United States Department of Agriculture
Soil Conservation Service
Northeast NTC
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Subject: Trip Report of GPR Field Assistance; Pensacola, Florida, 17 - 20 September 1990

Date: October 2, 1989

To: Niles T. Glasgow
State Conservationist
USDA-Soil Conservation Service
Federal Building, Room 248
401 S.E. 1st Avenue
Gainesville, Florida 32601

File code: 430-13-7

Purpose:

To provide ground-penetrating radar field assistance and guidance to radar specialists in Florida.

Principal Participants:

Edward Cummings, Soil Specialist (GPR), SCS, Lake City, FL
Jim Doolittle, Soil Specialist (GPR), SCS, Chester, PA
Douglas Lewis, Soil Specialist (GPR), SCS, Sebring, FL
Andrew Williams, Soil Specialist (GPR), SCS, Pensacola, FL

Activities:

I arrived in Pensacola on 17 September 1990. Following a brief review of the planned activities for the week, the participants proceeded to the field to conduct GPR interpretative training and soil transects. Field studies were restricted primarily to the area around Molino. I returned to Chester, Pennsylvania, on the evening of September 20, 1990.

Observations and Comments:

The GPR field work and interpretative skills of Eddy Cummings and Doug Lewis are most impressive. Andrew Williams is enthusiastic and will shortly be a qualified GPR specialists.

This field assistance provided an opportunity for the discussion of new equipment available from the manufacturer, field techniques, and interpretations of radar imagery.

Specific accomplishments included:

1. Completion of fourteen transects for the soil survey of Escambia County.

2. Evaluation of GPR system components available in Escambia County. The SIR System-3 radar unit with a 300 MHz antenna appears to be a most adequate system to conduct the soil survey update in Escambia County. Compared with the 120 MHz antenna, the 300 MHz antenna provides shallower (though adequate for soil survey investigations) depths of penetration, but higher levels of resolution. Unfortunately the 300 MHz antenna produces low levels of background noise on graphic profiles. The background noise should not interfer with radar interpretations.

The Model 38 VDU color monitor provides a greater range in the gray scale than possible on the Model PR-8315 profiling recorder. However, its use for routine field work is discouraged as the color monitor will require additional time for calibration with no assurance of improved interpretations. The SIR-System 3 provides a hard copy radar profile needed for soil interpretations. I recommend that the use of the Model 38 VDU color monitor be restricted to demonstrations and detailed site investigations.

3. Developed interpretative skills needed to classify soils in Escambia County. The 300 MHz antenna was able to discern layers of lamellae, plinthite, and iron stones. Unfortunately, in most observed areas, the upper boundary of the argillic horizon was too gradational (gradual transition from loamy sands to sandy loam) to be discerned with either the 300 or 120 MHz antennas. This is unfortunate, as this layer is a diagnostic subsurface horizon used in the classification of soils. While the presence and depth to the argillic horizon was difficult to determine, variations in soil type can be accurately determined by changes in the gross signatures appearing on the radar's graphic profiles. Time was spent in the field developing these skills. Andrew Williams will need to spend more time ground-truthing his initial interpretations and observations. In addition, compared with peninsula Florida, a greater number of auger observations will be required on many transects to confirm soil types and features.

I benefited from and deeply enjoyed the opportunity to return to Florida and work with members of your fine staff. With kind regards.

James A. Doolittle
Soil Scientist (GPR)

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