



**Using**

**SOILTAXONOMY**

**to Identify Hydric Soils**

# Soil Taxonomy is

A basic system of soil classification for making and interpreting soil surveys.

## **Objective:**

To develop a hierarchical classification that reflects the relationships between different soils, and between soils and the factors responsible for their character.

# Soil Taxonomy

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## Procedure:

Soils are classified on the basis of:

- ⌘ Soil properties observed in the field (e.g., soil horizons, texture, color, pH) and
- ⌘ Soil properties inferred from the combined data of soil science and other disciplines (e.g., soil temperature and moisture regimes inferred from soil science and meteorology).

# Soil Taxonomy



Fine-loamy,  
mixed  
(calcareous),  
frigid,  
Mollic  
Ustifluvent

Korchea  
Series

Not Hydric



# Soil Taxonomy

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| <b>Category</b> | <b>Number of Taxa</b> | <b>Nature of Differentiating Characteristics</b>                                        |
|-----------------|-----------------------|-----------------------------------------------------------------------------------------|
| Order           | 12                    | Soil-forming processes as indicated by presence or absence of major diagnostic horizons |

# Soil Orders

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⌘ Alfisols

⌘ Andisols

⌘ Aridisols

⌘ Entisols

⌘ Gelisols

⌘ Histosols

⌘ Inceptisols

⌘ Mollisols

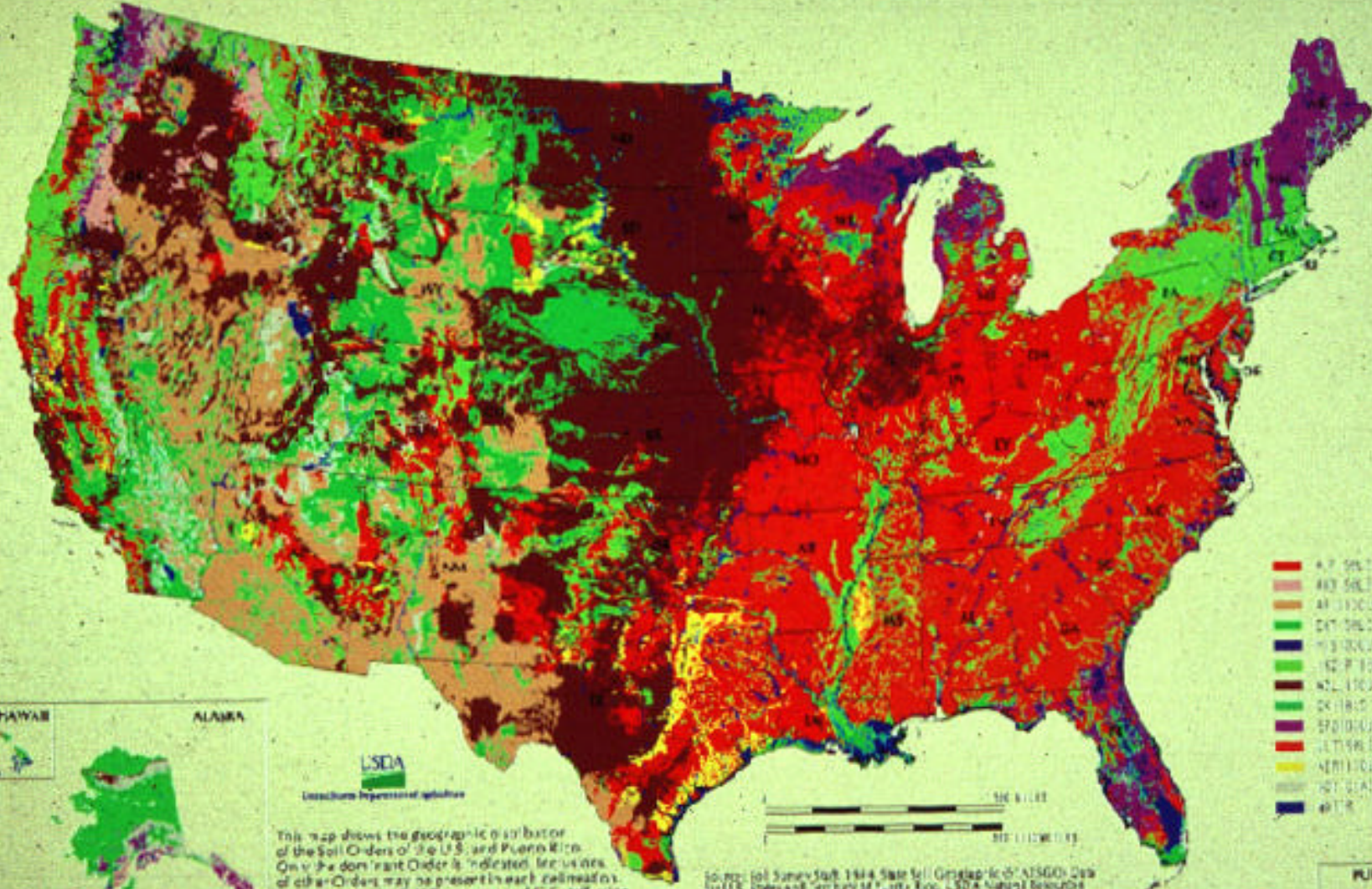
⌘ Oxisols

⌘ Spodosols

⌘ Ultisols

⌘ Vertisols

**DOMINANT SOIL ORDERS OF THE UNITED STATES AND PUERTO RICO**



- A-T SOILS
- ARID SOILS
- ARISOLIS
- DAT SOILS
- H1 SOILS
- H2 P SOILS
- NOLISOLIS
- OLISOLIS
- SPURISOLIS
- ULTISOLS
- VERISOLIS
- NOT CLASSIFIED
- WATER



