

THE POLITICAL GEOGRAPHY OF THE
RELICTED LANDS OF THE GREAT SALT LAKE

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For most of the period that the white man has been in the Great Basin, the development of the Great Salt Lake's resources has been given little consideration, especially in view of the potential which the lake possesses. Although a number of ponds for the evaporation of sodium chloride have existed for many years along the lake shore, their output has been limited almost entirely to local demand for salt. The existence of many chemicals other than common table salt in the lake has been known since the mid-eighteen hundreds,¹ but little research and practically no investment in facilities have taken place to retrieve other potentially more profitable chemicals from the lake. In 1967 the lake's economic potential came to the attention of some of the largest chemical producers in the United States as well as to some foreign producers, and subsequent feasibility studies have indicated the practicability of extracting a variety of chemicals from the lake.

The process of extracting minerals from saline brine is known as fractional crystallization and depends basically upon evaporation for its implementation. Fractional crystallization means simply that certain salts before others will precipitate out of brine as solids as the salinity of the brine increases. This process, which results in the concentration of solids in the brine, is carried out by evaporation in ponds built to maximize brine exposure to solar energy. In the case of the Great Salt Lake brine, the first solid to precipitate is sodium chloride. This

salt is the most abundant lake mineral but is the least important economically. Other salts, such as potassium sulfate and sodium sulfate, precipitate at a point of greater concentration than sodium chloride and are of greater value. The liquor which remains after the first three salts have been precipitated contains a high percentage of magnesium chloride, magnesium sulfate, and a small percentage of trace elements such as lithium, bromine, iodine, cobalt, and strontium. The commercial value of magnesium salts is the greatest of all minerals in the brine.

The total value of all mineral salts in the lake is estimated to be many billions of dollars. According to the Utah Geological and Mineralogical Survey, the lake contains between "4 and 6 billion tons of dissolved mineral solids"² which are estimated by Professor Glassett of the Brigham Young University to be worth between "60 and 75 billion dollars."³ This sum is almost equal to the value of such fabulous mineral finds as the East Texas oil field and the Prudhoe Bay discovery in Alaska. The cost of salt extraction would be higher than drilling for oil; and profits, therefore, would not be as great. But the Great Salt Lake's brines are a fabulous mineral lode measured by any standard.

With many billions of dollars in mineral wealth at stake, it is not surprising that the lake has begun to attract a number of investors to tap its resources. Since 1967 three major companies have built large scale solar pond complexes on the shores of the Great Salt Lake and have begun the initial operations of mineral extraction. Since the ponds, of necessity, must be located close to the brine source, the abundant mudflats that formerly composed the lake bottom when it was at a higher stage serve as the usual ponding location. Most of the land upon which these ponds have been built has been exposed since the arrival of the white man in the area. From the 1870's onward the lake datum has been falling due to drier weather conditions and

