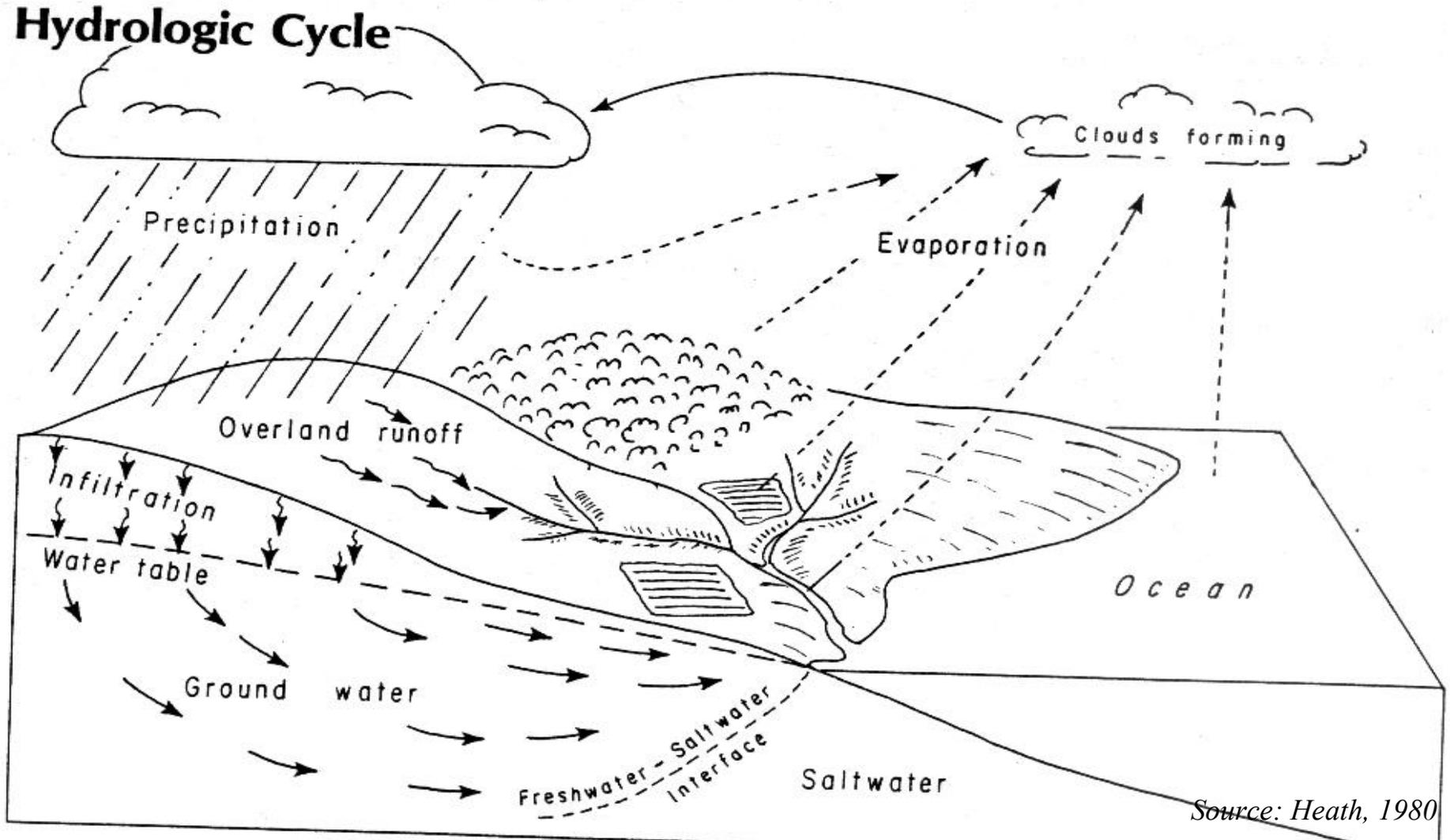


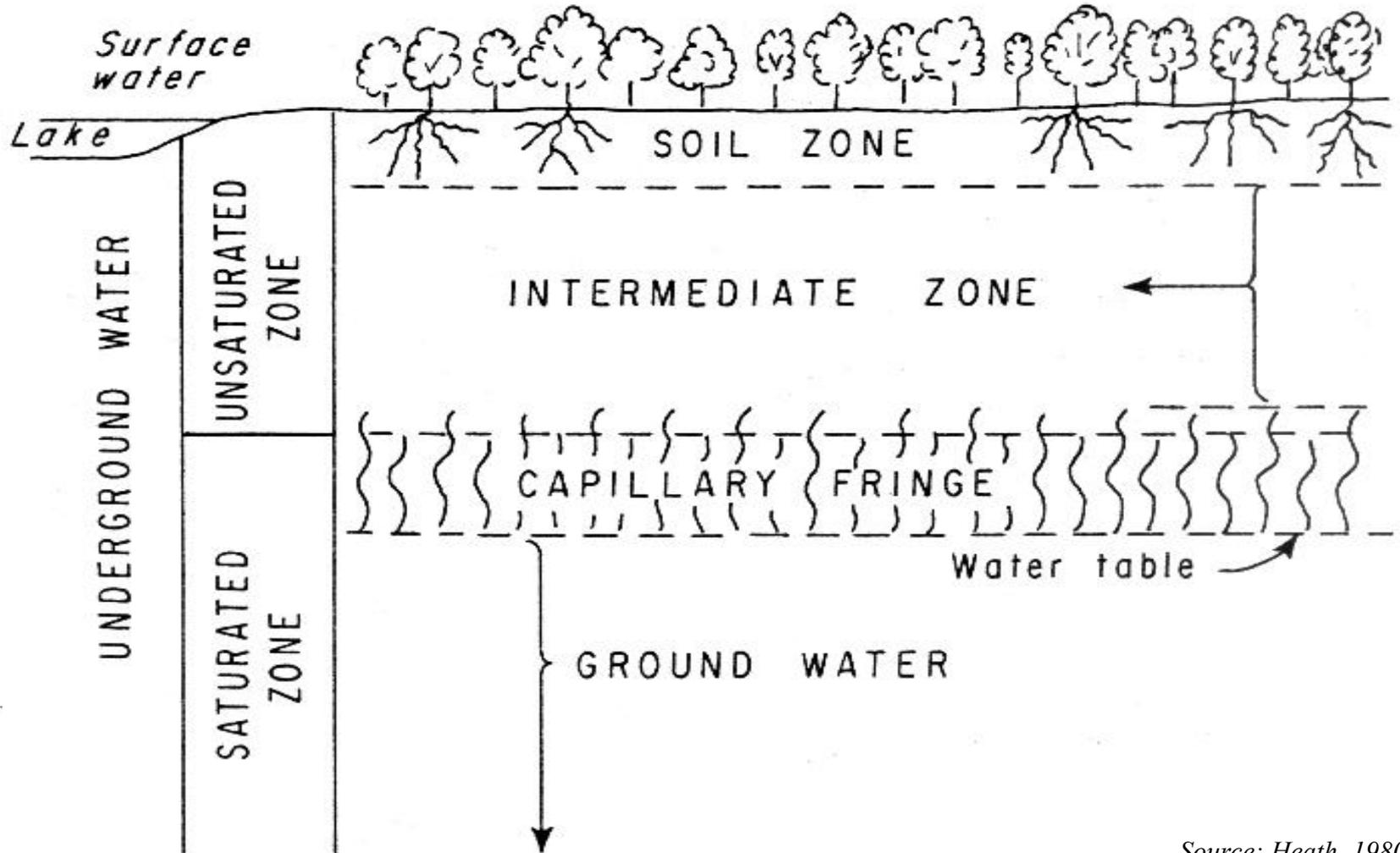
Hydrogeology & Geology of Orange County

– Presented by Rick Bolich
