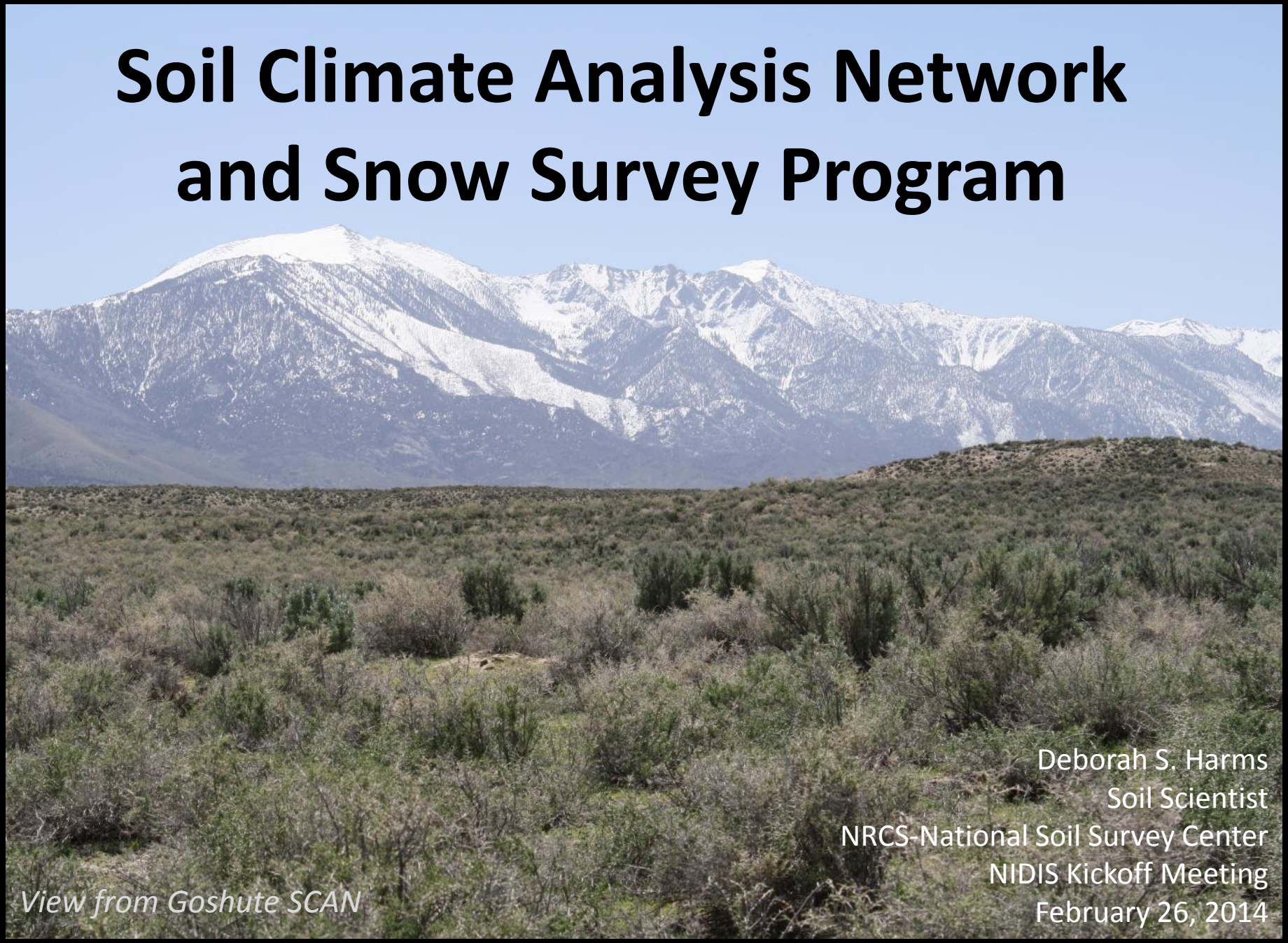
Soil Climate Analysis Network and Snow Survey Program



View from Goshute SCAN

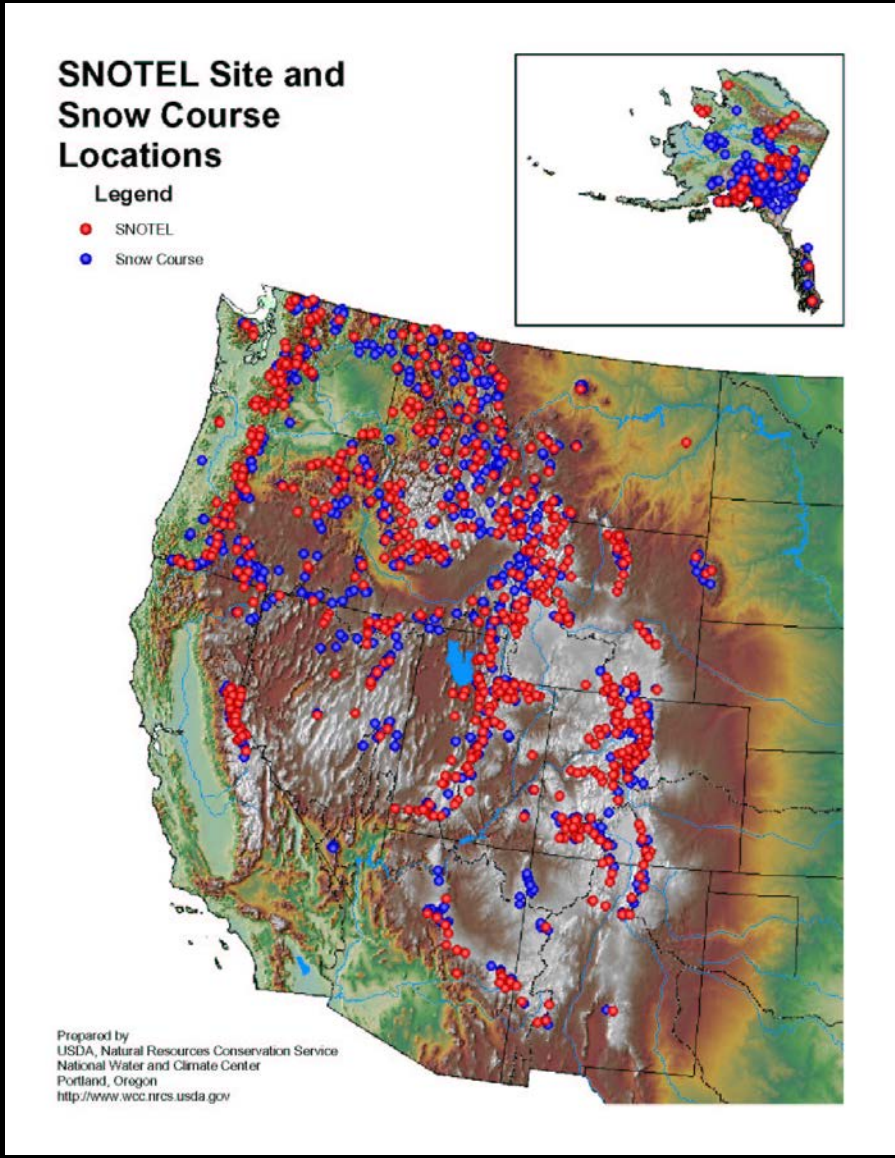
Deborah S. Harms
Soil Scientist
NRCS-National Soil Survey Center
NIDIS Kickoff Meeting
February 26, 2014

