Using the Field Indicators to Assess Long-Term Hydrology

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Objective of this Presentation

- To gain an appreciation for the potential use of Field Indicators of Hydric Soils to assess hydrologic characteristics of individual wetlands.
- *Not* to learn the Field Indicators.

Can we accurately characterize wetland hydrology in one visit?

Field Indicators of Hydric Soils

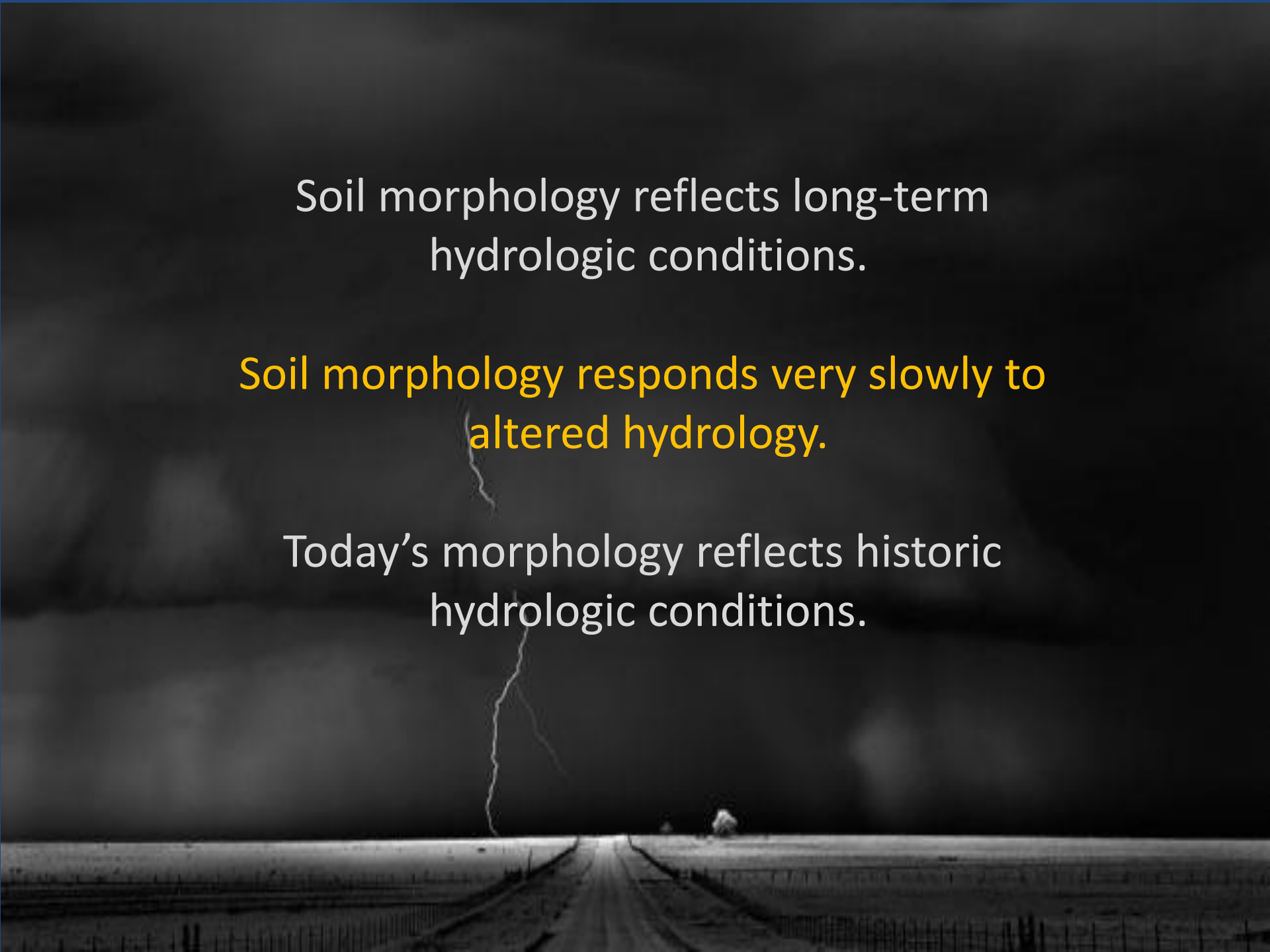
- Soil morphology reflects long-term hydrologic conditions.
- Basis for Field Indicators of Hydric Soils
- How closely do individual indicators reflect a discrete set of hydrologic conditions?
- Can the Field Indicators be used to characterize hydroperiods beyond the standard jurisdictional criteria?

Hydrologic Characteristics

- Hydroperiod
  - Duration of inundation
  - Average water table depth
  - Dynamic vs. static water table
- Episaturation vs. endosaturation
- Recharge vs. discharge

Benefits of Hydrologic Characterization

- Hydrologic characteristics impact functional capacity.
  - Hydrologic functions
  - Biogeochemical functions
- Wetland restoration
- Rapid assessment of wetland condition


Soil morphology reflects long-term hydrologic conditions.
Soil morphology responds very slowly to altered hydrology.
Today's morphology reflects historic hydrologic conditions.

Basis for the Field Indicators

Most indicators are based on low chroma colors near the surface due to iron reduction &/or organic matter accretion.

In some cases redox concentrations are required to ‘prove’ the low chroma is due to wetness.