NCDENR – Division of Water Quality
Aquifer Protection Section

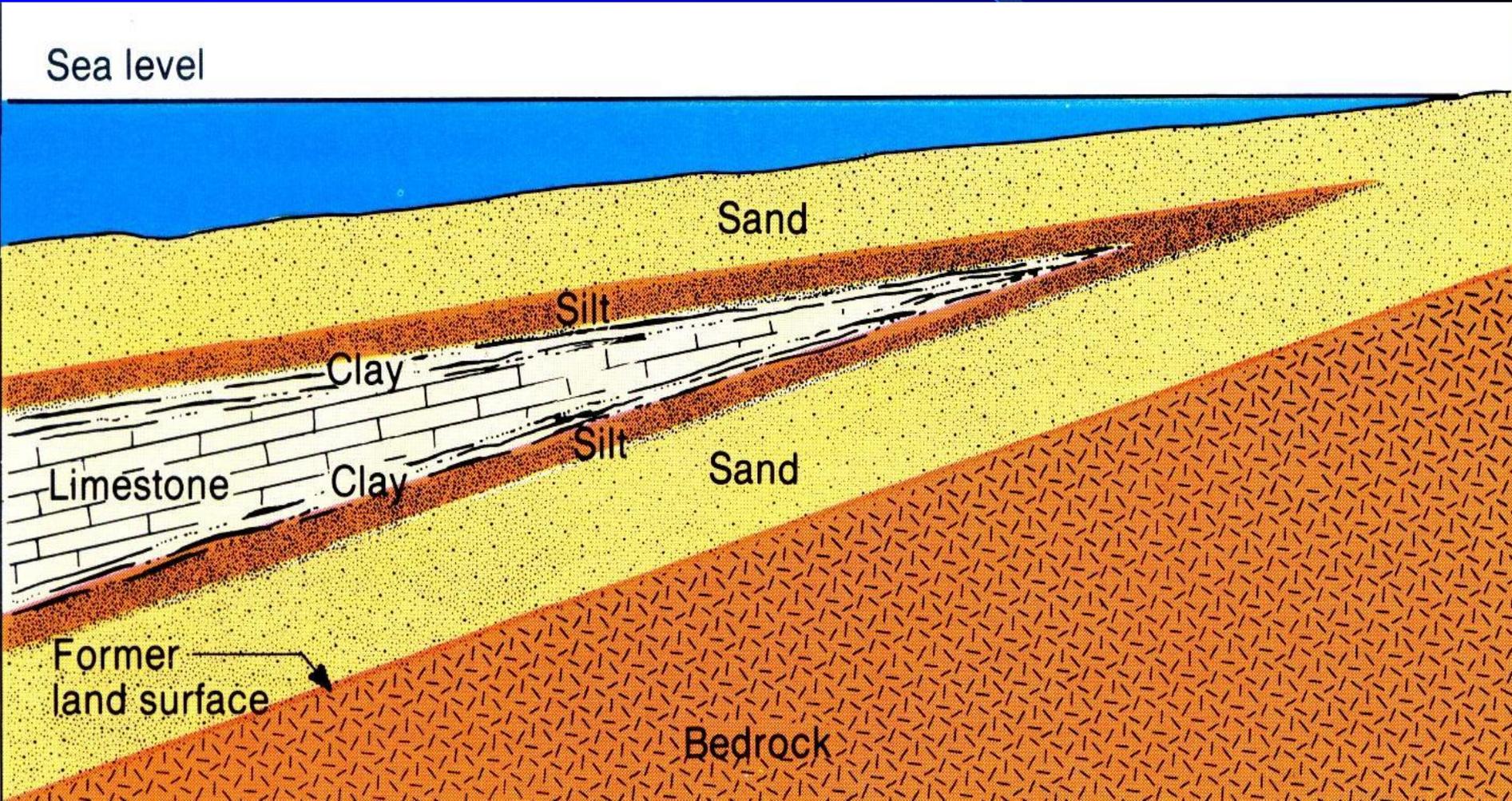
How Does Groundwater Form?



