Soils characteristics used to delineate Management Zones

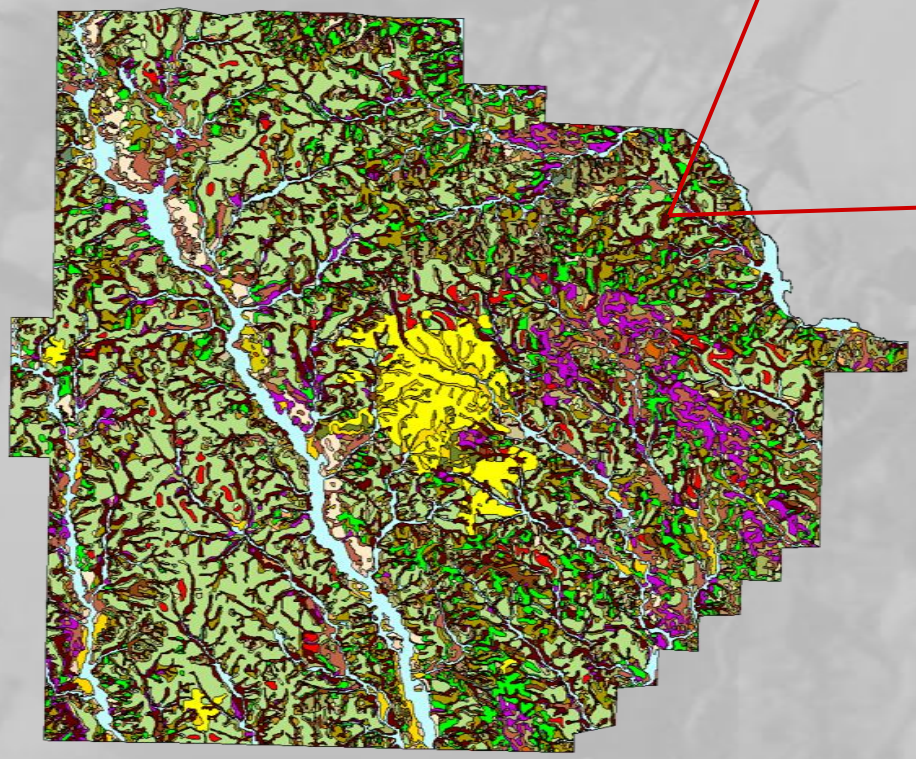
1. **Soil survey information**
   - Erosion control
   - Soil productivity
   - Identify natural fertility
2. **Soil survey information and SSM**
   - Texture
   - Slope length
   - Slope steepness
   - Drainage
   - Acidity

Identify **GENERAL** soil problems

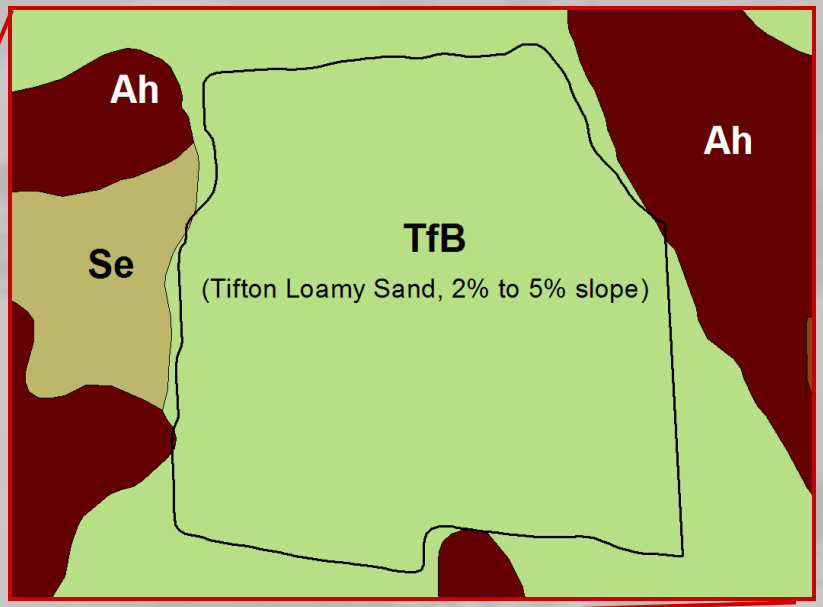
Soil survey by the USDA-NRCS

Information available for the producers…

County soil survey (Order 2)



Tift county (GA)



Soil survey (2nd order) shows the field as homogeneous with respect to soil type

Source: SSURGO soil database (USDA-NRSC)

