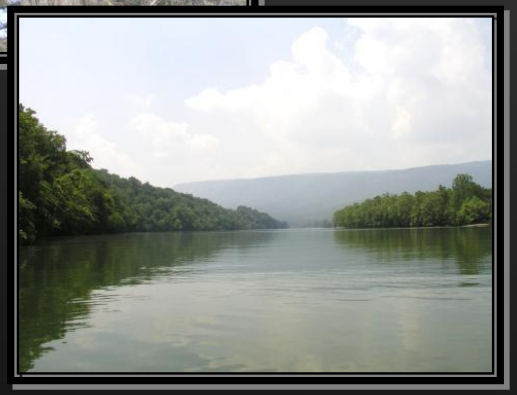
SEVERAL CHARACTERISTICS TO CONSIDER FOR MAPPING TO TARGET PLACEMENT OF EFFECTIVE RIPARIAN FOREST BUFFERS FOR WATER-QUALITY IMPROVEMENT



November 7, 2012

by
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science for a changing world

COMMON QUESTIONS

What are Removal Efficiencies?

- Nitrogen
- Phosphorus
- Suspended sediment

What should be the prescribed buffer width?

What Land Area is Treated?

How to Target?

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WHY ARE HYDROLOGIC CHARAACTERISTICS IMPORTANT?

Determine the pathways for contaminant transport around or into the parts of riparian forest buffers where processes effectively reduce contaminant concentrations.

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Hydrologic Characteristics for Effective Buffers Can Differ for Surface Runoff and Groundwater

