# Bluewater Lake--New Mexico State Park Series

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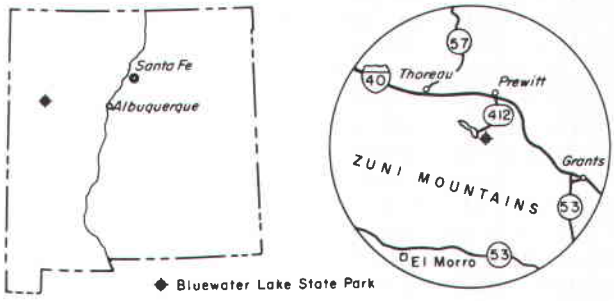
# Bluewater Lake



Bluewater Lake State Park, near Prewitt west of Grants, is surrounded by wooded areas and offers excellent boating, waterskiing, and swimming. The lake is stocked with rainbow trout and channel catfish by the Department of Game and Fish. Camping/picnic units with tables, benches, and fireplaces; group shelters; modern restrooms with showers; a cafe/store with camping, boating, and picnic supplies; a boat ramp; a boating service dock; and boat rentals are available.




## General

Settlers moved into the Bluewater area near Prewitt in the 1880's. After establishing a series of ditches, they irrigated their crops from Bluewater Creek. However, the stream was dry during parts of the summer. An earthen dam was constructed in 1894 at the confluence of Azul and Bluewater Creeks to furnish a more reliable source of water. This dam was washed out by a flood in 1905 and a second earthen dam, higher than the first, met the same fate a few years later. The present 80-ft-high concrete arch dam was constructed in 1925 by the Bluewater-Toltec Irrigation District. At the crest of the uncontrolled siphon spillway (elevation 7,402 ft), the dam impounds 38,500 acre-ft of water. (An acre-ft is the amount of water required to cover an acre of land to a depth of one foot. This amounts to approximately 325,000 gallons.) At the crest of the ungated spillway over the dam (elevation 7,405 ft), the lake contains 44,200 acre-ft. A lower outlet tube at 7,345 ft leaves a dead storage of 3.4 acre-ft of water. The lake generally is not drawn lower, however, than the conservation level of 7,365 ft, below which water is owned by the State Game and Fish Department. Only rarely does the reservoir contain enough water for irrigation, and not since April 1941 has water flowed over the spillway. Most water used for irrigation is obtained from wells. At present only approximately 3,000 acres are irrigated in the Bluewater district. Lowering of the ground-water table and the low annual precipitation (14–20 inches in the Zuni Mountains), resulting in only slight recharge to the water-bearing beds, are the reasons for the reduction from the originally planned 10,000 acres. The principal crops grown in the area include carrots, peas, lettuce, cabbage, corn, alfalfa, sorghum, and oats.

LOOKING WEST FROM A TYPICAL WOODED PICNIC AREA ACROSS LAKE. North dip slope of San Andres Formation is seen in background.

## Geologic setting

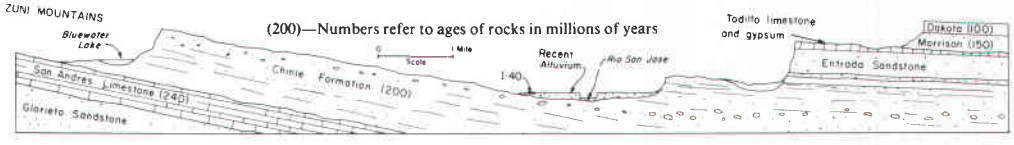
Bluewater Lake is situated on the north flank of the Zuni Mountains. Here the rock strata slope to the north away from the axis of the uplift. The more resistant rocks such as sandstone and limestone form cliffs and cap the dip slopes; the weaker rocks, primarily shales, underlie the intervening valleys. The reservoir is located in a valley carved in shales in the lower part of the Chinle Formation of Triassic age (see cross section). The San Andres Limestone of Permian age caps the dip slope south of the lake. These limestones were deposited in an ancient sea that covered this area over 225 m.y. ago. These rocks can be examined more closely at the overlook on the north side of the dam and along the canyon of Bluewater Creek. If you look closely you may find fossil snails, brachiopods, and much broken fossil material. The Glorieta Sandstone represents beach and near-shore sediments deposited as the Permian sea advanced to the north. These rocks can be seen best in Bluewater Canyon below the dam. Excellent views of this beautiful canyon are available from the picnic area east of the road. The Chinle formation was deposited by rivers that meandered across this area following retreat of the Permian seas. These colorful rocks, conglomerates, sandstones, and shales, can be seen on the north side of the lake and along NM-412 to the junction with I-40. On leaving Bluewater Lake, a pull-off from NM-412 is located just at the top of the hill. From this point a spectacular view can be seen across I-40 to the cliffs of Jurassic and Cretaceous rocks and Mount Taylor, an extinct volcano rising to an elevation of 11,301 ft. The bright orange to red cliff on the north side of the valley is the Entrada Sandstone. This will help you to locate the other geological formations shown in the cross section.

