderate mineral resource potential for sediment-hosted disseminated gold resources, with certainty level B**—Applies to all areas marked “M/B”.
- **Geologic terrane having moderate resource potential for geothermal energy, with certainty level B**.

**Levels of certainty:**

- **B** Data indicate geologic environment and suggest the level of resource potential.
- **C** Data indicate geologic environment and give a good indication of the level of resource potential.

**GEOLOGIC FEATURES**

- **Alluvial deposits of Quaternary age**
- **Contact separating Lower Devonian and older rocks from Upper Devonian and younger rocks**
- **Paved road**
- **Unpaved road**

North Stansbury Mountains WSA
Mineral resource potential and pertinent geologic features of the North Stansbury Mountains Wilderness Study Area, Tooele County, Utah.
Area Name, Classification, Number, Size
Notch Peak Wilderness Study Area
UT-050-078
51,130 acres; 28,000 acres designated suitable for wilderness were studied.

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

Tungsten, gold, and possibly molybdenum are associated with the Notch Peak granite-sedimentary rock contact in the Notch Peak Wilderness Study Area (WSA). Tungsten and gold deposits occur in taconite and marbleized limestone beds. Molybdenum minerals may occur in granite at the west edge of the study area. A minimum of 775 tons of rock grading 0.51% WO₃ (tungsten trioxide) was identified in the study area at the Brown Queen Mine.

Mineral Resource Potential

The study area has a high resource potential for tungsten, a moderate potential for gold, silver, molybdenum, copper, lead, oil and gas, and a low potential for uranium, thorium, coal, and geothermal energy.

Mining Activity

No mineral production has been recorded from within the study area, but from 1942-1956, production from just outside the boundary was listed as 1,000 short tons of WO₃ from the New Klondike Mine and 57 tons of scheelite-bearing ore from the Scheelite Queen Mine. Total gold production from the Amasa Valley placer (just to the east of the study area) is unknown. The mines and prospects are all within the Notch Peak mining district. There is no current company activity within the WSA.

Mineral Setting/Geology

The study area is immediately underlain by Cambrian- and Ordovician-age limestone and shale that are intruded by a Jurassic-age granite. The area is underlain at depth by thrust faults of the Sevier orogenic belt and cut by Tertiary-age Basin and Range faults.
Recommendations

Detailed mapping to delineate geologic structures and seek areas of alteration, including jasperoids, is needed. A detailed stream-sediment geochemical study and selective rock sampling should be conducted over the entire study area to further refine and resolve anomalies detected during earlier work. Exploration for tungsten and/or gold is recommended along the granite-sediment contact and in the vicinity of the Brown Queen Mine.

References


Gray, R. S., 1956, Preliminary report of geological investigations of the property of the Treasure Mountain Mining Company, House Mountain Range, Millard County, Utah: on file at Utah Geological and Mineralogical Survey, Salt Lake City, Utah.


References--Continued


Map showing the location of the Notch Peak Wilderness Study Area, Millard County, Utah.
Approximate Boundary Notch Peak Wilderness Study Area

- Explanation -

H/B High mineral resource potential for tungsten.
M/B Moderate mineral resource potential for gold, silver, molybdenum, copper, lead, zinc, oil, and gas.
L/B Low mineral resource potential for uranium, thorium, coal, and geothermal energy.

Paved road ===== Dirt road ⬆️ Mine

Map showing the mineral resource potential of the Notch Peak Wilderness Study Area, Millard County, Utah
Area Name, Classification, Number, Size

Orderville Canyon Wilderness Study Area
UT-040-145
1,750 acres

BLM District
Cedar City

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

Inferred subeconomic resources of gypsum (about 20 million tons), suitable for use in building materials, fertilizer, cement, and many other products were identified in the Orderville Canyon Wilderness Study Area (WSA). Inferred subeconomic resources of sandstone, suitable for construction purposes, and limestone, suitable for agricultural purposes are also present in the WSA.

Mineral Resource Potential

The study area has a moderate energy resource potential for small oil and gas pools in Paleozoic- and Mesozoic-age rocks. A low potential exists for other resources including all metals, geothermal sources, and coal.

Mining Activity

There has been no mineral production recorded from this area. No mining districts, mines, or patented claims are in the WSA. The nearest mining district is the Silver Reef (Harrisburg) district, about 24 mi to the southwest. A block of over 300 unpatented lode claims just east of and slightly overlapping the southeastern study area boundary was staked for uranium in the Cretaceous-age Dakota Sandstone. In 1950, a small amount of uranium ore was shipped from workings on these claims, about 0.5 mi east of the WSA. There is no surface evidence of similar uranium deposits inside the study area.

Mineral Setting/Geology

The study area consists of gently-dipping Jurassic- and Cretaceous-age sedimentary rocks. These are largely sandstones, limestones, and shales, none are favorable for hosting mineral deposits. Coal and uranium are found above these sedimentary rocks in younger Cretaceous rock.
Recommendations

Deep drilling would be required to evaluate oil and gas possibilities.

References


References—Continued

EXPLANATION OF IDENTIFIED RESOURCES AND MINERAL AND ENERGY RESOURCE POTENTIAL

Summary of identified resources and resource potential for each of the eight study areas. All eight study areas have a low mineral and energy resource potential for all metals (including silver and uranium) and geothermal sources, with certainty level D. The Orderville Canyon, North Fork Virgin River, and Deep Creek study areas have a low energy resource potential for coal, with certainty level D; the other five study areas have no potential for coal, with certainty level D. Although the Orderville Canyon, North Fork Virgin River, and Deep Creek study areas have identified resources of gypsum, they have no mineral resource potential for additional gypsum, with certainty level D; the other five study areas have no potential for gypsum, with certainty level D.

Area of identified resources of gypsum

M/C Geologic terrane having a moderate energy resource potential for oil and gas, with certainty level C—Applies to entirety of all eight study areas

Approximate boundary of wilderness study area

Certainty levels

B Data indicate geologic environment and suggest level of resource potential

C Data indicate geologic environment and resource potential but do not establish activity of resource-forming processes

D Data clearly define geologic environment and level of resource potential, and indicate activity of resource-forming processes in all or part of study area

Identified resources and mineral and energy resource potential of the eight wilderness study areas, Washington and Kane Counties, Utah.
Area Name, Classification, Number, Size

Paria-Hackberry Wilderness Study Area
UT-040-247
135,822 acres; 94,642 acres designated suitable as wilderness were studied.

BLM District
Cedar City

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

Quartz-rich sandstone, suitable for the manufacture of container glass and construction purposes, occurs in the Paria-Hackberry Wilderness Study Area (WSA).

Coal, copper, gypsum, lead, manganese, and uranium occur nearby, but no resources were identified in the WSA.

Mineral Resource Potential

The study area has a moderate mineral potential for uranium resources in the Chinle Formation. There is a low mineral potential for resources of oil and gas, coal, metals, and geothermal energy.

Mining Activity

The Kaiparowits coal field occurs just east of the WSA, and coal-bearing formations surround the area on the north, east, and west. There are no mines or mining claims in the study area, and no coal or uranium was found. Before 1988, almost the whole region was leased for oil and gas. Most of the leases have expired, and there are no current leases in the WSA. In 1966, oil shows were reported from an oil and gas test hole that was drilled about 0.5 to 1 mi west of the study area. Because of the folded structures in the area, there was abundant activity in leasing through the 1980's but no further drilling.

Mineral Setting/Geology

The study area is on the northern end of the Kaibab uplift and is underlain by flat- or gently-dipping sedimentary rocks of the Moenkopi, Chinle, Moenave, Kayenta, Navajo, and Carmel Formations.
Recommendations

None

References


Map showing the location of the Paria-Hackberry Wilderness Study Area, Kane County, Utah.
Approximate Boundary
Paria-Hackberry
Wilderness Study Area

Explanation:

M/B - Moderate mineral resource potential for uranium.
L/B - Low mineral resource potential for oil and gas, coal, metals, and geothermal energy.

Map showing the mineral resource potential of the Paria-Hackberry Wilderness Study Area, Kane County, Utah.

320
Area Name, Classification, Number, Size

Parunuweap Canyon Wilderness Study Area
UT-040-230
30,800 acres; 14,100 acres designated suitable as wilderness were studied.

BLM District

Cedar City

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

Inferred subeconomic resources of gypsum (about 6 million tons), suitable for use in building materials, fertilizer, cement, and many other products were identified in the Parunuweap Canyon Wilderness Study Area (WSA). Inferred subeconomic resources of sandstone, suitable for construction purposes, and limestone, suitable for agricultural purposes are also present in the WSA.

Mineral Resource Potential

The study area has a moderate energy resource potential for small oil and gas pools in Paleozoic- and Mesozoic-age rocks. A low potential exists for other resources including all metals, geothermal sources, and coal.

