



# Soil and Water Science

## Research Brief

University of Florida

Institute of Food and Agricultural Sciences

### SOIL, HYDROLOGY, AND CLIMATIC PARAMETERS ALONG A NONHYDRIC TO HYDRIC SOIL TRANSECT

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This project was established to monitor soil, hydrologic, and climatic parameters a nonhydryc-hydric transect. In addition to gathering data, it is used to teach methodology employed to collect data for hydric soil determination in accordance to standards of the National Technical Committee for Hydric Soils (NTCHS). Results will augment soil classification according to Soil Taxonomy will improve hydric soil standards established by NTCHS.

Four sites were instrumented at Austin Cary Memorial Forest (14 K northeast of Gainesville, FL) on the South Atlantic and Gulf Coastal Lowlands landscape. Flatwoods, constitute the dominant landform and are interspersed with the wetland landforms: flats and Depressions. Elevations and relative locations of the four sites along the transect are shown in Fig. 1. Elevation change is slightly more than one m and total transect length is 35 m. Alleged hydric soil boundary is approximately halfway between sites 2 and 3 at an elevation of about 45.8 m.

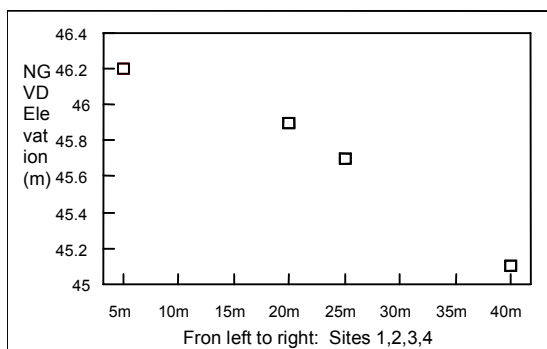


Fig. 1. Relative elevations and locations of sites 1 to 4 (left to right) along transect (vertical scale is exaggerated).

Site 1, the southernmost (driest) site, is within the flatwoods (Fig. 2). It has no hydric soil indicator. Seasonal saturation to a height of about 22 cm, as evidenced by the occurrence of a stripped matrix below that depth, is expected. Site 2 is at the edge of the flatwoods. It also has no hydric soil

indicator. A stripped matrix occurs at a depth of 16 cm and seasonal saturation is expected there.



Fig. 2. Upper soil profiles from Site 1 (left) and Site 2 (right).

Site 3 (Fig. 3, left) is on the flats landform. It has the Hydric Soil Indicators (Hurt, et al. 1998) A7 (2cm Mucky Mineral) and S7 (Dark Surface). Site 4 (fig. 3, right) is within the depression. It has multiple Hydric Soil Indicators: A9 (1cm Muck), A7, and S7.

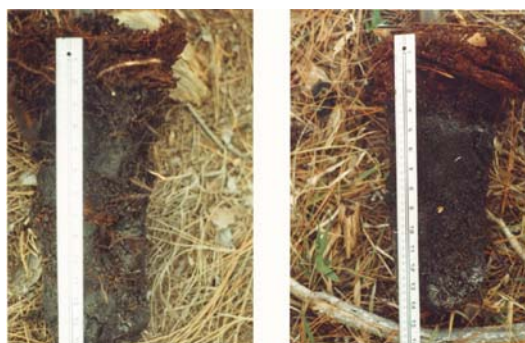


Fig.3. Upper soil profiles from Site 3 (left) and Site 4 (right).

At each site (Fig.4) the following were installed: a) two piezometers at a depth of 25 cm to determine if the NTCHS standard for hydric soil saturation is met and two piezometers at a depth of 100 cm to determine if the Soil Taxonomy (Soil Survey Staff.

1999) requirements for aquatic suborders/subgroups are met; one slotted PVC well at a depth of 2 meters to record local hydrology patterns; c) one thermocouple at a depth of 50 cm and one at a depth of 100 cm to determine temperature regime according to the current and proposed Soil Taxonomy requirements; and d) five platinum electrodes at a depth of 12.5 cm to determine if the NTCHS standard for reduction is met. The fence (Fig. 4) was added to minimize human and fauna traffic across the instrumented area.



Fig. 4. Overview of Sites 2 (front), 3 and 4 after instrumentation.



Fig. 5. Rain gage, solar panel, and datalogger (left to right).

Rain (Fig. 5, left) and air temperature recorders were also installed to coordinate rainfall data with hydrology data and air temperature with soil temperature. All instrumentation is connected to a control panel and from there to the datalogger (Fig. 5, right) that is powered by a 12-volt battery that is charged by a solar panel (Fig. 5, center).

Once all instrumentation was completed, all wiring was connected to multiplexers and from there to the datalogger. In order to open a communication line between the datalogger and the computer, programming was necessary.

A serial port (Fig. 6) on the datalogger is periodically connected to a laptop computer to download the data via an interface between the computer and the datalogger. The air temperature sensor and the KCL reference electrode are located beneath the control box. Ultimately, results will augment soil classification (Soil Survey Staff, 1999) and hydric soil standards (NTCHS, 2000).



Fig. 6. Data are downloaded from the datalogger to a laptop and imported into a spreadsheet.

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