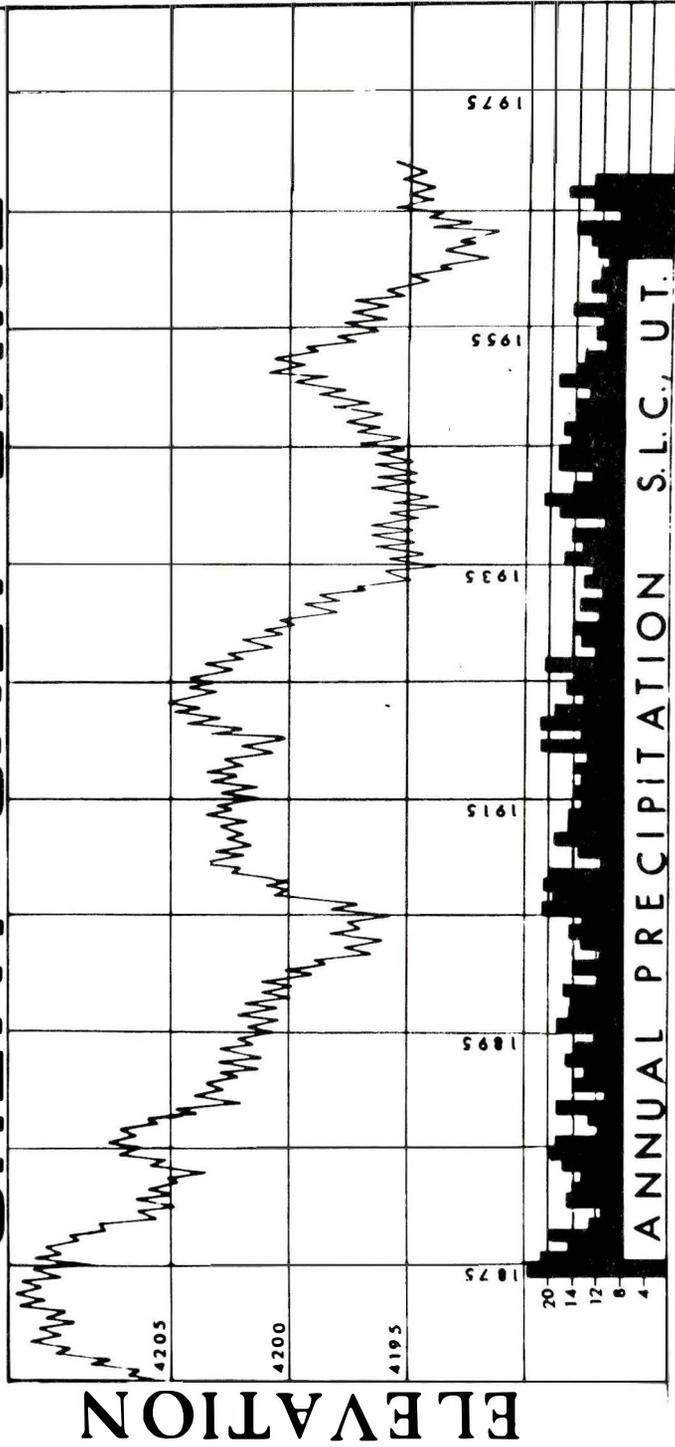
to large scale diversion of tributaries which feed the lake. Water diverted is mainly used for irrigation and culinary purposes with a high percentage lost due to evaporation. (See Figure 1 for lake levels at various time periods.)

The land which has been exposed by the falling lake level is of great value to mineral companies for ponding operations as well as to the State of Utah for tax and royalty revenues. The cost of pumping plus the cost of purchasing higher and usually more valuable industrial sites requires that solar ponds be located on these newly exposed or relicted lands. Ownership of the former lake bottom is, however, the object of a dispute between the State of Utah and the federal government. The lands now exposed could belong to one of two parties: either the State of Utah, which owns them by virtue of sovereign rights over navigable waterbodies within its borders as well as the earth under them, or the owners of land on the adjacent uphill slope above the lake bed. Since the federal government holds title to the largest percentage of property above the shoreline, the State of Utah is suing, in the Supreme Court of the United States, to quiet title of all relicted lands. Numerous private owners with holdings uphill from the lakeshore are also extremely interested in the outcome of the case since the value and extent of their land will be affected by its outcome (see Map).

In the case presently before the Supreme Court, the State of Utah is contesting the right of ownership to the lake's relicted lands in addition to the minerals which lie therein; the suit is based upon the doctrine of navigability:

