

# Moving from Static to Dynamic Soil Climate Information

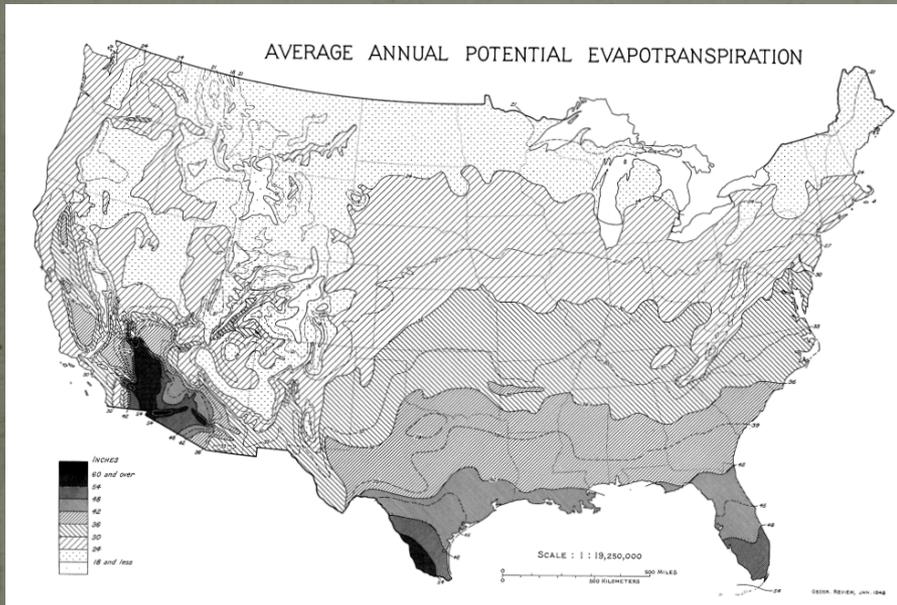
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Global Climate Change  
Global Soil Change

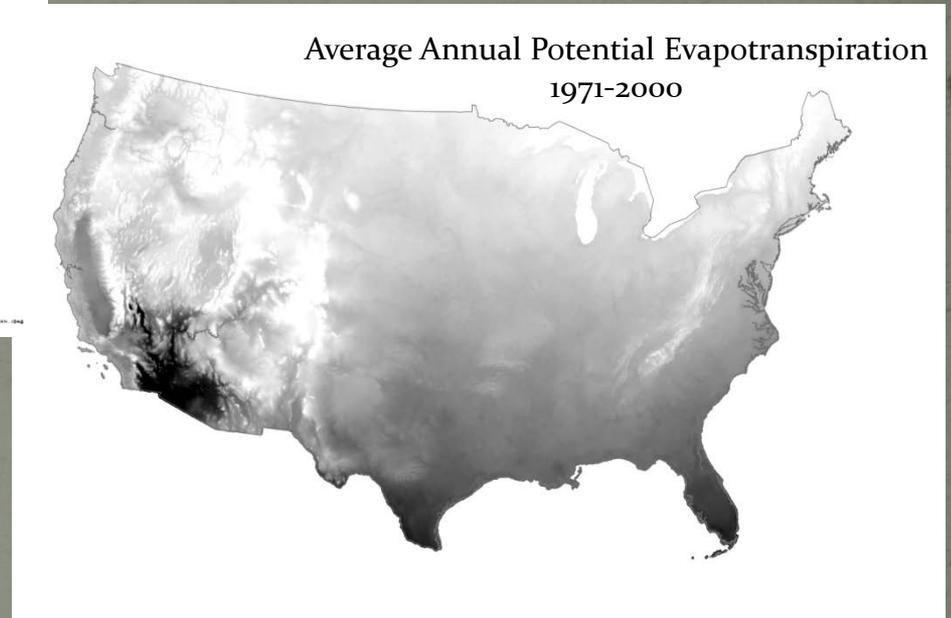
# NCSS Focus

- “The focus of the NCSS is shifting from producing static printed soil survey reports to providing a dynamic resource of soils information for a wide range of needs.” – <http://soils.usda.gov/technical/nasis/>
- Global climate change
- Global Soil Change

# Static to dynamic = from classes to estimates



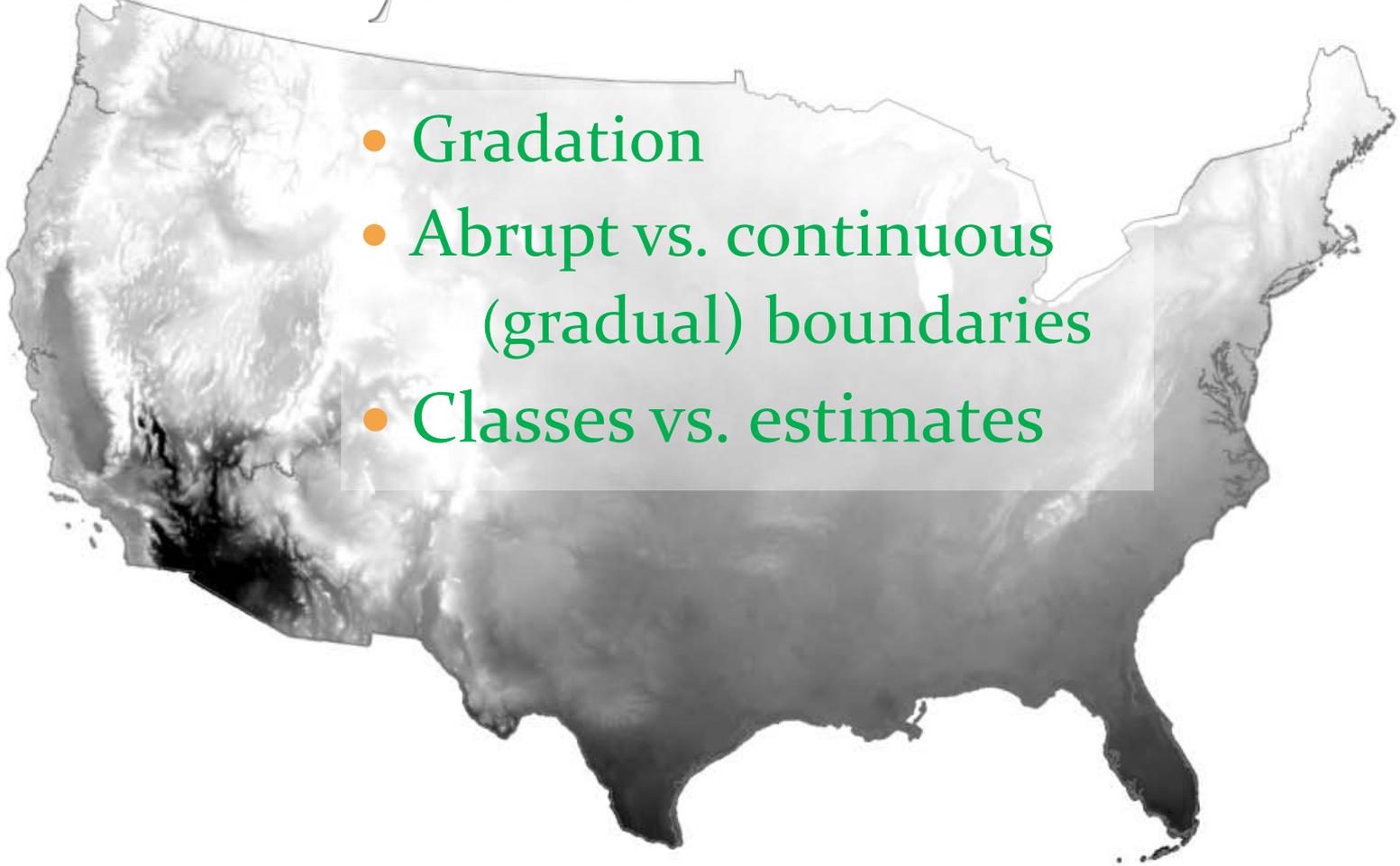
- From Thornthwaite's original 1948 publication, *An approach toward a rational classification of climate*.
- Classes



