Bracing for the Flood

Briggs/Utah Dept. of Trans.

When the Saltair resort reopened last year after a 15-year respite, owners hoped to recreate the original demand for its shoreside location and services. Now, the parking lot is flooded, and the resort is a lonely island in the Great Salt Lake.

With memories of last year's flooding still fresh, Utah residents watch helplessly as the Great Salt Lake continues to rise

By CHERYL SIMON

From the day it opened in 1893, the Saltair resort epitomized the dream that the Great Salt Lake could be a recreational center for the state of Utah. Old-timers fondly recall days spent bobbing in the briny waters, afternoon picnics, and then evenings in the vast dance pavilion where 1,000 couples could sway and strut to the rhythms of the era's biggest bands. But grand though it was, Saltair, perched on the lake's shore 15 miles from Salt Lake City, was powerless against the capricious nature of the lake. The original Victorian pavilion, built on stilts over the water, burned in 1925, and was reopened four years later. But a series of misfortunes befell Saltair, and it never regained its first flush of success. By 1935 the lake level had dropped seven feet, stranding the resort three-fourths of a mile from the shoreline. During the Great Depression, recreational dollars all but vanished, and increasing use of autos allowed the resort's patrons to venture much further afield. Finally, Saltair was closed in 1968.

The pavilion is symbolic of the people and institutions whose existence for centuries has been subject to the tides of change of this vast inland sea. Since record keeping began more than 100 years ago, the lake surface has fluctuated repeatedly, although the average level has not changed. But since long before that — experts estimate at least 10,000 years — the local peoples have had to accommodate the whims of the Great Salt Lake. Populations varied from nomadic hunters and gatherers to flourishing village cultures reliant on marsh resources and farming, depending on the lake level.

Today's residents are less flexible in their options.

Saltair, rebuilt and reopened in 1983, is just one of the victims of the lake's latest blow — flooding. High waters have flooded the resort's amusement rides and the 700-car parking lot. When rebuilding started only two years ago, Saltair was secure and dry 300 to 400 feet from the lake; now it is an island surrounded by water seven feet deep.

"We haven't given up yet," says Jim Silver, one of Saltair's present owners. But like other area residents, he is discouraged, and concerned. A wind tide can raise the lake level a foot or two, and waves swell on the water's surface, pounding lakeside structures with water heavy with its legendary load of salts and minerals. With spring's approach, the waters are rising further still, surging up the lake shore's shallow slopes.

Last year, floods caused widespread damage to the cities and businesses ringing the lake. Rising waters threatened the Salt Lake City Airport and attacked the roadbeds. The 1983 flooding cost the state and its industries and recreational facilities more than $60 million. As winds fanned by a tremendous warming in the Pacific (SN: 2/26/83, p. 135) generated storms over the Great Basin, the lake level rose a record-breaking 5.2 feet between Sept. 19, 1982, and June 30, 1983. The waters flooded shoreside facilities and duck breeding grounds, and pounded mineral and salt extraction factories clustered along the lake. The swollen waters of the Jordan River coursed through a sodden Salt Lake City, temporarily turning State Street into "State Street River" and isolating beleaguered businesses in the city's commercial district. The lake level peaked in July when evaporation, the only route by which water leaves the lake, finally removed more water than rivers and rainfall were supplying.