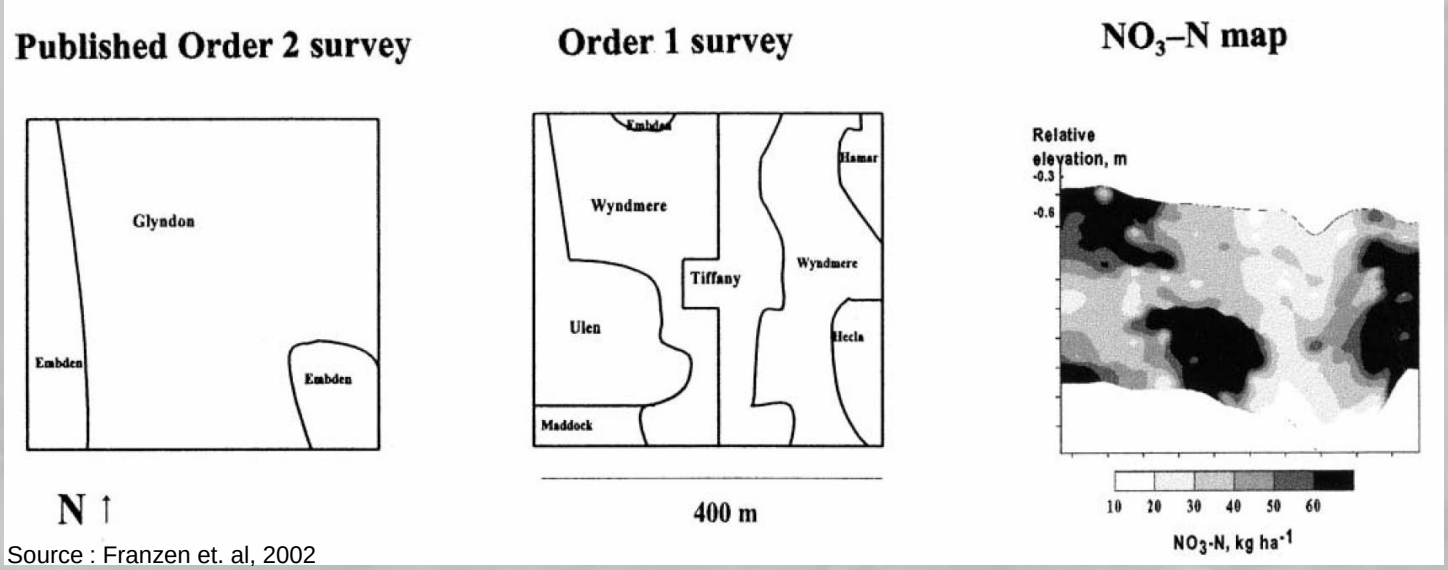
Differences between Order 2 and 1 soil surveys

1. Order 2

- County soil surveys
- Scales of 1:12,000 to 1:31,680
- Min. size delineation: 1.5 - 10 acres
- NA for SSM if not complementary info. Too coarse for N management
- Generalize the, often highly variable, nature of soils at farm field scale