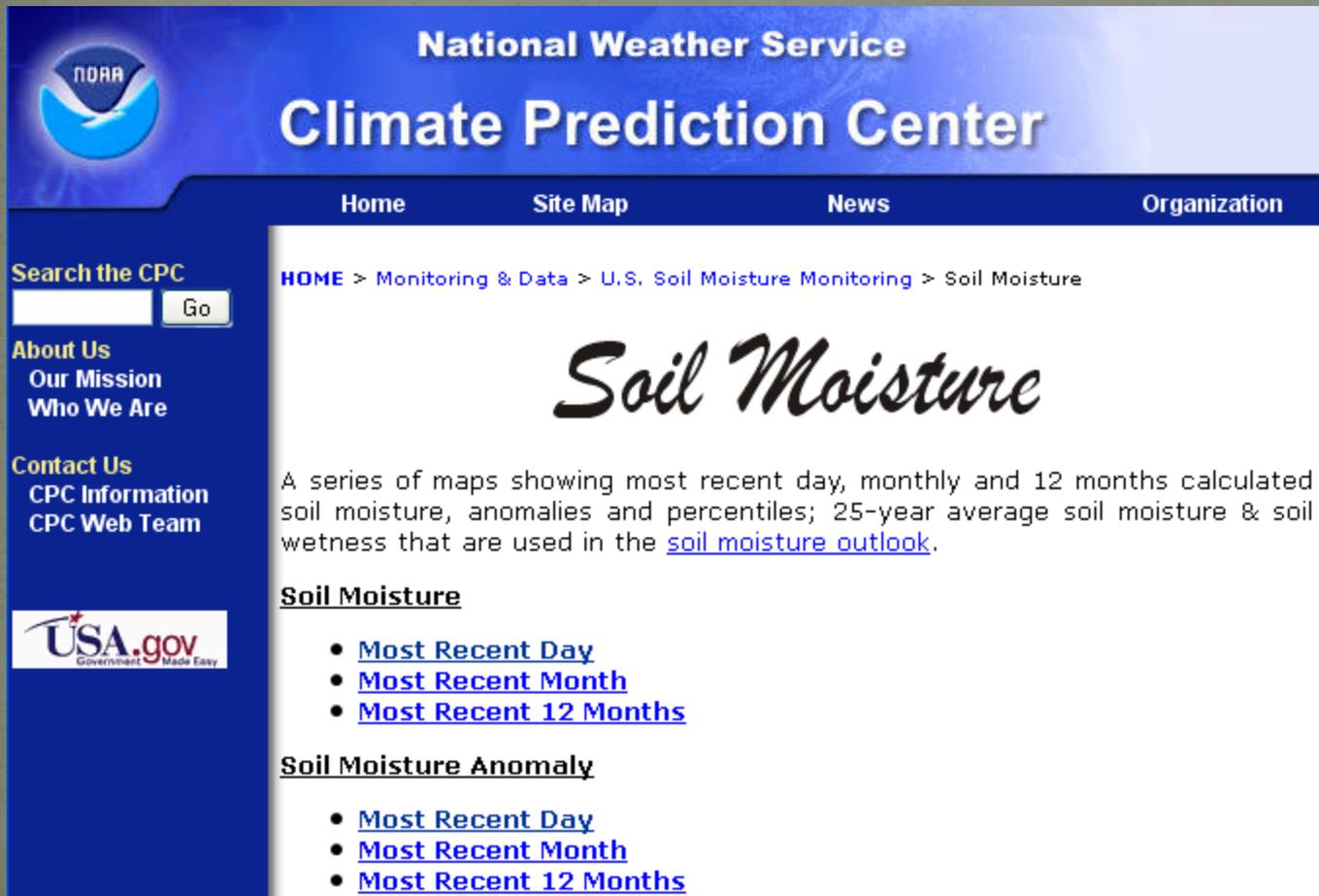
- Calculated from monthly precipitation and temperature data using Thornthwaite's formula and PRISM inputs
- Pixel-by-pixel estimates

# Natural Systems

- Gradation
- Abrupt vs. continuous (gradual) boundaries
- Classes vs. estimates



# National Soil Moisture Modeling



The screenshot shows the NOAA Climate Prediction Center website. The header includes the NOAA logo and the text "National Weather Service Climate Prediction Center". A navigation bar contains links for "Home", "Site Map", "News", and "Organization". On the left side, there is a search box labeled "Search the CPC" with a "Go" button, and sections for "About Us" (Our Mission, Who We Are) and "Contact Us" (CPC Information, CPC Web Team). At the bottom left is the USA.gov logo. The main content area features a breadcrumb trail: "HOME > Monitoring & Data > U.S. Soil Moisture Monitoring > Soil Moisture". The title "Soil Moisture" is displayed in a large, black, cursive font. Below the title is a paragraph: "A series of maps showing most recent day, monthly and 12 months calculated soil moisture, anomalies and percentiles; 25-year average soil moisture & soil wetness that are used in the [soil moisture outlook](#)." There are two sections: "Soil Moisture" and "Soil Moisture Anomaly", each with a bulleted list of links: "Most Recent Day", "Most Recent Month", and "Most Recent 12 Months".

**National Weather Service**  
**Climate Prediction Center**

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USA.gov  
Government Made Easy

HOME > Monitoring & Data > U.S. Soil Moisture Monitoring > Soil Moisture

## Soil Moisture

A series of maps showing most recent day, monthly and 12 months calculated soil moisture, anomalies and percentiles; 25-year average soil moisture & soil wetness that are used in the [soil moisture outlook](#).

### Soil Moisture

- [Most Recent Day](#)
- [Most Recent Month](#)
- [Most Recent 12 Months](#)

### Soil Moisture Anomaly

- [Most Recent Day](#)
- [Most Recent Month](#)
- [Most Recent 12 Months](#)

What actual soil information is used in the estimates from NOAA?

# National Soil Moisture Modeling



**National Weather Service**

**Climate Prediction Center**

Home
Site Map
News
Organization

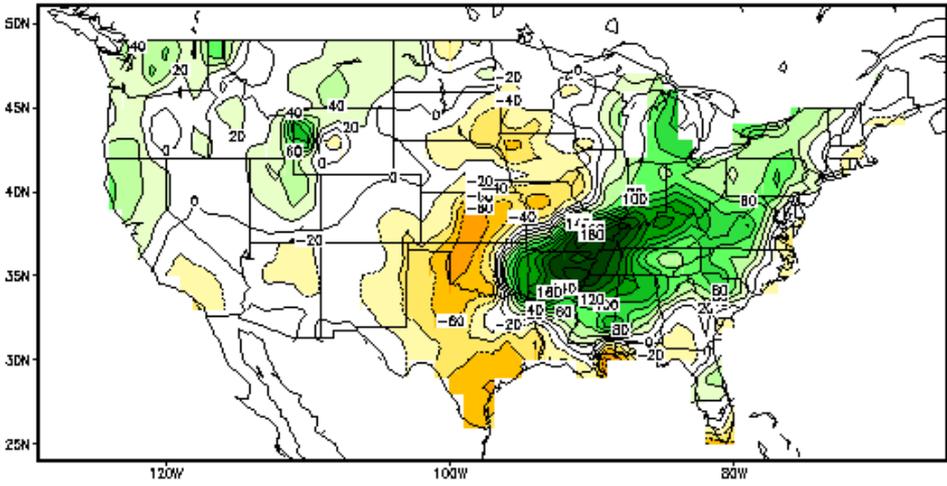
[HOME](#) > Land Surface Monitoring and Prediction

## Soil Moisture (mm)

Move cursor over product parameter name to display the graphic.

