



ENVIRONMENT

Experts: Wells for Hyundai's Georgia site will 'pirate' water from other areas

John Deem Savannah Morning News

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Georgia environmental officials insist that other than potentially dropping the depth in dozens of private wells serving farms and homes, extracting 6.6 million gallons of subterranean water per day for Hyundai Motor Company's electric vehicle-manufacturing megasite near Savannah will have minimal environmental impact.

That conclusion is at the heart of the Georgia Environmental Protection Division's draft permits for four planned Bulloch County wells that will send the pumped water to Hyundai's nearly 2,500-acre complex in Bryan County.

The wells will tap into the Floridan Aquifer, an extensive underground reservoir covering 100,000 square miles beneath all of Florida and parts of Georgia, Alabama and South Carolina.

In Bulloch County, there is approximately 400 feet of "low-permeability clay-rich material" atop the aquifer, explained Jim Reichard, a professor of geology at Georgia Southern University's School of Earth, Environment and Sustainability.

"This so-called confining layer basically acts as an insulator and greatly reduces the vertical hydraulic connection between the Floridan and surface streams and ponds," said Reichard.

That clay-rich section, EPD insists, protects streams and other water bodies above from any potential effects of pumping from below.

In the "southeastern portion of the state or the coastal area of south Georgia, pumping from the Floridan Aquifer does not have surface water implications," EPD spokeswoman Sara Lips wrote in an emailed response to questions from the Savannah Morning News.

But some experts who have studied the Floridan extensively suggest that conclusion discounts an element of physics that anyone who's floated on a river, stood in the surf or sat in a bathtub has experienced: Water moves not just vertically, but also horizontally.

First step: Georgia releases draft permits to send 6.6M gallons of water per day to Hyundai site

'Don't get to produce something from nothing'

Todd Kincaid, a longtime hydrologist whose doctoral studies focused on what are known as karst aquifers, like the Floridan, has spent a quarter-century developing computer models to track the flow of water through such underground systems.

Kincaid, who has donned scuba gear to observe firsthand how the Floridan operates, agrees that pumping millions of gallons from the Bulloch wells likely will have little impact in the immediate area of the wells.

"But regardless of the confining unit, withdrawals from the Floridan deplete down-gradient discharges," he said.

That conclusion, Kincaid explained, is rooted in simple math.

"We don't get to produce something from nothing," he said. "So, when you take water out of the ground, mass balance dictates that it has to come from someplace."

Kincaid witnessed that firsthand while doing a decade of research in the early 2000s with the Florida Geological Survey.

Using dye tracing and computer modeling, Kincaid and his colleagues found that pumping from a section of the aquifer that extends as far north as Albany in Georgia depleted flows to Wakulla Springs near the Gulf Coast of Florida. Wakulla is one of the world's largest and deepest freshwater springs.

"Despite what is very often said, pumping 'pirates' water away from natural discharges," explained Kincaid, who leads a Reno, Nevada-based company that specializes in computer modeling of aquifers.

Banking on water

Rhett Jackson, the John Porter Stevens distinguished professor of water resources at the University of Georgia's Warnell School of Forestry and Natural Resources, likened this kind of transactional activity to an interest-free bank account.

"Taking \$100 from either your income or from your balance or adding it to your bills all have the same effect on your balance and your finances," he said.

The Floridan "recharges" when accumulated rainwater seeps from the surface – the equivalent of a deposit to the bank.

The aquifer's outgoing "payments" flow through springs that connect it to surface streams, while wells like those that will serve Hyundai and farms function like ATMs.

The Floridan is spending more than it's taking in, said Sydney Bacchus, a hydroecology expert who has conducted research throughout the aquifer over the course of three decades.

"The bank is empty, and any additional withdrawals simply are increasing the magnitude of the existing harm from unsustainable groundwater withdrawals," added Bacchus, who has written or co-authored dozens of peer-reviewed research papers on the environmental impacts of changes in the aquifer and has urged the state to reject permits for the four Bulloch County wells.

Corps of Engineers under fire: Feds should have known – and been told – of water demands for Hyundai site, experts say

Low flow in Ogeechee

A recent study by other researchers functioned as an audit of sorts for the Floridan.

Aquifer depths have declined over the past quarter-century as pumping from the Floridan exploded, the authors noted in the June 2021 edition of the *Journal of Hydrology: Regional Studies*.

Wells serving farms dominate aquifer demand in southern Georgia, they reported, adding that statewide, the number of acres irrigated surged by about 2,000 percent, from more than 42,000 acres in 1976 to 936,000 acres in 2013.

“High levels of irrigation have been shown to cause aquifer storage loss, changes in groundwater flow (such as) gaining stream to losing stream, decreases in stream baseflow and decreases in aquifer recharge,” the researchers said.

The 2020 study and another published in 2021 also found that water flow levels in the Ogeechee River declined over the same period that the aquifer levels fell.

That comes as no surprise to Jackson, the UGA professor.

“If you remove groundwater from the Ogeechee basin and (and don’t return it to the aquifer), you necessarily reduce streamflow,” he explained.

'Vulnerable to disturbance'

The National Oceanic and Atmospheric Administration Fisheries division took particular interest in the Ogeechee when it directed EPD to consider the impact of withdrawals from the Floridan on two species of federally protected sturgeon.

The request was part of the comment process ahead of EPD’s recent release of draft permits for the four proposed wells in Bulloch County.

Potential changes in water temperature and oxygen levels in the Savannah and Ogeechee rivers related to pumping such large amounts from the aquifer below could harm shortnose and Atlantic sturgeon, both of which are protected under the U.S. Endangered Species Act, NOAA said in its letter.

Both species rely on fresh water in the two rivers for spawning, and flow and temperature play a critical role in triggering reproductive behavior, NOAA explained.

“All information available regarding the populations of both shortnose and Atlantic sturgeon in the Ogeechee River indicates their numbers are depressed and they are vulnerable to disturbance,” NOAA said in its letter.

Both species are anadromous, which means they come upstream from the coast to spawn and hatch in river channels' rocky shoals. The so-called river monsters have been around for millions of years and thrived until overfishing, pollution and habitat loss led to their decline.

When asked about the potential impact on sturgeon, EPD reiterated its stance that the

confining clay-rich layer atop the aquifer will prevent any interaction with surface water.

Complaints flow: Hyundai wells fuel water war between Bulloch County residents, leaders

What's next?

EPD's recent release of the draft permits for the wells came two weeks after local agreements were finalized to draw water from the Floridan Aquifer in Bulloch County and send it to Hyundai's nearly 2,500-acre complex in Bryan County.

Bryan, bound by a joint development agreement to supply water for the \$7.6 billion manufacturing complex, is going outside the county because it is subject to state withdrawal limits aimed at limiting saltwater intrusion in the aquifer near Savannah.

EPD estimates the depth of the Floridan will drop by as much as 19 feet near the new wells, and that private wells could decline by up to 15 feet.

Bryan and Bulloch commissioners agreed in June to create a fund to help property owners whose wells are impacted, with each county initially contributing \$250,000. EPD added that the fund "may include contributions from other entities," but did not single any out. Some critics of the project have insisted that Hyundai should be aiding the effort.

EPD said it will accept comments on the proposed permits until Aug. 20 and will host a public meeting, 6 to 9 p.m., Aug. 13 at Southeast Bulloch High School, 9184 Brooklet-Denmark Road, Brooklet, Georgia.

John Deem covers climate change and the environment in coastal Georgia. He can be reached at 912-652-0213 or jdeem@gannett.com.