Occurrence of Groundwater



Groundwater in the Coastal Plain



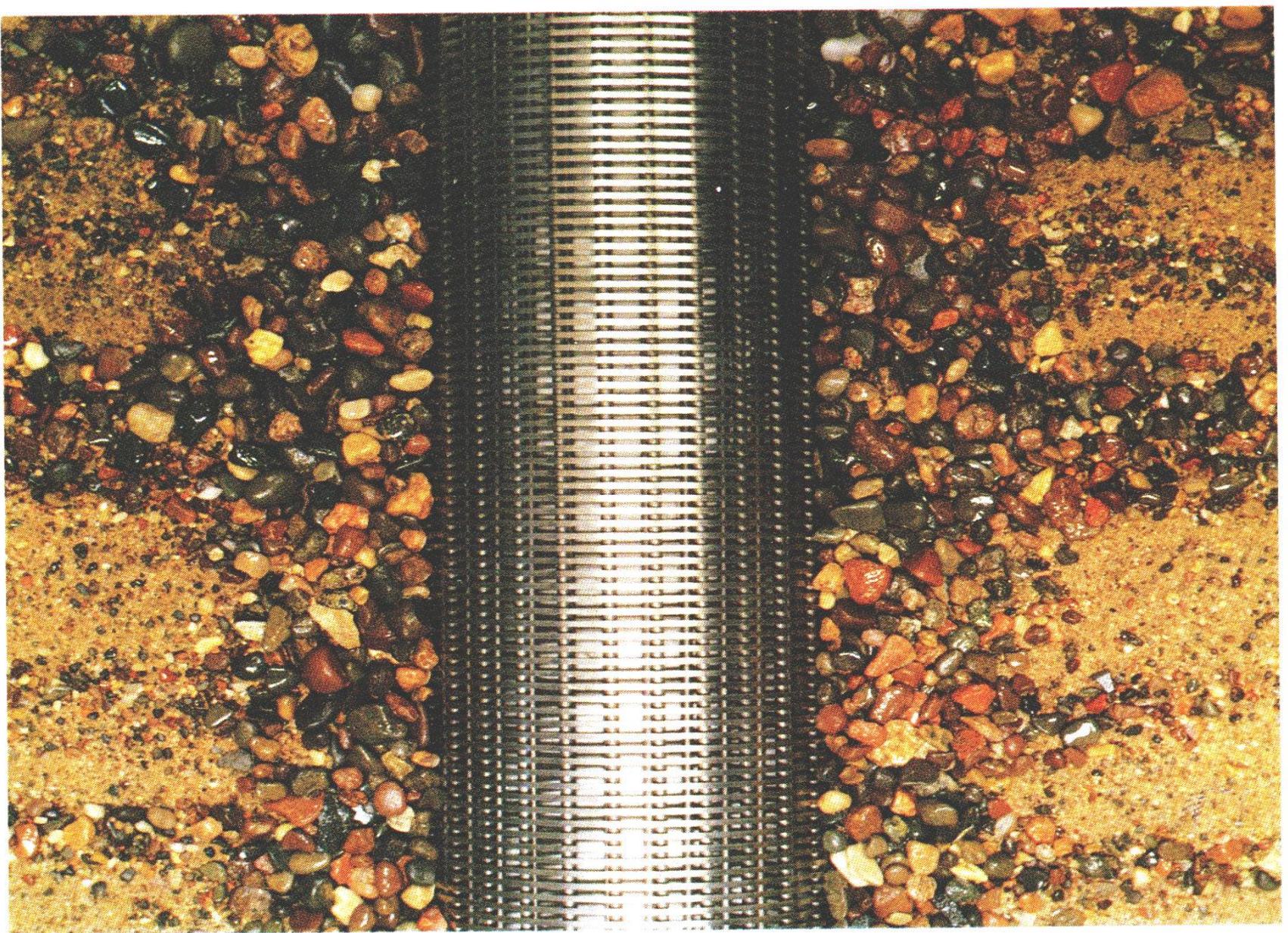
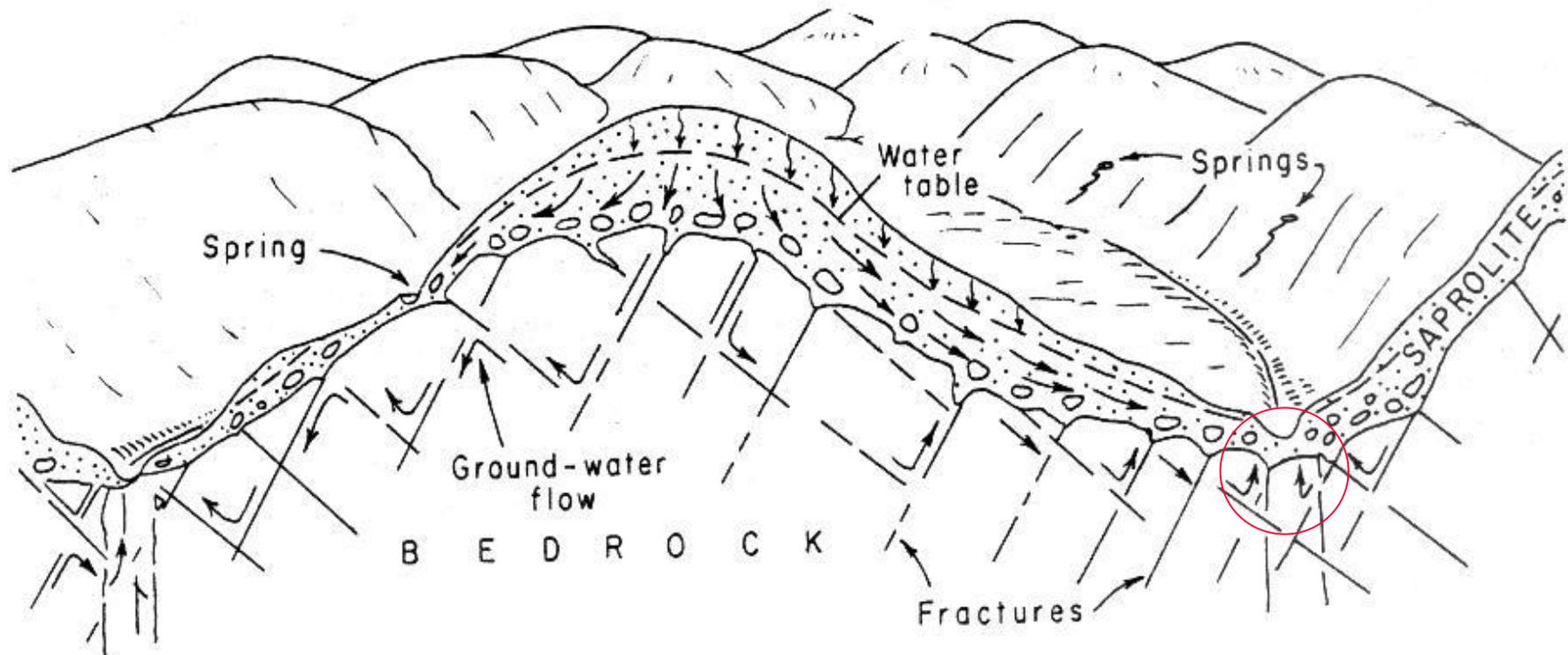


Figure 15.3. Natural development removes most particles near the well screen that are smaller than the slot openings, thereby increasing porosity and hydraulic conductivity in a zone surrounding the screen.