Mining Activity

There has been no mineral production recorded from this area. No mining districts, mines, or patented claims are in the WSA. The nearest mining district is the Silver Reef (Harrisburg) district, about 26 mi to the west. Two unpatented lode claims are on the Jurassic-age Navajo Sandstone along and partially inside the eastern study area boundary. There are no workings on these properties and there was no surface evidence of mineralization.

Mineral Setting/Geology

The study area consists of gently-dipping Jurassic- and Cretaceous-age sedimentary rocks. These are largely sandstones, limestones, and shales.

Recommendations

Deep drilling would be required to evaluate oil and gas possibilities.
References


EXPLANATION OF MINERAL RESOURCE POTENTIAL

- **Red**
  - Area having identified resources of gypsum, as well as a moderate resource potential for oil and gas

- **M/C**
  - Geologic terrane having a moderate resource potential for oil and gas, with certainty level C—Applies to entire study area

- **L/D**
  - Geologic terrane having a low resource potential for uranium and silver, and for geothermal sources and coal, with certainty level D—Applies to entire study area

- **N/D**
  - Geologic terrane having no potential for gypsum, with certainty level D—Applies to that part of the study area not containing identified resources of gypsum

Mineral resource potential of the Parunuweap Canyon Wilderness Study Area, Kane County, Utah.
**Area Name, Classification, Number, Size**

<table>
<thead>
<tr>
<th>Area Name</th>
<th>Classification</th>
<th>Number</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pine Canyon Wilderness Study Area*</td>
<td>UT-060-188</td>
<td></td>
<td>15,180 acres</td>
</tr>
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</table>

**BLM District**

<table>
<thead>
<tr>
<th>District</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moab</td>
</tr>
</tbody>
</table>

**Mineral Commodity Significance**

**Identified Mineral Resources & Significant Occurrences**

No mineral resources were identified in the Pine Canyon Wilderness Study Area (WSA).

**Mineral Resource Potential**

The study area has a moderate mineral resource potential for oil and gas, and a low mineral resource potential for uranium, vanadium and other metals, coal, and geothermal energy.

**Mining Activity**

The nearest mining district is about 3 mi north of the study area. Uranium occurrences are in the Chinle Formation; however, this formation is not present in the WSA.

**Mineral Setting/Geology**

The WSA is underlain by relatively flat-lying sedimentary rocks of the Permian-age Cedar Mesa Sandstone.

**Recommendations**

The area should be examined by the U.S. Geological Survey and the Bureau of Mines. A detailed geochemical study should be conducted over the entire area to target specific areas of mineral resource potential. A geophysical study should be conducted to determine regional structure and tectonic setting related to the assessment of resource potential.

*THIS AREA HAS NOT BEEN STUDIED BY USBM & USGS*
References


Approximate Boundary
Pine Canyon
Wilderness Study Area

Approximate Boundary
Sheik's Flat
Wilderness Study Area

Approximate Boundary
Bullet Canyon
Wilderness Study Area

Approximate Boundary
Grand Gulch Complex
Instant Study Area

Approximate Boundary
Slickhorn Canyon
Wilderness Study Area

Explanation:

M/B - Moderate mineral resource potential for oil and gas.

L/B - Low mineral resource potential for uranium, vanadium and other metals, coal, and geothermal energy.

Dirt Road

Map showing the mineral resource potential of the Pine Canyon Wilderness Study Area, San Juan County, Utah.
<table>
<thead>
<tr>
<th>Area Name, Classification, Number, Size</th>
<th>BLM District</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Butte Wilderness Study Area</td>
<td>Cedar City</td>
</tr>
<tr>
<td>UT-040-147</td>
<td></td>
</tr>
<tr>
<td>804 acres</td>
<td></td>
</tr>
</tbody>
</table>

**Mineral Commodity Significance**

**Identified Mineral Resources & Significant Occurrences**

Inferred subecononic resources of sandstone, suitable for construction purposes occur in the Red Butte Wilderness Study Area (WSA).

**Mineral Resource Potential**

The study area has a moderate energy resource potential for small oil and gas pools in Paleozoic- and Mesozoic-age rocks. A low potential exists for other resources including all metals, geothermal sources, and coal.

**Mining Activity**

There has been no mineral production recorded from this area. No mining districts, mines or patented claims are in the study area. The nearest mining district is the Silver Reef (Harrisburg) district, about 13 mi to the southwest. A block of 70 unpatented lode claims partially overlaps the northwestern part of the study area. These claims were staked for uranium and vanadium in the Jurassic-age Moenave Formation. Oil and gas leases and lease applications cover most of the WSA. Lode claims in the northwestern part currently are being prospected for uranium, vanadium, silver, and copper.

**Mineral Setting/Geology**

The study area consists of gently-dipping Jurassic-age sedimentary rock. These are largely sandstones and mudstones. Neither is favorable for hosting mineral deposits in this area.

**Recommendations**

Deep drilling would be required to evaluate oil and gas possibilities.
References


EXPLANATION OF IDENTIFIED RESOURCES AND MINERAL AND ENERGY RESOURCE POTENTIAL

Summary of identified resources and resource potential for each of the eight study areas: All eight study areas have a low mineral and energy resource potential for all metals (including silver and uranium) and geothermal sources, with certainty level D. The Orderville Canyon, North Fork Virgin River, and Deep Creek study areas have a low energy resource potential for coal, with certainty level D; the other five study areas have no potential for coal, with certainty level D. Although the Orderville Canyon, North Fork Virgin River, and Deep Creek study areas have identified resources of gypsum, they have no mineral resource potential for additional gypsum, with certainty level D; the other five study areas have no potential for gypsum, with certainty level D.

- **Area of identified resources of gypsum**
- **M/C** Geologic terrane having a moderate energy resource potential for oil and gas, with certainty level C—Applies to entirety of all eight study areas
- **B** Data indicate geologic environment and suggest level of resource potential
- **C** Data indicate geologic environment and resource potential but do not establish activity of resource-forming processes
- **D** Data clearly define geologic environment and level of resource potential, and indicate activity of resource-forming processes in all or part of study area

Identified resources and mineral and energy resource potential of the eight wilderness study areas, Washington and Kane Counties, Utah.
Area Name, Classification, Number, Size

Red Mountain Wilderness Study Area
UT-040-132
18,250 acres; 17,450 acres designated suitable for wilderness were studied.

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

No mineral resources were identified in the Red Mountain Wilderness Study Area (WSA); however, silver, copper, and uranium occurrences in the Springdale Sandstone could underlie the WSA.

Mineral Resource Potential

The study area has a high potential for low-temperature geothermal energy in the western and central parts of the WSA and a moderate potential for high-temperature geothermal energy in the eastern part. There is a low potential for metal deposits, including gold, silver, copper, uranium, and vanadium, low potential for oil and gas, and no potential for coal.

Mining Activity

There are no known mining claims or mineral production in the study area. The Santa Clara mining district is southwest of the WSA, but no mineral production is known. About 10,640 acres of the study area are under oil and gas lease.

Mineral Setting/Geology

The WSA is along the Pine Valley syncline and is underlain by gently-inclined Mesozoic-age sedimentary rocks and some Cenozoic-age volcanic rocks.

Recommendations

None
References


EXPLANATION OF MINERAL AND ENERGY RESOURCE POTENTIAL

[Entire study area has low resource potential for (1) silver, copper, uranium, vanadium, and gold, with certainty level B, (2) all other metallic minerals, with certainty level C, and (3) oil and gas, with certainty level B. Entire study area has no energy resource potential for coal, with certainty level D]

- **H/D** Geologic terrane having high energy resource potential for low-temperature geothermal sources, with certainty level D—Applies to entire study area
- **M/B** Geologic terrane having moderate energy resource potential for high-temperature geothermal sources, with certainty level B—Applies to eastern part of study area (patterned)

Certainty levels

- **B** Data indicate geologic environment and suggest level of resource potential
- **C** Data indicate geologic environment and resource potential, but do not establish activity of resource-forming processes
- **D** Data clearly define geologic environment and level of resource potential, and indicate activity of resource-forming processes in all or part of study area

- **Oil and gas leases**—Information from the U.S. Bureau of Land Management as of 1985

Summary map showing mineral and energy resource potential and oil and gas leases within the Red Mountain Wilderness Study Area, Washington County, Utah.
**Area Name, Classification, Number, Size**

Road Canyon Wilderness Study Area  
UT-060-201  
52,420 acres

**BLM District**

Moab

**Mineral Commodity Significance**

**Identified Mineral Resources & Significant Occurrences**

Inferred subeconimic resources of sandstone are present in the Road Canyon Wilderness Study Area (WSA).

