WATERBALANCE ON A FORESTED WATERSHED IN THE FLATWOODS*

by

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A waterbalance study was begun by the Wetland Improvement Project of the Southeastern Forest Experiment Station, U. S. Forest Service, Charleston, S. C., in March 1964 as part of a watershed management research program in flatwood forests of the Southeastern coastal plain. Hydrologic data from small forested watersheds in this area are very scarce. Results from this waterbalance study, therefore, will furnish valuable information on three segments of the hydrologic cycle--streamflow, evapotranspiration, and groundwater recharge. Each segment will fill particular needs in wetland water management, i.e.:

(1) Data on the amount and constancy of streamflow will aid in water resource allocation to domestic, industrial, agricultural, and wildlife uses. Also, bridges, culverts, and other water management structures can be designed with greater confidence that they will handle stormflows.

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(2) The water removed by forest vegetation (evapotranspiration) is a natural drainage loss from forested areas and account should be made of this water use in planning water management systems.

(3) Groundwater supplies can be managed more efficiently to facilitate the growth of forest vegetation and maintain an adequate water reserve.

The 400-acre study area is a small watershed representative of pine and branch hardwood flatwoods in the coastal plain, with a majority of the soils classified as very poorly to somewhat poorly drained. Its waterbalance is being evaluated by the equation:

$$P = RO + \Delta B + \Delta SM + ET$$

P = Precipitation

RO = Surface runoff

B = Ponding basin storage

SM = Soil moisture and water volume

ET = Evapotranspiration

All of the variables in the equation are being measured directly except evapotranspiration. Precipitation is measured in 5 standard U. S. Weather Bureau gages located systematically in and around the watershed. A modified Albany weir (300 CFS capacity) equipped with an analog-to-digital recorder measures stream discharge and ponding basin storage. Twenty-four soil stations are measured biweekly to provide data on groundwater storage in the watershed.

The waterbalance equation will be rearranged to solve for biweekly values of evapotranspiration which will be compiled by seasons and periods of differing moisture stress. Finally, the measured values will be compared to those computed by the methods of Thornthwaite and Penman and with U. S. Weather Bureau evaporation pan data to determine how well such estimates can be used for prediction.