Determining Season High Water Tables

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Sometimes It's Obvious

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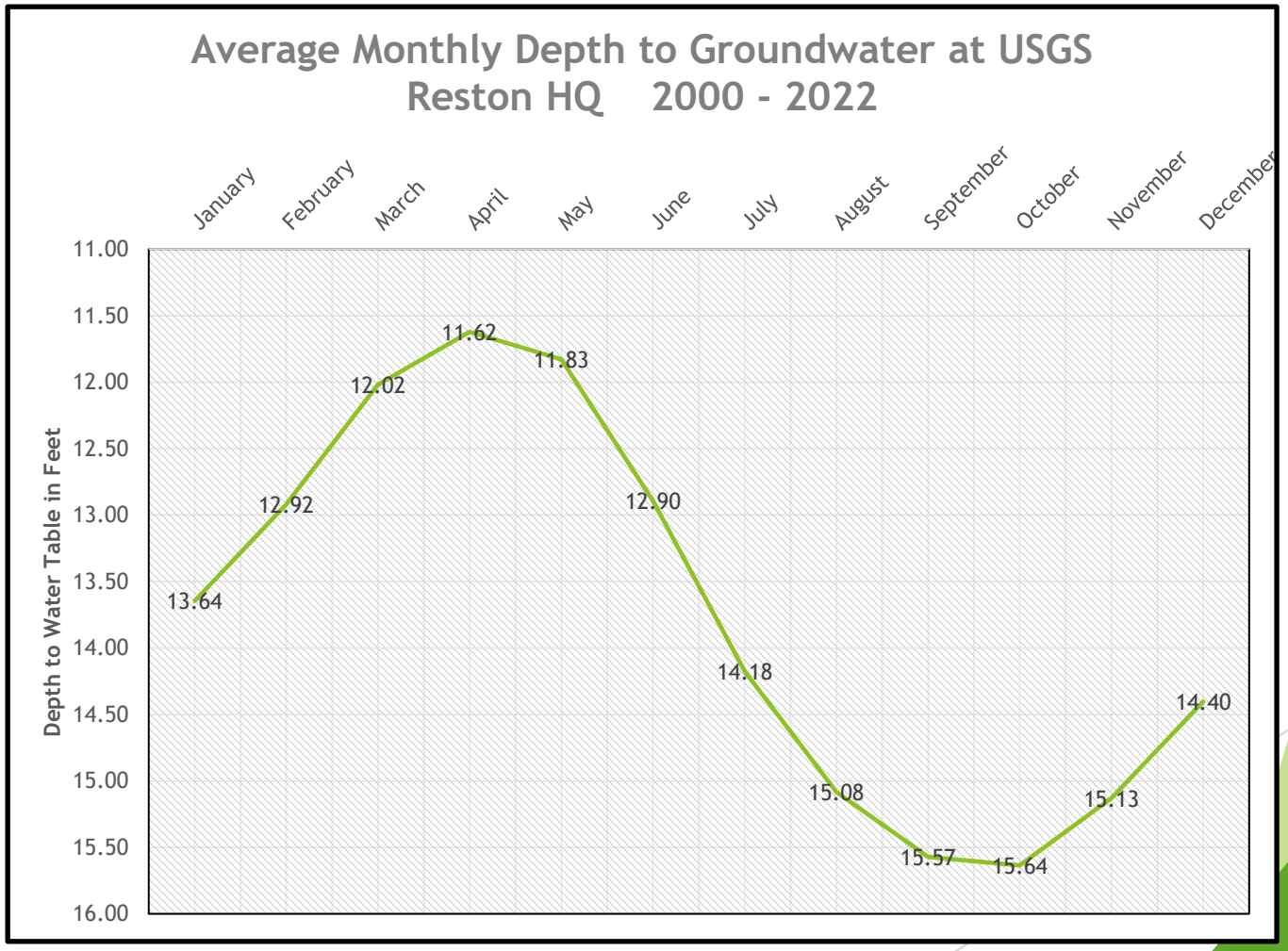
But Often, It's Not



