The Disappearing Waters of Lake Jackson

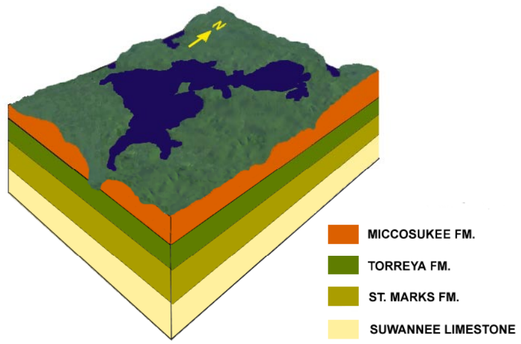
Lake Jackson occupies a large, 6,300-acre angular basin nestled in the Tallahassee Hills of northern Leon County. It is about six miles from tip-to-tip, and irregularly one-half to two miles in width. The mean lake water level is about 87 feet above mean sea level (msl) and the hills surrounding the lake rise up to about 250 feet msl. It is a shallow, generally flat-bottomed lake rarely exceeding about eight feet deep. Two major depressions containing sinkholes occur near the southwestern shore of the lake. Like other lakes in Leon County, Lake Jackson periodically disappears, leaving stranded fish and only a muddy prairie where water once stood. The Native American name for the lake was "Okeeheepkee", meaning "disappearing water." Drainage events are caused by a combination of low rainfall, evaporation, and drainage through the sinks in the lake bottom. The largest of these sinks is named Lime Sink. A second, named Porter Hole, occurs near the southwestern shore, just north of Faulk Drive. The sinkholes are partially or completely plugged with sediments, but may collapse and open when groundwater levels drop during periods of extremely low rainfall. Water then funnels downward through natural conduits in the sediments and into the underlying cavernous limestones of the Floridan aquifer system. Until recently, Lake Jackson drained on a schedule of about every 25 years.

GEOLOGY

Lake Jackson is situated in the Tallahassee Hills, part of a series of stream-dissected highlands spanning northern Florida. The clayey sand hills attain elevations of about 250 feet above mean sea level near the lake.

The Oligocene Suwannee Limestone (about 33 million years ago (mya)) and the overlying Miocene St. Marks Formation (25 mya), both units of the Floridan aquifer system, underlie the Lake Jackson area. Many local wells draw water from these units. In areas of Leon County where these limestone units are close to land surface, the rock is typically riddled with cavities, caves and other solution features. Sinkholes are also common in these areas, and form from collapse of underground cavities in the rock. The Lake Jackson basin formed by dissolution and lowering of the underlying bedrock.

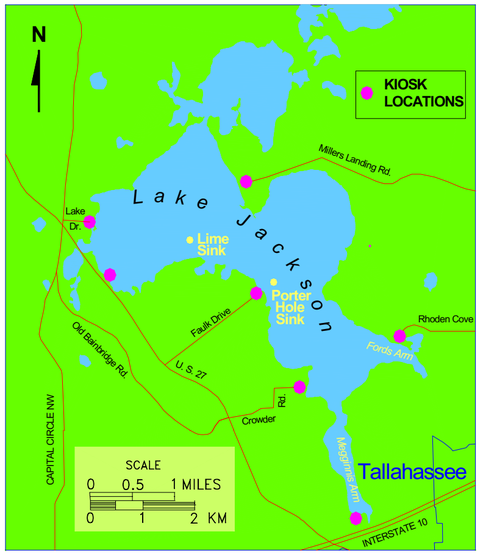
Clays, sands, and carbonate rocks of the Miocene Torreya Formation (about 18 mya) locally overlie the St. Marks Formation. Lake Jackson is perched on clayey Torreya Formation sediments, and the sinks, which periodically drain the lake, penetrate the unit. Conduits, or pipe-like passages through the rock, carry the lake water downward into the deeper underlying units of the Floridan aquifer system. The red, clayey sand hills surrounding Lake Jackson are comprised largely of Pliocene Miccosukee Formation (about 3 mya) sediments.



