Phase 5.0 Chesapeake Bay Watershed Model: FTABLES

U.S. Department of the Interior
U.S. Geological Survey

Stream Reach Connection

The routing of water and associated constituents through a single simulated stream reach is governed by the function table (FTABLE).

Stream reach characteristics: geometry, slope, and roughness

ROWS COLS ***

5 4

DEPTH (FT)	AREA (ACRES)	VOLUME (AC-FT)	DISCH (CFS) ***
0.00	0.0	0.0	0.0
1.50	1040.0	1512.7	1020.
3.00	1103.0	3120.0	3279.
4.50	1166.1	4821.8	6527.
6.00	1229.1	6618.2	10683.

END FTABLE700

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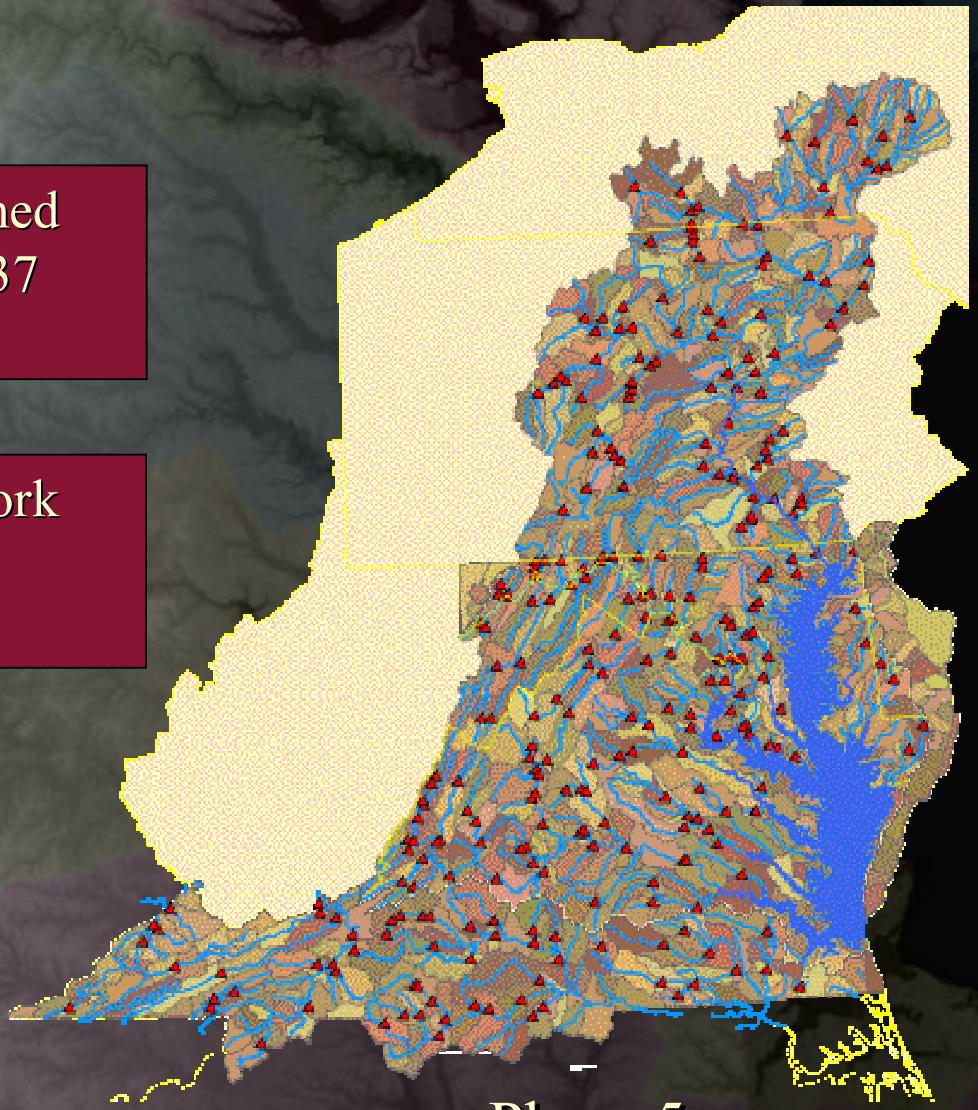
Phase 5 CB Model

