Bottomless Lakes--New Mexico State Park series

Frank E. Kottlowski

New Mexico Geology, v. 1, n. 4 pp. 57-58, Print ISSN: 0196-948X, Online ISSN: 2837-6420.
https://doi.org/10.58799/NMG-v1n4.57

This page is intentionally left blank to maintain order of facing pages.

Bottomless Lakes

Cool, deep pools of azure water bordering the Pecos Valley southeast of Roswell—a delight to summer swimmers—a curious mystery year round to New Mexico residents and visitors alike—these are Bottomless Lakes. In addition to their geologic interest, these six sparkling lakes boast camping and picnicking sites. The largest of the lakes, Lea Lake, has an extensive recreation area offering boating, horseback riding, and a new swimming beach.

Are the lakes *really* bottomless? Actually, none are deeper than 90 ft, but the dense growth of dark green moss covering the lake bottoms gives the impression of great depth. (''Bottomless'' usually means that the longest rope on hand won't touch bottom.) Or as someone once remarked, ''If the lake has no bottom, why doesn't the water run out?''

Supposedly, the lakes were named by early High Plains cowhands and Pecos Valley farmers who would try to touch bottom by letting down their ropes, weighted on the ends. As one length played out, another would be attached, but the ''explorers'' never seemed to touch bottom. Tales began about a very deep current (in a still lake?) that pulled ropes, weights and all, through an underwater cavern into the next county! There are underwater caverns indeed, but no strong currents; furthermore, any flow would be *into* the lakes, not away from them.

The Bottomless Lakes area has long been a popular recreation spot in eastern New Mexico. Purchased by the State in 1935 for $2,630, it became New Mexico's first State Park. Piping fresh city water from Roswell to the lakes was a great improvement—an event dedicated by Governor Bruce King on May 15, 1971.

Accommodations

Facilities at the park include sheltered tables, group shelters, campsites, grills, trash disposals, sanitary facilities, and at Lea Lake, a new Visitors' Center, remodeled concession stand, swimming beach, paddle boats, and horseback riding (summers only). Picnic spots dot the area surrounding the six lakes; turnouts from the shore drive and several overlooks from the mesa road above offer scenic views.

History

The park encompassing 581 acres, lies near the old Goodnight-Loving trail, a historic cattle-drive route up the Pecos Valley between Texas and eastern New Mexico dating from the 1860's and '70's.

Lea Lake, the largest of the six in the park, was named for Captain Joseph C. Lea, an early-day rancher and founder of nearby Roswell. Captain Lea had ridden with William Clark Quantrill during the Civil War, as well as with Frank and Jesse James. Prior to the Lincoln County cattle war he was a friend of Henry McCarty, alias William Bonney, alias Billy the Kid.

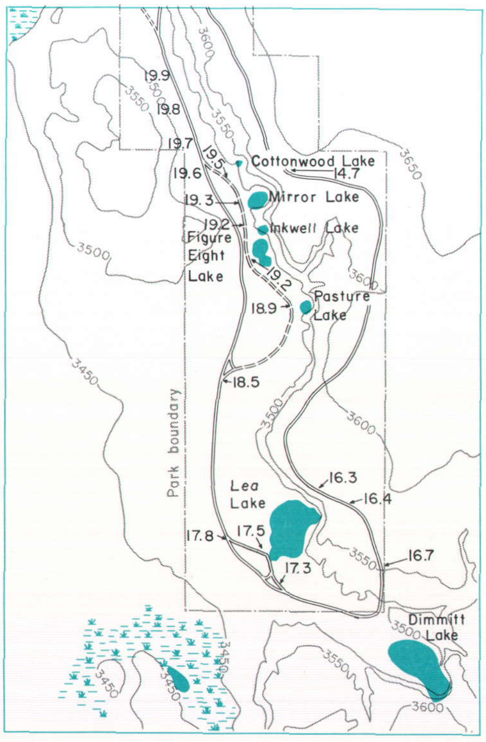
Geography

Bottomless Lakes State Park is situated on the east bluffs bordering the Pecos River Valley. Eastward, rolling sandy plains ascend gently for 30 mi to the ''Caprock,'' the western edge of the High Plains, or Llano Estacado (Staked Plains).

Westward from the park, the green fields of the Pecos Valley stretch 10 mi to Roswell—where hilly gravel and limestone form ribbed plains sloping westward up to Capitan and the Sacramento Mountains and snow-capped Sierra Blanca. East and west of the valley lies the domain of the cowboy and the cattle ranch captured in the reknowned works of artist Peter Hurd. (The Roswell Museum and Art Center, 100 W. 11th Street in Roswell, has an outstanding private collection of Peter Hurd's paintings and lithographs, as well as those of his wife, Henriette Wyeth.)