1. Short term saturation: orange + grey
2. Long term saturation: uniform grey
3. Long term inundation: black & brown

1

2

3

Wet

Iron reduction & segregation

Wetter

Thick, dark A horizons

Wettest

O horizons organic

Wet

F3. Depleted matrix

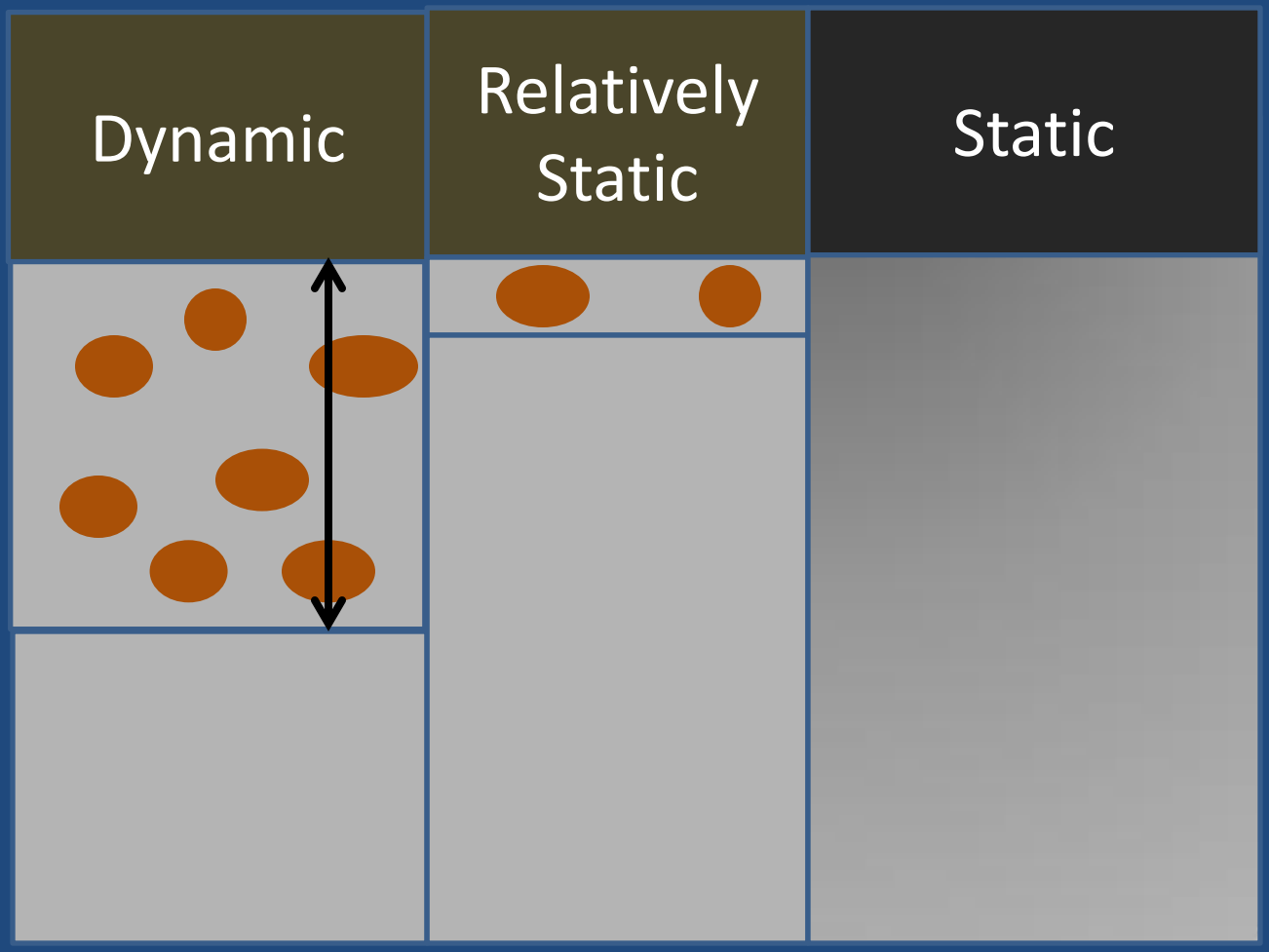
Wetter

A11. Depleted below dark surface

Wettest