Phase 5: CB Watershed
Calibration sites = 237
Watersheds = 684

Phase 5: Extended Network
Calibration sites = 296
Watersheds = 899



Phase 5

FTABLE/Rating Table

XSECT

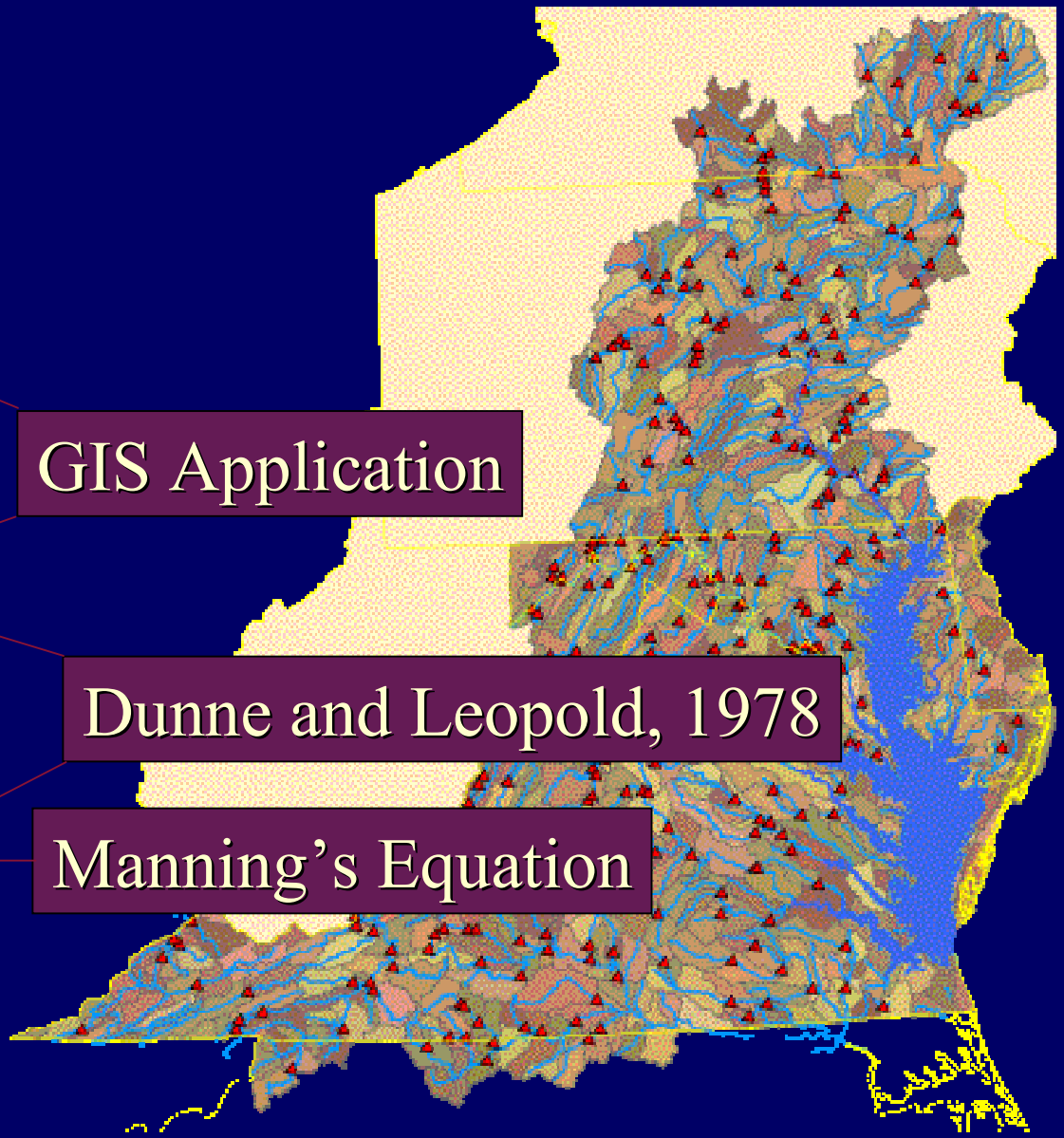
F-table input

- Reach length (mi)
- Upstream elevation (ft)
- Downstream elevation (ft)
- Slope of floodplain
- Channel bottom width (ft)
- Channel bankfull width (ft)
- Channel bankfull height (ft)
- Manning's n for channel
- Manning's n for floodplain