Total			Anomaly			Percentile			Change	
Daily	Monthly	Last Day of Month	Daily	Monthly	Last Day of Month	Daily	Monthly	Last Day of Month	Monthly	Seasonal

**Calculated Soil Moisture Anomaly Change**  
**MAY 14, 2011 from FEB.28**



**CPC Search**

**SM Home**

**United States**

**Soil Moisture**

- Recent Conditions
- Last 12 Months
- Soil Moisture Clim
- Soil Wetness Clim

Evaporation

Precipitation

Runoff

Temperature

**Summary**

Recent Anomalies

**OUTLOOK**

**About Us**

Our Mission

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CPC Information

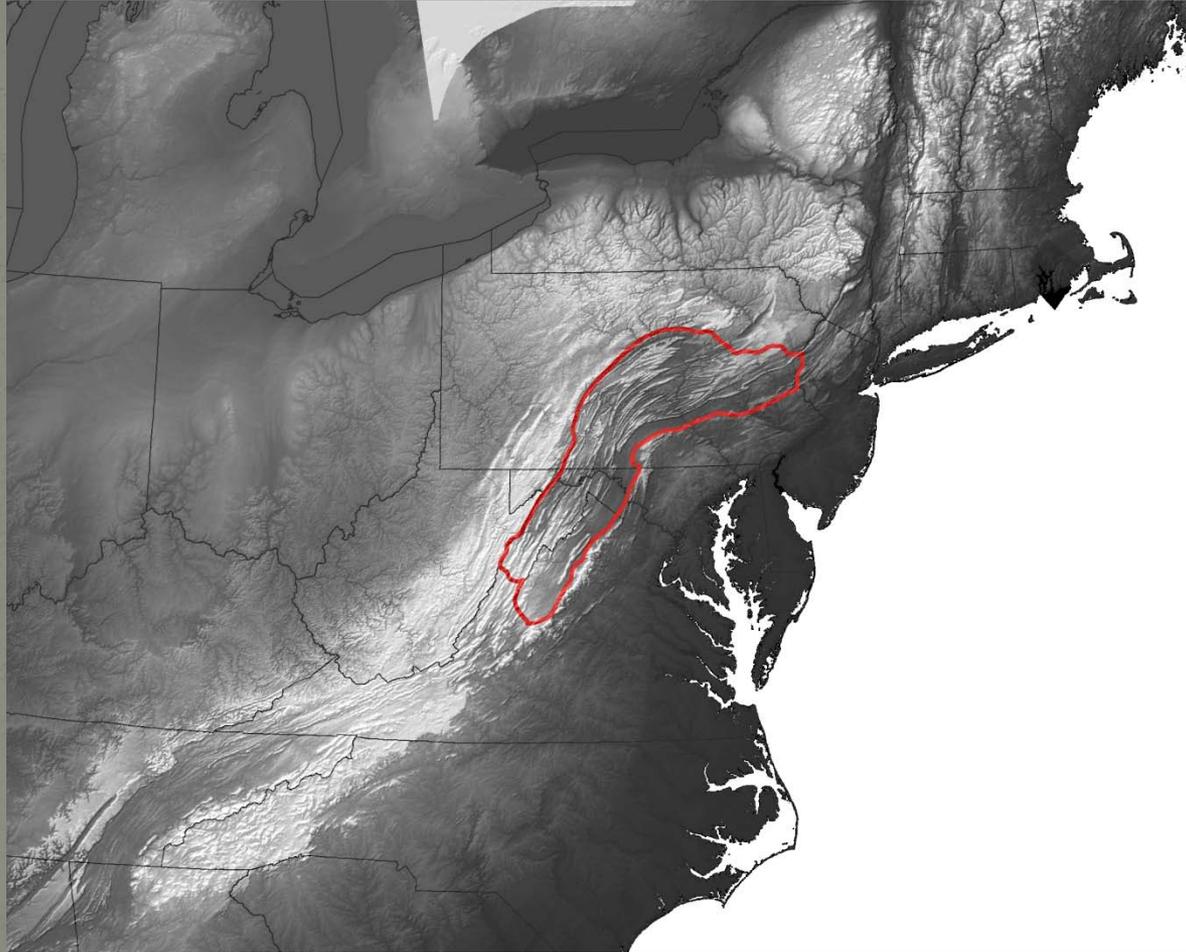
CPC Web Team

# Soil Climate vs. Soil Weather

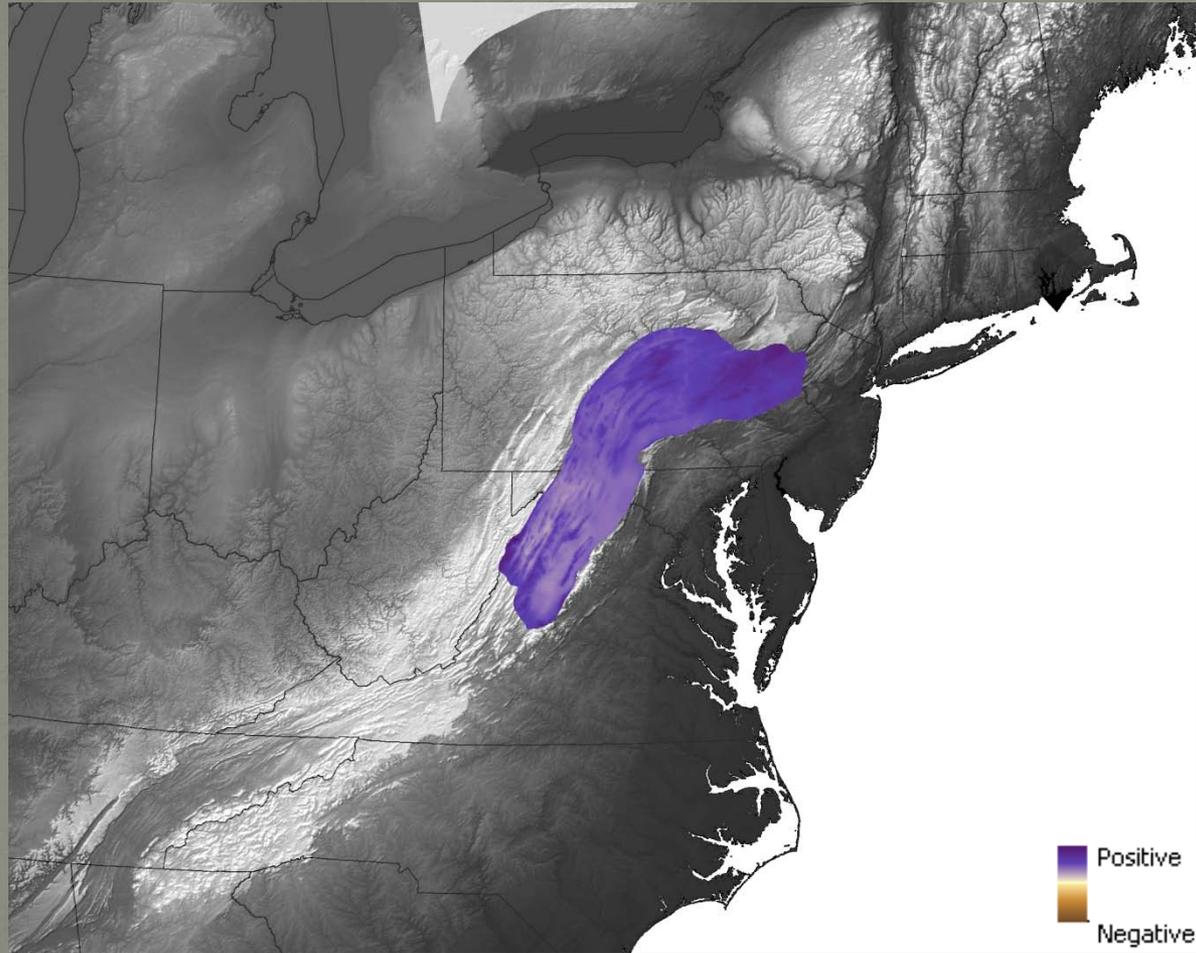
- Climate – long-term trends in weather
- Pedogenesis & geological timescales
- Tracking the pace of soil change

