Elephant Butte Lake--New Mexico State Parks series

Adrian P. Hunt

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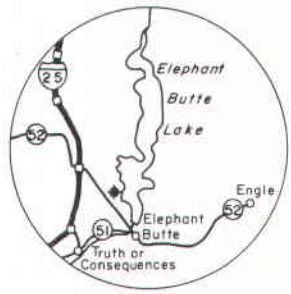
Elephant Butte

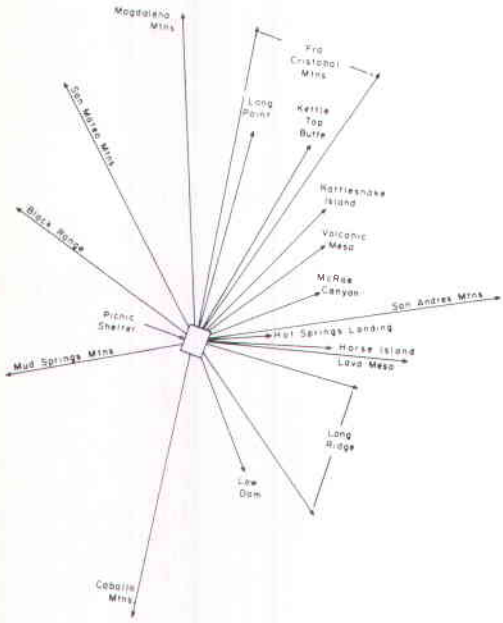
Elephant Butte Lake is literally an oasis in the Lower Sonoran desert of south New Mexico. It provides, for nine months of the year, facilities for water skiers, boaters, and bathers in an area of the state where the average yearly rainfall is only inches, and fishermen may enjoy catching bass, catfish, pike, and crappie the year round.

Elephant Butte Lake (formally Hall Lake) is situated only 5 mi from Truth or Consequences in Sierra County and owes its existence to a 306-ft dam.



History and scenery

Extensive irrigation in southern Colorado and northern New Mexico, beginning in about 1860, caused increased hardship for the farmers in the Mesilla Valley of southern New Mexico and the El Paso–Juarez Valley of west Texas and Mexico. The initial notion, suggested in 1888, was for an international dam to be built 3 mi upstream from El Paso to provide irrigation water for west Texas and Mexico. New Mexico farmers objected for not only would they not benefit from the dam, but moreover they would lose much of the fertile Mesilla Valley to flood water. Before this project came to fruition the Rio Grande Dam and Irrigation Company obtained a charter from the Department of the Interior to build a private dam across the Rio Grande at Elephant Butte. The company was unable to construct the dam for financial and legal reasons. However, following the drought of 1902–03, farmers in both countries renewed their call for a dam and in 1904 the Reclamation service of the Department of the Interior decided the only logical place for a dam was at Elephant Butte. Following an international water allocation treaty in 1906, work on the dam began. The dam was finally completed in 1916 after 5 yrs of construction at a cost of about $5 million and became the world's largest dam and created the second largest man-made water impoundment. The dam is over 300 ft high and 1,100 ft long with a ¼-mi road along its length. In 1940, a hydroelectric generating plant with a capacity of 24,300 kilowatts was installed. The present Elephant Butte reservoir still has over 80% of its initial capacity of 2,634,000 acre ft and sedimentation rates have been much lower than predicted.



Elephant Butte Lake became a New Mexico State Park on July 1, 1964, after a 50-yr agreement with the Bureau of Reclamation and is now open the year around. The Park itself is split into two locations—one at Elephant Butte dam and the other 3 mi upstream at Lions Beach, where the park headquarters and information office are located.

At Elephant Butte are cabins, a restaurant, the Anchor Room Lounge, a store, and a post office all set amid the restful shade of cottonwood trees. West of the Anchor Room is a walk along the top of the steep bank where wisteria vines drape over a natural stone-columned arbor. The cabins are on a bay of the lake southeast of Elephant Butte itself.

North from the patio of the Anchor Room the dark and lonely mass of Elephant Butte thrusts itself through the quiet waters of the lake, rising over 400 ft from the lake floor; from this area of the park one can see the elephantine shape of this striking island. At times of low water, a neck of land connects the Butte to the east shore, but even when the Butte is isolated goats may be seen on its towering cliffs.

