

***ACT PRESENTATION 2
SOIL COLOR CONTRAST AND
QUANTITY OF
REDOXIMORPHIC FEATURES
OCTOBER 2011***



The previous presentation showed you how to properly read the colors. This presentation tells you how to determine the contrast between colors, specifically if the difference is faint, distinct or prominent, as well as the meanings of the differences.

**HOW TO PROPERLY
DETERMINE THE
DIFFERENCE BETWEEN
SOIL COLORS**

To calculate Hue Change:

- To determine the "difference in hue" between colors, **COUNT THE NUMBER OF 2.5-UNIT INTERVALS.**
- For example, hues of 2.5Y and 7.5YR differ by two 2.5-unit intervals ($7.5-2.5=5$, which is two 2.5 unit intervals), and so their difference in hue is counted as "2."
- Hues of 5Y and 5GY differ by four 2.5-unit intervals, and so their difference in hue is counted as "4."
- Could also just use the wheel.

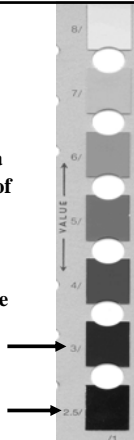
Hue change from Neutral

- **The Hue change from NEUTRAL to ANY OTHER HUE is a change of ONE UNIT OF HUE.**

Units of Value Change

- Units of value range from 0 to 10. Normally, there is a one unit change between each color, but there may be less.
- For example:
The difference in Value between a 10YR 5/1 and a 10YR 7/1 is 2 UNITS. (The difference between 5 and 7 is 2.)
The difference in Value between a 7.5YR 2.5/1 and a 7.5YR 3/1 is 0.5 UNITS ($3-2.5=0.5$, or <1 unit of value change)

- Here, the values can change as little as 0.5 units within the same chroma.
- The difference between a value of 2.5 and a value of 3 (both at chroma 1) is 0.5 units. If you were to count chips, the answer would be different, where the *wrong* answer would be a difference of 1 chip.

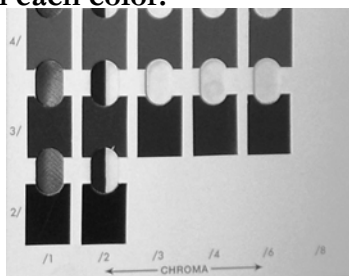


VERY
IMPORTANT!!!

- **TO DETERMINE VALUE CHANGE, CALCULATE DIFFERENCE BETWEEN THE UNITS**
(Value of 2.5, 3, 4, etc.) –
DO NOT COUNT CHIPS !!

Units of Chroma Change

- Units for Chroma range from 0 to 8. There is a **one** or **two** unit change between each color.



VERY
IMPORTANT!!!

- **TO DETERMINE CHROMA CHANGE, CALCULATE DIFFERENCE BETWEEN THE UNITS**
(Chroma of 1, 2, 3, 4, etc.) – DO NOT COUNT CHIPS !!

Units of Chroma Change

- For example:
 The difference in Chroma between a 10YR 5/1 and a 10YR 5/2 is 1 unit. (2-1=1)
 The difference in Chroma between a 7.5YR 5/3 and a 10YR 5/6 is 3 units (6-3=3).
Note by looking at the hue cards that there is a change of two chips but is actually a change of 3 units of chroma.
Do not count chips!!!

Note

- When reading values and chromas, only those units are considered.
- Change in hue does not affect the calculation of the difference between values or chromas, they are independent of each other.
- Simply determine the value or chroma in each color and calculate the difference without regard to hue.

QUESTIONS???

Contrast between Soil Colors

Contrast refers to the degree of visual distinction between associated colors.

Faint – contrasts that are evident only on close examination.

Distinct -- contrasts that are readily seen but are only moderately expressed

Prominent -- contrasts that are strongly expressed.

QUESTION -

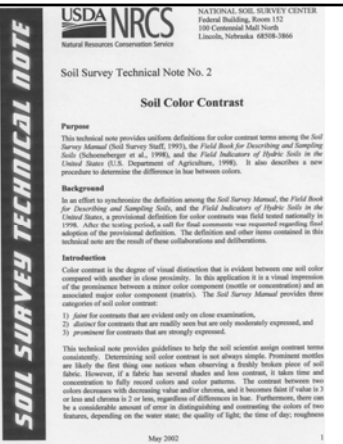
Can different people uniformly and consistently judge these subjective criteria with no other guidelines?