USDA  
United States Department of Agriculture

This map shows the geographic distribution of the Soil Orders of the U.S. and Puerto Rico. Only the dominant Order is indicated for each area; other Orders may be present in each subregion. Map produced by Soil Taxonomists and GIS staff using ArcInfo 7.0.4, U.S.G.S. 1:2,000,000 state boundaries. Authors: Ecological Assessment Division, National Soil Survey Center, Lincoln, NE. NCS-C-4133-0000-010- JUNE 1996

Source: Soil Survey Staff, 1994. State Soil Geographic (STATSGO) Data for U.S. States and Territories, 1:250,000 Scale, USDA National Resources Conservation Service, National Soil Geographic Service, Lincoln, NE. Digitized by Ecological Assessment Division, National Soil Survey Center, Lincoln, NE. This map is a derivative work of the "STATSGO" dataset prepared by the Soil Survey Staff of the National Resources Conservation Service, Lincoln, NE. It is not intended for use in any other project without the permission of the National Resources Conservation Service, Lincoln, NE. It is not intended for use in any other project without the permission of the National Resources Conservation Service, Lincoln, NE. It is not intended for use in any other project without the permission of the National Resources Conservation Service, Lincoln, NE.





# Taxonomic Names

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| <b>Soil Order</b> | <b>Names Ends in:</b> |
|-------------------|-----------------------|
| Alfisols          | -Alf                  |
| Andisols          | -And                  |
| Aridisols         | -Id                   |
| Entisols          | -Ent                  |
| Gelisols          | -El                   |
| Histosols         | -Ist                  |
| Inceptisols       | -Ept                  |
| Mollisols         | -Oll                  |
| Oxisols           | -Ox                   |
| Spodosols         | -Od                   |
| Ultisols          | -Ult                  |
| Vertisols         | -Ert                  |

# Entisol Suborders

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## ⌘ Aquents

(L. Aqua, Water)

Wet Entisols

## ⌘ Orthents

(Gr. Orthos, True)

The Common Ones

## ⌘ Fluvents

(L. Fluvius, River)

Floodplain Soils

## ⌘ Psamments

(Gr. Psammons, Sand)

Sandy Soils

# Entisol Great Groups

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## ⌘ Suborder

Aquents

(Wet Entisols)

## ⌘ Great Group

Cryaquents - cold

Fluvaquents - flood plain

Hydraquents - water

Psammaquents - sand

Epiaquents - perched

# Entisol Great Groups

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## ⌘ Suborder

Fluents

(Floodplain soils)

## ⌘ Great Group

Cryofluents

Torrifluents - Torrid  
(hot and dry)

Tropofluents

Udifluents - Humid  
(not dry in most years)

Ustifluents - Semi-arid  
(between Udic-Aridic)

Xerofluents - Semi-arid  
(moist cold winter - dry  
warm summer;  
Mediterranean climate)

# Soil Taxonomy

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## ⌘ Suborder

Psamments

(Sandy Soils)