- SNOTEL background
- SCAN background
- Soil Function
- Current and future projects

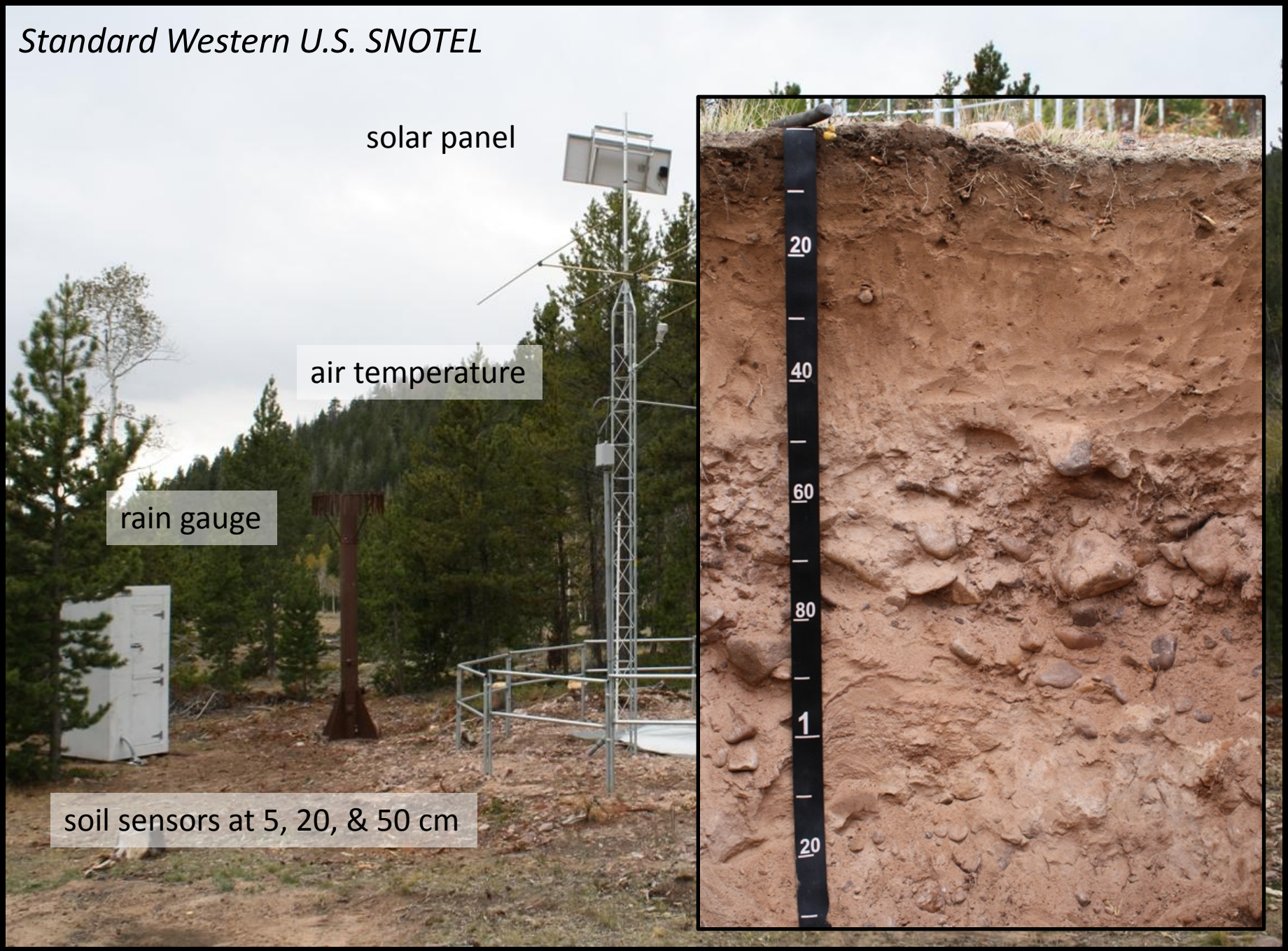
Snowpack Telemetry

SNOTEL

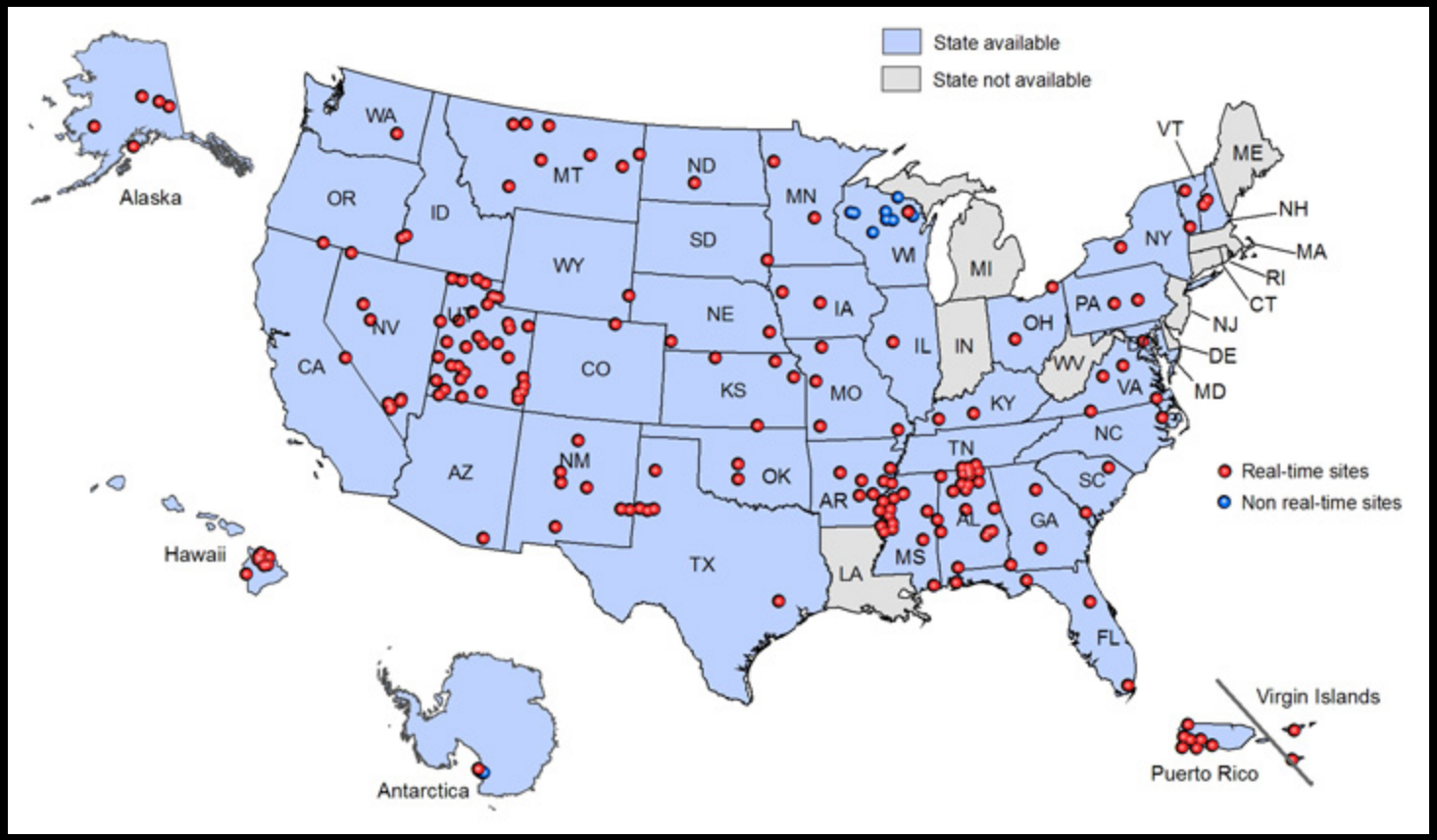
- 900 sites west-wide
- DCOs located in
  - Portland, OR
  - Boise, ID
  - Salt Lake City, UT
  - Bozeman, MT
  - Denver, CO
- Water Supply Specialists in WA, CA, NV, AZ, NM, & WY.



