

## Redoximorphic Features

- New term replacing soil mottling
- Soil color patterns in the soil resulting from seasonal fluctuating in the water table.

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## Redoximorphic Features

- Soil features associated with soil saturation and reduction; formed by the processes of reduction, translocation, and/or oxidation of Fe and Mn oxides.



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## Conditions needed for Formation of Redox Features

1. Soil temperatures above biological zero
2. Soil Microorganisms
3. Source of carbon (food)
4. Iron minerals in the soil

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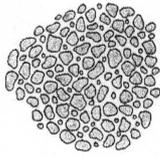
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## How Redox Features Form



In well drained, upland soils the bright color in the subsoil is due to iron oxide stains coating the individual soil particles.

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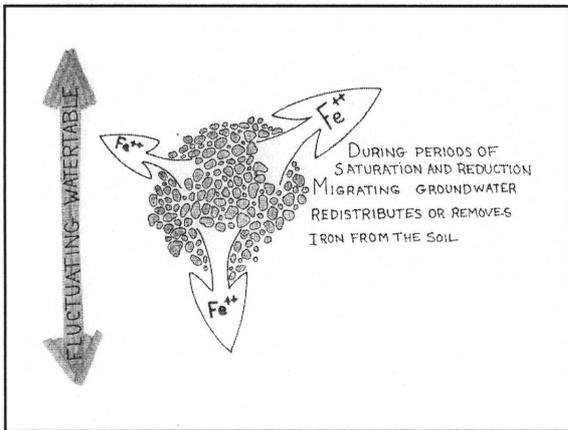
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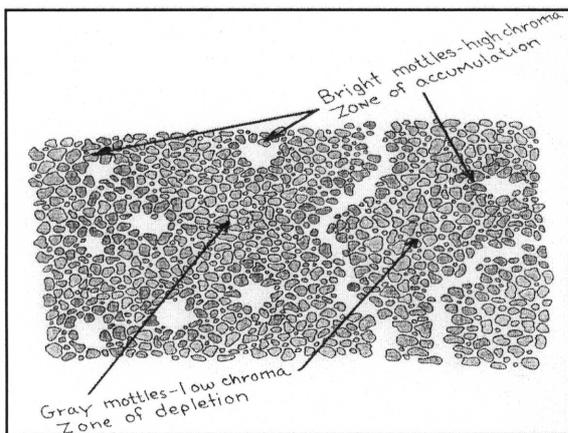
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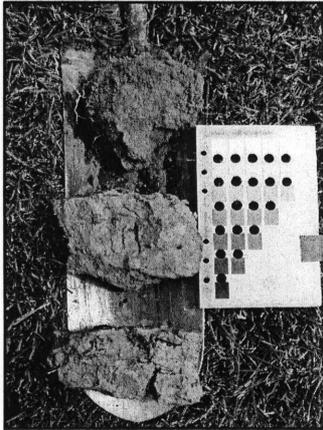
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Generally speaking, the longer the period of soil saturation and reduction the greater the % gray colors

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### Significance Observing Redox Features in the Soil

- Evidence of soil saturation and reduction
- Height of the average seasonal high water table
- Duration of 2 continuous weeks or more during the growing season
- Typically repeats itself from year to year

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### Redoximorphic Features, two broad groupings

- Redox concentrations
- Redox depletions

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## Redox Concentrations

- Formerly bright mottles
- Areas where iron and/or manganese has concentrated
- Colors with chromas of 3 or more



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## Nodules and concentrations

Hardened areas in the soil where iron and/or manganese have concentrated and cemented the soil particles together. Bog iron or iron pan are cemented layers.

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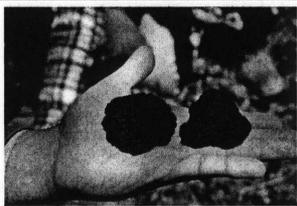
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Nodules and Concretions



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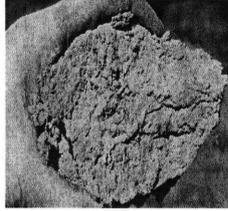
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## Redox Depletions

- Formerly gray mottles
- Areas in the soil where iron and manganese have been reduced and removed by groundwater flow.



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## Gleyed Soil

(Depleted and Gleyed Matrices)

- Soil horizons and layers that have a light gray matrix color resulting from significant periods of soil saturation and reduction.
- Soil matrix colors with values of 4 or more, and chromas of 2 or less.

