Methodology For Estimating Ash Depth in Forest Soils

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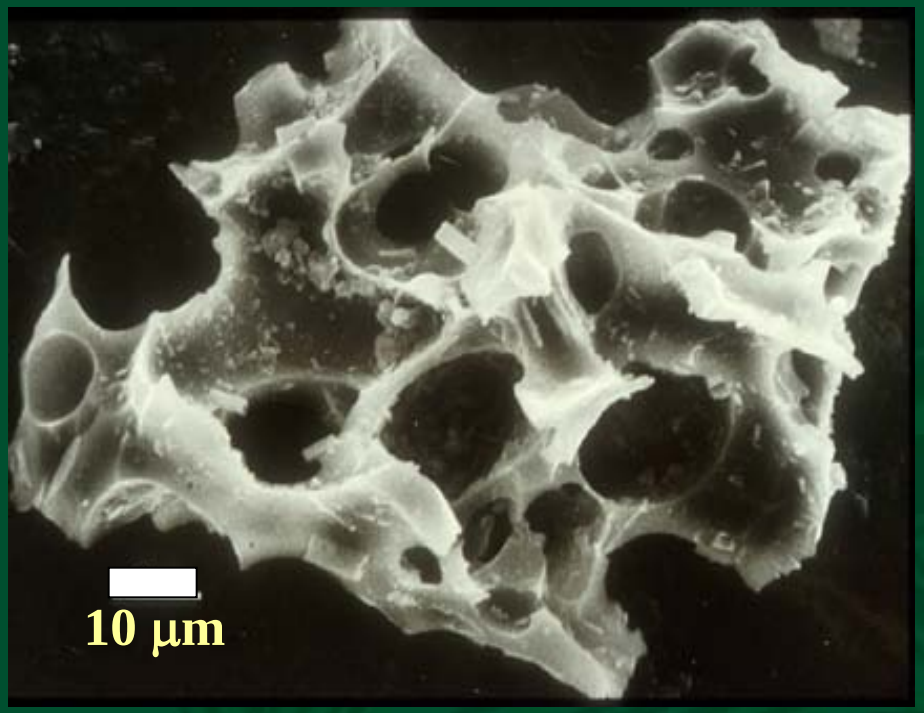
Review:
Why Do We Want To Know The Distribution of Volcanic Ash?

Properties

- Nutrients?
- Water Holding Capacity?
- Productivity?

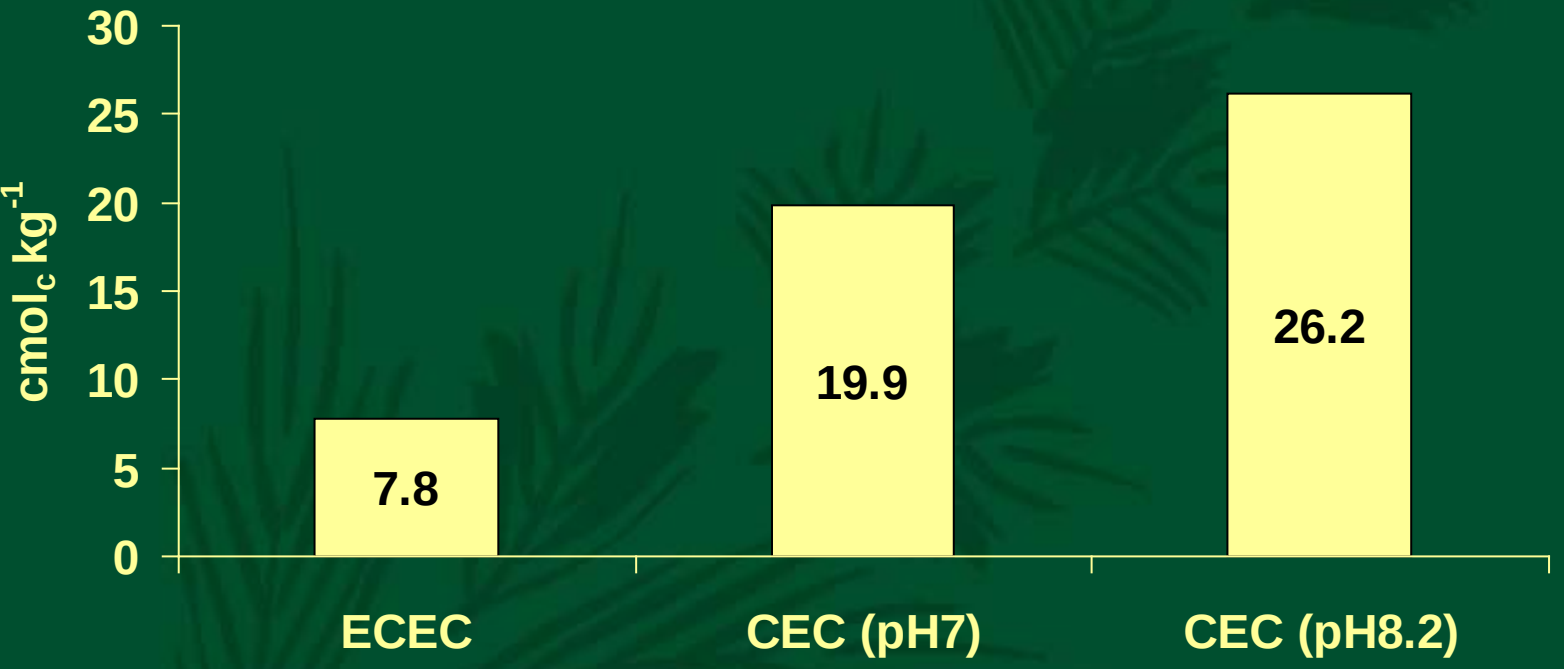
Nutrient Status



Element	%
SiO_2	72.0
Al_2O_3	14.4
Na_2O	5.1
Fe_2O_3	2.1
K_2O	2.7
CaO	1.6
MgO	0.5
TiO_2	0.4

(UI Soil Characterization Laboratory)

