Brimfield and Brookfield - Post Active Acid Sulfate Soils

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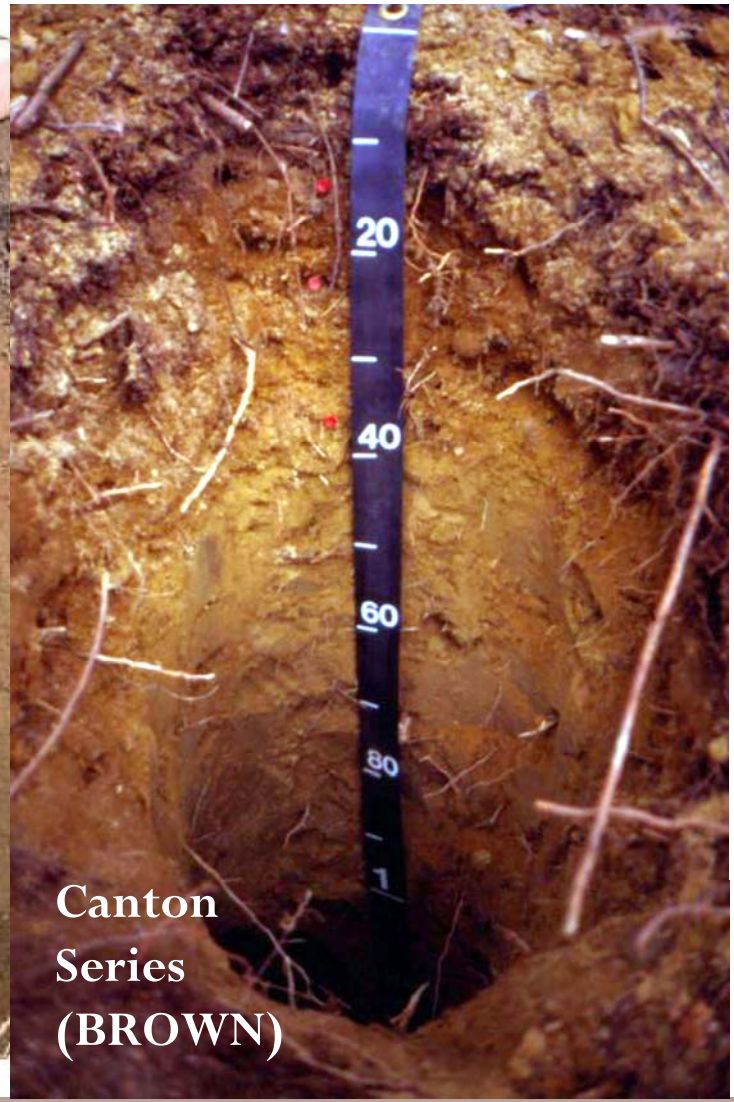
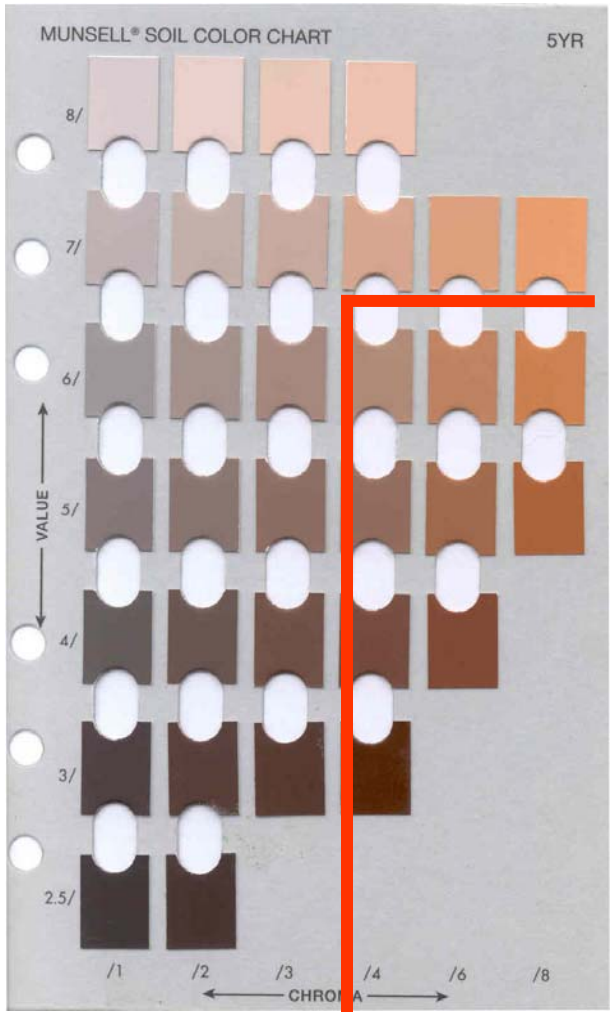
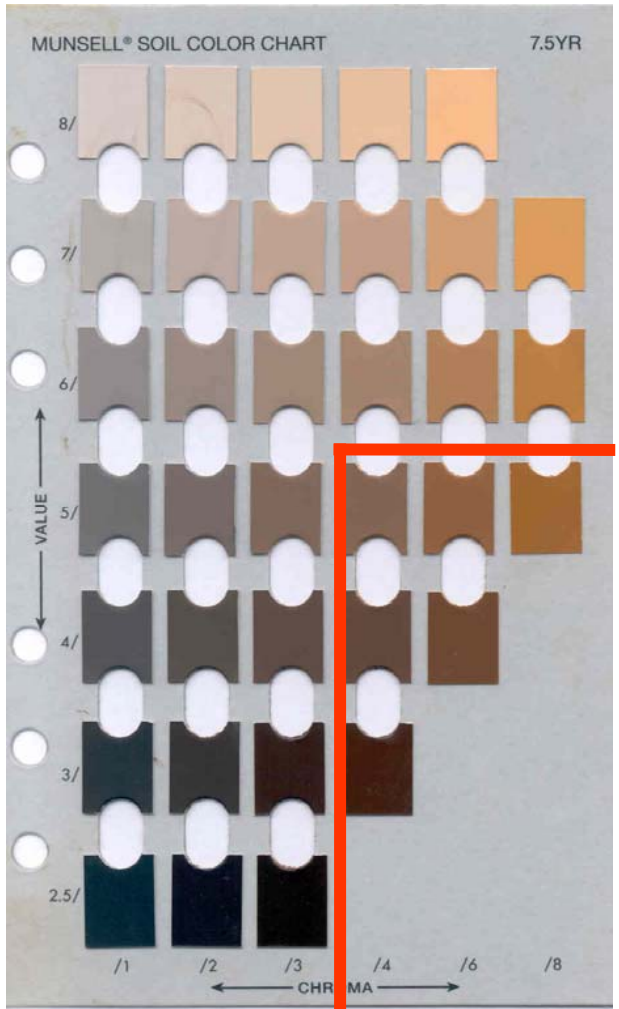
Background