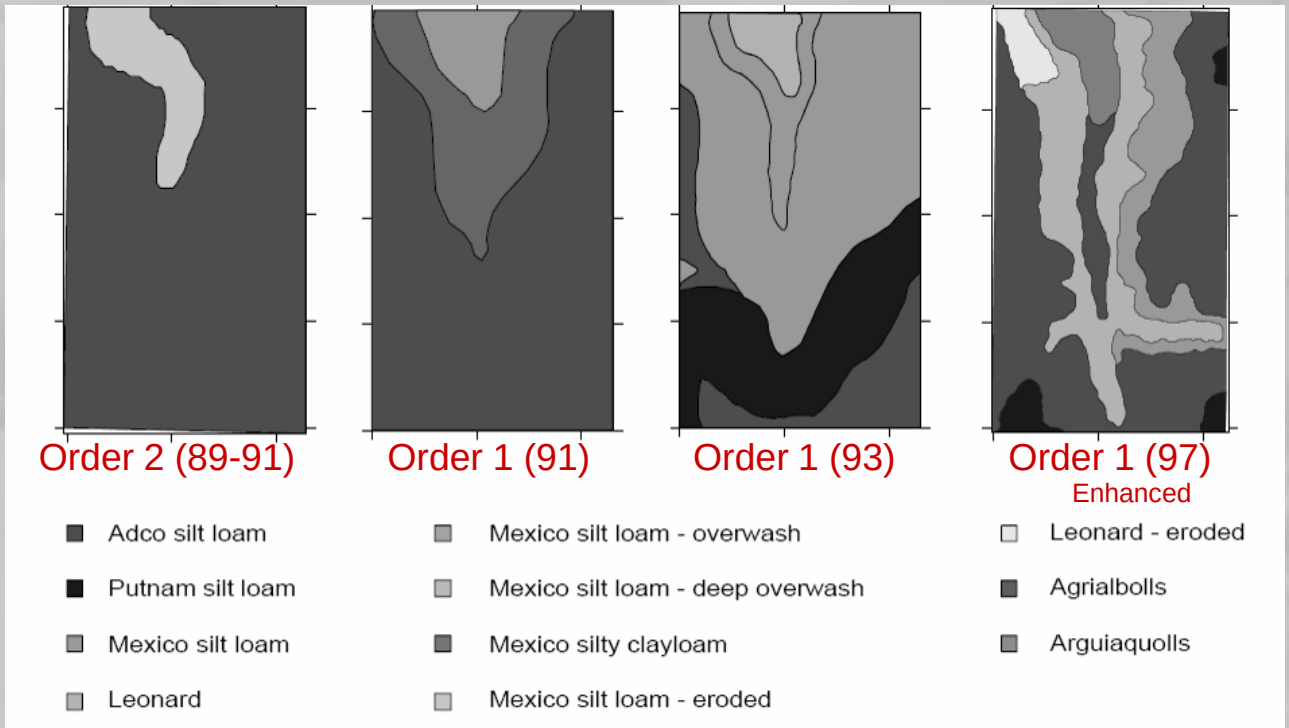
2. Order 1

- Farm or field soil survey
- Scale >1:15,840, finer than Order 2.
- Min. size delineation: 2.5 acres
- Useful for SSM (VRA of inputs).
- Soil units are closely related to crop yield and nutrient variability.



Source : Franzen et. al, 2002

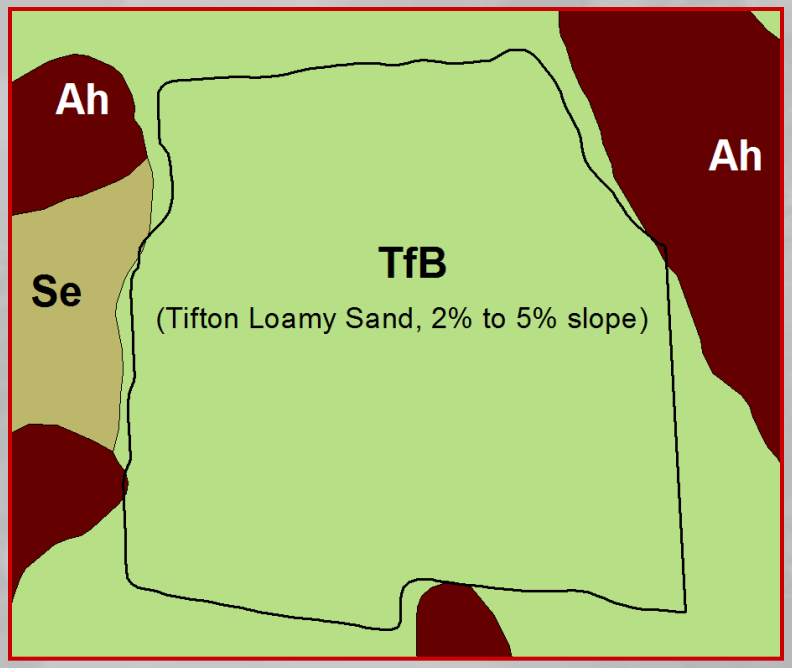
MZ and soil surveys



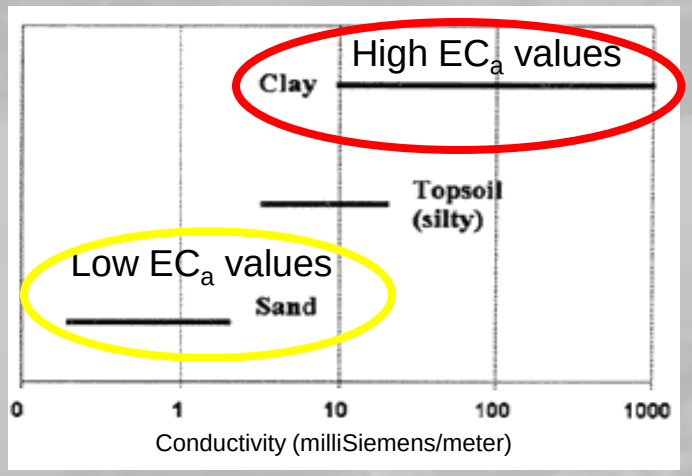
- Order 1, provides a better discrimination and corresponding with yield variability.

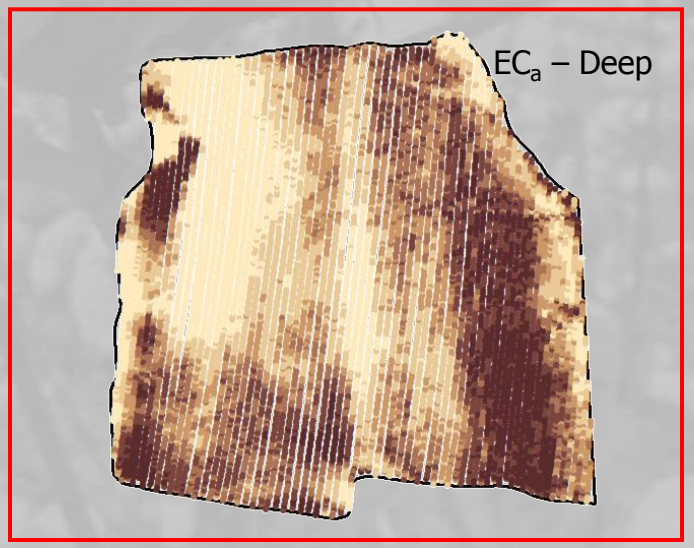
- Order 2, provides a better discrimination than no sub-field delineation *