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Ap horizon

Bg horizon

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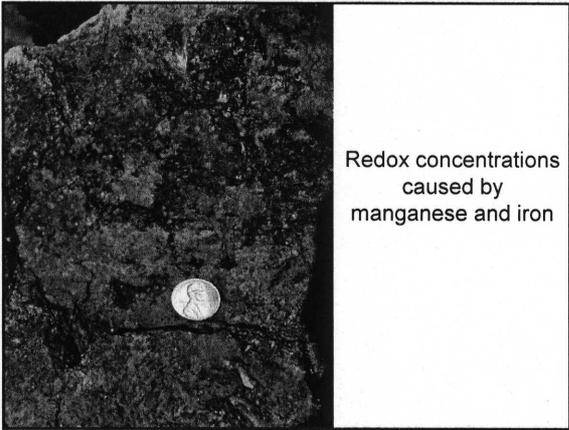
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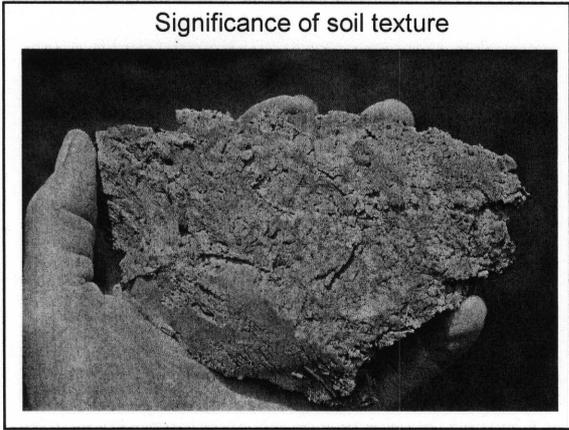
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- Situations where Redox Features can be absent or misinterpreted
- Steep slopes with fast flowing GW
  - Sandy soils
  - Stratified sands and gravel
  - Rust layers
  - Abrupt textural changes
  - Highly colored parent materials (Mesozoic and Carboniferous sediments)
  - Drained areas
  - Etc.

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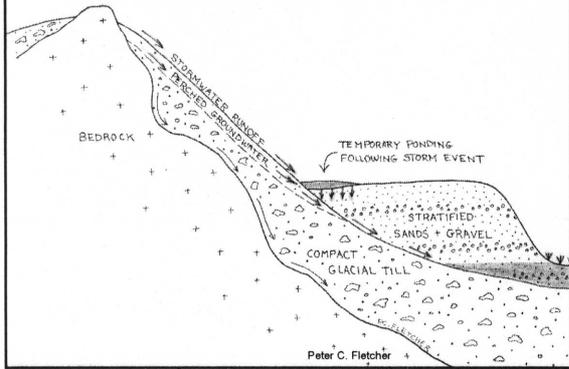
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A situation where redox features may not form - fast flowing groundwater and brief period of saturation



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Redox expression often weak in sandy soils



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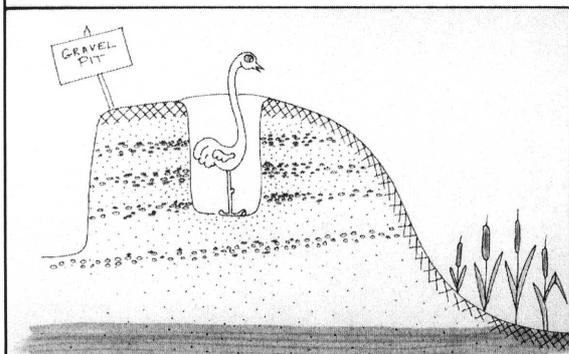
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Keep your head out of the pit



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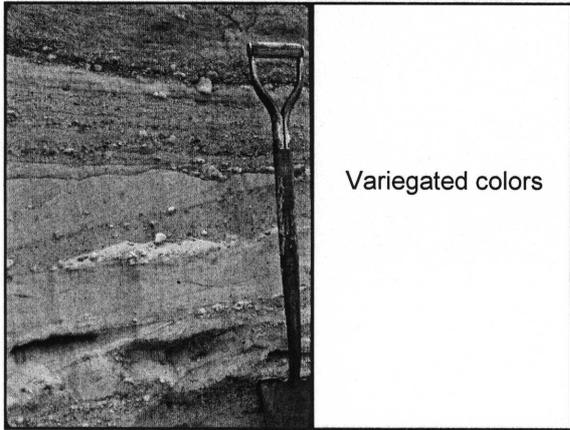
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Variegated colors