Standard Western U.S. SNOTEL



Soil Climate Analysis Network - **SCAN**

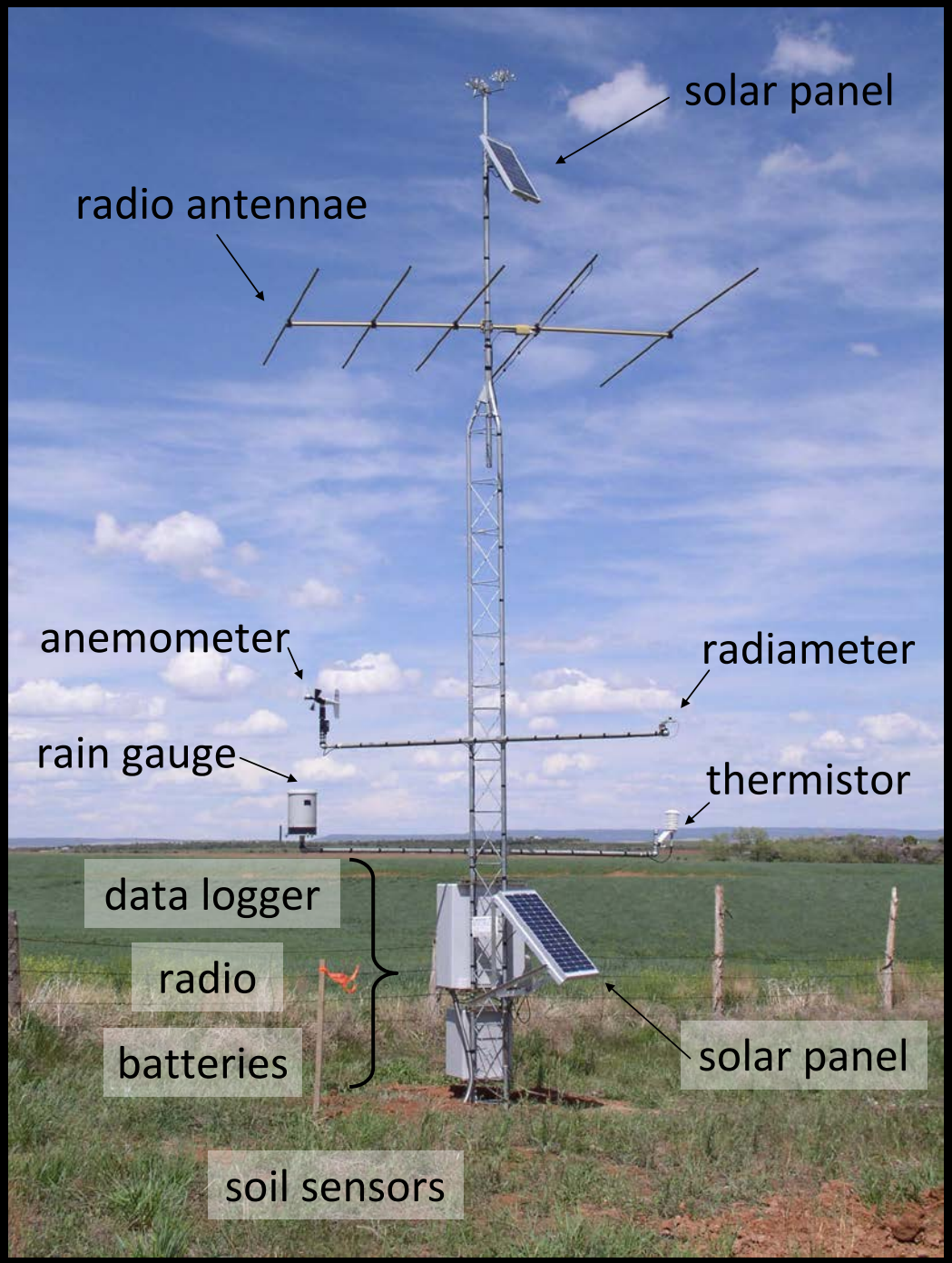


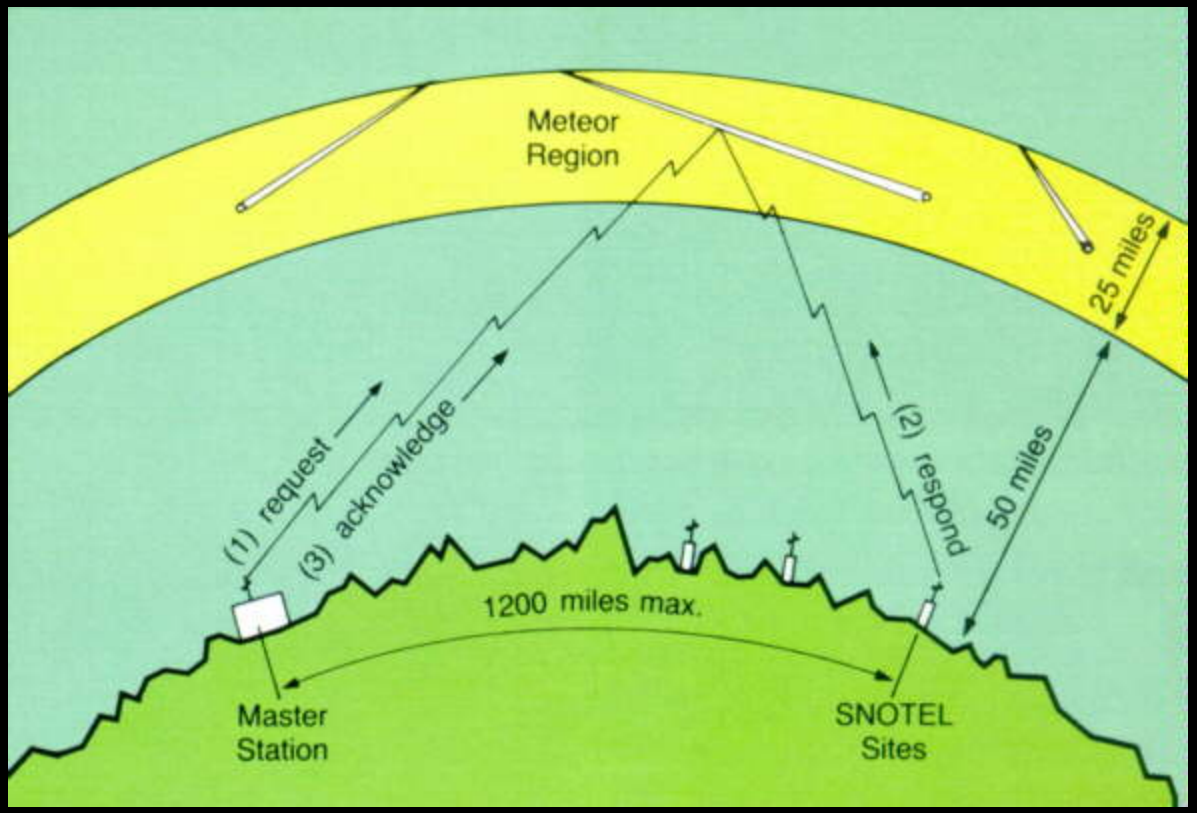
- 190 sites nation-wide
- 35 sites in Utah
- Initiated in 1991 as a pilot study with 25 sites.

- Site maintenance (*outside Utah*) is organized through NWCC.
- Data editing and quality control (*outside UT*) is done by a statistical assistant in MT.

Site layout

- Air temperature
- Relative humidity
- Wind speed & direction