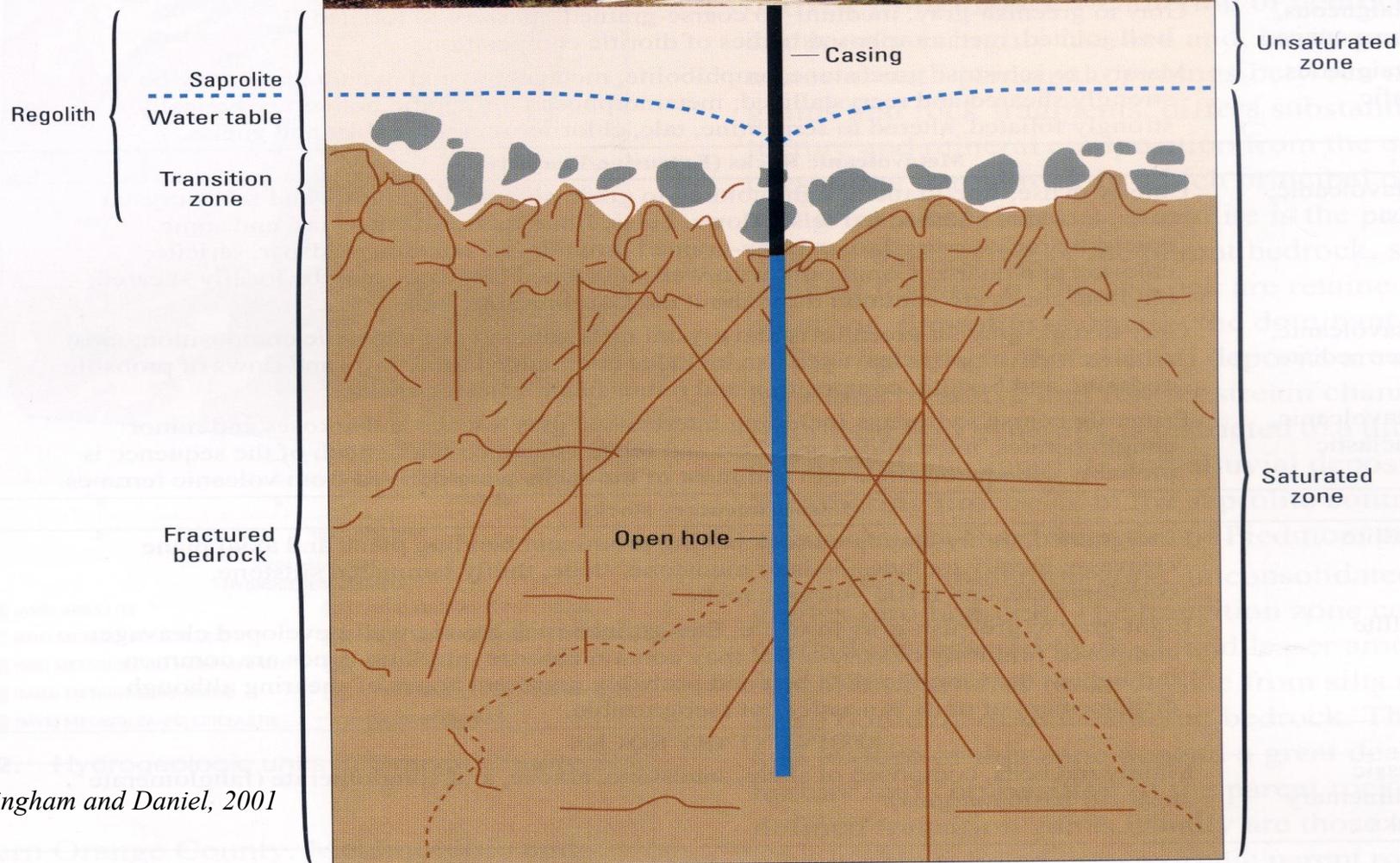
From Driscoll, 1986, Groundwater & Wells

