

# Borrowed Topsoil Properties As Affected By The Topsoil Definition Used In Salvaging Soil Material.

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## Abstract:

Increasing urbanization leads to a growing demand for topsoil for landscaping purposes. Current guidelines for borrowed topsoil for such purposes define topsoil as the surface layer of native soil, or soil A horizon, a definition that may be too conservative, resulting in limited use of available resources. Because soil texture affects important physical and hydrological soil properties, we initiate a study to evaluate how the use of different topsoil definitions affects the texture of the resulting salvaged material. The National Soil Characterization Database (USDA-NSSC, Lincoln NE) was used to calculate properties of A (Am) and E master horizons (reconstructed from their respective sub layers), followed by calculating the effects of mixing A and E master horizons to form a hypothetical AE soil. Selected properties were then compared among Am, AE, and soil upper A, and/or Ap surface layers (ASL, and APL, respectively). The resulting dataset included 7747, 4173, 3939, and 965 pedons of Am, ASL, APL and AE-mixed topsoils, respectively, from the 48 contiguous states and all but Histosol, Andisol, and Oxisol soil orders. Overall average topsoil (Am, AE, ASL and APL) had a loamy texture with 39, 42, and 19 % sand, silt, and clay, respectively; 2.0 % organic-C (OC), cation exchange capacity (CEC) of 18.3 cmolc kg<sup>-1</sup>, and pH of 6.0. Significant differences were observed among the distinct topsoils, with average topsoil depth decreasing in the order: AE > Am > APL > ASL; with sand content decreasing in the order: ASL > AE > Am > APL; clay decreasing in the order: APL > Am > ASL > AE; and OC decreasing in the order: ALS > Am > APL > AE. The calculated effect of mixing A and E master horizons compared to using only Am was an increase in excavation depth of 250% with only minor adverse effects on the resulting texture. Based on clay frequency distributions it is apparent that mixing A and E horizons did not increase the probability, or risk, of AE having a higher clay content than its Am counterpart. The mixing resulted in an average reduction of 38% of OC in AE compared to Am alone. But because addition of organic matter to borrowed soil material is an already recommended and common practice, this should be of minor concern. Based on this simulation we conclude that excavating and mixing A and E horizons for use as topsoil for landscaping purposes will have only minor adverse effects on the resulting texture. Hence, this study supports adoption by the landscaping industry of the U.S. Surface Mining Control and Reclamation Act definition for topsoil (i.e. Topsoil means the A and E soil horizon layers of the four master soil horizons, 30 CFR 701.5) to assure maximum utilization of salvaged soil material as topsoil.

Keywords: topsoil, borrowed soil, landscaping, soil horizon, soil texture

Topic: B. Impacts of urbanization on soil resources

Sub-topic: B6. Physical aspects of urban soil changes

Presentation type: Poster

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