# Correlating Raster Soils Data to Augment SSURGO

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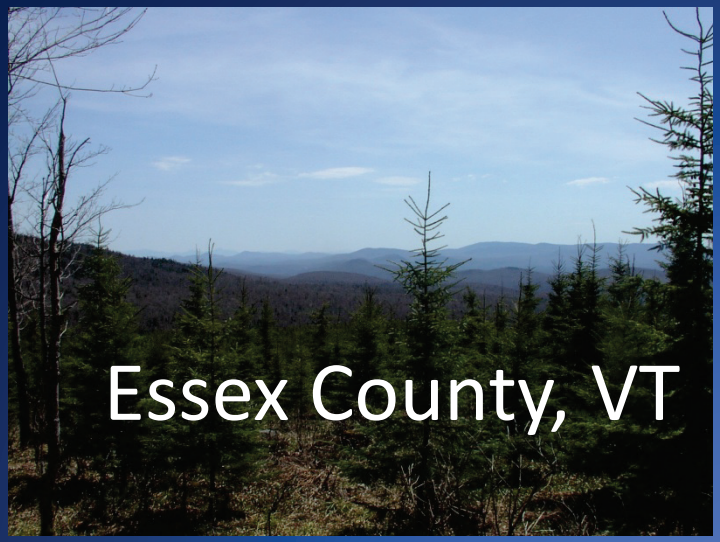
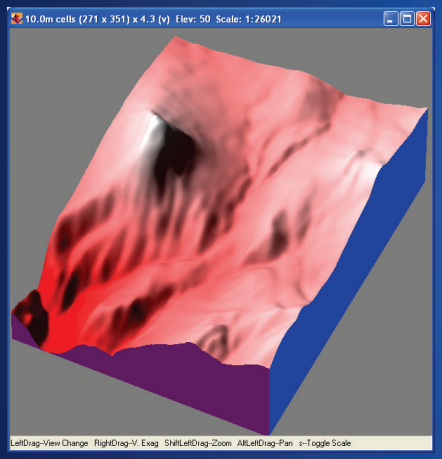
2012 Northeast Regional Cooperative Soil Survey Conference



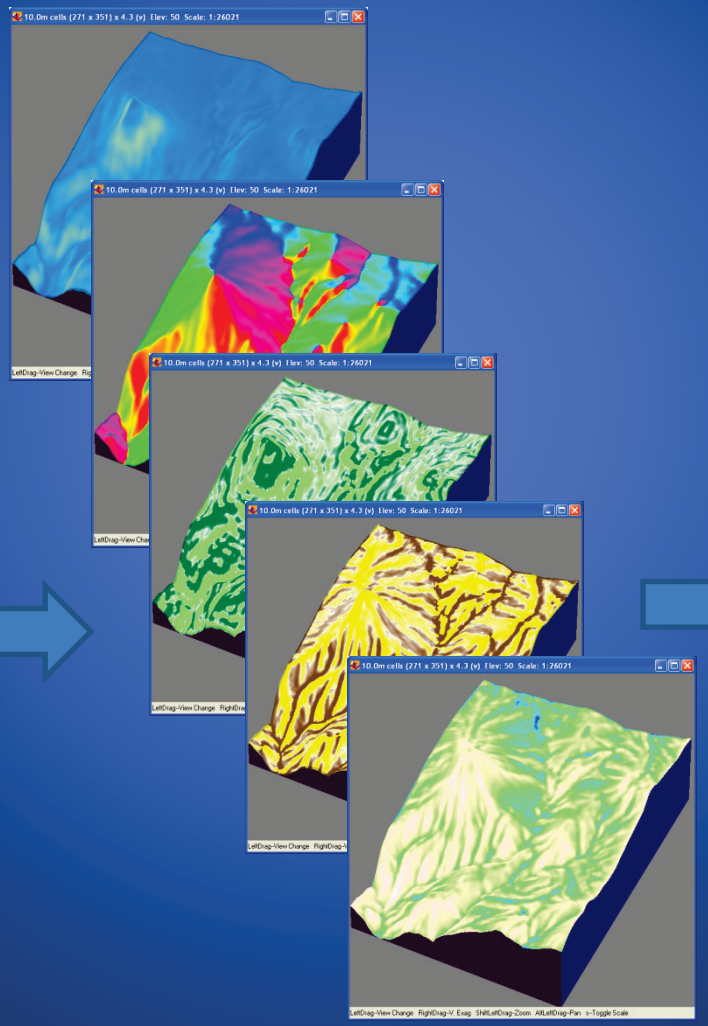
- First initial soil survey in the US completed to SSURGO standards using entirely digital techniques, and (mostly) raster results from automated mapping software
  - Arc Soil Inference Engine (ArcSIE)
  - 430,000 acres were mapped to the order 2 level in 4 field seasons.
- Raster mapping was manipulated to create SSURGO polygons
  - Two separate products

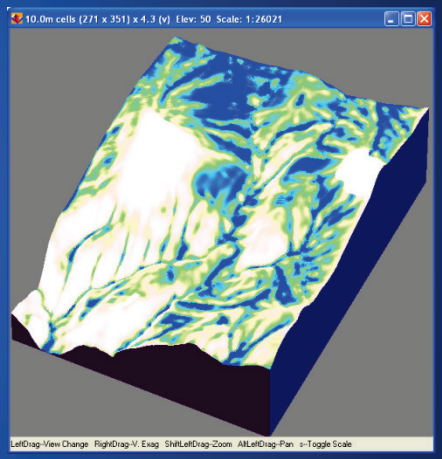
ArcSIE is a proven tool, designed for *field soil scientists* to implement knowledge-based raster soil mapping.

# Raster Soil Mapping




DEM



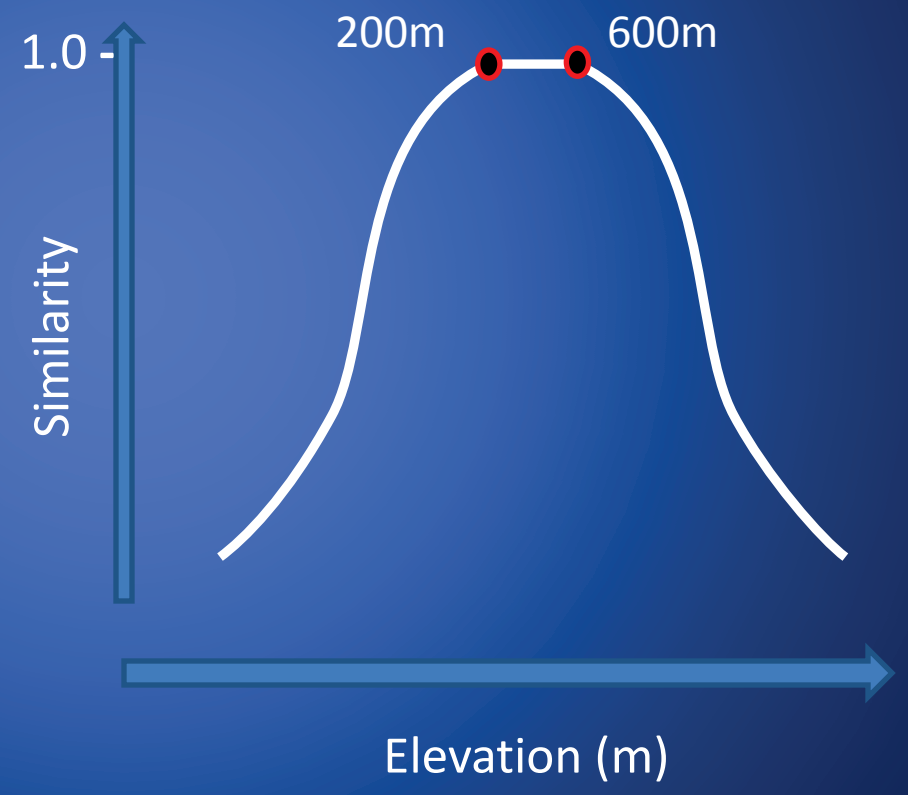




Cabot soil

# Knowledge Represented as a Rule

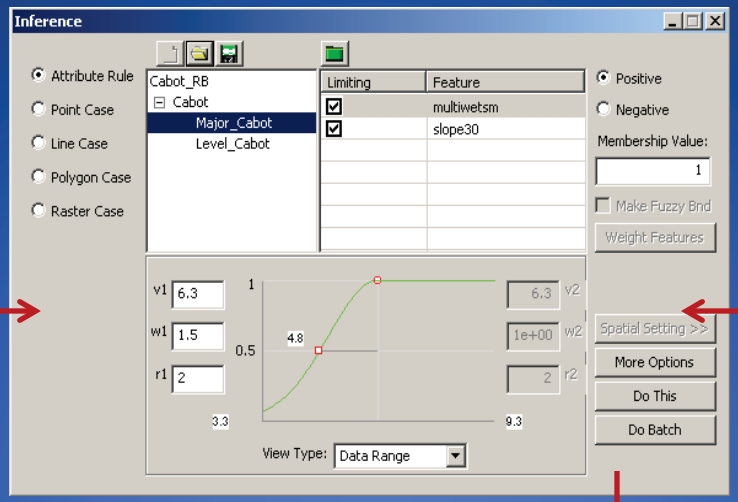
Elevation 200–600m is typical for soil A.

