Productivity and Risk

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NE Cooperative Soil Survey Conference

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Outline

- Projects for customers old and new
  - National Commodity Crop Productivity Index
  - National Commodity Crop Productivity Index (Irrigated)
  - National Biomass Productivity Index (Lowland Switchgrass)
  - Stormwater Management Suite

Soil Productivity

- National Commodity Crop Productivity Index (NCCPI) uses NASIS data to array soils based on their inherent properties
- Dryland (non-irrigated) soils
- Have the data for the US
- Maps are available on Soil Survey Atlas site, when it is visible again

Productivity

- A need exists to array soils based on their productivity when irrigated.
- Irrigated National Commodity Crop Productivity Index under development.
- Should see a National Bulletin to ask for your help and input.

Productivity

- Biofuels are of interest
- National Biomass Productivity Index (Lowland Switchgrass) in conjunction with Patrick Drohan at Penn State.
- Uses a similar process as NCCPI.

Risk

- NCCPI addresses the positive aspects of soil productivity.
- Using a soil to produce a commodity crop entails some level of risk to the environment.
- Environmental Risk of Commodity Crop Production looks at what can go wrong.

Philosophy – What Can Go Wrong?

- Three main detrimental effects:
  - Surface water contamination
  - Ground water contamination
  - In-situ degradation

Surface Water Degradation

- Rapid runoff
- Slope
- K factor
- Slope shape
- Precipitation sufficient for runoff
- Artificial drainage
- Flooding

Groundwater Contamination

- Rapid water movement (high Ksat through profile)
- Availability of leaching water (adequate precipitation to move material through)
- Low cation exchange capacity

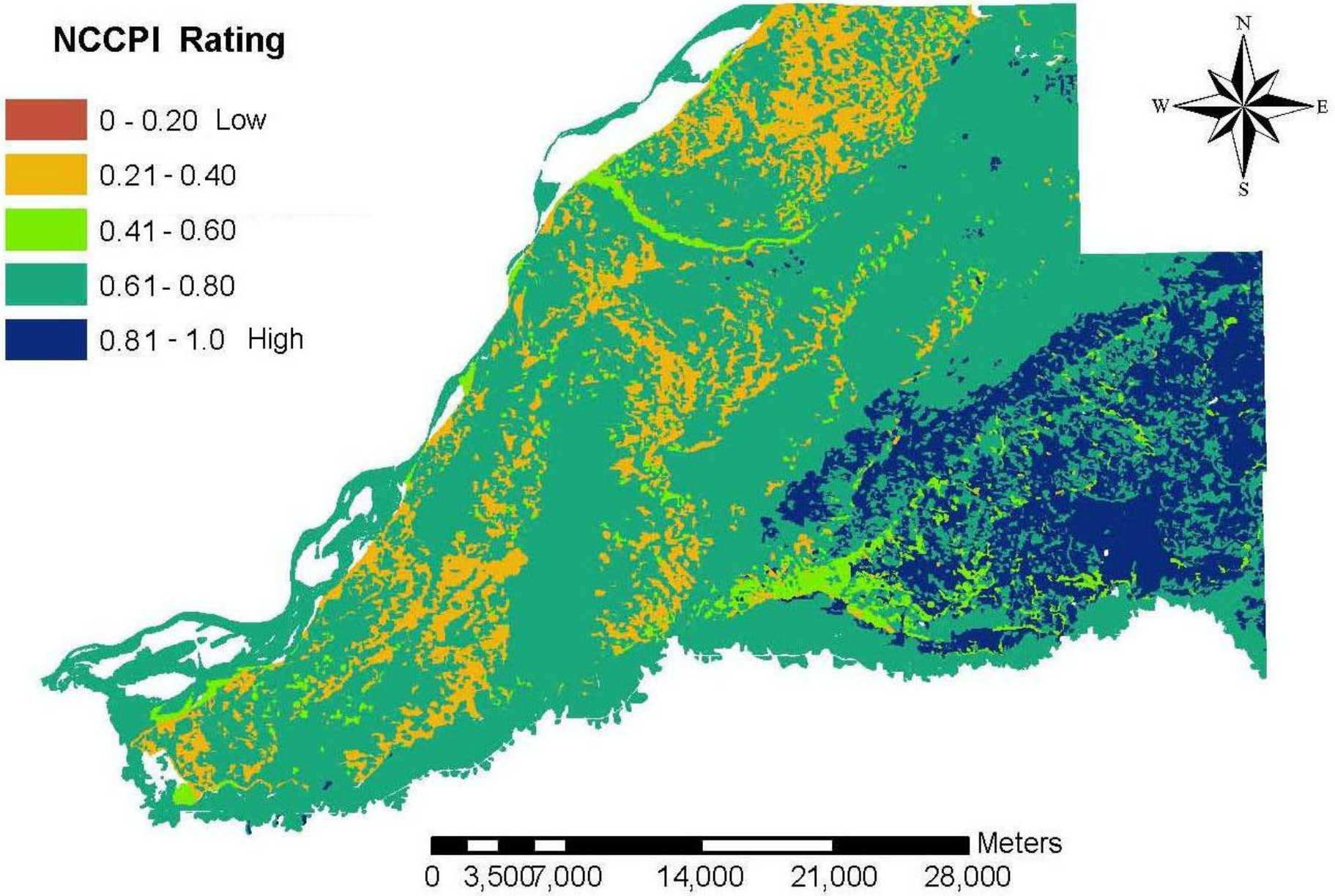
In-situ Degradation (Dynamic Soil Properties)

