

## White Lake Springs: Frequently-Asked Questions

### Q: What studies have been done of the springs?

**Frey (1949):** examined springs areas in 1947, and found the centers to be about 8” lower than the edges, with hard sand bottoms, with no detectible chemical evidence of any volume of water entering the lake through these depressions, although he noted that “at a time of higher lake level and more favorable ground water conditions there might be visible evidence of inflowing water”.

**NC DNRC (1982):** Groundwater wells provided “evidence of a semi-confined groundwater aquifer which is probably the source for the springs that have been reported near the northeastern shore in the lake”; this report goes on to state: “the exact relationship between rainfall, groundwater levels, and the lake level should become more clear as monitoring continues” (which did not). The US Geological Survey definition of a water table, or unconfined aquifer is “an aquifer whose upper water surface (water table) is at atmospheric pressure, and thus is able to rise and fall. Water-table aquifers are usually closer to the Earth’s surface than confined aquifers are, and as such are impacted by drought conditions sooner than confined aquifers” (<https://www.usgs.gov>).

**USGS (2010):** hydrogeological mapping based on well data shows that the surficial aquifer includes the groundwater above and below the shallow hardpan clay layer.

**NC DEQ (2017):** Groundwater level monitoring noted the association between levels in a shallow onshore well and a shallow in-lake well. A deeper in-lake well at a springs site had the same pH and nutrient levels as the lake water.

#### **Shank and Zamora (2019):**

- Groundwater inputs to the lake are low, because the groundwater capture zone feeding the lake is relatively small. Inflow comes primarily from the northern and eastern edges, with outward groundwater flow along the southwestern edge of the lake.
- There is no evidence that springs from deeper confined aquifers are contributing water to the lake.
- High-volume rainfall and infiltration could create flow through “preferential groundwater flow paths” such as fractures in the hardpan clay layer that produce freshwater springs, with the chemical characteristics of the surficial aquifer groundwater.
- Lake water loss to groundwater was determined to be 5 times greater than the amount of groundwater flowing into the lake.
- There was no evidence found that blueberry farm pond pumping is affecting groundwater flow into White Lake. Most of these ponds are located in areas where groundwater flow is naturally away from the lake (so they are outside the groundwater capture zone for the lake).

### Q: Are the springs and the groundwater surficial aquifer one and the same?

*A. Yes, here at White Lake they are. Artesian flow into the lake can occur when the water table is high.*

### Q: Do low lake levels mean the springs are not working?

*A. No, the hydrology of the lake is influenced by rainfall, so lake levels and groundwater levels (and therefore groundwater flow rates) fluctuate naturally. **Groundwater flow is highest when the water table is high, which happens when it rains a lot.** Rainfall amounts can vary quite a bit from year to year. Lake water can also flow from the lake into the groundwater as well as exiting from Turtle Cove.*

### Q: Does the higher pH of the lake mean the springs are not working?

*A. No. The pH of the lake is dictated by rainfall, first and foremost. A three-inch rainfall is equivalent to 87 million gallons of water falling on the lake surface. The pH of rainfall was equivalent to the pH of groundwater but now it is higher, as airborne acidic pollutants have been reduced.*

***Rainfall rules both lake levels and lake chemistry***