As elevation deviates from this range, the soil's similarity to type A gradually decreases.

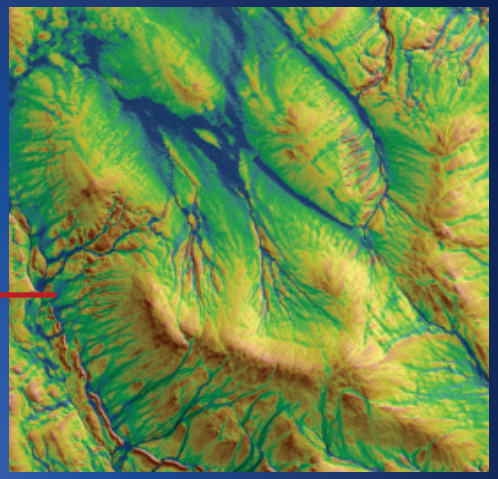


# Soil Inference Components

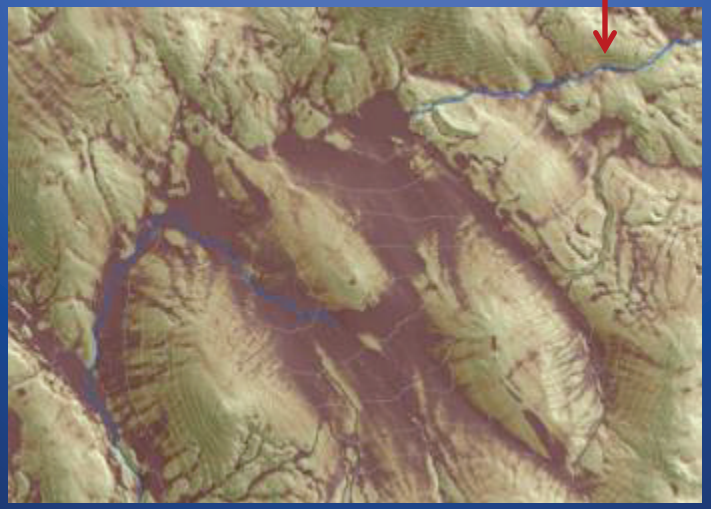
Soil Scientists' Knowledge



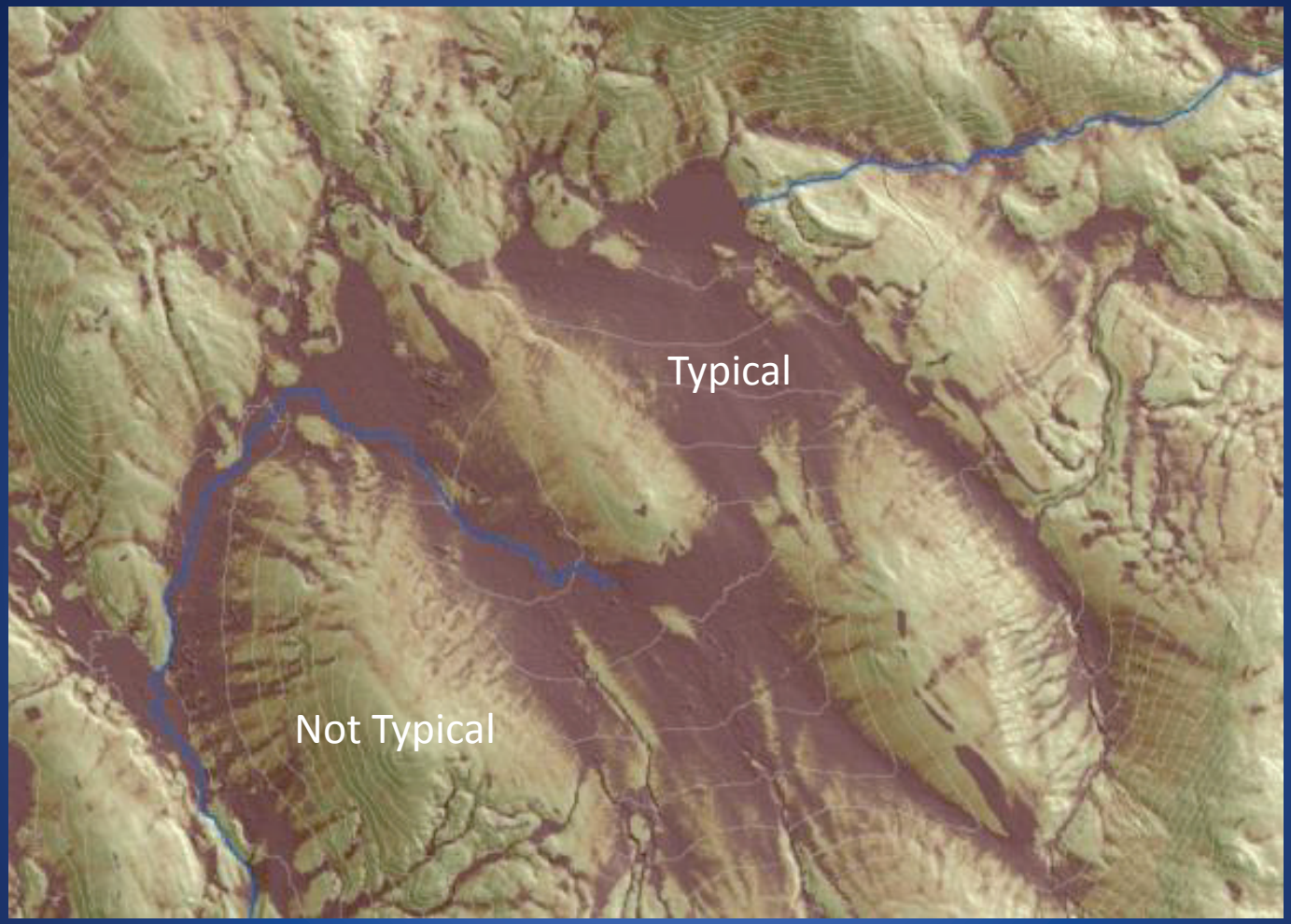

Soil Inference Engine



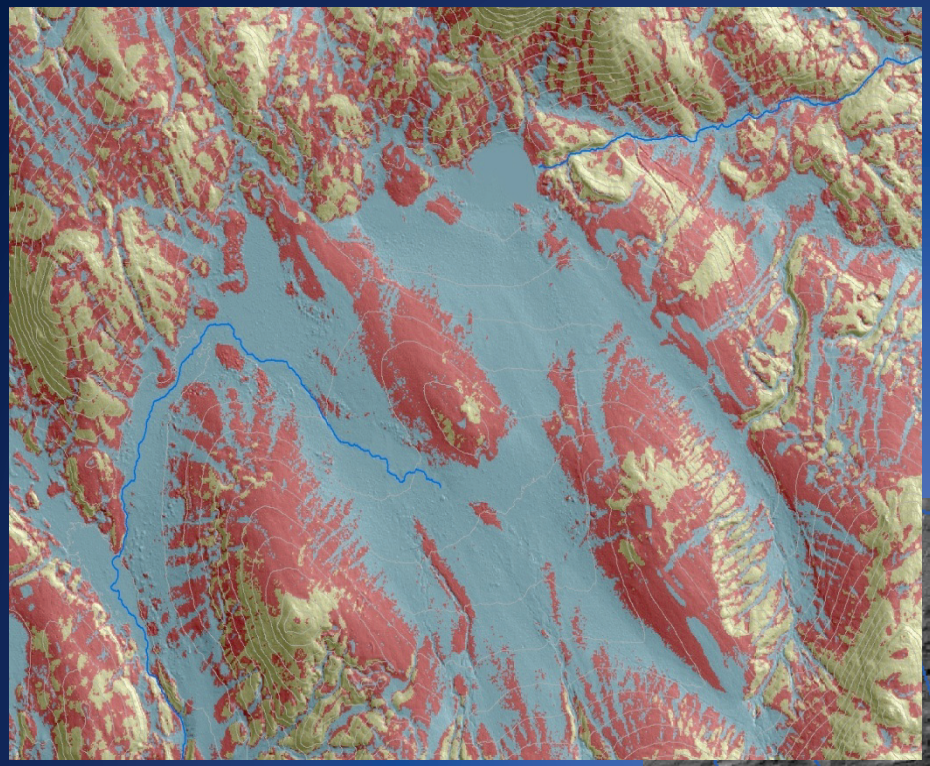