GIS Application

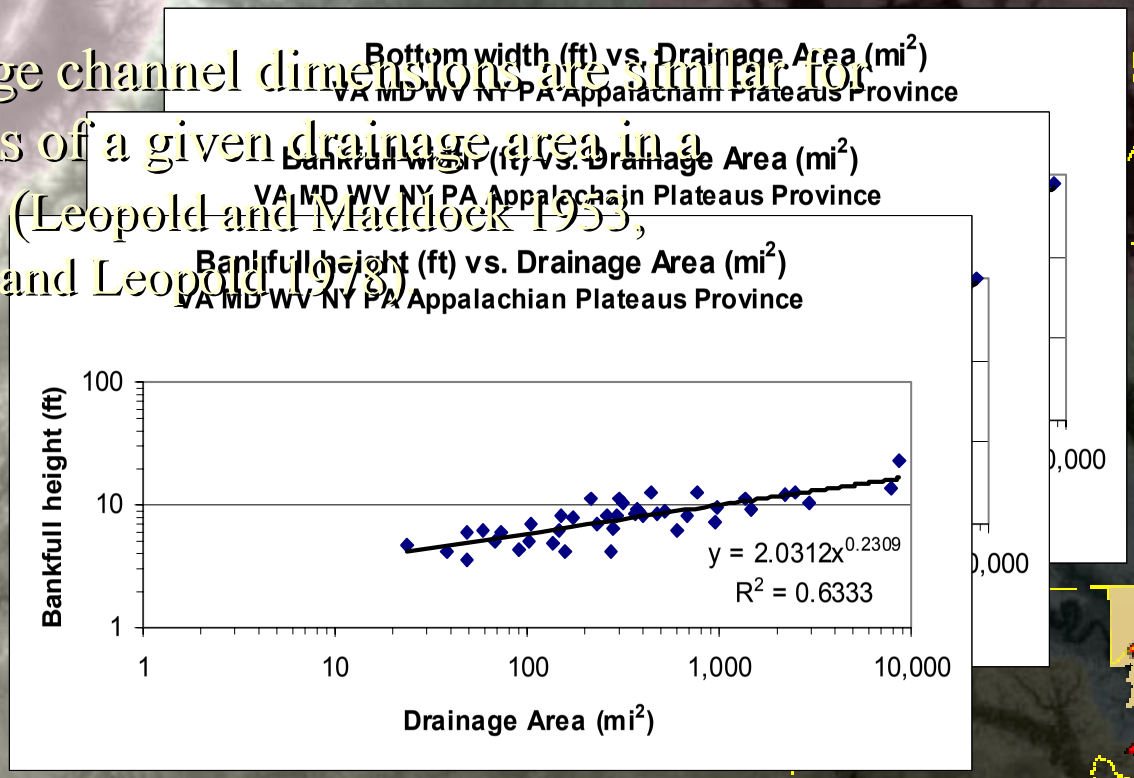
Dunne and Leopold, 1978

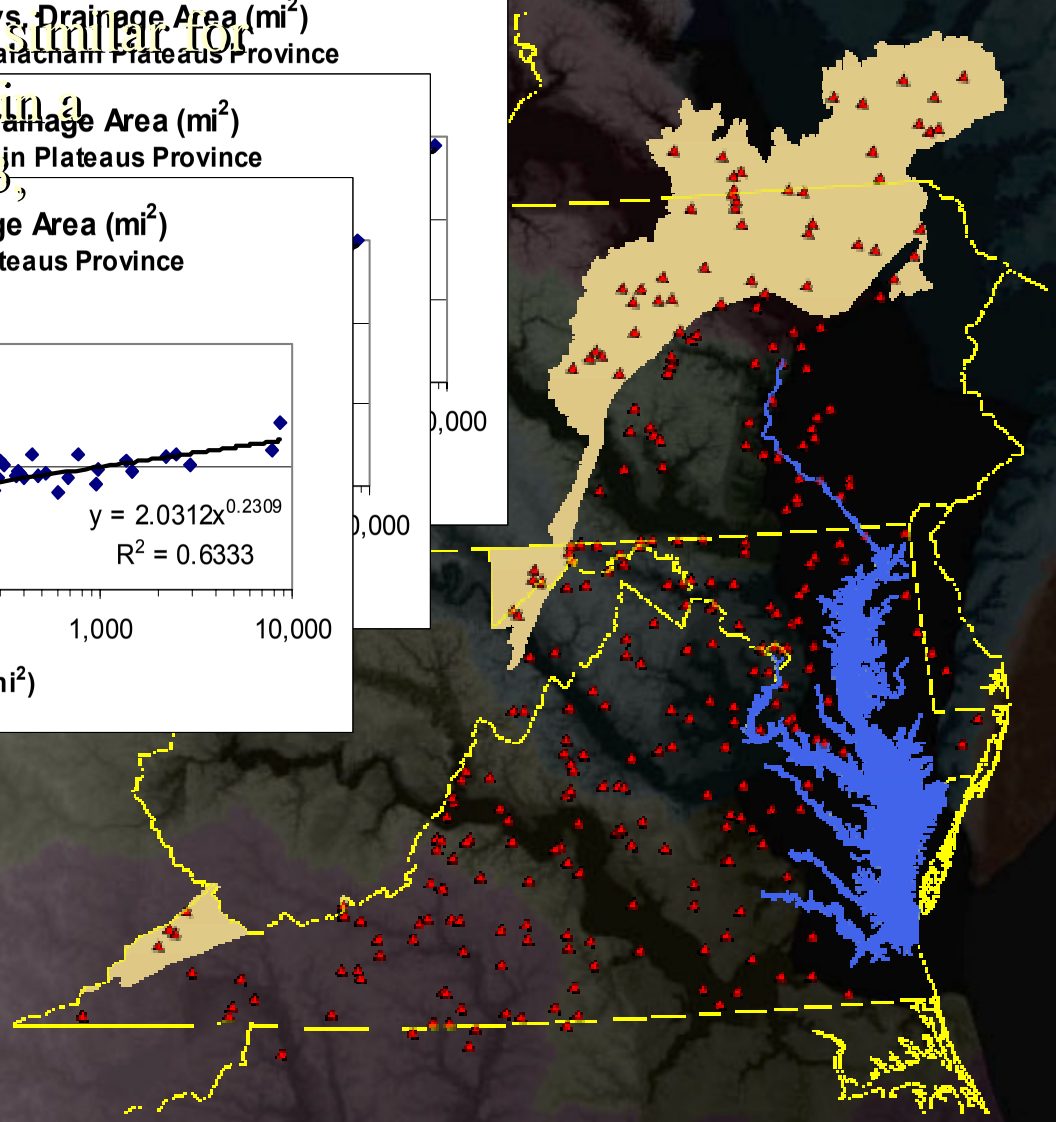
Manning's Equation



Channel Geometry: Appalachian Highlands

Average channel dimensions are similar for streams of a given drainage area in a region (Leopold and Maddock 1953, Dunne and Leopold 1978)