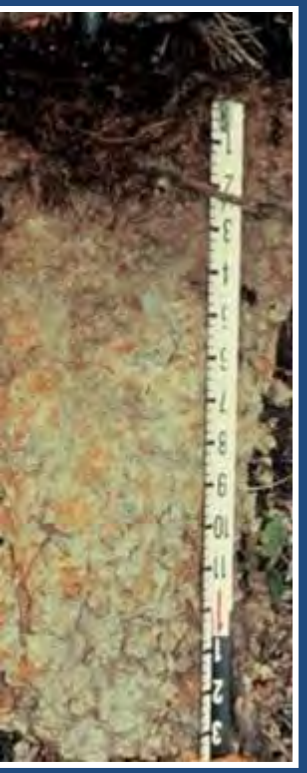
A3. Black histic

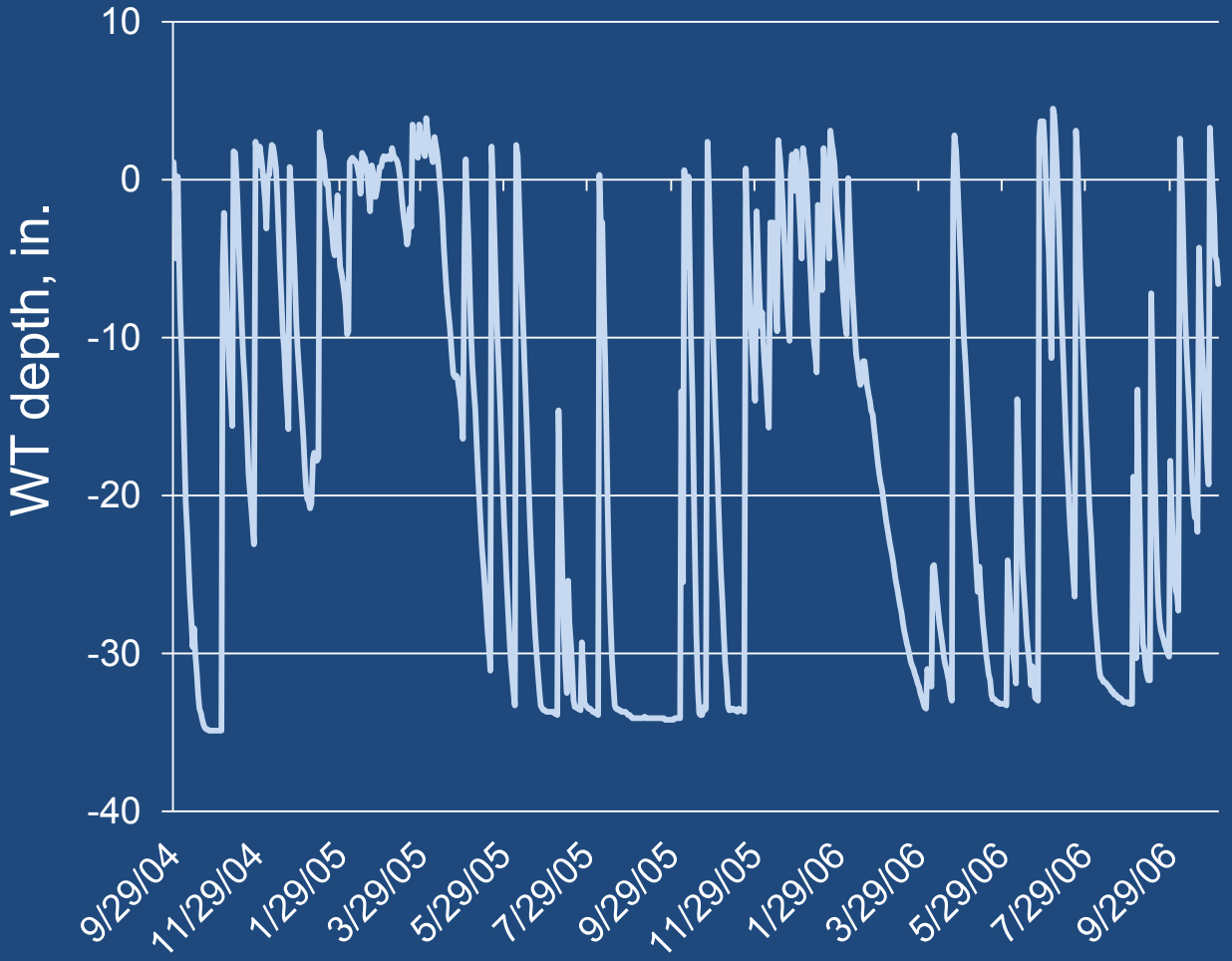
Water Table Fluctuations



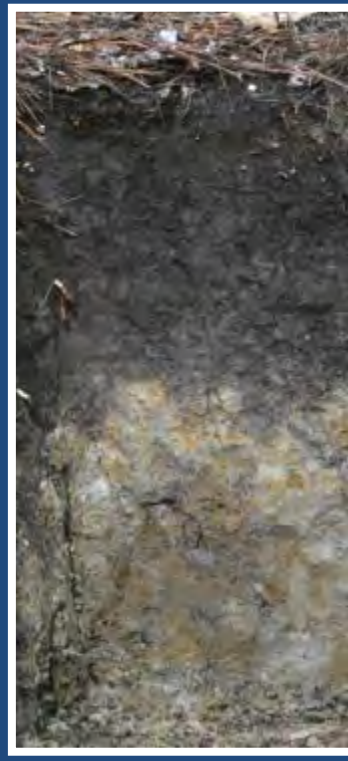
Seasonally Saturated

F3



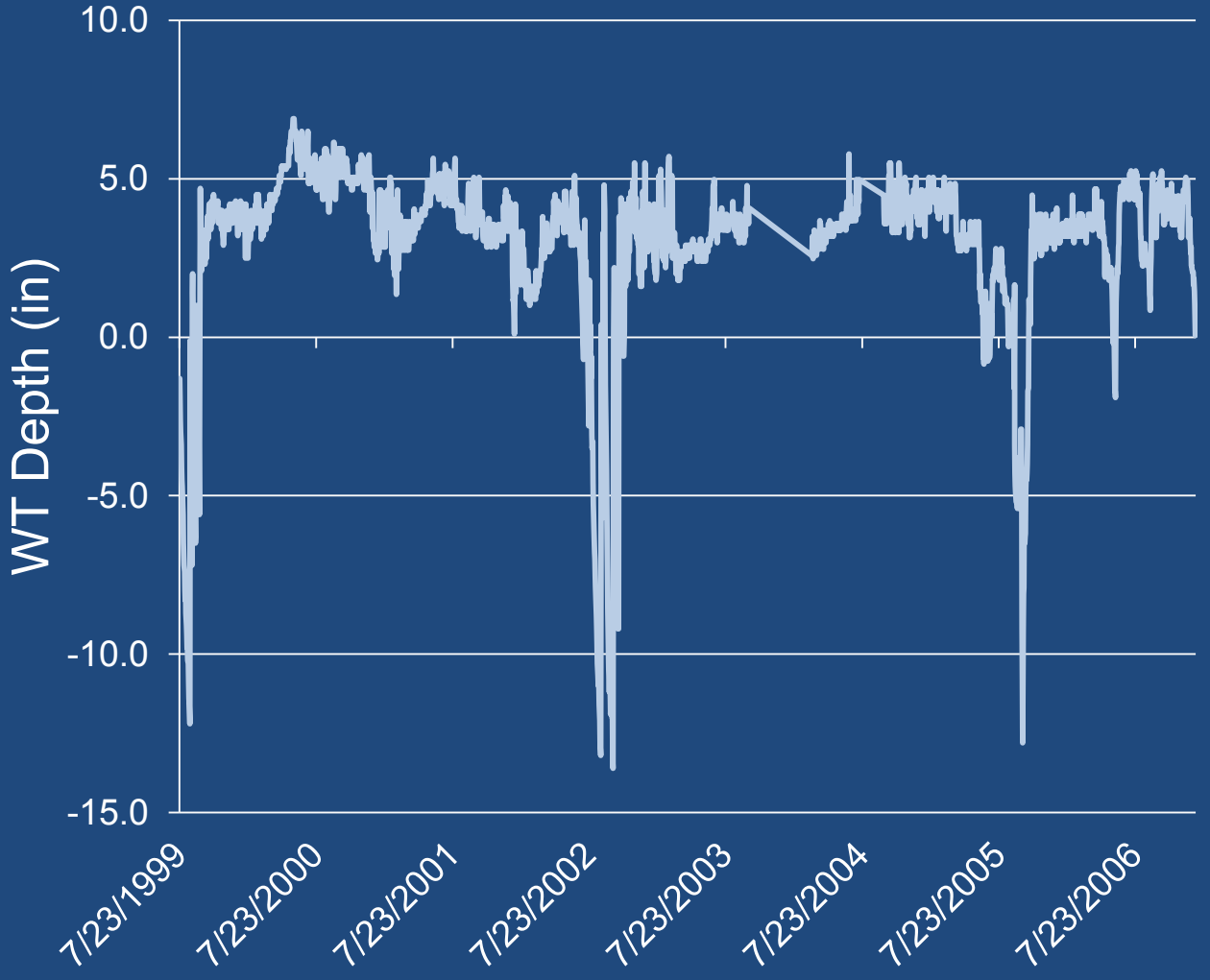


A11

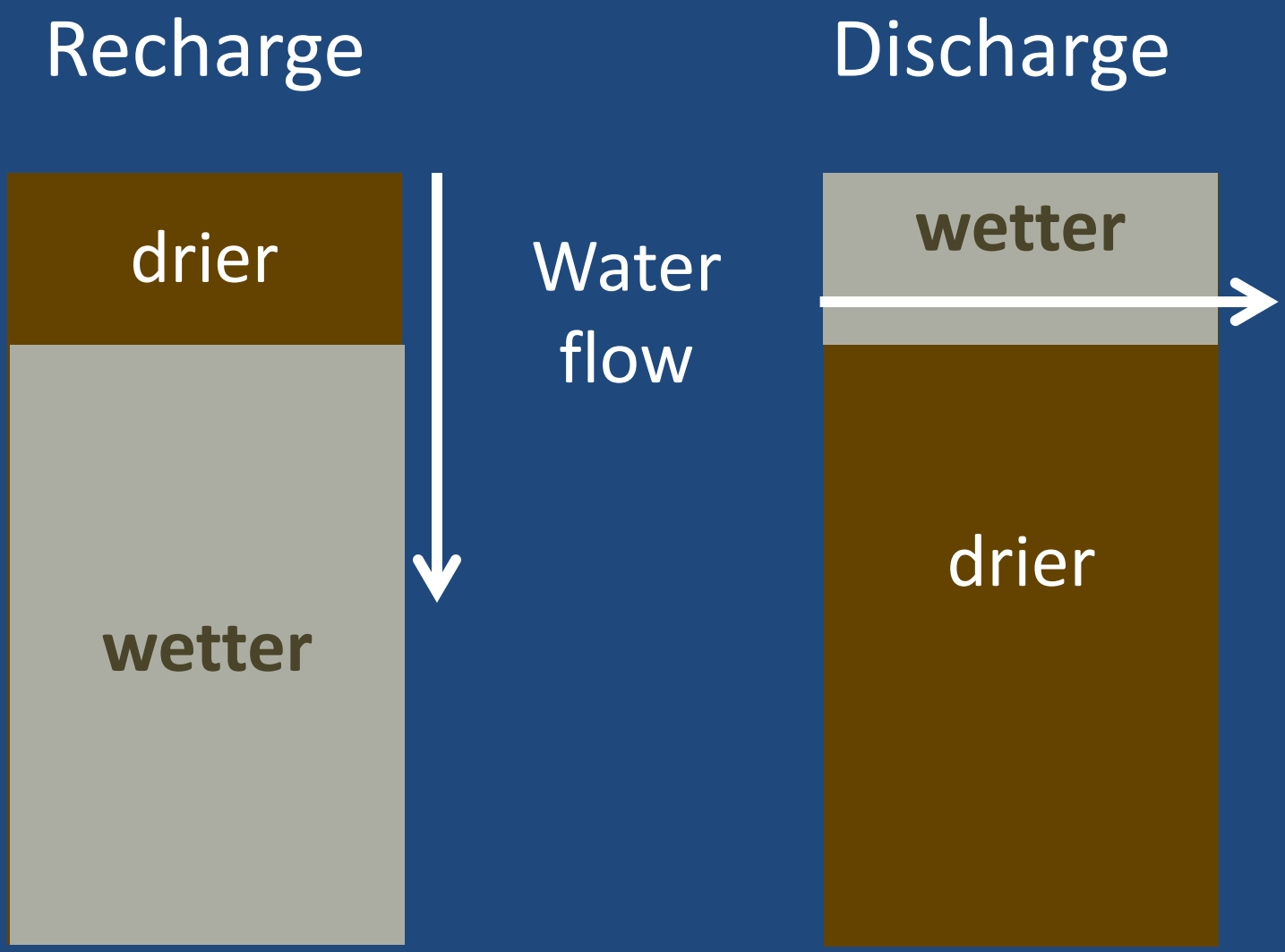


Permanently Inundated

A3



F6


Recharge
Discharge
drier
wetter
Water flow
wetter