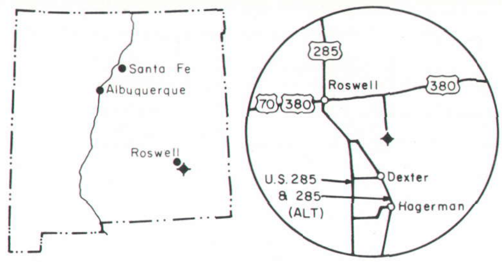
Southward, the Pecos Valley wends its ribbon of green to Artesia and Carlsbad. Northward, the valley narrows to a canyon cut in red cliffs, that reaches 200 mi into the high Sangre de Cristo Mountains east of Santa Fe, where melting snows feed the Pecos River.

The five smaller lakes in the park, amid and below the river-valley bluffs are, from north to south, Cottonwood, Mirror, Inkwell, Figure Eight, and Pasture Lakes. Lea Lake, 15 acres in area, lies at the base of the bluffs in the southern part of the park. A similar lake, Dimmitt Lake, lies just to the southeast.



Park Tour

From *Scenic Trip to Geologic Past No. 3* published by New Mexico Bureau of Mines & Mineral Resources.



Mileage

- 0.0 *Center of Roswell.* Drive eastward on US-380.
- 2.5 Roswell eastern city limits.
- 3.1 Side road to north—to Bitter Lake National Wildlife Refuge.
- 4.6 Highway drops from Orchard Park terrace down onto Lakewood terrace.
- 5.1 Salt water conversion plant north of highway.
- 5.3 Highway drops down onto present Pecos River floodplain.
- 7.1 Bridge across Pecos River.
- 7.6 Ascending Comanche Hill. Roadcuts are in pink, gray, and red siltstone interbedded with gypsum beds of the Seven Rivers Formation of the Artesia Group.
- 10.1 Junction; turn right (south) on road to Bottomless Lakes State Park.
- 13.3 Park entrance.
- 13.6 Road cuts in gypsum.
- 14.0 Junction; Lake Drive. Keep left.
- 14.9 TV relay tower on left.
- 15.3 Parking area on right overlooks cliff. Scenic view of northern lakes.
- 17.0 Turnout and viewpoint above Lea Lake. This is the largest of the lakes, 15 acres in area, and 90 ft deep. Park Headquarters and recreational facilities are along the southwest shore.
- 17.3 Descend hill. Dimmitt Lake lies below the red cliffs ahead.
- 18.1 Junction; keep right to Park Headquarters.
- 18.6 North edge of Headquarters area, turn right to lower loop road.
- 19.3 Turn right onto Lake Loop gravel road.
- 19.7 Pasture Lake; 18 ft deep.
- 20.0 Figure Eight Lake, caused by near coalescence of two sinkholes; the north lake is 37 ft deep.
- 20.1 Devil's Inkwell, 31 ft deep. A small circular sinkhole with steep walls and clear water. Mirror Lake; 50 ft deep. A larger depression made up of two adjacent sinkholes.
- 20.3 Cottonwood Lake—35 ft deep and about 150 ft in diameter. The water is usually crystal clear, allowing the rock walls, which seem nearly perpendicular, to be seen for considerable depths below the water's surface.

20.4 Junction with asphalt road; turn right, go northward. Note sinkholes in varying stages of development along bluff to east.
21.0 Lazy Lagoon on left.
22.6 Junction with upper road; end of loop. Turn left to *Roswell,* 13.4 mi.

Geology

The Pecos Valley near Bottomless Lakes is cut in sedimentary rocks laid down about 230 m.y. (million years) ago in an arm of the vast Permian sea. Periodically, when this area was a huge, shallow baylike feature, the gypsum and reddish siltstones of the Artesia Group of rocks were deposited. The entire area was tilted very gently (2° to 3°) to the east. The Pecos Valley was cut during relatively recent geologic time in these Permian sediments. Originally, the Pecos River flowed several miles west of Roswell, but the tilt of the beds caused the river to shift eastward as downcutting continued.

Sediments deposited in the valley by the river are sand, some gravel, and quantities of clay and silt. The present river channel occupies the lowest area and is bordered by floodplains with oxbow lakes and swamps marking abandoned channels (such as Lazy Lagoon in the northwest part of the park).

Above the floodplain, especially on the west side of the river, are higher terraces comprised of older sands and silts. The upper terrace, the Orchard Park, is about 40 ft above the floodplain. The lower terrace, the Lakewood, is about 20 ft above the floodplain. These terrace sediments were deposited and truncated during varying periods of the Pleistocene Ice Age, 10,000 to 20,000 years ago, as huge volumes of glacier melt-water came roaring down from the Sangre de Cristo Mountains.

Some of these Artesia Group rocks are exposed in road cuts along US-380 at Comanche Hill on the east side of the valley between Bottomless Lakes State Park and Roswell. Here the rocks are pink, green, and red siltstones interbedded with grayish to white beds of gypsum. Similar rock beds occur in the park, along the roads and surrounding lakes.