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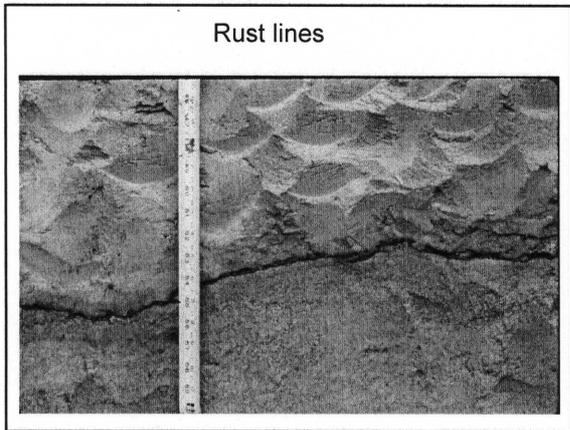
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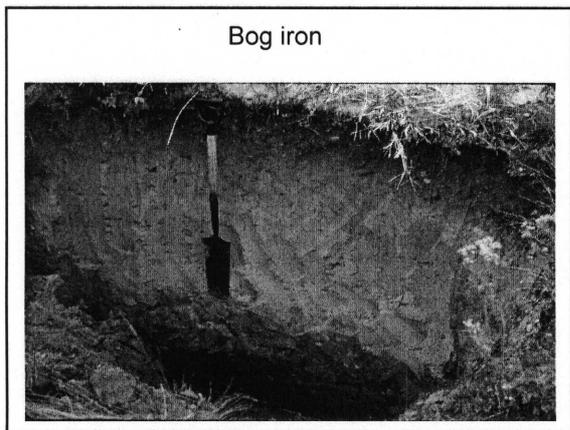
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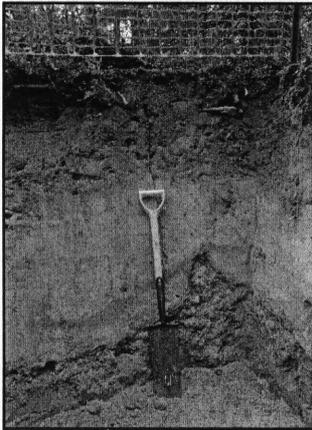
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Caution where there are abrupt textural changes

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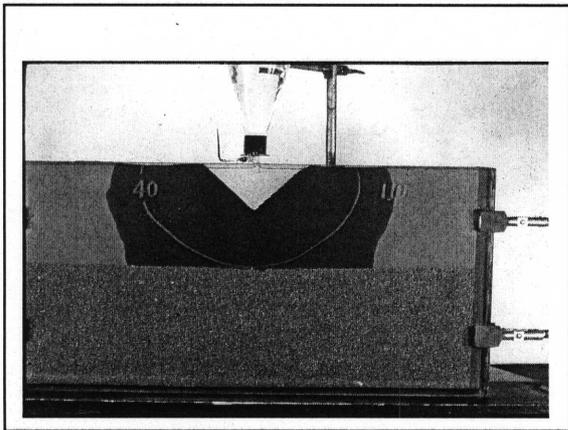
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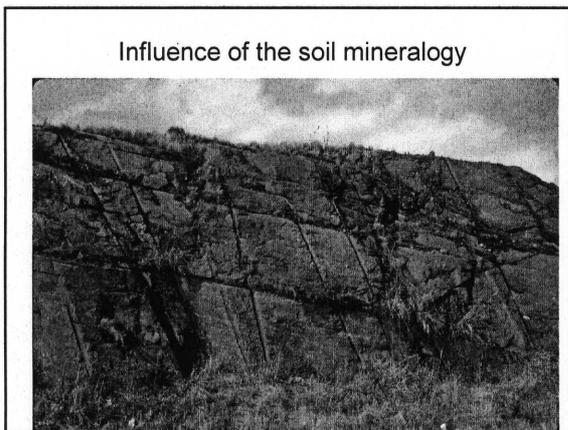
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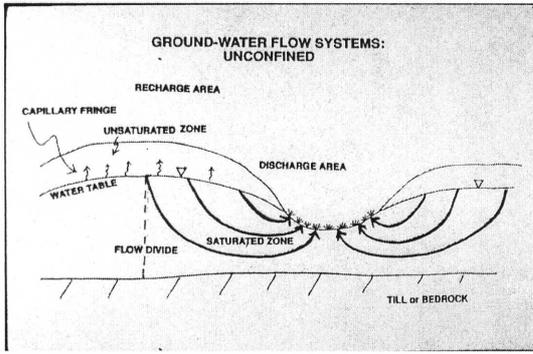
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### Areas of groundwater discharge



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Iron stains around individual rock fragments

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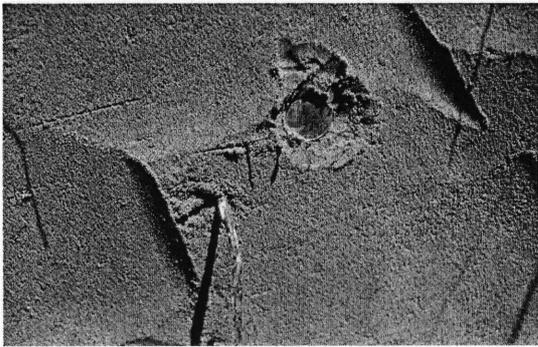
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Avoid being a redox detective, there are subtle color changes in all soils.