**Mineral Resource Potential**

The study area has a moderate resource potential for oil and gas, and a low resource potential for metals, including uranium and thorium, coal, and geothermal energy.

**Mining Activity**

There are no mines, prospects, or mining claims located in or near the WSA.

**Mineral Setting/Geology**

The study area is underlain by the broadly-folded sedimentary rocks of the Monument upwarp. Pennsylvanian- through Triassic-age limestones, sandstones, and shales crop out in the study area.

**Recommendations**

Strata that underlie the WSA contain productive oil and gas zones elsewhere in the Paradox Basin, but they have not been adequately explored here.

**References**

ROAD CANYON--Continued

References--Continued


Map showing the mineral resource potential of the Road Canyon Wilderness Study Area, San Juan County, Utah.
Area Name, Classification, Number, Size

Rockwell Wilderness Study Area*
UT-050-186
9,151 acres

BLM District
Richfield

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

No identified mineral resources or significant occurrences are known to occur on the surface of the Rockwell Wilderness Study Area (WSA).

Mineral Resource Potential

The study area has a moderate resource potential for oil and gas. Formations that have produced coal or uranium in other parts of Utah are not known to occur in the subsurface of the study area, and the potential for these resources is regarded as low. Because the WSA is covered with alluvium and information is not available about the presence or absence of igneous rocks or structures, the potential for metallic resources is not known. There is a low potential for resources of geothermal energy.

Mining Activity

There is no known recent mining activity in the study area but the West Tintic district is adjacent to the east boundary. The district produced an unknown amount of gold, silver, lead, and zinc from replacement deposits in limestone and dolomite associated with intrusions and fissures. Similar rock types and structures extend into the study area.

Mineral Setting/Geology

Quaternary-age alluvium and wind-blown sand deposits cover the WSA. Paleozoic-age sedimentary rocks and probable thrust faults exist in the subsurface of the study area.

*THIS AREA HAS NOT BEEN STUDIED BY USBM & USGS
Recommendations

The area should be examined by the U.S. Geological Survey and the Bureau of Mines. A detailed geochemical study should be conducted over the entire area to target specific areas of mineral resource potential. A geophysical study should be conducted to determine regional structure and tectonic setting related to the assessment of resource potential.

References


Approximate Boundary
Rockwell Wilderness
Study Area

-Explanation-

M/B - Moderate mineral resource potential for oil and gas.
L/B - Low mineral resource potential for coal, uranium, and geothermal energy.
U/A - Unknown mineral resource potential for metals, excluding uranium.

Map showing the mineral resource potential of the
Rockwell Wilderness Study Area, Juab County, Utah.
This area should be examined by the U.S. Geological Survey and the Bureau of Mines. A detailed geophysical study should be conducted over the entire strata/sediment specific areas of mineral resource potential. A geophysical study should be conducted to determine regional structure and stratigraphic setting related to the assessment of resource potential.

References


San Rafael Reef Wilderness Study Area
UT-060-029A
59,170 acres

Area Name, Classification, Number, Size

BLM District
Moab

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

Uranium is the principle commodity of interest in the San Rafael Reef Wilderness Study Area (WSA). Uranium resources are southwest of and extend into the WSA. Several mines in the Temple Mountain mining district just south of the study area each contain orebodies of at least 10,000 tons.

Other mineral occurrences include vanadium, gold, semi-precious gemstones, gypsum, limestone, sandstone, sand and gravel, tar sand, and oil and gas. The gypsum will not be mined in the foreseeable future because adequate supplies exist closer to current markets. Semi-precious gemstones (agate and agatized wood) will continue to be produced on a small scale.

Mineral Resource Potential

The study area has a high potential for uranium and vanadium. The potential for oil and gas, carbon dioxide, helium, bentonite, and geothermal sources is moderate.

Mining Activity

The Temple Mountain mining district includes the south end of the WSA; the Green River district covers the north end. Between 1948 and 1956, the Temple Mountain district (largely outside the WSA) yielded 1.3 million lb $U_3O_8$ and 3.8 million lb $V_2O_5$. Only a few thousand tons of uranium ore were produced from within the WSA.

There were at least 1,300 mining claims in and near the WSA in 1987. These covered at least 15 mines and prospects in the WSA and 7 prospects outside. Two companies were exploring for uranium and other minerals in the area in 1987.

Mineral Setting/Geology

The study area forms part of a continuous ring comprising the outer, relatively steeply-dipping part of the San Rafael Swell, an eroded structural dome. Faults, folds, and solution collapse features occur in the study area.


**Recommendations**

More work is necessary to determine if additional uranium deposits occur within the southern part of the WSA and to determine the source of anomalous gold found in some rock samples. This should consist of detailed sampling, geologic mapping, and subsequent closely-spaced drilling near the most favorable prospects. Detailed geologic mapping, sampling, and subsequent drilling will also be necessary to evaluate the gypsum occurrence.

**References**


-EXPLANATION-

H/B - High mineral resource potential for uranium and vanadium.

M/B - Moderate mineral resource potential for oil, gas, carbon dioxide, helium, bentonite, and geothermal sources.

Mine

=== Dirt road

Map showing the mineral resource potential of the San Rafael Reef Wilderness Study Area, Emery County, Utah.
Area Name, Classification, Number, Size

Scorpion Wilderness Study Area
UT-040-082
35,884 acres; 9,620 designated suitable as wilderness were studied.

BLM District
Cedar City

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

No mineral resources were identified in the Scorpion Wilderness Study Area (WSA).

Mineral Resource Potential

Because the study area is underlain by known oil-bearing units and there are structural similarities to the nearby Upper Valley gas field, potential for oil and gas, and carbon dioxide is moderate. The potential for gypsum and geothermal resources is low and the potential for uranium is unknown because it could occur in the Chinle Formation beneath the WSA.

Mining Activity

The study area is within the Kaiparowits Plateau region. No patented or unpatented mining claims or oil and gas leases are located in the WSA.

There is no recorded minerals-related activity within the study areas, but several companies drilled exploratory oil and gas holes within 15 mi. No shows or production are recorded.

Mineral Setting/Geology

The WSA is in a region of broad, homoclinal folds that formed in Mesozoic-age rocks. The area contains gently-dipping to flat-lying Triassic- through Jurassic-age sedimentary rocks undisturbed by faulting. The sedimentary rock units are of dominantly marine shelf and continental origin covered in places by younger terrace and pediment deposits.
Recommendations

The Timpoweap Member of the Moenkopi Formation and the Kaibab Limestone are oil and gas targets for exploratory drilling.

References


Map showing the mineral resource potential of the Scorpion Wilderness Study Area, Garfield County, Utah.
SHEIKS FLAT*

Area Name, Classification, Number, Size

Sheiks Flat Wilderness Study Area*
UT-060-224
3,070 acres

BLM District
Moab

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

No mineral resources were identified in the Sheiks Flat Wilderness Study Area (WSA).

Mineral Resource Potential

The study area has a moderate mineral resource potential for oil and gas and a low mineral resource potential for uranium, vanadium, and other metals, coal, and geothermal energy.

Mining Activity

The nearest mining district is about 20 mi northwest of the WSA. Uranium occurrences are in the Chinle Formation; however, this formation does not occur in the study area.

Mineral Setting/Geology

The WSA is underlain by relatively flat-lying sedimentary rocks of the Permian-age Cedar Mesa Sandstone.

Recommendations

The area should be examined by the U.S. Geological Survey and the Bureau of Mines. A detailed geochemical study should be conducted over the entire area to target specific areas of mineral resource potential. A geophysical study should be conducted to determine regional structure and tectonic setting related to the assessment of resource potential.

*THIS AREA HAS NOT BEEN STUDIED BY USBM & USGS

353
References


Map showing the mineral resource potential of the Sheiks Flat Wilderness Study Area, San Juan County, Utah.

**Explanation**

- **M/B** Moderate mineral resource potential for oil and gas.
- **L/B** Low mineral resource potential for uranium, vanadium and other metals, coal, and geothermal energy.
- **Dirt Road**
Area Name, Classification, Number, Size

Sids Mountain/Sids Cabin Wilderness Study Area
UT-060-023
80,530 acres

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

Inferred subeconomic resources of gypsum in the Carmel Formation have been identified in the Sids Mountain/Sids Cabin Wilderness Study Area (WSA). Occurrences of uranium (Chinle Formation), copper (Kayenta Formation and Wingate Sandstone), and tar sands (Chinle Formation) have also been found.

Mineral Resource Potential

The study area has a high potential for uranium and vanadium. The potential for oil and gas, carbon dioxide, helium, bentonite, and geothermal sources is moderate.

Mining Activity

Five prospects explore uranium zones and two prospects explore copper zones on faults in the WSA. Five mines and prospects explore the Calf Mesa area, about 1 mi outside the WSA; mineralized channels do not extend into the study area.