- Water erosion
- Wind erosion
- Compaction
- Organic matter loss sensitivity
- Salinization
- Acidification
- Nitrogen loss
- …

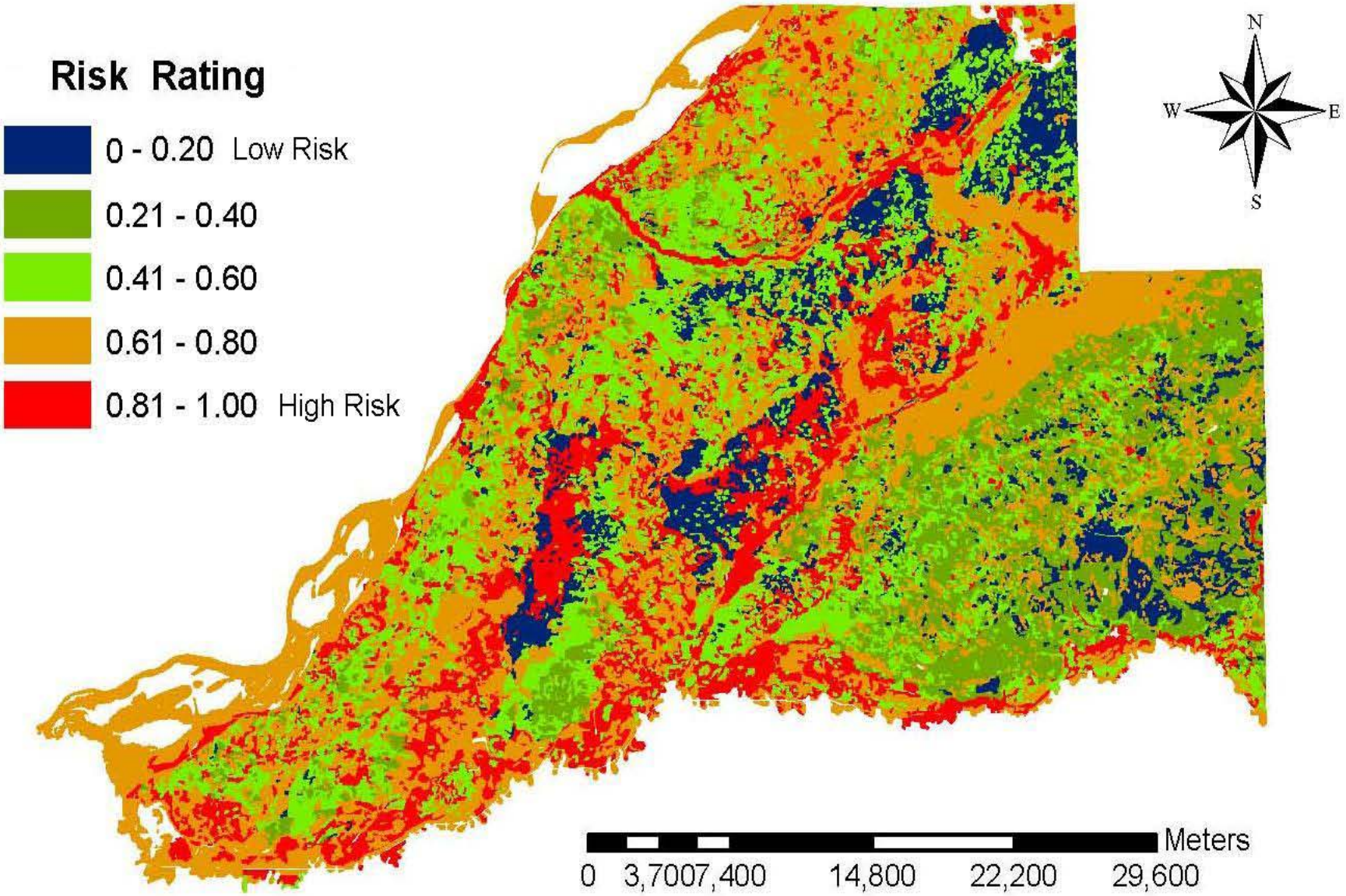
Environmental Risk Index

- Challenges
  - Most of these issues can be overcome by good management
  - Balancing the relative impact of the factors