drier

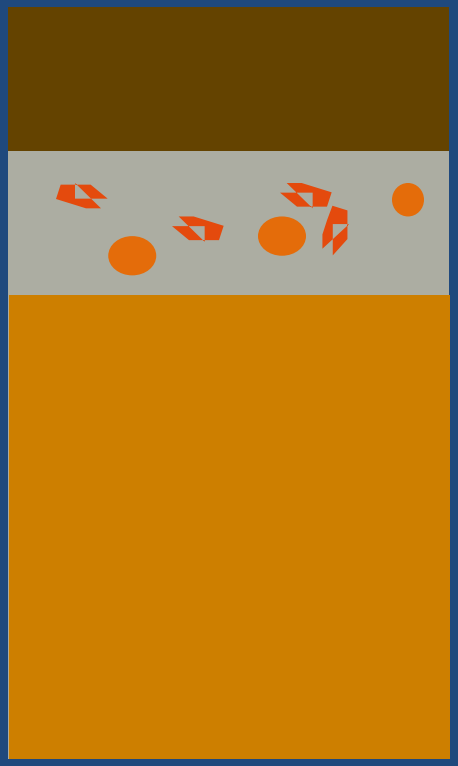
Discharge Wetland

Recharge Wetland

F3. Depleted Matrix: Recharge or Discharge?

1. *A layer at least 2" thick all within 6" of the surface.*
2. *A layer at least 6" thick starting within 10"of the surface.*

1. Discharge



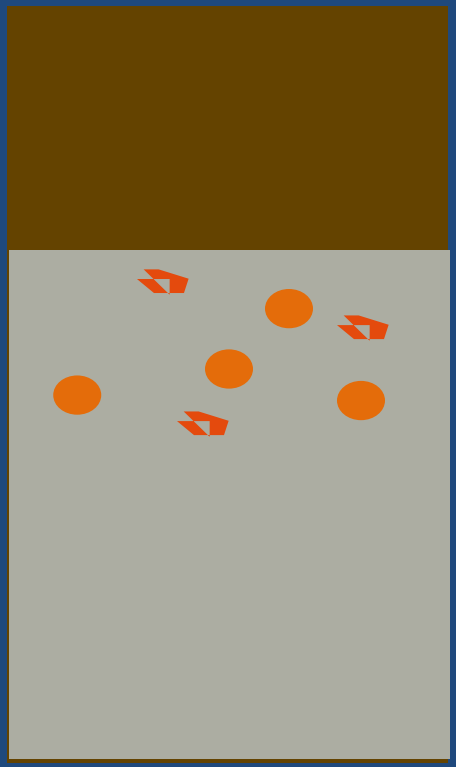
5"

10"

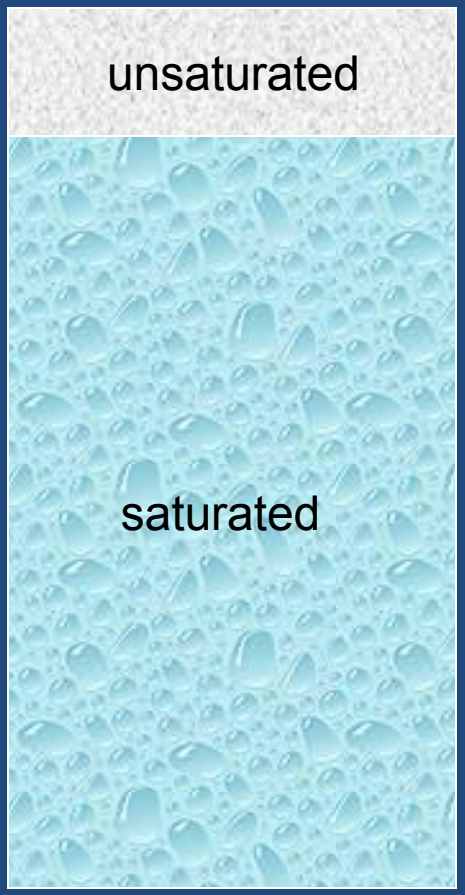