Active claims cover the gypsum exposures on the west side of the WSA; however, there has been no mining activity. In 1986, 975 unpatented lode claims were current in and adjacent to the study area.

Mineral Setting/Geology

The study area forms part of a continuous ring comprising the outer, relatively steeply-dipping part of the San Rafael Swell, an eroded structural dome. Faults and folds cut through the arched sedimentary rock units.

Recommendations

A detailed drilling program is needed to delineate the uranium zones laterally and at depth at the uranium mines and prospects.
References


Gilluly, James, 1926, Geology of a part of the San Rafael Swell, Utah: Ph.D. dissertation, Yale University, New Haven, Connecticut, 158 p.


References—Continued


Approximate Boundary
Sids Mountain
Wilderness Study Area

Map showing the mineral resource potential of the Sids Mountain/Sids Cabin Wilderness Study Area, Emery County, Utah.

H/B - High mineral resource potential for uranium and vanadium.
M/B - Moderate mineral resource potential for oil, gas, carbon dioxide, helium, bentonite, and geothermal sources.
Mine
Dirt road

Explanation -

High mineral resource potential for uranium and vanadium.
Moderate mineral resource potential for oil, gas, carbon dioxide, helium, bentonite, and geothermal sources.
### Slickhorn Canyon Wilderness Study Area*

<table>
<thead>
<tr>
<th>Area Name, Classification, Number, Size</th>
<th>BLM District</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slickhorn Canyon Wilderness Study Area*</td>
<td>Moab</td>
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<tr>
<td>UT-060-197/198</td>
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<tr>
<td>45,390 acres</td>
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</tbody>
</table>

#### Mineral Commodity Significance

**Identified Mineral Resources & Significant Occurrences**

No mineral resources were identified in the Slickhorn Canyon Wilderness Study Area (WSA).

### Mineral Resource Potential

The study area has a moderate mineral resource potential for oil and gas and a low mineral resource potential for uranium, vanadium, and other metals, coal, and geothermal energy.

### Mining Activity

No mining claims are known to have been located within the WSA. There are approximately 41,500 acres of oil and gas leases in the study area.

### Mineral Setting/Geology

The study area is underlain by relatively flat-lying sedimentary rocks of the Permian-age Cedar Mesa Sandstone.

### Recommendations

The area should be examined by the U.S. Geological Survey and the Bureau of Mines. A detailed geochemical study should be conducted over the entire area to target specific areas of mineral resource potential. A geophysical study should be conducted to determine regional structure and tectonic setting related to the assessment of resource potential.

*THIS AREA HAS NOT BEEN STUDIED BY USBM & USGS*
References


Map showing the mineral resource potential of the Slickhorn Canyon Wilderness Study Area, San Juan County, Utah.

Explanations:

M/B - Moderate mineral resource potential for oil and gas.
L/B - Low mineral resource potential for uranium, vanadium and other metals, coal, and geothermal energy.
==Dirt Road
Area Name, Classification, Number, Size

South Needles Wilderness Study Area*

UT-060-169A

160 acres

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

No mineral resources were identified in the South Needles Wilderness Study Area (WSA).

Mineral Resource Potential

There is a moderate potential for oil and gas in the study area and a low potential for placer gold, silver, uranium, vanadium, copper, and other metals, potash, halite, geothermal sources, and coal.

Mining Activity

None

Mineral Setting/Geology

The WSA is underlain by Late Paleozoic- and Mesozoic-age sedimentary rocks. The block faulted structural zone known as the "Grabens" extends into the northern part of the study area.

Recommendations

None

References

Doelling, H. H., 1969, Mineral resources, San Juan County, Utah, and adjacent areas Part II: uranium and other metals in sedimentary host rocks: Utah Geological and Mineralogical Survey Special Studies 24, 64 p.

*THIS AREA HAS NOT BEEN STUDIED BY USBM & USGS
References--Continued


EXPLANATION

[The entire Indian Creek Wilderness Study Area has inferred subeconomic resources of potash and halite in the subsurface]

**H/C** Geologic terrane having high mineral resource potential for uranium, and byproducts vanadium and copper (north quarter of Bridger Jack Mesa Wilderness Study Area) with certainty level C

**M/B** Geologic terrane having moderate mineral resource potential for oil and gas with certainty level B—Applies to entire area of each of the three wilderness study areas

**L/C** Geologic terrane having low resource potential for uranium and associated byproducts vanadium and copper, potash and halite (in the subsurface), gold, silver, and all other metals, and coal and geothermal energy, with certainty level C—Applies to entire area of each of the three wilderness study areas except for uranium, vanadium, and copper in the north quarter of Bridger Jack Mesa Wilderness Study Area

**U/A** Geologic terrane having unknown resource potential for rare-earth elements, with certainty level A—Applies to entire area of each of the three wilderness study areas

**Level of certainty**

**A** Available information is not adequate for determination of the level of resource potential

**B** Available information suggests level of resource potential

**C** Available information gives good indication of level of mineral resource potential

**礦** Mines and prospects

--- Unpaved road

South Needles WSA

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Map showing the mineral resource potential of the South Needles Wilderness Study Area, San Juan County, Utah.
Area Name, Classification, Number, Size

Spring Creek Canyon Wilderness Study Area
UT-040-148
4,433 acres

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

Inferred subeconomic resources of sandstone, suitable for construction purposes and limestone, suitable for agricultural purposes or aggregate occur in the Spring Creek Canyon Wilderness Study Area (WSA).

Mineral Resource Potential

The study area has a moderate energy resource potential for small oil and gas pools in Paleozoic- and Mesozoic-age rocks. The study area has a low potential for any metallic mineral resources, including uranium, copper, and silver, and for geothermal energy resources. There is no potential for coal or gypsum.

Mining Activity

There has been no mineral production recorded from this area. No mining districts, mines, or patented claims are in the WSA. The nearest mining district is the Silver Reef (Harrisburg) district, about 20 mi to the southwest. Partially inside the southwestern boundary are two blocks containing 11 unpatented lode claims on the Triassic-age Moenkopi and Kaibab Formations. The claims may have been staked for copper; no workings are on these claims. Oil and gas lease applications cover about 480 acres in the northern part.

Mineral Setting/Geology

The study area consists of a thick section of Permian- through Jurassic-age sedimentary rocks exposed along a fault scarp.

Recommendations

Drilling would be needed to locate oil if it is present at depth.
References


EXPLANATION OF RESOURCE POTENTIAL

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>M/C</td>
<td>Geologic terrane having moderate energy resource potential for oil and gas, with certainty level C—Applies to entire study area</td>
</tr>
<tr>
<td>L/C</td>
<td>Geologic terrane having low resource potential for all metals including copper, silver, uranium, and geothermal sources, with certainty level C—Applies to entire study area</td>
</tr>
<tr>
<td>N/D</td>
<td>Geologic terrane having no resource potential for coal and gypsum, with certainty level D—Applies to entire study area</td>
</tr>
</tbody>
</table>

Levels of certainty

- **D** Data indicate geologic environment, indicate level of resource potential, but do not establish activity of resource-forming processes
- **C** Data clearly define geologic environment and level of resource potential and indicate activity of resource-forming processes in all or part of the area

Summary map showing mineral and energy resource potential of the Spring Creek Canyon Wilderness Study Area, Iron County, Utah.
Spruce Canyon Wilderness Study Area
UT-060-100C1
20,350 acres; 14,736 acres designated suitable for wilderness were studied.

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

The Mahogany oil shale bed underlies the Spruce Canyon Wilderness Study Area (WSA), but cover prevents an accurate quantification. It averages less than 3 ft thick, much thinner than the generally accepted minimum exploitable thickness of 15 ft.

About 10 ft to 50 ft below the Mahogany, oil-impregnated, lenticular sandstones and siltstone beds of the P. R. Spring tar sand deposit occur in the Douglas Creek Member of the Green River Formation. The tar sands underlying the WSA average 8.4 gallons/ton; those in the main part of the P. R. Spring deposit average 25 gallons/ton. At present, no oil is commercially produced from tar sands in the U.S.

The WSA is surrounded by producing oil and gas fields (gas is by far predominant). A small part of the Book Cliffs field is inside the east-central boundary.

Mineral Resource Potential

There is a high potential for coal and oil and gas for all of the study area. There is a low potential for oil shale, tar sand, uranium, metal deposits, and geothermal energy in the study area.

Mining Activity

Although the WSA is within the Sego Coal Field, no coal production has been reported from inside the boundary; over 2 million tons was mined at Sego, about 11 mi southwest.

Total production of oil and gas from the region is about 216 billion cubic ft of gas and 2 million barrels of oil. Production from the Book Cliffs field is about 409 million cubic ft of gas.