On-the-Go sensing & MZ delineation



Soil survey (2nd Order)





Soil EC_a (VERIS 3100)

Soil ECa measurement methods

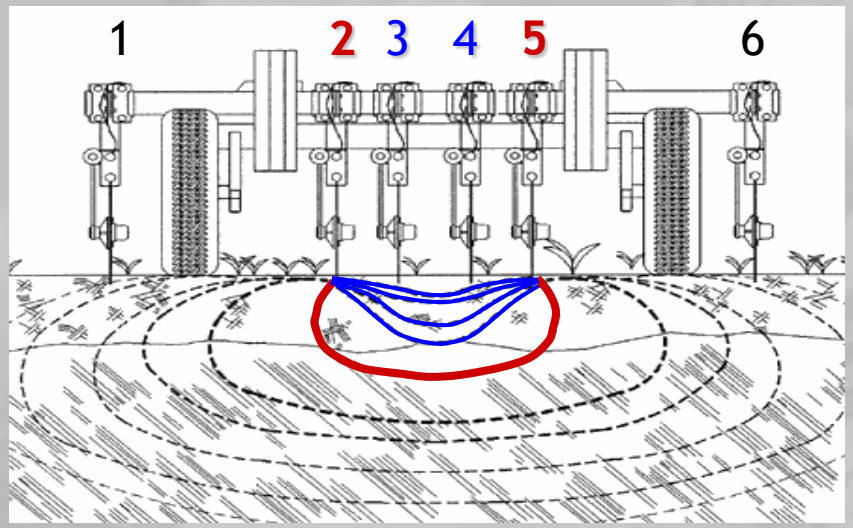
Electrical Resistivity (ER)

It requires good contact between the soil and the four electrodes inserted in the soil

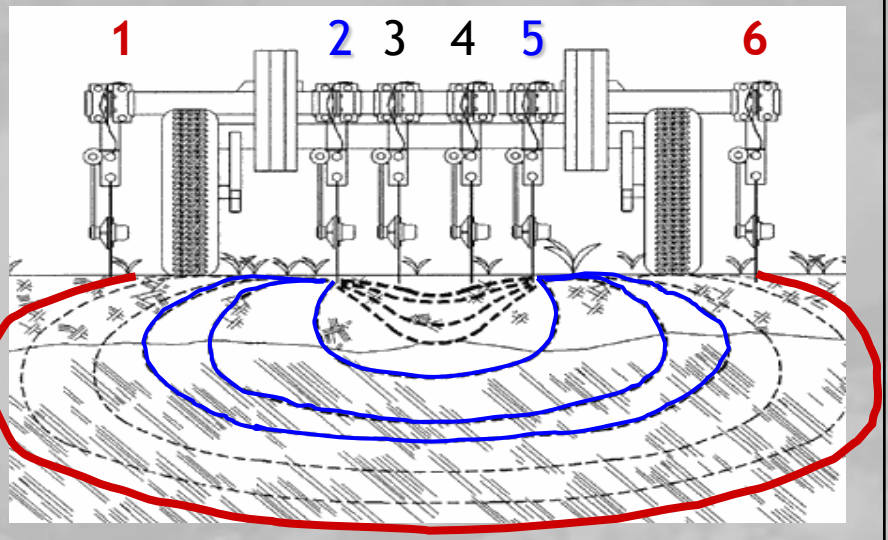
Electromagnetic Induction (EM)

It does not require physical contact with the soil.

Electrical Resistivity (ER) ≈ VERIS 3100



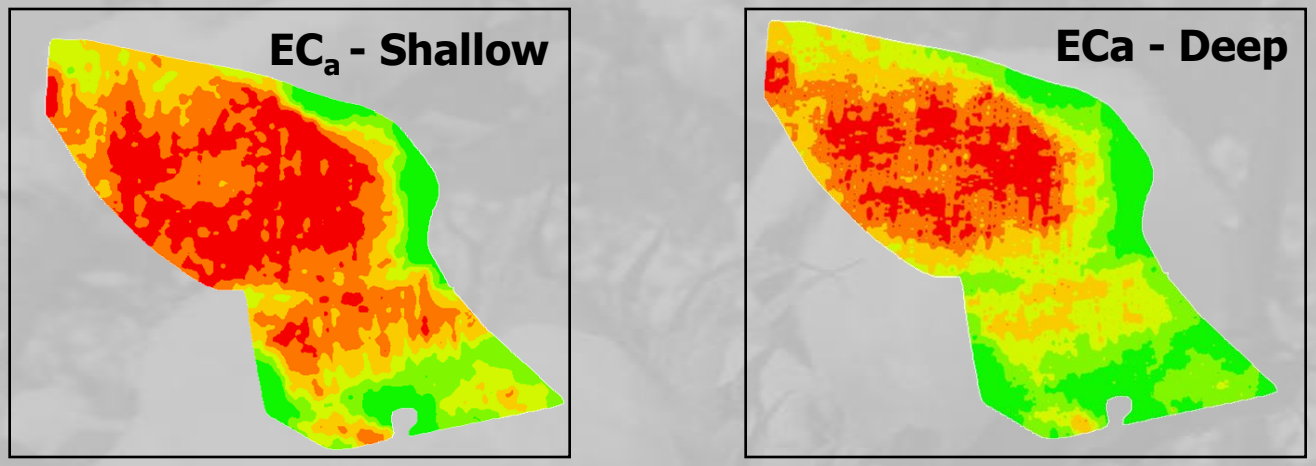
- Shallow (0- 12 inches)
- EC_a-shallow, the instrument uses the discs 2, 3, 4 & 5.
- The voltage is measured between discs 3 and 4.