- Barometric pressure
- Rainfall
- Solar radiation
- Soil moisture (5, 10, 20, 50 & 100 cm)
- Soil temperature (5, 10, 20, 50 & 100 cm)
- Soil electrical conductivity (5, 10, 20, 50 & 100 cm)





Hourly data collection

- Air temperature
- Precipitation
- Snow water equivalent
- Snow depth
- Soil moisture (5, 20, & 50 cm)
- Soil temperature (5, 20, & 50 cm)

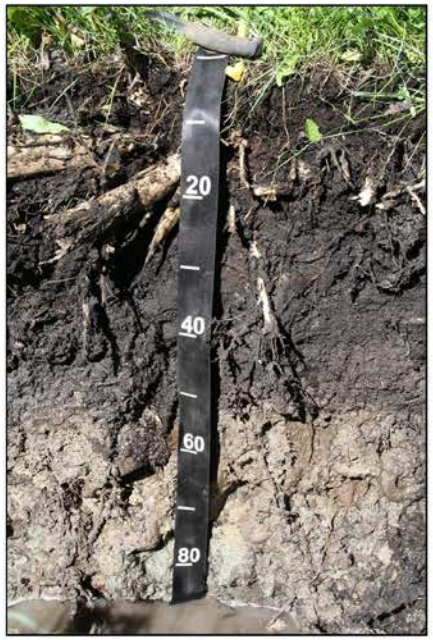
Image from: http://en.wikipedia.org/wiki/Meteor_burst_communications