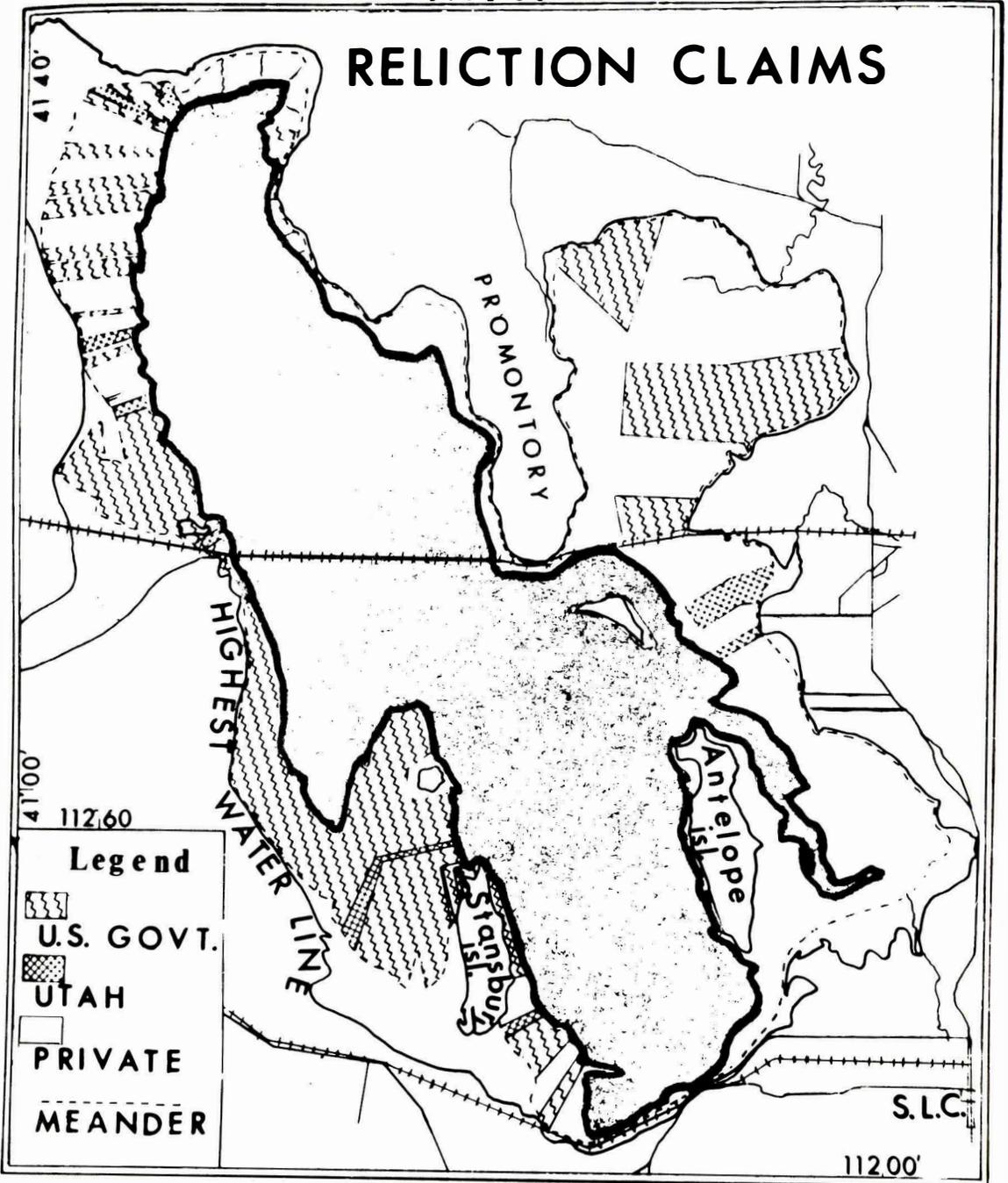
The State of Utah claims that by virtue of its admission into the Union on January 4, 1896, on an equal footing with all other states of the Union, it received title to the beds of all navigable lakes and rivers located within the State of Utah.⁴