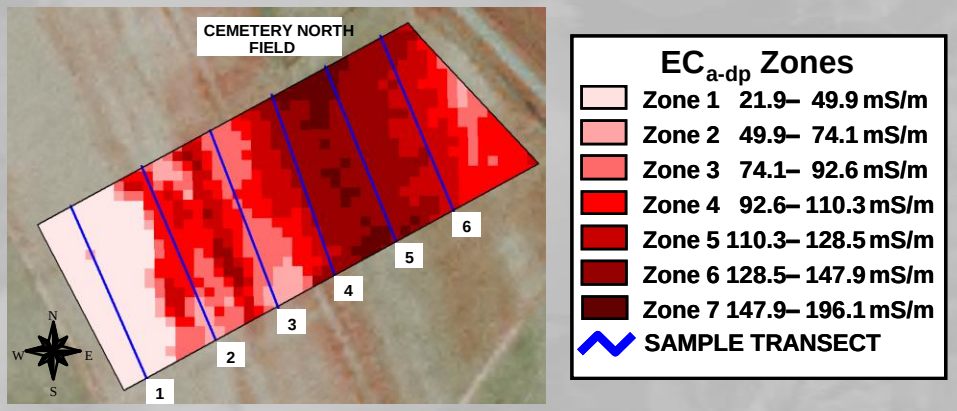
- Deep (0- 36 inches)
- EC_a-deep, the instrument uses the discs 1, 2, 5 & 6.
- The voltage is measured between discs 2 and 5.

Soil ECa maps from VERIS sensor

South Georgia (Loamy Sand)

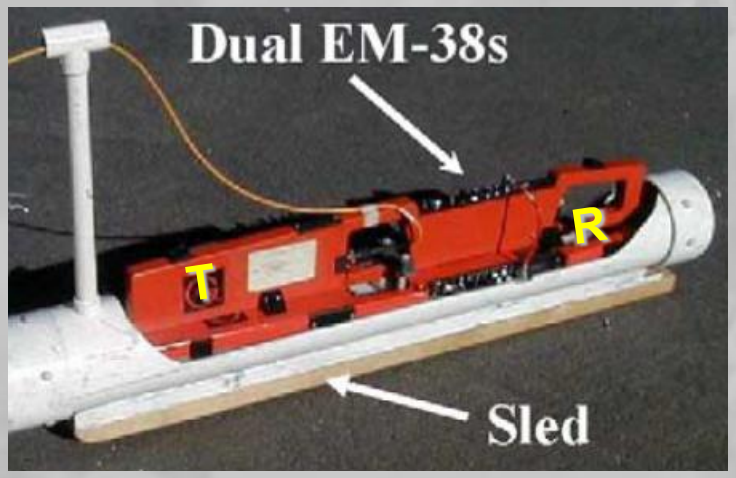


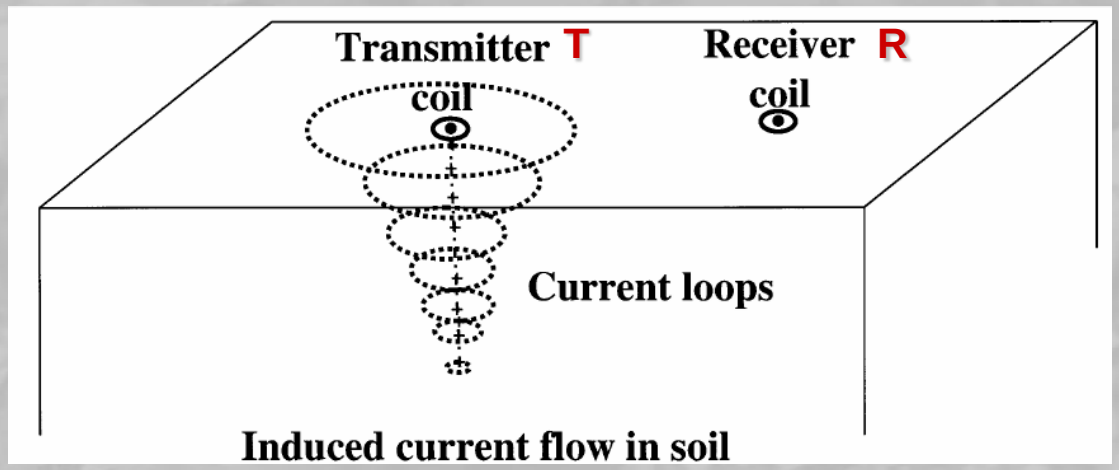
Northeast Louisiana (Alluvial soil area)



Source: Wolcott, M. 2007. Cotton yield response to residual effects of Telone Fumigant. In *Beltwide Cotton Conference*. New Orleans.