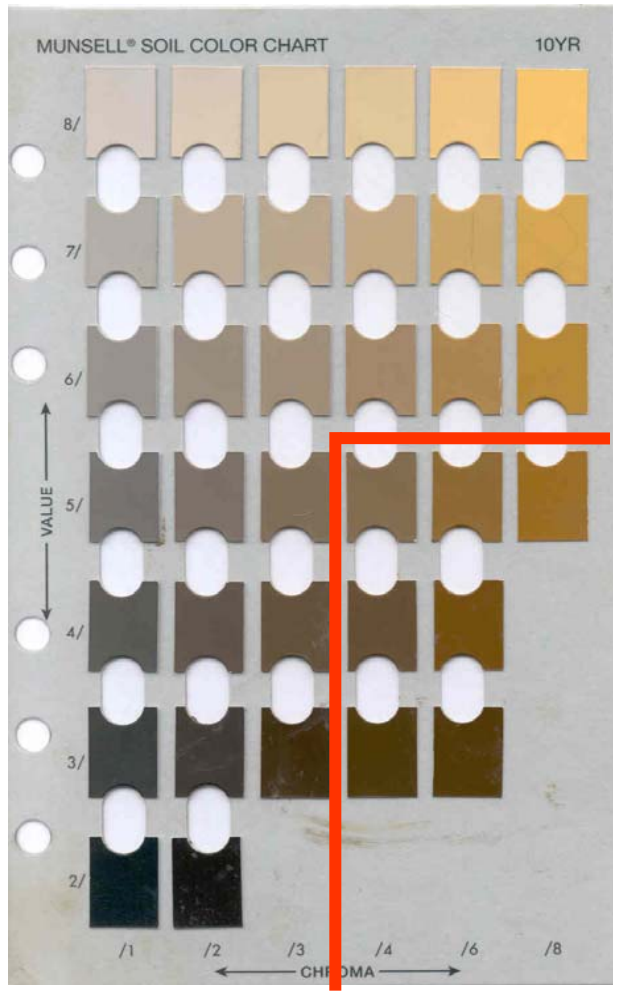


Background (continued)

The upper part of the Bw horizon has hue of 2.5YR or 5YR, value of 3 to 6 and chroma of 4 to 8. The lower part of the B horizon has hue of 5YR to 10YR, value of 4 or 5 and chroma of 4 to 8.







Background

FeO

(Amorphous Iron)

$$Fe_2O_3 + X\,H_2O$$

(Recrystallized Iron)

Background

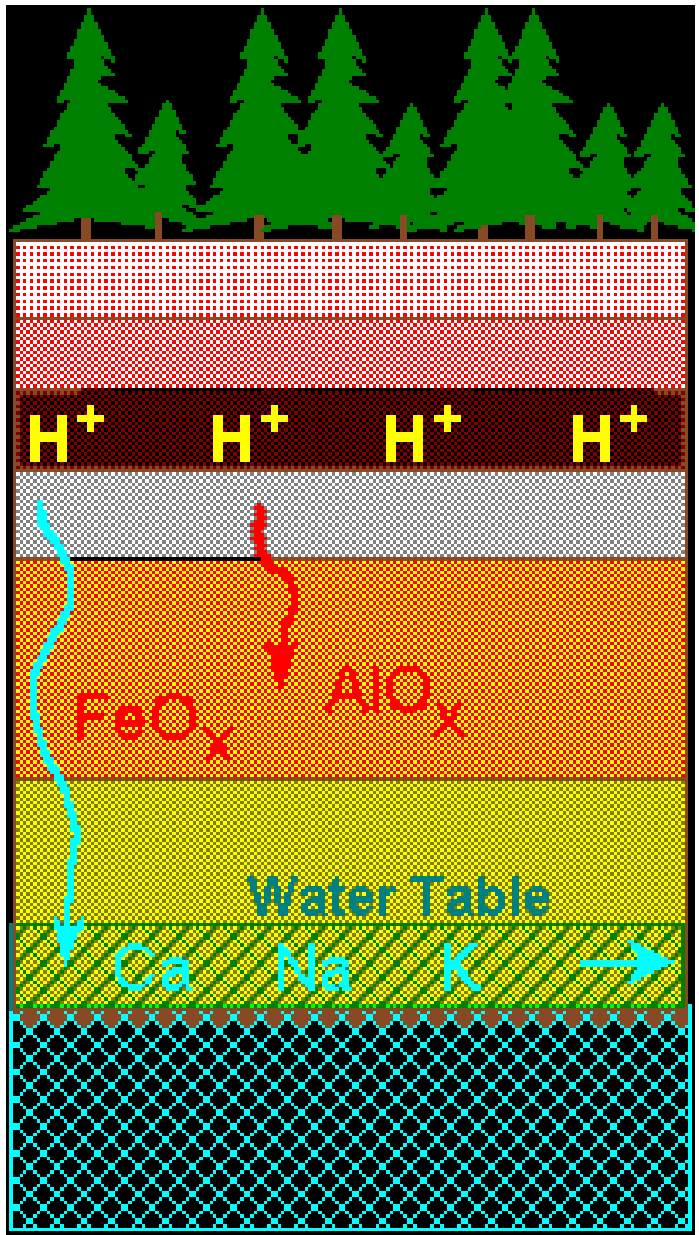
- **Dithionite-citrate extractable iron (Fe_d)**
  - Measure of crystalline or "free iron"
  - Pedogenically significant
    - ✓ increasing concentration with increasing weathering and effect on soil colors *(Schwertmann, 1992)*
  - Used as a criterion in the ferritic and parasesquic mineralogy classes of *Soil Taxonomy*