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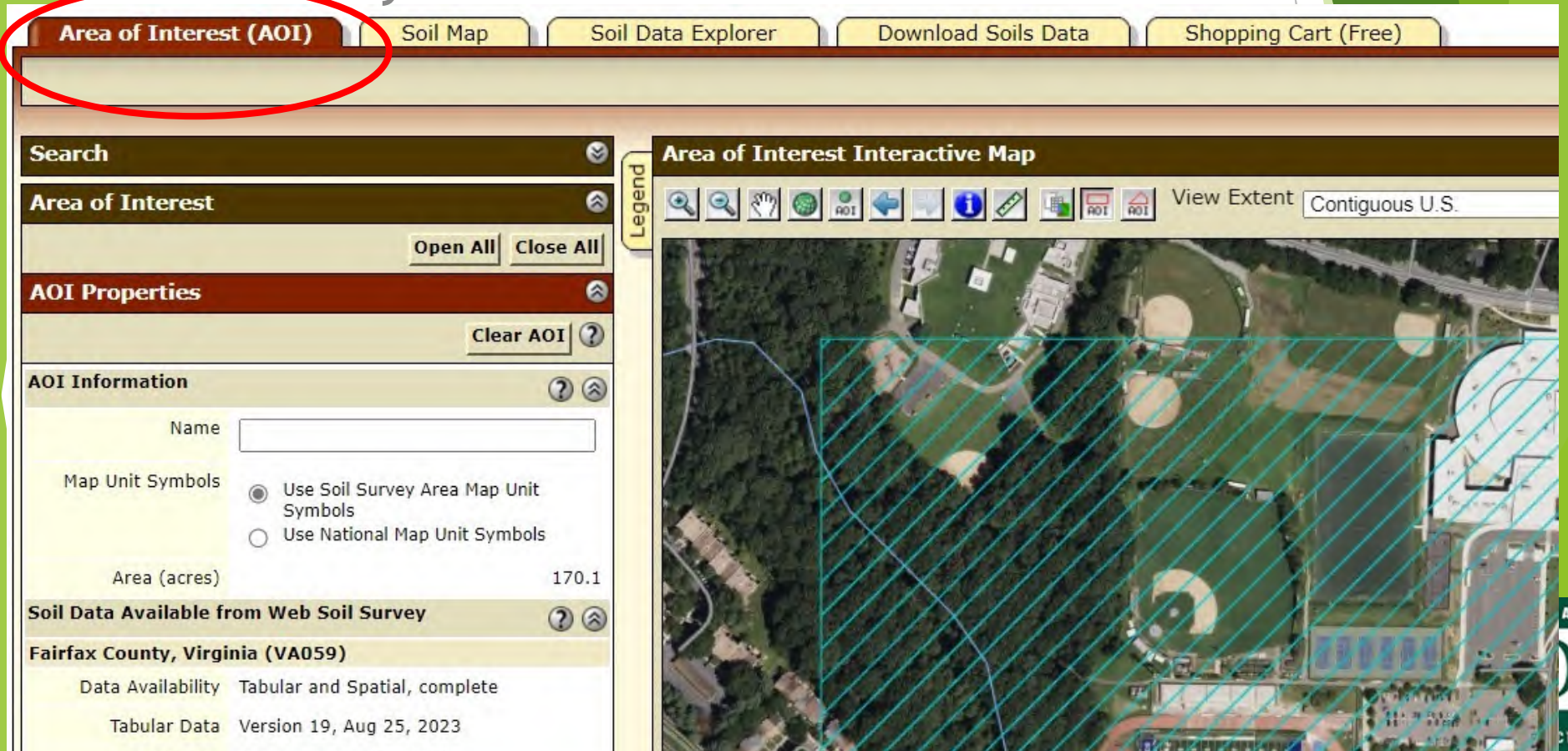