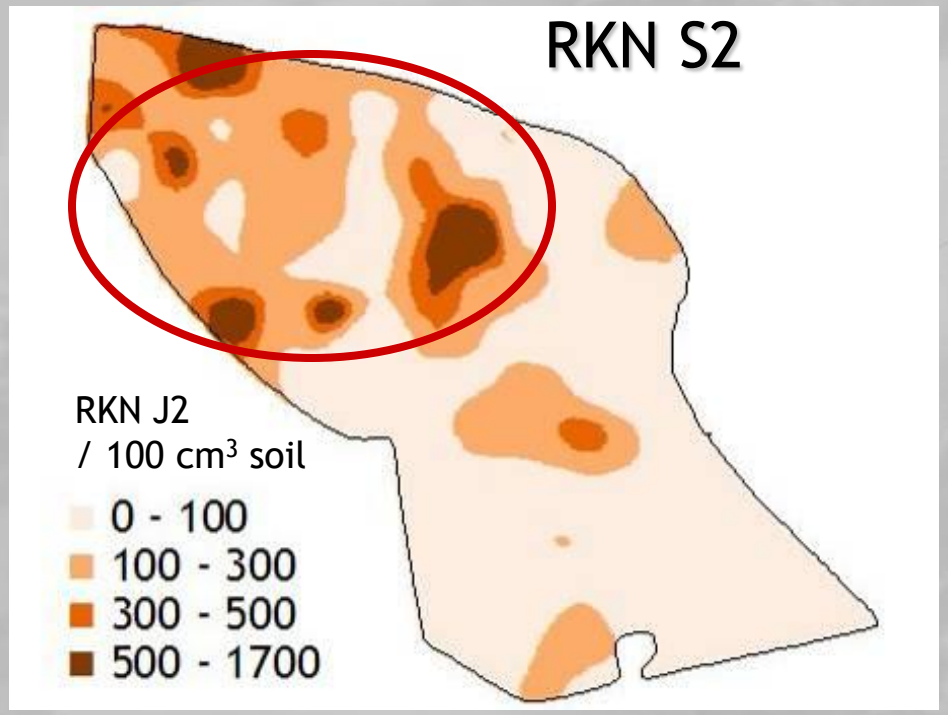
Electromagnetic Induction (EM) ≈ Geonics EM 38

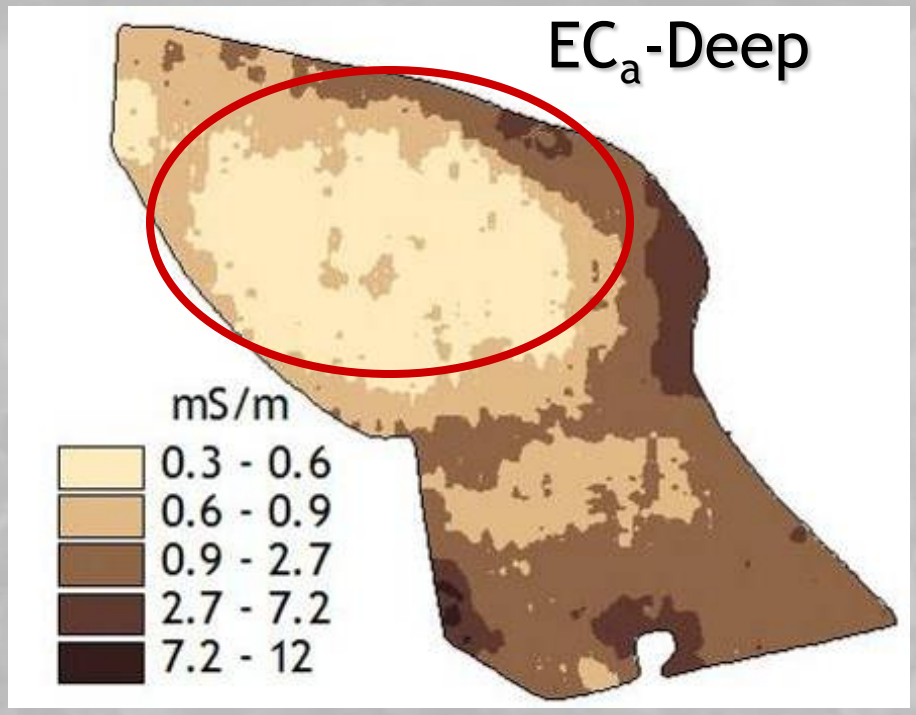




- The sensor is made up of two coils:
  - The Transmiter : induces current loops into the soil
  - The Receiver: measures the resulting electromagnetic field from these current loops.
- EM 38 in a Horizontal orientation measures ≈ EC_a up to 30 inches
- EM 38 in a Vertical orientation measures ≈ ECa up to 60 inches