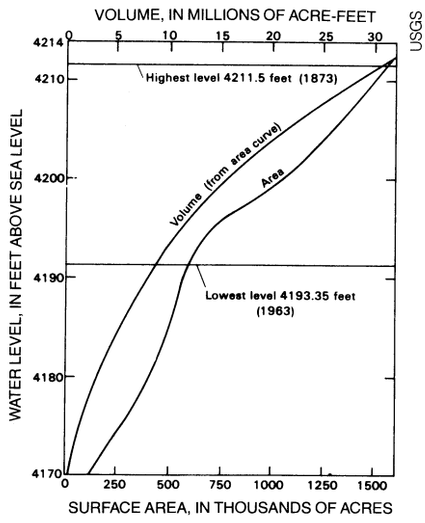
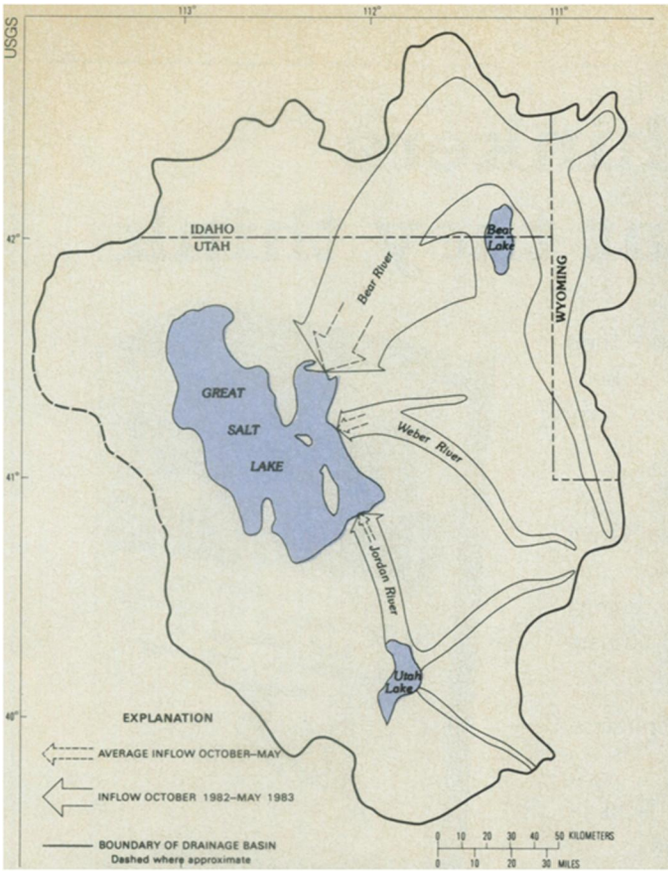


Chart shows relationship between the level, area and volume of Great Salt Lake. An acre-foot is 326,000 gallons, or the amount of water needed to cover an acre of land with water one foot deep.

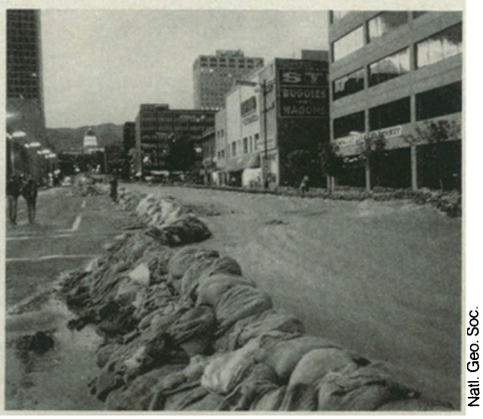
The conditions leading to the flood and lake rise last year were extreme. A cool spring, coupled with abundant snowfall, persisted until the second half of May when temperatures soared and snow melted suddenly, gushing down the mountains. But the summer was cloudy and cooler than normal, and the lake level dropped only half a foot, rather than its customary two or three feet. Thus, when fall rains and snows resumed last November, the lake already was distended. Forecasters project that this year, the peak will be three or four feet higher than last year's troublesome levels.

The first measurements of the lake placed the surface at 4,200 feet above sea level. Its historic high, 4,211.5 feet in 1873, prompted the Mormons' leader, Brigham Young, to consider the possibility that waters from the lake could be spilled into the desert to the west, averting a flood. But the lake declined to a lower level without human intervention, and the proposal was shelved. Temple A. Reynolds, executive director of the Utah Department of Natural Resources and Energy, is in charge of implementing a law the Utah legislature passed in 1979, in effect making it illegal for the lake's surface elevation to rise above 4,202 feet. With conspicuous disregard, the lake flouted the law last year, rising to 4,205 feet and leaving Reynolds and his department to make sure it does not happen again.

Some obvious, stopgap measures are



Briggs/Utah Dept. of Trans.



Natl. Geo. Soc.

