

## ABSTRACT

Methods to Predict the Lateral Effect of a Drainage Ditch on Adjacent Wetland Hydrology.

Two methods were studied to predict the lateral effect of a drainage ditch on wetland hydrology – a field method based on threshold drainage conditions and an approximate method based on numerical solutions to the Boussinesq equation. Defined here, the lateral effect is the width of a strip of land adjacent to the ditch that is drained such that it will no longer satisfy wetland hydrologic criterion. Three years (2002 – 2004) of data were collected at field sites located at the Mildred Woods the ABC mitigation sites located in eastern North Carolina. Hourly water table depths were recorded along well transects perpendicular to one drainage ditch (1.2 m depth) at Mildred Woods, a shallow ditch (0.9 m) and a deep ditch (1.3 m) at the ABC site. Rainfall was recorded at each site and temperature data were collected from nearby weather stations. DRAINMOD simulations were performed for a 54-year period for each ditch to determine the threshold drain spacing, i.e. a spacing associated with water table fluctuations that would just barely satisfy the wetland hydrologic criterion in one half of the years. Next DRAINMOD was used with the threshold ditch spacing and depth along with recorded rainfall data for 2002-2004 to predict the maximum consecutive duration that the water table would be above the 30 cm depth for those specific years. Results of the two methods compared favorably. Based on the measured durations for each year the estimated lateral effect was 41 m for Mildred Woods and 42.6 m based on the approximate method. Similar results were obtained for the ABC deep ditch; 12 m and 14.1 m based on threshold drainage conditions and the approximate method, respectively. The approximate method predicted a lateral effect of 7.2 m for the shallow ABC ditch versus <3.8 m using the threshold method.