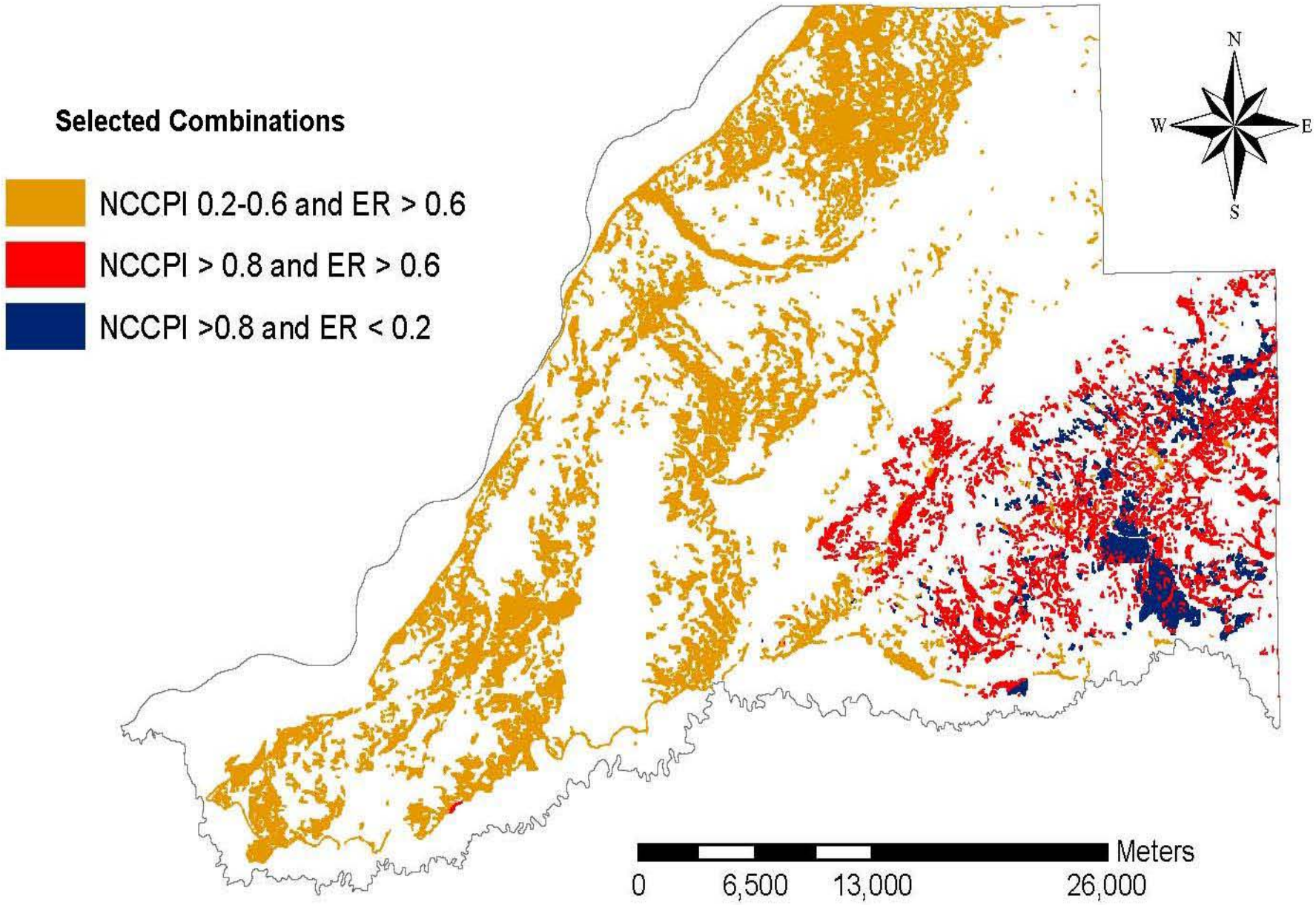
Mason County, IL NCCPI



Mason County, IL Risk Rating



Mason County, IL NCCPI and ER



Stormwater Management

- WV DEP and ARS working with WV NRCS, University of Akron, VA Tech and NSSC
- Many types of stormwater management practices
- Interpretations for three basic types:
  - Deep infiltration – rain garden
  - Shallow infiltration – pervious pavement
  - Retention – intermittent wetland