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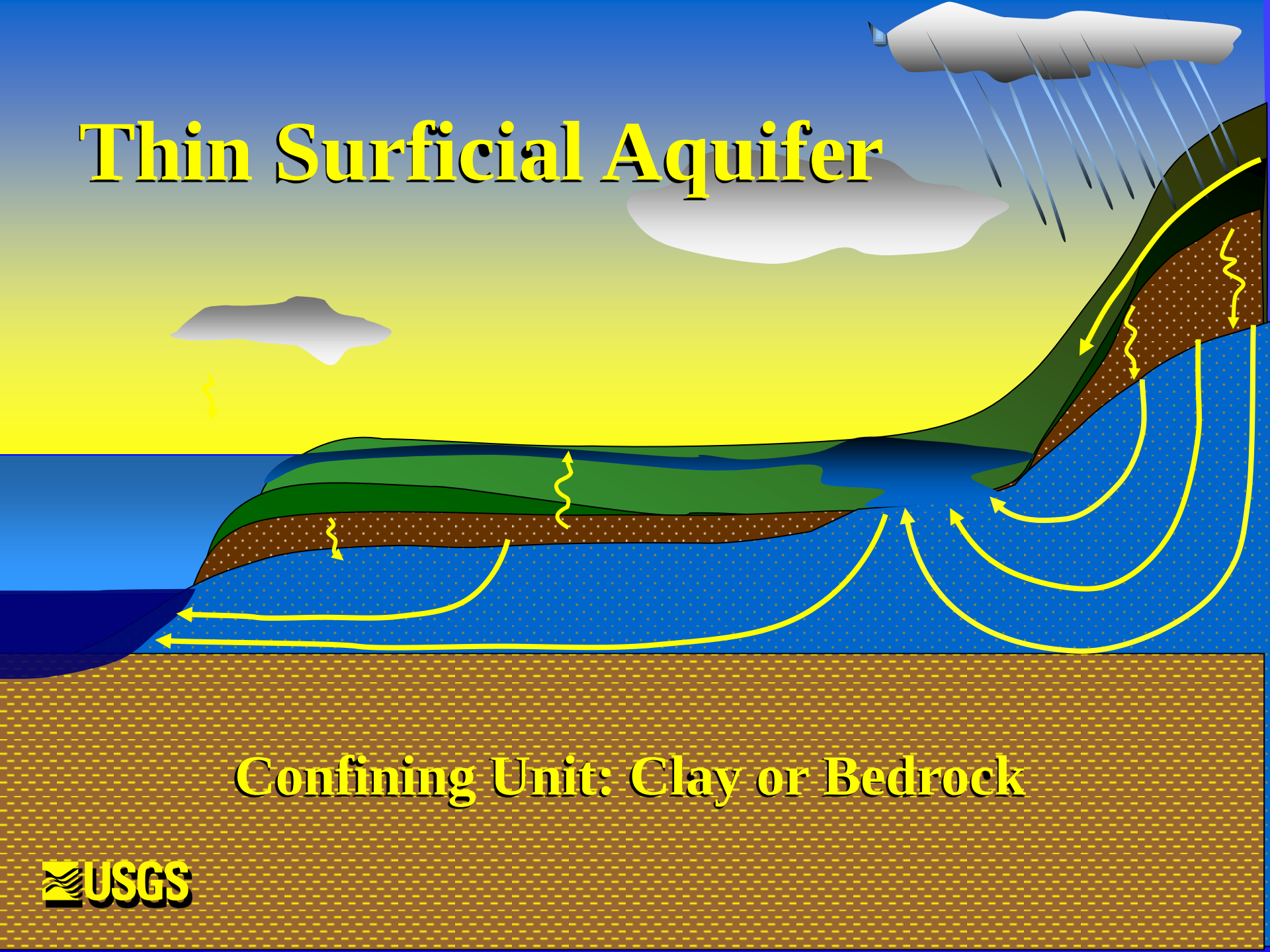