No claims have been staked in or near the study area; no recent company activity has taken place.
Mineral Setting/Geology

Flat-lying Late Cretaceous- and Tertiary-age sedimentary rocks make up the ridges and canyons of the WSA.

Recommendations

None

References


Approximate Boundary Spruce Canyon Wilderness Study Area

-EXPLANATION-

H/B - High mineral resource potential for coal, oil, and gas.
L/B - Low potential for oil shale, tar sand, uranium, metals, and geothermal energy.
ISCR - Inferred subeconomic coal resources
DCRR - Demonstrated coal reserves and resources.
Mine
Dirt Road

Map showing the mineral resource potential of the Spruce Canyon Wilderness Study Area, Grand County, Utah.
SQUAW AND PAPOOSE CANYONS*

<table>
<thead>
<tr>
<th>Area Name, Classification, Number, Size</th>
<th>BLM District</th>
</tr>
</thead>
<tbody>
<tr>
<td>Squaw and Papoose Canyons Wilderness Study Area*</td>
<td>Moab</td>
</tr>
<tr>
<td>UT-060-227/CO-030-265A</td>
<td></td>
</tr>
<tr>
<td>11,287 acres</td>
<td></td>
</tr>
</tbody>
</table>

**Mineral Commodity Significance**

**Identified Mineral Resources & Significant Occurrences**

No mineral resources have been identified in the Squaw and Papoose Canyons Wilderness Study Area (WSA). Jurassic-age Morrison Formation hosts uranium deposits and occurrences at several sites adjacent to the southern boundary. Cretaceous-age Dakota Sandstone is known to contain thin, discontinuous coal beds inside the study area.

Stratigraphic studies by oil companies indicate that the Pennsylvanian-age Paradox Formation, which contains the producing zones in five nearby oil and gas fields, underlies the WSA. Carbon dioxide and helium have been produced from nearby wells.

**Mineral Resource Potential**

The study area has a high resource potential for oil and gas, a moderate potential for resources of uranium and vanadium in the Morrison Formation and resources of coal in the Dakota Formation. The potential for all other metals and for geothermal energy is low.

**Mining Activity**

Prospecting and exploration drilling are the only minerals-related activities that have taken place in the WSA. Large blocks of lode mining claims were located for uranium during the 1970's, but nearly all that were inside the study area have been abandoned. No significant deposits were discovered.

**Mineral Setting/Geology**

The study area is in the Paradox Basin and is underlain by flat-lying Jurassic- and Cretaceous-age sedimentary rocks that were deposited in a terrestrial environment.

*THIS AREA HAS NOT BEEN STUDIED BY USBM & USGS*
Recommendations

The WSA should be mapped in detail, geochemical stream-sediment surveys should be conducted, and geophysical gravity, magnetic, and seismic surveys should be undertaken to further define the potential for mineral resources.

References


Approximate Boundary
Squaw / Papoose Canyons
Wilderness Study Area

- Explanation -

H/C - High mineral resource potential for oil and gas.
M/C - Moderate mineral resource potential for uranium and vanadium and coal.
L/C - Low mineral resource potential for all other metals, and geothermal energy.

Map showing the mineral resource potential of the Squaw and Papoose Canyons Wilderness Study Area, San Juan County, Utah.
Area Name, Classification, Number, Size

Steep Creek Wilderness Study Area
UT-040-061
21,896 acres; 18,350 acres designated suitable as wilderness were studied.

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

Uranium occurrences are present in the Shinarump Member of the Chinle Formation outside the Steep Creek Wilderness Study Area (WSA). The Shinarump Member is at depth beneath the WSA and similar grade sandstone-type uranium occurrences could be present.

Permian-age and Lower Triassic-age carbonate reservoir and source rocks that contain hydrocarbon resources elsewhere are present in the study area. Oil and gas occurrences could therefore be present; however, no drilling or oil and gas exploration has been conducted in the study area.

Large bentonite occurrences in the Monitor Butte and Petrified Forest Members of the Chinle Formation in the WSA are without special or unique properties and higher-quality occurrences are present elsewhere outside the study area. Mesozoic-age sandstone beds in the WSA are suitable for decorative and dimension stone. Petrified wood, suitable for gem material, is abundant in the study area where the Petrified Forest Member is exposed.

Mineral Resource Potential

The mineral resource potential for undiscovered bentonite, oil and gas, and carbon dioxide is moderate in the entire study area. The mineral resource potential for undiscovered uranium is moderate in the northeastern part of the WSA and unknown in the western part. The mineral resource potential for undiscovered iron, cobalt, nickel, copper, lead, molybdenum, tin, cadmium, strontium, and vanadium is low, as is the potential for geothermal energy.

Mining Activity

The study area is about 1.5 mi west of the Circle Cliffs uranium area of the Henry Mountains mining district. No mining has taken place in the WSA; however, uranium mines and prospects are within 1.5 mi of the eastern boundary. Unpatented mining claims extend inside the northeastern boundary.
Mineral Setting/Geology

The WSA is in a region of broad folds that formed in Mesozoic rock sequences west of the Circle Cliffs upwarp. The study area contains exposed, gently-dipping to flat-lying Triassic- through Jurassic-age sedimentary rocks that are minimally offset by normal faults.

Recommendations

Subsurface exploration would be required to determine if the Shinarump Member contains uranium occurrences at depth. Geophysical surveys and a drilling program are needed to evaluate hydrocarbon resources.

References


EXPLANATION

Geologic terrane having moderate mineral resource potential for uranium with certainty level C—Applies only to the northeastern part of the Steep Creek Wilderness Study Area

Geologic terrane having moderate energy resource potential for oil, gas, and carbon dioxide with certainty level B and thin bentonite beds dispersed throughout the lowermost Chinle Formation on the surface and in the subsurface with certainty level C—Applies to both the Steep Creek Wilderness Study Area and to the Escalante Canyons Tract V

Geologic terrane having low mineral resource potential for iron, cobalt, nickel, copper, lead, molybdenum, tin, cadmium, strontium, vanadium, and geothermal energy with certainty level C—Applies to both study areas

Geologic terrane having low mineral resource potential for gypsum with certainty level C—Applies only to the Escalante Canyons Tract V

Concealed geologic terrane having unknown mineral resource potential for uranium with certainty level A—Applies to the western, central, and southeastern part of the Steep Creek Wilderness Study Area and to the entire Escalante Canyons Tract V

Geologic terrane having no resource potential for gypsum with certainty level D—Applies only to Steep Creek Wilderness Study Area

Level of certainty:
A Available geologic information is not adequate for determination of the level of mineral resource potential
B Data indicate geologic environment and suggest the level of mineral resource potential
C Data indicate geologic environment and give a good indication of the level of mineral resource potential
D Data clearly define geologic environment and level of resource potential

Unpaved road

Steep Creek WSA
Approximate boundary and mineral resource potential of the Steep Creek Wilderness Study Area (Ut-040-061), Garfield County, Utah, and the Escalante Canyons Tract V (UT-040-077), Kane County, Utah.
Area Name, Classification, Number, Size

Swasey Mountain Wilderness Study Area
UT-050-061
49,500 acres; 34,500 acres designated suitable for wilderness were studied.

BLM District
Richfield

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

Inferred subeconomic resources of high-purity limestone, quartzite, and sand and gravel are present in the Swasey Mountain Wilderness Study Area (WSA). No metallic mineral resources were identified in the WSA. The Wheeler Shale and Marjum Formation contain fossils that are scientifically important, and some that are valuable to collectors.

Mineral Resource Potential

The northern and southern parts of the study area have a moderate potential for lead, zinc, copper, molybdenum, silver, and gold. The WSA has a moderate potential for oil and gas, and for undiscovered deposits of high-purity limestone and dolomite. There is a low potential for geothermal energy and no potential for coal.

Mining Activity

About 800 acres are covered by placer claims and 300 acres are covered by lode claims.

Mineral Setting/Geology

The WSA is in the House Range, one of many fault block mountain ranges in the Basin and Range province. The rocks in the study area consist of faulted and tilted Paleozoic-age sedimentary rocks.

Recommendations

A structural analysis by seismic data and test drilling is recommended to test rocks and structures beneath a buried detachment fault for oil and gas.
References


Tuftin, S. E., 1987, Mineral resources of a part of the Swasey Mountain Wilderness Study Area (UT-050-061) and a part of the Howell Peak Wilderness Study Area (UT-050-077), Millard County, Utah: U.S. Bureau of Mines Open-File Report MLA 71-87, 28 p.

EXPLANATION

[Both study areas contain inferred subeconomic resources of high-purity limestone (Howell Limestone), quartzite (Prospect Mountain Quartzite), sand and gravel (in washes and along flanks), and fossils (in the Wheeler Shale and the Marjum Formation). Both study areas have moderate mineral resource potential for high-purity limestone and dolomite, with certainty level B, except for the Prospect Mountain Quartzite, the Howell Limestone, and units of Tertiary and Quaternary age.]

