Mineral Resource Assessment of Selected Areas in Clark and Nye Counties, Nevada, Edited by Steve Ludington
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Chapter L. Mineral Resource Potential of the Big Dune Area of Critical Environmental Concern, Nye County, Nevada

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Summary and Conclusions

The Big Dune Area of Critical Environmental Concern (ACEC) is mostly underlain by Quaternary eolian sand. The sand is unsuitable as a silica source, and the sandy area has low potential for the occurrence of silica sand deposits. There is no potential for the occurrence of other deposits of locatable or leasable minerals.

The ACEC contains areas with both moderate and low potential for the occurrence of sand and gravel aggregate deposits, but there is no potential for the occurrence of crushed-stone aggregate deposits.

Introduction

This report was prepared for the U.S. Bureau of Land Management (BLM) to provide information for land planning and management, and, specifically, to determine mineral resource potential in accordance with regulations at 43 CFR 2310, which governs the withdrawal of public lands. The Clark County Conservation of Public Land and Natural Resources Act of 2002 temporarily withdraws the lands described herein from mineral entry, pending final approval of an application for permanent withdrawal by the BLM. This report provides information about mineral resource potential on these lands.

The Big Dune ACEC was studied in the field to confirm descriptions of the geology that were gleaned from the scientific literature. One sample was collected and analyzed.

Definitions of mineral resource potential and certainty levels are given in appendix 1, and are similar to those outlined by Goudarzi (1984).

Lands Involved

The Big Dune ACEC is about 15 km west of the town of Amargosa Valley and about 3 km southwest of US Highway 95 (fig. 1). It can be accessed most easily using unimproved roads from the east (U.S. 95) and south. A legal description of these lands is included in appendix 2.

Physiographic Description

The southwest part of the Big Dune ACEC consists of a cluster of shifting longitudinal and barchan dunes (fig. 2) that reach elevations of as much as 835 m. The dunes lie on a southward draining alluvial fan surface, which comprises the east and northeast part of the ACEC. The lowest point in the ACEC is at the southeastern corner at an elevation of about 750 m on the alluvial fan surface.

Geologic Setting

The Big Dune ACEC is in the Amargosa Desert, a northwest-trending structural basin in the Basin and Range Physiographic Province. The Amargosa Desert occupies an area between the north-trending Basin and Range structures to the northeast and northwest-trending structures to the southwest. It lies along the possible southeastern continuation of the Walker Lane Belt, a major northwest-trending zone of right-lateral faulting caused by late Tertiary to modern extension (Stewart, 1992).

Geology

The Big Dune ACEC is covered by Quaternary eolian sand and fanglomerate. A simplified geologic map is presented in figure 1. The source of the sand is mostly Precambrian (Neoproterozoic) rocks that lie 2 to 10 km to the southwest. The alluvium mainly contains Precambrian metamorphic, Paleozoic carbonate, and Cenozoic volcanic detritus.

Mining History

There has been no known mining in the Big Dune area. Claims were staked on the sand dunes for silica, aluminum, iron, gold, and titanium (records 6461 and 14977, Nevada Bureau of Mines and Geology, 2001), but these claims have lapsed and there are now (2006) no active claims in the ACEC.

Mineral Deposits

There are no known mineral deposits in the Big Dune ACEC. Chemical analysis of a sample (AP–110) of eolian sand from Big Dune (Ludington and others, 2005) shows that the sand contains about 73 percent SiO_2 and thus is not suitable as a source of silica. In addition, the sand contains no significant metal concentrations.

The closest mineral occurrences are gold-bearing quartz veins in Proterozoic rocks and limonitically altered Paleozoic carbonate rocks. These occurrences are in the Lee mining district, about 7 km southwest of Big Dune (Ball, 1907). No gold production has been reported from the district (Cornwall, 1972).

Mineral Exploration and Development

There is no current exploration activity for minerals in or near the Big Dune ACEC. There are no active claims in the Big Dunes ACEC.

Mineral Resource Potential

Locatable Minerals

The Big Dunes ACEC has no potential for locatable mineral deposits.