FIGURE 1 FLUCTUATIONS OF GREAT SALT LAKE



MAP

RELICION CLAIMS



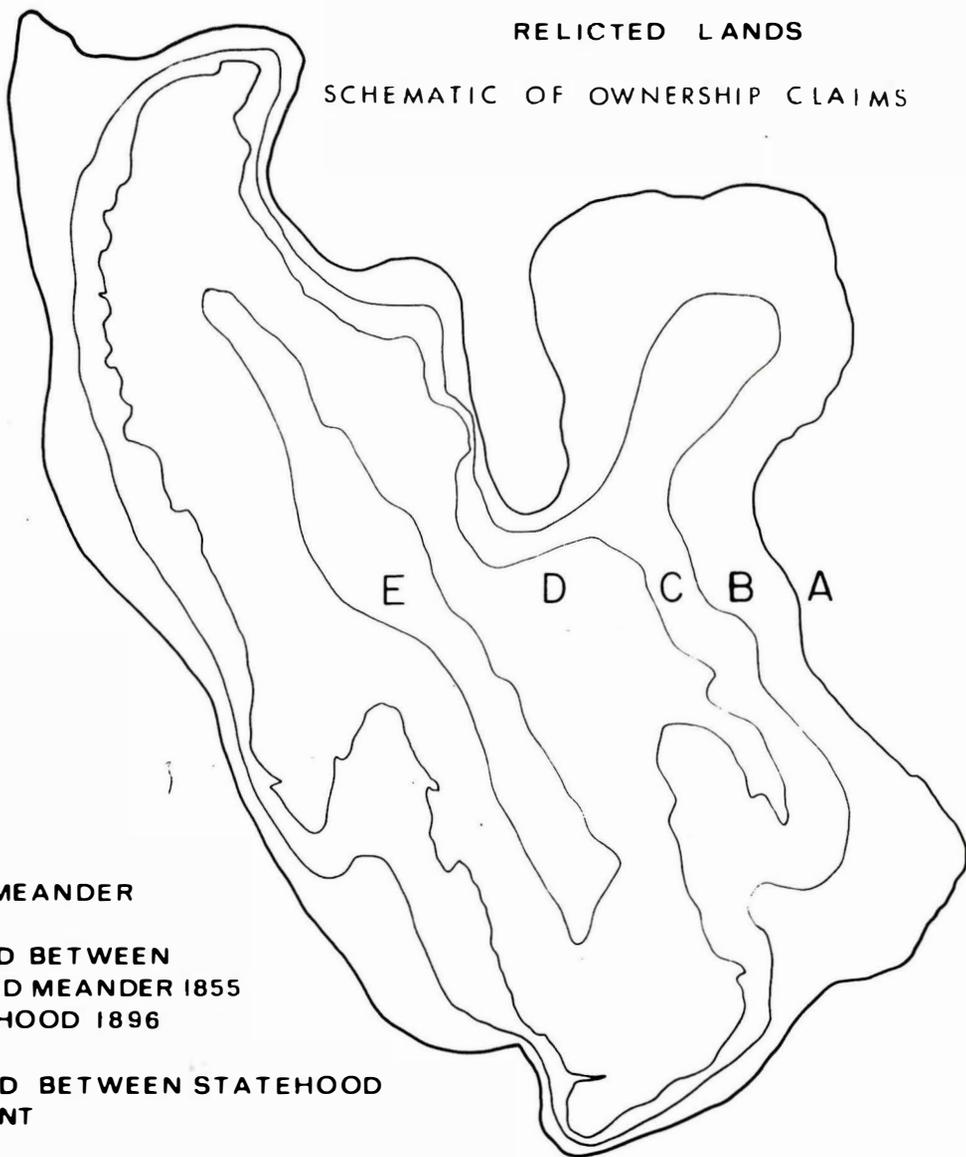
The lake level at the time of Utah's entry into statehood stood at 4200.8 feet, considerably higher than the present level. An earlier survey, conducted by the United States Geological Survey in 1855, attempted to determine the mean water level of the lake and to survey at that time a "meander line" as the legal extent of the lake. This line lies at a point approximately 4205.0 feet above sea level (see Figure 2).

The State of Utah lays claim to all the lands which are exposed below the "mean high water mark," a delineation which the state construes to be the surveyed "meander line." This land it claims by virtue of the doctrine set down in *United States v. Utah*, 283 U.S. 64 (1931), an earlier case involving the navigability of the Colorado River and thus establishing the ownership to lands under that waterbody. In the decision handed down by the Supreme Court in this case, the Court held that there were indeed portions of the Colorado River which were navigable; therefore, Utah held title to those parts of the underlying river bed which were covered by navigable water. According to the present case presented by the State of Utah, this doctrine of navigability applies to the Great Salt Lake which is obviously navigable.

The United States, on the other hand, holds that the test of navigability is not whether the water is in fact navigable--the federal government agrees that the Great Salt Lake could float the Queen Mary. What the federal government does contend is that the waterbody must be used as a highway of commerce,⁵ and that in its natural state the lake must be capable of being used for the purposes of transport. The federal brief on the lake holds, however, that the lake is too desolate and isolated to serve as a highway of commerce. The federal case states that there is no need to utilize the capability of the lake for commercial navigation and that the lake does not, in fact, now serve as a highway of commerce nor has it in the past served as a commercial

Figure 2

RELICTED LANDS
SCHEMATIC OF OWNERSHIP CLAIMS



A. ABOVE MEANDER

B. EXPOSED BETWEEN
SURVEYED MEANDER 1855
& STATEHOOD 1896

C. EXPOSED BETWEEN STATEHOOD
& PRESENT

D. SHALLOW AREA COVERED BY WATER

E. DEEP AREA NOT PRESENTLY AFFECTED

route for anything but excursion boats and other light craft on a nonscheduled basis. The decision of the Court will depend upon which of the two interpretations constitutes navigability.