Cation Exchange Capacity in Ash Soils



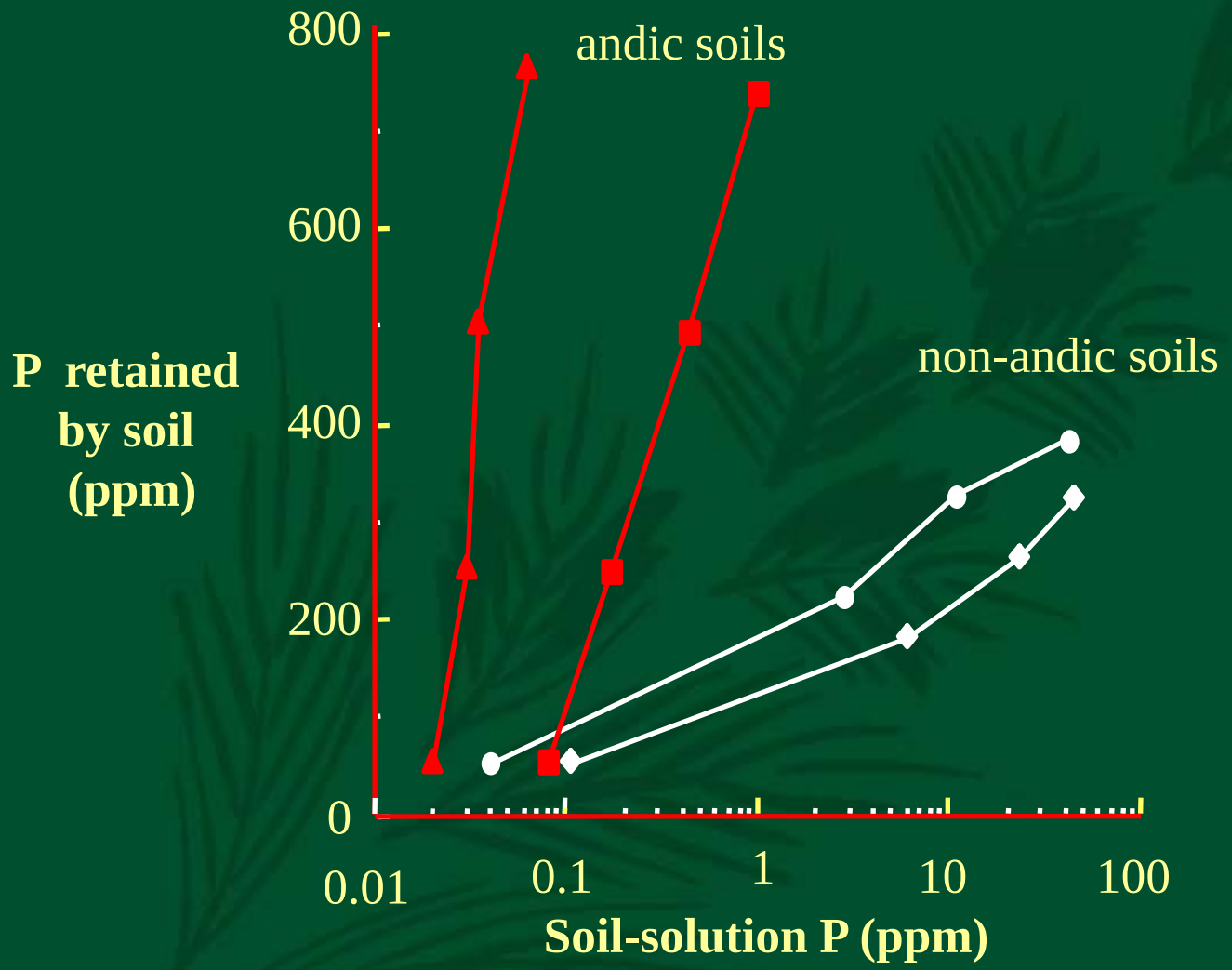
Reference:

Organic soil >100

Clay soil ~ 50-80

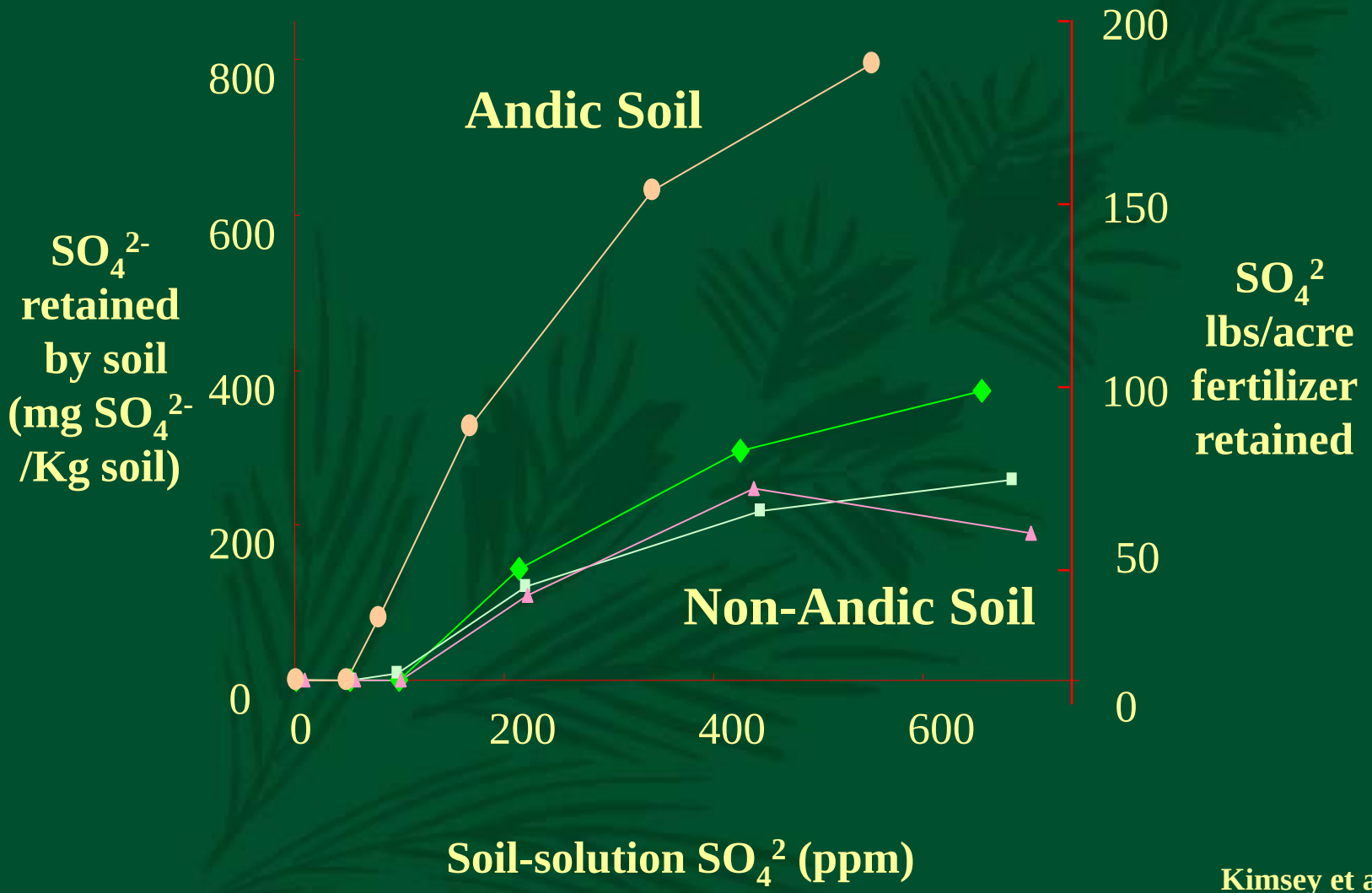
McDaniel et al., 2005

Anion Exchange Capacity in Ash Soils



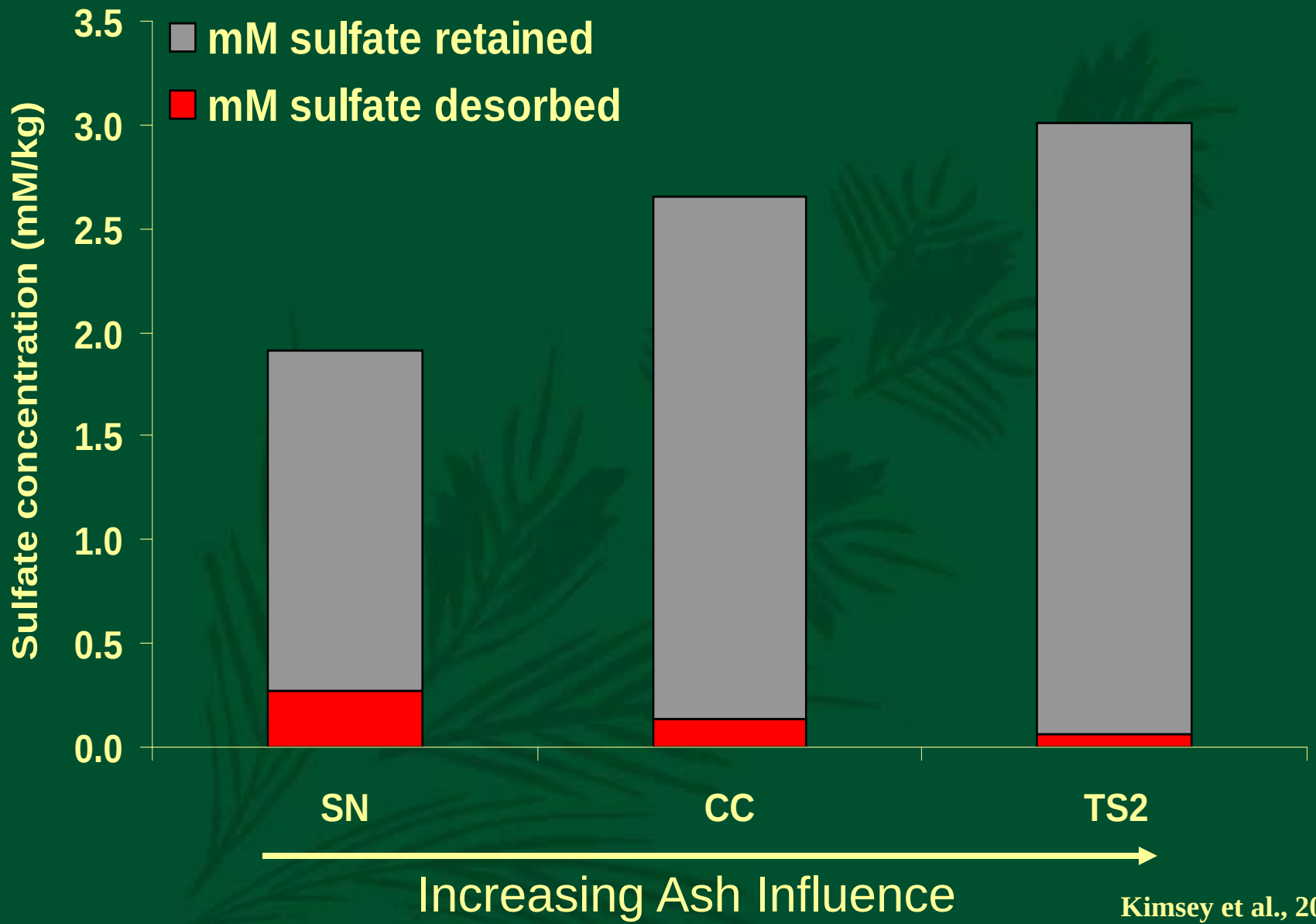
(UI Soil Characterization Laboratory)