Background

- **Ammonium oxalate extractable iron (Fe_o)**
  - Measure of noncrystalline iron (amorphous or poorly crystalline)
  - Notable properties include high variable charge, high surface area, high anion retention, high water retention, low bulk density
  - Used as a criterion for spodic materials and andic soil properties in *Soil Taxonomy*

Background (continued)

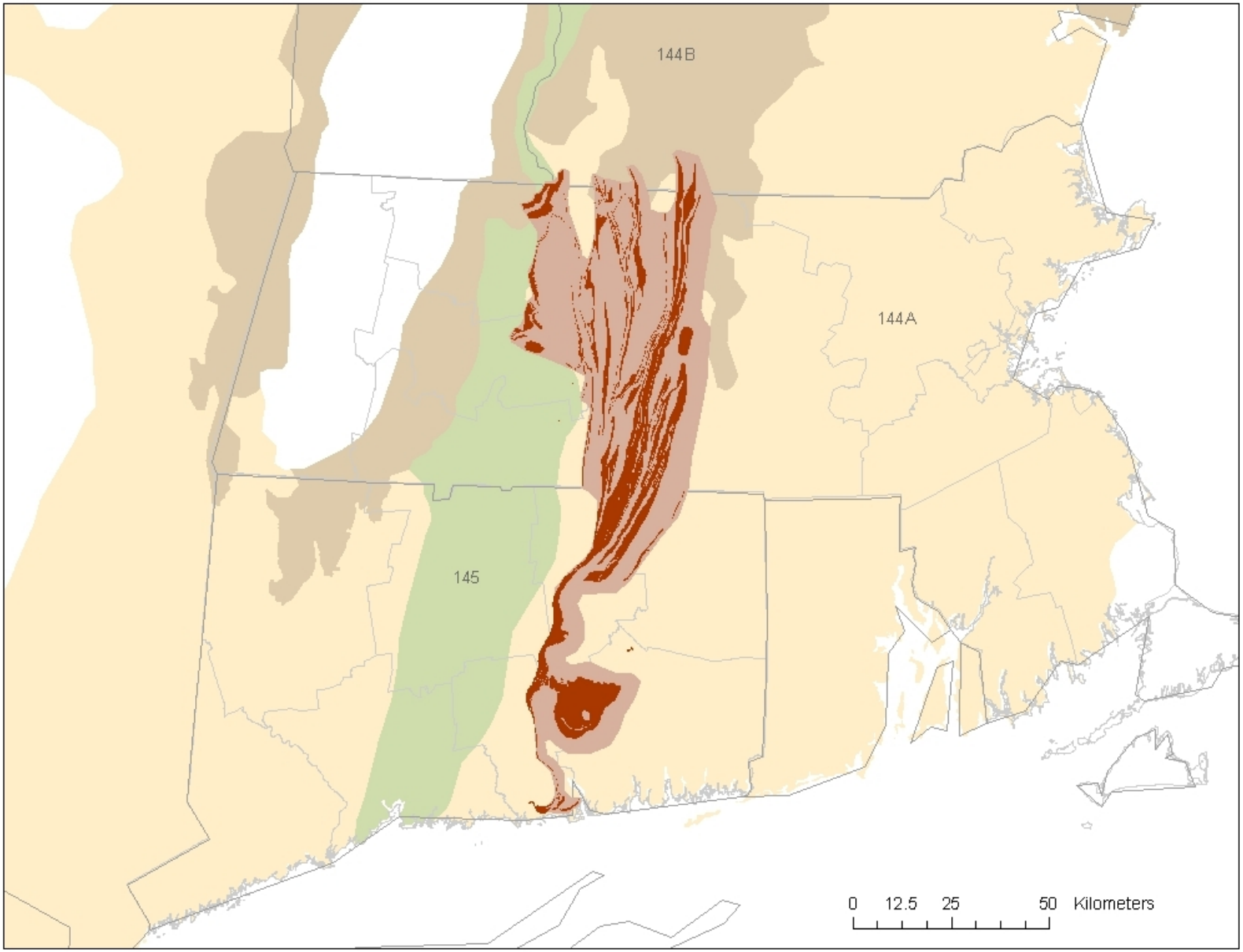
Using ratio of iron extracts provides a potential measurement of podzolization and weathering



