Unit 4 Pre-Work: Soil Organic Matter and Soil Mapping

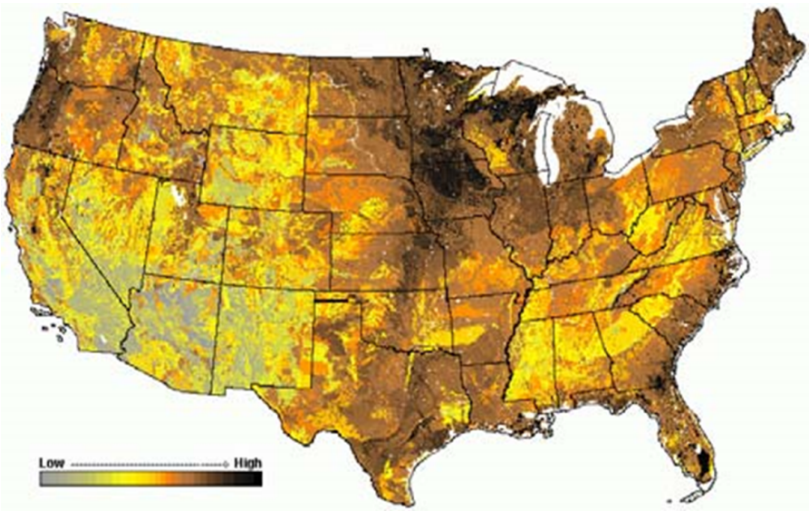
1) Read the Introduction of Soil Organic Matter and define SOM, describing its role in supporting plant growth. (A full credit answer will provide a definition and at least three important roles/functions of SOM.) (3 pts)

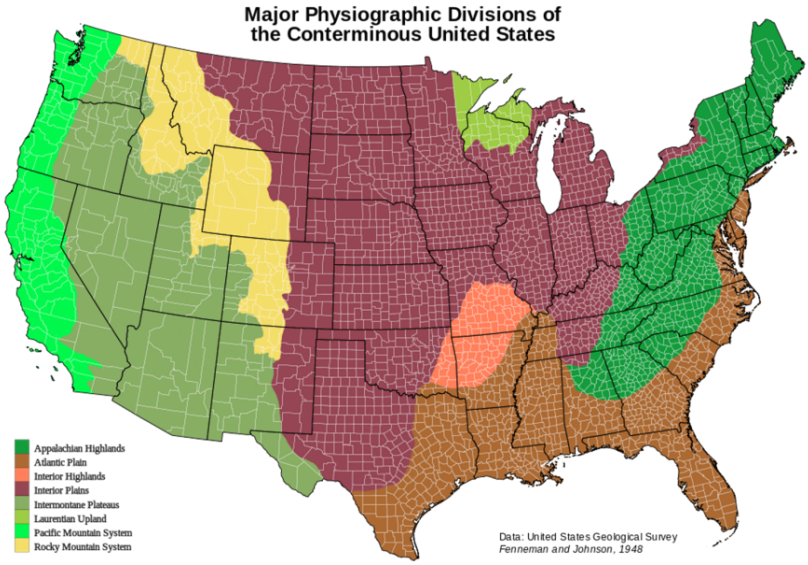
2) Compare the figures below showing the relative amounts of soil organic matter and the major physiographic regions in the United States.

a. Does the amount of soil organic matter generally relate to physiographic region? (A full credit answer will describe similarities or differences between at least three regions on the maps.) (3 pts)

b. Based on the reading, what are the two controls on the amount of SOM? How might these controls relate to physiographic regions? (A full credit answer will discuss two agents that impact the amount of SOM in the soil and relate these agents to physiographic regions.) (3 pts)

Soil Organic Matter (From Hargrove and Luxmore, 1988)





3) Soils are mapped at distinct spatial scales. Soil scientists interpolate, or approximate, boundaries between soil units (pedons). The resolution of a soil study is known as the order of the soil survey. The scale of each order is given in hectares (ha). One ha is equivalent to an area of 100 m X 100 m (10,000 m^2). Soils are classified by identifying soil properties at depth. These are characterized by examining physical (e.g. texture, color) and chemical properties (e.g. SOM) to a depth of <2 meters.

National soils are mapped by soil scientists and provided through STATSGO (State Soil Geographic database) and SSURGO (Soil Survey Geographic database). STATSGO surveys represent a 1:250,000 scale. SSURGO surveys are more detailed with a scale of 1:24,000 or less. Note that STATSGO surveys represent ~2.5 soil sample sites per 10 ha, and SSURGO scale represents ~2.5 soil sample sites per ha.

Based on the table below, what planning activities/management decisions might the STATSGO and SSURGO soil surveys assist with? (2 pts)

STATSGO:

SSURGO:

What activities might require even more detailed sampling than that which is available through SSURGO? (1 pt)

Order of soil survey (Soil Survey Staff, 1993).

Order of soil survey	Minimum size of delineation hectares [ha]
First order: very intensive - experimental plots, building sites	1 or less
Second order: intensive - general agriculture, urban planning	0.6 - 4
Third order: extensive - range land, community planning	1.6 - 16
Fourth order: extensive - for broad land use potential and general land management	16 - 252
Fifth order: very extensive	252 - 4000

References:

Figure 1: Hargrove, W.W. and R.J. Luxmore. 1988. Soil organic matter content across the United States, From: A New High-Resolution National Map of Vegetation Ecoregions Produced Empirically Using Multivariate Spatial Clustering, released to the USDA, public domain. (http://proceedings.esri.com/library/userconf/proc98/proceed/TO350/PAP333/P333.HTM)

Figure 2: http://commons.wikimedia.org/wiki/File:US_Conterminous_48_Physiographic_Divisions_v1.svg The major physiographic divisions of the 48 conterminous United States. Map based on public domain data from the USGS (http://water.usgs.gov/GI) Creative Commons Attribution 3.0 Unported.

Table 1: Order of soil survey. Soil Survey Staff. 1993. *Soil Survey Manual* 18, US Government, Printing Office, Washington, D.C.