RELATION OF INDIVIDUAL TREE CONDITION TO DEGREE OF SITE ABUSE BY HUMANS ON A FORESTED RECREATION AREA

BY

BENJAMIN VINCENT HARRISON IV

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ABSTRACT

An attempt was made to quantitatively describe four degrees of recreational abuse based on tree characteristics and soil properties under white pines, scarlet, black and white oaks. Abuse categories were heavy, moderate, light and no abuse (control). Tree characteristics measured were age, height, diameter, basal area stocking, extent of wounding, radial growth, root biomass, and root starch content, while soil properties measured were penetration resistance, bulk density, and organic carbon content. Neutron thermalization technique was used to monitor soil moisture regimes under heavily abused and control trees.

Soil compaction was greater under heavily and moderately abused trees and soil organic carbon was less under heavily abused trees when compared to control trees. Heavily and moderately abused trees received more wounding and appeared to have less healthy crowns than control trees. However, no differences in radial growth and root starch content, the best indicators of tree condition, were detected between abuse classes. Differences between abuse classes described by soil and some tree characteristics do not seem to accurately reflect tree condition. What disadvantages heavily and moderately abused sites offer trees seem to be compensated for by less competition from other vegetation.

Soil moisture monitored for the surface 1.5 meters of profile under heavily abused and control trees depicted similar patterns of accretion and depletion. Soil moisture in the upper 30 centimeters of soil under heavily abused trees was consistently higher than under control trees; although differences were not significant. More intense rooting activity under control trees was suspected to be the reason for the measured differences.

Trees clustered into four abuse classes when using site condition variables. When tree condition variables were used with site condition variables, heavy and moderate abuse class trees formed one class and light abuse and control class trees formed another class.