Environmental Data



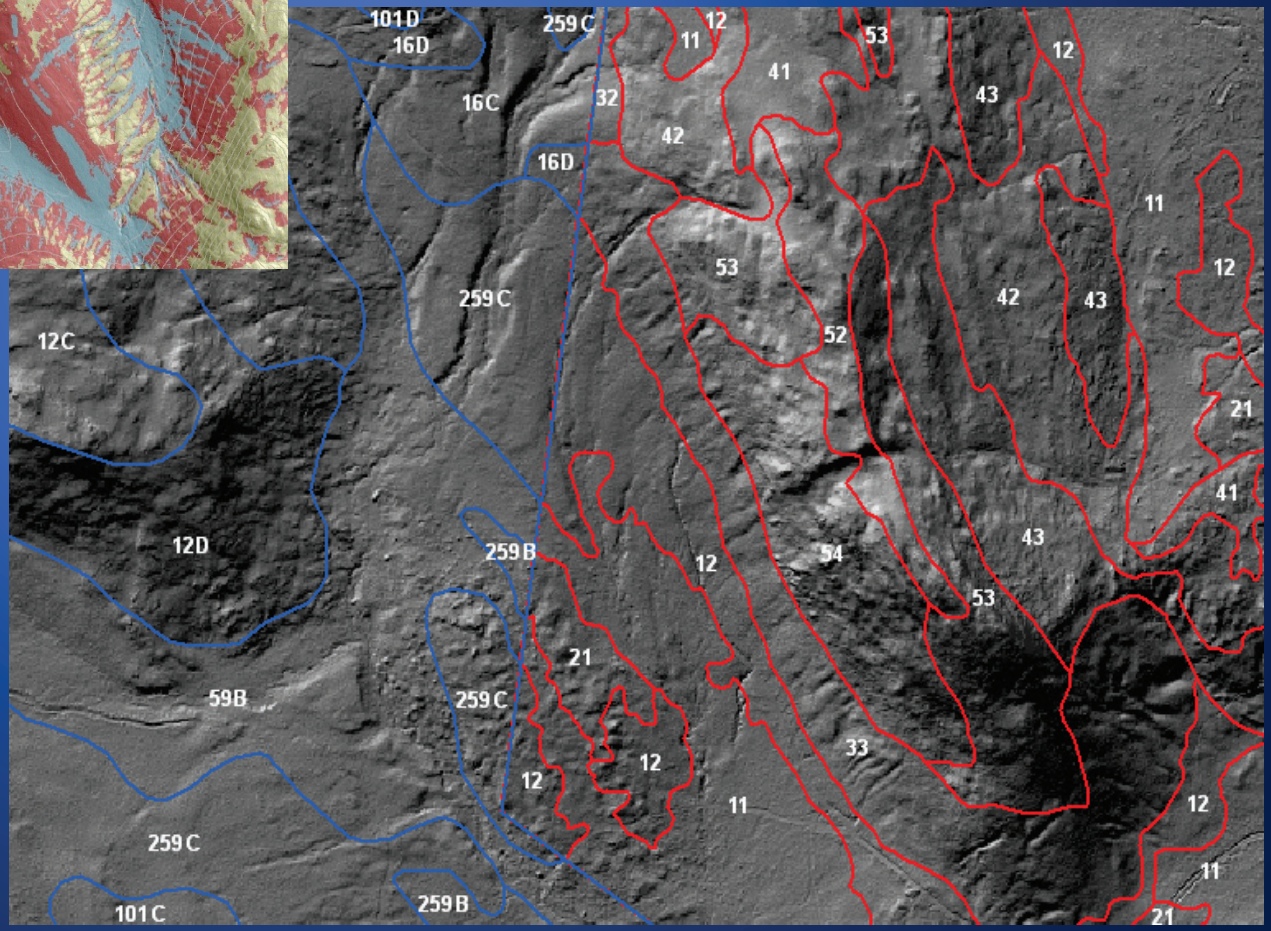
Fuzzy Soil Membership Map




The fuzzy membership values represent the similarities of each pixel location to the typical soil formative environment (results for poorly drained soil are shown).

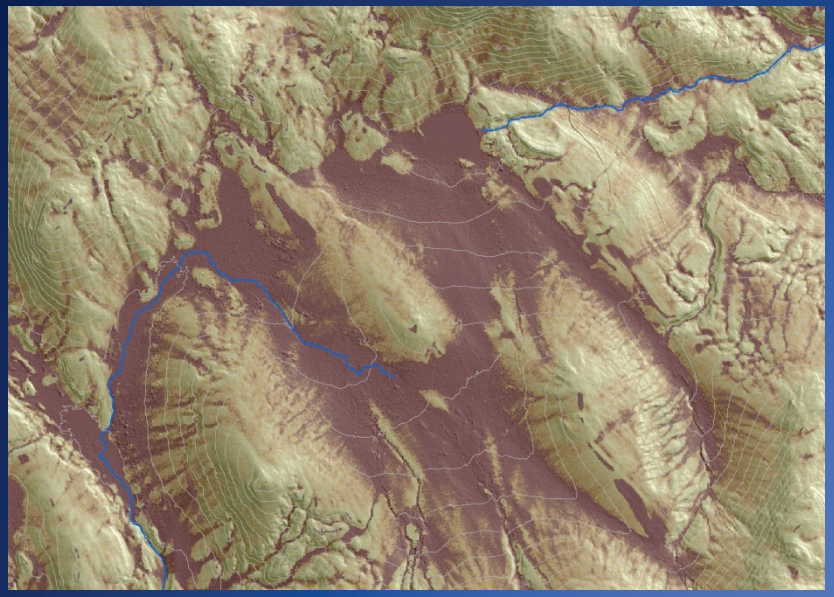


Raster Values must be Logically Integrated to Create….