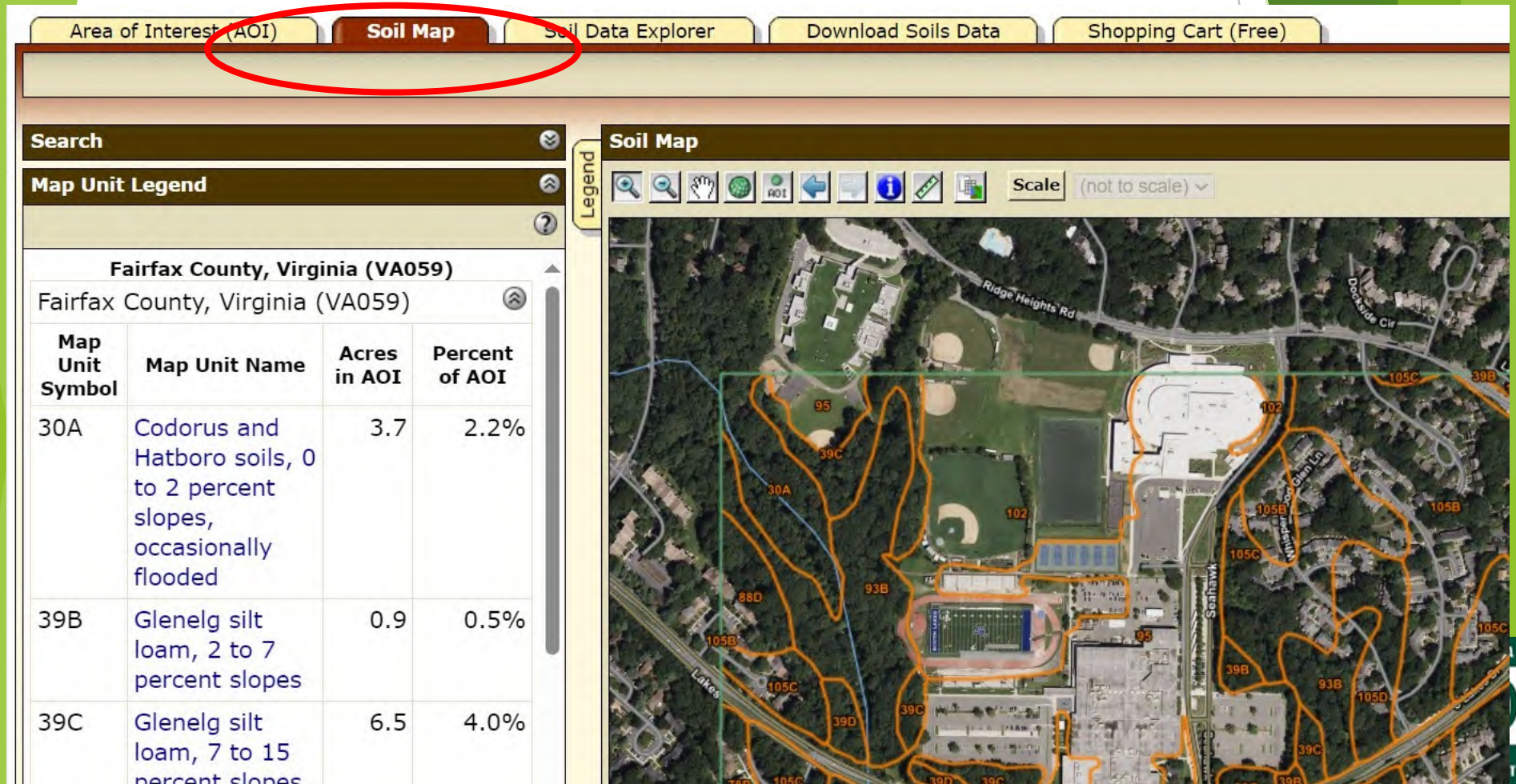
What To Do?

