**Things to know:**



**Available water capacity** is the volume of water that should be available to plants if the soil, inclusive of fragments, were at field capacity. It is commonly estimated as the amount of water held between field capacity and wilting point, with corrections for salinity, fragments, and rooting depth. Available water capacity is an important soil property in developing water budgets, predicting droughtiness, designing and operating irrigation systems, designing drainage systems, protecting water resources, and predicting yields.

Example to figure AWC.

Elliott soil had a rooting depth to 60 inches. What is the AWC 0 to 60 inches?

Horizon horizon depth (inches) texture AWC (in/in of the soil)

A1 0-10 sil .23 .23x10=2.3

A2 10-14 sicl .22 .22x4=.88

Bt1 14-30 sic .12 .12x16=1.92

Bt2 30-36 sicl .19 .19x6=1.14

C 36-60 sicl .19 .19x24=4.56

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 10.8 inches

**Saturated hydraulic conductivity** (old term-permeability) is the ease with which pores of a saturated soil transmit water. Formally, it is the proportionality coefficient that expresses the relationship of the rate of water movement to hydraulic gradient in Darcy's Law (a law that describes the rate of water movement through porous media). It is expressed in micrometers per second. To convert micrometers per second to inches per hour, multiply micrometers per second by 0.1417. The historical definition of “saturated hydraulic conductivity” is the amount of water that would move vertically through a unit area of saturated soil in unit time under unit hydraulic gradient. Saturated hydraulic conductivity is used in soil interpretations. It is also known as Ksat. The soil properties that affect saturated hydraulic conductivity are distribution, continuity, size, and shape of pores. Since the pore geometry of a soil is not readily observable or measurable, observable properties related to pore geometry are used to make estimates of saturated hydraulic conductivity. These properties are texture, structure, pore size, density, organic matter content, and mineralogy.

**Landform information**

Some common landforms in eastern CO:

Fluvial: floodplain, floodplain step, stream terrace, drainageway

Eolian: dune, sand sheet, blowout

Slope: interfluves, hillslope, mountain slope

Erosional: pediment

Depressional: playa, closed depression, drainageway

Some common Landscapes in eastern CO: plains, mountains

**Aspect**: direction toward which a slope faces with respect to the compass or the rays of the sun (south facing/ north facing)

**Bulk Density**

Mass of dry soil (g) – Mass of Rocks (g) Volume of dry soil (mL)–Volume of Rocks (mL)

= Bulk Density (g/mL or g/cm3)

 For a pipe, the volume of the pipe will have to be determined using the equation:

Volume of a pipe = Pi x r2 x h x 1 mL/1 cm3 Where:

Pi is the mathematical constant approximately equal to 3.141592654

r is the radius of the base of the pipe (cm) h is the height of the pipe (cm)

If the bulk density for a soil sample is <1.0, it has a very low density and may have a high organic matter content. In order to identify organic matter, look for a dark color and the presence of roots. Many times, soil horizons on the surface are high in organic matter. If the bulk density for a soil sample is near 2.0 or greater, it is a very dense soil. Soils become dense if they have been compacted and do not have a high organic matter content. This is common in surface soils on which people walk or where machinery has compressed the soil. Soils with massive or single grained structure will have higher densities than soils with granular or blocky structure. The texture of the soil can also affect the bulk density. In general, sandy soils have a higher bulk density than clayey or silty soils, because the porosity is lower although the size of the pores is larger in sandy soils.

**Hydric soil characteristics**: 1.Blue/green/gray color 2.Anaerobic conditions (water table) 3.Frequent flooding 4.Redoximorphic features 5.Prooly drained

**A pH of 9** and higher may indicate high sodium in the soil. Gypsum (calcium) or draining the soil may lower pH.

**Worms** need organic matter (surface plant residue), nitrogen, moisture

**Three types of wind erosion**: saltation, suspension, creep.

**Three stages of soil erosion** are dislodgement, transportation, and sedimentation.

**Healthy soil performs**: nutrient cycling, water filtering, increases biodiversity, stability.

**Review slides 7, 9, 10, 11, 17, 21, and 42 on the Intro to Soils 2017lc.pptx power point**