## Facilities

The developed part of the State Park is on the east side of the lake north of the dam. Here are approximately 100 picnic tables and fireplaces as well as some lean-tos. Drinking water and sanitary facilities are located in numerous places in this part of the park. Also provided are showers and a playground area. Non-state operated facilities include stores, cafes, and a motel.

## Fishing

Bluewater Lake is stocked by the State Game and Fish Department. For the most part, stocking had been limited to rainbow trout. However, the Department has introduced native or cutthroat trout as well. The cutthroat is very similar to the rainbow but, as the name indicates, has red streaks under the throat. The cutthroat also has fewer black spots than the rainbow variety. Trout weighing up to 9 lbs have been caught in Bluewater Lake. The lake is open year round and is a popular spot for ice fishing. There are numerous good fishing areas, easily reached by car, on the north and northeast side of the lake. The south side is connected by a road that crosses Azul Creek above the west arm of the lake. Roads that border the lake are not all paved and commonly are on the soft shales of the Chinle Formation which, when wet, are difficult to drive on even with four-wheel drive vehicles. The more recent sediments near the lake shore are derived from these shales, and




SOUTH-NORTH CROSS SECTION OF BLUEWATER LAKE AREA.

CLIFFS OF TRIASSIC FORMATION OVERSHADOW DOCK AREA AT NORTH END OF LAKE.

below the dry crust are saturated with water. Caution should be used in approaching the lake and in driving most of the dirt roads during or after rain storms. □

### Stephenson-Bennett (*continued from p. 13*)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## Cross sections available

The Roswell Geological Society announces the availability of its new Pecos Slope Abo Cross Section. Stretching from De Baca County to Eddy County, New Mexico, this set of N-S and E-W cross sections detail electrical-log and lithologic relationships of this important new play. To our knowledge, the Abo play is the first in which hydrocarbons in economic amounts have been found in nonmarine redbeds. With over 300 producing wells, this Abo play is indeed of major significance.

The cross section is available in two scales: 1″ = 40′ at $60.00 per set, and 1″ = 60′ at $40.00 per set. Requests for copies of or information about this cross section can be sent to Roswell Geological Society, P.O. Box 1171, Roswell, New Mexico 88201.