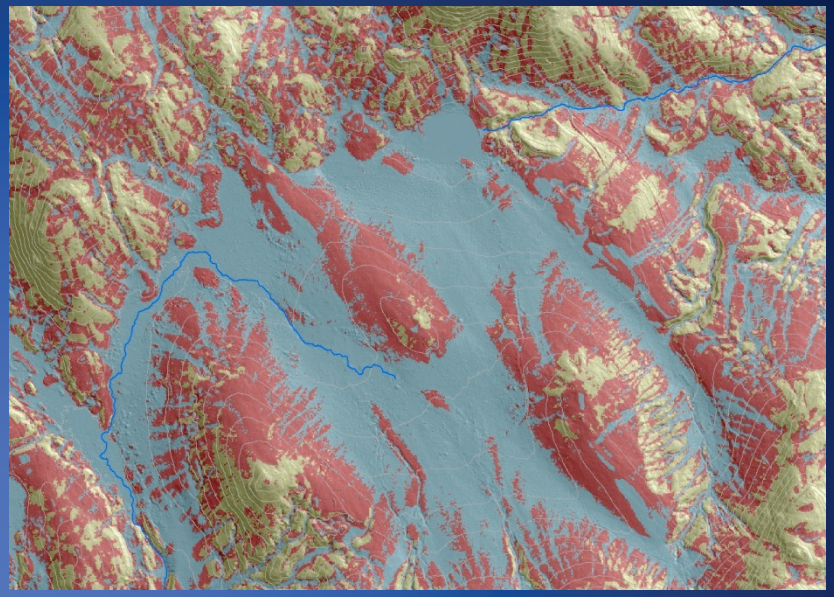



…..the SSURGO Product

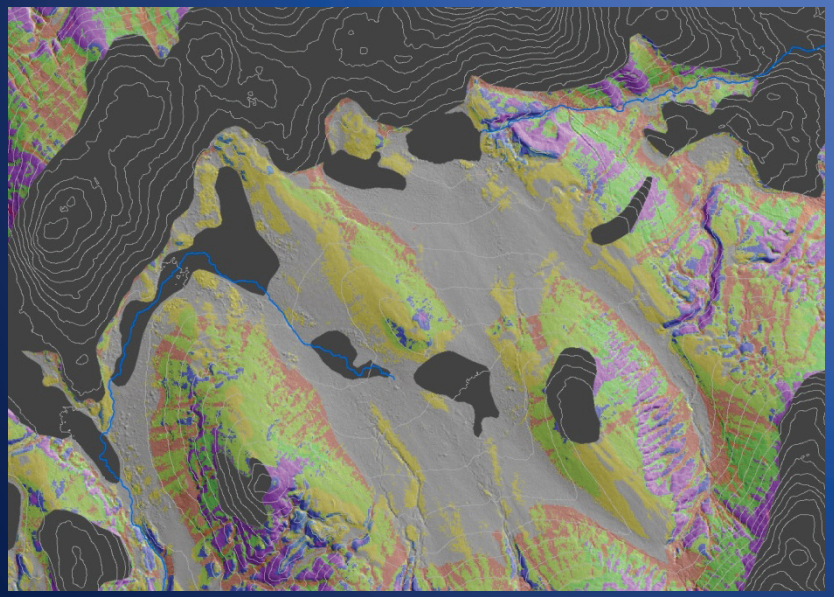
# Outline of ArcSIE Process Steps



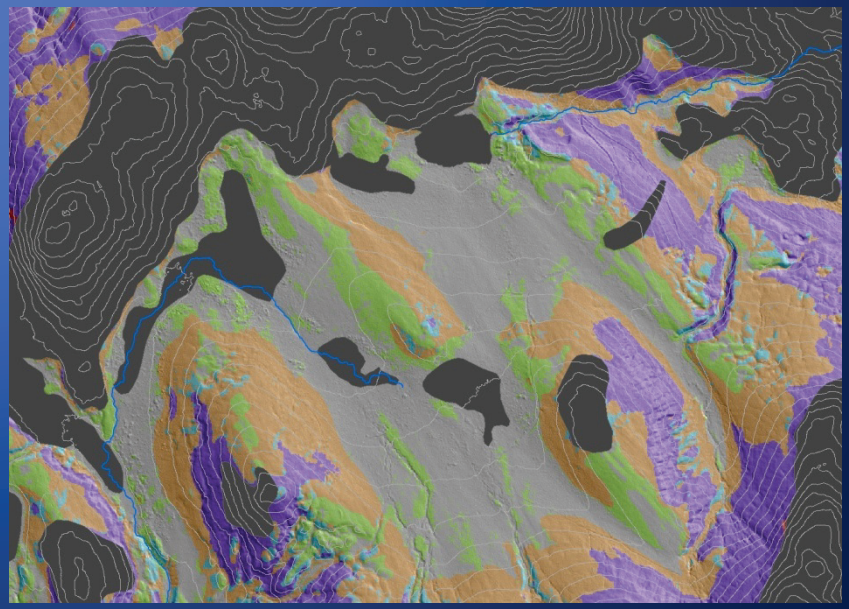
Inference by Soil Series



Harden Results

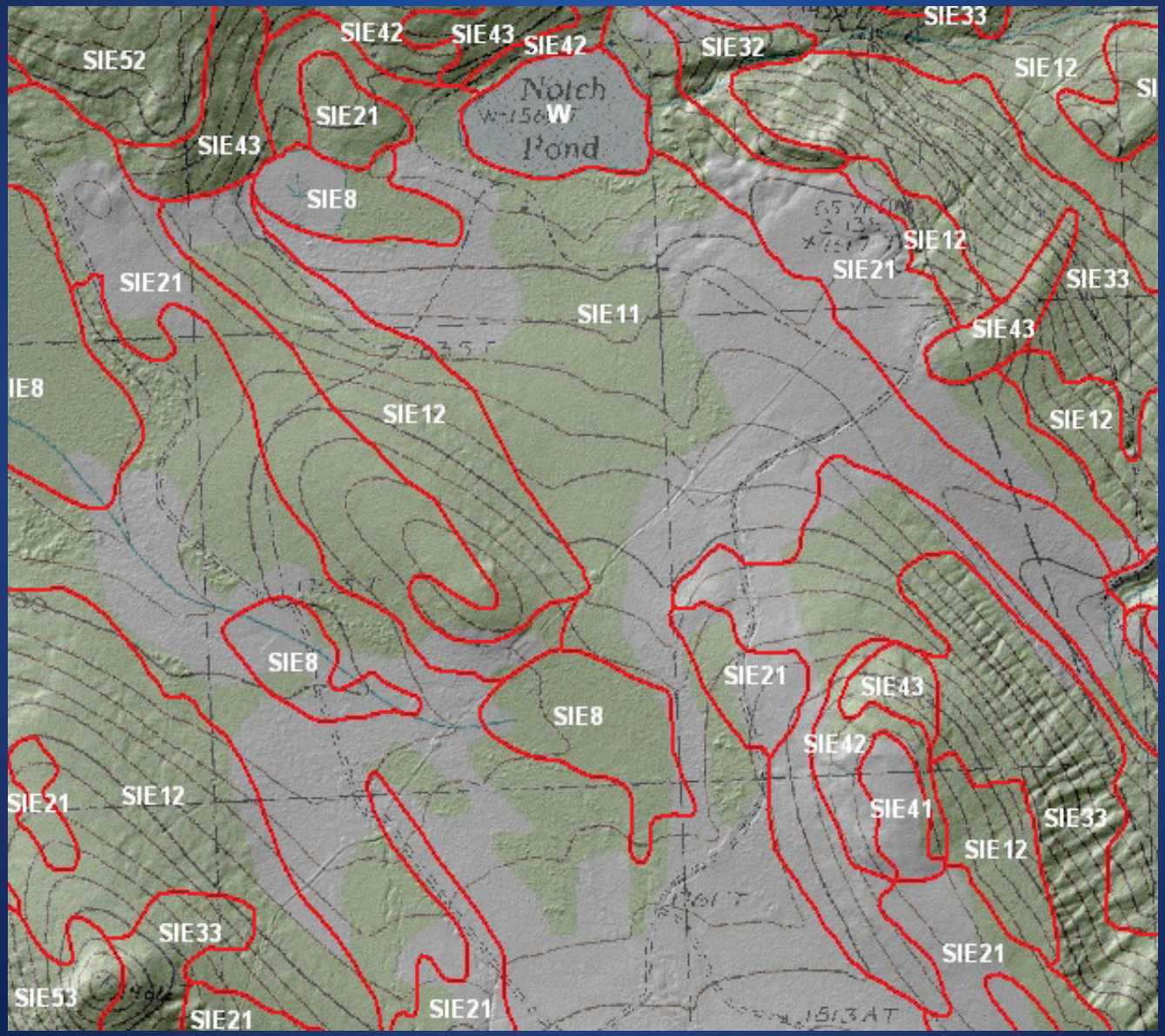


Integrate Slope Phases

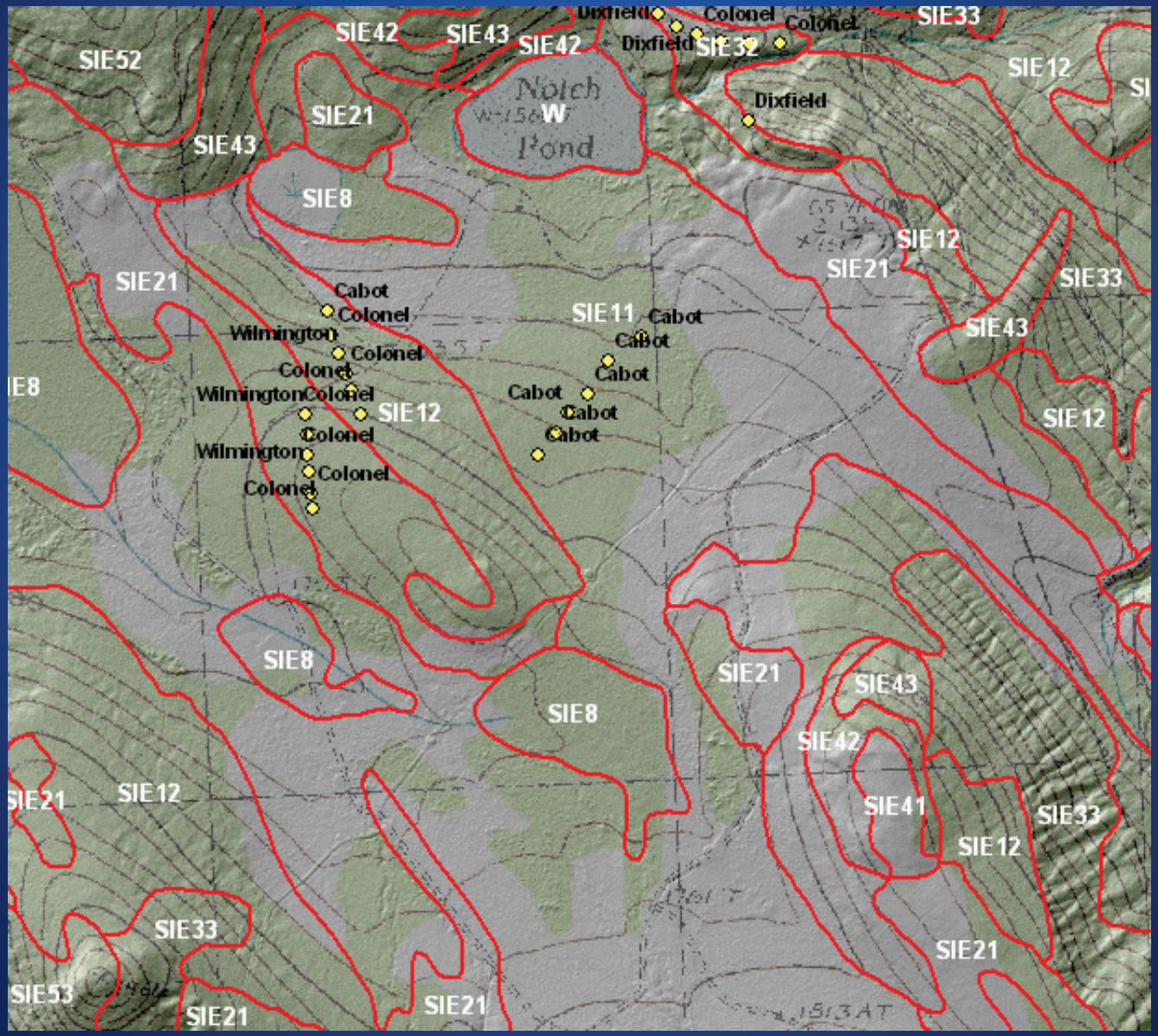


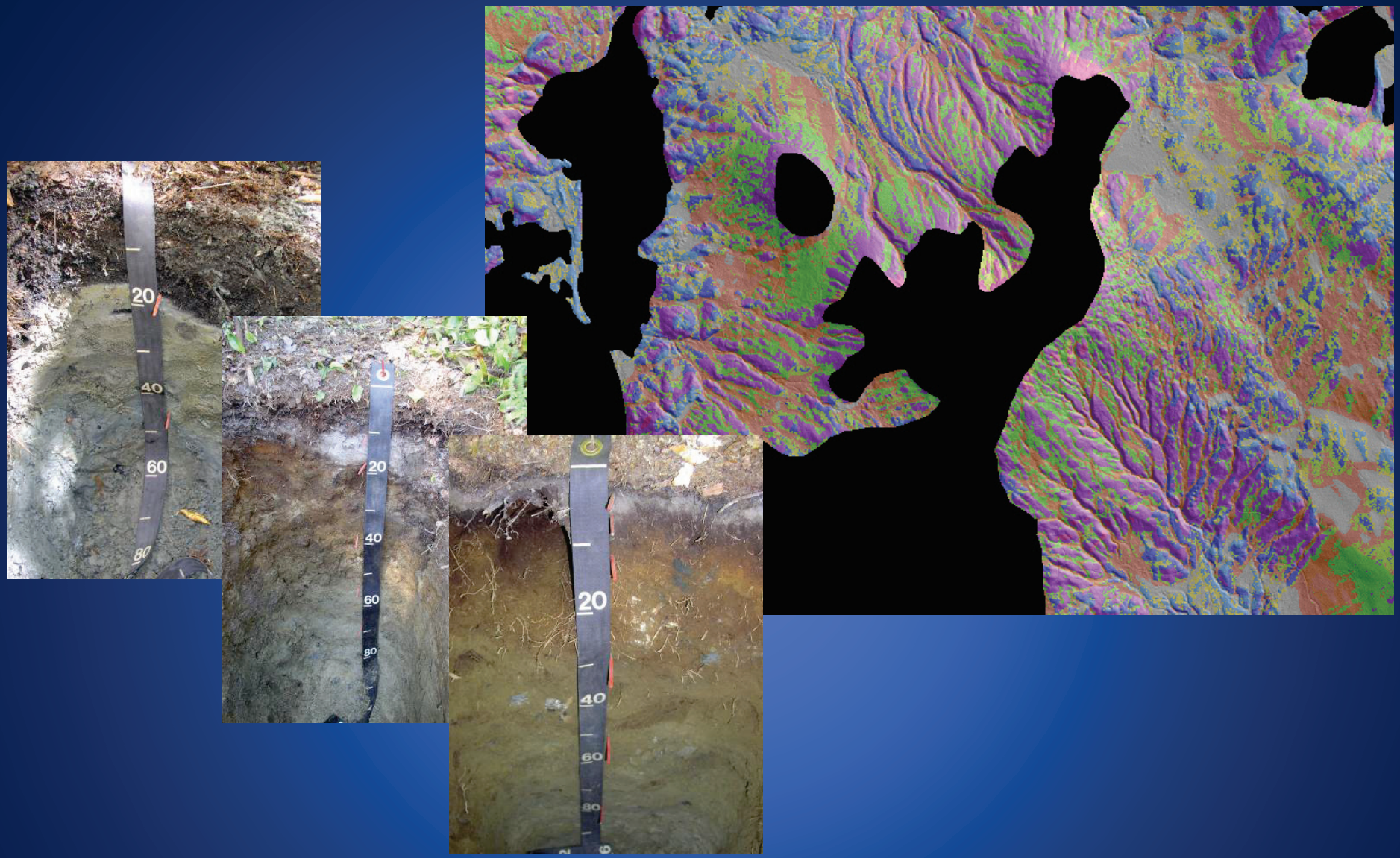
Create Logical Map Units