Levels of certainty

Data indicate geologic environment and suggest level of mineral resource potential

B Data indicate geologic environment, give good indication of level of resource potential, but do not establish activity of resource-forming processes

Road

Boundary of House Range

Swasey Mountain WSA
Howell Peak WSA
Map showing mineral resource potential of the Swasey Mountain and Howell Peak Wilderness Study Areas, Utah.
**Taylor Creek Canyon Wilderness Study Area**

**BLM District**

<table>
<thead>
<tr>
<th>Area Name, Classification, Number, Size</th>
<th>BLM District</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taylor Creek Canyon Wilderness Study Area</td>
<td>Cedar City</td>
</tr>
<tr>
<td>UT-040-154</td>
<td>35 acres</td>
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</tbody>
</table>

**Mineral Commodity Significance**

**Identified Mineral Resources & Significant Occurrences**

Inferred subeconomical resources of sandstone, suitable for construction purposes and limestone, suitable for agricultural purposes or aggregate occur in the Taylor Creek Canyon Wilderness Study Area (WSA).

**Mineral Resource Potential**

The study area has a moderate energy resource potential for small oil and gas pools in Paleozoic- and Mesozoic-age rocks. The study area has a low potential for other resources including all metals and geothermal sources. There is no potential for coal.

**Mining Activity**

There has been no production recorded from this area. No mining districts, mines, or patented claims are in the WSA. The nearest mining district is the Silver Reef (Harrisburg) district, about 18 mi to the southwest.

**Mineral Setting/Geology**

The study area consists of gently-dipping Jurassic-age sedimentary rocks. These are largely sandstones, mudstones, and limestones. None is favorable for hosting mineral deposits in this area.

**Recommendations**

Drilling would be needed to determine if oil is present at depth.
References


EXPLANATION OF IDENTIFIED RESOURCES AND MINERAL AND ENERGY RESOURCE POTENTIAL

Summary of identified resources and resource potential for each of the eight study areas: All eight study areas have a low mineral and energy resource potential for all metals (including silver and uranium) and geothermal sources, with certainty level D. The Orderville Canyon, North Fork Virgin River, and Deep Creek study areas have a low energy resource potential for coal, with certainty level D; the other five study areas have no potential for coal, with certainty level D. Although the Orderville Canyon, North Fork Virgin River, and Deep Creek study areas have identified resources of gypsum, they have no mineral resource potential for additional gypsum, with certainty level D; the other five study areas have no potential for gypsum, with certainty level D.

- Area of identified resources of gypsum
- Geologic terrane having a moderate energy resource potential for oil and gas, with certainty level C—Applies to entirety of all eight study areas
- Approximate boundary of wilderness study area

Certainty levels

B  Data indicate geologic environment and suggest level of resource potential
C  Data indicate geologic environment and resource potential but do not establish activity of resource-forming processes
D  Data clearly define geologic environment and level of resource potential, and indicate activity of resource-forming processes in all or part of study area
Turtle Canyon Wilderness Study Area
UT-060-067
33,690 acres

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

The entire Turtle Canyon Wilderness Study Area (WSA) is underlain by the Sunnyside coal zone at depths from about 1,300 ft on the western side to over 3,000 ft on the eastern side. Coal beds are thickest northwest of the study area and appear to thin and eventually pinch out to the east. The coal rank is high-volatile A or B bituminous and is metallurgical grade. Total coal resources for the WSA, which include measured, indicated, and inferred coal beds thicker than 3.5 ft with less than 2,000 ft of overburden, are estimated to be 6.3 million tons; the following table shows a breakdown by bed thickness and depth of overburden.

Estimated coal resources within the Sunnyside coal zone (x 1,000 short tons).

[No coal beds thicker than 1.2 ft were estimated to have less than 1,000 ft of overburden.]

<table>
<thead>
<tr>
<th>Coal thickness in feet</th>
<th>1,000-2,000 ft of overburden</th>
<th>2,000-3,000 ft of overburden</th>
<th>Greater than 3,000 ft of overburden</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Category 1.2-2.3</td>
<td>2.3-3.5</td>
<td>3.5-7.0</td>
</tr>
<tr>
<td>Measured</td>
<td>0</td>
<td>0</td>
<td>72</td>
</tr>
<tr>
<td>Indicated</td>
<td>518</td>
<td>1,107</td>
<td>819</td>
</tr>
<tr>
<td>Inferred</td>
<td>4,959</td>
<td>10,905</td>
<td>2,394</td>
</tr>
<tr>
<td>Hypothetical</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

399
Identified Mineral Resources & Significant Occurrences--Continued

Coal beneath the study area is an extension of reserves defined by the Kaiser Coal Company that are buried outside, but along the western study area boundary. The reserves are an extension of coals that have been mined at the Geneva Mine, and the Geneva Mine is linked to processing and transportation facilities at the nearby Sunnyside Mine. If coals beneath the WSA were mined in conjunction with the Kaiser reserves, development costs would be minimal. Therefore, coal resources beneath the WSA may be economically developable.

Oil and gas discoveries in proximity to the WSA accumulated in traps within structural and stratigraphic features that are reported to extend beneath the study area, suggesting that additional oil and gas accumulations could be present. Drilling would be necessary to evaluate the possibility of commercial development beneath the study area.

Building stone and sand and gravel are found in the WSA, but have no unique qualities. Material derived from sedimentary rocks, like those in the area, are generally limited in use, have high transportation costs, and a low unit value, which restricts the use to local markets. Nearby communities are small and a sufficient supply of similar material exists outside the study area.

Mineral Resource Potential

The study area has a high potential for coal in the central part of the study area and a moderate potential for oil and gas.

Mining Activity

The study area is within the Book Cliffs Coal Field and part of the study area is in the Book Cliffs Known Recoverable Coal Resource Area (KRCRA). There are no mines within the study area, but the Sunnyside coal mine is about 10 mi northwest. Kaiser Coal Company was operating the mine in 1987, and held coal leases that overlapped the western boundary and cover about 680 acres of the WSA.

During the 1980's, Kaiser Coal Company conducted an extensive drilling program on their leases along the western side of the study area. A reserve of 100-120 million tons of coal was delineated at depths less than 2,000 ft.
Mineral Setting/Geology

Geologic units exposed in the WSA are of sedimentary origin and deposited principally in fluvial and lacustrine environments. The bedrock is Cretaceous and Tertiary in age. The terrain is rugged and is characterized by high cliffs and narrow canyons.

Recommendations

Additional core drilling is needed to determine the thickness and extent of coal beds. A seismic survey should be conducted to determine regional structure and allow a better assessment of oil and gas potential.

References


References--Continued


Map showing the location of the Turtle Canyon Wilderness Study Area, Emery County, Utah.
-EXPLANATION-

Id. Res. - Identified Resources

Geologic terrane underlain by identified coal resources - Resources west of the Green River are in the Sunnyside coal zone of the Blackhawk Formation and resources east of the Green River are in the Chesterfield, Ballard and Palisade coal zones of the Neslen Formation.

Geologic terrane underlain by identified resources of subeconomic oil shale in the Green River Formation.

Geologic terrane having high resource potential for coal with certainty level B - In the Blackhawk Formation west of the Green River and in the Neslen Formation east of the Green River.

Geologic terrane having high potential for oil and gas with certainty level C - In rocks of Tertiary age.

Geologic terrane having moderate potential for oil and gas with certainty level B - In rocks of Mesozoic age.

Geologic terrane having high potential for bituminous sandstone with certainty level C - In upper part of Colton Formation and lower part of Green River Formation.
Approximate Boundary
Middle Creek Area

Approximate Boundary
Canyon Area

Geologic textures and strains to identify local resources. Resources west of the Green River are in the Wyoming coal zone of the Blackhawk Formation, and resources east of the Green River are in the Chugwater, Harlow, and Glorieta coal zones of the Niobrara Formation.

Geologic terrane having high potential for oil and gas - in rocks of Tertiary age.

Geologic terrane having moderate potential for oil - in rocks of Mesozoic age.

Geologic terrane having high potential for oil - in upper part of Green River Formation.

Geologic terrane having high potential for oil - in lower part of Green River Formation.
Area Name, Classification, Number, Size
Wah Wah Mountains Wilderness Study Area
UT-050-073/UT-040-205
42,140 acres; 36,382 acres designated suitable for wilderness were studied.

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences
There are 100 short tons of inferred subeconomic iron ore in the southwestern part of the Wah Wah Mountains Wilderness Study Area (WSA), and inferred subeconomic resources of limestone, dolomite, high-silica sandstone, quartzite, and volcanic rock.