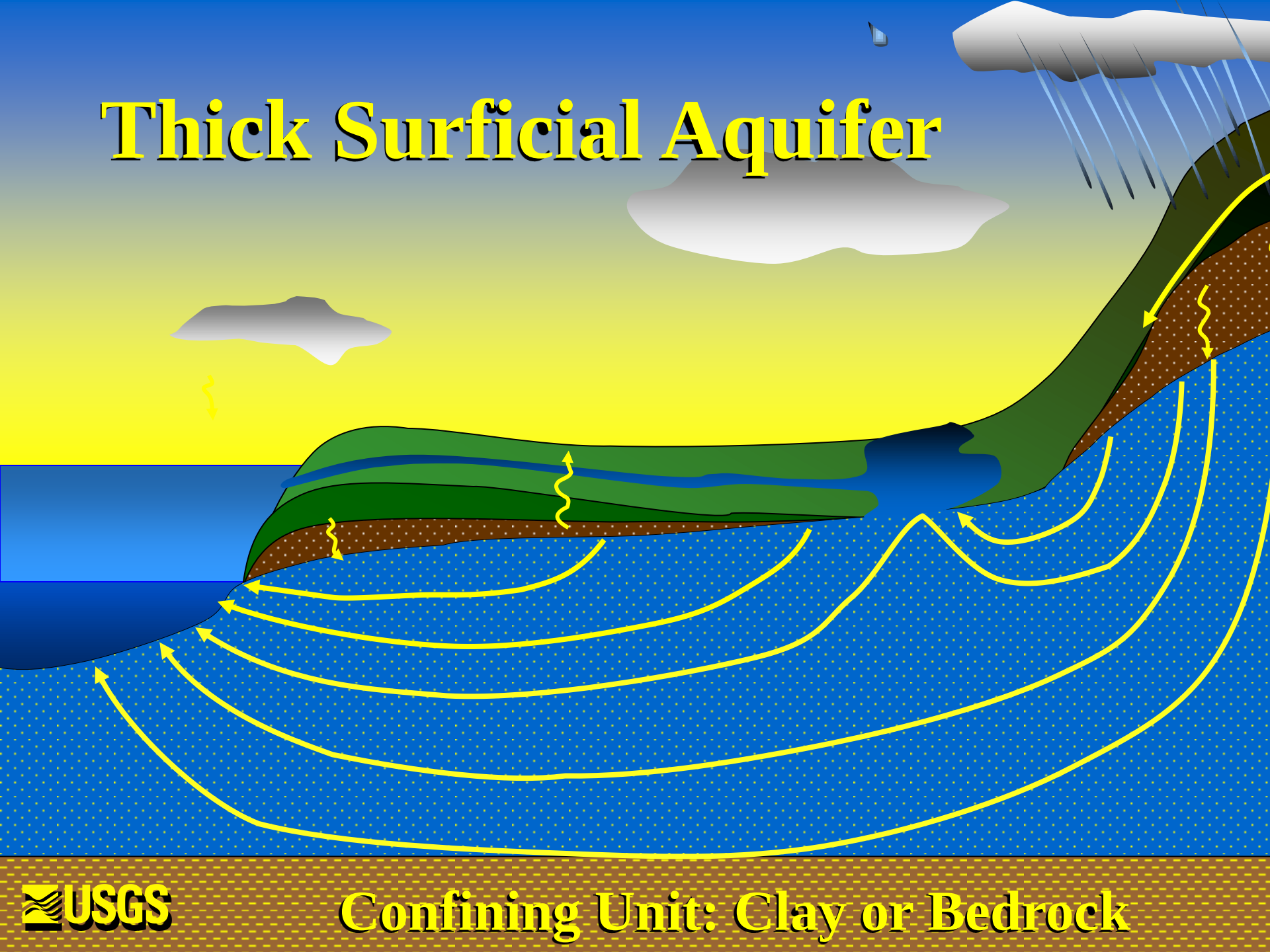
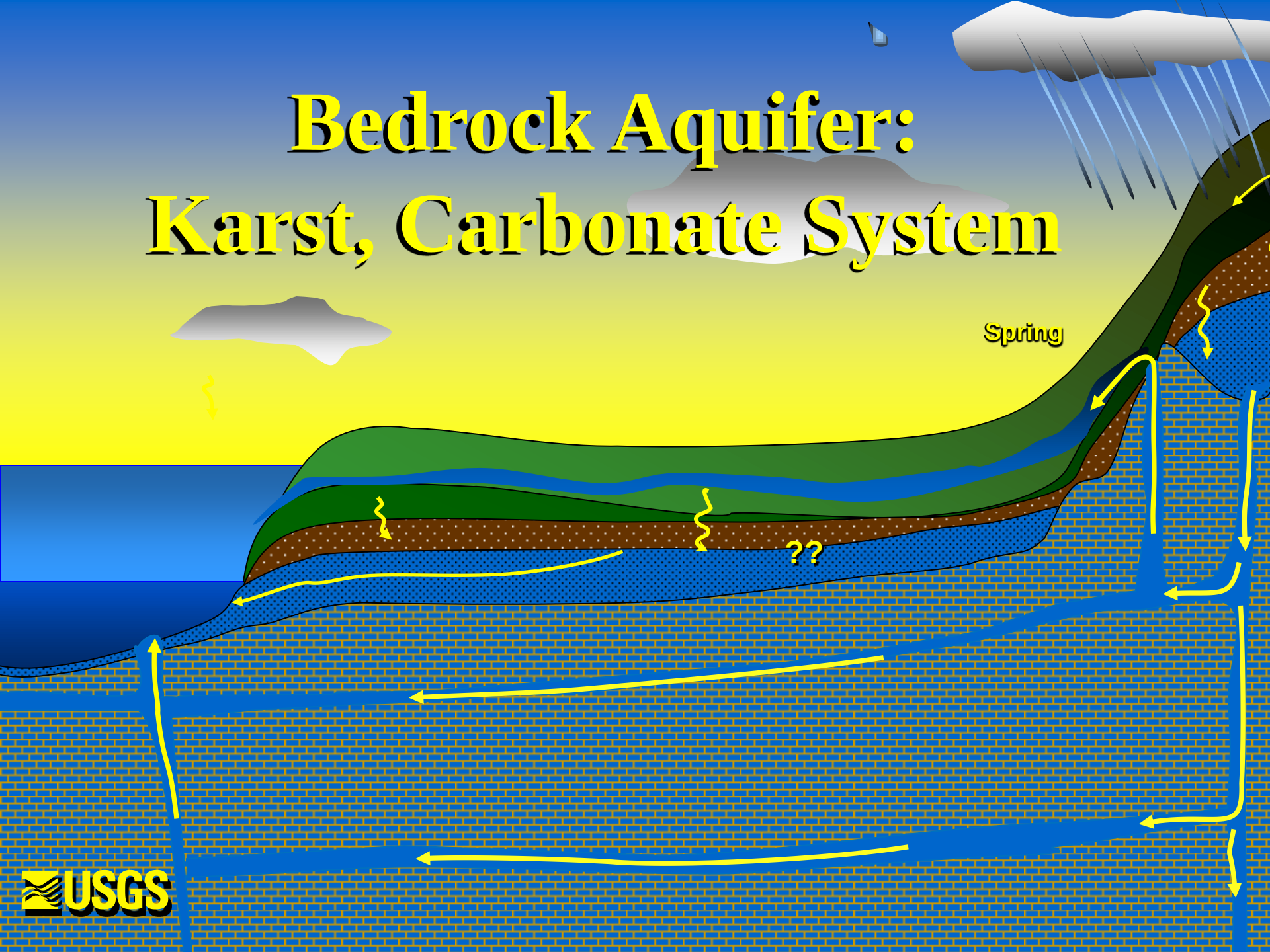