# Study Site: MLRA 147

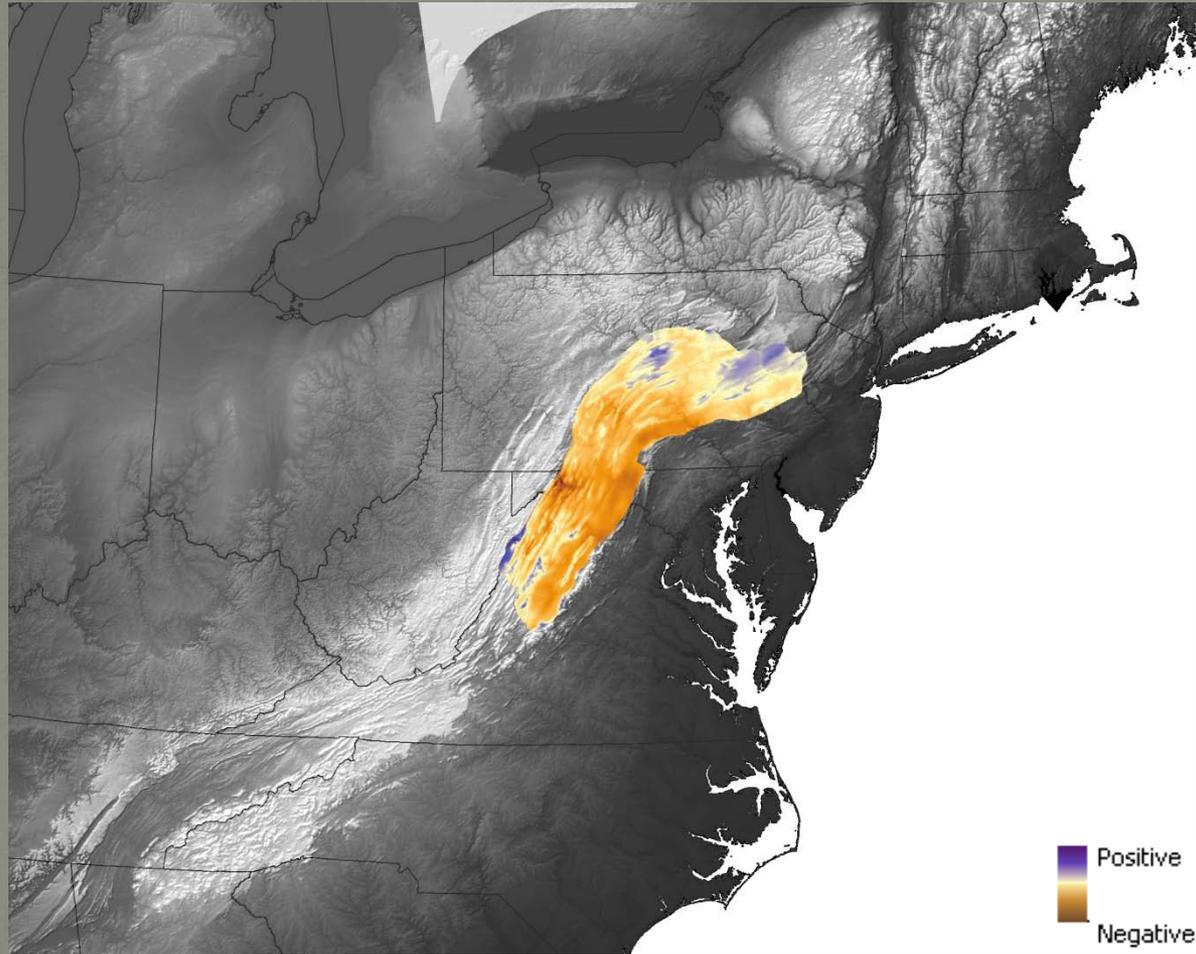
## 1970 – 2000 Soil Climate Summary



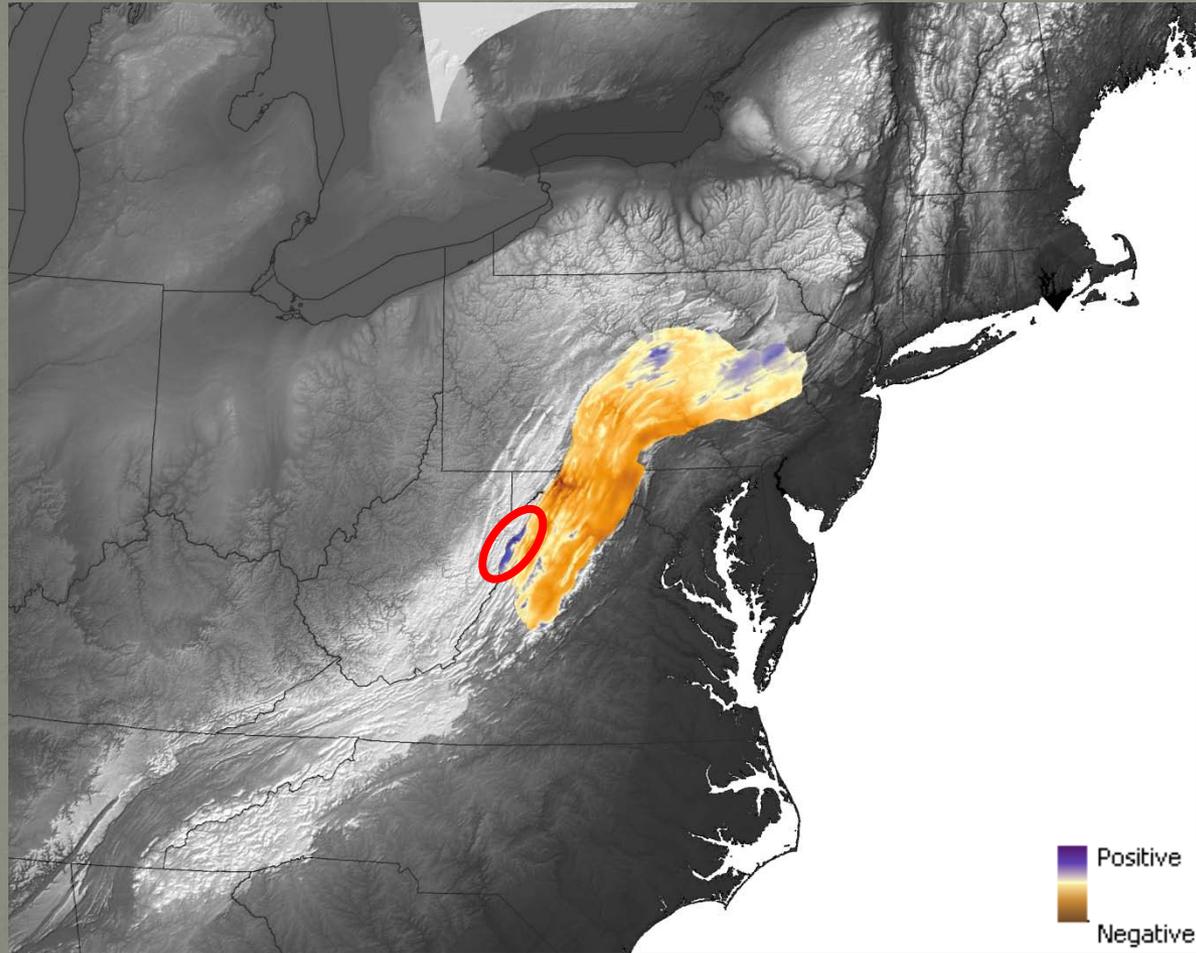
# jNSM Output (1971-2000): mean annual water balance (mm)