15"

20"

2. Recharge



Endosaturated



Episaturated (perched)

Perched Indicators: F8. Redox Depressions

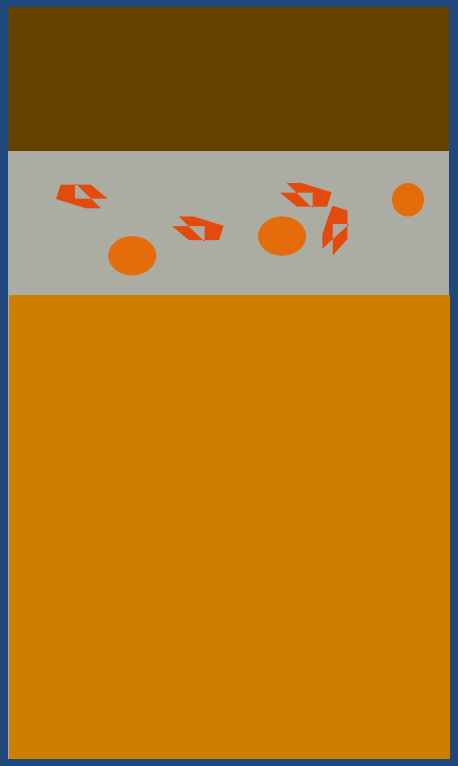
In closed depressions subject to ponding, ≥5 %

redox concentrations in a layer ≥ 2” thick and is entirely within the upper 6” of the soil.

F3. Depleted Matrix: Endosaturated or Episaturated?