# Raster Results are Further Processed and then Vectorized



# Map Unit Composition is Determined by Traditional Field Investigations

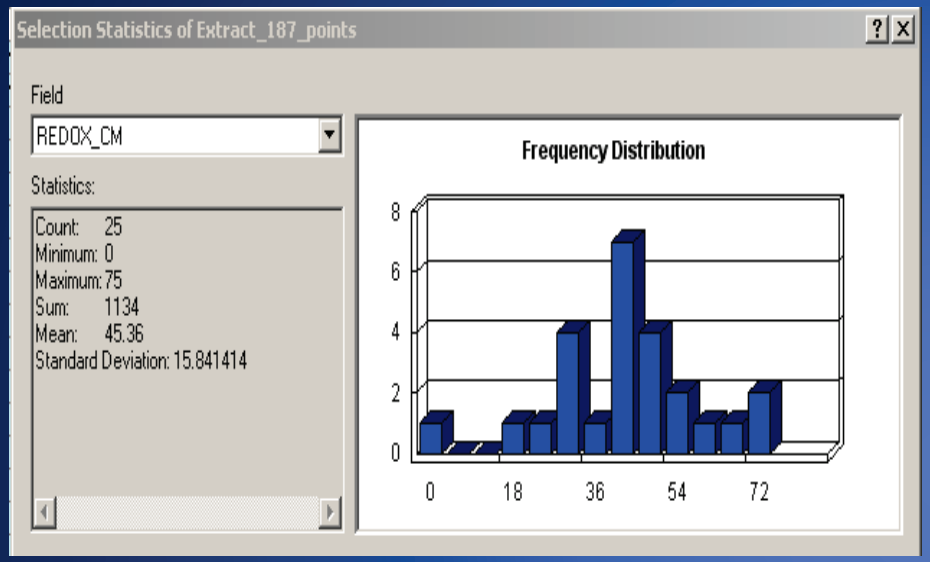


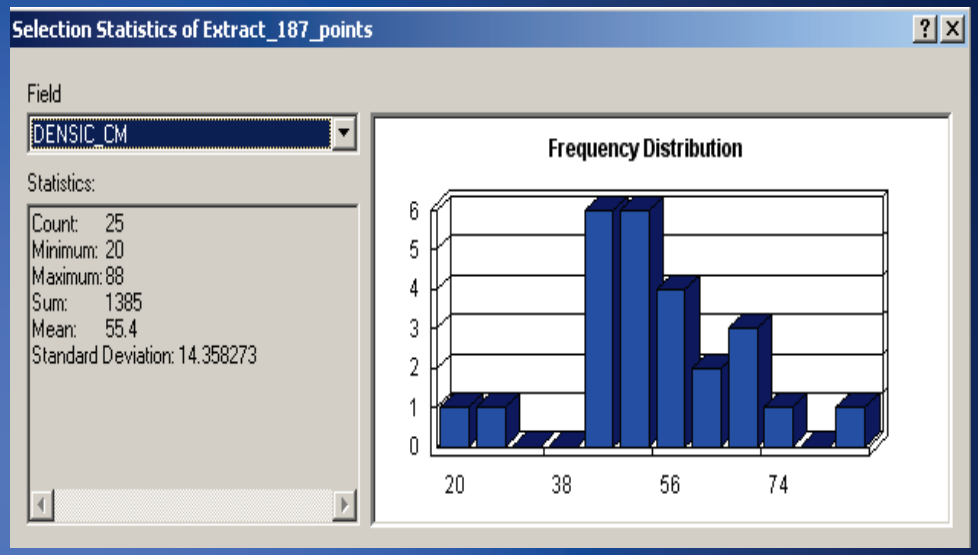



Soil predictive models have been developed for each member of the basal till catena.

- To correlate the raster soil components as stand-alone entities, data from 187 well-documented field samples were analyzed and used to validate raster component concepts