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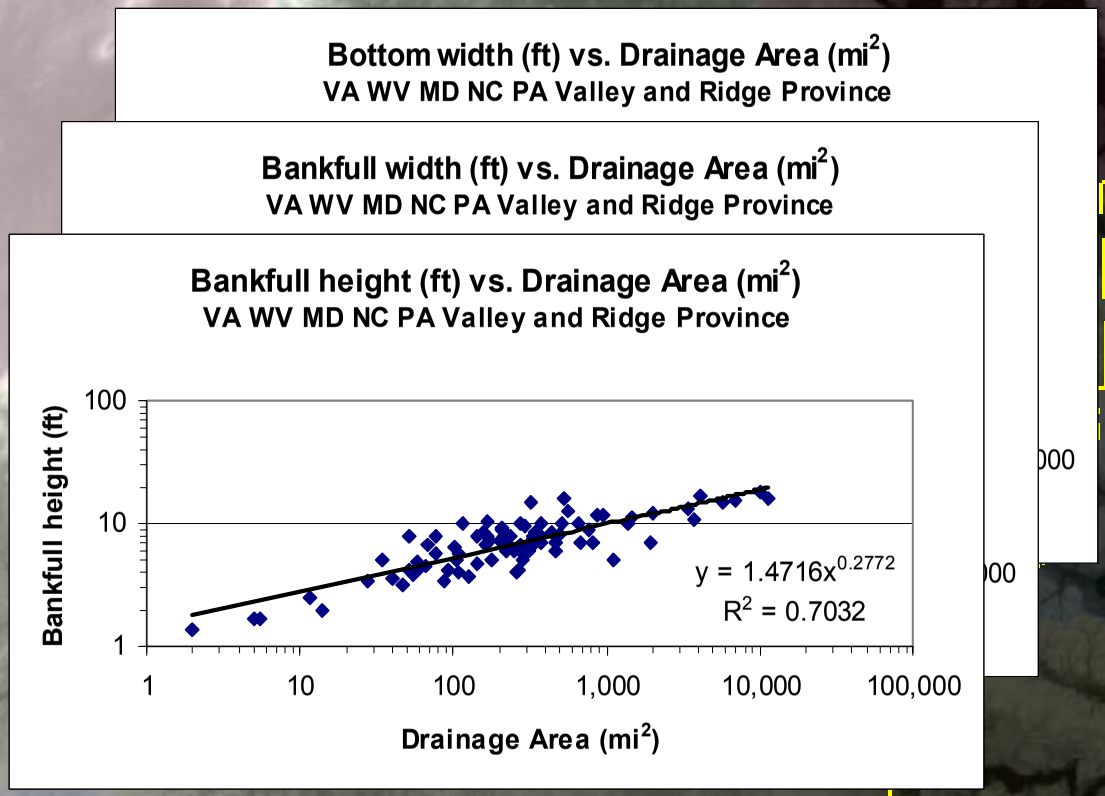
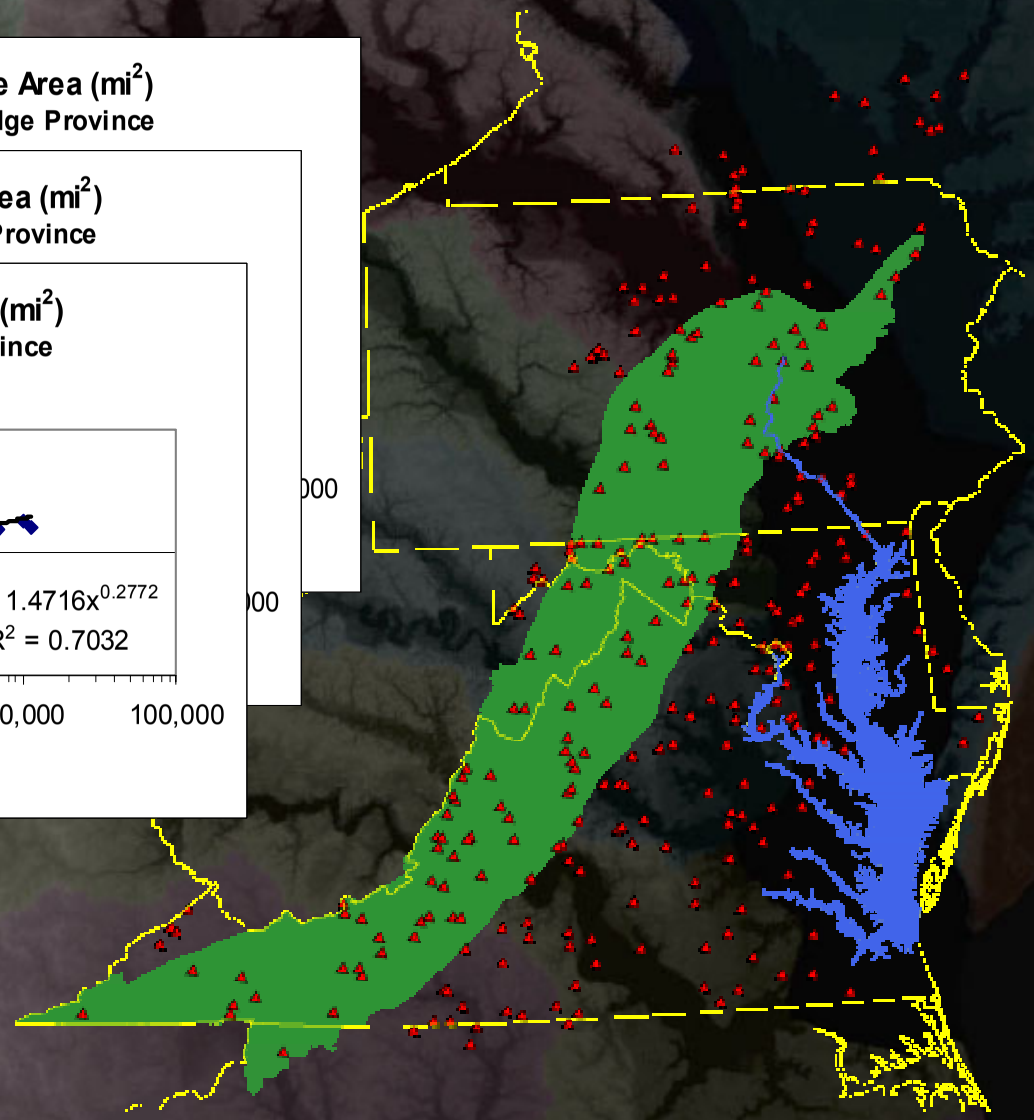
Channel Geometry: Valley and Ridge