1. *A layer at least 2" thick all within 6" of the surface.*
2. *A layer at least 6" thick starting within 10"of the surface.*

1. Episaturated



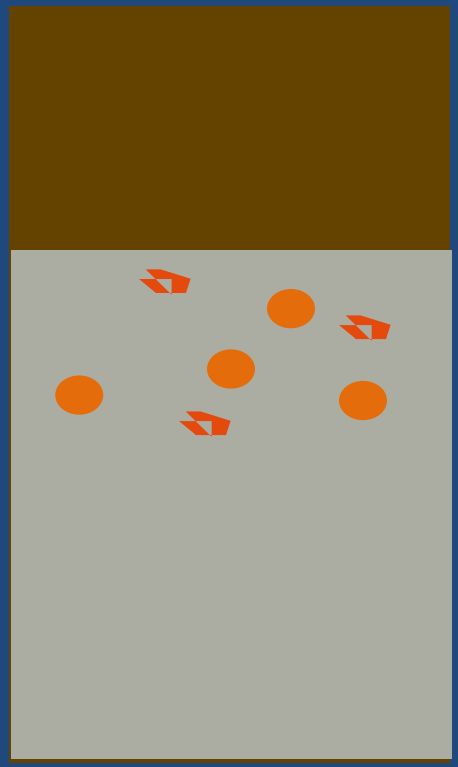
5"

10"

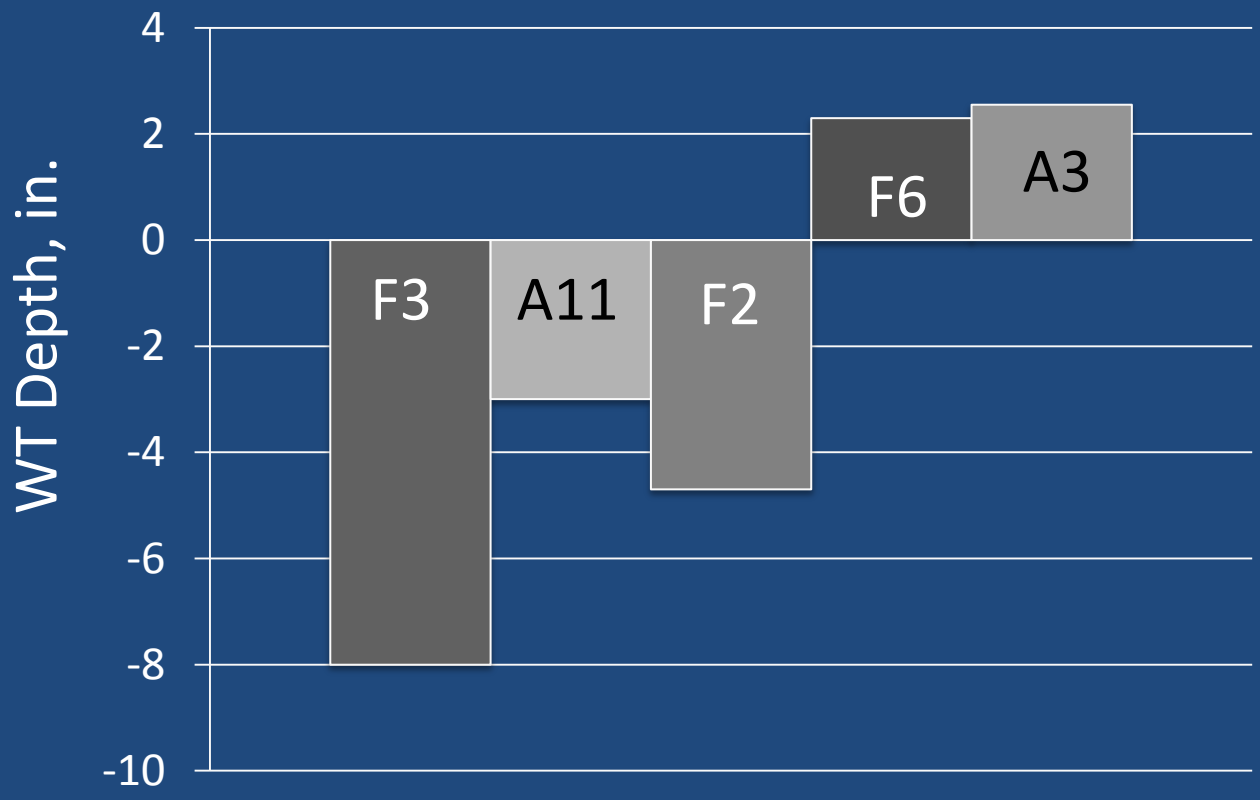
15"

20"