Distant views from this portion of the park are blocked by Elephant Butte, but on the west edge of the lake can be seen the north-south trending Long Ridge. To the east of the Butte, on the skyline, are the Fra Cristobal Mountains and closer are several flat lava-topped mesas.

Northwest of Elephant Butte is an area called "The Jungles" because it is alternately flooded and exposed and is often covered by low vegetation. It is near the mouth of McRae Canyon which stretches off to the east draining flood waters from the Jornada del Muerto (Spanish = journey of death) around Engle, 15 mi to the east. Along this canyon are the sometimes flooded ruins of Fort McRae.

The fort was built in 1869 and abandoned by the Army in 1876. It was used as a base of operations during negotiations with the Apache Indians and was apparently abandoned when the Apache were settled on reservations. The fort was named after Captain McRae, a member of the Union Army who was killed at the Battle of Valverde, which took place during the Civil War about 35 mi to the north near Fort Craig.

To the north at Hot Spring Landing is an extensive marina with docks and landings for boats, a center for fishing, sailing, and water skiing where boats may be rented. North of the State Parks Information Office is an extensive picnicking and camping area offering shaded picnic tables, grills, and washrooms along a north-south-trending ridge that leads to Lions Beach. West of Lions Beach is a large camping and picnicking area with electrical hookups, washrooms, and sheltered tables.

From the highest and most southerly picnic table on the hilltop overlooking Hot Springs Landing, a spectacular view across the lake with Horse Island and Long Ridge to the east splitting Hot Springs Landing bay from the main body of the lake can be seen. Across the lake is a flat-topped lava-covered mesa, atop which are the sub-conical remnants of once violent volcanoes.

On the northwest skyline are the ridges of the San Andres Mountains that lie 40 mi to the east across the barren Jornada del Muerto, named by the early Spanish for the hostility of this arid plain.

To the northeast in the middle of the lake is Rattlesnake Island, connected to Lions Beach by a narrow gravel bar. Sudden spring floodings of the lake concentrate snakes here.

To the north loom the rugged Fra Cristobal Mountains with the more distant Magdalena Mountains lying west of due north. Barely visible to the west is the Black Range lying on the east edge of the rugged Mogollon–Datil volcanic plateau. Much nearer to the southwest are the Mud Springs Mountains with dolomites, sandstones, and limestones forming a sinuous pattern on the range's northern slopes.

To the south are the Caballo Mountains where one can see the pattern of the strata that dip to the east under the Jornada del Muerto but rise again further to the east in the San Andres Mountains.

To the north-northwest is the flat-topped Kettle Top Butte, an erosional remnant of the lava mesa to the east. In contrast to the

horizontal lava flows, to the east beyond Horse Island at the mouth of McRae Canyon is a vertical dike of igneous rock.

Long Point, on the west side of the lake directly to the north, reaches its low, mostly vegetation-covered peninsula eastward toward Kettle Top Butte to make the middle narrows of Elephant Butte Lake.

Geology

The quiet serenity of the placid waters belie the often violent geological history of this area. The rocks in the immediate vicinity are young geologically, ranging only from Late Cretaceous to Pleistocene, but they record at least two periods of violent volcanism and major fracturing of the earth.

The oldest rocks are of the Mesaverde Group, outcrops of which can be seen on both sides of NM-52 and in the vicinity of the dam. Long Ridge, northwest of the cafe and lying along the west edge of the lake and the dam, is also composed of this unit, as are the rock walls of the cafe.

The Mesaverde is approximately 3,300 ft thick and consists of alternating beds of sandstone, shale, siltstone, and mudstone.

Thin beds of coal are present in the lower one-third of the section. In the immediate area of the Park, coal beds are very thin; however, Lee (1905) reported one bed of clean coal in Mescal Canyon that was 1 ft in thickness and which, he wrote, was comparable in quality to those found in the Mesaverde in the northern part of the state (now being mined near Gallup). Coal has been mined in the past in the Engle field to the east of the reservoir.