Leasable Minerals

Because the chemical composition is not suitable, the dune area in the ACEC cannot be considered a viable silica sand deposit. The potential for silica sand is low.

Most of the Big Dune ACEC is within the area the region considered by the BLM to be moderately favorable for oil and gas (Smith and Gere, 1983). There are no exploration wells reported in Nevada within 80 km of the ACEC (Garside and others, 1988).

There is no indication of potential for brine or evaporite deposits of sodium or potassium. The ACEC contains no known deposits of other leasable minerals, and the potential for their occurrence is low.

Salable Minerals

Crushed Stone.—Because no rock crops out, there is no potential for crushed stone aggregate in the ACEC.

Sand and Gravel.—The southwest half of the ACEC is covered by fine-grained sand, as sheets and dunes as much as 80 m thick (Swadley and Carr, 1987). The portion of the ACEC that is beneath sand has low potential for sand and gravel aggregate, with a high certainty level (tract ABGD03, fig. 3). However, clastic sediment underlies the dune; it is primarily exposed in the northeast half of the ACEC. This sediment consists of alluvial fan deposits that contain pebble- to boulder-sized clasts of Proterozoic quartzite, Paleozoic carbonate rocks, and Cenozoic volcanic rocks. This area has moderate potential for sand and gravel aggregate, with a moderate certainty level (tract ABGD02, fig. 3).

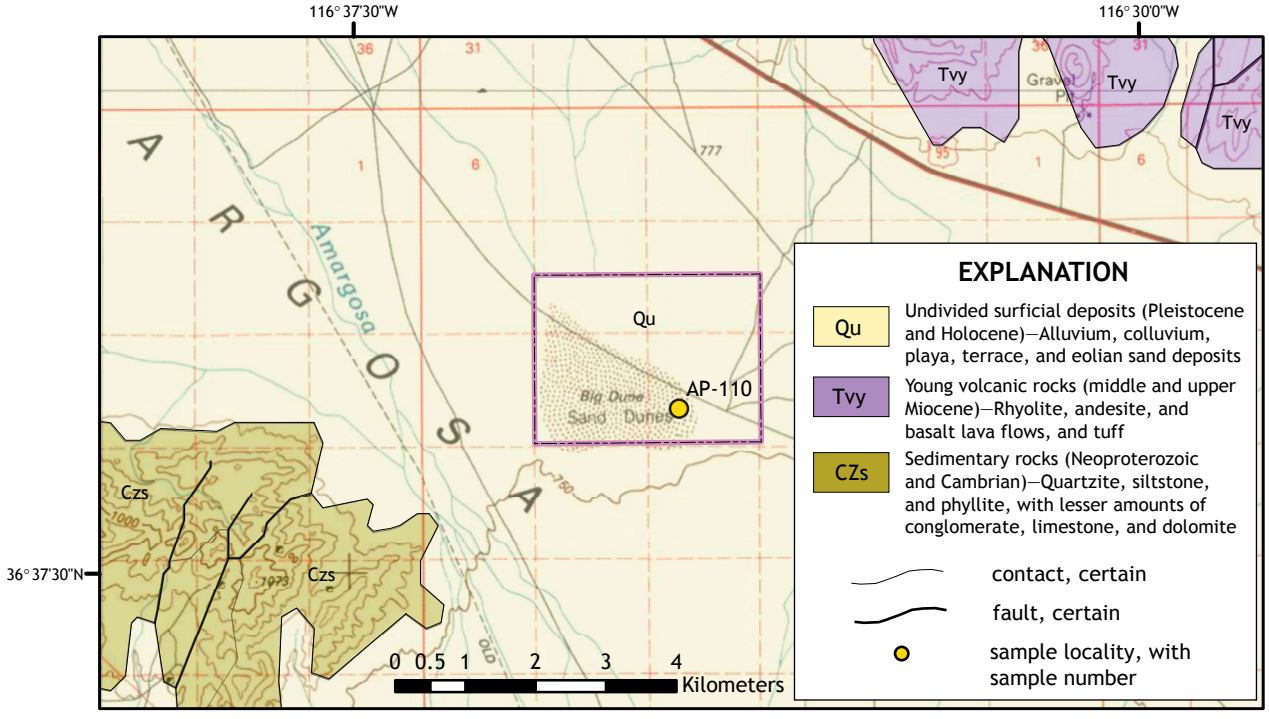

Figure 1. Big Dune Area of Critical Environmental Concern (ACEC; outlined in pink), showing generalized geology and location of analyzed sample. Geology modified from Stewart and Carlson (1978).