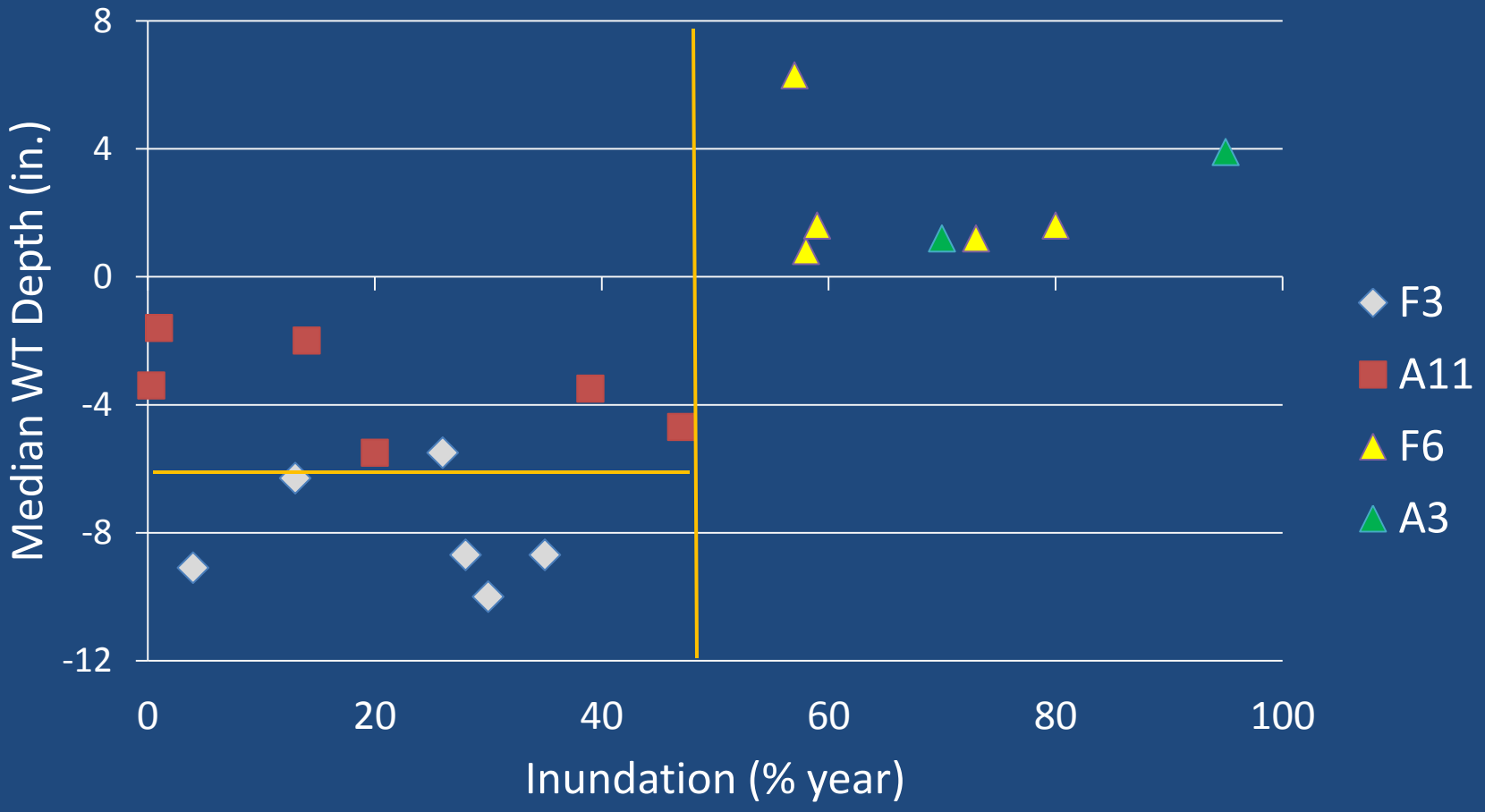
2. Endosaturated



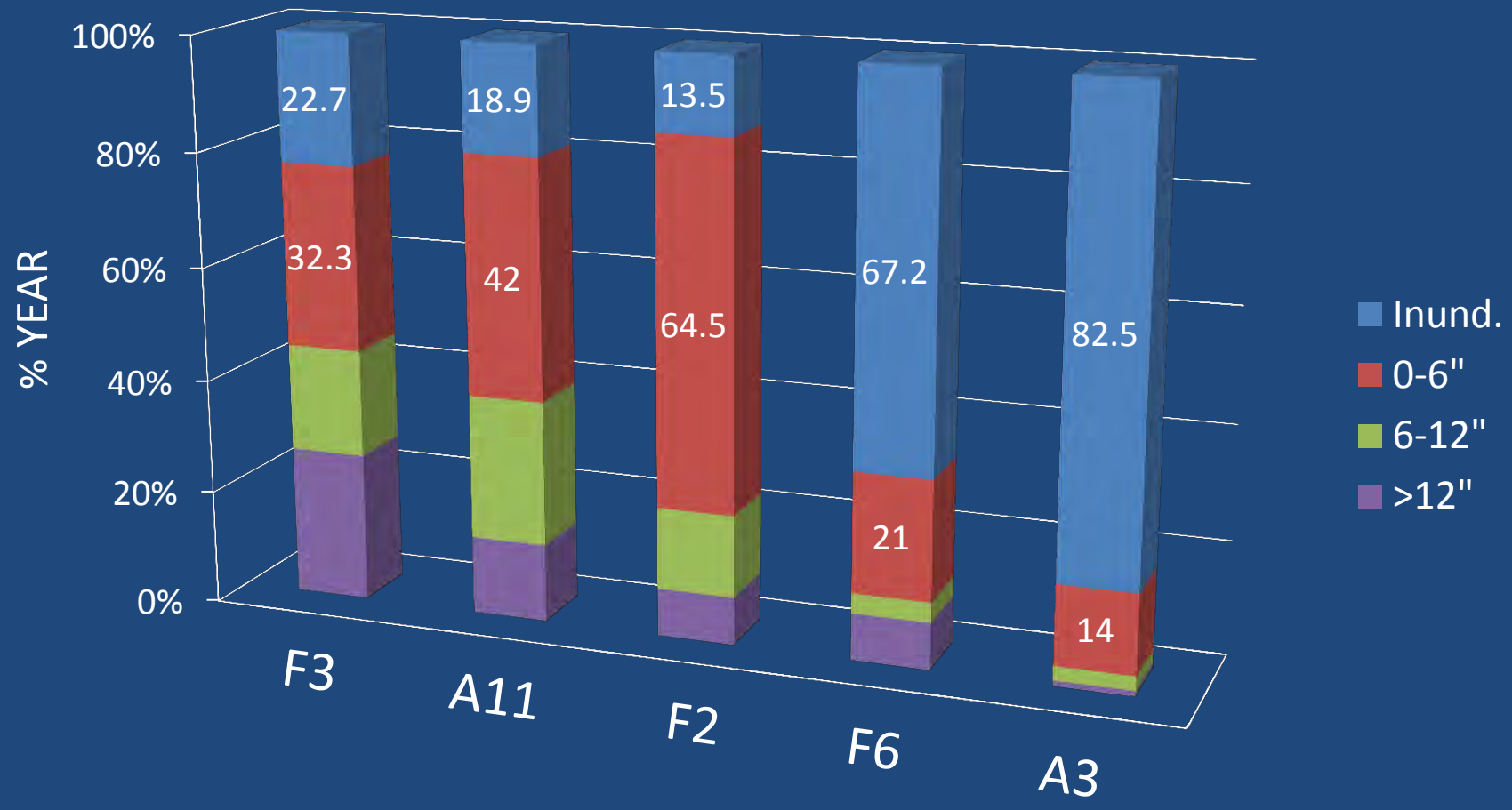
Median WT Depth for Piedmont Slope Wetlands Separated by Field Indicator



