Large network of underground gopher tunnels found with GS9000 MCGPR at the Big Bone Lick state historic site

Sometimes you go out to the job site looking for something specific, and end up finding something totally unexpected. That's exactly what happened recently when Proceq's Patrick Baldwin, Tom Ott and Darrell Stanyard set out to collect data with the Proceq GS9000 Multichannel GPR (MCGPR) at the Big Bone Lick state historic site.

Big Bone Lick State Historic Site, in Kentucky, is recognized as the "Birthplace of American Vertebrate Paleontology." Its historic importance stems from its salt-sulfur springs, which attracted and preserved the remains of numerous charismatic Late Pleistocene megafauna (like mastodons, mammoths, and mega sloths).

The site gained prominence when President Thomas Jefferson commissioned the first organized scientific excavation in North America here in 1807, officially launching the study of prehistoric life on the continent.

Challenge

The area is being studied by the Kentucky Geological Survey, directed by Dr. M.M. (Mike) McGlue, the State Geologist and Director of the 14th Kentucky Geological Survey. McGlue is a tenured full professor in the Department of Earth and Environmental Sciences and holder of the EES Alumni Endowed professorship.

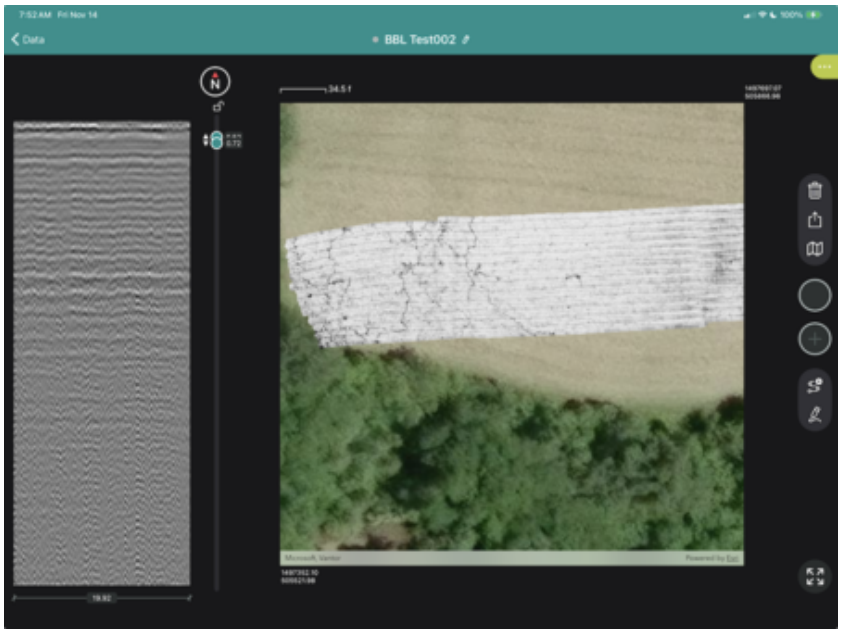
Dr. McGlue was looking to map shallow stratigraphy related to this famous Paleontological site. One of the many techniques being deployed on this site includes MCGPR, Electrical Resistivity, LiDAR, and seismology to name a few.

The team also ran a short GPR-SLICE and GPR Insights workshop discussing the data post-processing and analytics of the MCGPR data.

Solution

The GS9000 with the GX2 (30-750 MHz stepped frequency) array antenna was chosen as one of the technologies to scan the site. With 100% real-time data visualization, the GS9000 instantly creates a high-resolution map of the subsurface as the archaeologist walks the survey path.

This immediate, on-site interpretation is crucial for confidently identifying and tracing subtle voids or linear anomalies, such as gopher tunnels or narrow archaeological features, without any processing delay.

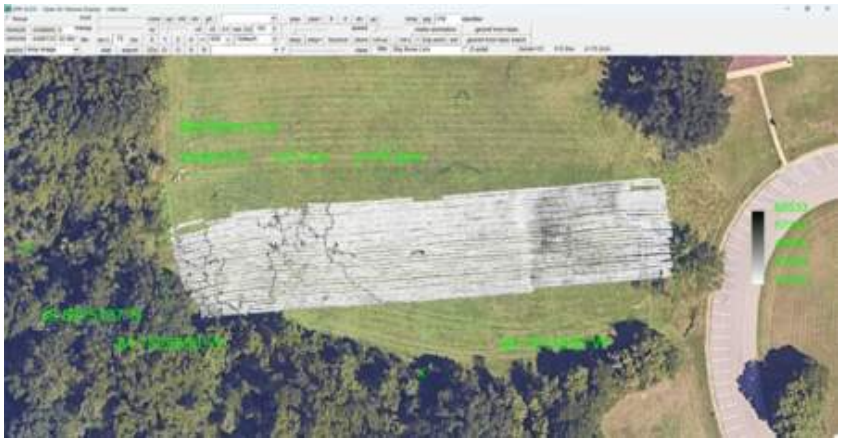


Day 1 iPad data from the GS9000

Paired with precise GNSS corrections, the resulting map is accurately tied to site coordinates, for efficient documentation and follow-up investigation.

Results

Not much in the way of stratigraphy was found in the area scanned. Instead, the team found something quite unexpected - a very clear indication of a large network of gopher tunnels hidden underground. The raw MCGPR data was analyzed using GPR Slice post-processing software by Dean Goodman, Founder and Developer of GPR Slice.



Day 1 field results, processed in GPR Slice.

Day 2 data results from GPR Insights.

Patrick Baldwin explains “It was a challenging field area due to no cellular connection, and with network corrections for GPS, the Starlink was a game changer.”

This unexpected finding at Big Bone Lick serves as a vivid reminder that when using advanced technology like the GS9000 and GPR Slice, every survey holds the potential for surprising and valuable insights. Check out more archaeological case studies on our Tech Hub.

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