## ⌘ Great Group

Cryopsamments

Quartzipsamments -  
Quartz

Torripsamments

Udipsamments

Ustipsamments

Xeropsamments



# Aquic Soil Moisture Regimes

## ⌘ Typic Subgroup Aquic Suborder

⊞ \_\_\_\_\_ aq \_\_\_\_\_

⊞ wettest

## ⌘ Aeric Subgroup Aquic Suborder

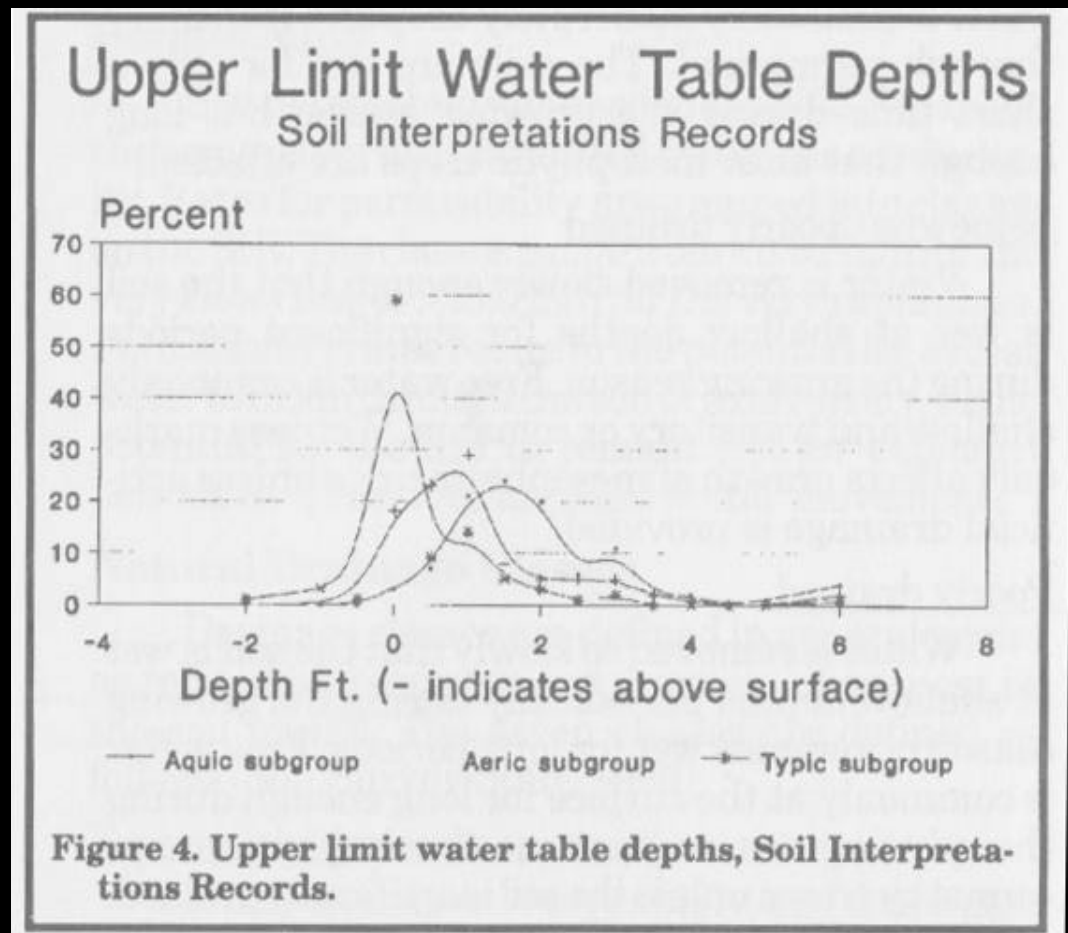
⊞ Aeric \_\_\_\_\_ aq \_\_\_\_\_

⊞ better aerated

## ⌘ Aquic Subgroup

⊞ Aquic \_\_\_\_\_

⊞ driest



From Mausbach 1992

# Subgroups

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4 3 2 1

Typic Fluvaquents

4 1 2

Typical Entisols with aquic moisture

3

regimes that occur on floodplains.

- |             |                |
|-------------|----------------|
| 1. Order    | 3. Great Group |
| 2. Suborder | 4. Subgroup    |



# Subgroups

---

4 3 2 1

Mollic Fluvaquents

1 2

Entisols with aquic moisture regimes that

3

occur on floodplains, and that have thick,

4

dark surface layers.

- 1. Order
- 2. Suborder
- 3. Great Group
- 4. Subgroup

# Subgroups

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4      3      2      1

Aeric Fluvaquents

1

3

2

Entisols, occurring on floodplains, with an aquic

moisture regime that are not so wet. Better

4

aerated in the “upper” part of the soil.

1. Order

3. Great Group

2. Suborder

4. Subgroup

# Soil Taxonomy

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| <b>Category</b> | <b>Number of Taxa</b> | <b>Nature of Differentiating Characteristics</b>                                                                                                                                                                                                                                                                |
|-----------------|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Series          | 15,000+               | <p>A series may have virtually the full range that is permitted in a family in several properties, but in one or more properties the range is restricted, such as:</p> <ul style="list-style-type: none"><li>- Kind and arrangement of horizons</li><li>- Color</li><li>- Texture</li><li>- Structure</li></ul> |

# Soil Taxonomy- Predicting "Problem" Hydric Soils

| Formative Element | Soil Order | Why a Problem                                                                                                                      |
|-------------------|------------|------------------------------------------------------------------------------------------------------------------------------------|
| Alf               | Alfisols   | Gray / White (high value / low chroma) horizon below A, not always indicative of wetness.                                          |
| And               | Andisols   | Fe immobilized, redox. features are often deeper than depth to water table. Some Andisols have thick, dark colored surface layers. |
| Ent               | Entisols   | Recent depositional events exceed rate of typical hydric morphology formation. Also many sandy soils are Entisols.                 |

# "Problem" Orders, cont.

|     |           |                                                                                                                                                     |
|-----|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| Oll | Mollisols | Dark colored surface layers "mask" redox features. Check colors below mollic, allow surface layers to dry then look for redox (NTCHS Indicator F6). |
| Od  | Spodosols | Sandy surface layers, no redox features evident in upper part. (Use organic layers, dark surface, and stripped matrix indicators).                  |
| Ult | Ultisols  | Some have gray / white (high value / low chroma) horizon below A, not necessarily indicative of wetness.                                            |
| Ert | Vertisols | High shrink-swell clays, surface hydrology. Many Vertisols also have dark-colored surface layers.                                                   |

# "Problem" Great Groups

|             |                                     |                                                                                               |
|-------------|-------------------------------------|-----------------------------------------------------------------------------------------------|
| Alb         | Albic horizon                       | Gray / White (high value / low chroma) horizon below A, not necessarily indicative of wetness |
| Calci, calc | Presence of a calcic horizon        | Gray / White (high value / low chroma) horizon below A, not necessarily indicative of wetness |
| Dur         | Presence of a Duripan (dense layer) | Subsoil may be brownish color.<br>Perched water table situation.                              |
| Epi         | Perched water table                 | Subsoil may be brownish color.                                                                |
| Fluv        | Floodplain                          | Surface hydrology, recent deposition                                                          |

# Great Groups, cont.

|       |                                      |                                                     |
|-------|--------------------------------------|-----------------------------------------------------|
| Fragi | Presence of a Fragipan (dense layer) | Subsoil may be brownish color, perched water table. |
| Gloss | Presence of a Glossic horizon        | Multi-colored horizon below A horizon.              |
| Melan | High organic content                 | Dark colors may mask redox features.                |
| Psamm | Sandy texture                        | No, or low Fe content, also low OM.                 |
| Sal   | Presence of a Salic horizon          | High pH, low OM; no, or few redox features.         |