  - Depth to densic and depth to redox were critical

# Example of specific property and taxonomic data collected



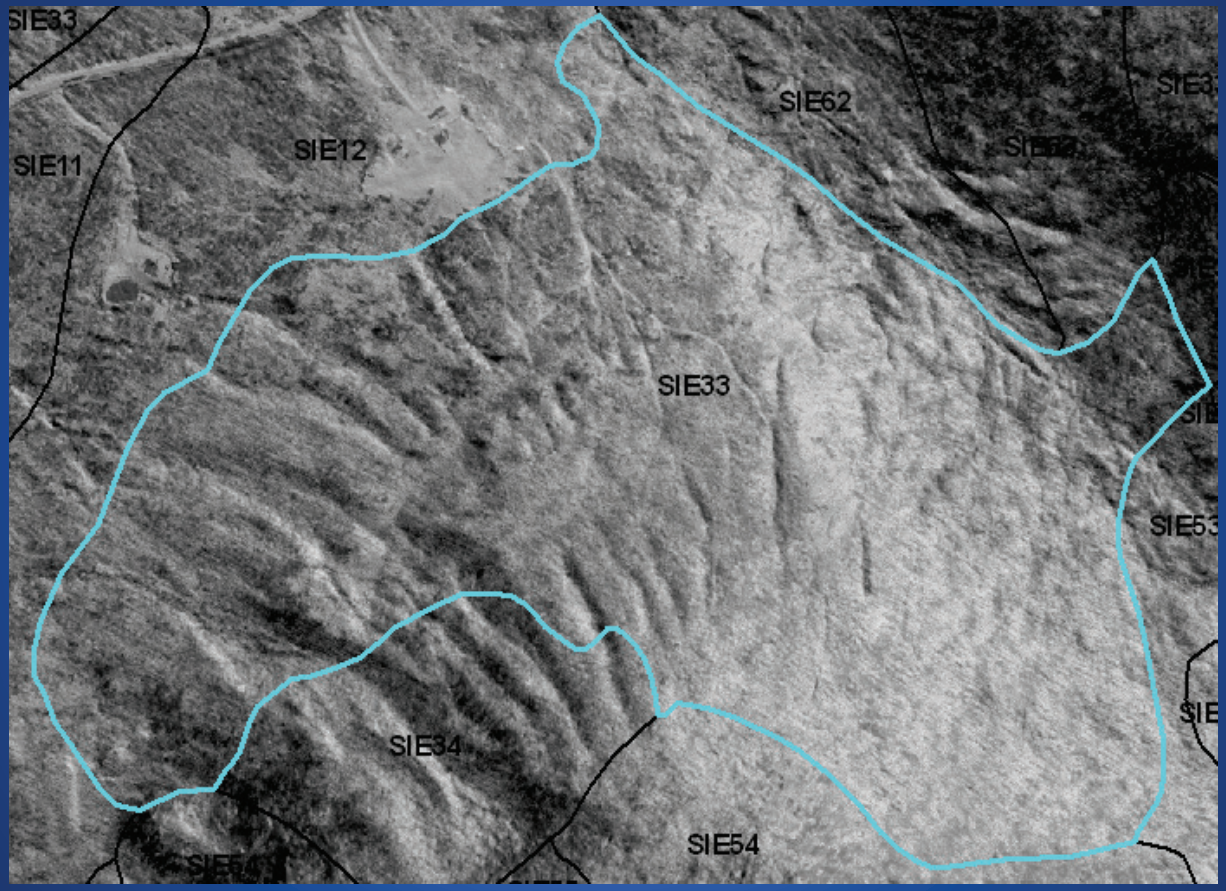




Field measured depths; component 33

| FEATURE | Count_FEATURE |
|---|---|
| Dixfield | 16 |
| Colonel | 6 |
| Skerry | 2 |
| Wilmington | 1 |

Soil series; component 33

# Why is Raster Data Valuable?



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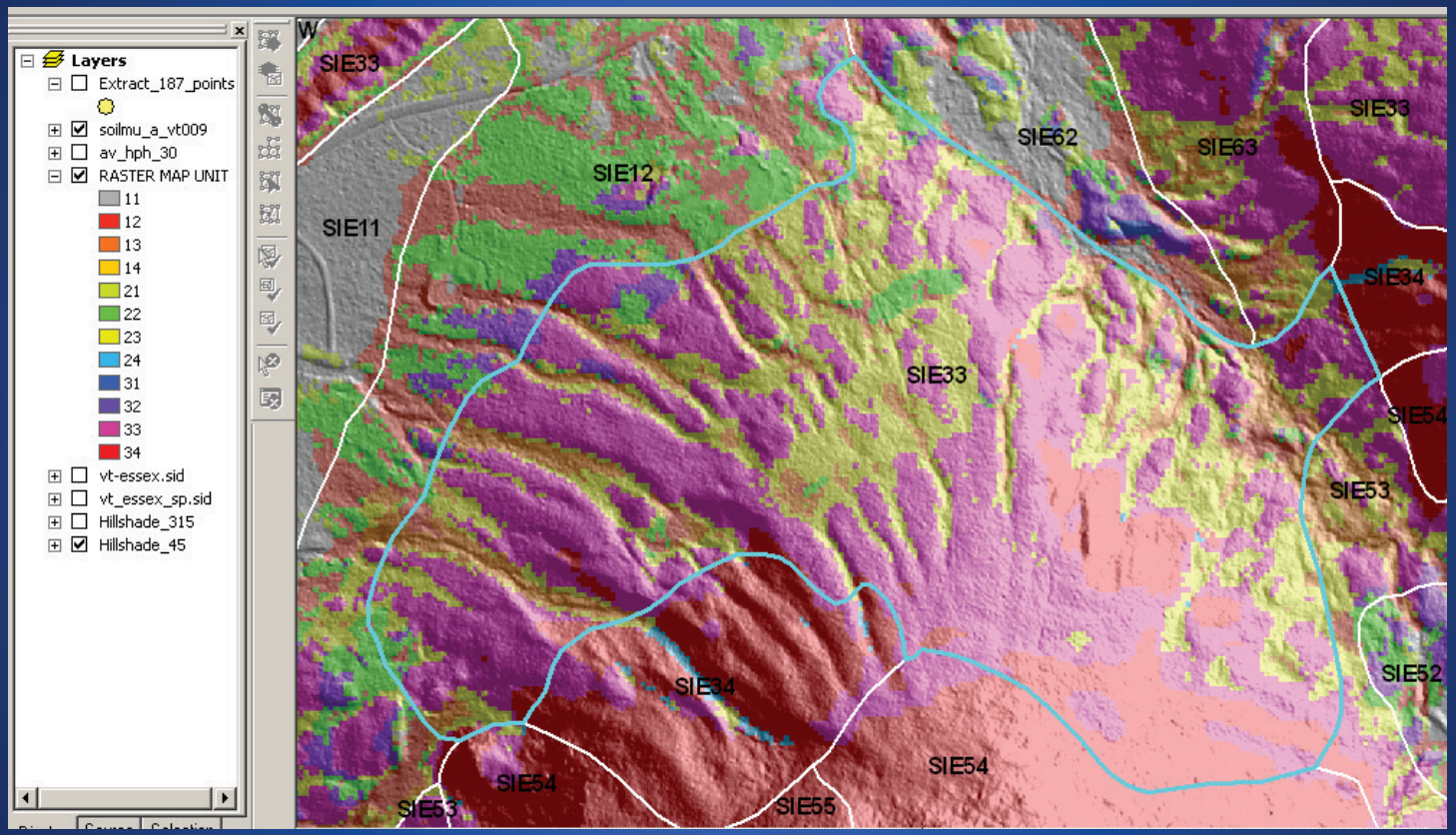