Thin Surficial Aquifer
Confining Unit: Clay or Bedrock
USGS


Thick Surficial Aquifer
USGS
Confining Unit: Clay or Bedrock

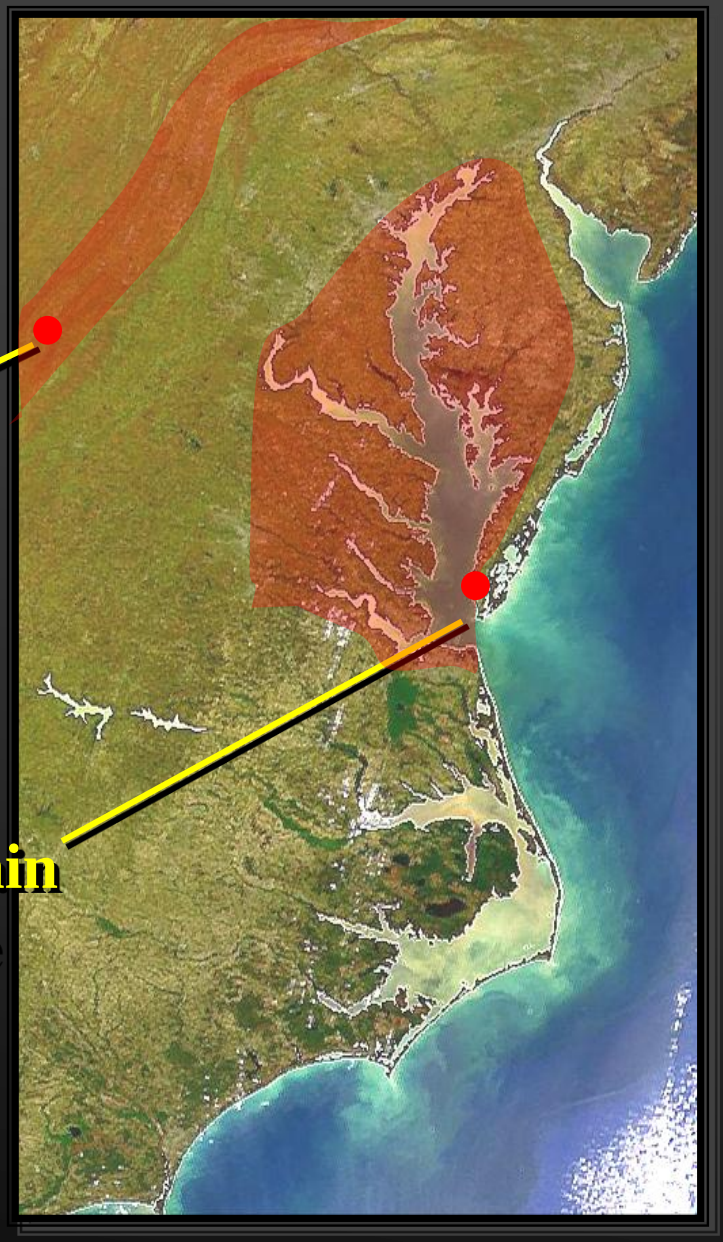
Bedrock Aquifer: Karst, Carbonate System



Study Sites

Karst Setting of the Valley and Ridge Physiographic Province

Estuary of the Coastal Plain Physiographic Province



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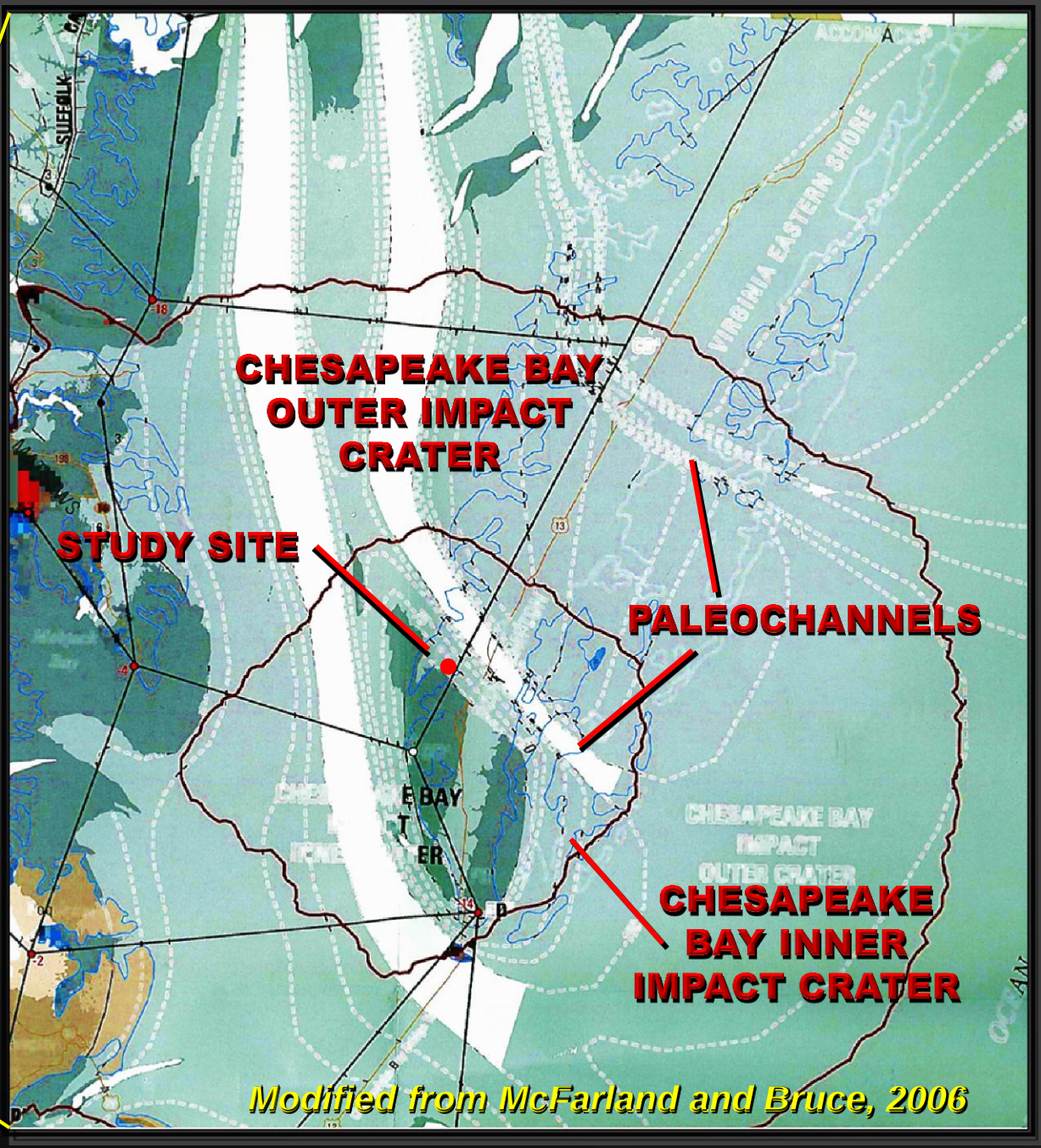
Regional Geologic Controls on Groundwater Flow