Mineral Resource Potential
Several areas in the southern part of the study area have a moderate potential for lead, zinc, cadmium, antimony, tungsten, molybdenum, arsenic, bismuth, and gold; the rest of the study area has a low potential for these commodities. The WSA has a moderate potential for oil and gas, and a low potential for uranium and geothermal energy.

Mining Activity
There is a small adit and a prospect pit in an iron occurrence in the southern part of the study area. In 1986, there were 46 unpatented mining claims in the WSA and half of the study area is under oil and gas lease.

Mineral Setting/Geology
The Wah Wah Mountains are an uplifted fault block of Paleozoic-age carbonate rocks and some small outcrops of Tertiary-age volcanic and intrusive igneous rocks.

Recommendations
None
References


Map showing the location of the Wah Wah Mountains Wilderness Study Area, Beaver and Millard Counties, Utah.

Map showing the location of the Wah Wah Mountains Wilderness Study Area, Beaver and Millard Counties, Utah.
EXPLANATION OF IDENTIFIED RESOURCES AND MINERAL RESOURCE POTENTIAL

[The entire study area has inferred subeconomic resources of limestone, dolomite, and volcanic rock. Numbered areas are described in text]

- Geologic terrane having inferred subeconomic resources of iron
- Geologic terrane having inferred subeconomic resources of silica in high-silica sandstone and quartzite
- Geologic terrane having moderate energy resource potential for oil and gas, with certainty level B—Applies to entire study area
- Geologic terrane having moderate mineral resource potential for zinc, cadmium, antimony, molybdenum, lead, arsenic, and bismuth in vein and replacement deposits, with certainty level B; and for zinc, lead, and tungsten in skarn, with certainty level B
- Geologic terrane having moderate mineral resource potential for zinc, cadmium, antimony, molybdenum, lead, arsenic, bismuth and gold in vein and replacement deposits, or in igneous breccia, with certainty level B; and for zinc, lead and tungsten in skarn, with certainty level B
- Geologic terrane having moderate mineral resource potential for antimony, with certainty level B
- Geologic terrane having moderate mineral resource potential for antimony and tungsten, with certainty level B
- Geologic terrane having low resource potential for uranium, geothermal energy, and all metals except as described above, with certainty level C—Applies to entire study area

Certainty levels

B Available information suggests the level of mineral resource potential
C Available information gives a good indication of the level of mineral resource potential

CORRELATION OF MAP UNITS

- Qs Surficial material (Quaternary)
- Te Extrusive igneous rocks (Tertiary)
- Ti Intrusive igneous rocks (Tertiary)
- OCs Sedimentary rocks (Ordovician and Cambrian)
- Cc Contact metamorphosed sedimentary rocks (Cambrian)

LIST OF MAP UNITS

- Surficial material (Quaternary)
- Extrusive igneous rocks (Tertiary)
- Intrusive igneous rocks (Tertiary)
- Sedimentary rocks (Ordovician and Cambrian)
- Contact metamorphosed sedimentary rocks (Cambrian)

Geological terrane having inferred subeconomic resources of limestone, dolomite, and volcanic rock. Numbered areas are described in text.

- M/B Geologic terrane having inferred subeconomic resources of iron
- 1M/B Geologic terrane having inferred subeconomic resources of silica in high-silica sandstone and quartzite
- 2M/B Geologic terrane having moderate energy resource potential for oil and gas, with certainty level B—Applies to entire study area
- 3M/B Geologic terrane having moderate mineral resource potential for zinc, cadmium, antimony, molybdenum, lead, arsenic, bismuth and gold in vein and replacement deposits, or in igneous breccia, with certainty level B; and for zinc, lead and tungsten in skarn, with certainty level B
- 4M/B Geologic terrane having moderate mineral resource potential for antimony, with certainty level B
- L/C Geologic terrane having moderate mineral resource potential for antimony and tungsten, with certainty level B
- B Geologic terrane having low resource potential for uranium, geothermal energy, and all metals except as described above, with certainty level C—Applies to entire study area
- C Available information suggests the level of mineral resource potential

Wah Wah Mountains WSA
Summary map showing identified resources and mineral resource potential of the Wah Wah Mountains Wilderness Study Area (UT-050-073/040-205), Beaver and Millard Counties, Utah. Geology simplified from Hintze, 1974a, b, and Hintze and others, 1984.
Area Name, Classification, Number, Size

Wahweap Wilderness Study Area
UT-040-248
134,400 acres; 70,380 acres designated suitable for wilderness were studied.

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

The Wahweap Wilderness Study Area (WSA) contains 350,000 tons of indicated subeconomic coal resources in the Dakota Sandstone.

Mineral Resource Potential

The southern part of the WSA has a high mineral potential for resources of sand and gravel. There is a moderate mineral potential for resources of oil and gas in the study area, and for coal in the Straight Cliffs Formation in the central and southern parts. There is a low mineral resource potential for gold, arsenic, copper, manganese, and geothermal energy.

Mining Activity

Aggregate for the Glen Canyon dam was mined just south of the study area. There are no mines within the WSA, but there are ten unpatented mining claims and five placer claims within it.

Mineral Setting/Geology

The study area is underlain by flat-lying sedimentary rocks of the Carmel, Entrada, Dakota Sandstone, Tropic, and Straight Cliffs Formations.

Recommendations

None
References


Map showing the location of the Wahweap Wilderness Study Area, Kane County, Utah.
Identified subeconomic coal resources are in the Dakota Sandstone (Kd).

Geologic terrane having high mineral resource potential for sand and gravel, with certainty level C (applies to southern part of the Wahweap Wilderness Study Area).

Geologic terrane having moderate mineral resource potential for oil and gas, with certainty level C (applies to entire study areas).

Geologic terrane having moderate mineral resource potential for coal in the Straight Cliffs Formation, with certainty level C.

Geologic terrane having low mineral resource potential for arsenic, gold, copper, manganese, uranium (western part of Cockscomb Wilderness Study Area), and geothermal energy (applies to all of the study areas).
Map showing the mineral resource potential of the Wahweap Wilderness Study Area, Kane County, Utah.
Approximate Boundary
Southwest Wilderness
Study Area

Geologic terrain is composed of marine sediments in the Dakota Sandstone (Kd) with occasional lenses of clay, silt, and sand in the Dakota Formation (Kd). Lower Cretaceous (Kc) strata and Paleozoic rocks. The geologic terrain has moderate recreation resource potential for sand and gravel, with sediment resource remains to southern part of the Southwest Wilderness Study Area.

Geologic terrain includes moderate recreation resource potential for oil and gas, with certain amount of unconvention drilling study area.

Geologic terrain is highly mineralized resource potential for coal in the Straight Cliffs Formation, with potential mining.:

Geologic terrain is highly analogous resource potential for arsenic, gold, copper, manganese, and copper (the largest pot of Southwestern Wilderness Study Area), and geothermal potential (reserves not at the Southwest).

36-37MS. 6
**Area Name, Classification, Number, Size**

The Watchman Wilderness Study Area  
UT-040-149  
600 acres

**Mineral Commodity Significance**

**Identified Mineral Resources & Significant Occurrences**

Inferred subeconimic resources of sandstone, suitable for construction purposes occur in The Watchman Wilderness Study Area (WSA).

**Mineral Resource Potential**

The study area has a moderate energy resource potential for small oil and gas pools in Paleozoic- and Mesozoic-age rocks. A low potential exists for other resources including copper, gold, lead, silver, zinc, manganese, uranium, coal, and geothermal resources.

**Mining Activity**

There has been no mineral production recorded from this area. No mining districts, mines, or patented claims are in the WSA. The nearest mining district is the Silver Reef (Harrisburg) district, about 18 mi to the northwest.

**Mineral Setting/Geology**

The study area consists mainly of mudstones and sandstones of Triassic and Jurassic age. The Chinle Formation (Triassic) is known to contain uranium in many parts of Utah, and the Springdale Sandstone (Jurassic) contains silver nearby.

**Recommendations**

Possibly drilling to determine the presence of petroleum at depth.
References


EXPLANATION OF RESOURCE POTENTIAL

- **M/C** Geologic terrane having moderate energy resource potential for oil and gas, with certainty level C—Applies to all of each area
- **L/C** Geologic terrane having low resource potential for copper, gold, lead, silver, zinc, uranium, and geothermal energy, with certainty level C—Applies to all of each area
- **L/D** Geologic terrane having low resource potential for coal and manganese, with certainty level D—Applies to all of each area

Levels of certainty:
- **C** Data indicate geologic environment and resource potential, but do not establish activity of resource-forming processes
- **D** Data clearly define geologic environment and level of resource potential and indicate activity of resource-forming processes in all or part of the area

Summary map showing mineral resource potential of the Canaan Mountain and The Watchman Wilderness Study Areas, Washington and Kane Counties, Utah.
Area Name, Classification, Number, Size

Westwater Canyon Wilderness Study Area
UT-060-118
31,160 acres

BLM District
Moab

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

About 24 oz of placer gold ($9,000 worth at $382.62/oz) in one 5,000 cubic yard deposit was identified in the Westwater Canyon Wilderness Study Area (WSA).