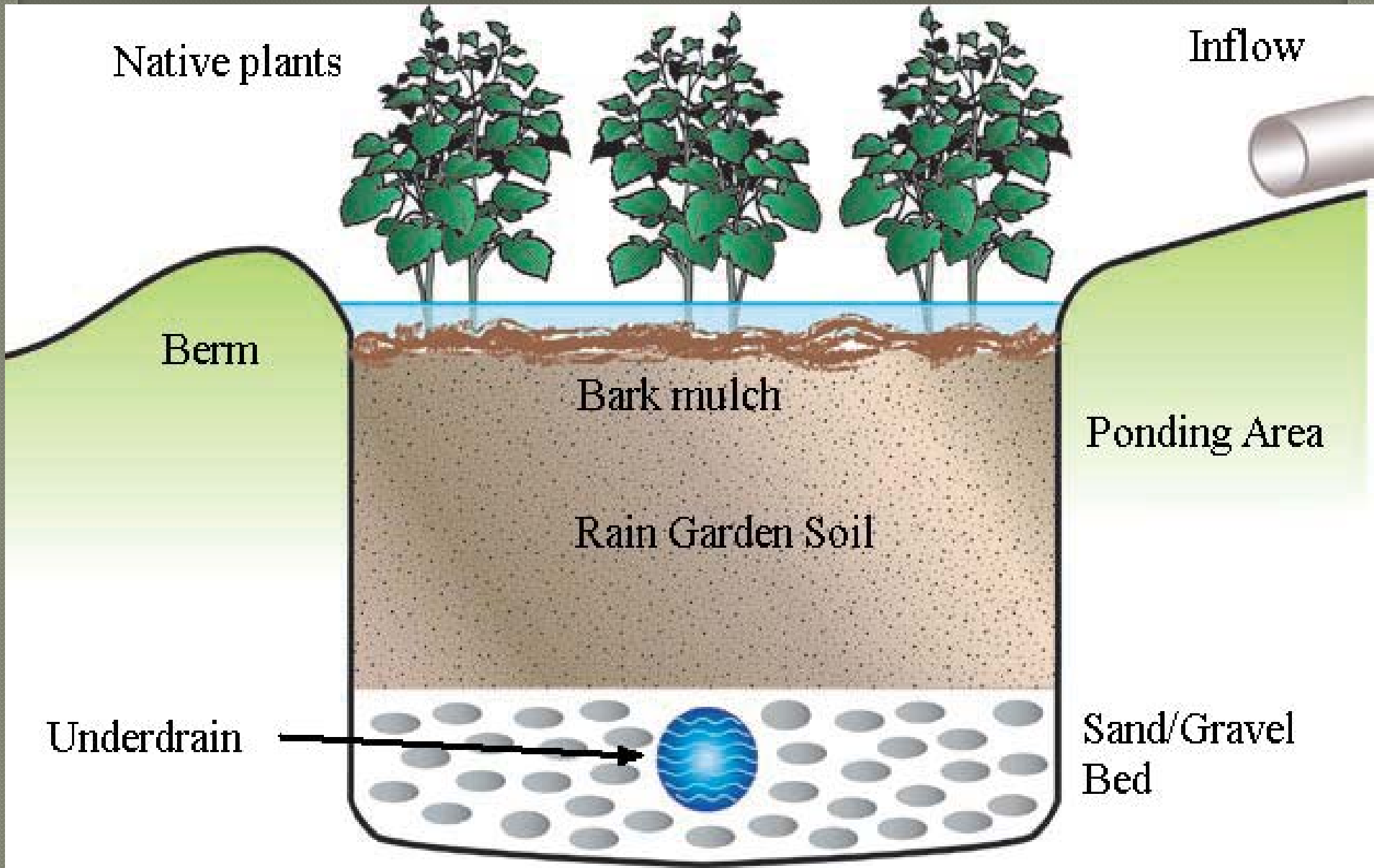
Stormwater Management

Special Considerations for Appalachia:

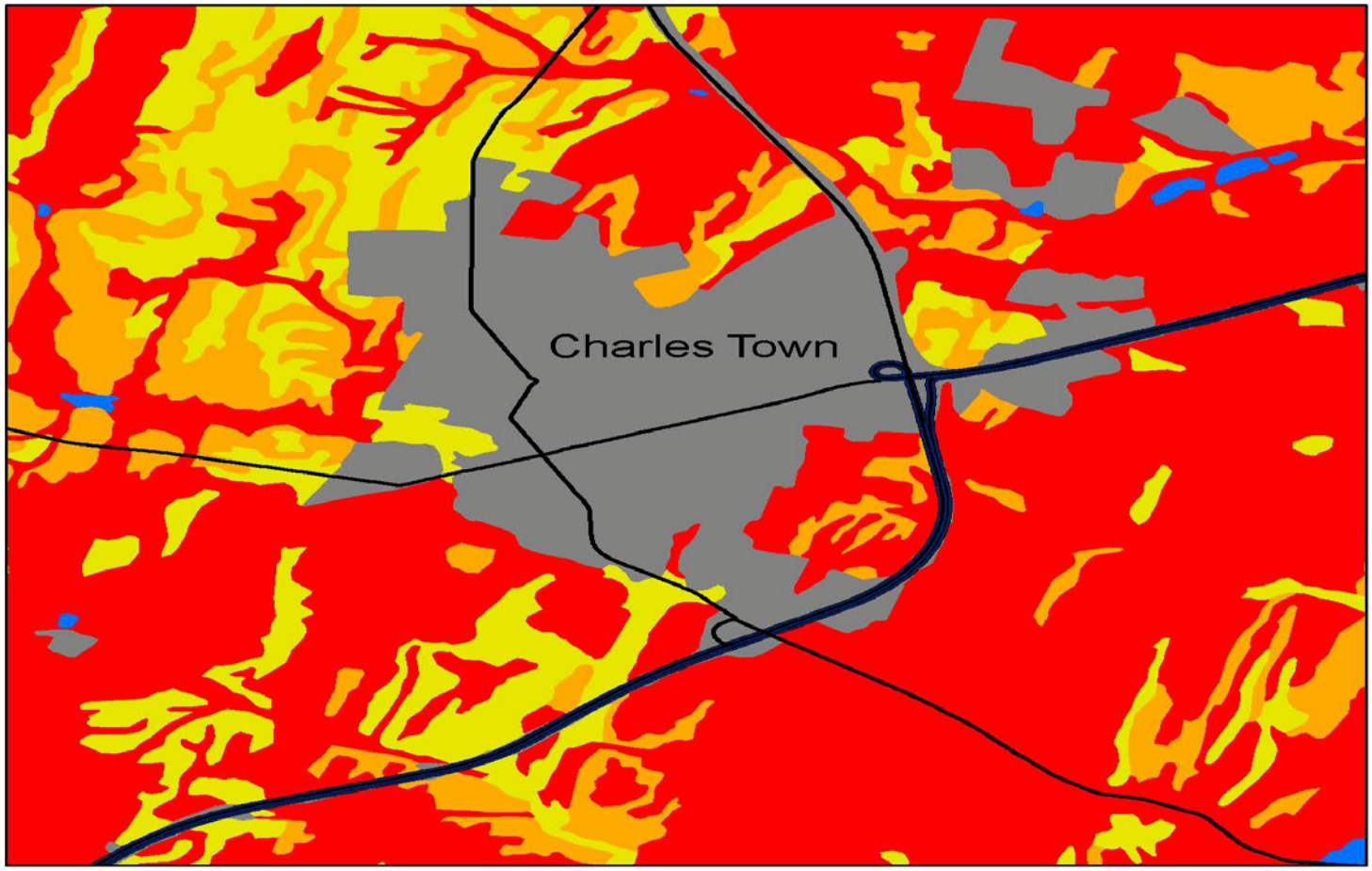
Karst – must be very careful not to exacerbate solution cavern formation – but at the same time these areas cannot be excluded

Slope Stability – slope is the dominant limiting feature so sloping areas (up to 20 percent) cannot be excluded, but clayey sloping soils can move

"Rain Garden"


Native plants
Inflow
Berm
Bark mulch
Ponding Area
Rain Garden Soil
Underdrain
Sand/Gravel Bed

Jefferson County, WV
Stormwater Management



Legend

Shallow Infiltration Systems

- Somewhat Limited (0.21-0.40)
- Somewhat Limited (0.41-0.60)
- Somewhat Limited (0.61-0.80)
- Severely Limited (=1)
- Water
- Not Rated

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0 0.3750.75 1.5 Kilometers