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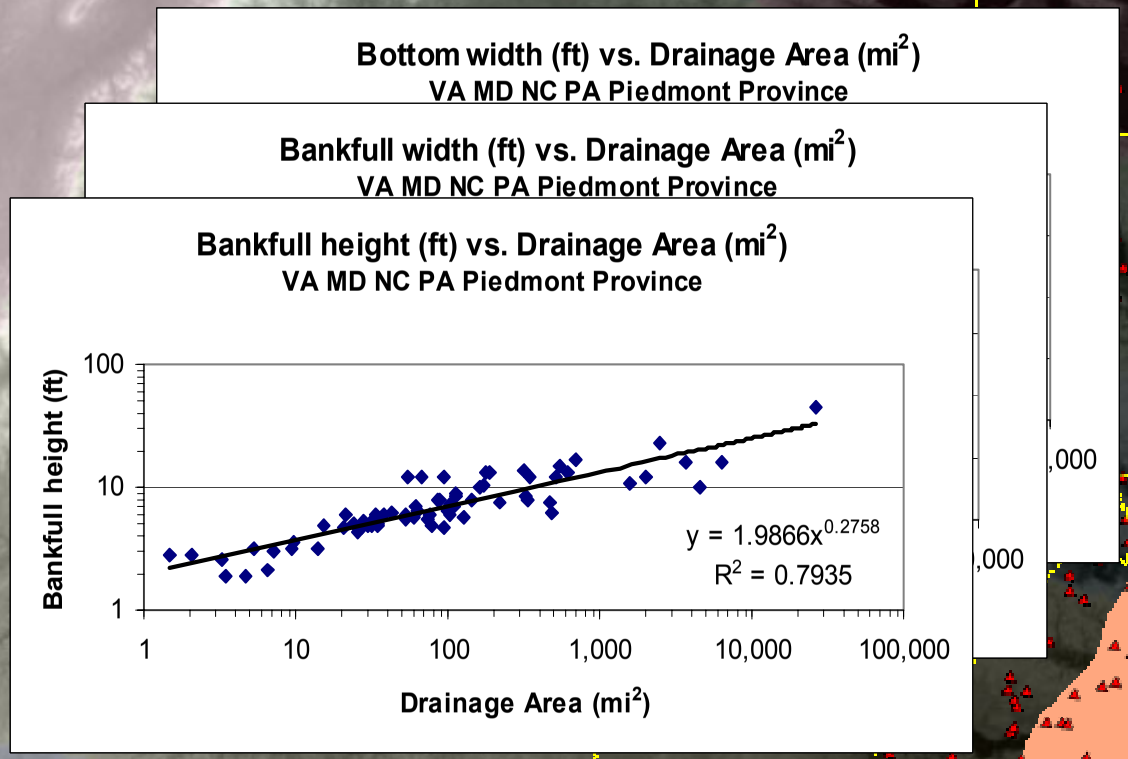
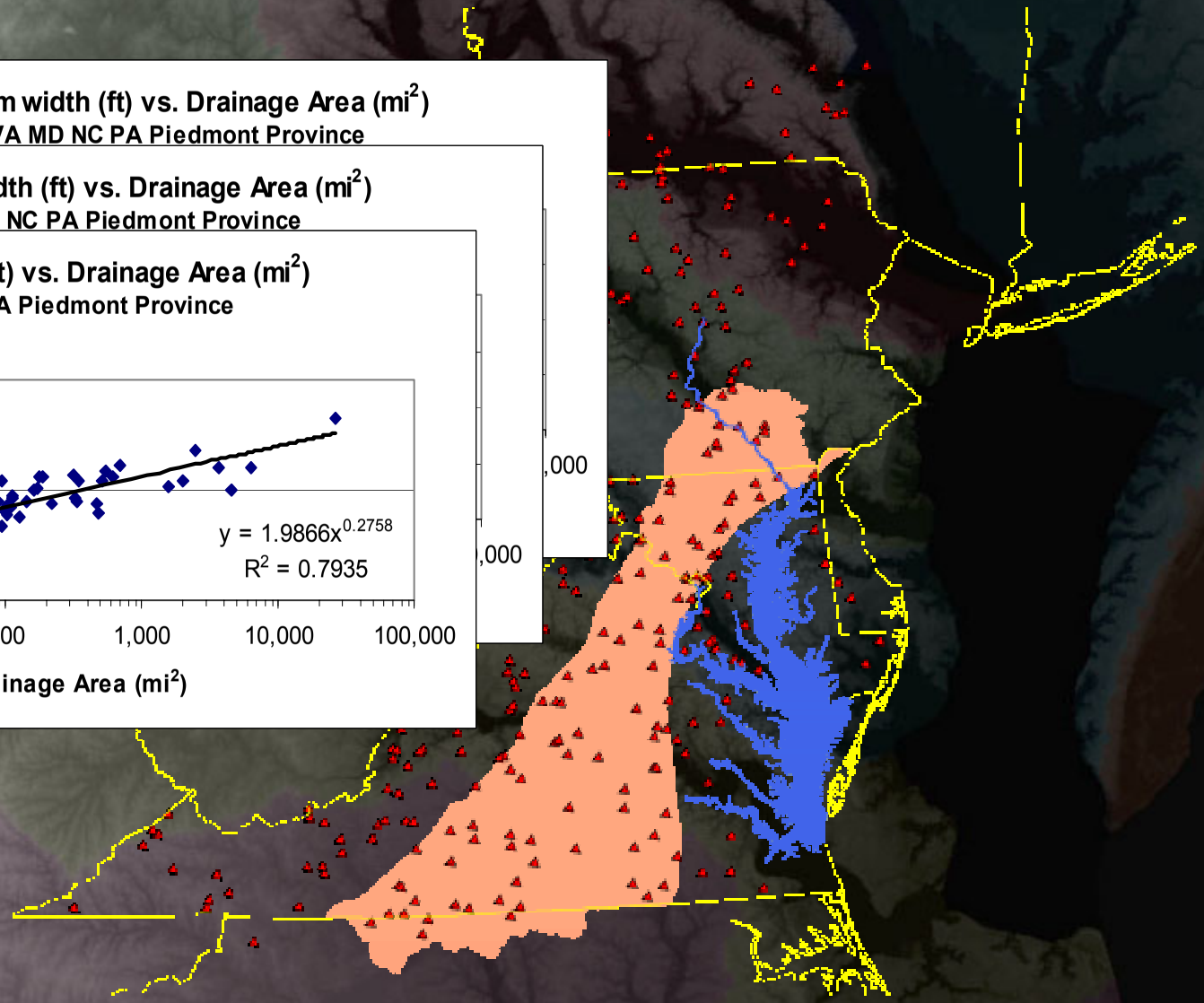
Channel Geometry: Piedmont