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Where the hydrology has been altered, the redox features may not represent the current hydrology

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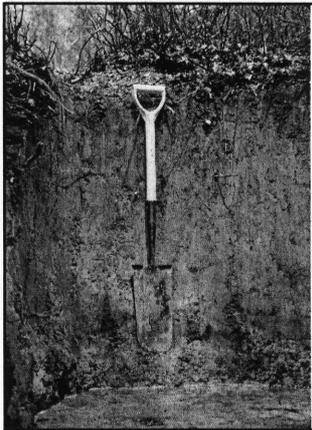
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Estimating the depth to seasonal high water table

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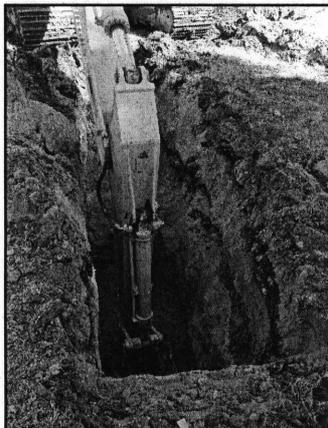
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When possible, like to observe groundwater

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## Documenting Redox Features

- Soil color or colors
- Abundance: as a percent or few (less than 2%), common (2 to less than 20%), or many (greater than 20%)
- Contrast: faint, distinct, or prominent
- Size: fine, medium, coarse, very coarse, and extremely coarse

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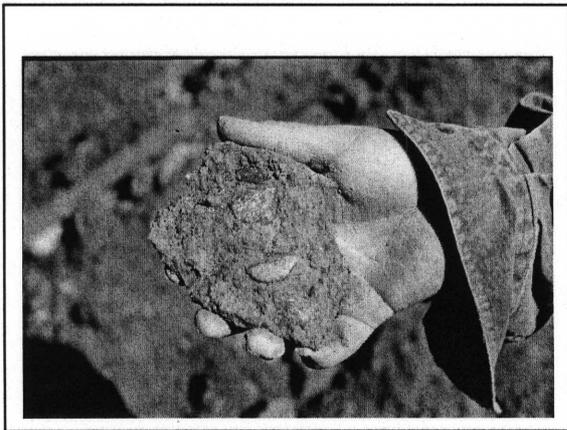
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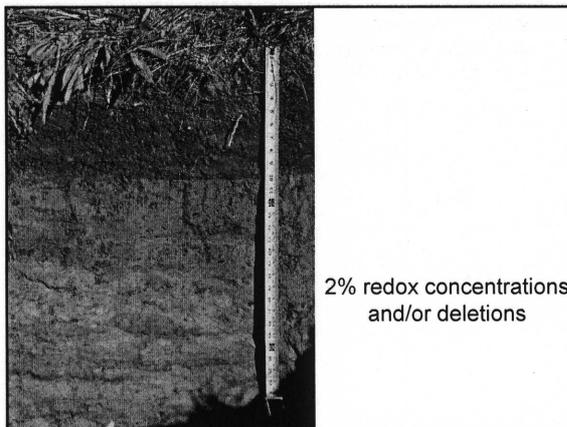
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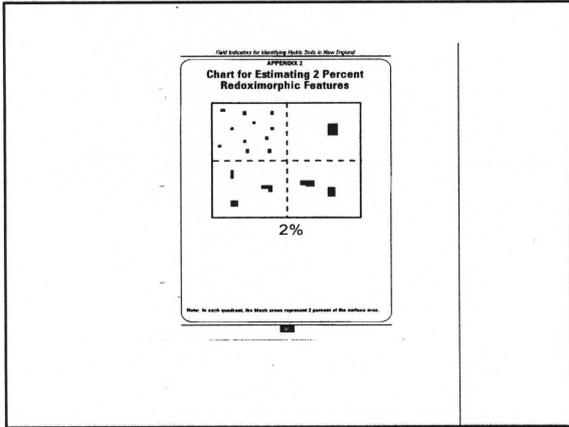
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Look for evidence of perched groundwater

Restrictive layer (Cd layer)

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When in doubt, install monitoring a monitoring well

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