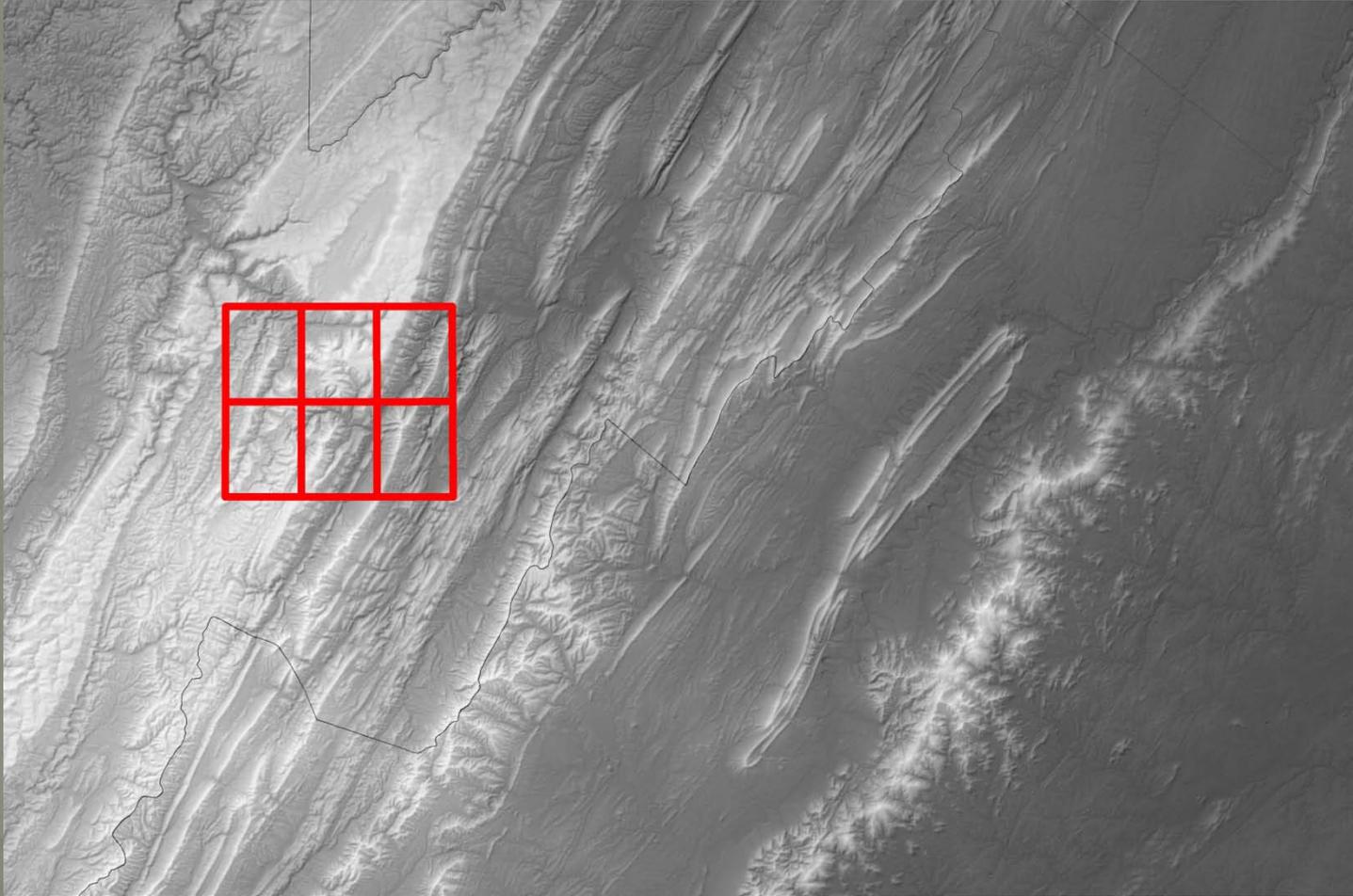
# jNSM Output (1971-2000): mean summer water balance (mm)



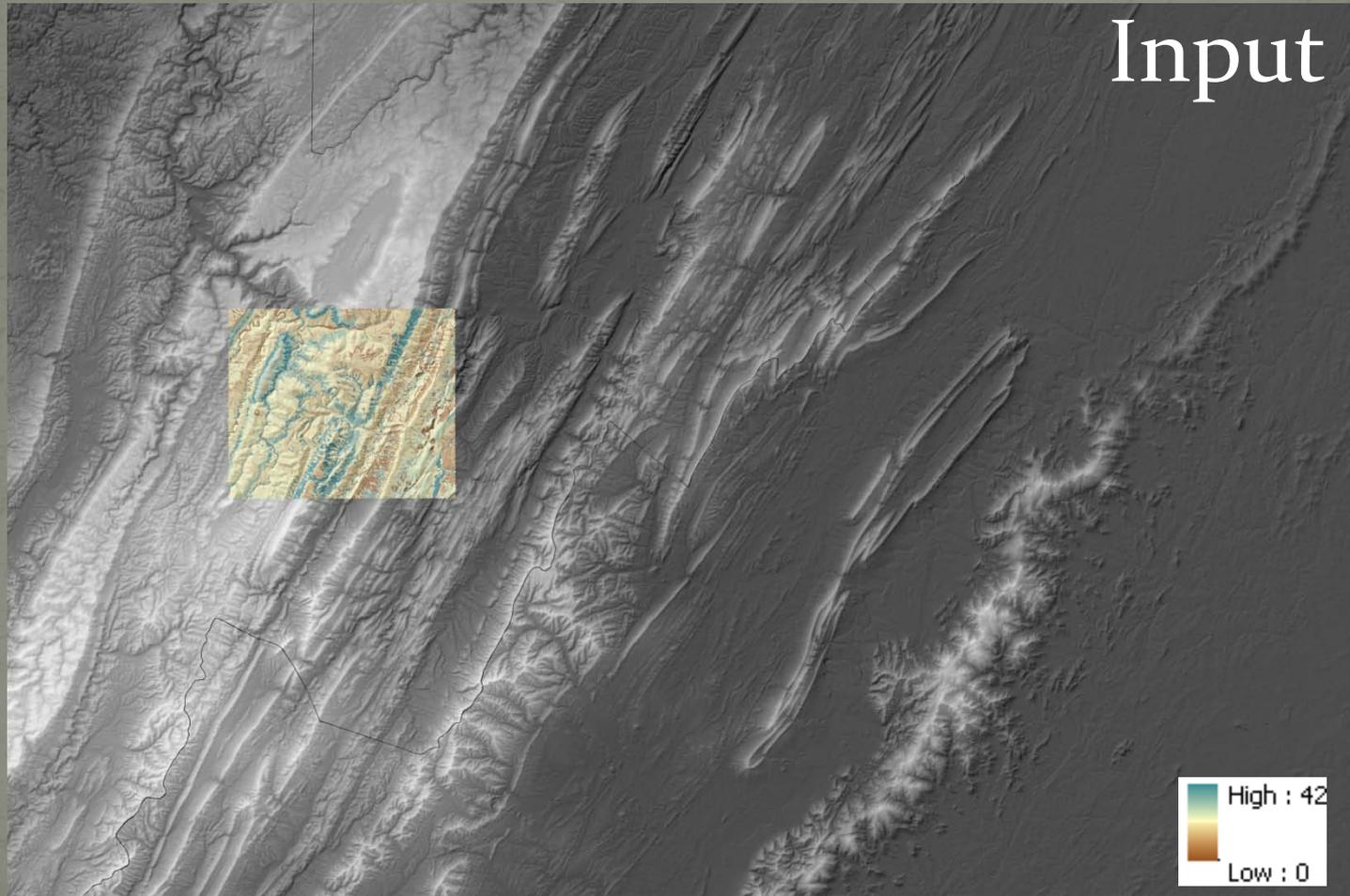
# jNSM Output (1971-2000): mean summer water balance (mm)