- Check the Soil Survey First: https://websoilsurvey.nrcs.usda.gov/
  - Set you area of interest



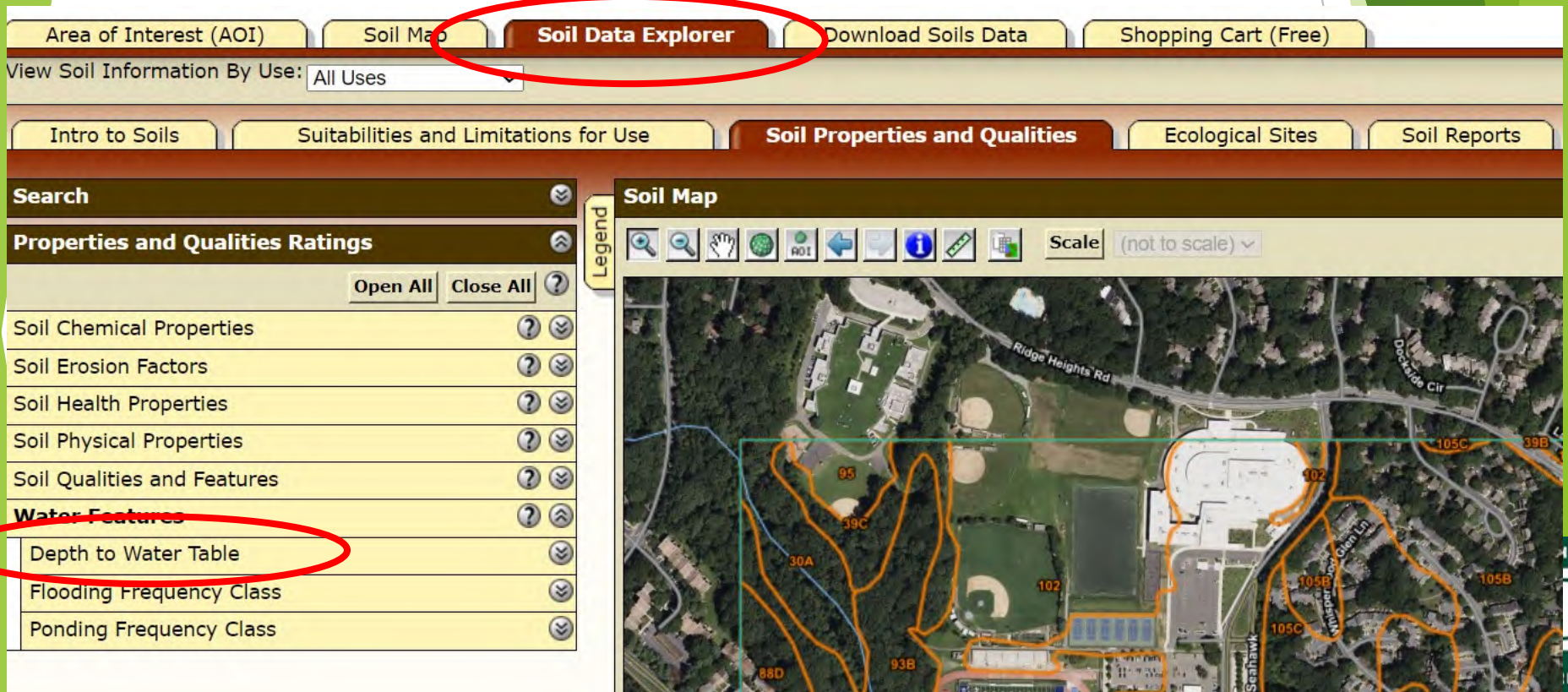
What To Do?

- Check the Soil Survey First:
  - Pull up the Soil Map



What To Do?

- Check the Soil Survey First:
- Open the Soil Data Explorer
  - Select Water Features → Depth to Water Table



The Grey Zone

- Using Soil Morphology in the field
- Fe and Mn are your clues

Red,Yellow, Orange & Brown = Iron Oxide

Black Colors = Mn Oxide

Photos courtesy of Dr. John Galbraith, Virginia Tech

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The Grey Zone

- Without Fe/Mn oxide staining, most soil is grey.

Photos courtesy of Dr. John Galbraith, Virginia Tech

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The Grey Zone

- Fe and Mn are your clues
  - Following approx. 2 weeks of saturation, Fe and Mn reduce
  - When they reduce, they become soluble/invisible. Soil turns grey.
  - When they re-oxidize elsewhere in soil, they return to their original color. Soil turns red, orange, black.
  - Colors caused by reduction and oxidation of Fe and Mn called “redox” features or mottling