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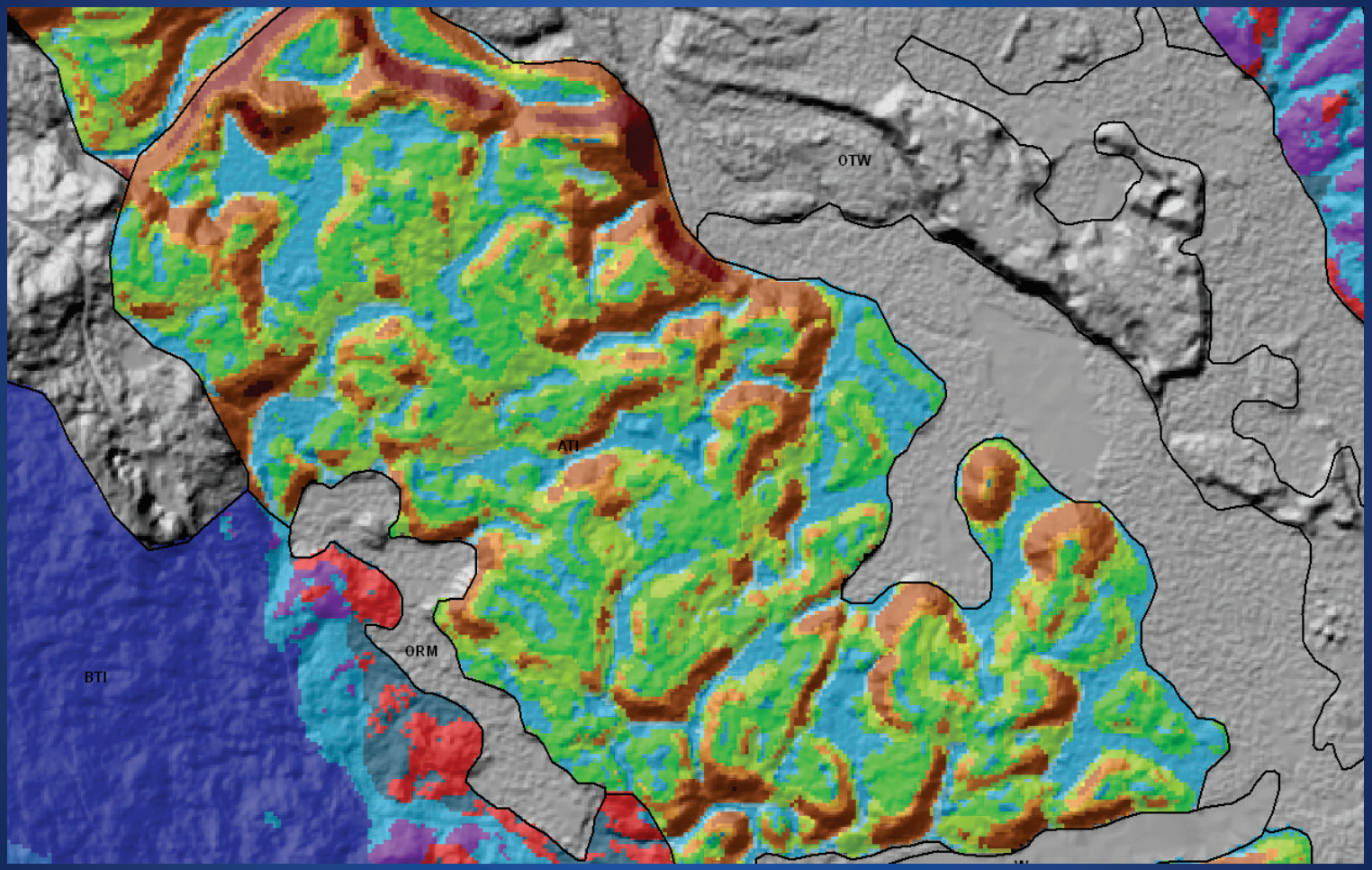


The catena models allow us to visualize where each component occurs within a map unit.

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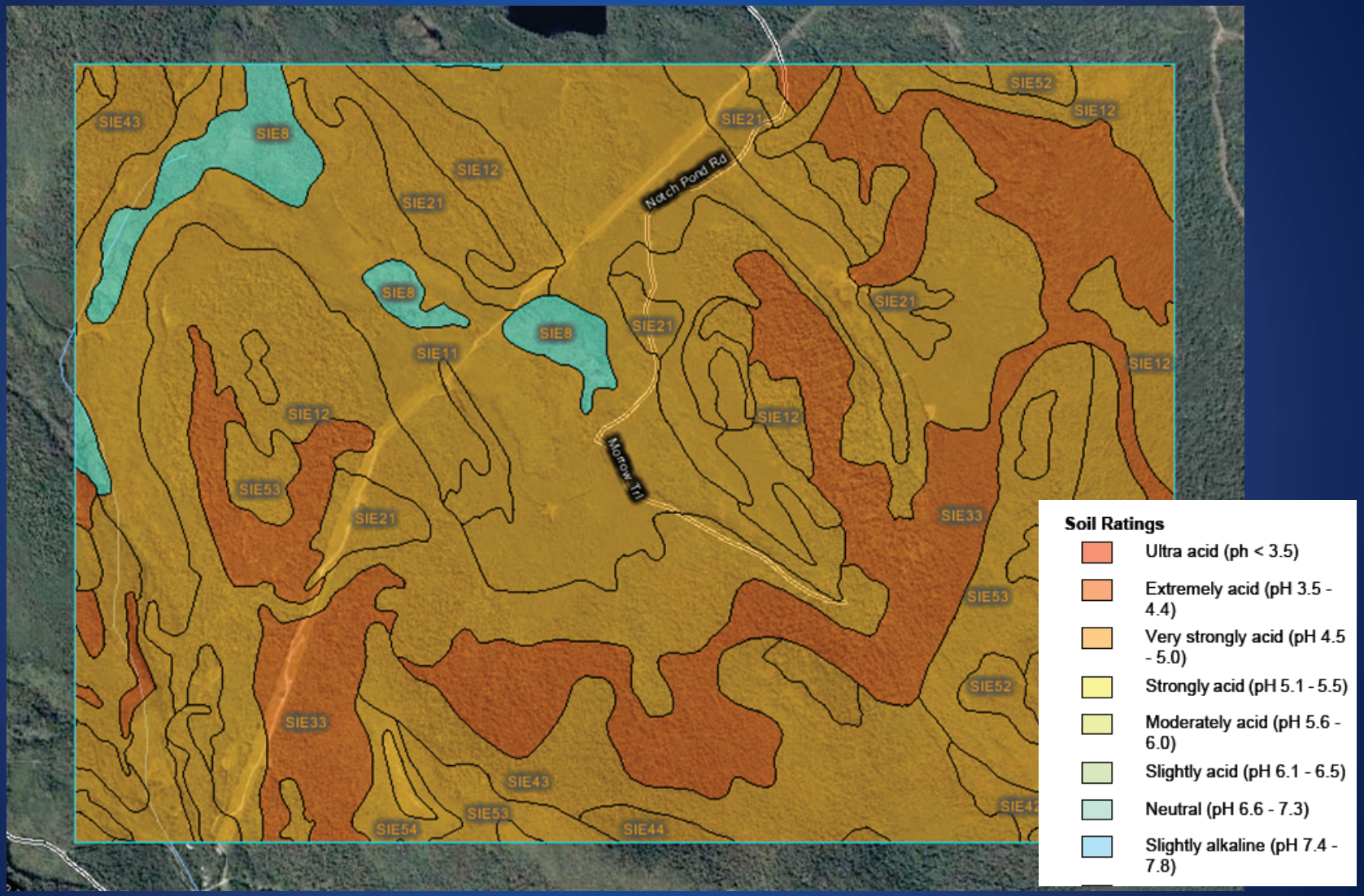


