Soils

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What is Soil?

- The loose material covering the mantle (rock) of the earth
- The medium for plant growth
- The unconsolidated material at the surface of the earth that consists of solids, liquids, and gases
Why Interested

• for growing crops
• for buildings
• for roads
• for playgrounds
How is soil formed?
Soil Formation Involves

- Parent Material
- Climate
- Topography
- Vegetation
- Organisms
- Time
- Humans
When we want to know something about soil in our area

- Check a soil survey report
How do we describe soils


Horizons

• Mineral soils

• Organic soils
Mineral Soils

Master horizons

- A
- B
- C
- R
- W
Mineral Soils

Suffix

e f
g h
m p
t
Major Soils in PEI

- Podzolic
- Brunisolic
- Gleysolic
- Luvisolic
- Organic
- Regosolic
Soil Texture (< 2 mm)

- Sand = .02 to 2 mm
- Silt = .02 to .002 mm
- Clay = < .002 mm
Soil Structure

- Granular
- Platy
- Blocky
- Columnar
- Structureless
Soil organic matter

• how do you recognize it: darker color
• why important: amends other soil properties, food source for soil organisms, nutrient source for plants, holds water and nutrients
• how do you change it: addition to soil thru manure, cover crops, green manure crops, management (increase crops such as forages in the rotation)
Other soil properties

- Soil compaction or bulk density
- Infiltration
- Water holding capacity
Bulk Density

- Mass over volume
- Related to amount of pore space
- In general the higher the density the less pore space, lower hydraulic conductivity, lower water infiltration rate and less water holding capacity
Infiltration

- water entering the soil
- other related parameters: permeability, hydraulic conductivity
Water Holding Capacity

- Related to bulk density, soil texture, soil structure, organic matter content
- Very important to crop growth depending upon climate
- Available water is not all that is in the soil (determined by amount at various tensions)
FIGURE 3  RELATIONSHIP BETWEEN THE FIELD CAPACITY, WILTING POINT, AVAILABLE WATER, AND UNAVAILABLE WATER TO SOIL TEXTURE

Source: Water Relations of Plants, Kramer, 1983
Interpretations

• agriculture
• non agriculture
Agriculture - CLI

• references:
  pages 89-92 of Soils of Prince Edward Island and
• 7 classes
• only 5 on PEI
• class 2 to 4 – arable farming
• class 5 – grazing
• class 7 – non agriculture
Classes

- **Class 1** Soils in this class have no significant limitations in use for crops.
- **Class 2** Soils in this class have moderate limitations that restrict the range of crops or require moderate conservation practices.
- **Class 3** Soils in this class have moderately severe limitations that restrict the range of crops or require special conservation practices.
- **Class 4** Soils in this class have severe limitations that restrict the range of crops or require special conservation practices.
- **Class 5** Soils in this class gave very severe limitations that restrict their capability in producing perennial forage crops, and improvement practices are feasible.
- **Class 6** Soils in this class are capable only of producing perennial forage crops, and improvement practices are not feasible.
- **Class 7** Soils in this class have no capacity for arable culture or permanent pasture.
SUB CLASSES

- **C** Adverse climate
- **D** Undesirable soils structure and/or low permeability
- **E** Erosion
- **F** Low fertility
- **I** Inundation by streams or lakes
- **M** Moisture limitations
- **N** Salinity
- **P** Stoniness
- **R** Consolidated bedrock
- **S** Combination of subclasses
- **T** Topography
- **W** Excess water
- **X** This Subclass is comprised of soils having a limitation resulting from the cumulative effect of two or more adverse characteristics
Non Agriculture

- reference pages 136 to 140 of Soils of Prince Edward Island
- guidelines for septic fields, housing, recreation, etc.
- guidelines are subject to change as technology changes and more information becomes available