SOIL MOISTURE

Grantsville

Chicken Ridge sage

Chicken Ridge aspen



Burts Miller Ranch

Buffalo Jump

Manderfield

Spooky

Vermillion

Panguitch

Tony Grove

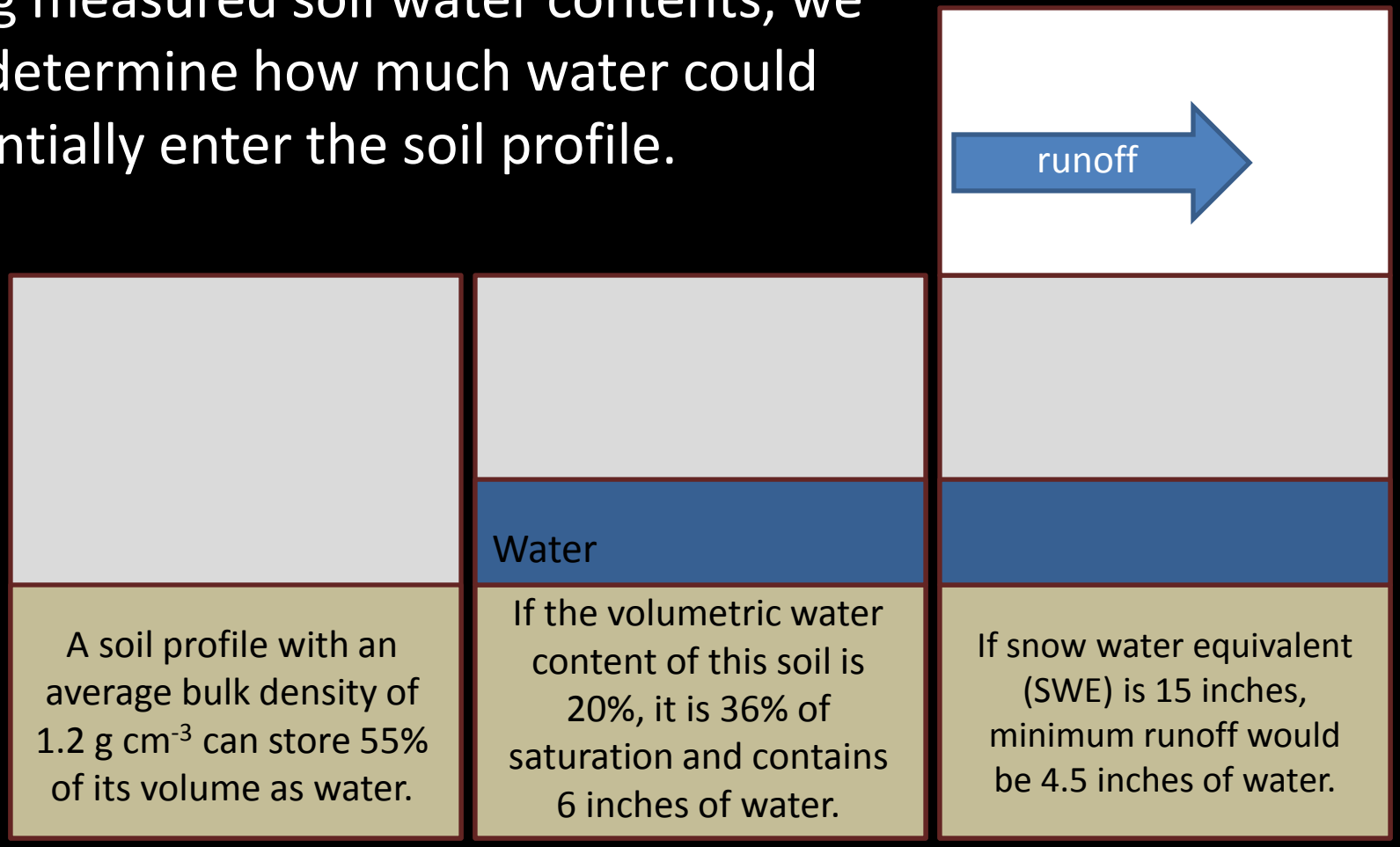
Klondike Narrows

Soil Moisture/Soil Temperature Measurement

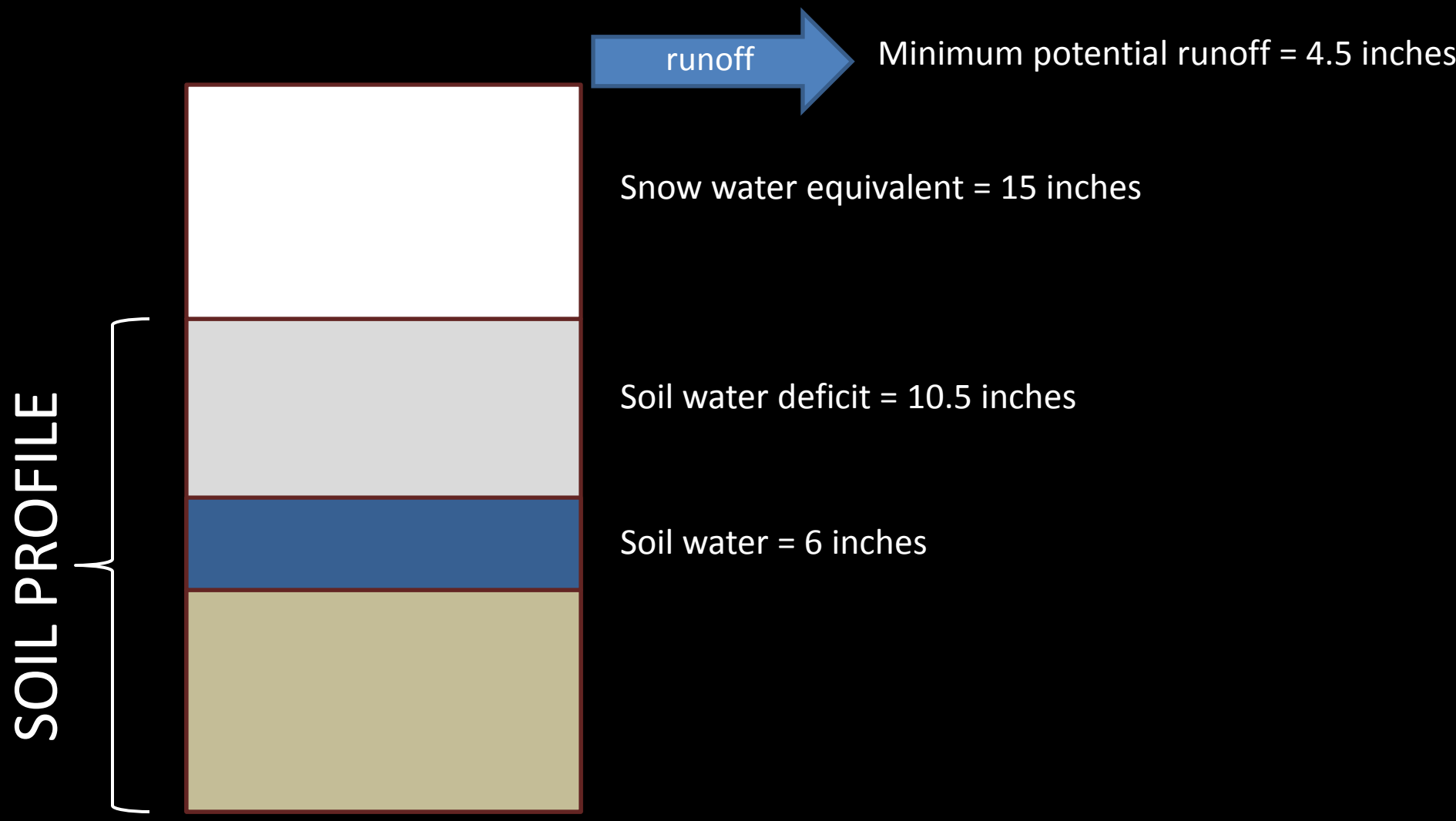
- NRCS uses a capacitance type of sensor.
- Steven Water “Hydra Probe” SDI-12 is currently used
- Installed at specific depths
- Full soil description and characterization analysis are done at each location
- Description and characterization data available to users from the Web

Soil Water Deficit

- Using measured soil water contents, we can determine how much water could potentially enter the soil profile.



