

COLORADO GEOLOGICAL SURVEY
Open-file Report OF-98-06
Preliminary Evaluation of Mineral and Mineral Fuel Potential
of the
130 Tracts of State Trust Land Nominated by the Public for Inclusion in the
Stewardship Trust
July 1998

The State Land Board (SLB) in March 1998 received 130 nominations for about 600,000 acres of state trust land in 38 counties for possible inclusion in the Stewardship Trust. In late April, 1998 the SLB requested that the Colorado Geological Survey (CGS), which at that time had just began an inventory of the mineral and mineral resource potential on the +4,000,000 acres of state trust lands, make an evaluation of the mineral and mineral fuel resource potential of the 130 tracts of state trust land nominated for inclusion in the Stewardship Trust. The SLB asked that this study be completed by July 1.

The CGS began work on this project in the middle of May, 1998. This evaluation was headed by H. Thomas Hemborg, CGS staff petroleum geologist. Assisting Mr. Hemborg were two geological consultants retained by the CGS: Harry Ter Best, petroleum and coal geologist and Alex Scarbrough, mining geologist. Both Mr. Hemborg and Mr. Ter Best have over 25 years of private sector experience each in oil and gas exploration, much of this in Colorado. Mr. Ter Best's experience also includes projects involving coal and coalbed methane exploration. Mr. Scarbrough has nearly 25 years experience in the minerals exploration industry.

To complete this task in a thorough manner would have taken 3 to 5 months. However, the CGS evaluation team was able to telescope this time into approximately 1-1/2 months by undertaking the following strategies:

- A detailed check of the legal description of the mineral acres of each nominated tract was not carried out. In most cases a cursory examination of was made of SLB computer records of mineral holdings and then this determination was compared with the surface boundaries provided on the nomination form. Only tracts that were perhaps more than 5 percent discordant by this comparison were checked in more detail.
- A geologic map for each parcel was not included. Only tract boundaries for each parcel are displayed on a United States Geologic Survey (USGS) topographic base – 3 parcels in central San Miguel County do not include a map because the USGS has not yet made available a CD ROMs that includes topography for this part of Colorado. In addition, the 70,900 acre State Forest in Jackson County does not include a map because the forest boundary could not be placed legibly on the page format applied in this report.
- Detailed library research on each tract was not attempted. In its place, a select collection of published maps and references pertaining to the oil and gas, coal, metallic minerals, and industrial mineral resources of Colorado was assembled and jointly studied in a “war-room-type” type setting by the CGS evaluation team.
- Detailed write-ups for each tract were not completed. Instead this report presents a series of bar graphs which ranks each tract's resource potential for oil and gas, coal, metallic minerals, and industrial minerals. Also included is an index map showing the general location of each tract in the state, an acreage total for each tract, and the county location for each tract.

The CGS evaluation team wants to stress that the rankings for each of the mineral commodities on each of the tracts are preliminary and subject to change pending additional library research when the respective tracts are evaluated in detail. However, we believe that in the majority of cases this additional work will not significantly alter the ratings.

The methodology by which the rapid assessment of the mineral commodities on the 130 tracts nominated for inclusion in the State Stewardship Trust was undertaken and subsequently rated is briefly discussed in the paragraphs below.

Maps Showing Legal Description of Tract

All the accompanying tract maps showing the boundaries of the nominated state land tracts were prepared by Tiffany LeHart. These were assembled by overlying the boundaries provided in the respective nomination forms onto a computerized topographic base map and then checking the included acreage with the SLB's computerized legal descriptions of acreage holdings. In most cases the bases were 7.5-minute USGS topographic quadrangles although for some of the larger tracts 1° X 2° AMS sheets were utilized.

The limitations of relying on the boundaries given in a nomination are that many of the forms showed only the surface acres owned by the state. Although surface and mineral tracts in most cases are coincident, or nearly so, there are some notable exceptions wherein the state has sold all mineral acres and retained only surface ownership and vice-versa. Additionally on-going land exchanges between the state with the federal government and private individuals render even the SLB's computerized legal descriptions of certain parcels inaccurate. The most obvious discrepancies were corrected but other lessor incongruences may remain. These will be resolved when the detailed reports for the respective tracts are prepared.