Some of the silica-rich clasts may reduce the quality of this aggregate due to alkali-silica reactivity (ASR). There are very large amounts of similar material in the immediate surroundings of the Big Dune ACEC, as it constitutes much of the sediment that fills the Amargosa Valley.

Figure 2. Sand dunes in the Big Dune Area of Critical Environmental Concern. Photo taken toward the northwest. Note all-terrain vehicle tracks in the foreground.

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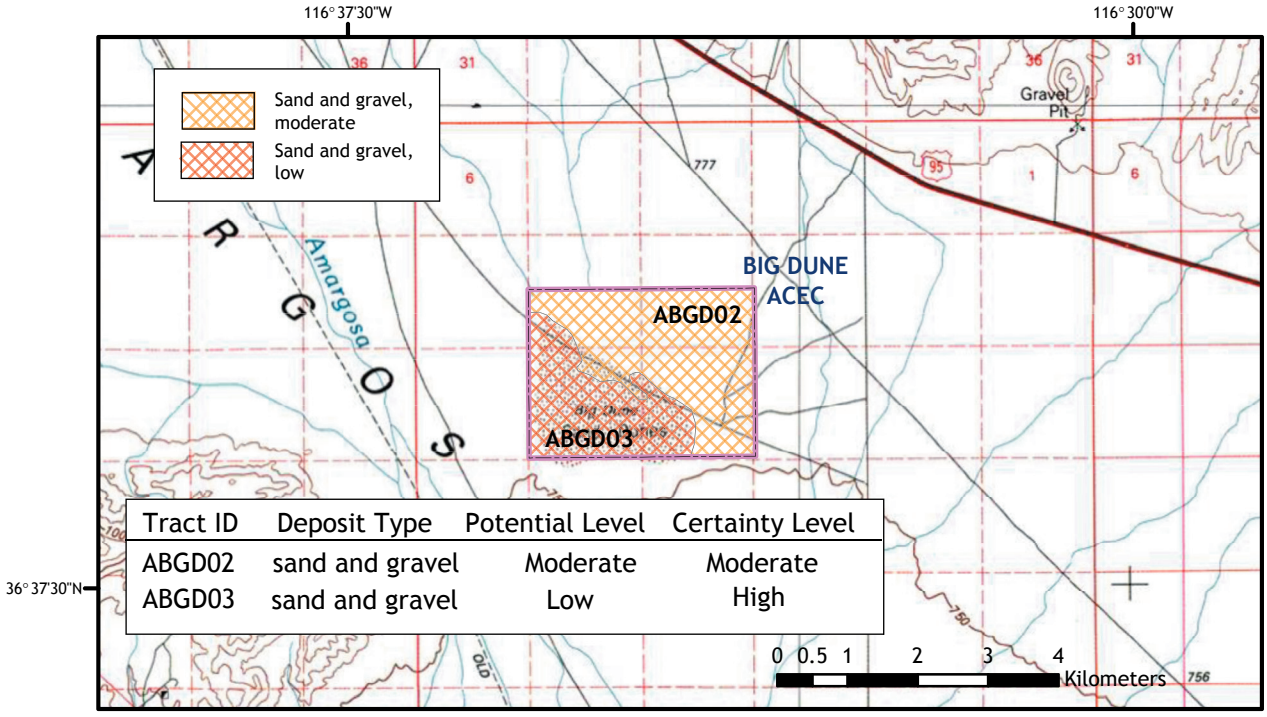

Figure 3. Mineral resource potential tracts for aggregate resources in the Big Dune Area of Critical Environmental Concern (ACEC; outlined in pink).