Groundwater in the Piedmont



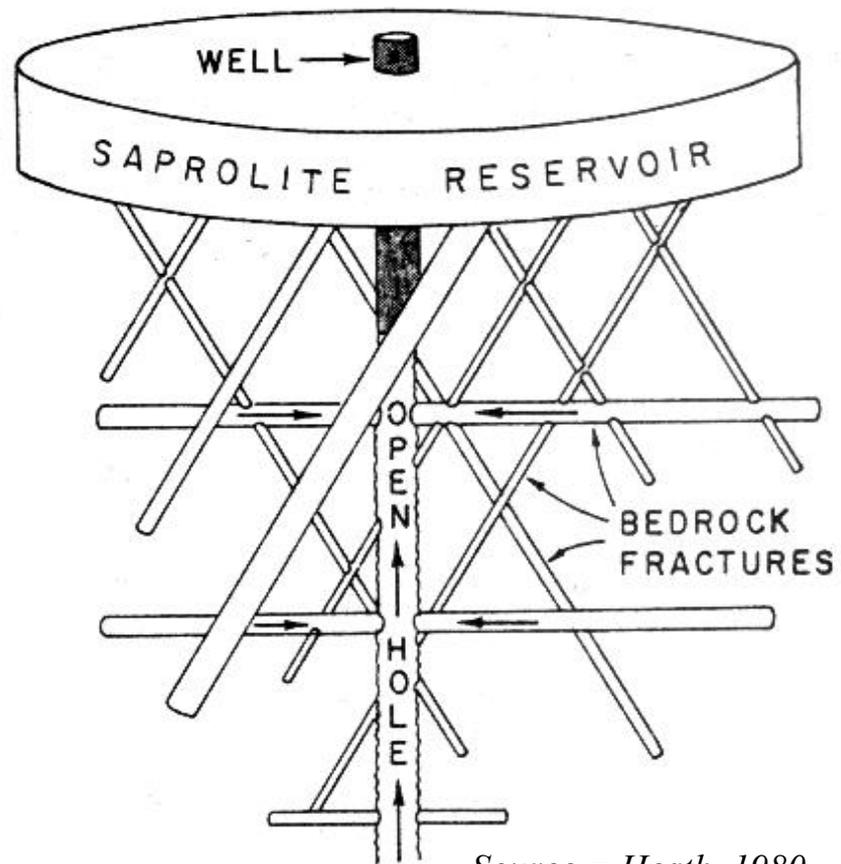
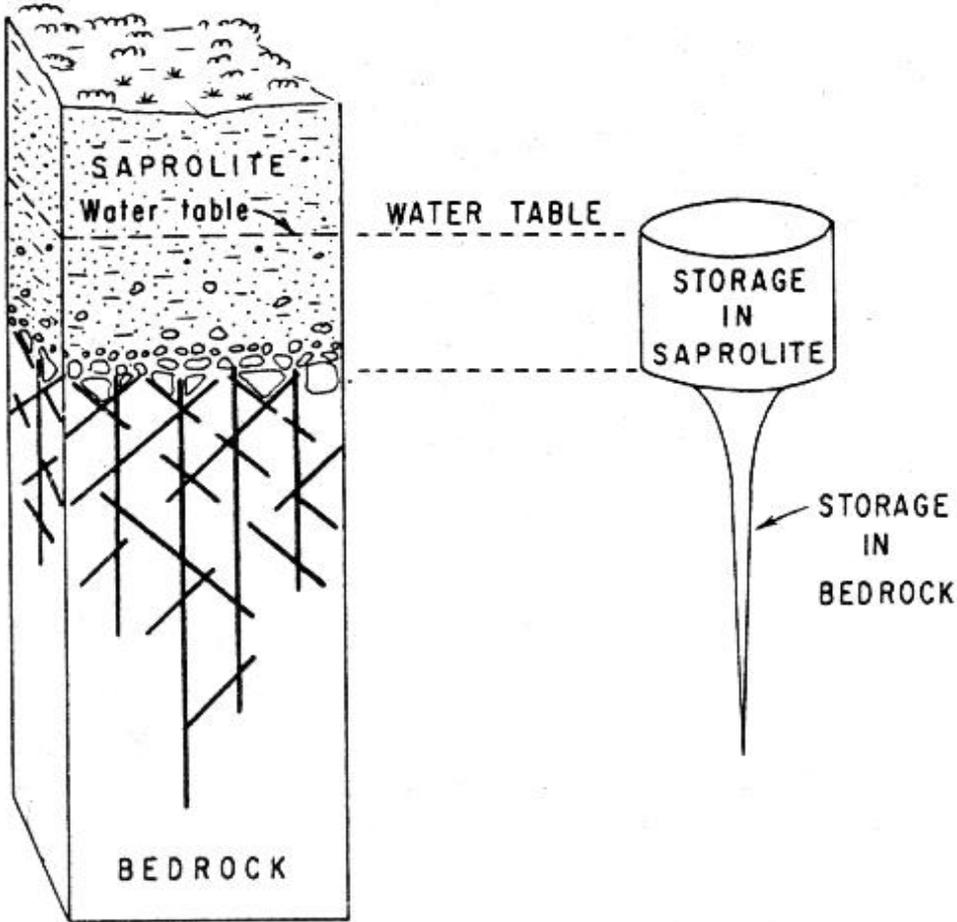
New Hope Creek @ Duke Forest (10/3/2007)





Source: Cunningham and Daniel, 2001

Hydraulic Characteristics of the Piedmont and Mountain Ground-Water System



Source = Heath, 1980

Soil & Saprolite



Run #1 : 0-5ft

Run #2 5-10ft

Run #3 10-15ft

Run #4 15-20ft

Transition Zone



Box 11
57-57
57-57

02/14/00
02/14/00

Bedrock

Run #18: 85.0' - 90.0' Rec = 5.0'

Run #18 cont.

Run #19; 90.0 - 95.0' Rec = 5.0'

Run #20; 95.0 - 100.0' Rec = 5.0'