A notable feature of these beds are the "Pecos Diamonds," small, doubly-terminated quartz crystals found for nearly 100 mi along the east side of the Pecos Valley, from Dunlap in De Baca County to the north, across Chaves County, to just south of Artesia in Eddy County. In areas where the gypsum beds come to the surface, as at several overviews in the park, the sparkle of sunlight from the quartz crystals is quite noticeable. Gypsum crystals also reflect the sunlight. Perfect quartz crystals are difficult to find, but beautiful Pecos Diamonds are prominent in the collections of many mineralogists.

How did the lakes form? One of the best places to comprehend their origin is at the overlook above Lea Lake where the bluffs coincide with a sharp flexure in the Artesia Group beds. The regional dip is gentle and to the east, yet along this river-valley escarpment, the dip is rather steep to the southwest. The pronounced reversal of dip is probably due to the solution of gypsum and consequent slumping of overlying beds. Underground channels and caverns were dissolved out by circulating ground water, resulting in deep, steep-walled depressions now filled by the lakes. These collapse structures caused by ground-water solution of rocks are called sinkholes.

The lake water, fed from salty underground flow, is high in sulfates (4,000 to 14,000 ppm) from the gypsum beds. Thus the necessity of piping in water from Roswell—to make the swimming more enjoyable.

Flora and fauna

Among the vegetation in the valley are mesquite, creosote bush, salt brush, salt grass, snake weed, salt cedar (tamarisk), yucca, and cactus. Sparse grass and scattered shrubs conserve the sandy soil of the uplands.

Roadrunners and jackrabbits rule the brush. Rare fish, such as the zebra killifish and Texas cyprinodon, inhabit the salty lake waters. □

—F. E. Kottlowski
NMBM&MR

Gravitational ore separation

(continued from page 55)

various water inlets and the overflow, which evacuates air from the pulse water, allow a very subtle bed movement. The patented valve system regulates the suction of the movement. These three variables allow concentration of material down to 325 mesh. In the Hansonburg district, our material will be concentrated in three carefully screened groups: 50-150 mesh, 150-200 mesh, and material passing 200 mesh.

Results with the jig have been highly satisfactory on our ore, with galena and barite recoveries well above 90 percent. Fluorspar recovery is somewhat lower (70-80 percent). The remaining tailings will be treated by gravity separation, using magnetic material as previously mentioned. The price of fluorspar at the moment does not warrant recovery from the tailings. It will be stockpiled until better prices justify further processing.

The pulverizer (fig. 2) is basically similar to any other pulverizer. The most significant differences lie in the design of the breaking plates, the rotor outlet, and the rotor itself. The use of special wedge-shaped steel plates and the curvature of

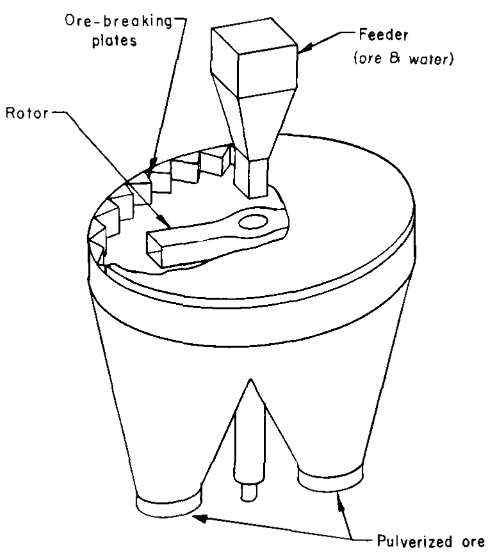


FIGURE 2—THE PULVERIZER.

the ore-breaking plates maintain the impact force perpendicular to the plates, thus holding plates wear to a minimum. The lid can be lifted hydraulically and easily swung aside. The ring containing the breaking plates can be removed in 5 minutes; the rotor is similar in design—the tungsten-carbide plates are attached with a few bolts, enabling their replacement in a matter of minutes.

This system has the following advantages. 1) Power consumption for processing copper ore was 35 percent less than a secondary crusher and a ball mill would have required. 2) Capital cost savings as a result of the elimination of secondary crushing and milling when these operations are combined into a single process. 3) Reduced maintenance costs due to reduced wear and less down time. 4) Machine operates on a limited water supply, and at low pollution levels. 5) Minimal skills are required for operation.

Because these advantages may encourage successful mining ventures in more remote areas, the development of this type of machinery is both economically sound and essential.

Acknowledgments

My thanks to Dr. Frank Kottlowski, Director; Robert W. Eveleth, Mining Engineer; and Neila MacDonald, Associate Editor, NM Bureau of Mines & Mineral Resources, without whose help this paper would not have been possible.

Reference cited

Kottlowski, F. E., 1979, Barite-fluorite-lead mines of the Hansonburg mining district in central New Mexico, *in* New Mexico Geology: NM Bureau of Mines & Mineral Resources, v. 1, no. 2, p. 17-20

□