USDA

United States Department of Agriculture

Some Notes on Estimating SOC Stocks

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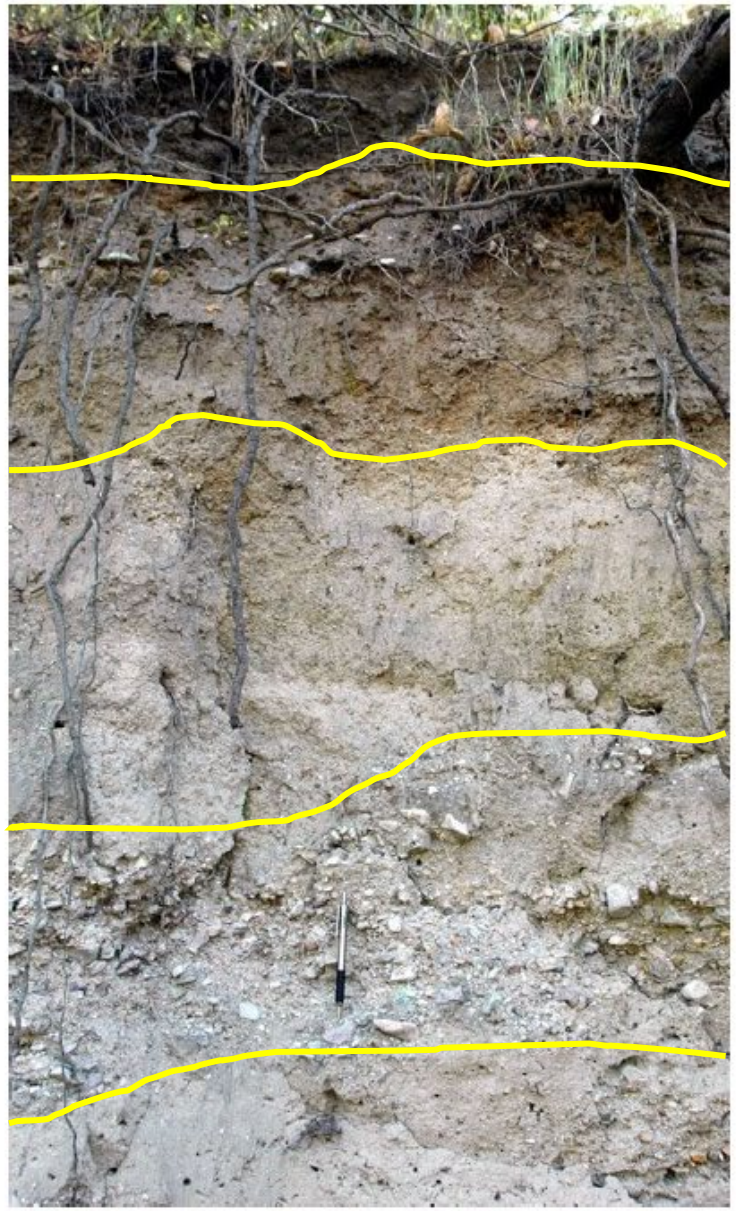
Natural Resources Conservation Service