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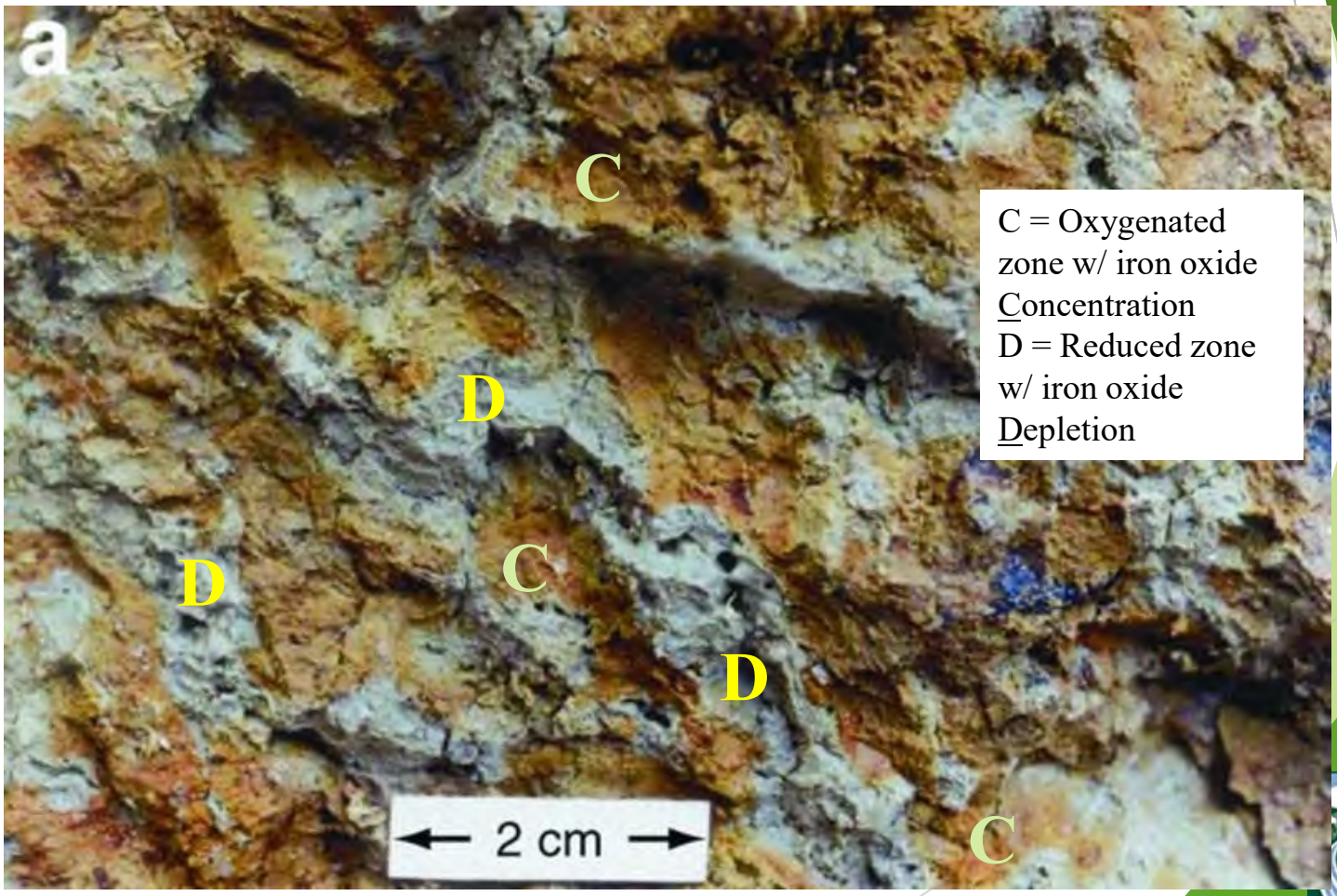
The Grey Zone

- Redox “mottling”



