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PRATT MAMMOTH SITE: USE OF GIS IN PALEONTOLOGY

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The excavation of a mammoth at the Pratt County Airport in 1999 and 2000 provided an opportunity for the collection of detailed three-dimensional data at the site and subsequent data manipulation in Geographic Information Systems (GIS) software. The site was surveyed using professional-grade surveying equipment and an estimated within-site accuracy of at least 1 cm was achieved. Aspects of the site located in three-dimensional space included a wide variety of significant geologic and paleontologic information, including bone locations, geologic features such as bedding planes, surface topography, and the locations of mineralogical and pollen samples. Real-world coordinates (UTM) were established by utilizing coordinates obtained with a hand-held Global Positioning System (GPS) on select site monuments and making corrections in accordance with the survey data. Estimated error to real-world coordinates is at most plus or minus 7 meters. All the point data were imported into GIS software as a point cloud. Point data representing surfaces (e.g., ground surface and bedding contacts) were used to create surface representations, and bone location points were used to draft georeferenced geometric shapes. A database of attributes was created for the fossil shapes with fields for taxon, left/right, field number, bone description, appendicular/axial elements, and others. Using this technique and improvements developed since this excavation allows for the digital documentation of paleontological sites and subsequent rapid visualization of the site in numerous ways.