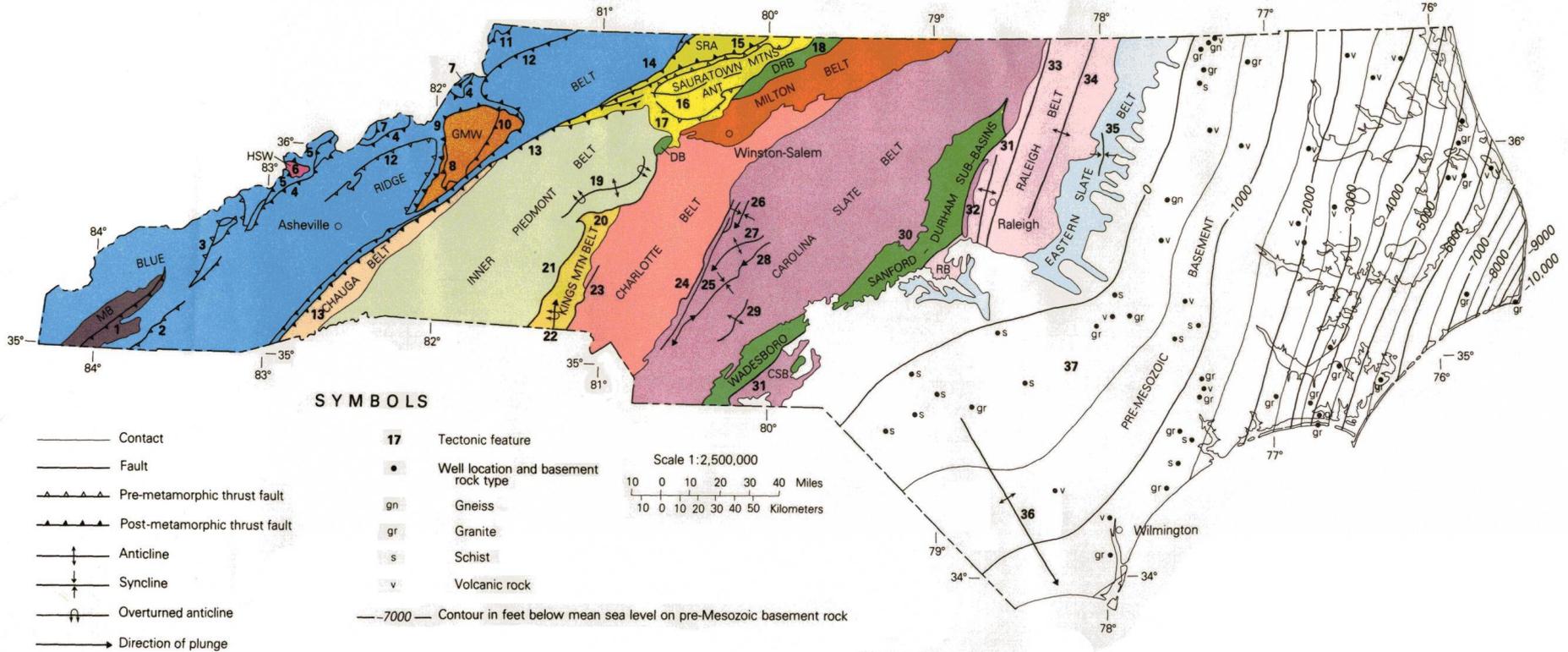


NCSU Lake Wheeler Rd. Site - RAL-2



Litho-Tectonic Belts

EXPLANATION



MAP SHOWING MAJOR LITHO-TECTONIC FEATURES

Carolina Terrane Rocks

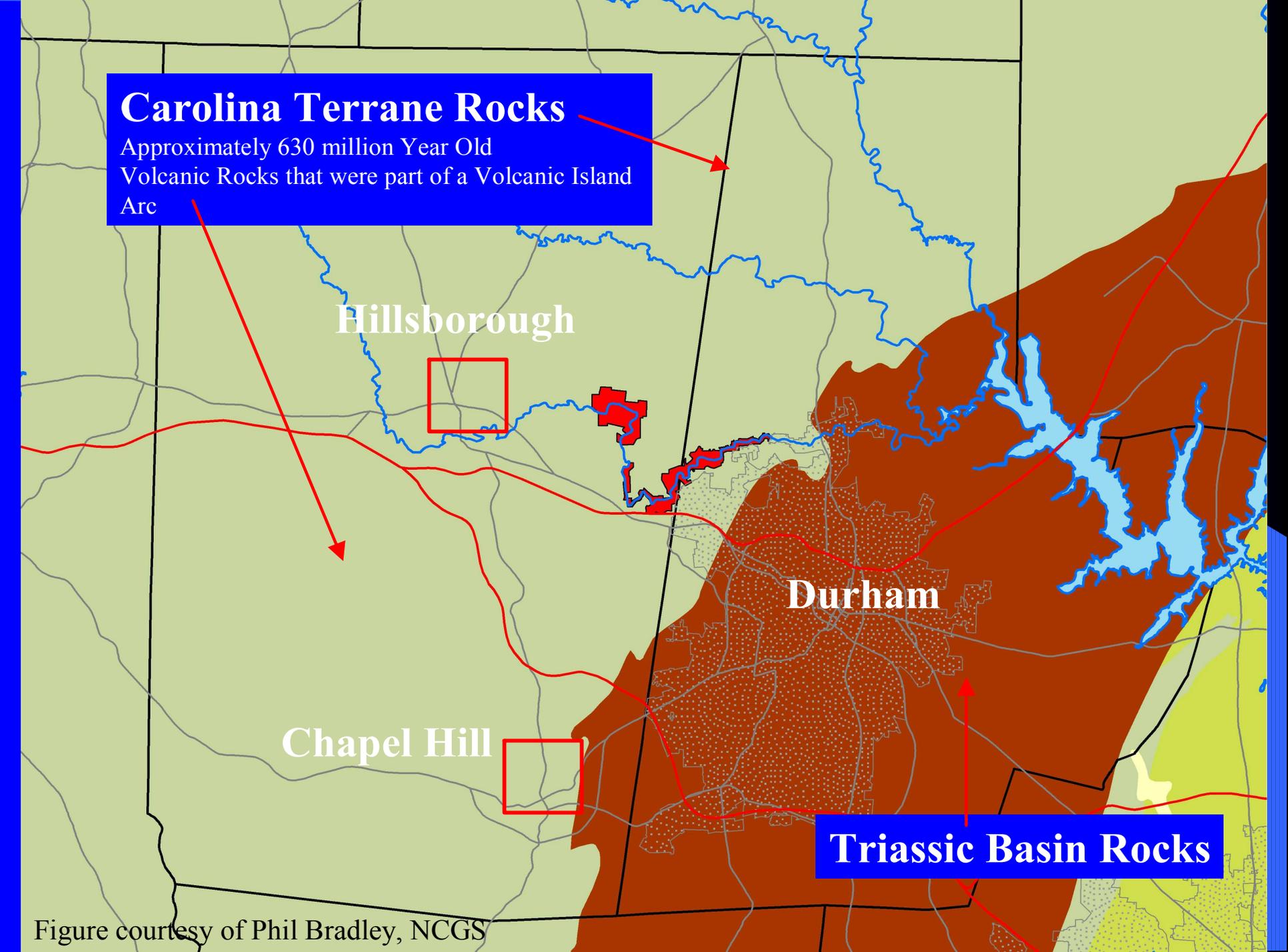
Approximately 630 million Year Old
Volcanic Rocks that were part of a Volcanic Island
Arc