Photos courtesy of Dr. John Galbraith, Virginia Tech

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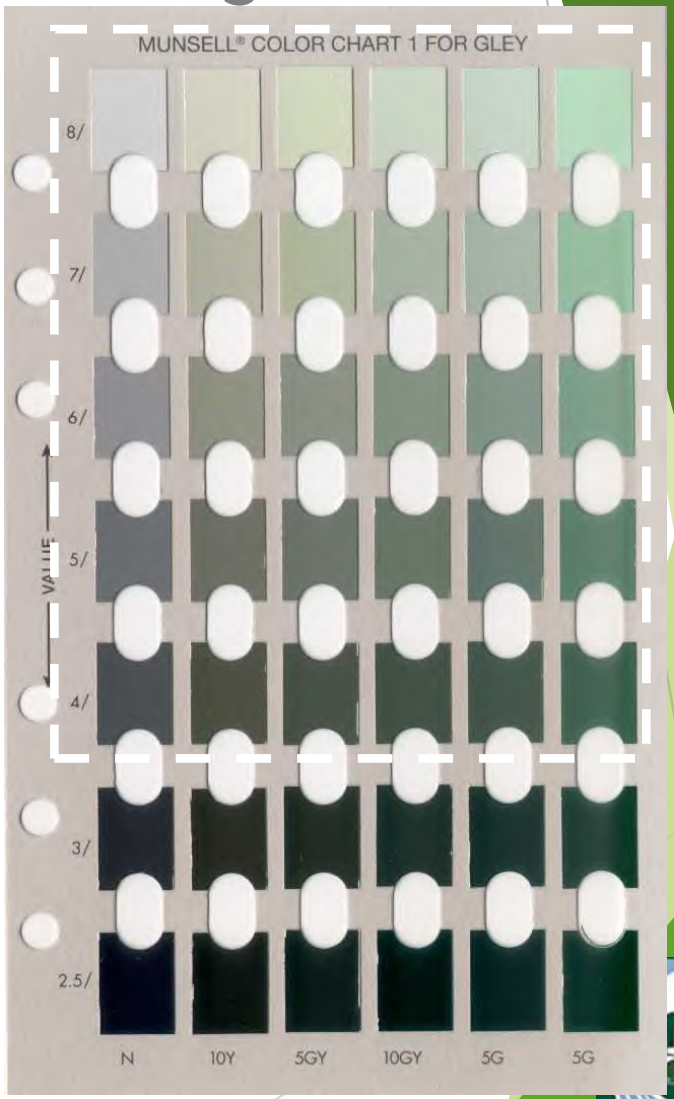
The Grey Zone

- This creates redox “mottling”



Munsell colors with value of ≥ 4 and chroma ≤ 2 or colors on the Gley page with value ≥ 4 used as the definition of “redox” grey colors.

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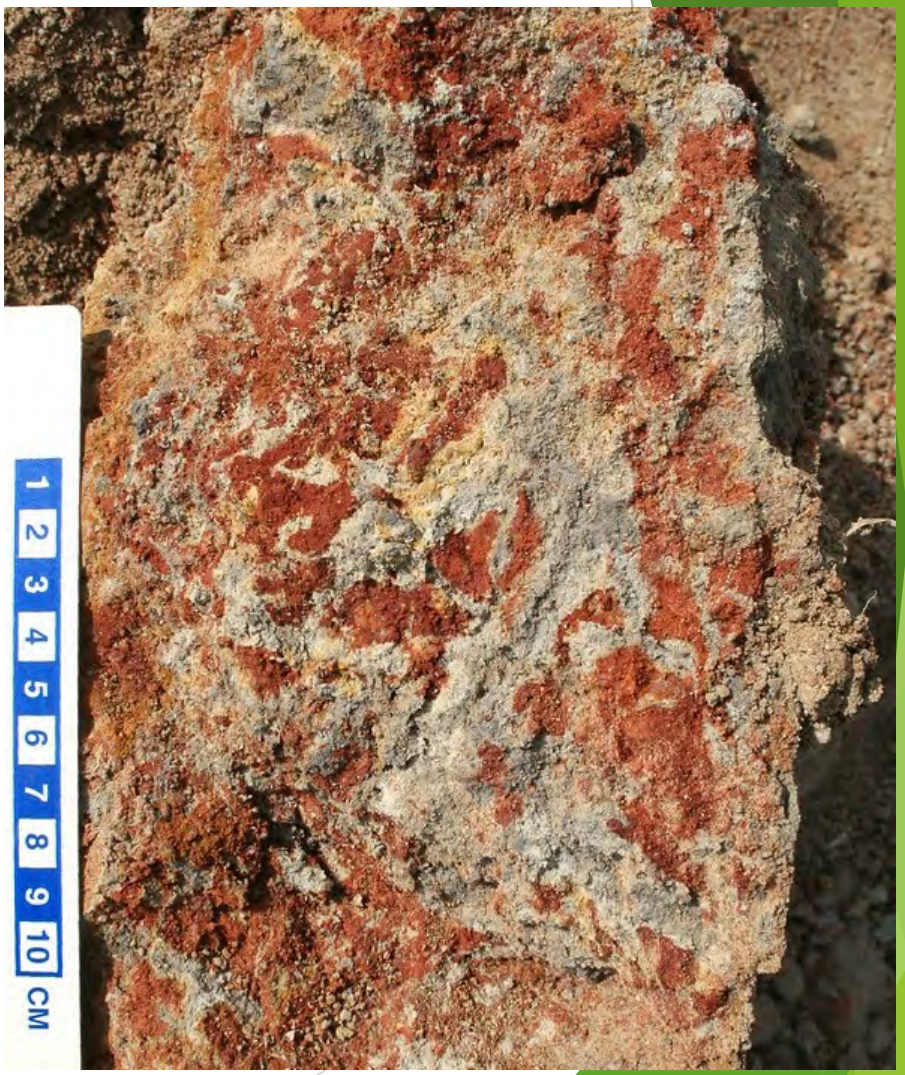
The Grey Zone