# Gallery of Geology

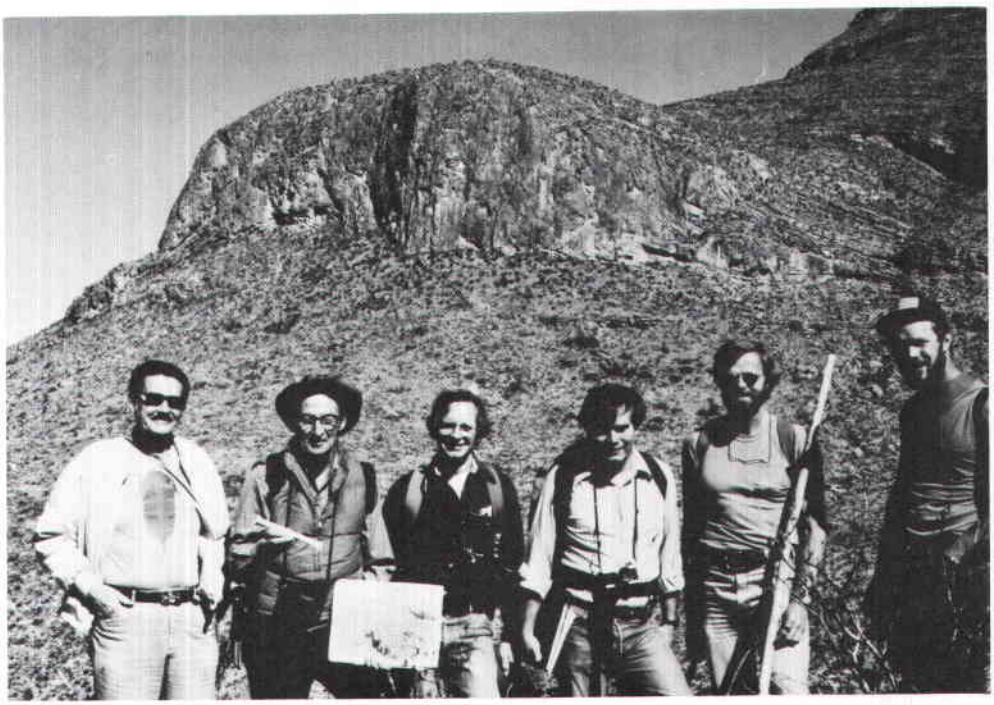

*Photo by Sam Thompson III*

*Muleshoe mound* is one of the more spectacular limestone buildups seen in the Lake Valley Formation (Mississippian) along the western escarpment of the Sacramento Mountains in Otero County, New Mexico (NW¼ SW¼ sec. 28, T. 17 S., R. 10 E.). This bioherm (reef), 350 ft high and 1,000 ft in diameter, was deposited 5 mi seaward (south) of the shelf edge in water depths up to 100 ft or more during a relative rise of sea level. Note in this northward view that the massive core interfingers downward and eastward with clastic material derived from the core, that this eastern flank facies thins down to approximately 70 ft, and that younger Mississippian units of deep-marine deposits onlapped and buried the bioherm. Various theories of origin consider the main biohermal framebuilders to be crinoids, fenestrate bryozoans, filamentous algae (inferred from lime-mud deposits), or some combination.

Six of the geologists who have made significant contributions to the study of Muleshoe mound are shown, left to right, in chronological order of their work: 1) Arthur L. Bowsher (Yates Petroleum Corporation), who with Lowell R. Laudon (University of Wisconsin, not shown) discovered the mounds while they were establishing the regional stratigraphic framework of the Mississippian in the late 1930's-1940's; 2) Lloyd C. Pray (University of Wisconsin), who during the late 1940's-1950's mapped the Sacramento Mountains, studied the entire stratigraphic section, and discovered the presence of fenestrate bryozoans in the core facies of the bioherms; 3) William J. Meyers (State University of New York, Stony Brook), who by petrographic analysis and other techniques in the 1970's determined that the bioherms were cemented initially in at least three episodes of fresh-water diagenesis, probably during brief eustatic falls of sea level in late Mississippian time; 4) H. Richard Lane (Amoco Production Company, Research Center), who in the 1970's demonstrated by tracing stratigraphic units and dating them precisely with conodont zonations that a wedge-on-wedge relationship existed between the Lake Valley shelf margin and the later basin fill; 5) Thomas L. De Keyser (Texas Tech University), who in the late 1970's-1980's described several Mississippian sections in detail, sampled the bio- and lithofacies, traced depositional units, and analyzed mound development; and 6) William D. Jackson (Texas Tech University, graduate student of De Keyser), who recently measured and sampled a detailed section of the Muleshoe mound while dangling from a rope anchored at the top!

This group was assembled for the photograph during an international field seminar last March. A field guide for the trip was prepared by Lane and others on p. 115-182 (see p. 143-158 on Muleshoe mound) of: "Symposium on the environmental setting and distribution of the Waulsortian facies," published jointly by the El Paso Geological Society and the University of Texas at El Paso and edited by Keith Bolton, Lane, and David V. LeMone.

In the north Texas area, such bioherms contain sufficient porosity to be important reservoirs of oil and gas. However, these bioherms in the Sacramento Mountains have been so thoroughly cemented that practically all of the original porosity has been occluded. The Mississippian reservoirs of southeastern New Mexico have yielded relatively minor amounts of oil and gas.

*—Sam Thompson III*