Anion Exchange Capacity in Ash Soils



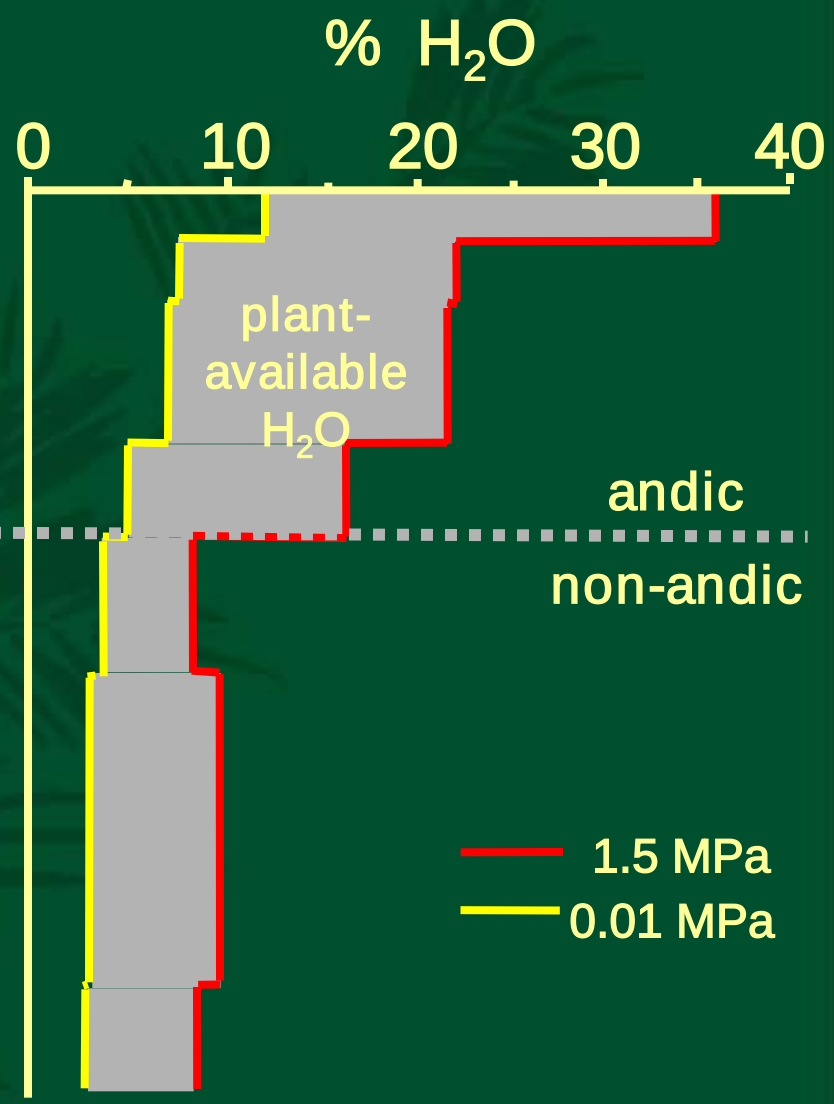
Kimsey et al., 2005

Sulfate Retention in Ash Soils



Kimsey et al., 2005