Trace gold from a hydrothermal system invading Precambrian-age rock fractures in large silicified zones at the south end of the WSA represents a possible exploration target.

Mineral Resource Potential

The study area has a high potential for placer gold along the Colorado River and at Big Hole in the western part and a moderate potential for gold, silver, copper, and barite in vein deposits in Star Canyon and Dry Gulch in the southern part. There is a low potential for oil and gas, carbon dioxide, and geothermal energy; for gold, mercury, copper, and silver in sedimentary rocks; for gold, silver, copper, and barite in veins; and for chromium, nickel, and cobalt in ultramafic rocks for all parts of the study area not mentioned above.

Mining Activity

Placer gold production at one site is probable, but there has been no recorded mineral production in the WSA. One placer claim with a surface excavation for gold, two unnamed sites of underground excavation for copper and/or precious metals and one claim group for placer gold and one for lode gold are within the study area.

Oil and gas leases cover 15% of the study area.

Mineral Setting/Geology

The study area is underlain by flat-lying Mesozoic-age sedimentary rocks and underlying Precambrian-age crystalline rocks. Poorly to unconsolidated Quaternary-age deposits exist near the Colorado River.
Recommendations

Additional sampling and analysis, coupled with geophysical studies such as induced polarization, telluric traversing, and audiomagneto-telluric soundings would be useful in determining if a suitable host rock occurs beneath the silicified fractures in Star Canyon and Dry Gulch.

The most favorable development target is the placer gold in the 5,000 cubic yard deposit in the Pussycat claims within the study area. The silicified fracture zone with a trace of gold at the south end of the study area should be studied further.

References


References—Continued

### Westwater Canyon WSA
### Black Ridge Canyons WSA

**EXPLANATION OF MINERAL RESOURCE POTENTIAL**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>L/D</td>
<td>Geologic terrane having no mineral resource potential for uranium in the Morrison Formation or for coal, with certainty level D</td>
</tr>
<tr>
<td>N/D</td>
<td>Geologic terrane having no mineral resource potential for uranium in the Morrison Formation or for coal, with certainty level D</td>
</tr>
<tr>
<td>M/C2</td>
<td>Geologic terrane having moderate mineral resource potential for gold, silver, copper, and barite in vein deposits, with certainty level C</td>
</tr>
<tr>
<td>M/C1</td>
<td>Geologic terrane having moderate mineral resource potential for uranium in the Morrison Formation, with certainty level C</td>
</tr>
<tr>
<td>H/D</td>
<td>Geologic terrane having high mineral resource potential for placer gold, with certainty level D</td>
</tr>
<tr>
<td>L/C1</td>
<td>Geologic terrane having low mineral resource potential for uranium, gold, mercury, copper, and silver in sedimentary rocks, for gold, silver, copper, and barite in vein deposits, for chromium, nickel, and cobalt in ultramafic rocks, and for geothermal energy and coal, with certainty level C</td>
</tr>
<tr>
<td>L/C2</td>
<td>Geologic terrane having low mineral resource potential for gold, mercury, copper, and silver in sedimentary rocks, for gold, silver, copper, and barite in vein deposits, for chromium, nickel, and cobalt in ultramafic rocks, and for geothermal energy, with certainty level C</td>
</tr>
<tr>
<td>L/C3</td>
<td>Geologic terrane having low mineral resource potential for geothermal energy, oil, gas, and carbon dioxide, with certainty level C</td>
</tr>
<tr>
<td>M/C</td>
<td>Geologic terrane having moderate mineral resource potential for gold, silver, copper, and barite in vein deposits, with certainty level C</td>
</tr>
<tr>
<td>H</td>
<td>Area of identified dimension stone resource</td>
</tr>
<tr>
<td>D</td>
<td>Area of identified subeconomic placer gold, sand, and gravel resource</td>
</tr>
<tr>
<td>C</td>
<td>Geologic terrane having low mineral resource potential for gold, silver, copper, and barite in vein deposits, with certainty level C</td>
</tr>
<tr>
<td>B</td>
<td>Geologic terrane having no mineral resource potential for uranium in the Morrison Formation or for coal, with certainty level D</td>
</tr>
<tr>
<td>A</td>
<td>Geologic terrane having low mineral resource potential for uranium in the Morrison Formation or for coal, with certainty level D</td>
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</table>
Summary map showing mineral resource potential of the Black Ridge Canyons and Westwater Canyon Wilderness Study Areas, Colorado and Utah.
**Area Name, Classification, Number, Size**

<table>
<thead>
<tr>
<th>White Rock Range Wilderness Study Area</th>
<th>UT-040-123/NV-040-202</th>
</tr>
</thead>
<tbody>
<tr>
<td>23,625 acres</td>
<td></td>
</tr>
</tbody>
</table>

**BLM District**

- Cedar City/Ely

**Mineral Commodity Significance**

**Identified Mineral Resources & Significant Occurrences**

There are no identified resources within the White Rock Range Wilderness Study Area (WSA).

**Mineral Resource Potential**

The study area has a low mineral resource potential for all metals, oil and gas, coal, and geothermal energy.

**Mining Activity**

Gold- and silver-bearing veins occur 500 ft east of the study area, but could not be traced into the WSA. A small cyanide heap leach operation, the Bargain Mine, is 1 mi south on the East Summit mining claims. There are no mining claims within the WSA.

**Mineral Setting/Geology**

The study area is underlain by Tertiary-age volcanic rocks, flanked on the west by Tertiary-age lake sediments; extensive colluvial deposits are present along the western and eastern sides.

**Recommendations**

In order to further explore and evaluate the mineralized veins, detailed mapping, additional sampling, and a drilling program would be needed.

**References**

References--Continued


EXPLANATION

L/B  Geologic terrane having low mineral resource potential for metals and geothermal energy, with certainty level B

L/C  Geologic terrane having low mineral resource potential for oil, gas, and coal, with certainty level C

Map showing mineral resource potential and location of the White Rock Range Wilderness Study Area, Nevada and Utah.
Area Name, Classification, Number, Size

Winter Ridge Wilderness Study Area*
UT-080-730
43,963 acres

Mineral Commodity Significance

Identified Mineral Resources & Significant Occurrences

Eleven oil and gas wells have been drilled in the Winter Ridge Wilderness Study Area (WSA) since 1986. There has been no mineral production, other than oil and gas, in the WSA. The study area is estimated to contain about 500 million barrels of oil-impregnated rocks (sandstones and siltstones) in addition to minor amounts of oil shale.

Mineral Resource Potential

The study area has a high potential for coal, oil and gas, tar sand, and oil shale, and a low potential for metals, including uranium and geothermal energy.

Mining Activity

There is no known mineral production nor are there any known mining claims in the WSA.

Mineral Setting/Geology

Flat-lying Late Cretaceous- and Tertiary-age sedimentary rocks make up the ridges and canyons of the study area.

Recommendations

The area should be examined by the U.S. Geological Survey and the Bureau of Mines. A detailed geochemical stream-sediment sampling program should be conducted to target specific areas for resource potential. A geophysical study should be conducted to determine the regional structure and tectonic setting.

*THIS AREA HAS NOT BEEN STUDIED BY USBM & USGS
References


Ritzma, H. R., 1979, Oil-impregnated rock deposits of Utah: Utah Geological and Mineral Survey Map 47, scale 1:1,000,000, 2 sheets.


Map showing the mineral resource potential of the Winter Ridge Wilderness Study Area, Uintah County, Utah.
**EXPLANATION:**

Ag - silver  C - coal  Do - dolomite  He - helium  Pb - lead  Qt - quartzite  Sn - tin  V - vanadium
Aa - arsenic  Cd - cadmium  Fo - feldspar (triholites)  Hg - mercury  Po - petrolatum (tar sand)  S - sulfur  W - tungsten
Au - gold  Co - carbon dioxide  Fe - iron  Ls - limestone  Ph - phosphate  Sa - salt  Y - yttrium
Ba - baffle  Cu - copper  Gt - geothermal  Og - oil and gas  P - potash  St - stone  Zr - zircon
B - boron  Gy - gypsum  Og - oil and gas  Os - oil shale  PW - petrified wood

**High mineral resource potential**  **Moderate mineral resource potential**

**Identified Mineral Resources**
**and Mineral Resource Potential for Wilderness Study Areas in Utah**