Block diagram illustrating the generalized stratigraphy in the Lake Jackson area.

HISTORICAL DRAINAGE EVENTS IN LAKE JACKSON

Lake Jackson has drained at least seven times in recorded history. One early documentation appears in an 1870 book entitled *A Winter in Florida*, by Ledyard Bill, in which a rapid, overnight drainage of Lake Jackson in the winter of 1837 is mentioned. Later, Charles Norton's *A Handbook of Florida,* published in 1891, describes another early event. Norton wrote: "…shortly after the Charleston earthquake of 1886, it (Lake Jackson) distinguished itself by disappearing completely through an unsuspected subterranean passage. Large numbers of fish perished, and for a time pestilence was dreaded by neighboring residents. After a few days, the lake began to fill up again."

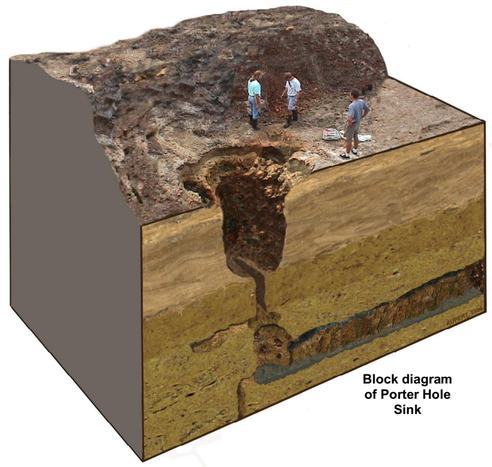


Similar disappearances of portions of the lake occurred after periods of low rainfall in May and June of 1907 and 1909. In January, March and July of 1932 the Tallahassee Daily Democrat reported the disappearance of the lake water and the death of thousands of stranded fish. After each drainage event, the lake was replenished by rainfall. Subsequent drainings occurred in 1957 and 1982, following periods of low rainfall. More recently, in mid-September, 1999, Lake Jackson drained into Porter Hole Sink over a period of several weeks, again stranding fish and turtles. The event attracted many spectators, some of whom scooped up fish trapped in small pools left by the receding water. After the lake had completely drained, geologists were able to descend into the sink.

ANATOMY OF A LAKE DRAIN SINK

The September 1999 draining of Lake Jackson afforded geologists an opportunity to explore Porter Hole Sink, one of two major drain sinks in the lake basin. Geologists from the Florida Geological Survey and various other agencies descended into the sink by ladder, and explored the subterranean cave passages. The figure below shows a cutaway block diagram of Porter Hole Sink. Photographs at the bottom of this display include pictures taken in the sink and associated cave.

The upper portion of Porter sink is a slightly funnel-shaped opening, about eight feet wide and nine feet deep. At a depth of nine feet the sink throat narrows to a slit. The slit-like restriction is about one-and-a-half-feet wide and four feet deep. It is developed along a fracture or joint in the Torreya Formation dolostone. Below the restriction, the sink throat opens into a lower cavity about six feet wide and eight feet high. The walls of this cavity are honeycombed with smaller cavities and conduit openings. A linear cave, about five feet high and one-and-a-half feet wide, extends a distance of 20 feet northwestward from the lower cavity towards a nearby sinkhole. The northwestern end of the cave is plugged with dolostone and clay boulders and mud, containing plants and other debris from the surface. The plug appears to have formed during the recent drainage event. Drainage from Porter Hole Sink presently takes place through the honeycomb of small cavities in the walls of the lower sink chamber.



Block diagram of Porter Hole Sink

Spectators watch as the last of the lake water disappears into the sink.

Large fish, trapped in pools by receding lake water, were caught by hand.

View looking southeast at the Porter Hole Sink and dry lakebed.

Florida Geological Survey geologist Tom Scott descends to explore the sink (photo by Tony Countryman).

Tom Scott squeezing through the restriction in Porter Hole Sink (photo by Tony Countryman).

One of the small conduits draining the lower sink cavity.

Cave at bottom of lower sink cavity.

Photos by Tom Scott unless otherwise noted.

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