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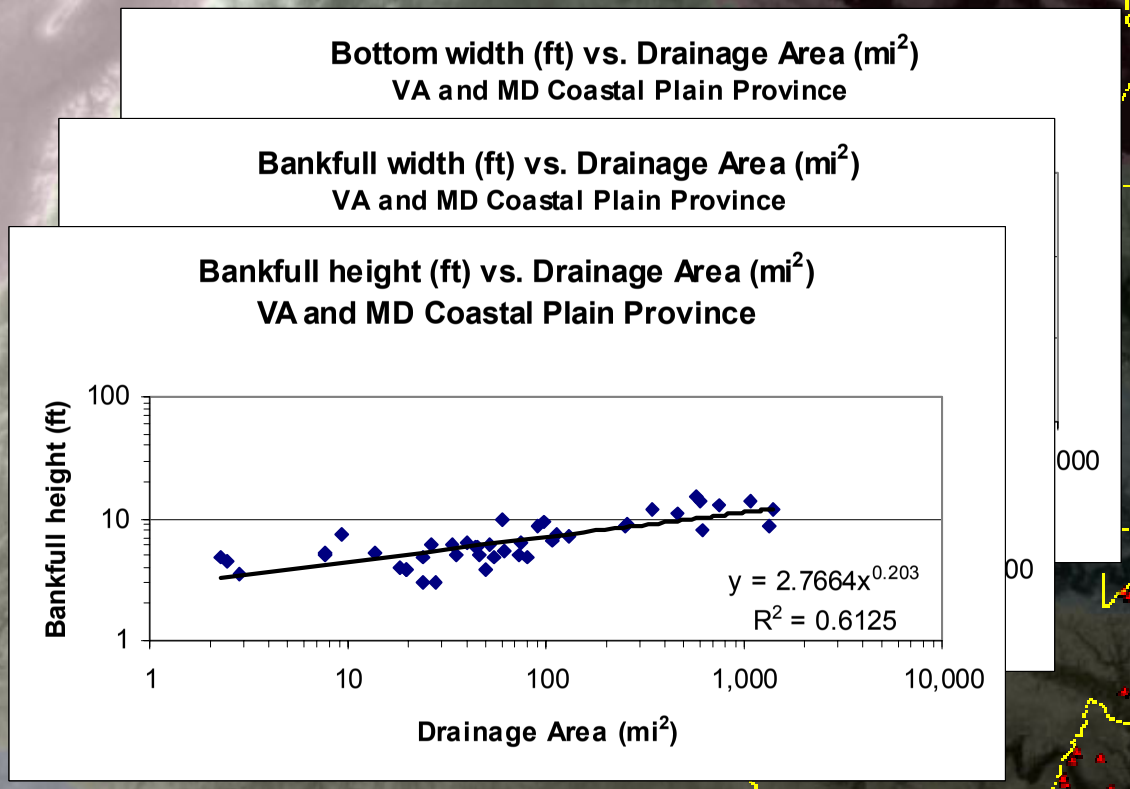
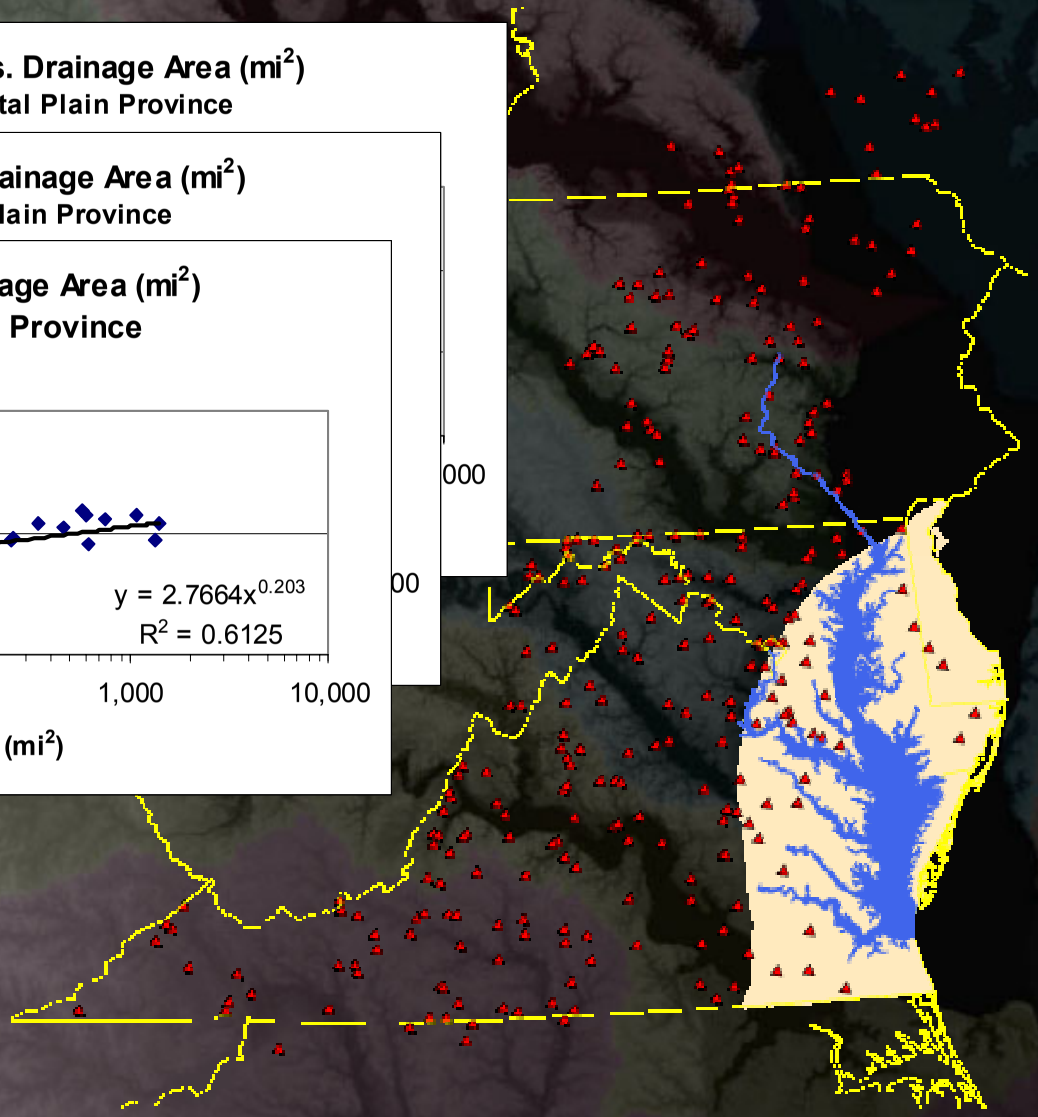
Channel Geometry: Coastal Plain





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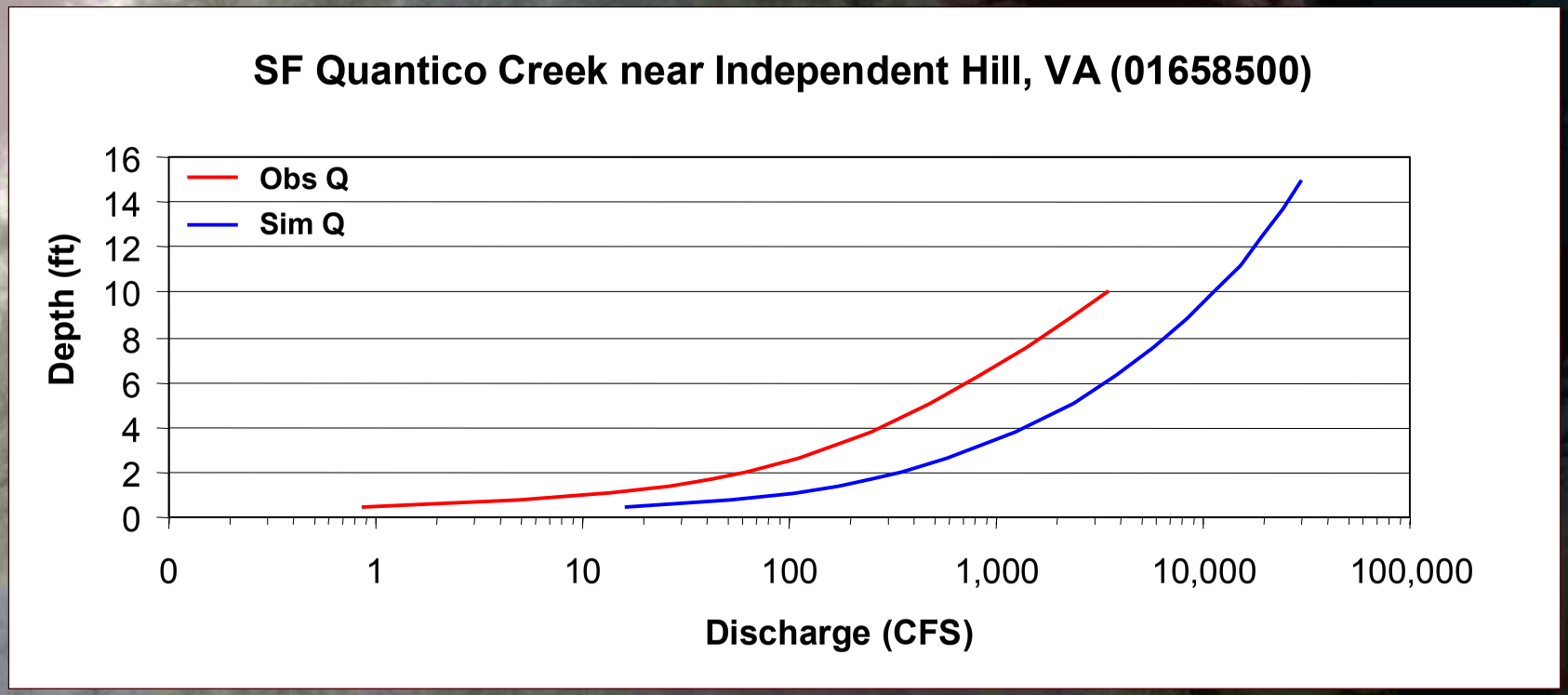
Estimating Channel Roughness