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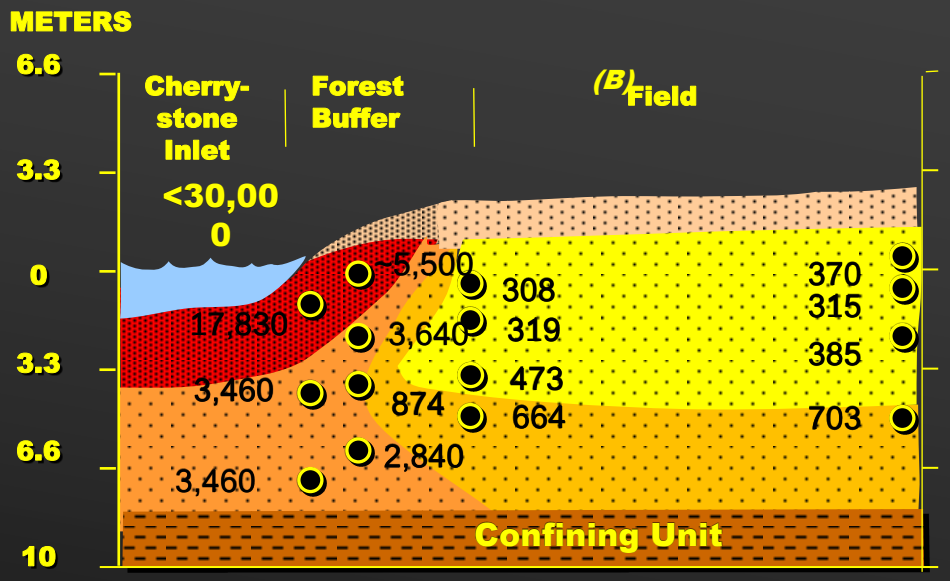
Buffered Coastal Plain Estuary: Specific Conductance