Typic Haplosapristis



**Torry Series**  
**Hydric**





# Terric Haplosaprists

**Tawas  
Series  
Hydric**





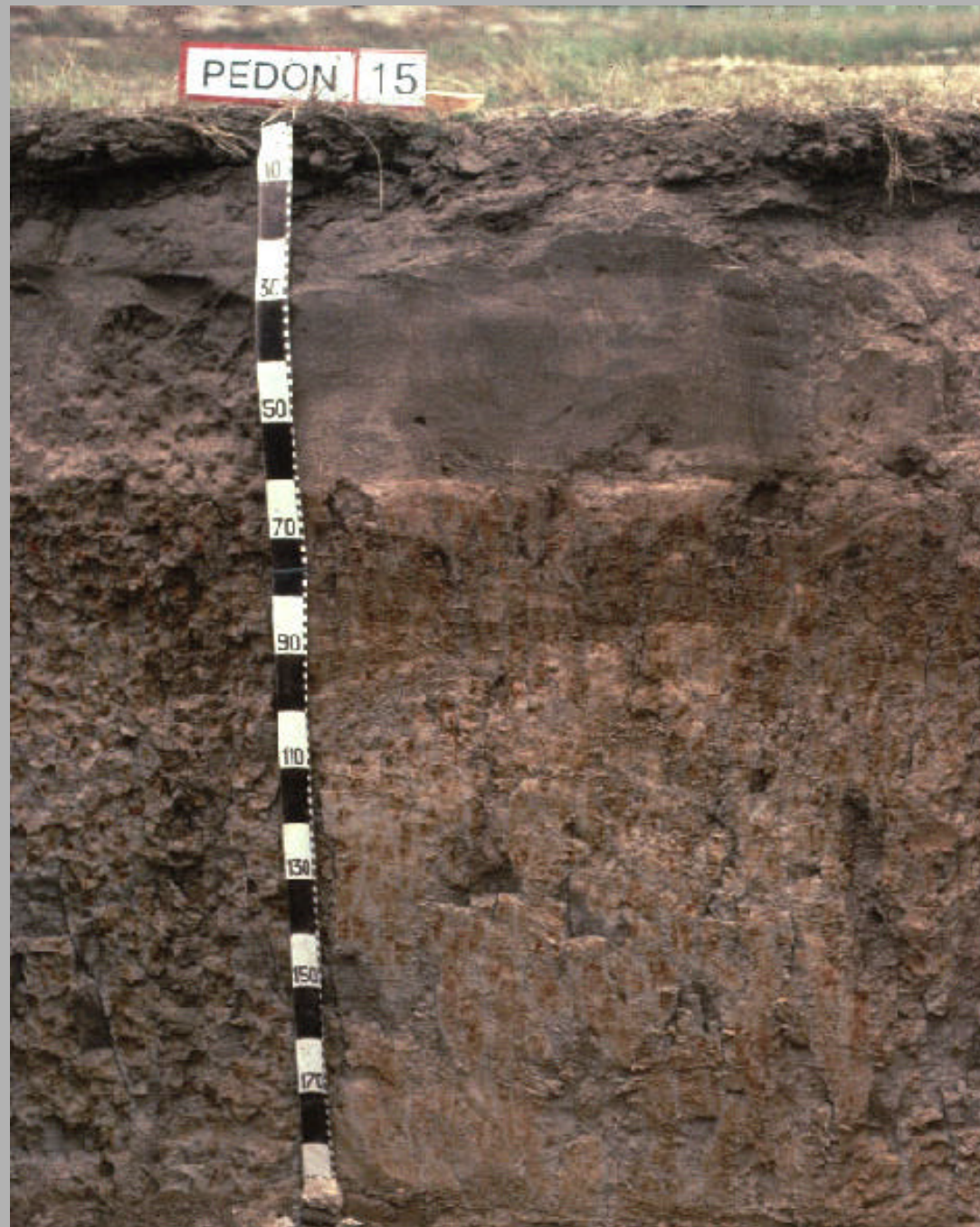
# Lithic Cryofolists

**Ricker  
Series  
Not Hydric**





# Aquic PaleudalFs



**Katy  
Series**

**Not Hydric**



# Aquic Glossudalfs



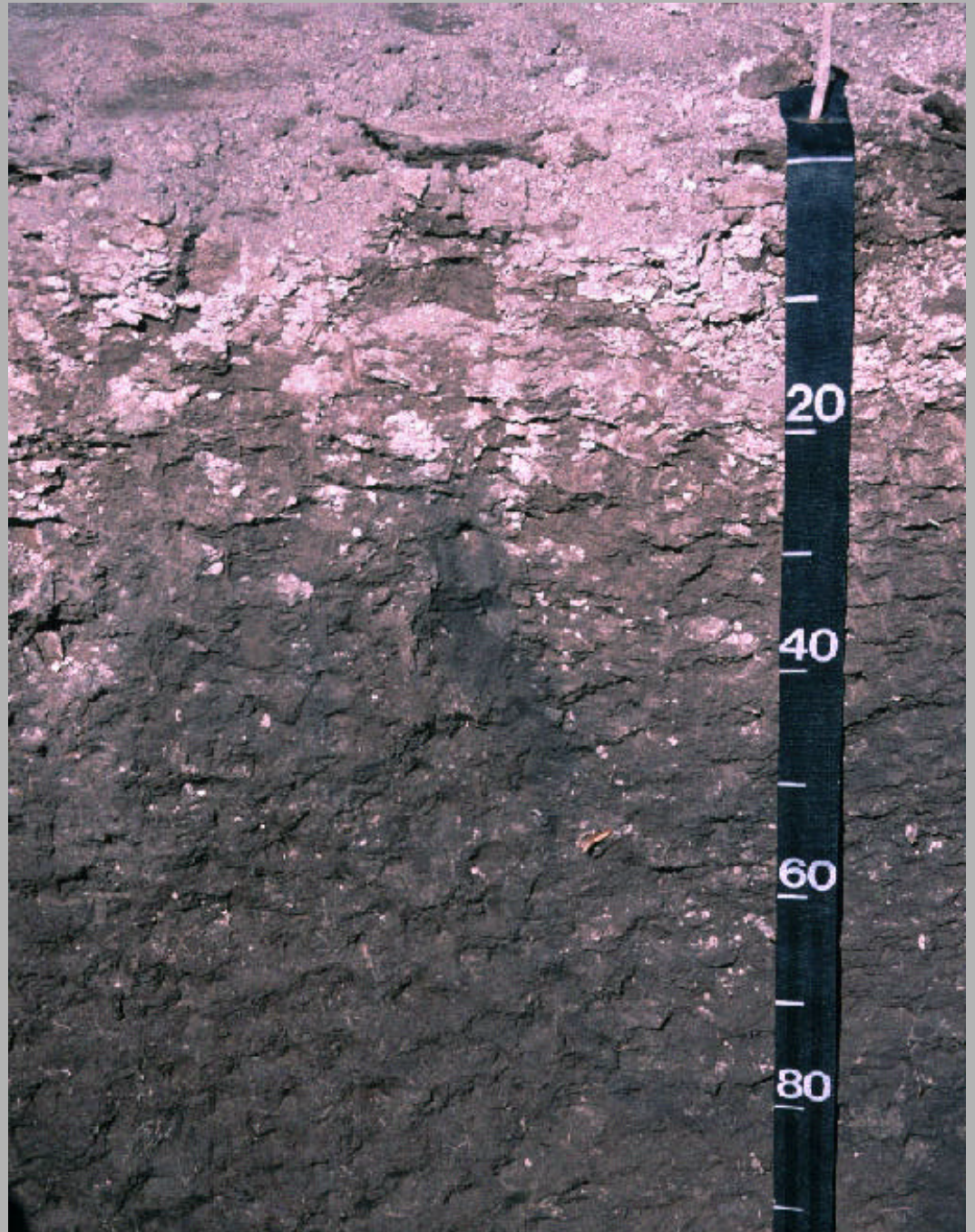