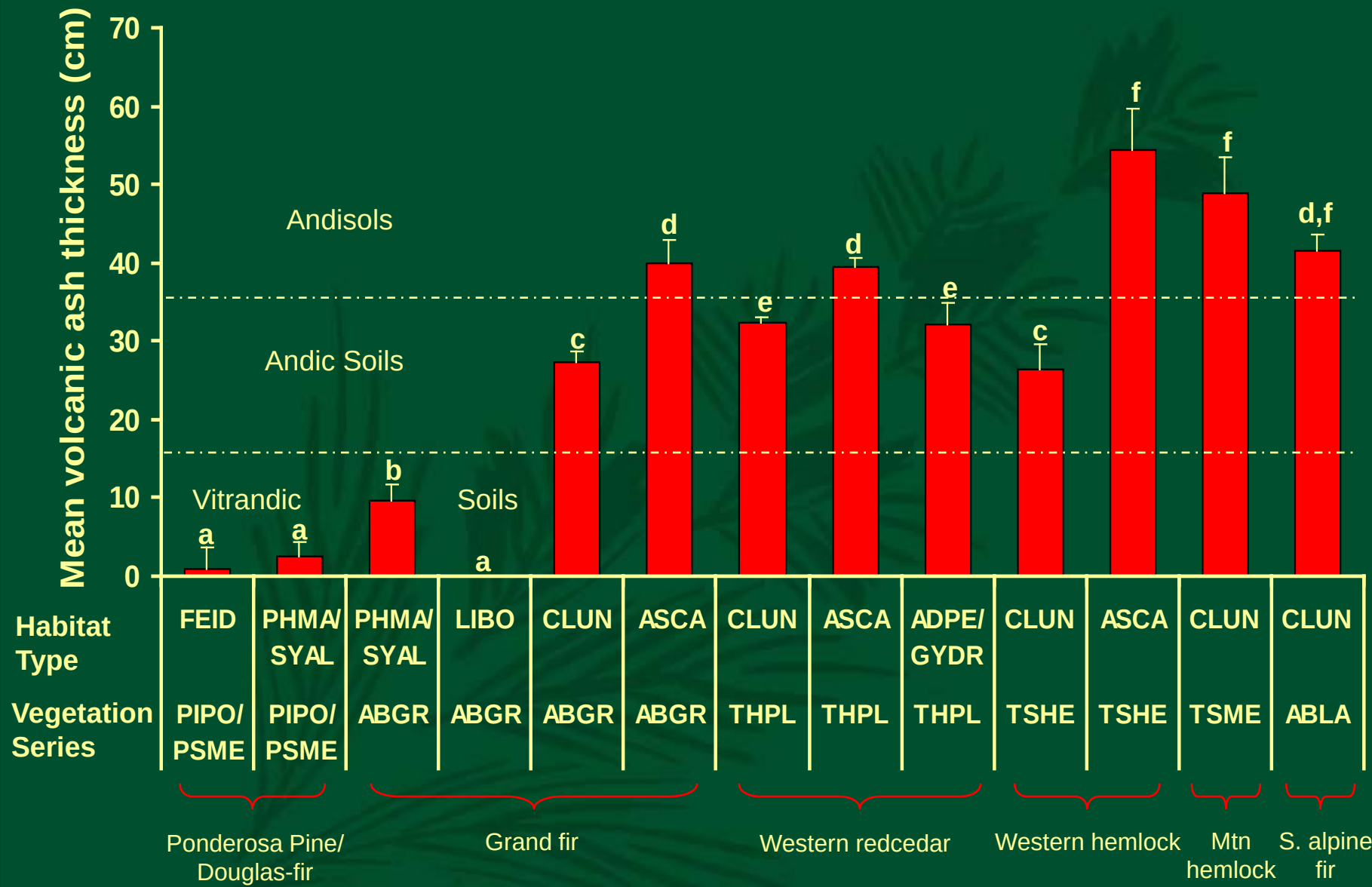
Water Holding Capacity



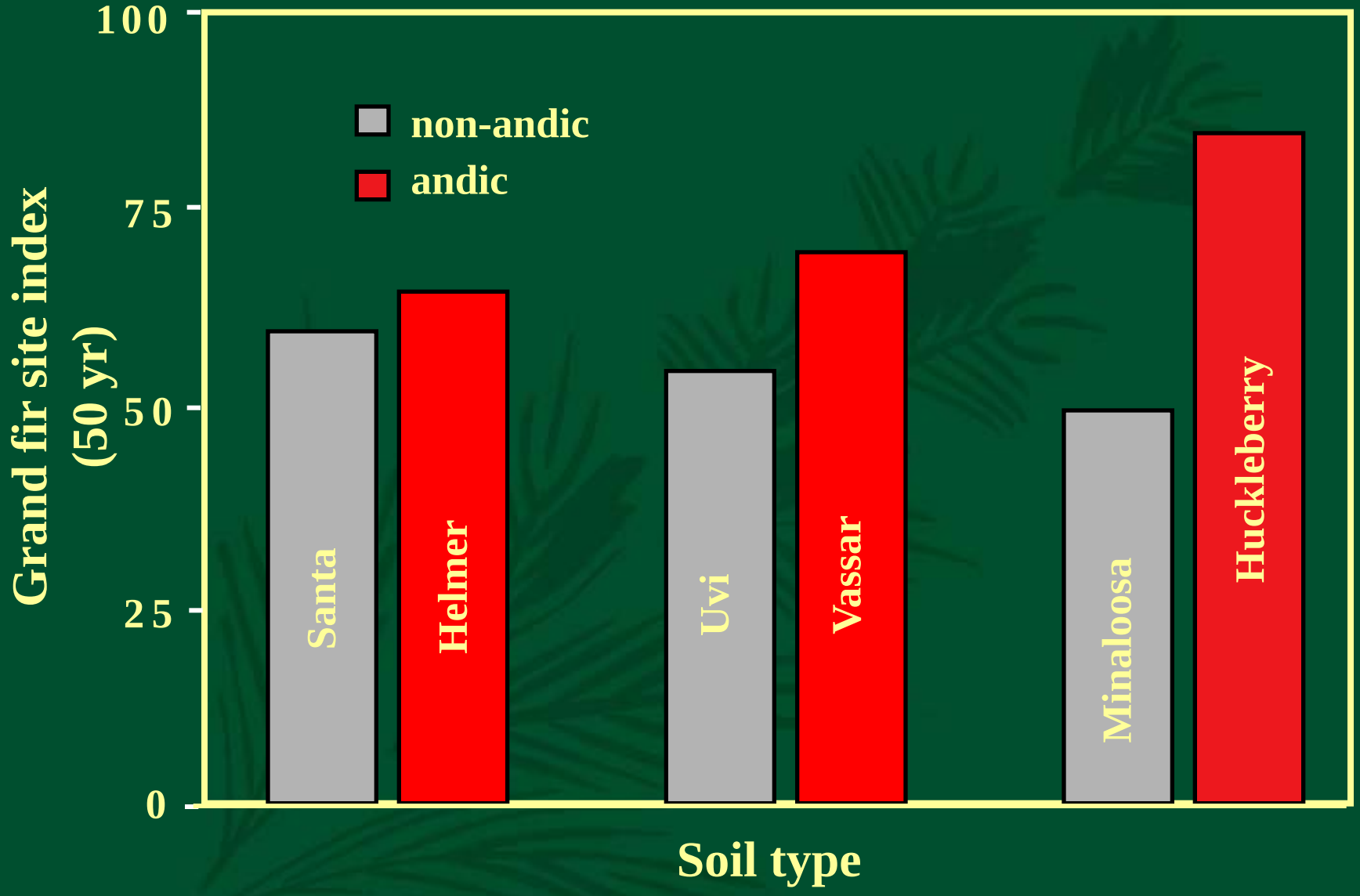
(UI Soil Characterization Laboratory)