Not very likely!!!!

We need a method by which we can be more objective with our determination. So, we use...

***USDA NRCS Soil Survey
Technical Note No. 2
May 2002
Soil Color Contrast
Definitions***

**This is the
cover page**



Definitions of soil color contrast terms

Note: If the mottle and matrix both have values of ≤ 3 and chromas of ≤ 2 , the color contrast is *Faint*, regardless of the difference in hue.

Faint - Evident only on close examination. The contrast is faint if the:

- 1) difference in hue = 0, difference in value is ≤ 2 , and difference in chroma is ≤ 1 , or
- 2) difference in hue = 1, difference in value is ≤ 1 , and difference in chroma is ≤ 1 , or
- 3) difference in hue = 2, difference in value = 0, and difference in chroma = 0, or
- 4) difference in hue is ≥ 3 and both colors have values of ≤ 3 and chromas of ≤ 2 .

Distinct - Readily seen but contrast only moderately with the color to which compared. The contrast is distinct if the:

- 1) difference in hue = 0, and
 - a. difference in value is ≤ 2 and difference in chroma is >1 to <4 , or
 - b. difference in value is >2 to <4 and difference in chroma is <4 .
- 2) difference in hue = 1, and
 - a. difference in value is ≤ 1 and difference in chroma is >1 to <3 , or
 - b. difference in value is >1 to <3 , and difference in chroma is <3 .
- 3) difference in hue = 2, and
 - a. difference in value = 0 and difference in chroma is >0 to <2 , or
 - b. difference in value is >0 to <2 and difference in chroma is <2 .

Prominent - Contrasts strongly with the color to which compared. Color contrasts that are not faint or distinct are prominent.

In the following slides, the symbol “ Δ ”(delta) means “change or difference in”. For example: $\Delta h=1$ means the change of hue between the two colors is one 2.5 unit interval.
Example 7.5YR TO 10YR
Use the method given in the technical note to determine hue difference.

IMPORTANT NOTE!!!
If the mottle and matrix both have values of ≤ 3 and chromas of ≤ 2 , the color contrast is faint, REGARDLESS OF THE DIFFERENCE IN HUE.

Table 1 - Tabular key for contrast determination using Munsell® notation
 Note: If both colors have values of < 3 and chromas of ≤ 2, the color contrast is Faint (regardless of the difference in hue).

Hues are the same ($\Delta h = 0$)			Hues differ by 2 ($\Delta h = 2$)		
Δ Value	Δ Chroma	Contrast	Δ Value	Δ Chroma	Contrast
0	≤1	Faint	0	0	Faint
0	2	Distinct	0	1	Distinct
0	3	Distinct	0	≥2	Prominent
0	≥4	Prominent	1	≤1	Distinct
1	≤1	Faint	1	≥2	Prominent
1	2	Distinct	≥2	---	Prominent
1	3	Distinct			
1	≥4	Prominent			
≤2	≤1	Faint			
≤2	2	Distinct			
≤2	3	Distinct			
≤2	≥4	Prominent			
3	≤1	Distinct			
3	2	Distinct			
3	3	Distinct			
3	≥4	Prominent			
≥4	---	Prominent			

Hues differ by 1 ($\Delta h = 1$)			Hues differ by 3 or more ($\Delta h \geq 3$)		
Δ Value	Δ Chroma	Contrast	Δ Value	Δ Chroma	Contrast
0	≤1	Faint	Color contrast is prominent, except for low chroma and value		
0	2	Distinct			Prominent
0	≥3	Prominent			
1	≤1	Faint			
1	2	Distinct			
1	≥3	Prominent			
2	≤1	Distinct			
2	2	Distinct			
2	≥3	Prominent			
≥3	---	Prominent			

- $\Delta h = 0$:
- 3 Faint
- 9 Distinct
- 5 Prominent
(Note that a Δ value or Δ chroma ≥ 4 is prominent)

Hues are the same ($\Delta h = 0$)		
Δ Value	Δ Chroma	Contrast
0	≤1	Faint
0	2	Distinct
0	3	Distinct
0	≥4	Prominent
1	≤1	Faint
1	2	Distinct
1	3	Distinct
1	≥4	Prominent
≤2	≤1	Faint
≤2	2	Distinct
≤2	3	Distinct
≤2	≥4	Prominent
3	≤1	Distinct
3	2	Distinct
3	3	Distinct
3	≥4	Prominent
≥4	---	Prominent