1) $$n_{bkf} = \frac{1}{Q_{bkf}}\left(1.49 R^{2/3} S^{1/2} A_{bkf}\right)$$

2) **Median of observed *n* values within each province**

3) **Median of depth-varying observed *n* values within each province**

FTABLE Generation



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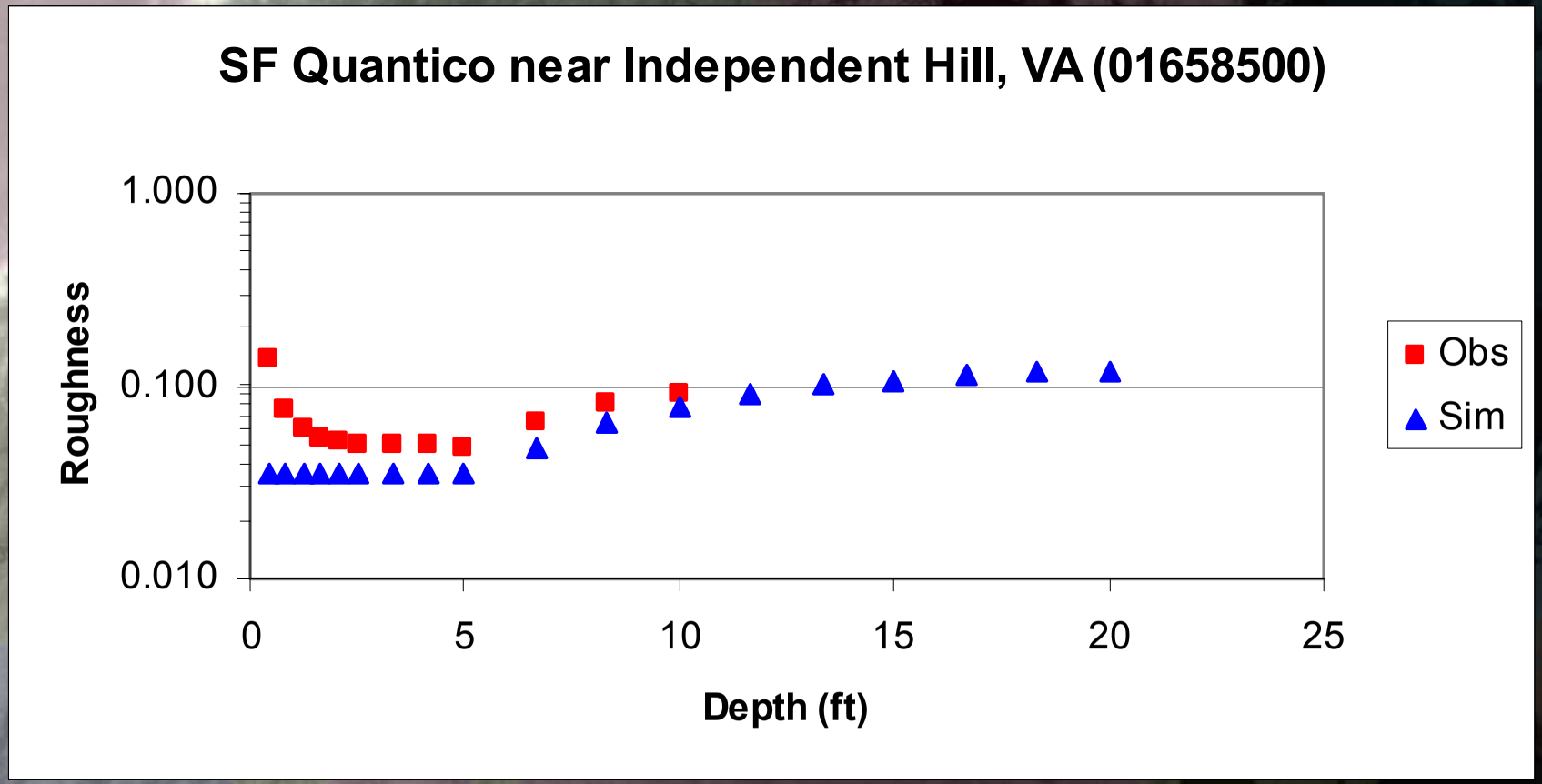
FTABLE Generation Cont.



