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Doolittle*

United States Department of Agriculture
Soil Conservation Service

Northeast NTC
Chester, PA 19013

Subject: Ground-Penetrating Radar Assistance Date: 29 May 1992

To: Gary R. Nordstrom
State Conservationist
Soil Conservation Service
St. Paul, Minnesota

Purpose:

To provide ground-penetrating radar (GPR), archaeological field assistance to the Mille Lacs Band of the Ojibwa Reservation in Mille Lacs County.

Participants:

Roger Berggren, Soil Scientist, U. of Minnesota, Milaca, MN
Bob Clouse, Archaeologist, Minnesota Historical Society, St. Paul, MN
James Doolittle, Soil Specialist, SCS, Chester, PA
Claron Krogness, District Conservationist, SCS, Milaca, MN
William Lorenzen, Biologist, SCS, St. Paul, MN
Merle Plante, County Home Supervisor, FmHA, Milaca, MN
William Scininger, District Director, FmHA, St. Cloud, MN

Activities:

I arrived in Milaca on 13 May 1992. Field studies were conducted on 14 and 15 May 1992. I departed Milaca for field studies in Michigan on 16 May 1992.

Equipment:

The ground-penetrating radar unit used in this study is the Subsurface Interface Radar (SIR) System-8 manufactured by Geophysical Survey Systems, Inc.¹ Components of the SIR System-8 used in this study were the model 4800 control unit, ADTEK SR 8004H graphic recorder, ADTEK DT 6000 tape recorder, power distribution unit, transmission cable (30 m), and the model 3205 (120 MHz) antenna. The system was powered by a 12-volt vehicular battery.

The scanning time for all surveys was 60 nanoseconds (ns). This provided a probing depth of about 1.7 meters. However, moist soil conditions, moderate clay content, dominance of smectitic clays, and relatively high base status generally limited profiling to depths of less than 1.50 meters. The propagation velocity was an estimated 0.58 m/ns.

1. Use of trade names in this report is for identification purposes only and does not constitute endorsement by the authors or their institutions.

Discussion:

All site traverses with GPR were selected by Bob Clouse. On 14 May, two closely spaced 900 foot transects were conducted along the center line of a portion of the proposed access road. Stakes were inserted in the ground at 50 foot intervals and served as references. The transects were located in an area immediately east of Highway 169 and north of a bay to Mille Lacs Lake. The transects were in an area of Cushing soils (fine-loamy, mixed Glosolic Eutroboralfs).

After reviewing the radar profiles from the traverses conducted along the center line of the proposed access road, a 350 foot segment (lying between station 600 and 950) was selected for a more detailed analysis. This segment was selected on the basis of highly discontinuous soil horizons and clusters of subsurface anomalies. The designated segment was resurveyed using a three foot interval. The radar record was used to define the locations of several areas having disturbed soil conditions and subsurface anomalies. These areas were identified in the field by stakes inserted in the ground.

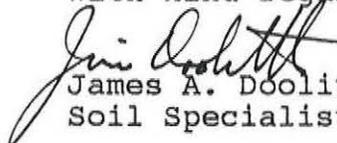
On May 15, a 540 foot transect was conducted along another portion of the proposed access road. This transect was located in an area of Cushing soils immediately west of Highway 169. Flags were inserted in the ground at 10 foot intervals and served as references. With the exception of two areas, the transected area was free of subsurface anomalies. The two areas were identified in the field with additional stakes. One area consisted of a large (45 by 12 foot), rectangular, subsurface feature. The feature is about 6 feet deep. This subsurface feature is believed to be artificial because of its shape, and abrupt, sloping boundaries.

Results:

Radar surveys were conducted in areas believed by archaeologists to have the highest probability of containing artifacts. Radar profiles revealed the location of several areas having disturbed soil conditions or subsurface anomalies. Archaeologists will later conduct traditional archaeological field examinations of all staked areas. The radar survey was successful as large areas were rapidly and continuously profiled. This survey helped to reduce field time and costs, and demonstrated SCS's commitment to historic preservation and conservation.

All radar profiles were turned over to Bob Clouse. It was my pleasure to be of assistance to your fine staff.

With kind regards.


James A. Doolittle
Soil Specialist

cc:

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