Kimsey et al., 2006

Plant Communities & Ash

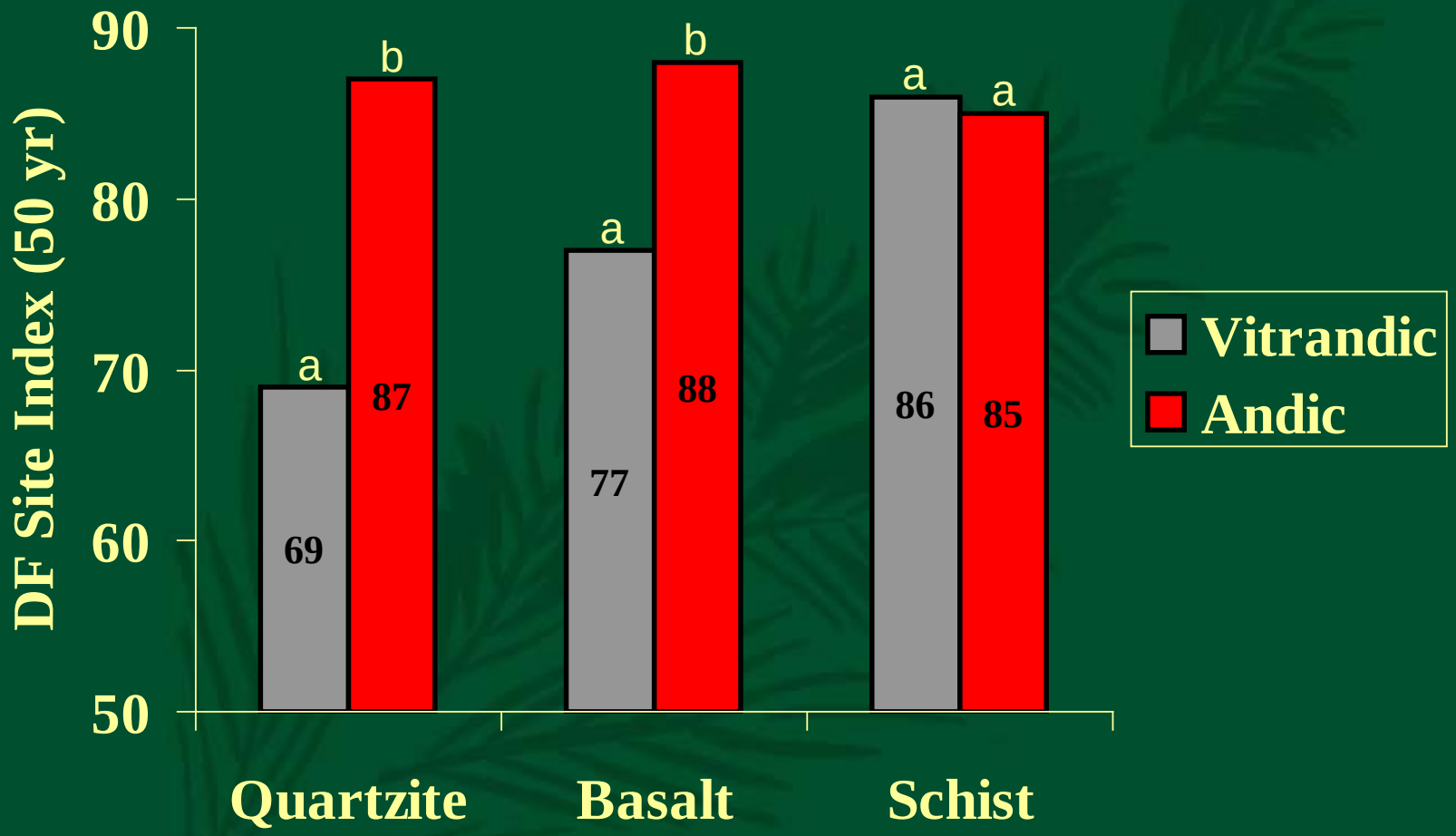


Site Productivity: Ash vs. Non-Ash Soils



(from SCS Soil Survey of Latah County Area, Idaho)