# Detail: Eastern West Virginia



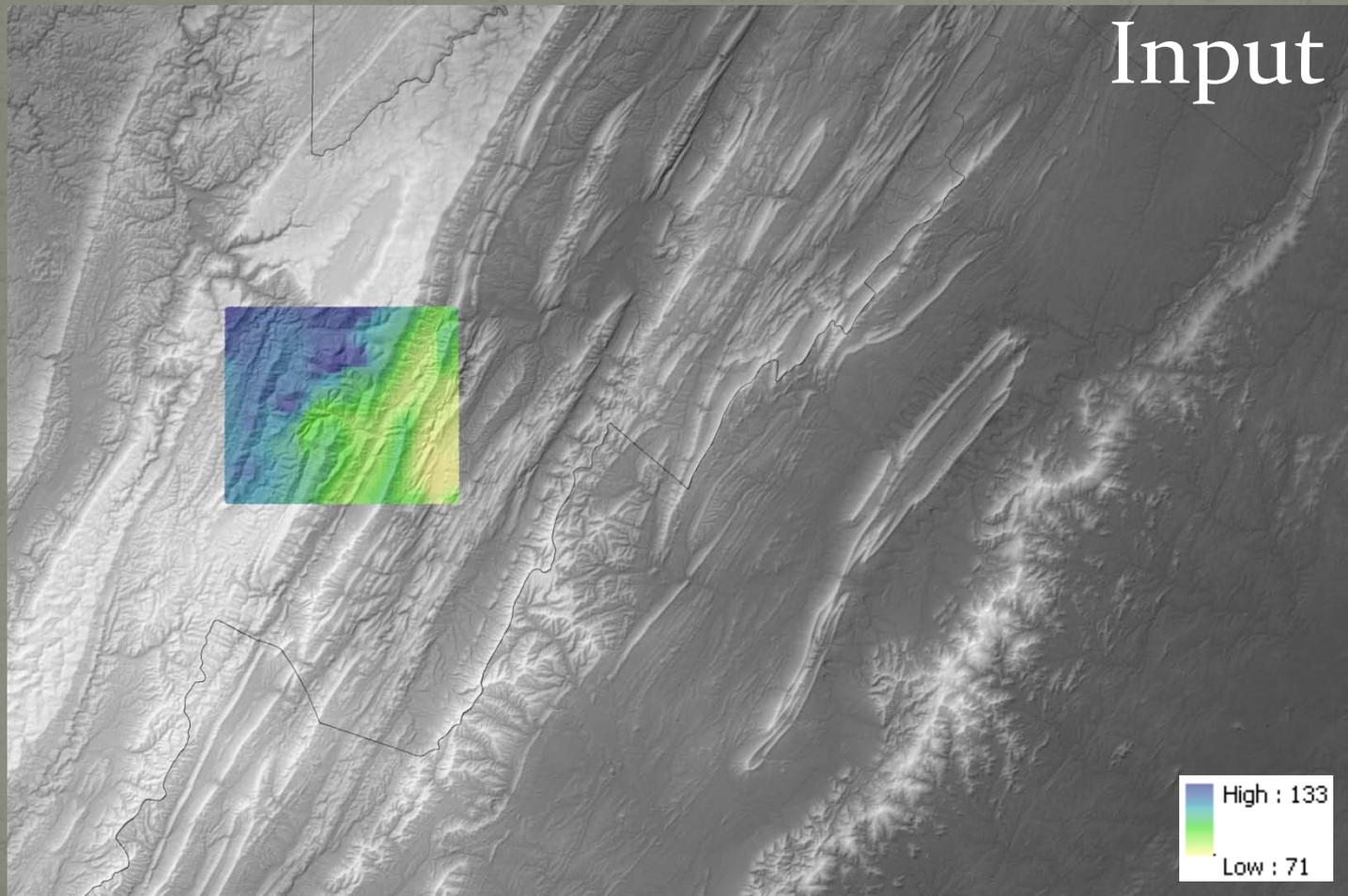
# Root Zone Available Water Capacity from Gridded SSURGO (cm)



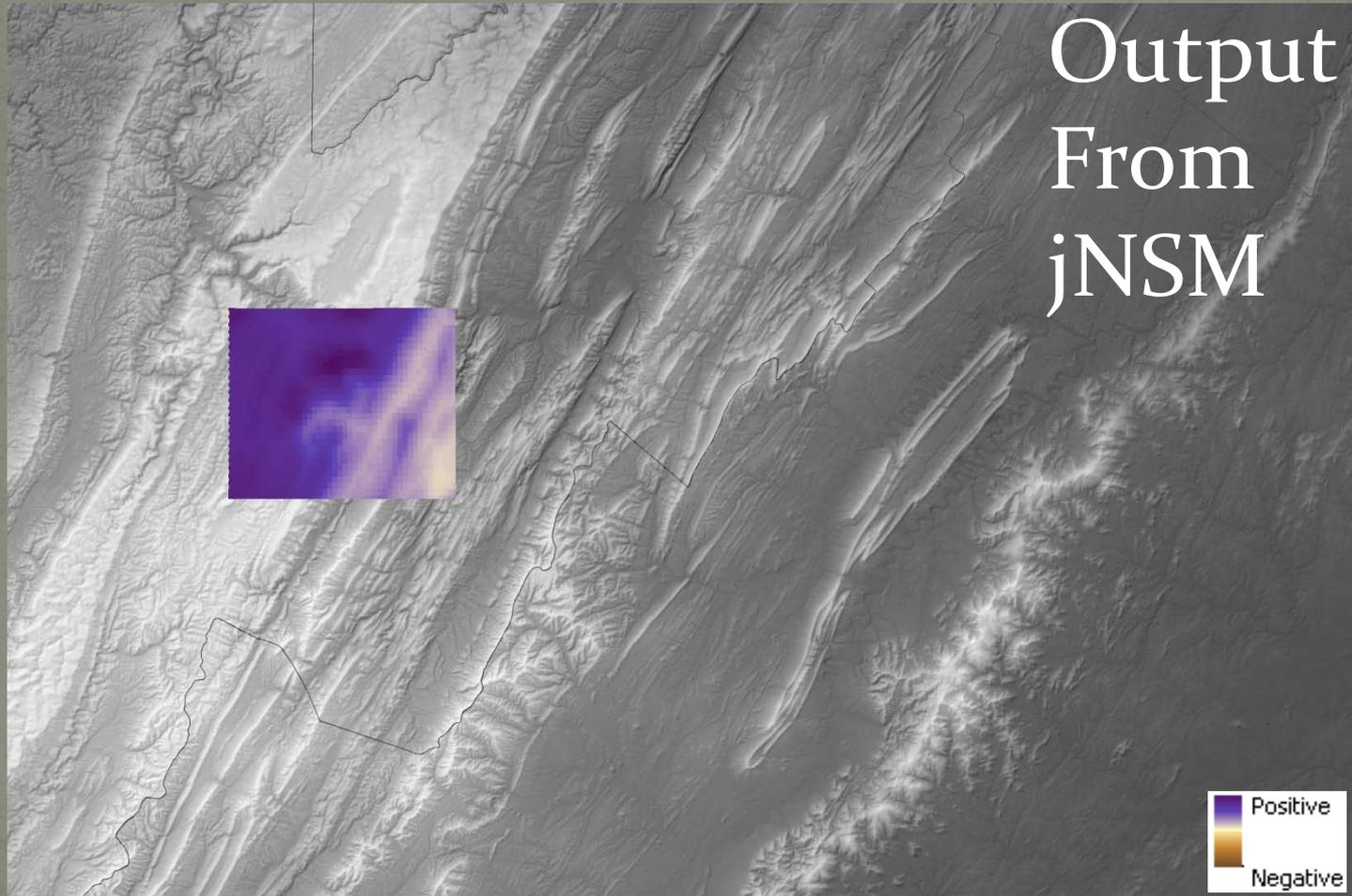
# Average August Air Temperature (°C)