Hillsborough

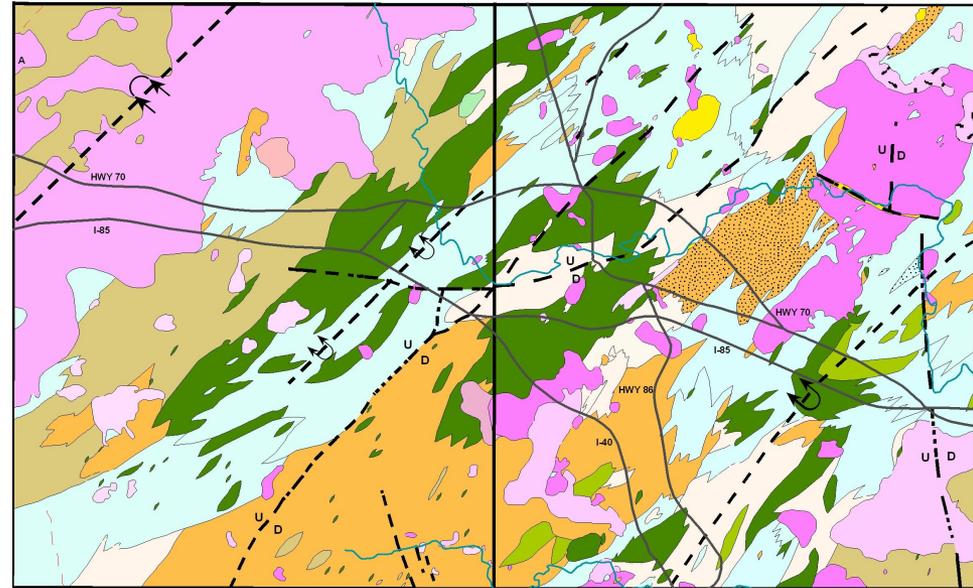
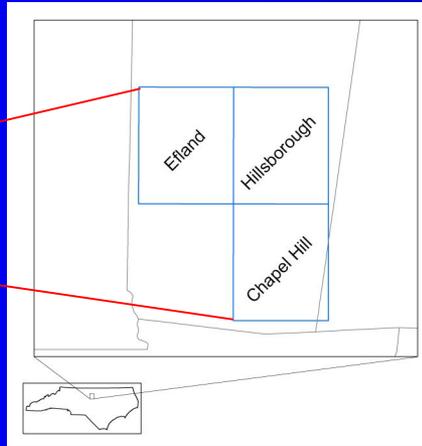
Durham

Chapel Hill

Triassic Basin Rocks



Geologic Map of the Chapel Hill, Hillsborough and Efland Quadrangle



BEDROCK GEOLOGIC MAP OF THE CHAPEL HILL, HILLSBOROUGH, AND EFLAND 7.5-MINUTE QUADRANGLES, ORANGE AND DURHAM COUNTIES, NORTH CAROLINA

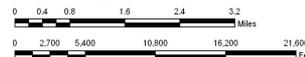
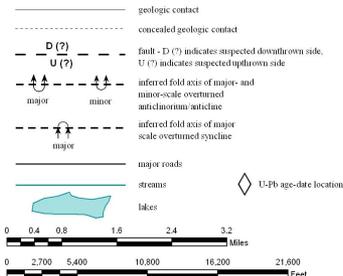
By
Philip J. Bradley, Norman K. Gay, Cindy M. Phillips,
Stephen J. Fuemmeler, and Randy Bechtel
2006

Digital representation by Michael A. Medina and Philip J. Bradley



CONTACTS

Lithologic contacts - Distribution and concentration of structural symbols indicates degree of reliability.

