

Tennessee Valley Authority  
Office of Natural Resources and Economic Development  
Division of Air and Water Resources  
Water Systems Development Branch

EFFECTS OF A RUNOFF EVENT ON  
NORMANDY RESERVOIR WATER QUALITY

Report No. WR28-1-86-102

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March 1984

ABSTRACT

17-2331

Water quality of a reservoir at stratification is governed by runoff from spring storms. Regularly scheduled surveys are unlikely to capture these transient inflows. An intensive sampling effort during a storm event in Normandy Reservoir ( $135 \times 10^6 \text{m}^3$  volume, 10 m mean depth) was made during April 1983. The purpose was to obtain estimates of suspended solids and nutrient loadings during the storm and to document subsequent water quality dynamics in Normandy Reservoir.

Influence of suspended solids on light attenuation and phosphorous adsorption was analyzed. Suspended solids linearly increased the light attenuation coefficient. Turbidity was also linearly proportional to the extinction coefficient. Turbidity was proportional to suspended solids. Settling of the suspended materials required more than one week. Sequential filtering allowed the particle size distribution to be determined. Settling followed Stokes law estimates, with particles less than  $4 \mu\text{m}$  remaining in suspension much longer than larger sizes. Detritus loading was significant and contributed to sediment oxygen demand. A depression in alkalinity (35 mg/L to 10 mg/L) and pH (7.5 to 6.5) was observed during the peak inflow.

Nitrogen loads were predominantly organic and very little increase in nitrate occurred in the reservoir. High concentrations of total phosphorous apparently settled with suspended solids. Dissolved phosphorus concentrations were increased somewhat, but not all the inflowing dissolved phosphorus remained in the reservoir. Implications for reservoir water quality surveys, nutrient loading estimates, and reservoir water quality models are discussed.