- Complications: not all greys are redox
  - Redox?
  - No – lithochromic!
    - Lithochromic = colors inherited from the parent rock or sediment.
    - Lithochromic colors often have sharp boundaries, not gradational changes. Can also mimic the original banding of the parent material.

Photos courtesy of Dr. John Galbraith, Virginia Tech

The Grey Zone

- Complications
  - Redox?
  - No – relict!
    - Relict = evidence of past, not current saturation
    - Relict colors have sharp boundaries, not gradational changes



Photos courtesy of Dr. John Galbraith, Virginia Tech

The Grey Zone

- What is redox and what is not?
  - Around carbon source
    - Microbes use up O^2 during decomposition. Cause Fe/Mn reduction.

Grey colors caused by iron reduction around decomposing roots in a soil.

Photos courtesy of Dr. John Galbraith, Virginia Tech

The Grey Zone

- What is redox and what is not?
  - Around flowing water
    - Pores saturate first and lead to Fe/Mn reduction

Grey colors caused by iron reduction along soil pores

Photos courtesy of Dr. John Galbraith, Virginia Tech

The Grey Zone

- What is redox and what is not?
  - If you find grey colors in the soil, but not next to a carbon source or water flow path, it might not be redox.

Grey colors in the soil, but not along a carbon rich root channel. Grey colors here are lithochromic, not redox.

Photos courtesy of Dr. John Galbraith, Virginia Tech

The Grey Zone

- What is redox and what is not?
  - Redox is heavenly
  - Features "halo" with diffuse boundaries

A halo surrounds the root channel. Colors gradually change from grey to yellow to orange to red with distance from the channel.

Photos courtesy of Dr. John Galbraith, Virginia Tech

The Grey Zone

- What is redox and what is not?
  - Redox is heavenly
  - Features “halo” with diffuse boundaries

Grey colors with no halo. Color transitions abruptly from grey to red. These colors are relict or lithochromic, not redox.

Photos courtesy of Dr. John Galbraith, Virginia Tech

Use Judgement

- Look around – use the landscape
- Use the web soil survey
- Use soil morphology

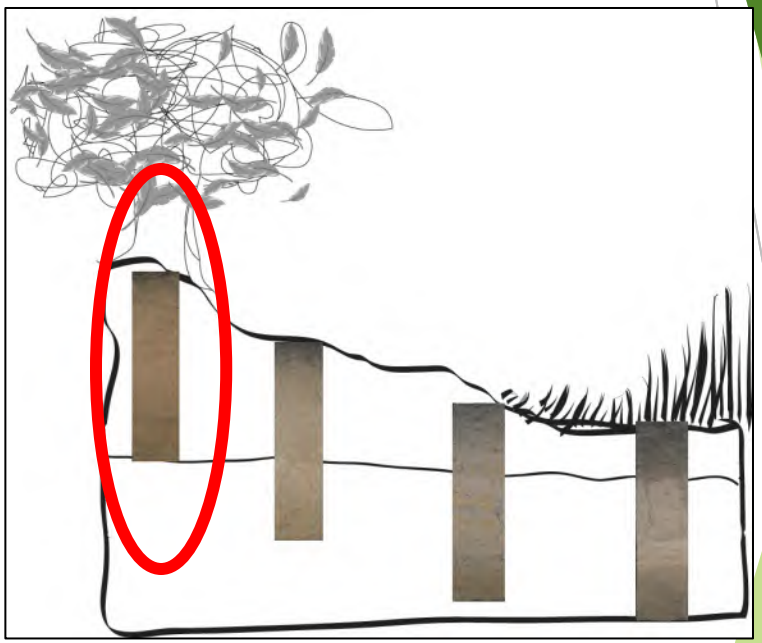
- Do all point to a wet soil?
  - Most likely redox
- Does only one?
  - May not be redox