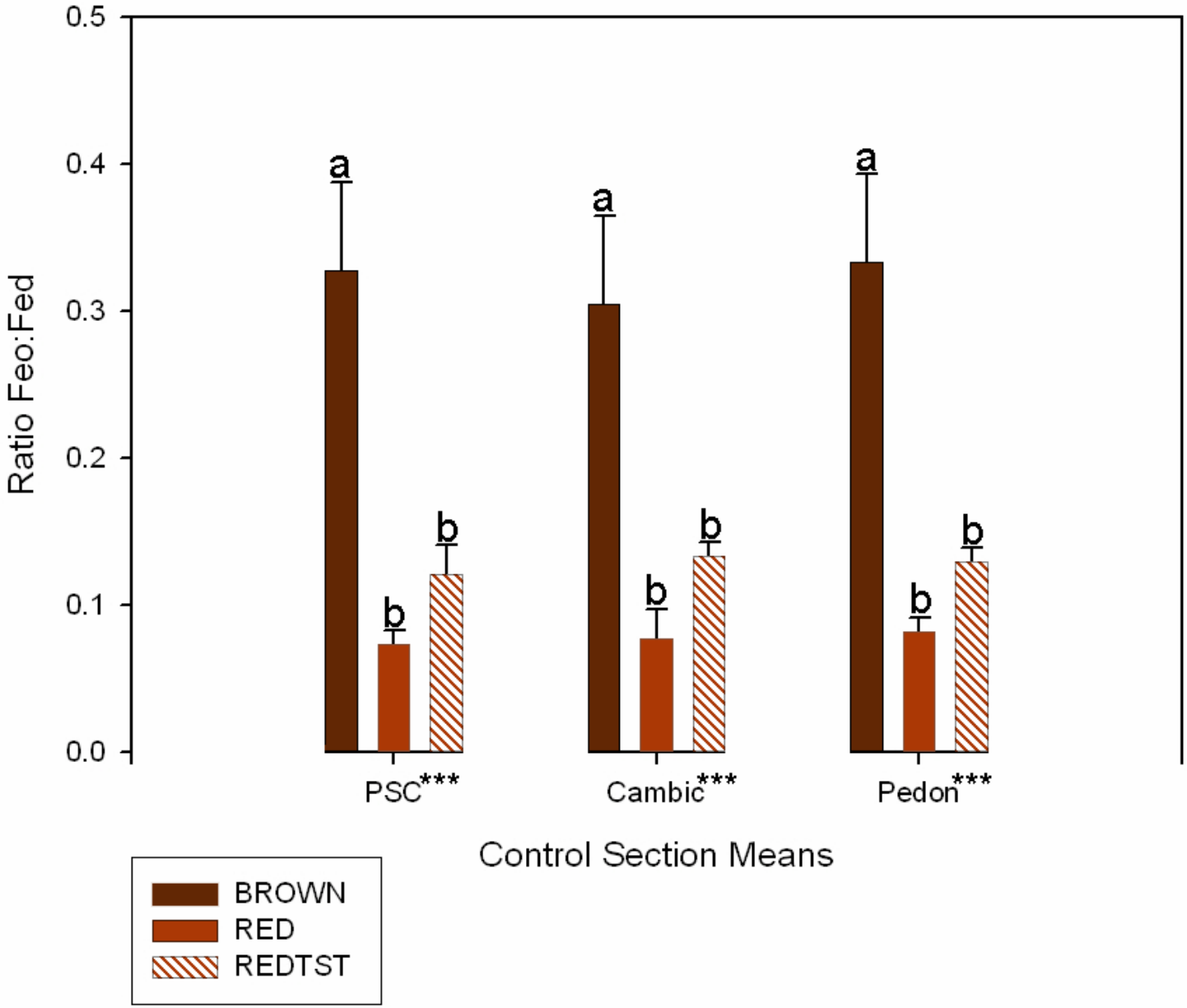
Background

Are these soils significantly different?

Methods



Results


0.5
0.4
0.3
0.2
0.1
0.0
Ratio Feo:Fed
a
b
b
a
b
b
a
b
b
PSC***
Cambic***
Pedon***
Control Section Means
BROWN
RED
REDTST

Results (continued)

Conclusions and Applications

- Brookfield and Brimfield soils are distinctly different from competitors
- Brookfield and Brimfield soils are under represented in the region
- Connecticut Valley soils own their red color for different reasons

Conclusions and Applications (continued)

- New moderately deep series (Nipmuck proposed) warranted for high sulfur parent materials