Soil Water Deficit

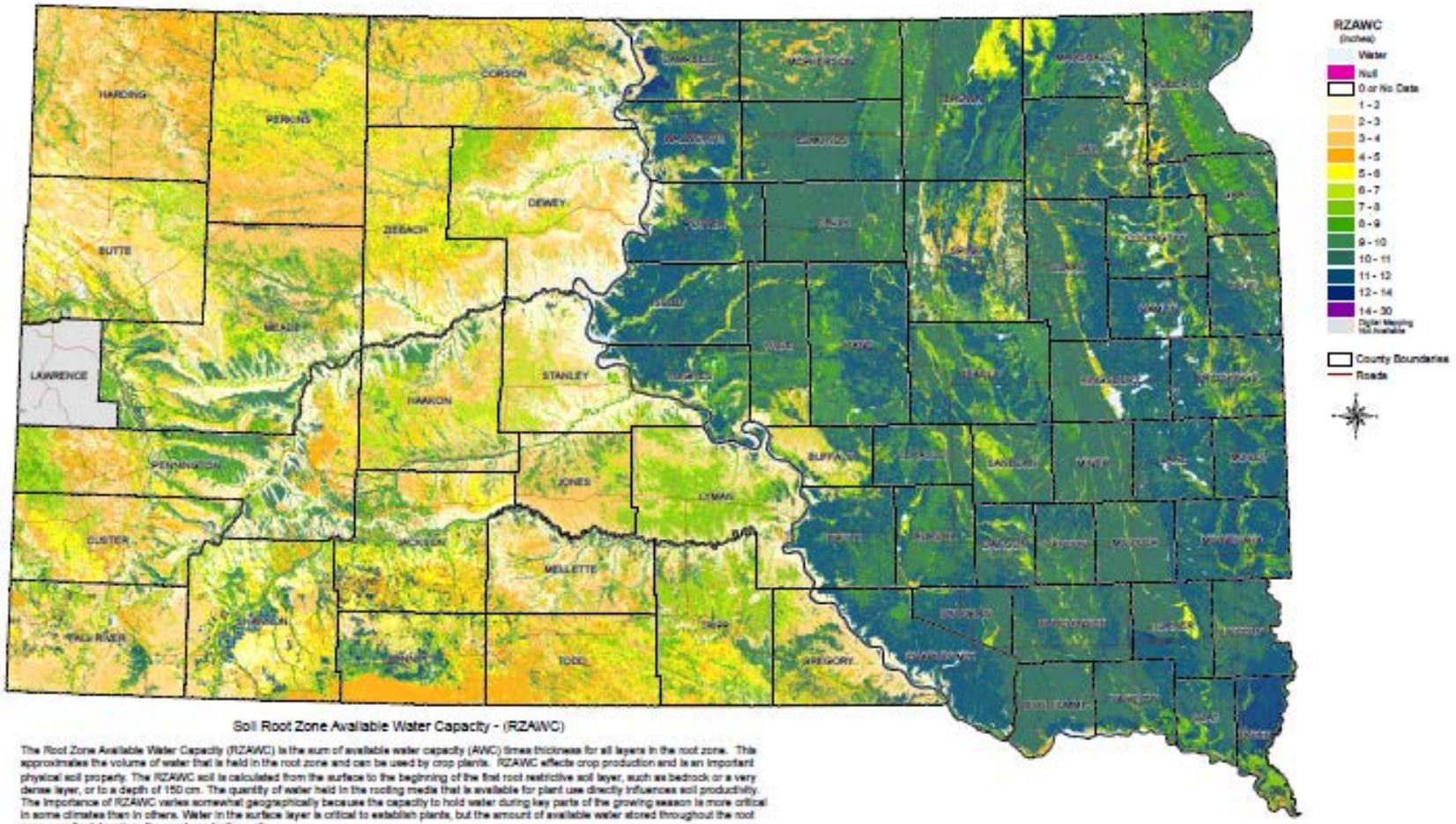


Soil Water Deficit

- We can calculate the minimum potential runoff at SCAN sites.
- This amount of runoff would only be attained if maximum infiltration was achieved.
- This value can be used to improve water supply and stream flow forecasts.

Root Zone Available Water Capacity Map of South Dakota

NRCS Natural Resources Conservation Service

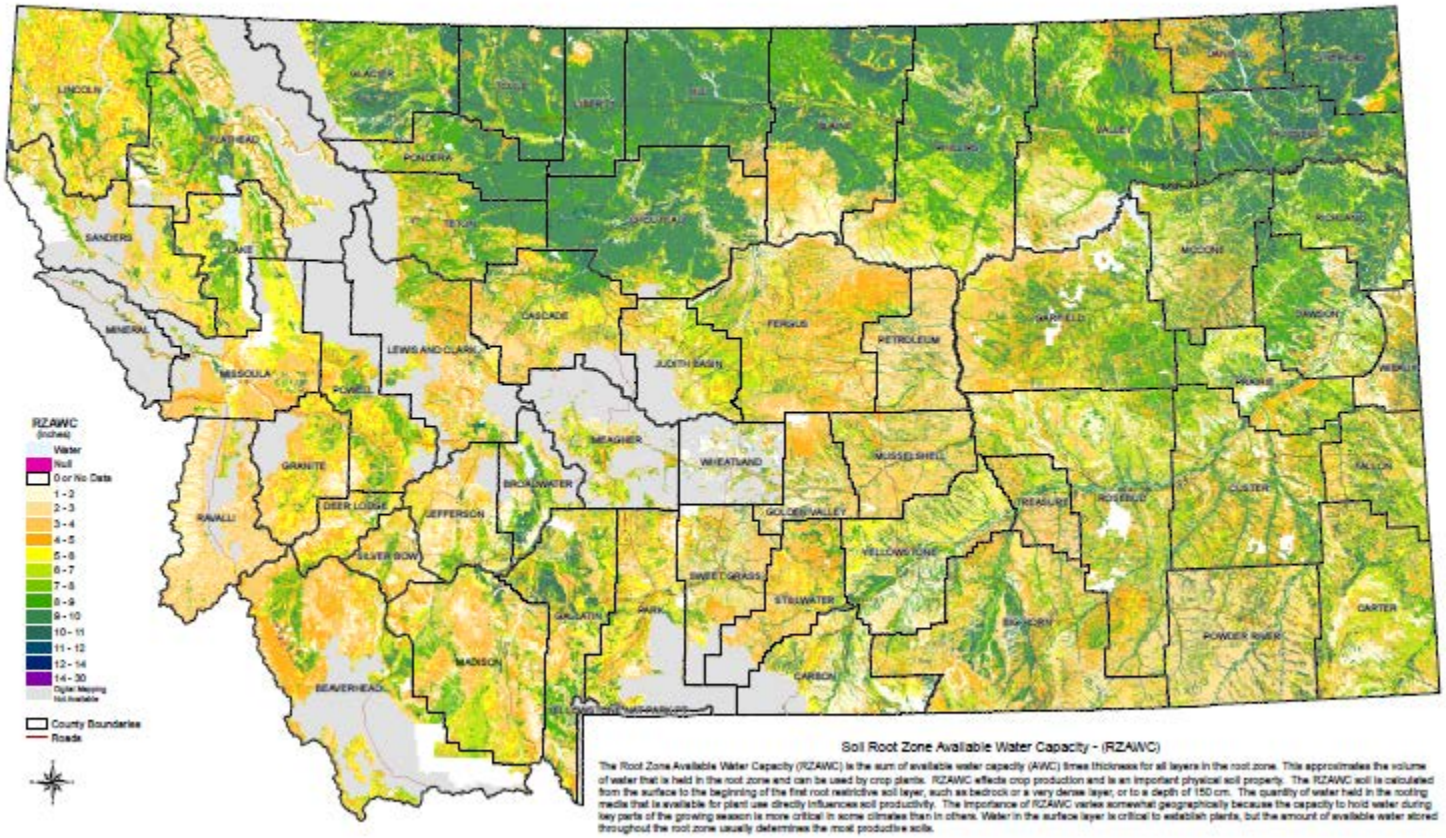


Soil Root Zone Available Water Capacity - (RZAWC)