MZ for Root-Knot Nematode (RKN) based on Soil EC_a-Deep



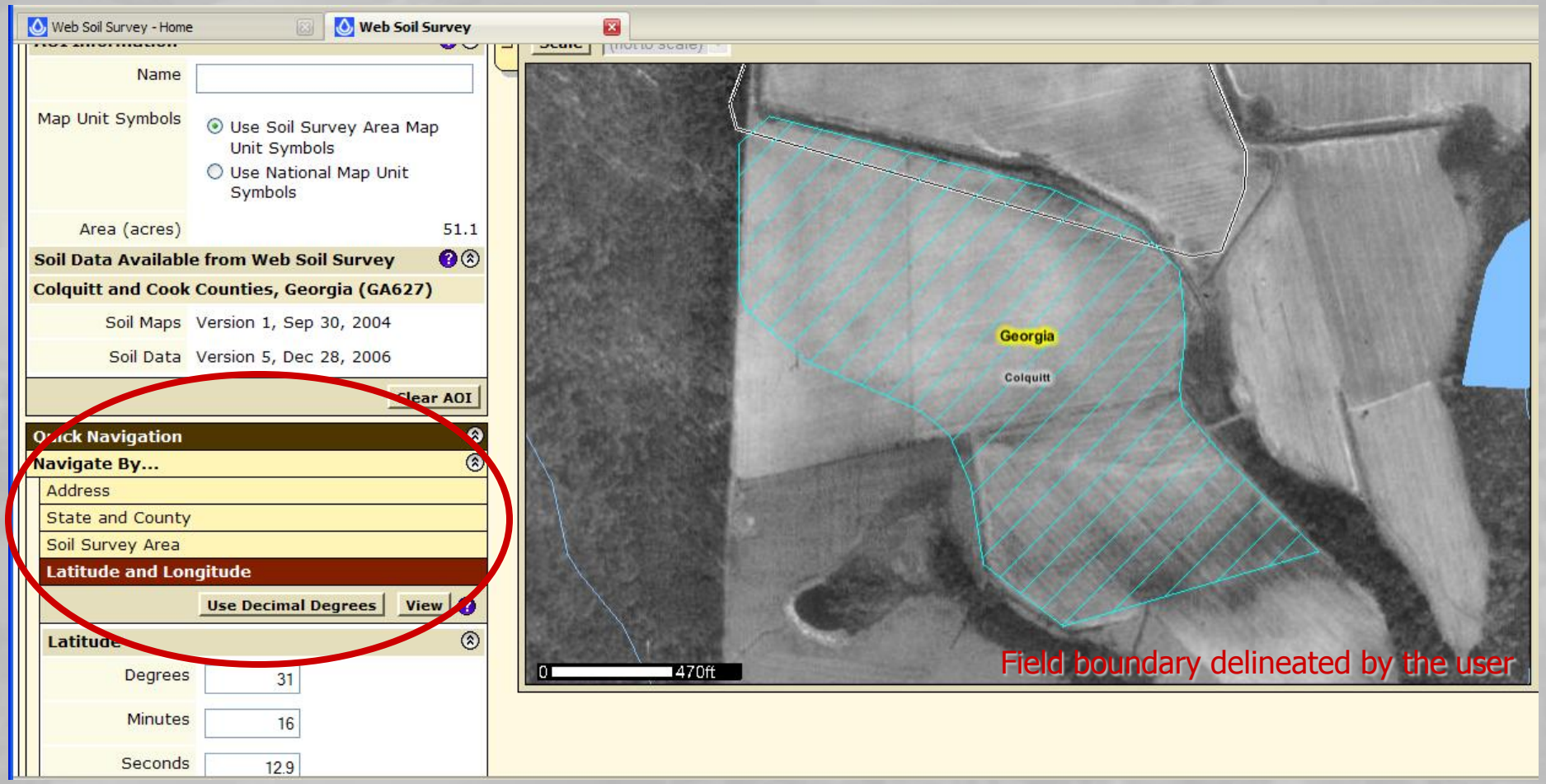


In South Georgia, areas with the lowest values of EC_a-Deep are at risk of having high population of RKN

