

Conflicting Interests Target Declining Great Salt Lake



SALT LAKE CITY (CN) - A steady drop in the Western Hemisphere's largest saltwater lake, drained by decades of water consumption, is affecting millions of migratory birds, and could bring major consequences for Utah tourism, industry and

residents. The Great Salt Lake, a remnant of the Glacial Age's Lake Bonneville, has reached near record-low levels, a recent study shows, exposing half of the natural lake's bed.

State university and community college faculty, joined by Division of Wildlife Resources and Water Resources workers, published "Impacts of Water Development on Great Salt Lake and the Wasatch Front" in April this year.

The [white paper](#) cites droughts and floods as short-term factors to the decline, but water management schemes, including consumption and mineral extraction are the major culprits in the 48 percent decline of the water level.

Shorebirds, Bathers and Sea Monkeys

The Great Salt Lake, a swath of rich blue and bright green water bordered by vast, pale salt flats to the west, spans nearly 1,700 square miles.

The nation's largest lake outside of the Great Lakes, it is the fourth-largest terminal lake worldwide, and once blanketed 20,000 square miles of present-day Utah, Nevada and Idaho.

Mormon pioneers, traveling west from the Great Plains after the assassination of Joseph Smith, settled Salt Lake City, 16 miles from the lake, in 1847.

Two decades later, in 1869, the Central Pacific and Union Pacific Railroads

joined rails in the nation's first transcontinental railroad, just north of the Great Salt lake.

By 1870, two recreational resorts had been built on the saline-rich shores.

Saltair, an amusement park and haven for swimmers, was launched by the Mormon Church in 1893, and connected to the city by railroad.

Mormon businessmen purchased Saltair, billed a "Coney Island of the West," in 1906.

An estimated 500,000 people visited the attraction in the early 1920s, but it burned to the ground in 1925 and was rebuilt the following year.

The Great Depression, maintenance costs and receding lake levels, among other challenges, led to the ultimate abandonment of Saltair and another devastating fire, in 1970.

Rebuilt again, now it serves as a music venue — nearly 200 yards from the south shore of the lake.

Called the "most important waterfowl hotspot" in the Intermountain West by conservation group Ducks Unlimited, the shallow waters of Farmington Bay and Bear River Bay, to the lake's east and north, provide nesting areas and food for millions of waterfowl.

Three million to four million birds of 35 species use the lake for nesting, resting and staging each year.

Eared grebes, ruddy ducks, mallards and Canada geese are common, though the enormous flocks that explorer John Fremont once observed have dwindled.

"The waterfowl made a noise like thunder," Fremont wrote in 1843, after visiting the lake near the Bear River Refuge, "as the whole scene was animated with waterfowl."

And there's money to be had in the lake, 75 miles long and just over 40 miles wide.

Economic analysis in 2012 by Bioeconomics tagged the annual value of the Great Salt Lake at \$1.32 billion, for recreation, mineral extraction and its \$57 million annual brine shrimp industry.

Brine shrimp eggs, or cysts, are harvested from the lake and canned,

shipped and hatched globally to feed baby shrimp.

The Great Salt Lake Brine Shrimp Cooperative, a group of member companies launched in 2006, and Ocean Star International harvest the shrimp, or "sea monkeys," from Oct. 1 to Jan. 31, with permits that may cost more than \$15,000 apiece.

Mineral extraction, including magnesium, salt for roads and potassium for fertilizer, bring more than \$1 billion to the Beehive State each year.



Sounding the Alarm

Since the pioneers arrived, lake levels have declined and net river inflow to the Great Salt Lake has been reduced by 39 percent, mainly from human development and water consumption.

The increasingly exposed lake bed exacerbates dust storms, which add to Salt Lake City's serious air pollution and inversion problems.

A State of the Air report from the American Lung Association in 2016 ranked Salt Lake City as the sixth worst air quality in the nation.

Severe dust storms and related health impairments have been documented by lake desiccation around the world, including Lake Urmia in Iran, the Aral Sea in Kazakhstan and Uzbekistan, California's Salton Sea, Mono Lake and Owens Lake, and Oregon's Abert Lake.

In each case, research states, the primary cause of rapid desiccation was

increased water withdrawal for agriculture and consumption.

Salt Lake City, surrounded by the sprawling Wasatch and Uintah Mountains, is nearly gated by oil refineries at its northern interstate entrance.

Water conservation has reduced urban per capita use in the city by 18 percent, researchers estimate. But overall municipal water use has increased due to a growing population. Salt Lake County is home to 1.1 million of Utah's 2.9 million residents.

Agriculture consumes 63 percent of the water in the Great Salt Lake Basin.

According to the impact paper, there was no significant long-term change in precipitation or water supply from mountain tributaries to the lake since the valley was settled.

Water development and river diversions, however, produced a persistent reduction in supply, and were offset with water imported from the Colorado River.

Wayne Wurtsbaugh, lead author of the research, told Courthouse News that his team's work "greatly stimulated" discussion in Utah and elsewhere about the need to get more water to the lake.