- $\Delta h = 1$
- 2 Faint
- 4 Distinct
- 4 Prominent
(Note that a Δ value or Δ chroma ≥ 3 is prominent)

Hues differ by 1 ($\Delta h = 1$)		
Δ Value	Δ Chroma	Contrast
0	≤1	Faint
0	2	Distinct
0	≥3	Prominent
1	≤1	Faint
1	2	Distinct
1	≥3	Prominent
2	≤1	Distinct
2	2	Distinct
2	≥3	Prominent
≥3	---	Prominent

Hues differ by 2 ($\Delta h = 2$)

Δ Value	Δ Chroma	Contrast
0	0	Faint
0	1	Distinct
0	≥ 2	Prominent
1	≤ 1	Distinct
1	≥ 2	Prominent
≥ 2	---	Prominent

- $\Delta h = 2$
 - 1 Faint
 - 2 Distinct
 - 3 Prominent
- (Note that a Δ value or Δ chroma ≥ 2 is prominent)

Hues differ by 3 or more ($\Delta h \geq 3$)

Δ Value	Δ Chroma	Contrast
Color contrast is prominent, except for low chroma and value.		Prominent

$\Delta h = 3$

All color contrast is prominent by definition -

EXCEPT FOR THOSE VALUES ≤ 3 AND CHROMAS ≤ 2 , WHICH ARE FAINT BY DEFINITION REGARDLESS OF HUE CHANGE

Volume of Redoximorphic Features

Or: Few, Common or Many Redox Features?

- The quantity (*volume*) of the redoximorphic features in the soil sample is important in the determination of the estimated seasonal high water tables.
- NOTE: Hydric soils can have *vastly different* requirements than non-hydric soils. More on this later.

Non-hydric soils

- Redoximorphic features must be at least COMMON, but can also be MANY.
- They CANNOT be FEW.
- So, what is the required volume redox features must occupy to count as “common” or “many”?

Quantity of Redoximorphic Features (few, common, many)

- The following amounts correlate with *specific* percentages:
- Few -- less than 2% (<2%)
- Common -- 2 to 20% (2-20%)
- Many -- more than 20% (>20%)

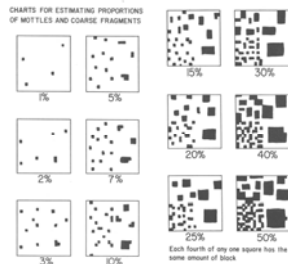
Determination of the quantity of Redox Features

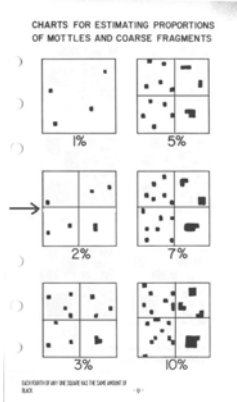
- Use the “Charts for Estimating Proportions of Mottles and Coarse Fragments” found in the Munsell Soil Color Charts. These will quantify the amount of redox features.

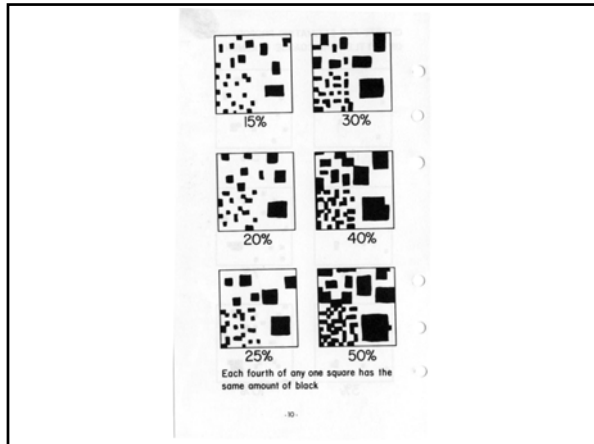
Abundance and Size of Color Contrasting Areas

- Size of mottles
 Fine -- < 5 mm
 Medium -- 5 to 15 mm
 Coarse -- > 15 mm
- Note that the size of the mottles do not matter, only the amount.

Abundance has SPECIFIC meaning for Hydric Soils







Hydric soils and abundance of features

- Often the indicators in hydric soils must meet a higher standard than non-hydric soils. Some features for indicators must be 100%, while others must be 10% or 70%.
- Watch for this in the Hydric Soils Presentation.

QUESTIONS???

End of Presentation