Oil and Gas Ratings

The factors used to determine the ratings included whether an individual tract contains all of the essential elements necessary for the accumulation oil and gas (source rocks, reservoir rocks, and a structural or stratigraphic trap which could entrap migrating oil and/or gas). The rating scheme also takes into account the proximity of proven oil and gas reserves to the tract as well as whether there is production of the same on a given state parcel. The primary maps used in determining these ranking were the following.

- Oil and Gas Fields Map of Colorado (CGS Map Series 26 – Smith, Tremain, and Brchan, 1991)
- Basement Structure Map of Colorado with Major Oil and Gas Fields (CGS Map Series 30 – H. T. Hemborg, 1996)

The limitations of this preliminary oil and gas evaluation are that time considerations prohibited a systemic examination of all well data on and adjacent to all the tracts.

Coal Ratings

The elements which determined the rating included whether it is in a known coal basin, whether a tract contains rocks which may contain coal, depth in the subsurface at which the identified coal measure would be encountered by a vertical shaft within the tract boundary, and its proximity to coal prospects, mines or proven resources. The primary map used in determining the ratings was the following.

- Coal Resources and Development Map of Colorado (CGS Map Series 9 – Jones, Schultz, and Murray, 1978)

Factors which may impinge on the coal rating assigned to a given tract include the inability to evaluate the proximity of coal mines and prospects to a given tract through examination of computerized databases, the complete set of available core hole on or adjacent to tract as well as more detailed maps and reports.

Metallic Mineral Ratings

Criteria used included whether a tract possesses rock types and structures which may host metallic mineral deposits, proximity to deposits and prospects of the same, likelihood of

whether undiscovered metallic mineral deposits may be present, whether resources exist, and whether exploitation of metallic reserves are taking place on a tract. The primary maps used in determining the ratings were the following.

- Location Map and Descriptions of Metal Occurrences in Colorado (CGS Map Series 28 – Streufert and Cappa, 1994)
- Various 1° X 2° geologic quadrangle map (1:250,000 scale) compiled by the USGS

The inability to thoroughly peruse computerized data bases, topographic and geologic maps, the professional literature for metallic mines and prospects, and make individual site visits constitutes a significant deficit which could alter the metallic mineral ratings by 1 or 2 upward in some cases.

Industrial Minerals/Construction Materials Ratings

Factors considered were whether a tract contains rock types and structures permissive to contain industrial minerals and/or construction minerals, whether resources of the same exist, and if exploitation of proven reserves of industrial minerals and/or construction materials is taking place on a tract. The primary maps used in determining these rankings were the following:

- Inventory of Non-Metallic Mining and Processing Operations in Colorado (Schwochow, 1981)
- Various 1° X 2° degree geologic quadrangle maps (1:250,000 scale) compiled by the USGS

The inability to thoroughly peruse computerized databases, 7.5-minute USGS topographic maps to locate nearby gravel pits and quarries, and make individual site visits constitutes a significant deficit which could alter the industrial mineral/construction material rating by 1 or two points upwards in some cases.

Bar Graph Ratings

The bar graph rating system was set up by the CGS evaluation team when engaged in the original detailed evaluation of all state trust lands. The meaning of the 1 to 5 scale had a certain specific meaning for each commodity group. In this accelerated evaluation that is presented in this publication, the ratings have somewhat been homogenized in to a one size fits all system with the following meaning for the specific number ranking.

- 5 – Commodity group is currently being mined and/or produced from tract.
- 4 – Commodity present within tract boundary but is not currently under going exploitation or, at least, it is highly probable commodity is present within tract boundary.
- 3 – Data suggests moderate likelihood of commodity present within tract boundary.
- 2 – Data suggests fair likelihood of commodity present within tract boundary.
- 1 – Data suggests poor likelihood of commodity present within tract boundary.
- 0 – Data suggests little or no likelihood of commodity present within tract boundary.