Once the question of navigability is established, the Court must next determine what constitutes a valid shoreline. This will be of particular importance if Utah wins the initial case, since the ownership of the relicted lands will be at stake. As in all law cases before the Court, either the ownership of the relicted lands and their geographic extent will be determined by past legal precedent or else a new precedent must be established. The unique character of the lake presents no small problem in using past precedents on relicted lands for none of them apply directly to the present controversy.

In the past, the principal reliction cases have been decided on the basis of common law, which defines reliction as the gradual, imperceptable, natural, and permanent uncovering of land along the shoreline. In such cases the mean shoreline must be determined by using tested scientific methods acceptable in courts of law. The Great Salt Lake, however, does not fall into the category of waterbodies which have easily defined shorelines and the tests of reliction do not fully apply to the lake. The exposure of land along its shores has been neither gradual nor imperceptable, and the land uncovered was not permanently exposed. In addition, the reasons for its being uncovered were only partly natural since man has played a major role in lowering the lake.

A number of attempts have been made in the past, and attempts are still being made, to use modern remote sensing techniques to determine if there is such a thing as a mean high water level of Salt Lake. Early surveys attempted to determine the mean high water level by tracing a "storm line" of driftwood left around the edge of the lake by wave action. This system proved to be of little use because the

line changed with the intensity of the wind, the time of the year, and the climatic conditions of the area. Vertical variation of the lake has been as much as forty inches in one year, and this change would cause a horizontal variation of up to ten miles in some sections of the lake's shoreline.

The written record of Captain Stansbury and his party explains that he was unable to determine with any accuracy the lake level at the time he surveyed the lake in 1850.⁶ He pointed out that the usual tests determining average or mean high level did not apply to the Great Salt Lake. The fluctuations of the lake have since been determined by the Utah Geological and Mineralogical Survey to be substantial, erratic, temporary, and to a large extent manmade. Shoreline variation has been caused, in part, by the artificial impounding and diversion of the natural tributaries of the lake. It is interesting that the level of the shoreline cannot be ascertained in advance by evaporation and precipitation data. On the contrary, the lake is itself a very good barometer of the meteorological conditions in the Great Basin, rather than the reverse.

Modern sophisticated methods of infra-red and high altitude color photography have been used to see if the U.S. Geological Survey can find a reasonable scientific method of determining what constitutes a valid shoreline. At the time of this writing, no method has been found which proves beyond reasonable doubt that a valid shoreline exists. Thus, the State feels that by choosing the already accepted "meander line" the burden of establishing any other line rests upon the federal government. This means that either the federal government must discover a new acceptable technique for determining the shoreline or the Supreme Court must set a new precedent concerning the old methods of determining its location. Otherwise, the State of Utah's case, based upon an accepted "meander line" and "navigability," will produce a decision in favor of the State.

From the information available to date in the form of preliminary briefs, past precedents set by the U.S. Courts, and hearings held by the House of Representatives, it appears that the case presented by the State of Utah has the greater validity. Sufficient proof exists to show that the Great Salt Lake is navigable and has served as a highway of commerce for gravel barges, ore boats, and even a sternwheel steamer (the *President Garfield*) in the past. The navigability of the lake, whether measured by the test of physical ability or commercial use, is probably one of its most obvious characteristics. Therefore, Utah apparently will be given title to all relicted land surrounding the lake.

The problem of establishing an acceptable shoreline will be a bit more difficult problem for the Courts, since a lack of legal precedent exists for a waterbody with abnormal variations, such as the Great Salt Lake. However, the Supreme Court is usually reticent to set new precedents even though facts surrounding a given case may be quite different from previous cases. Since the position of the State of Utah places the burden of finding a new "meander line" upon the federal government, past legal precedents which could be used as the basis for a decision favor the State. Thereupon, the extent of Utah's ownership will probably be determined by the 1855 "meander line," or perhaps by the line scribed by the lake's water level at the time Utah entered the Union. In either instance, the State of Utah will be given title to nearly one thousand square miles of lakeshore lands--and those are lands that have a significant tax base potential because of the rich potential of mineral extraction from the Great Salt Lake.

REFERENCES

- ¹G.B. Richardson, *Underground Water in Valleys of Utah Lake and Jordan River, Utah*, U.S. Geological Survey Water Supply Paper No. 157 (Salt Lake City: Geological Survey, 1905), p. 87.