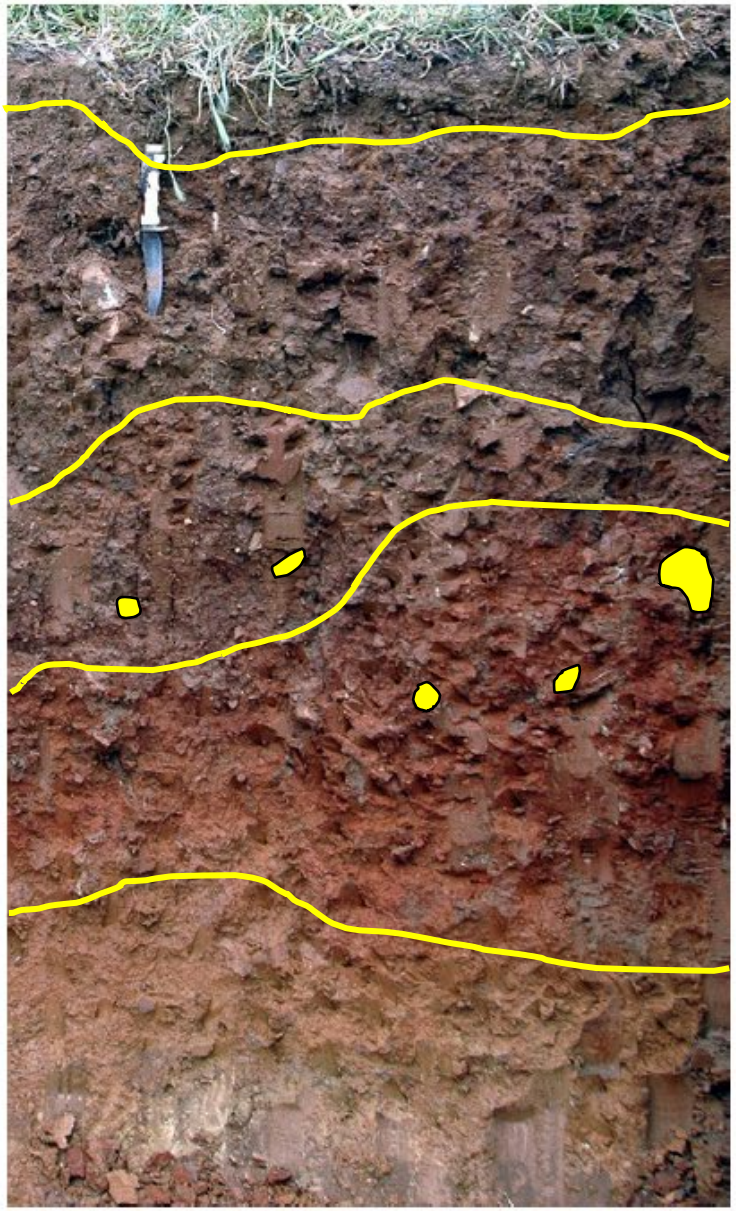
nrcs.usda.gov/

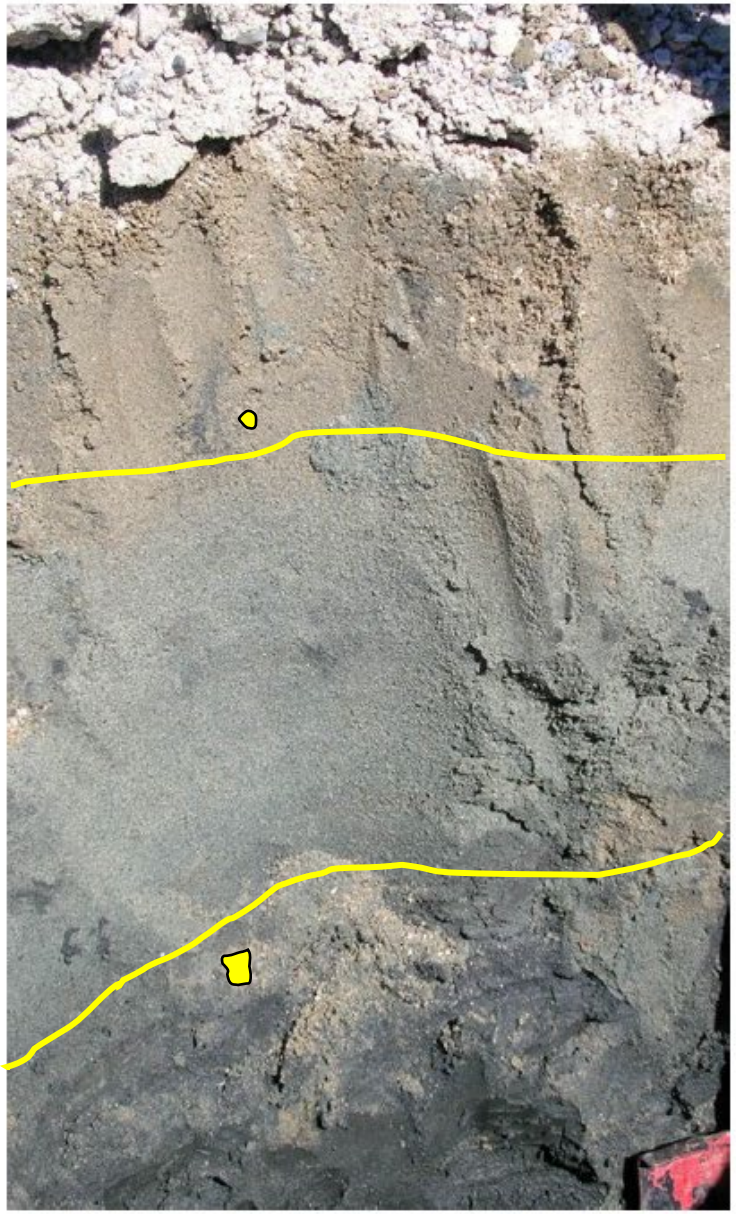
Soil Profiles

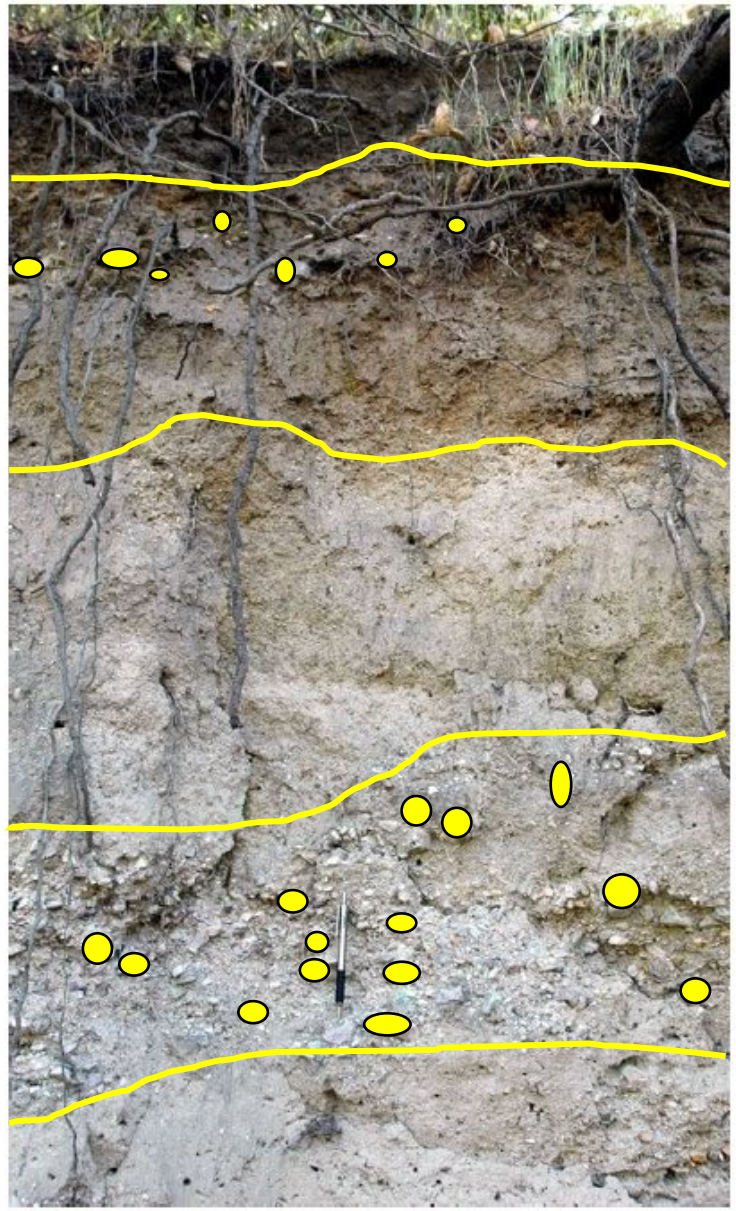
(Genetic) Soil Horizons



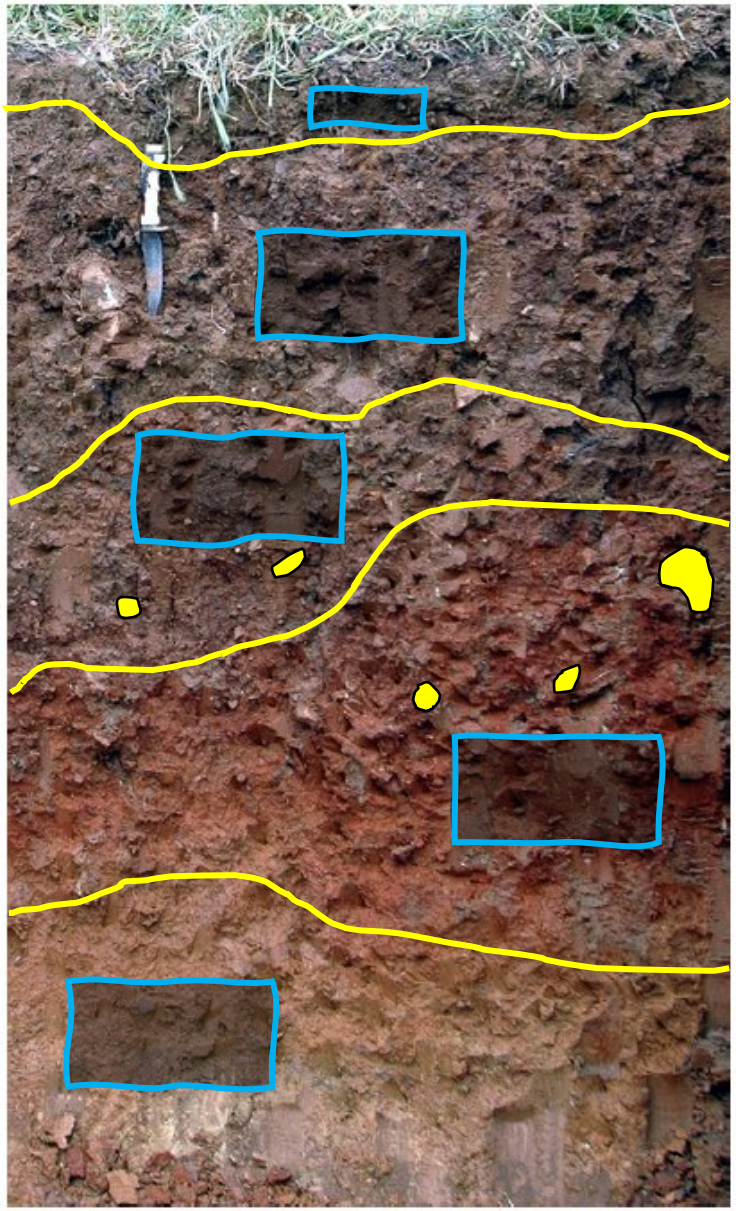
Coarse Fragment Volume

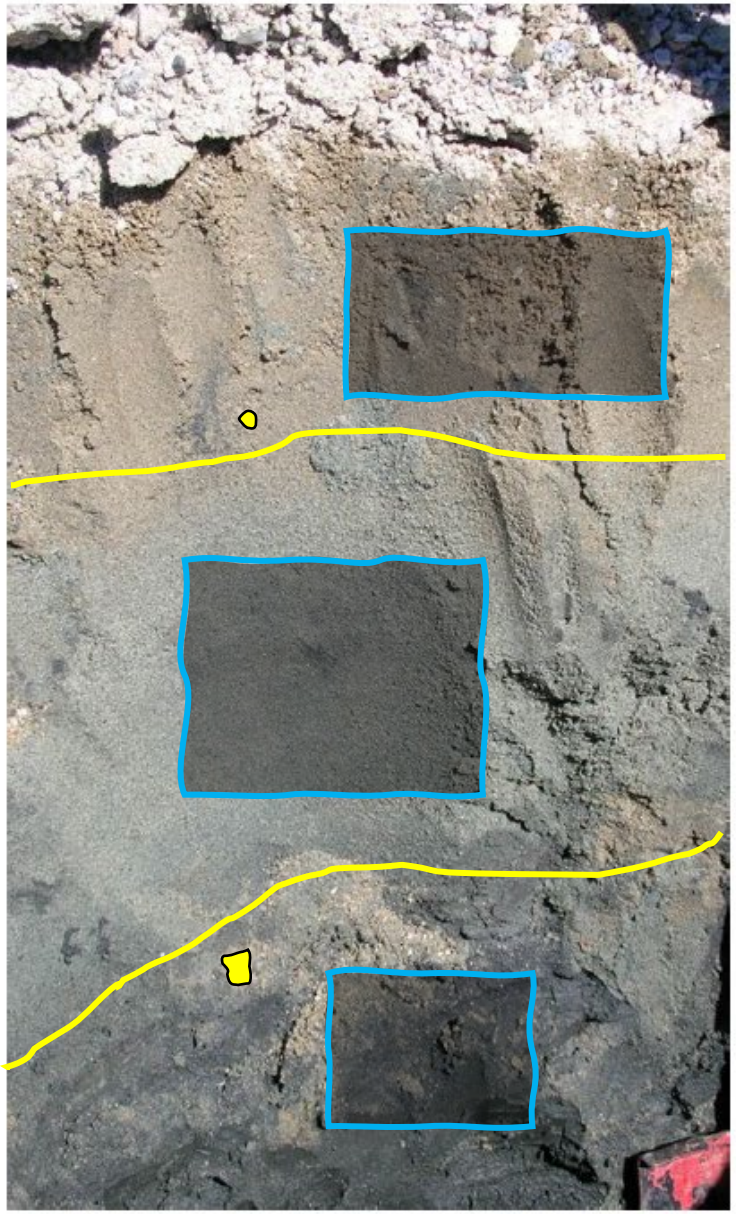