- Use the preponderance of the evidence

Use Judgement

- Preponderance of the evidence

Photos courtesy of Dr. John Galbraith, Virginia Tech



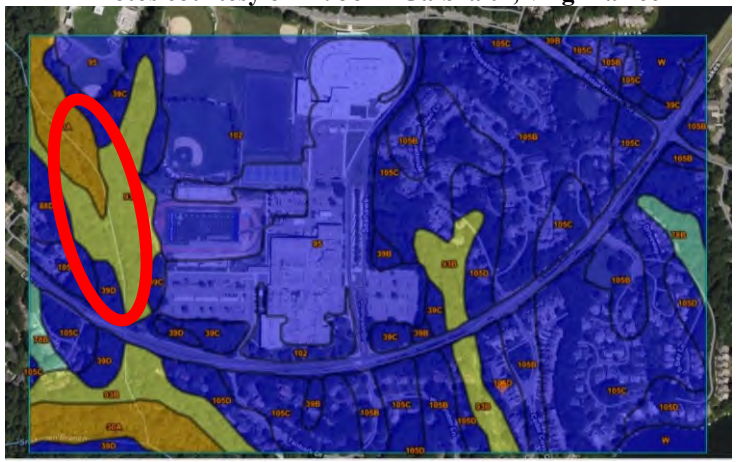
Grey colors with sharp borders found in soil at the top of the hill and in an area marked as having deep groundwater in the soil survey?

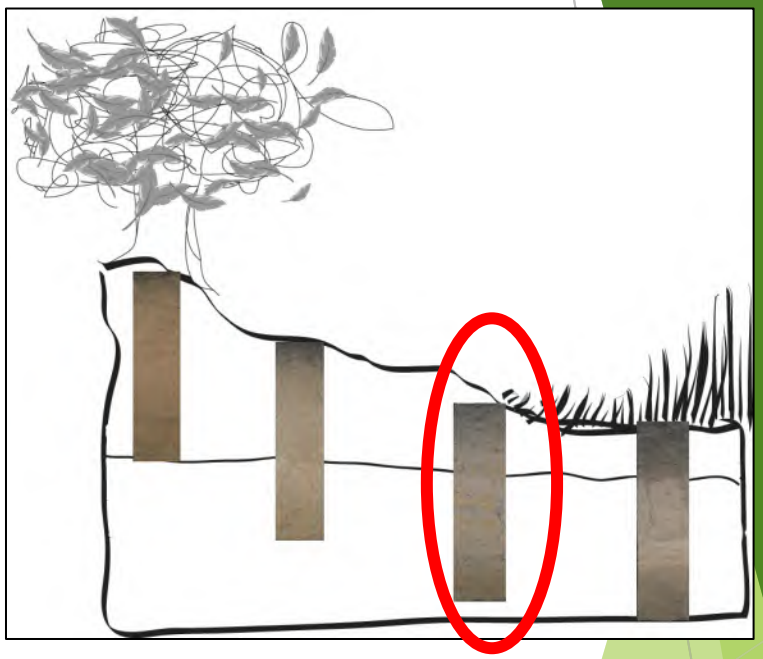
Probably not redox.

Use Judgement

- Preponderance of the evidence

Photos courtesy of Dr. John Galbraith, Virginia Tech





Grey colors with gradual halo along root channel in soil near bottom of the hill and in an area marked as having deep groundwater in the soil survey?

Probably redox.

More Information

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