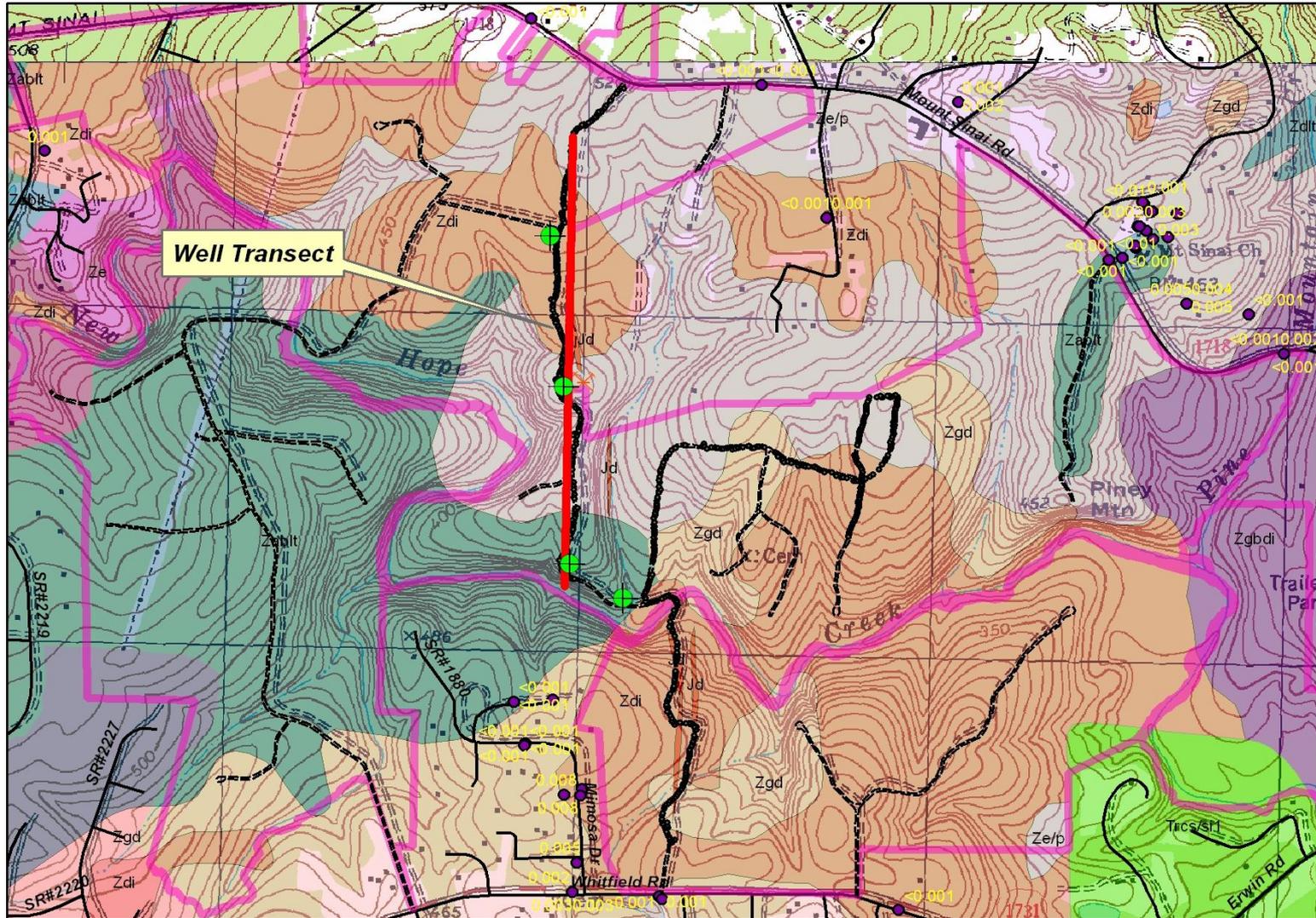


SCALE 1:115,000



Figure courtesy of Phil Bradley, NCGS

Duke Forest Hydrogeologic Research Station



Legend

ROCKUNIT

- Jd - diabase
- Trcs/si1 - Triassic sediment
- Zabl - andesite and basaltic tuff
- Ze/p - epiclastics and pyroclastics
- Zgbd - gabbro to diorite
- Zgd - granodiorite
- Zgr - granite

● As concentrations in private wells

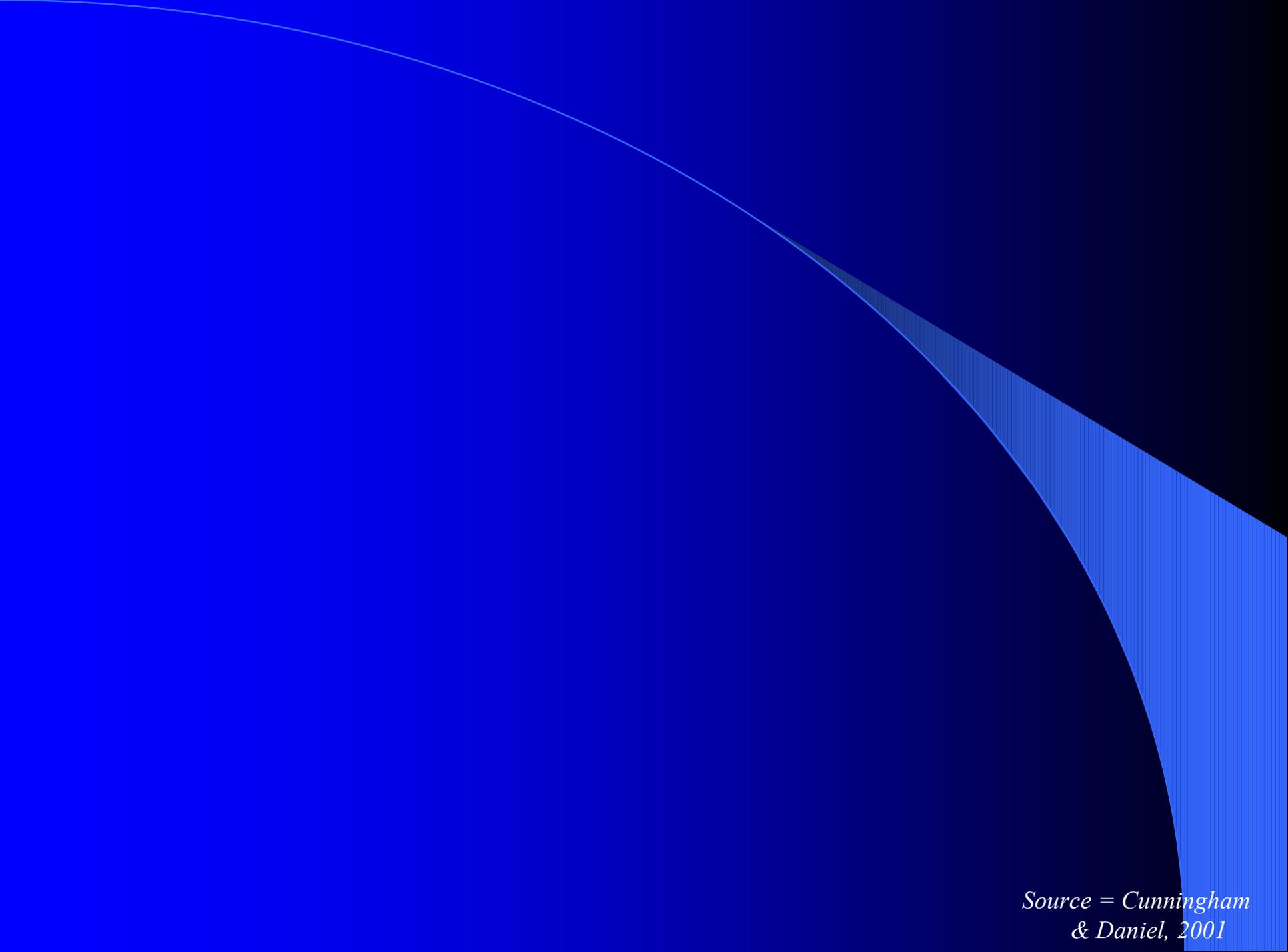
● Possible Location of Well Cluster

Forest_boundary

0 190 380 760 1,140 1,520
Meters

Core from Duke Forest





*Source = Cunningham
& Daniel, 2001*

Hydrograph Box Plot

Orange Co. Well; 1980-1991

Drought Considerations

- Water is stored in clayey *saprolite*, and transmitted to bedrock wells by fractures.
- Thicker saprolite means more water storage and better protection from drought.
- Precipitation usually increases in late Fall.
- Groundwater levels don't usually start to respond until early Spring.
- Even if your well is fine now, you should still try to conserve water.