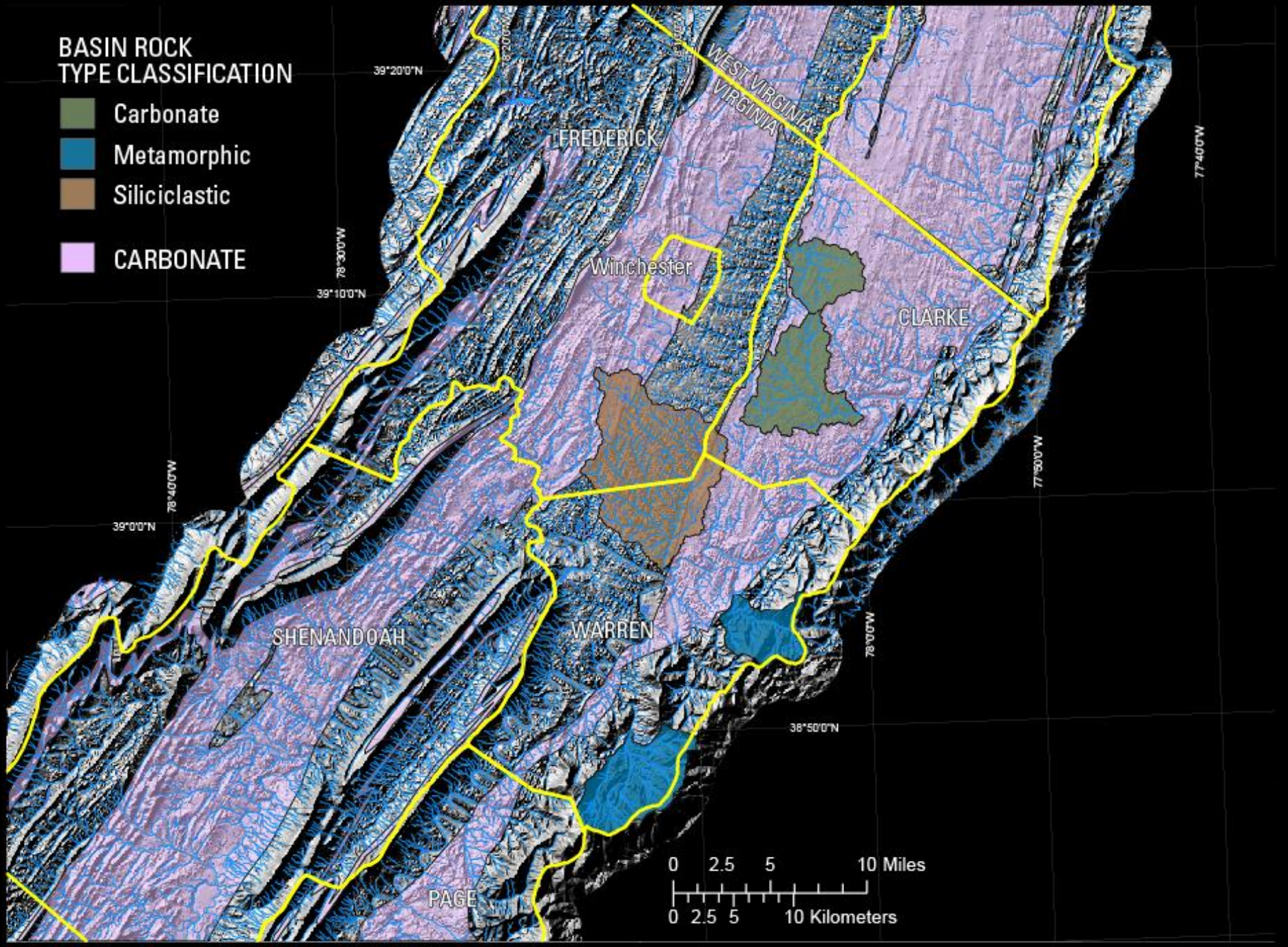
SC<500 mS/cm

1,000 >SC>500 mS/cm

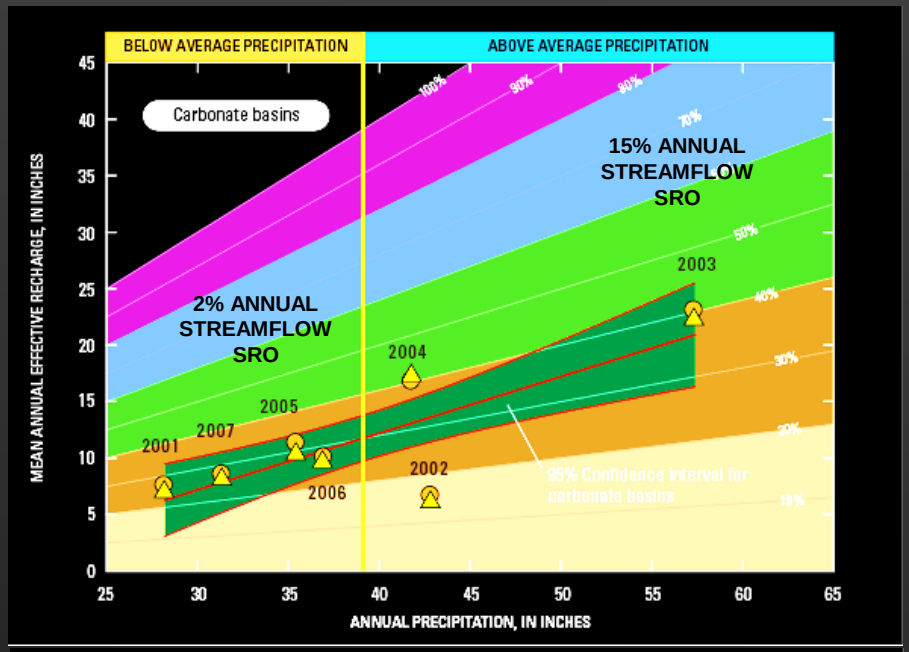
5,000>SC>1,000 mS/cm

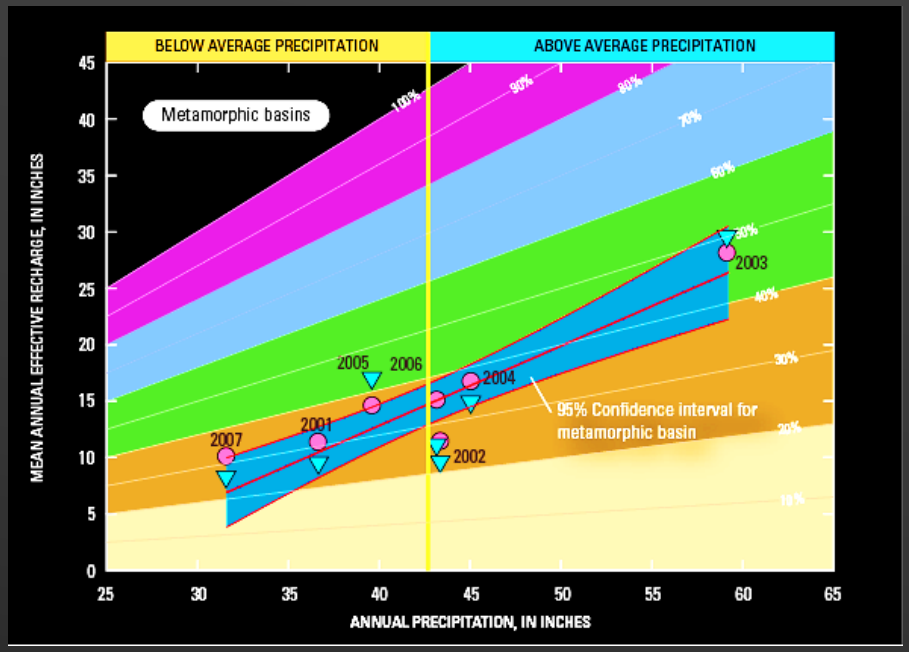
SC>5,000 mS/cm

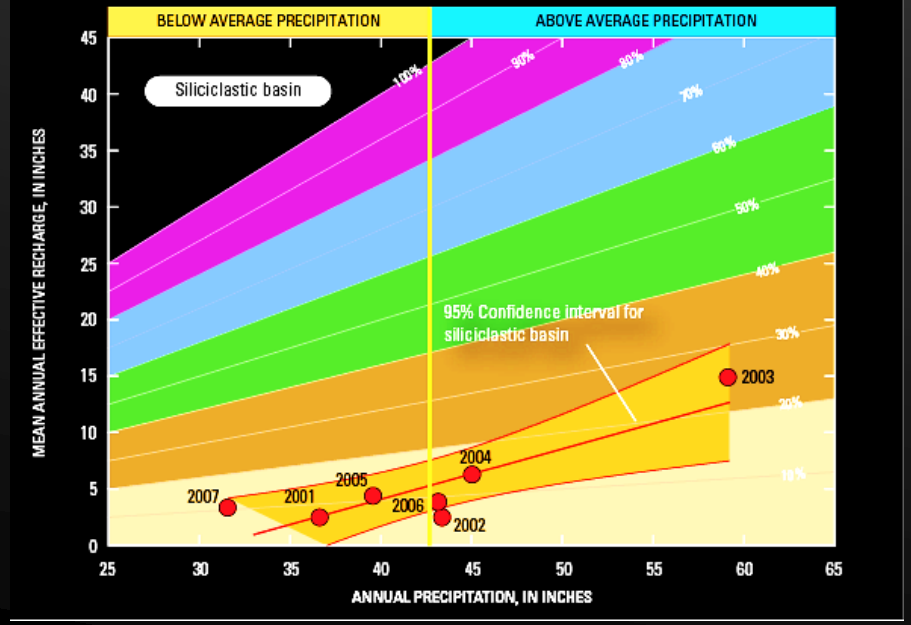
USGS


BASIN ROCK
TYPE CLASSIFICATION
Carbonate
Metamorphic
Siliciclastic
CARBONATE
39°20'0"N
78°30'0"W
39°10'0"N
78°40'0"W
39°0'0"N
77°40'0"W
77°30'0"W
78°0'0"W
38°50'0"N
WEST VIRGINIA
VIRGINIA
FREDERICK
Winchester
CLARKE
SHENANDOAH
WARREN
PAGE
0 2.5 5 10 Miles
0 2.5 5 10 Kilometers