**Withee  
Series  
Not Hydric**



Typic Aquisalids

Unknown Series  
**Hydric**





# Aquic Quartzipsamments

Unknown  
Series

**Not Hydric**





Oxyaquic Dystrudepts

**Paxton Series**  
**Not Hydric**



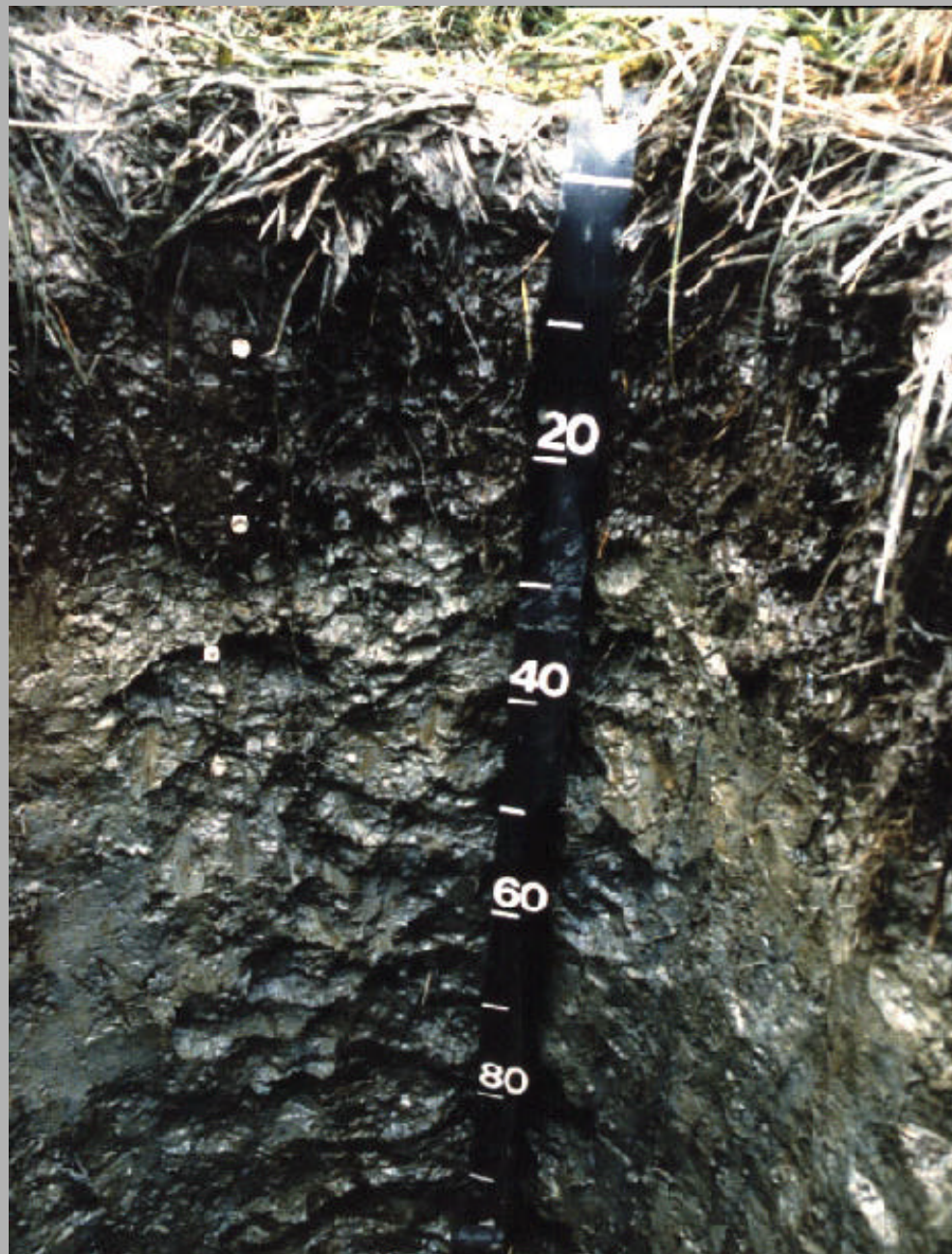


Typic Humaquepts



