

RESOURCE ASSESSMENT OF SEVIER DRY LAKE
MILLARD COUNTY, UTAH

By J. Wallace Gwynn

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BACKGROUND

In 1978, the Utah Geological and Mineral Survey (UGMS) entered into a cooperative resource assessment of Sevier Lake with Mr. M. C. Godbe, a Salt Lake based consultant. Since that time, numerous field and laboratory investigations have been conducted concerning both the lake brines and sediments; the results of this work are currently being held confidential by the UGMS until permission to release them is received from Mr. Godbe.

INTRODUCTION

Sevier Dry Lake is the terminus of the Sevier River Drainage Basin as is shown in figure 1. Located within southwestern Utah, the Sevier River Drainage Basin covers almost twenty percent of the area of the state. Numerous metallogenic provinces exist within the basin, and metallic constituents leached from throughout the area may be precipitated or contained within the lake sediments or its subsurface brines.

This resource assessment of Sevier Lake, Millard County, Utah, is based upon 1) field observations, 2) samples taken from deep drilling, 3) samples collected from a shallow augering program, and 4) laboratory tests performed on both sediment and brine samples.

PURPOSES

The purposes of this investigation are 1) to characterize the sediments and subsurface brine resources of Sevier Lake, 2) to determine the minerals that will precipitate from the subsurface brines, and 3) to characterize the climatic conditions at Sevier Lake as they relate to the evaporation of water.

SEDIMENT CHARACTERIZATION

The major portion of Sevier Lake sediments consists of clays. Of the non-clay fractions, gypsum, quartz, carbonates, and rock fragments make up the majority of the material. There may be a zonation of certain minerals within the lake's basin, and during dry periods a salt crust forms on and just beneath the playa surface.

BRINE CHARACTERIZATION

The subsurface brines found at Sevier Lake are basically a sodium chloride type and are similar to those found within Great Salt Lake or the Great Salt

Lake Desert with respect to both their density and chemical composition. Sevier Lake brines are, however, higher in sulfate and lower in magnesium and potassium than Great Salt Lake brines.

MINERALS FROM SEVIER LAKE BRINES

Sodium chloride is the first and most abundant salt that precipitates from Sevier Lake brines through the process of solar evaporation. Salts that contain sodium, potassium, magnesium, sulfate, and chloride ions will precipitate through continued evaporation of these brines. Additional mineral species will also precipitate when the brines are cooled.

CLIMATIC CONDITIONS AND EVAPORATION RATES

The overall climatic conditions at Sevier Lake are similar to those observed at several points around Sevier Lake, and at locations at or near Great Salt Lake. The evaporation rates at Sevier Lake appear to be somewhat greater than at some locations on Great Salt Lake.

SUMMARY AND CONCLUSIONS

1. Sevier Lake is the drainage terminus of a large portion of Utah and as such contains precipitated or dissolved materials derived from this area.
2. The sediments of Sevier Lake are composed mainly of clays, but contain quartz, gypsum, and carbonate minerals. Some mineral zonation may exist within the lake bed deposits.
3. Sevier Lake brines are basically a sodium chloride type and will produce sodium chloride early in the evaporation process and salts containing sodium, potassium, magnesium, chloride, and sulfate throughout and during the final stages of evaporation.
4. The climatic conditions at Sevier Lake are similar to those observed at Great Salt Lake. The evaporation of water at Sevier Lake may be somewhat higher than at Great Salt Lake.

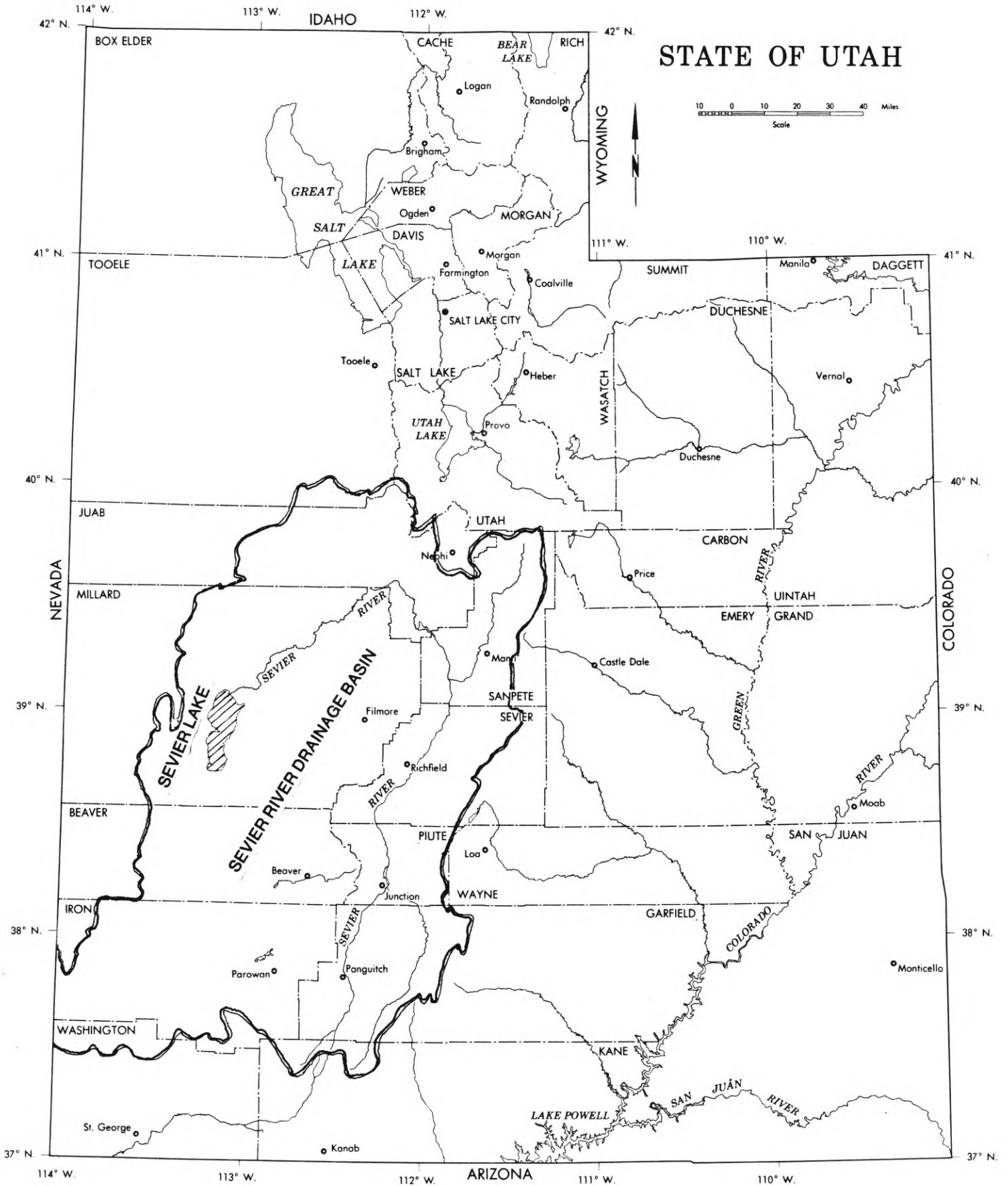


Figure 1. Map showing location of Sevier River Drainage Basin, southeastern Utah, and of Sevier Lake, Millard County, Utah.