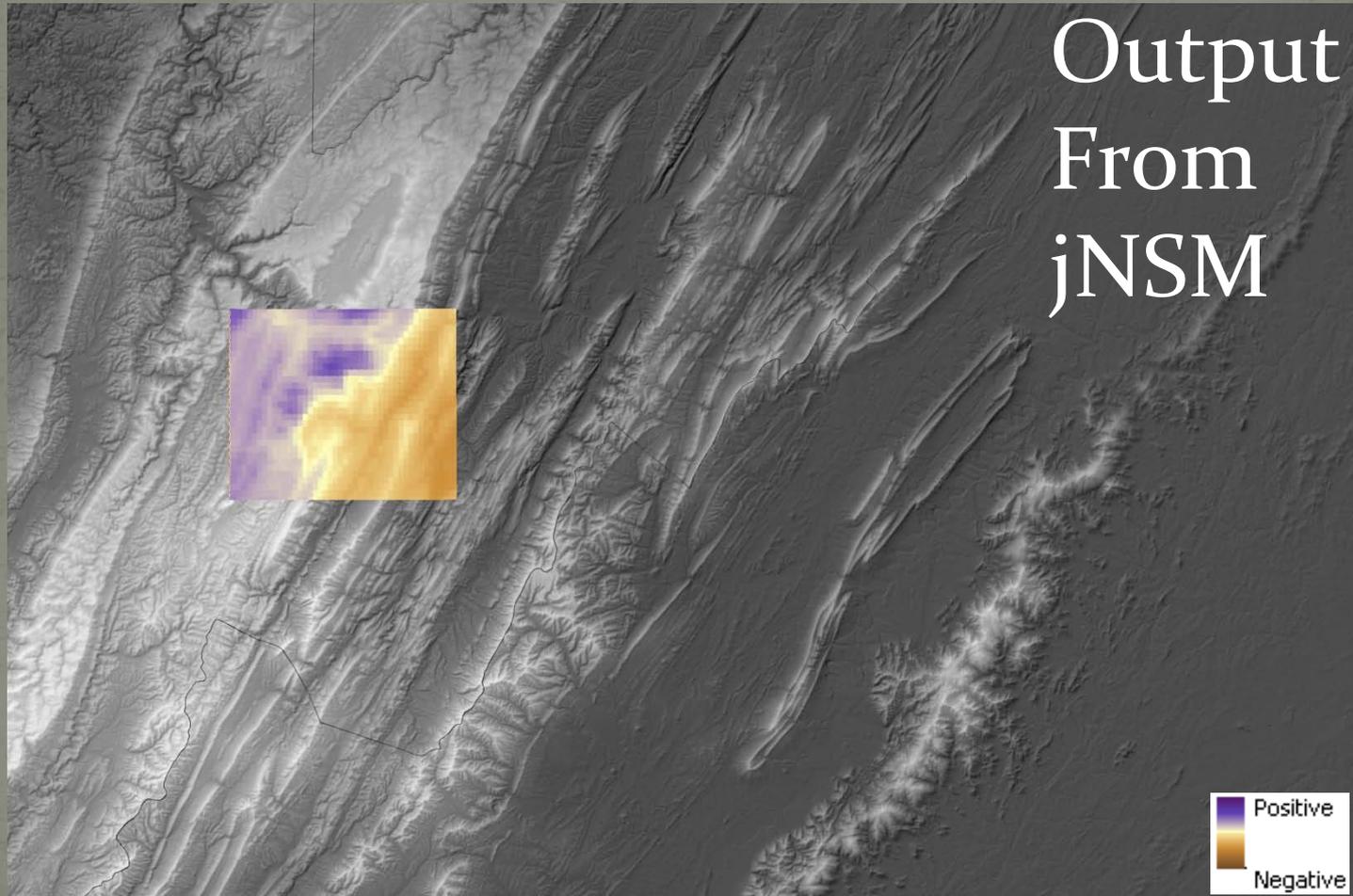
# Average August Precipitation (mm)



# Mean annual water balance (1971-2000)



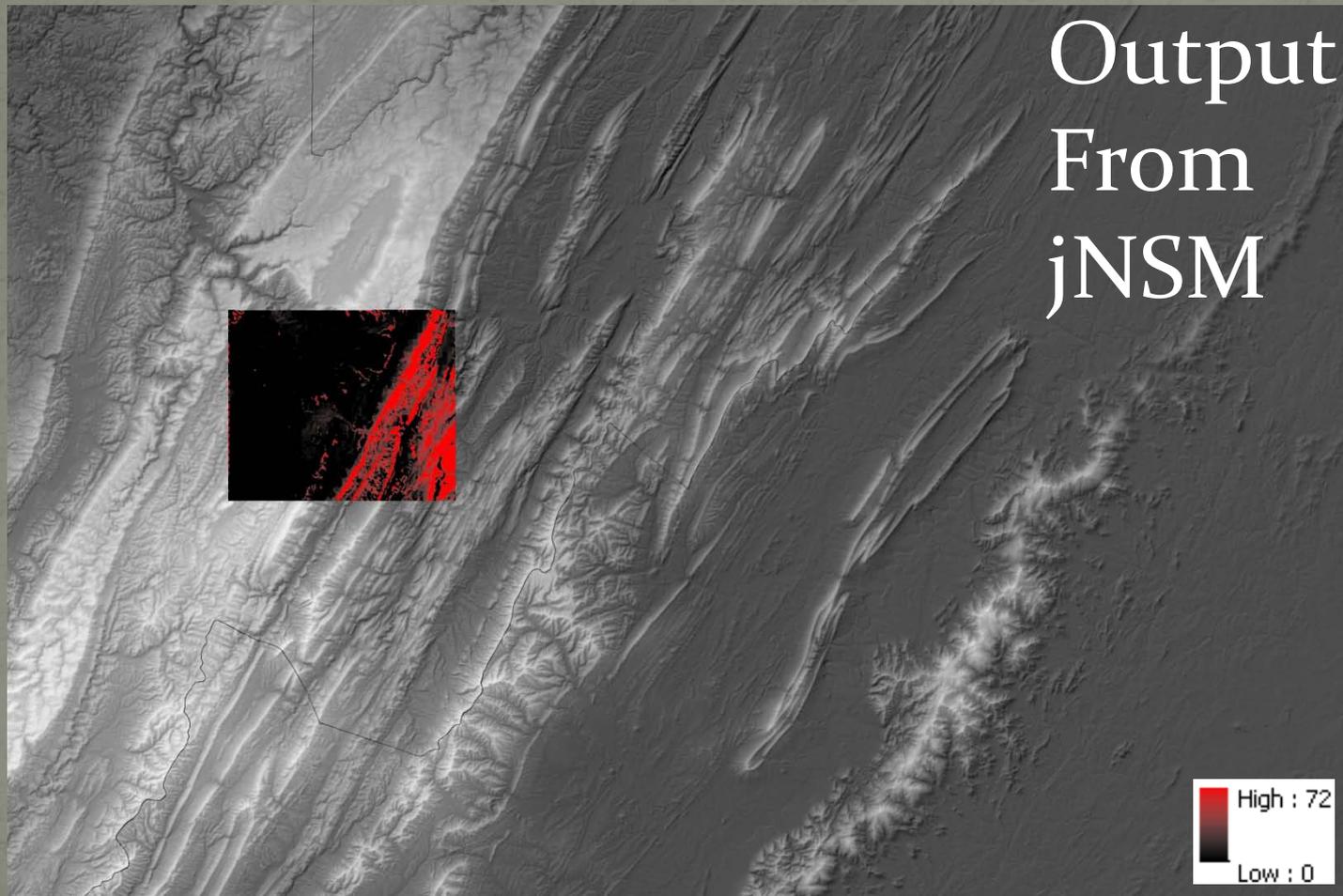
# Mean summer water balance (1971-2000)