**Birdsall Series**

**Hydric**





# Vertic Argiaquolls

**Parnell Series**

**Hydric**

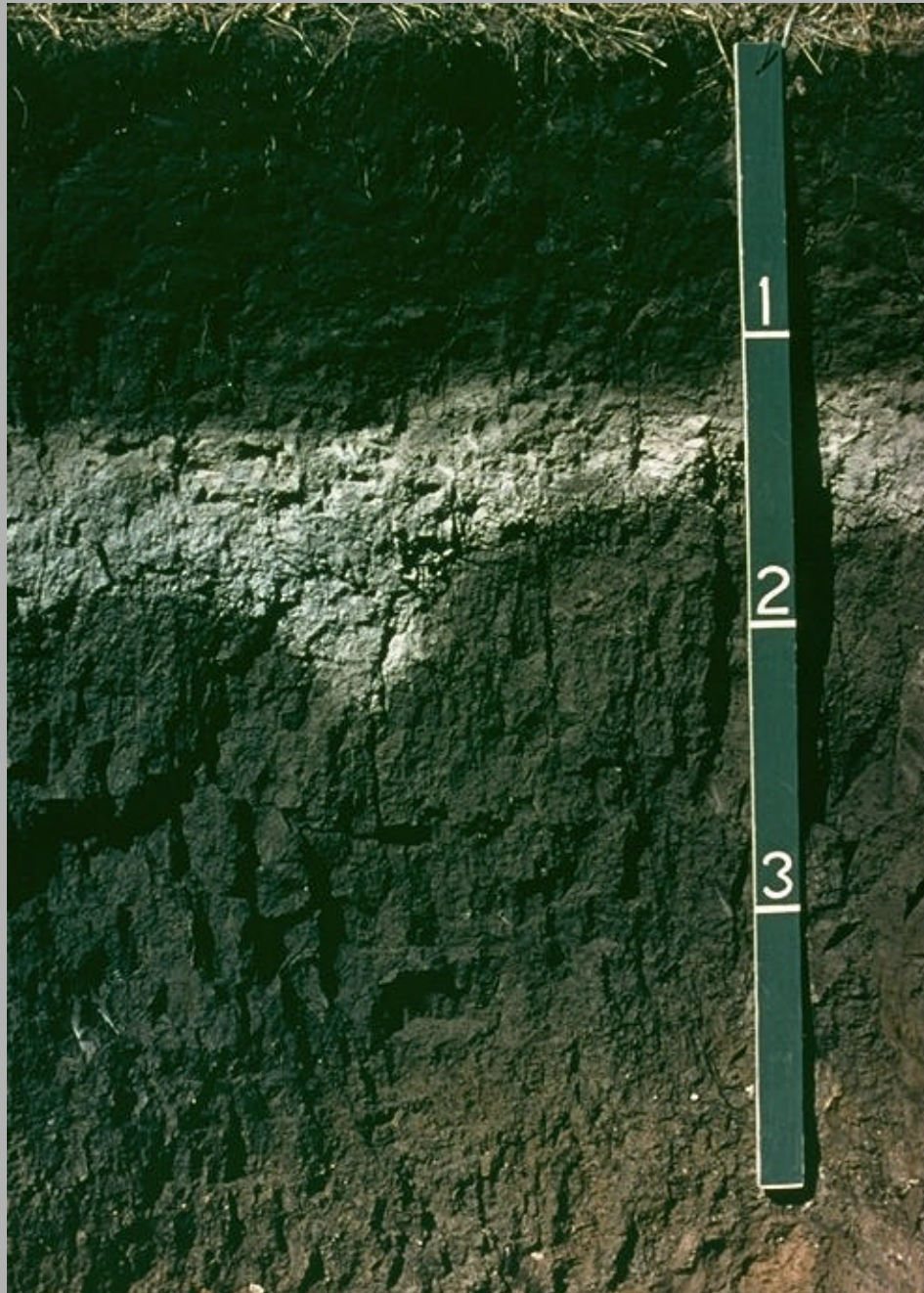




Argiaquic Argialbolls

# Tonka Series

## Hydric

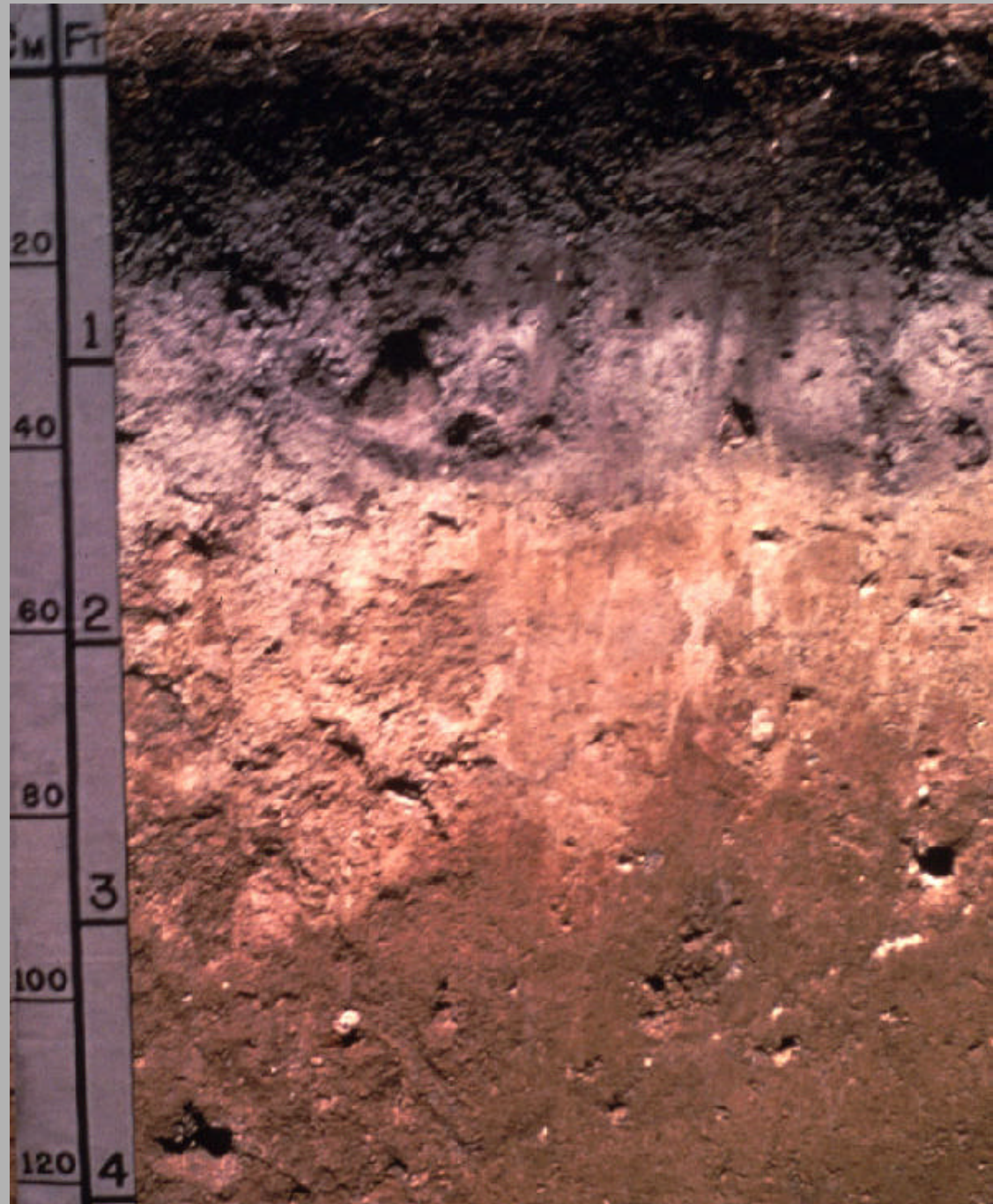




Aeric Calciaquolls

# Hamerly Series

## Not Hydric





# Aquic Haplorthods



## Sunapee Series

Not Hydric