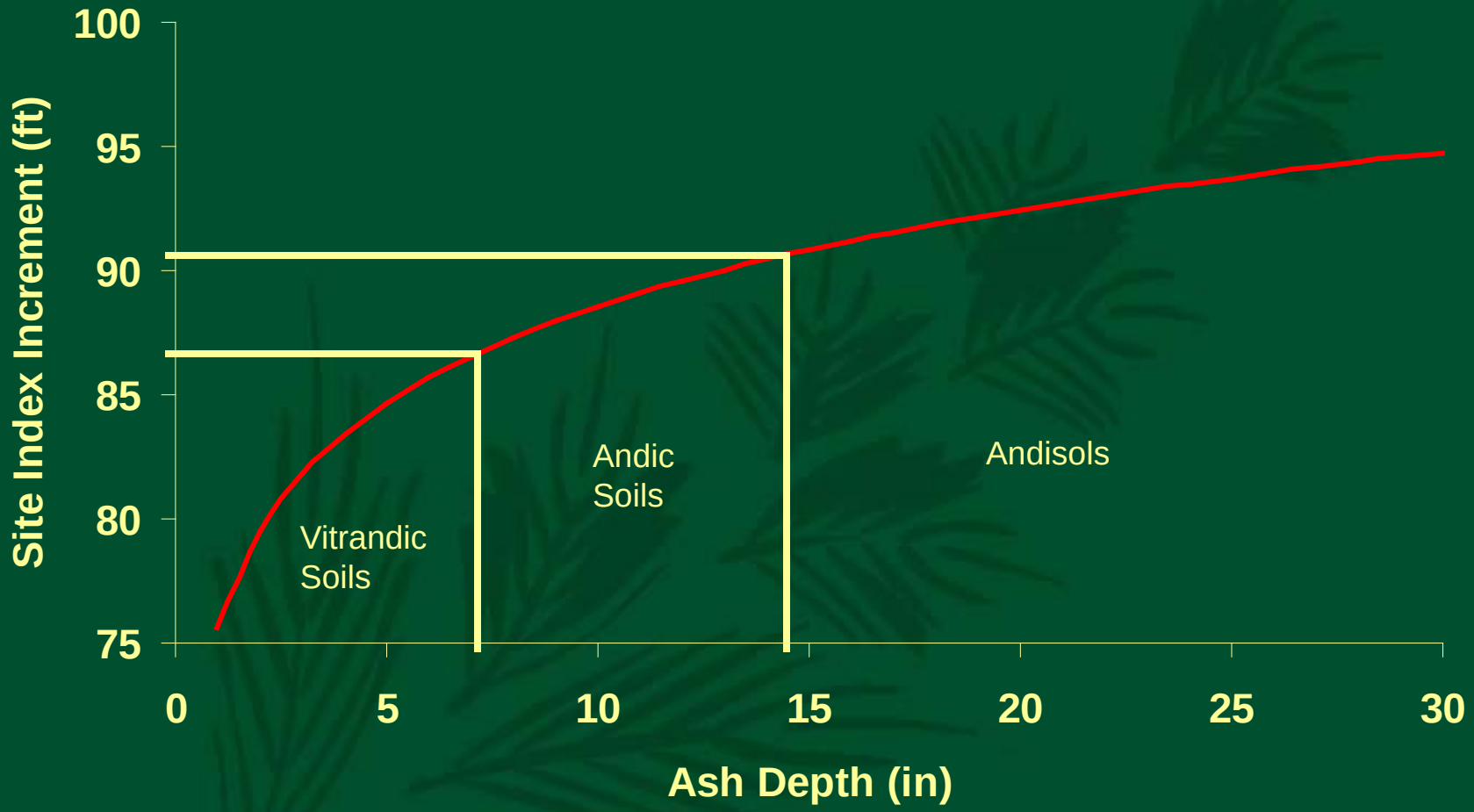
Site Productivity: Ash & Rock Type



Grand fir Vegetation Series x All Habitat Types

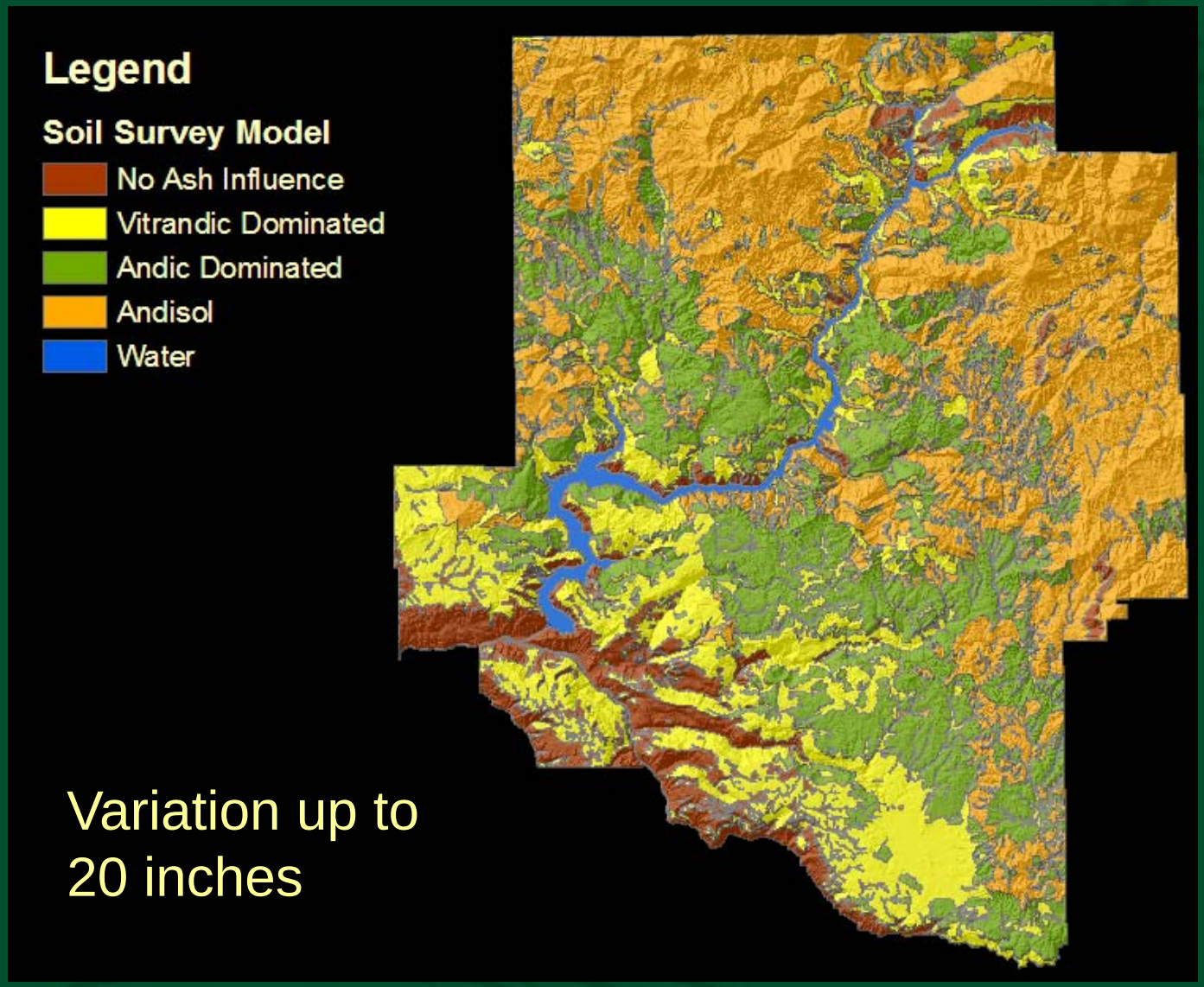
Kimsey 2005, unpublished

Ash & Douglas-fir Site Index

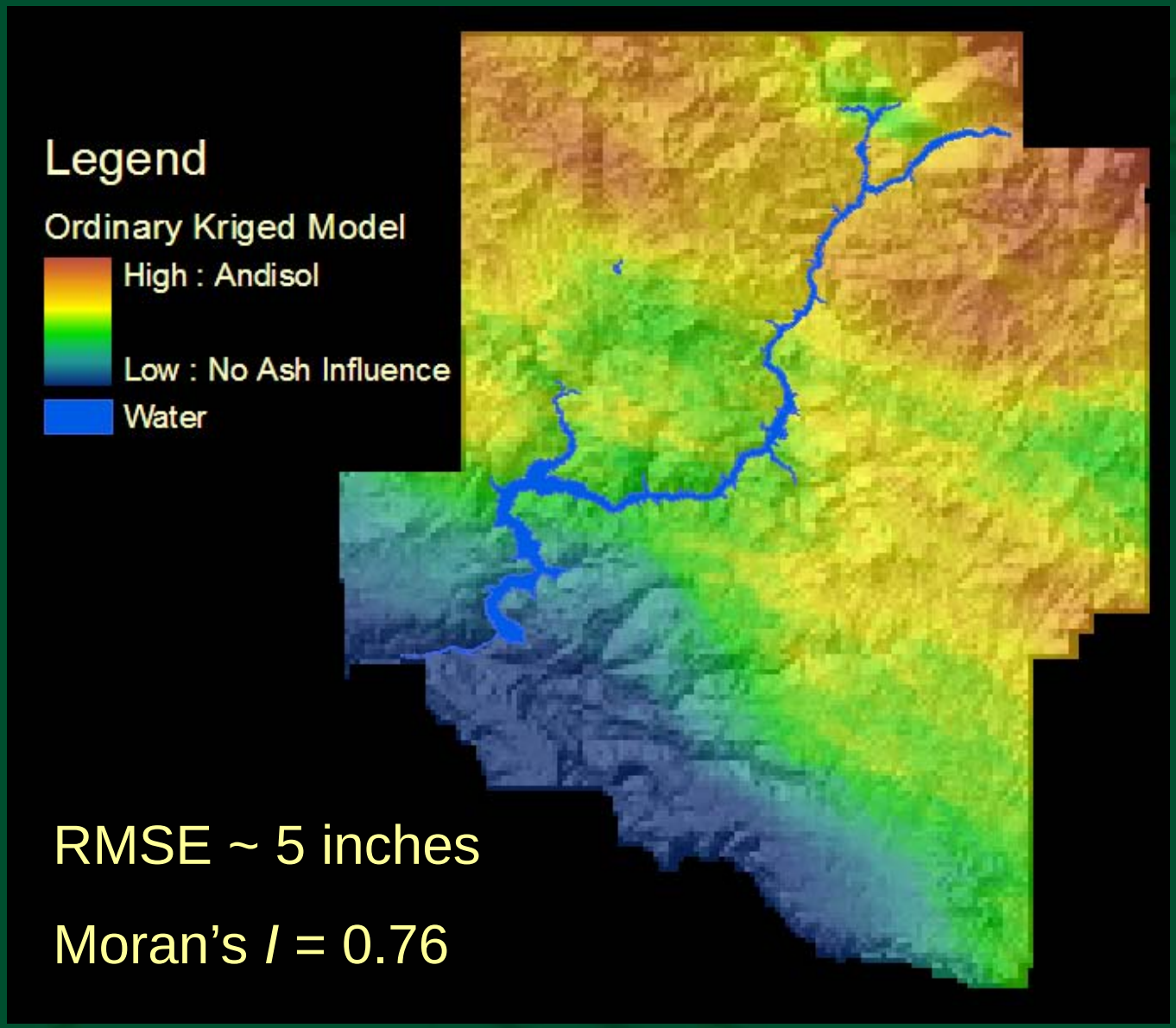


Kimsey, 2006

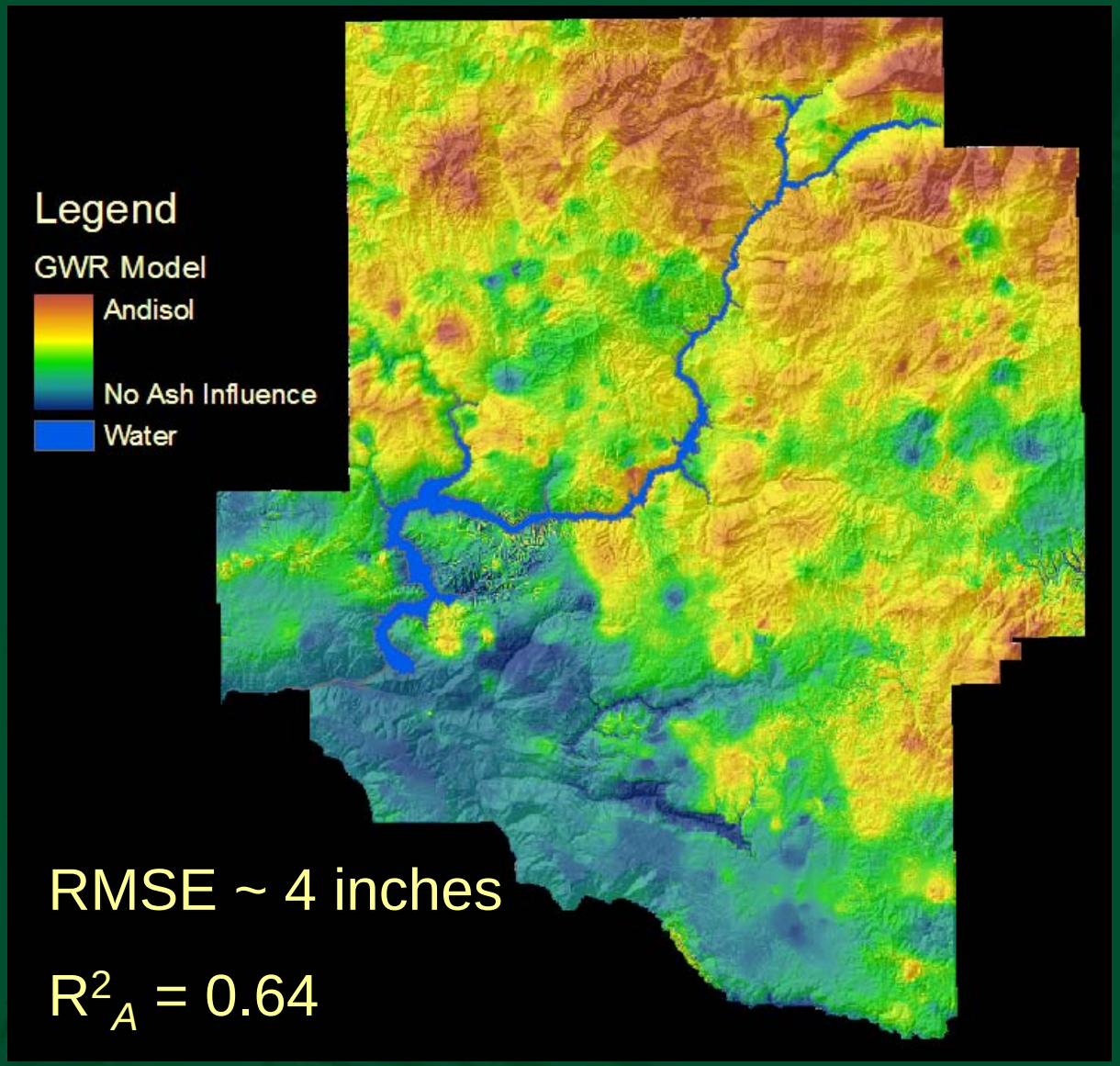
NRCS Ash Distribution Map



Point Kriged Ash Distribution Map



Geographically Weighted Ash Distribution Map



Methods: Which is better?

- Depends on Your Objective, $$, Time
  - Cursory Analysis = Class NRCS Survey Data
    - Limited quantifiable information (0”, 0”-7”, 7”-14”, >14”)
  - User-friendly Model = Point Kriging
    - Labor Saving, but accuracy dependent on dataset size
    - Easily amended with additional observations
  - Traditional Soil-Landscape Model = MLR, GWR, or some other user-defined function
    - Labor & Time Intensive, but yields more precise, continuously quantifiable estimates

The End of Spring Training

Thank you to all those who supported my education