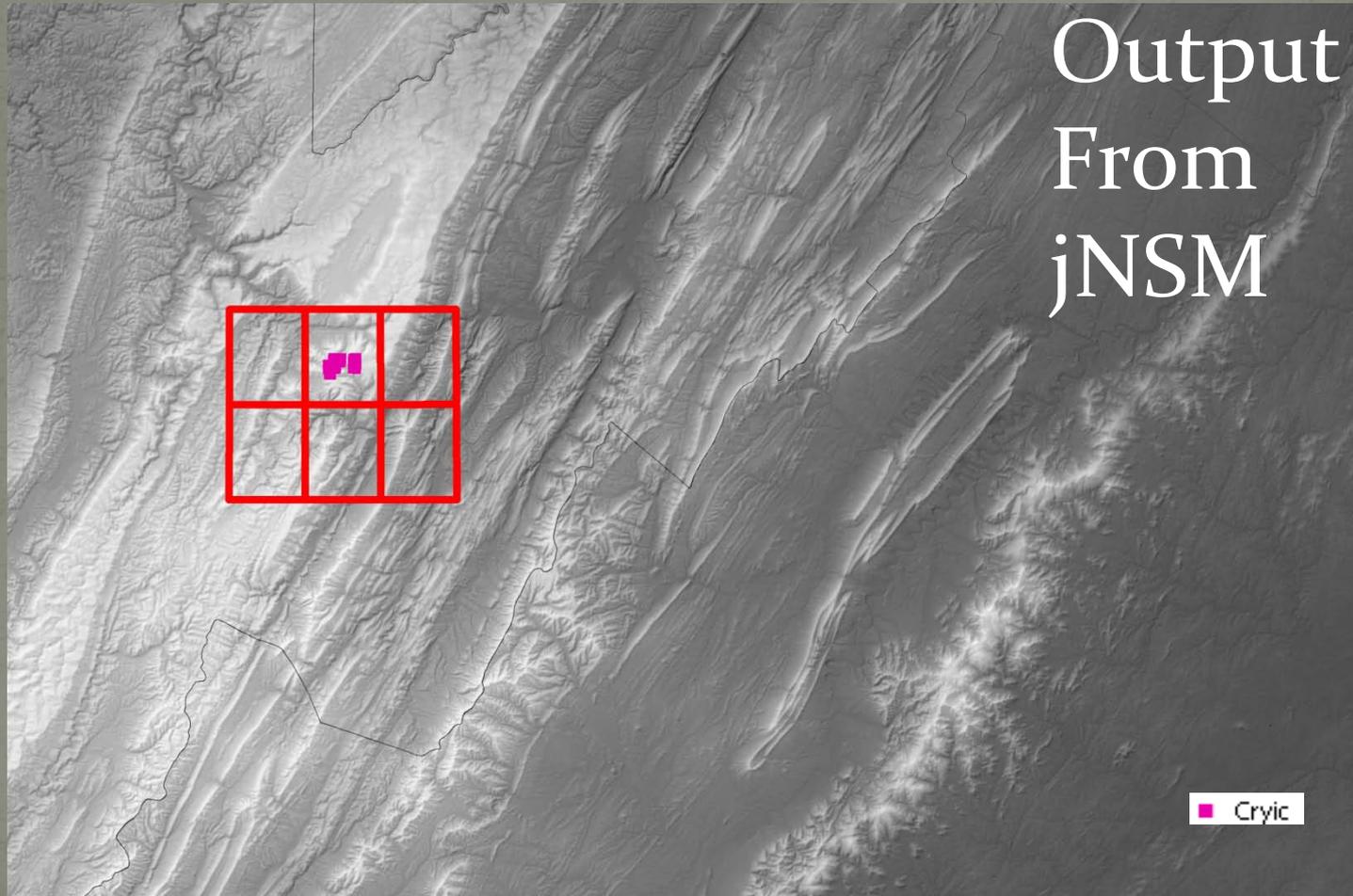
# Number of days per year soil is moist and $> 8^{\circ} \text{C}$ (1971-2000)



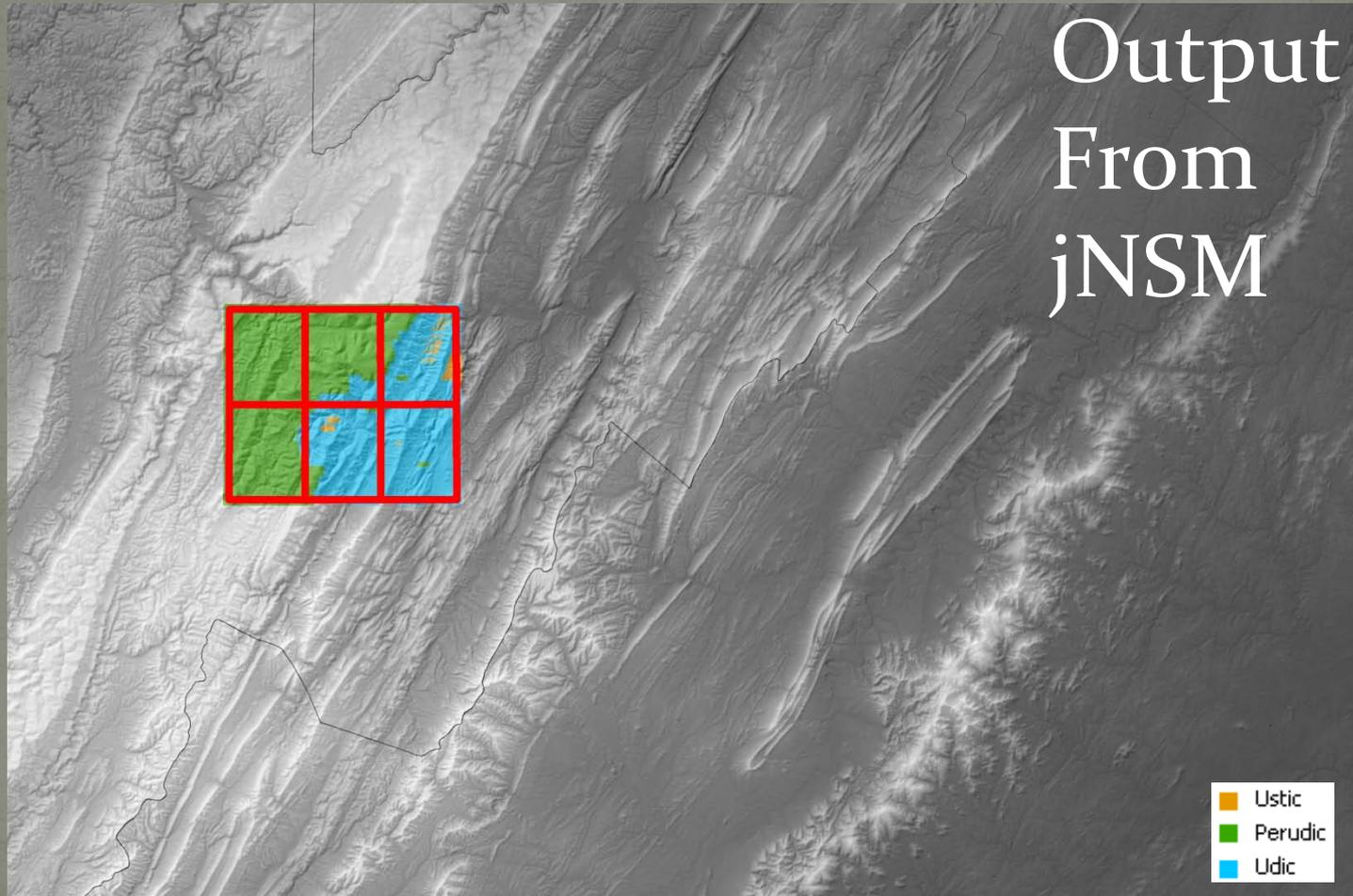
Days per year soil is at least partially dry in the MCS and  $> 5^{\circ} \text{C}$  (1971-2000)



# Soils that met Cryic Criteria (1971-2000)



# Soil Moisture Regimes (1971-2000)



# Tracking Soil Climate

- Soil change
- Climate change
- Soil climate change
- Real-time estimates of the rates of changes of soils
- Soil properties strongly influenced by climate – particularly soil carbon, always in dynamic flux with temperature and moisture variables
- Changes in climate mean changes in soil properties influenced by climate
- Is there public demand for high-quality soil climate estimates at detailed (SSURGO) scales?
- jNSM (Newhall Simulation Model) can be modified to give high-quality map outputs for soil climate values