Aeric Alaquods

**Leon Series**

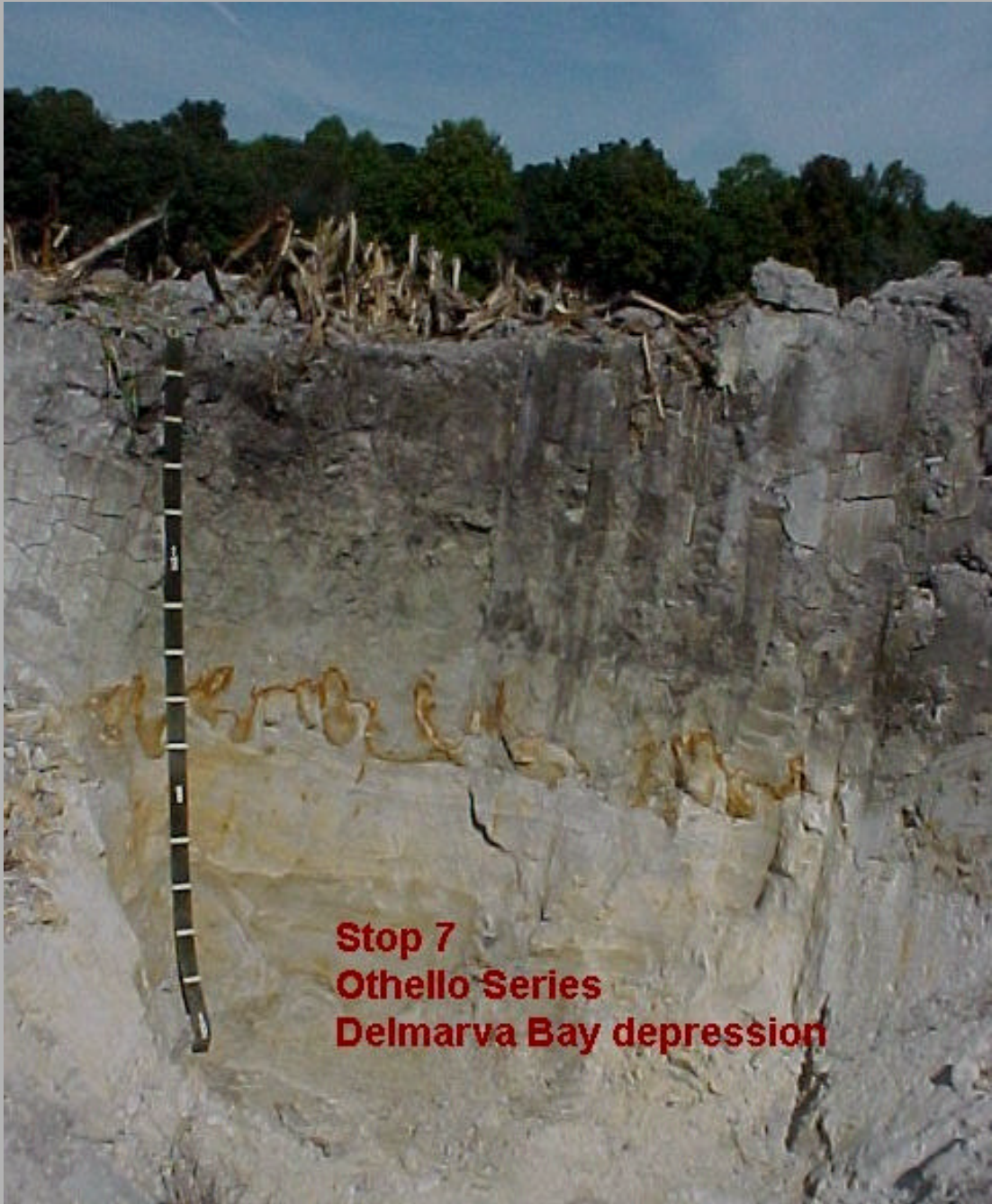
**Non-hydric phase**





# Typic Endoaquits

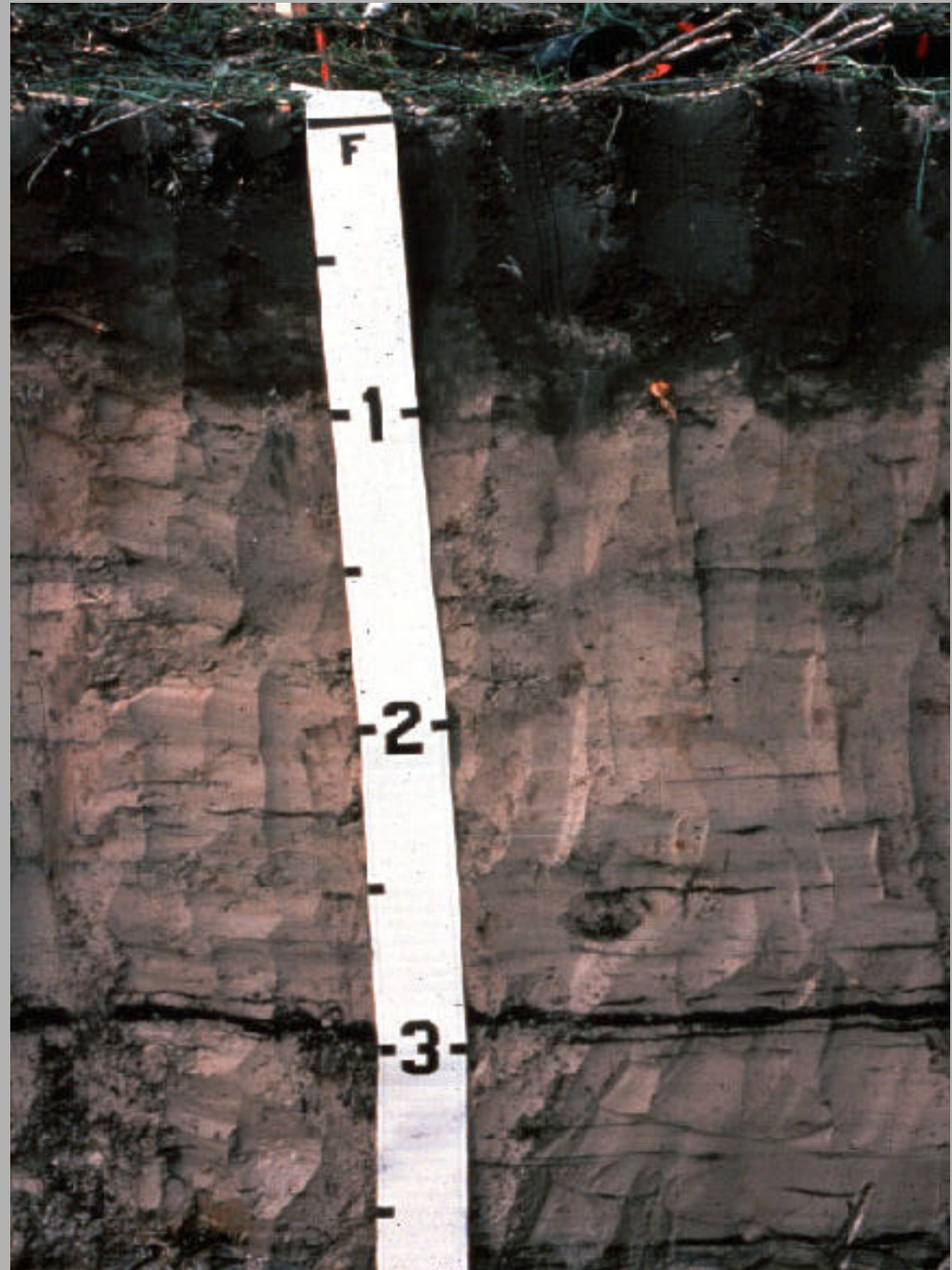
**Othello Series  
Hydric**





Typic Umbraquilts

Series Unknown  
Hydric





# Chromic Epiacquerts



**Sharkey Series**  
**Hydric**



# Summary

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- ⌘ Interpretation of Soil Taxonomic names in Soil Survey manuscripts provides another tool for identifying hydric soils.
  - ☑ Most useful off-site as part of preliminary analysis
  - ☑ Also useful to identify potential “problem” hydric soils