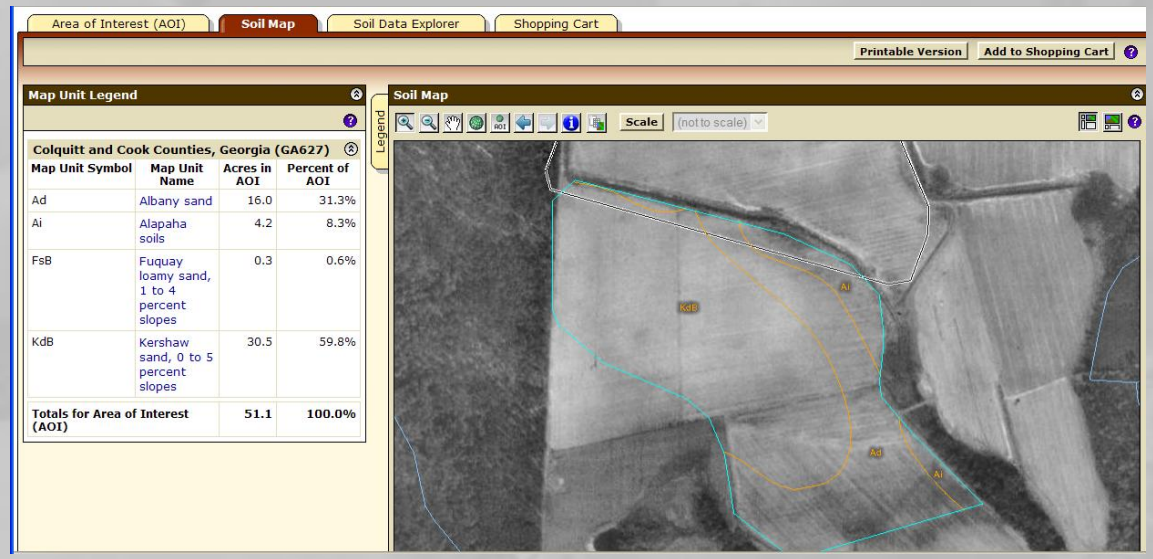
Where to find this type of data on Internet

http://websoilsurvey.nrcs.usda.gov/app/

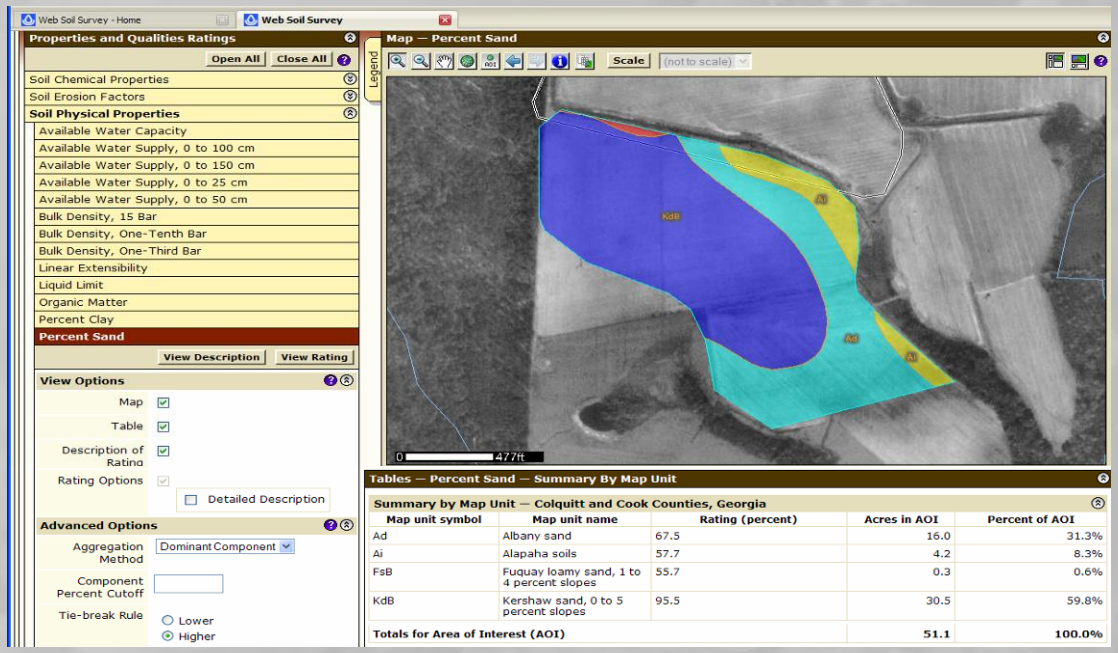
1. Search data by :

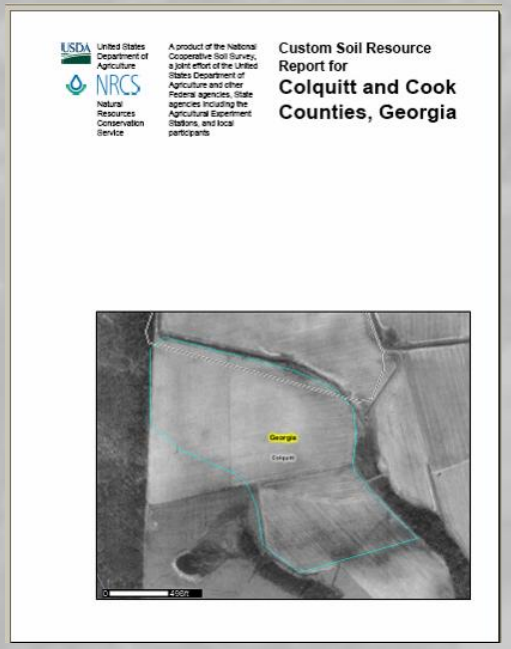


2. Soil series



3. Soil properties





3. Download Soils data