The sandstones are usually discontinuous and sometimes contain beautifully preserved leaves. Petrified wood is fairly common and is progressively more abundant up through the formation. The rocks are generally olive brown to brown with the shales sometimes gray or green.

The uppermost part of the Mesaverde is the Ash Canyon Member, good exposures of which can be seen in Ash Canyon although the type locality is immediately southeast of Kettle Top Butte. These beds are conglomerates that have a fairly local distribution and are believed to have originated as a result of local Late Cretaceous uplift in the Caballo Mountains.

Overlying the Mesaverde rocks is the McRae Formation whose basal portions are also conglomeratic but which can be separated on the large degree of andesitic material. This formation was named for Fort McRae and consists of a thickness of about 3,200 ft of non-marine clastic beds. The McRae has been split into two members, the lower of which is the Jose Creek unconformably overlying the Mesaverde and consisting of brown conglomerates, sandstones, and shales. The Jose Creek contains petrified wood and leaf florales similar to those of the Raton Formation of northeast New Mexico. Dinosaur bones, virtually always fragmentary, are occasionally found.

On NM-52 near the mouth of Ash Canyon is a unit interpreted as a local igneous breccia intrusion with the roundness of the large cobbles resulting from abrasion as they ascended an intrusive conduit. This area has been postulated as a source for the conglomeratic material of the Jose Creek Member.

The upper unit of the McRae Formation is the Hall Lake Member comprising purple shales and sandstones. This member is much more widespread than the Jose Creek and constitutes most (2,900 ft) of the thickness of the formation. This unit crops out around the base of Elephant Butte and along the eastern shore of the reservoir. *Ceratopsian* (horned dinosaur) remains were found at the base of this member early in this century, indicating a Late Cretaceous age. Plant remains are fairly common, but no time-diagnostic fossils are known from the upper part of the member; nevertheless, the member has been postulated to perhaps range into the Paleocene or Eocene.

Several volcanic plugs are in the area, the most prominent of which is Elephant Butte itself. This plug is intruded through the McRae Formation and represents the remains of a vent for a cone which extruded material onto an erosion surface several hundred feet above the present surface. The Butte is considered Pliocene–Pleistocene in age and is related to the extrusive sequence capping the mesas east of the reservoir. These lava flows rest on a broad erosional surface cut into Late Cretaceous rocks.

Upper Santa Fe beds (Pliocene–Pleistocene) in the area represent ancestral Rio Grande deposits, and a basalt tongue in the upper part has been dated with a K-Ar age of 2.9 ± 0.3 m.y. (Bachman and Mehnert, 1978). The Santa Fe beds are downfaulted against Hall Lake beds by the Hot Springs fault, which is the largest and most dramatic of many faults in the area. This fault runs from at least 6 mi south of the wing dam (west of the main dam) north-northeast across the reservoir. The other main fault zone in the area is the Quarry fault that runs through the mouth of Jose Creek up past Fort McRae and has been mapped for at least 9 mi.

The many other faults follow two major trends north-northeasterly, virtually normal to the Quarry fault. Most faults are normal with dips from 60–80°. The ages are predominantly post-Cretaceous and pre-Pliocene–Pleistocene because they followed deposition of the McRae Formation and fail to cut into the Pliocene–Pleistocene basalt flows.

Below the stillness of the lake the rocks tell a story of violence, of volcanoes such as that which once rose above Elephant Butte, of a huge thickness of volcanic ash that buried some of the mighty dinosaurs, and of huge lava flows which still lie, scorning erosion, on the eastern side of the lake.

Gold, silver, copper, lead, zinc, barite, fluorspar, iron ore, pumice, perlite, and bentonitic clay all occur in the nearby ranges, but at present the preeminent value of this region must be Elephant Butte Lake, truly an oasis in the desert.

ACKNOWLEDGMENTS—Several sources were heavily relied upon in this article including Hawley and Seager (1978) and Mueller (1978), both included in the excellent guidebook to the Rio Grande rift in New Mexico and Colorado compiled by Hawley (1978), as well as Bushnell (1953), Nicholson (1971), and Kottlowski (1963).

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—Adrian Hunt, 1981

ELEPHANT BUTTE RESERVOIR