Shortly after the paper was published, Wurtsbaugh said, the state Legislature passed Senate Bill 80, which included \$36 million for development of the Lake Powell Pipeline, to take water to St. George, plus funds to move forward with water development of the Bear River.

The funding, Wurtsbaugh said, "is largely for planning and land purchases for water pipelines, so it remains to be seen if dams and other water diversions will be built on the Bear, but the funding was an ominous sign."

The Bear River Development Project, a four-phase proposal to spend \$1.5 billion building dams on the largest tributary of the Great Salt Lake, would reduce lake levels by 8.5 inches, the paper states, and expose another 30 square miles of lakebed.

"The logic is straightforward: If less water is delivered to the lake, the lake level must drop," Wurtsbaugh wrote. "This is an inevitable consequence of

ever-increasing water consumption."

Wurtsbaugh cited a recent [presentation](#) by water attorney Stephen Clyde on legal avenues for supplying water to the lake. Clyde, who cited the legal doctrine of prior appropriation, said the federal government has a dual interest, as sovereign and proprietor, in Western water and appurtenant water resources.

Then there are the sea monkeys.

Salinity at the Great Salt Lake ranges from 5 percent, or just higher than sea water, to 27 percent, beyond which water cannot hold more salt, based on lake levels.

Brine shrimp rely on intermediate salinities to grow and reproduce.

Reducing freshwater inflows to lake increases salinity, causing shrimp to become stressed and cease reproduction. Low salinity levels bring a proliferation of predatory insects, which obliterate the sea monkeys.

Salinity levels also threaten the enormous bird population by decreasing available food, including brine shrimp and brine flies.

Shrinking estuaries in waterfowl areas also threaten a \$70 million hunting industry, the paper states.



Hope in Conservation

On a recent morning, a reporter trekked from a dirt lot at Saltair, past dilapidated outdoor showers, over a wall of jagged rock and tall grass to the lake's edge.

Assorted bones, rotting bird carcasses and shotgun shells dotted the

wavelike sand. As Asian tourists posed gleefully in the morning light, admiring the beauty of the water and surrounding mountains in the cold air of autumn in the high desert.

Historian Dale Morgan in 1947 called it a "lake of paradoxes."

"In a country where water is life itself and land has little value without it, Great Salt Lake is an ironical joke of nature — water that is itself more desert than a desert," Morgan wrote.

Cache County residents will vote Tuesday on whether to authorize the Cache Valley Water Conservancy District.

Cache County, 86 miles north of Salt Lake City, once frequented by mountain men, was the site of the 1863 Bear River Massacre, where the U.S. Army massacred hundreds of Shoshone men, women and children, which virtually exterminated the Shoshone in the area and opened northern Utah and southern Idaho to white settlers.

Fifty thousand of the 117,000 residents of Cache County live in Logan, the county seat. Logan is home to Utah State University, where Wurtsbaugh is a professor in the Department of Watershed Sciences.

The water conservancy district, Wurtsbaugh said, could facilitate the development of Bear River in Cache County. The district could be used to facilitate water conservation, "but that would be an unusual direction for a water district," he said.

The aim of a water conservancy district, Title 17B of Utah State Code states, is to deliver the greatest beneficial use of water, both appropriated and unappropriated, for domestic, power, irrigation and manufacturing.

The population of Cache County has increased by more than 30 percent since 2000, to 116,909 in 2013.

That increase, officials say, calls for an established district to conserve and protect water resources. The move isn't without critics, who claim increased taxes and the uncertainty of downstream impacts loom if the measure is passed.

Wurtsbaugh's colleagues on the white paper include Craig Miller, of the Utah Division of Water Resources; Utah State University professors Sarah

Null and Peter Wilcock; Maura Hahnenberger, a professor at Salt Lake Community College; and Frank Howe, of Utah State University and the Utah Division of Wildlife Resources.

Leading authorities across the state celebrated their research and called for a public response.

Erik Crossman, a professor at the University of Utah's Department of Atmospheric Sciences, told Courthouse News that Utahns need to "wake up."

"I believe people in Utah need to wake up to the fact that one of our ecological and biological gems is threatened," Crossman said.

Crossman called the white paper "timely," and added that most previous studies focused on variations in climate, storms and rainfall as the primary driver of lake level fluctuations.

State officials, Crossman said, need to have a "serious discussion" about water and how to manage the Great Salt Lake.

John Luft, the Great Salt Lake Ecosystem Program manager with the Utah Division of Wildlife Resources, said he hoped the paper "would educate people on what to expect if we are to continue on this path."

"Ultimately, people will have to choose what is most important to them," Luft told Courthouse News.

The sprawling lake remains an iconic emblem of the Beehive State. How enduringly great, however, seems to be in the hands of an assorted cast of advocates driven by competing concerns and agendas: mineral extraction, tourism, aquaculture, agriculture, and conservation of the millions of birds that once flocked to the lake on their annual migrations, their wings making a noise like thunder.