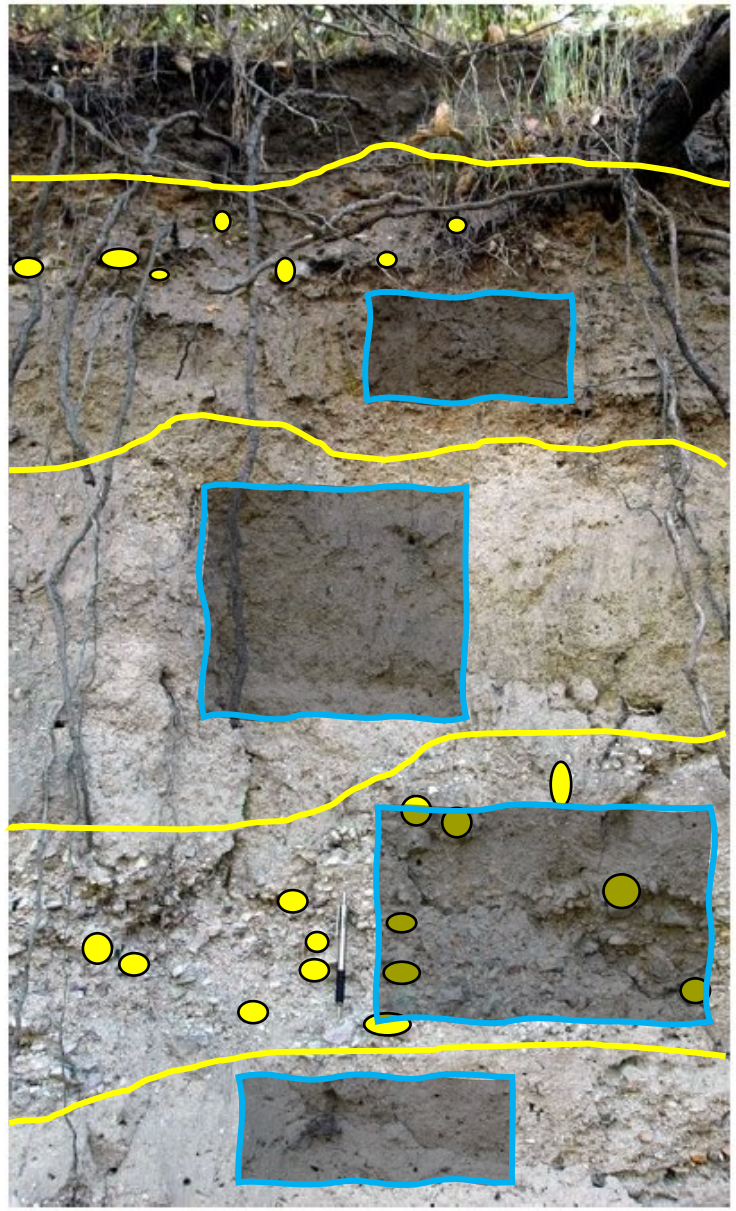




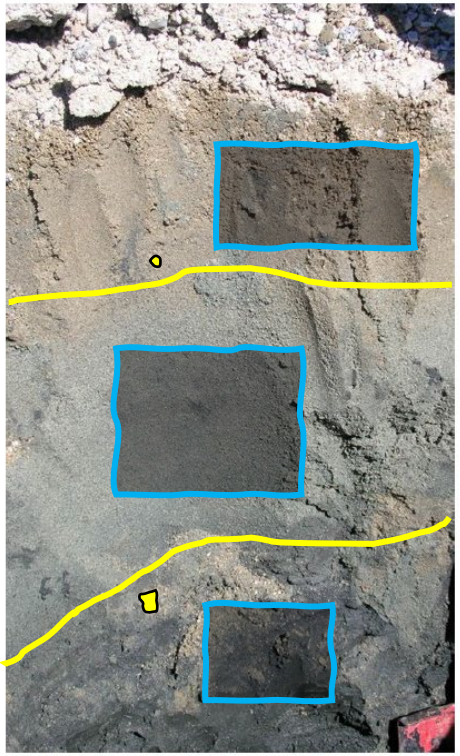
Soil Samples / Bulk Density Estimation

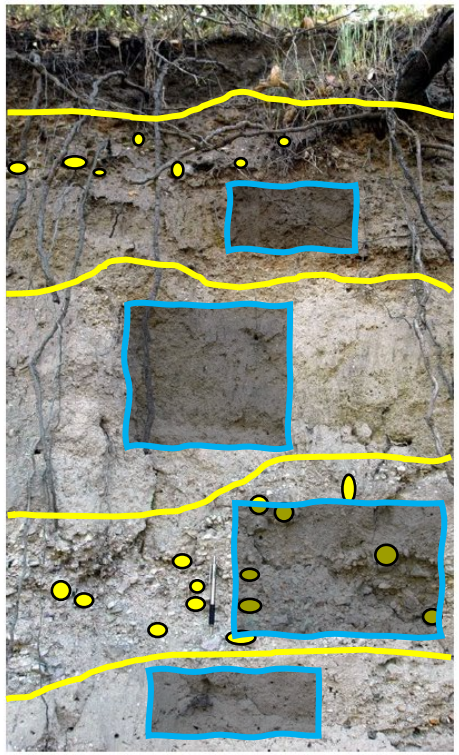






SOC Stock Estimation

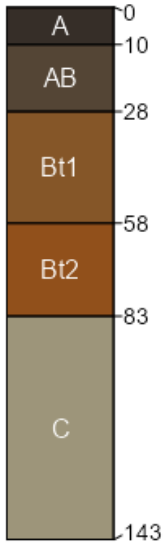




$$SOC_{stock} = \sum soc * z * (1 - cf) * Db * 10$$

$$\begin{bmatrix}0.042\\0.025\\0.013\\0.006\\0.001\\\dots\end{bmatrix} \quad \begin{bmatrix}10\\18\\30\\25\\60\\\dots\end{bmatrix} \quad \begin{bmatrix}0.05\\0.08\\0.15\\0.18\\0.02\\\dots\end{bmatrix} \quad \begin{bmatrix}1.33\\1.38\\1.42\\1.45\\1.52\\\dots\end{bmatrix}$$

$18.4\ {}^{kg}/_{m^2}$



Field Operations

1. determine horizon depths
2. determine horizon thickness
3. estimate rock fragment volume
4. measure bulk density
5. sample soil material for lab determination of organic carbon mass fraction

Critical Soil Properties

- **soc**: soil organic carbon, mass fraction
- **z**: horizon thickness (cm)
- **cf**: >2mm fragments, volume fraction
- **Db**: bulk density $\left({}^{g}/_{cm^3}\right)$
- **10**: conversion factor $\left(\frac{{}^{kg}/_{g}}{{}^{m^2}/_{cm^2}}\right)$