Hydroperiod Characteristics of Piedmont Slope Wetlands: Inundation & Median Water Table Depth



Temporal Distribution (% year) of WT Depth in Piedmont Slope Wetlands.

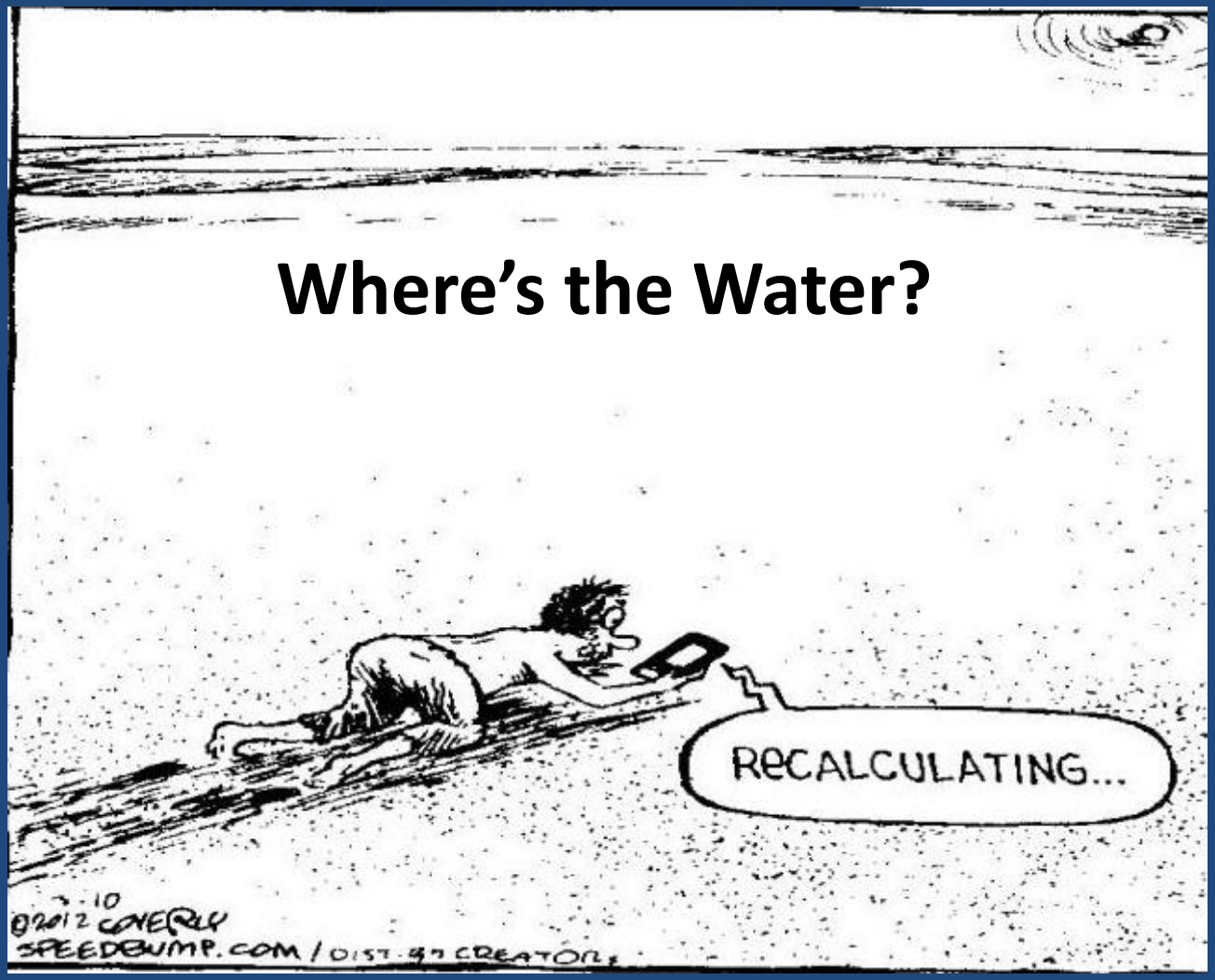


Review

- F3. Depleted Matrix: seasonal saturation, dynamic water table (mineral soil flat)
- A3. Black Histic: long-term inundation (backswamp)
- A5. Stratified Layers: floodplains, discharge systems
- F2. Loamy Gleyed Matrix: recharge systems, endosaturation
- A8. Redox Depressions: episaturation

Considerations When Using Field Indicators to Characterize Hydrology

- Regionalized
- Landscape position
- Other soil characteristics
  - Parent material
  - Texture
  - Structure
  - Confining layers



Wetland Restoration. How do we return when we don't know where we where?