Annual Precipitation and Mean Annual Effective Recharge







Clarke County Carbonate Basins

01616100 Dry Marsh Run at Route 645 near Berryville, Va.
01636316 Spout Run at Route 621 near Millwood, Va.

Warren County Metamorphic Basins

01630700 Gooney Run at Route 622 near Glen Echo, Va.
0163626650 Manassas Run at Route 645 near Front Royal, Va.

Warren County Siliciclastic Basin

01636242 Crooked Run below Route 340 at Riverton, Va.

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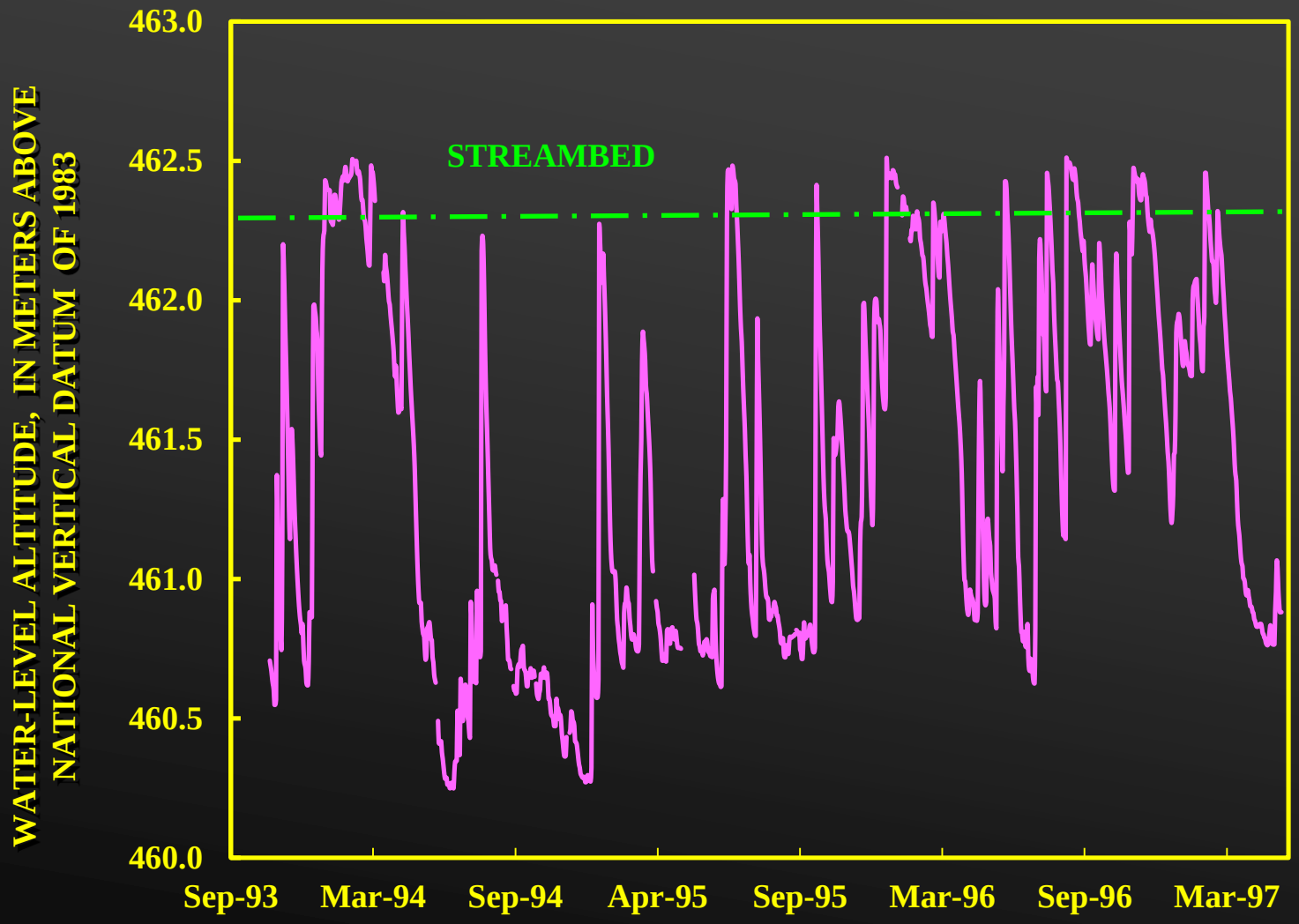
MAXIMUM DAILY WATER-TABLE ALTITUDE WELL 39S2
MUDDY CREEK (CARBONATE) WATERSHED



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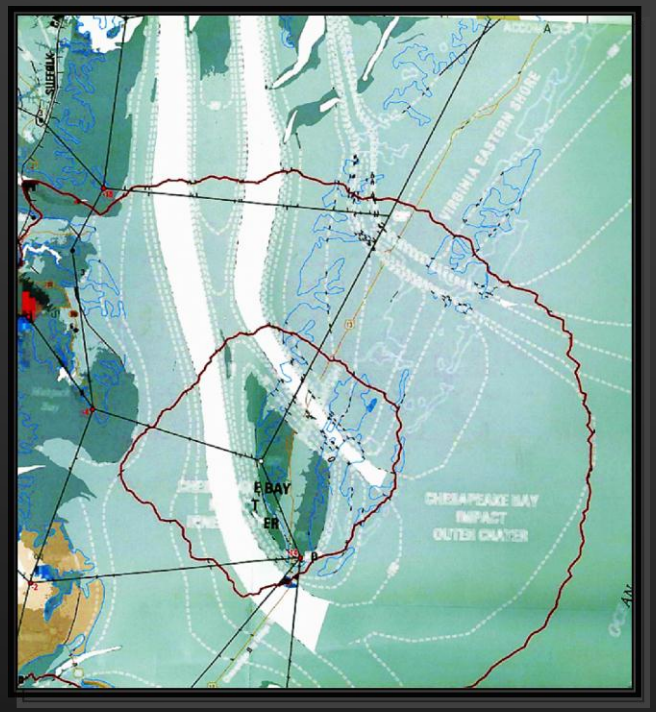
CONCLUSIONS



- Contaminants only are removed from riparian forest buffers when transported into buffer-processing areas.
- Local and regional hydrologic characteristics control transport pathways and, consequently, removal effectiveness.
- Hydrologic characteristics, not a single prescribed buffer width, control removal efficiencies and the land area treated.
- Consequently, hydrologic characteristics are key to targeting efficient forest buffers and differ for surface runoff and groundwater.
- Effective buffer design depends on hydrologic characteristics.

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Questions and Discussion

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