THE USE OF GEOMORPHOLOGICAL AND PEDOLOGICAL SOIL CHARACTERISTICS TO ASSESS PLANAR BORROWING AT A MANDAN INDIAN VILLAGE, NORTH DAKOTA

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ABSTRACT

The Double Ditch State Historic Site is situated in a loess landscape immediately east of the Missouri River near Bismarck, North Dakota. The site was occupied from ca AD 1450 to 1785 by Mandan Indians, Plains Villagers who exhibited a systematic and deliberate pattern of earth-moving behavior unique to the region.

A soil-coring program was conducted with: transects both within the village and in an adjacent area of similar, relatively undisturbed soil to serve as a control. An underlying, contiguous paleosol (Early Holocene) is used as the stratigraphic reference in concert with physical, chemical and spatial soil characteristics to determine the degree of earth-moving activity (planar borrowing). Utilization of geomorphological and pedological soil characteristics in concert with cultural features should allow an estimate of volume of earth removed and in fill in several large mounds on the site.

To date it has been difficult to assess volume of soil borrowed by planar activity due to its shallow and poorly defined nature. Utilizing a Digital Elevation Model of present-day surface and a model of pre-occupation surface generated with soil profile data, it was possible to calculate the differences between the two surfaces and determine a volume of soil removed and in fill. Planar borrowing accounted for half of the total volume of earth borrowed, indicating this was a major activity.