The Root Zone Available Water Capacity (RZAWC) is the sum of available water capacity (AWC) times thickness for all layers in the root zone. This approximates the volume of water that is held in the root zone and can be used by crop plants. RZAWC effects crop production and is an important physical soil property. The RZAWC soil is calculated from the surface to the beginning of the first root restrictive soil layer, such as bedrock or a very dense layer, or to a depth of 150 cm. The quantity of water held in the rooting media that is available for plant use directly influences soil productivity. The importance of RZAWC varies somewhat geographically because the capacity to hold water during key parts of the growing season is more critical in some climates than in others. Water in the surface layer is critical to establish plants, but the amount of available water stored throughout the root zone usually determines the most productive soils.

Root Zone Available Water Capacity Map of Montana

NRCS Natural Resources Conservation Service



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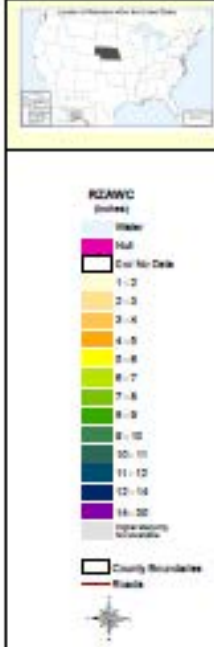
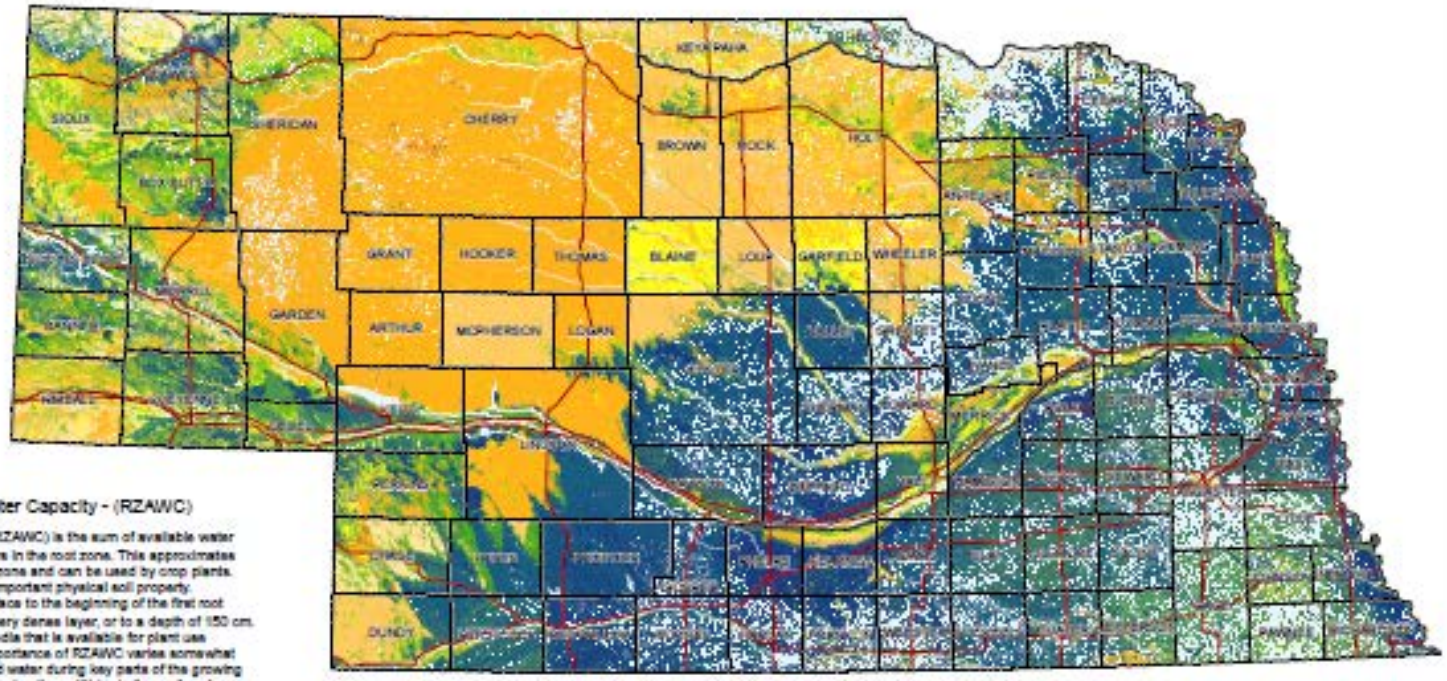
Root Zone Available Water Capacity Map of Nebraska