Left: Swollen tributaries add their waters to an already distended lake. Above right: Lake waters wash across Interstate 80. Dikes are being built to minimize the damage. Right: Sandbags channeled waters flowing down State Street last year, as waters from the Jordan River coursed through Salt Lake City.

being taken even now, as the lake's waters wash over a stretch of Interstate 80, along the southern end of the lake. Dikes are being placed along a three-mile span of highway that was built at a slightly lower elevation than the rest of the road. Union Pacific-Western Pacific Railroad, the tracks of which run along the lakeshore, and Southern Pacific, with tracks that cut across a 13-mile-long causeway that transects the lake, each are raising their road surfaces in a costly ploy to avoid losing the tracks altogether.

"A lot of actions taken last year will forestall things like the State Street River," Reynolds says. In Salt Lake City, for example, the city and county have cleaned out or replaced underground drains that were blocked and useless against last year's runoff.

One of the more significant measures involves breaching the Southern Pacific railroad causeway that divides the lake into north and south arms. The causeway, emplaced in 1959, curtails the lake's natural circulation, resulting in different salinities and surface levels for the two lake portions. Last year the surface level difference was as much as 3.25 feet—a disparity that in times of high lake level means that the southern arm is subject to considerably greater flooding than its northern counterpart. The difference varies depending on inflow and evaporation rates.

In January, the legislature ruled that a new opening could be built in the causeway, allowing freer flow of water between the lake sides. "Had we breached it last year, we feel pretty certain that the lake would have been about 10 inches lower on the south end," says Lloyd Austin of the Department of Natural Resources.

With a three-to-four-foot rise predicted, a 10-inch drop would help, but it won't solve the region's problems. A contingency plan for the Great Salt Lake, written after the decision to maintain the lake level below an elevation of 4,202 feet, harks back to Brigham Young's never-tried solution: pump water into the desert west of Salt Lake City, for evaporation. The desert is part of the lake bed of the prehistoric Lake Bonneville, which covered about 20,000 square miles of what is now Utah, Idaho and Nevada during the last ice age. The lake peaked 16,000 to 17,000 years ago, and by 11,000 years ago, had declined to about the size and level of the present lake.

Reynolds says that a pond, covering half a million surface acres and two to three feet deep, could bring the lake level down about 21 inches in the first year. But the legislature did not appropriate money for further study of the project. The main objections, Austin says, were that the brine ponds would inundate lands that are part of the Air Force bomb and test range, and "would involve some pretty delicate problems with the Air Force." Also, the initial engineering costs would be at least $50 million, with an additional $5 million each year in operating costs. The project would take up to two and a half years to complete. By then, the lake might subside of its own accord.

But the underlying fact, perverse in these times of flooding, is that Utah is a dry state. "We're always trying to develop our water resources, not get rid of them," Austin says. "It's a very unusual situation for us, and a lot of the philosophy is that we should be looking for ways to utilize that water before it gets into the lake."

The legislature did allocate funds for studies of the Bear River, the main tributary to the lake, and one of the least developed of the tributaries in the Salt Lake's 22,060 square mile drainage basin. Storage reservoirs in the watershed could be used in agriculture and industry, but those uses have to be encouraged, Reynolds says. Otherwise, with little demand for the water, once the reservoirs are filled, the water will simply flow past them and into the lake. "In honesty, all of the flood reservoirs we looked at would not reduce the level of the Great Salt Lake by more than one foot," if demand does not increase, Reynolds says. "And that would cost on the order of half a billion dollars."

With spring's approach, the hydrologists who chart the lake's progress say that if the spring is dry, with moderate temperatures, melting could begin in April, allowing the heavy mountain snowpack to run off gradually. Even under normal conditions, the lake may reach 4,209 feet by the end of June, and the National Weather Service is forecasting precipitation through May that is 10 percent to 30 percent above normal. On March 1 the lake, at 4,206.7 feet, already was 4.25 feet higher than this time a year ago, placing it at its highest level since 1887. A rainy spring could boost the waters another foot or two, bringing the swollen, diluted lake close to its 1873 record. □