- Hypothesized that Brookfield and Brimfield soils are PAAS as evidenced by soil properties

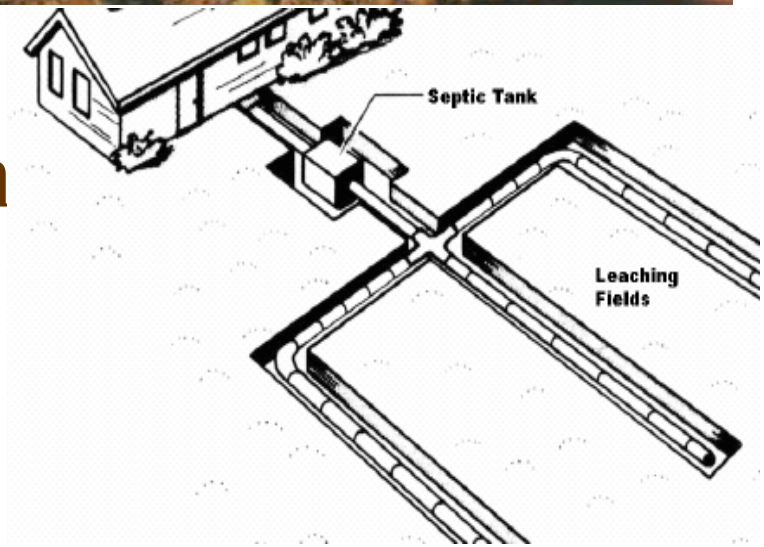
Phases of Acid Sulfate Soils

- Potential
- Active
- Post Active (Fossil)

Conclusions and Applications (continued)

- Aggregate stability

- Phosphorous retention



Conclusions and Applications (continued)

- Water quality

Conclusions and Applications (continued)

- Community development and excavation for roads

Conclusions and Applications (continued)

Concrete etching

Vegetating the surface does not stop sub-surface weathering