NRCS Natural Resources Conservation Service





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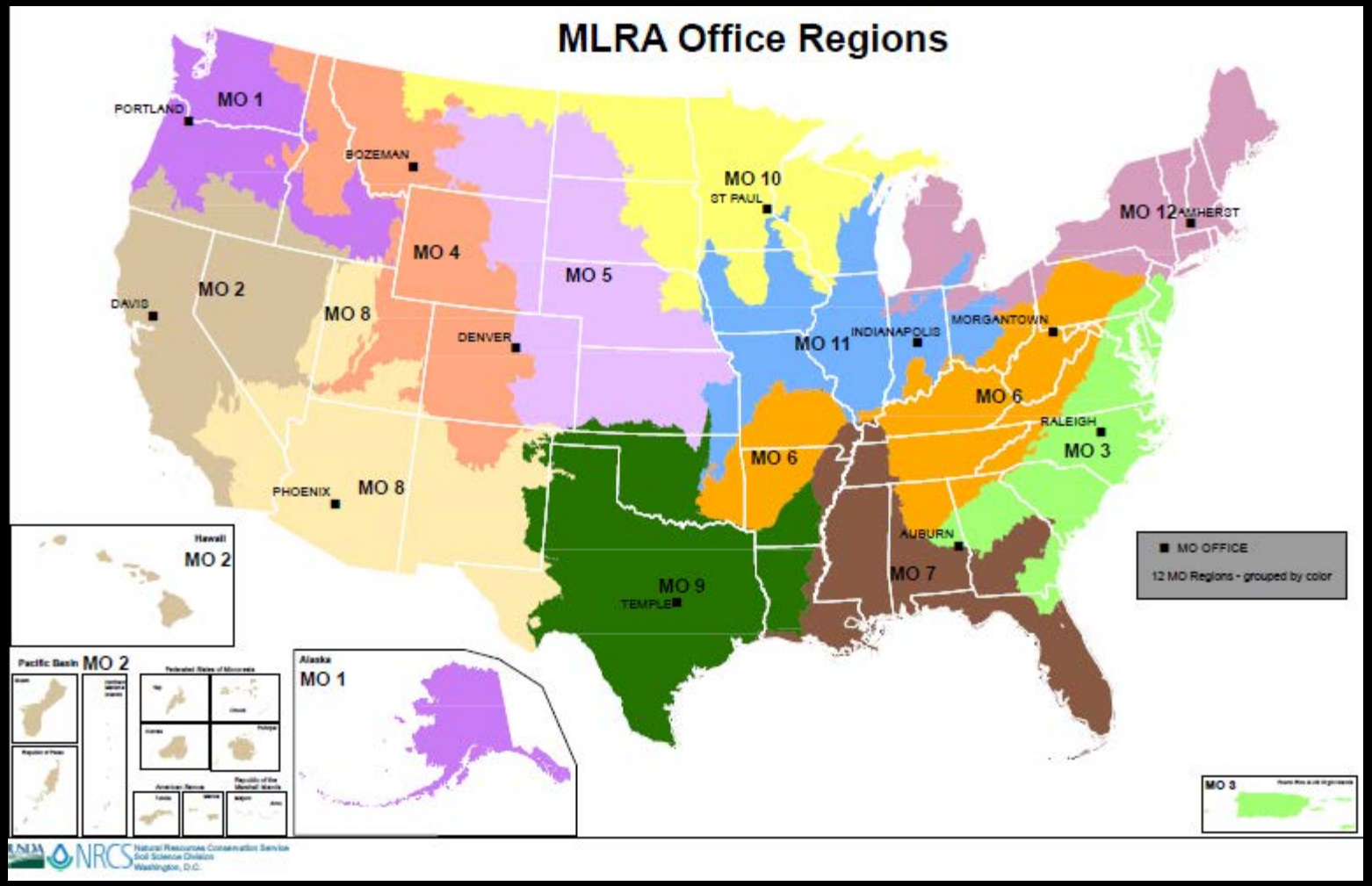
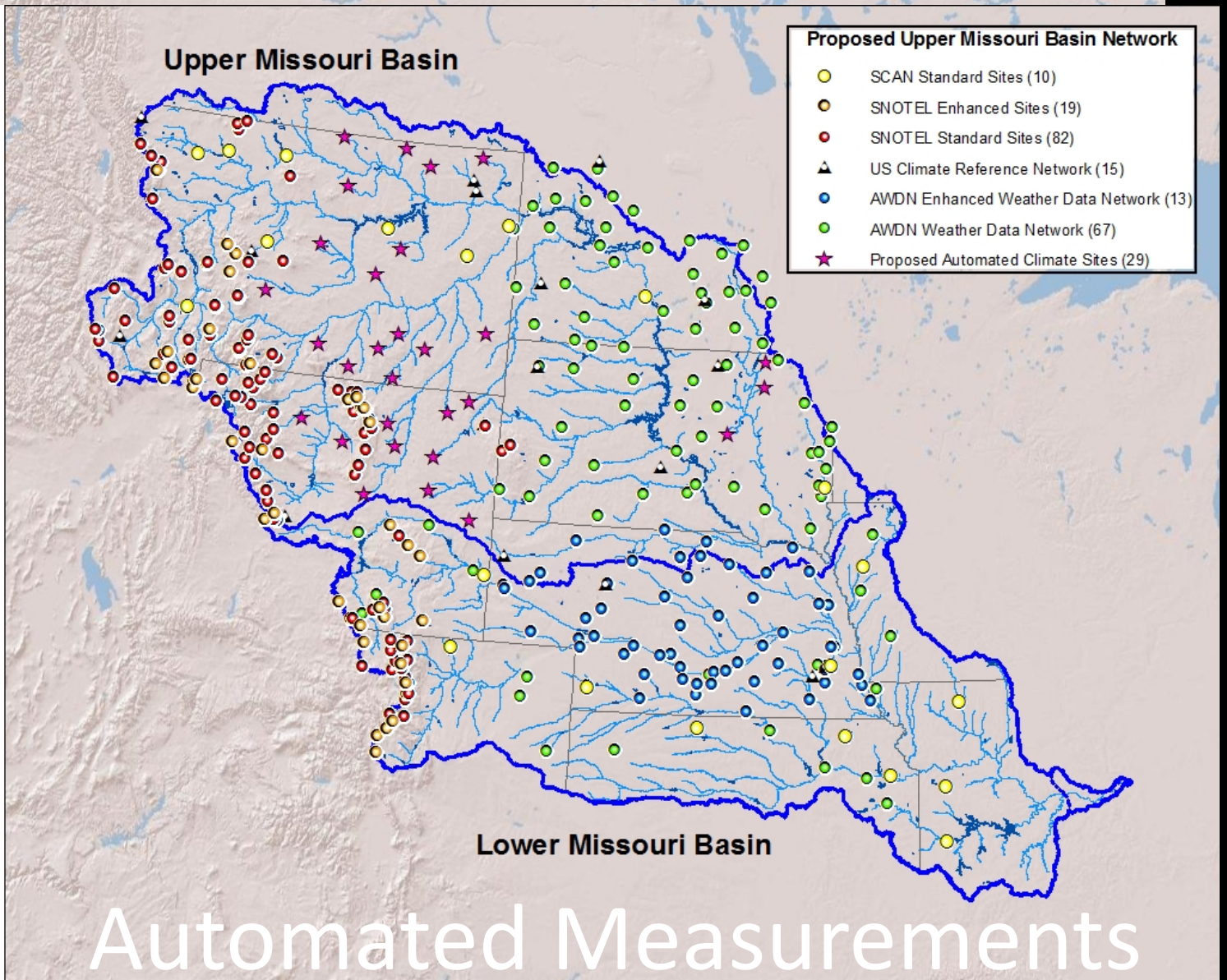
MLRA Office Regions



Current and Potential Stations



Automated Measurements

Questions or Comments?

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