pH of surface layer generated from SSURGO in Web Soil Survey

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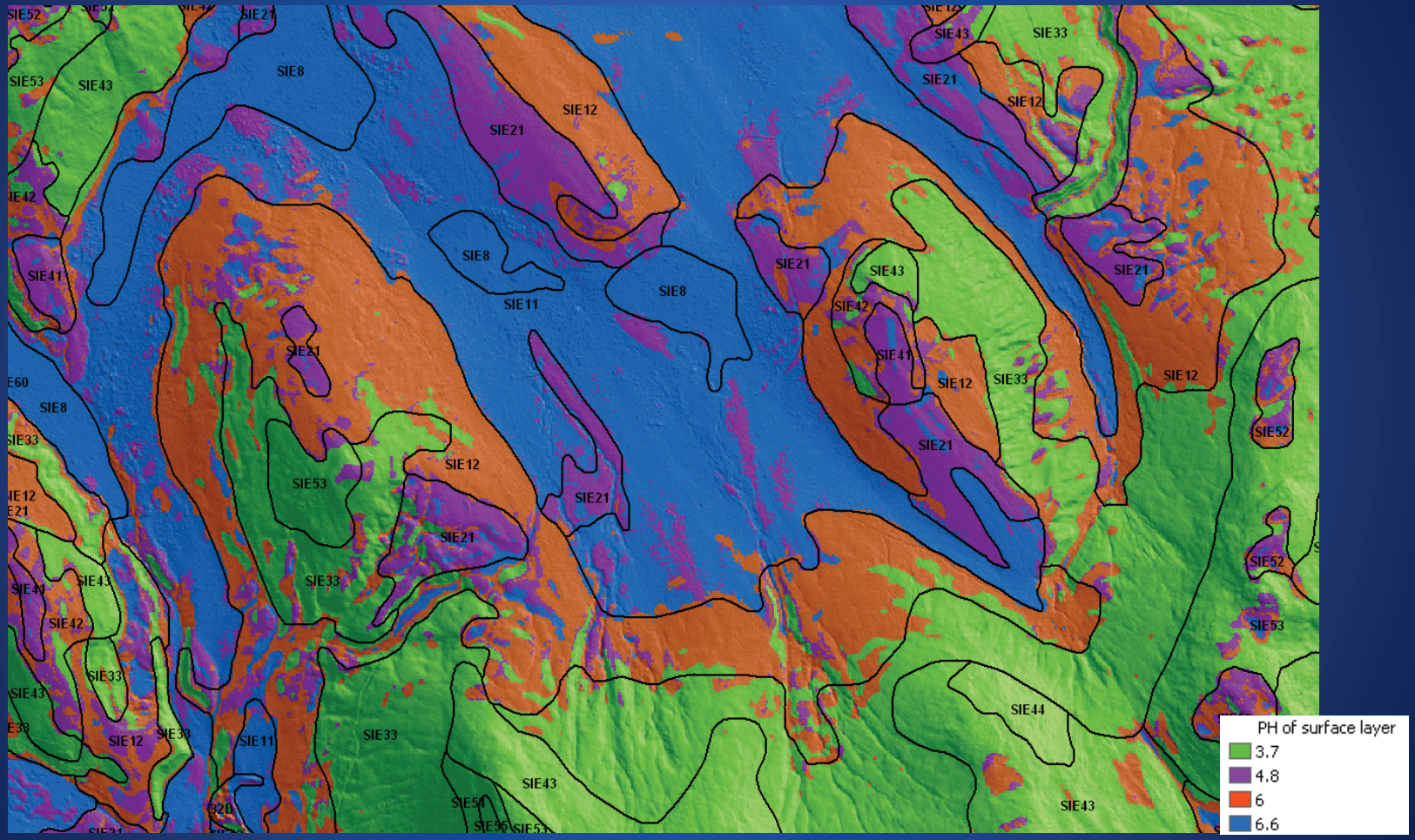


pH of surface layer generated from raster component map.

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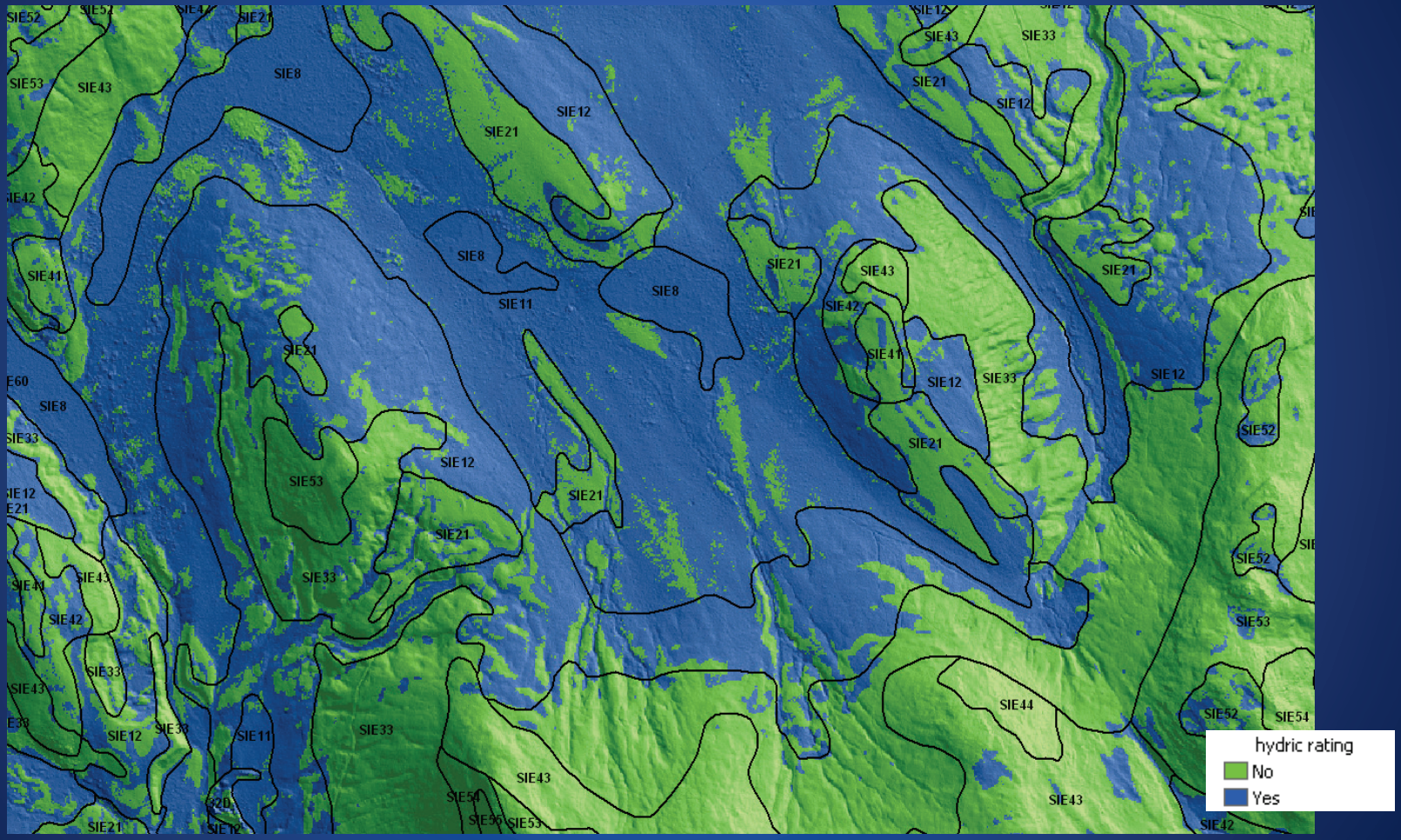


Any properties or interpretations available from Soil Data Mart tabular data should be able to be linked to the raster spatial data.