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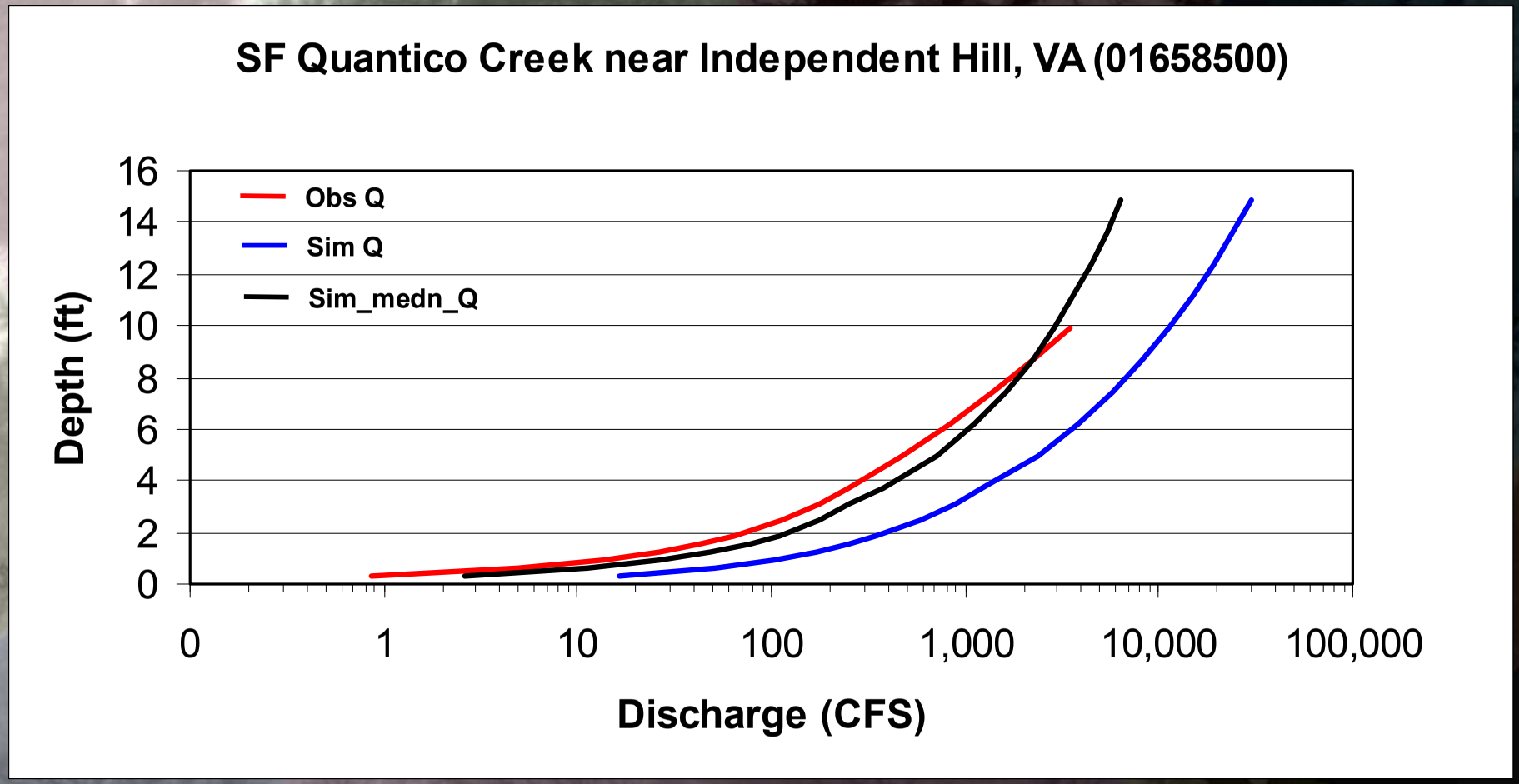
FTABLE Generation Cont.



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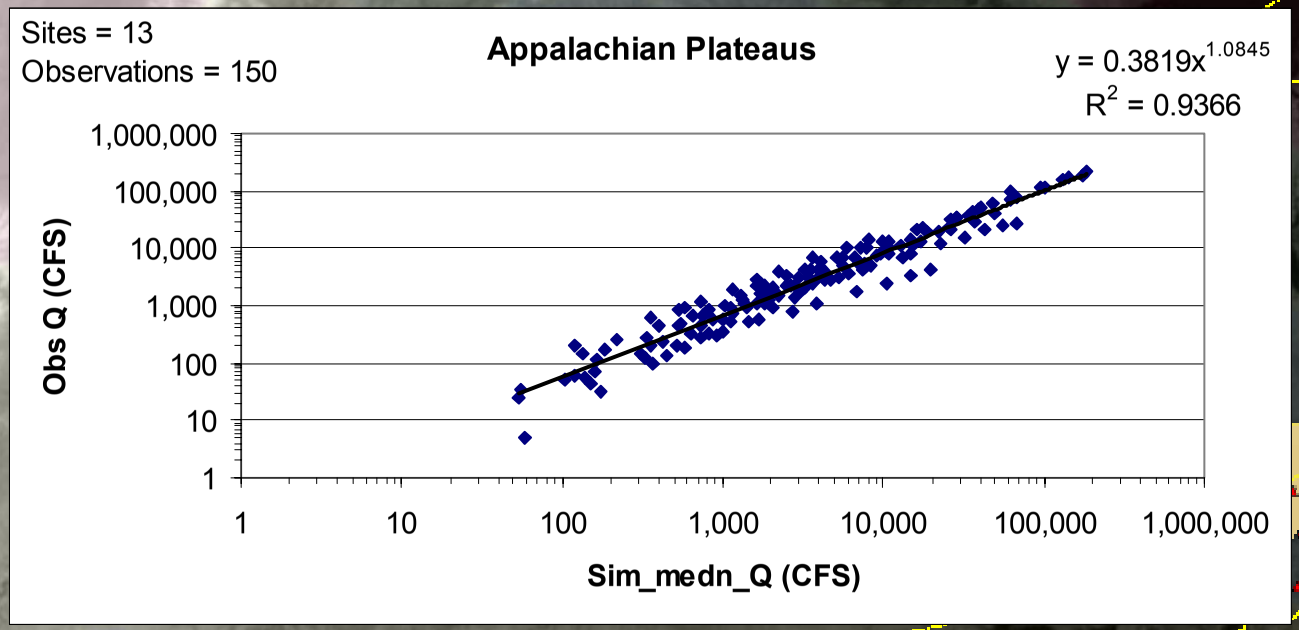
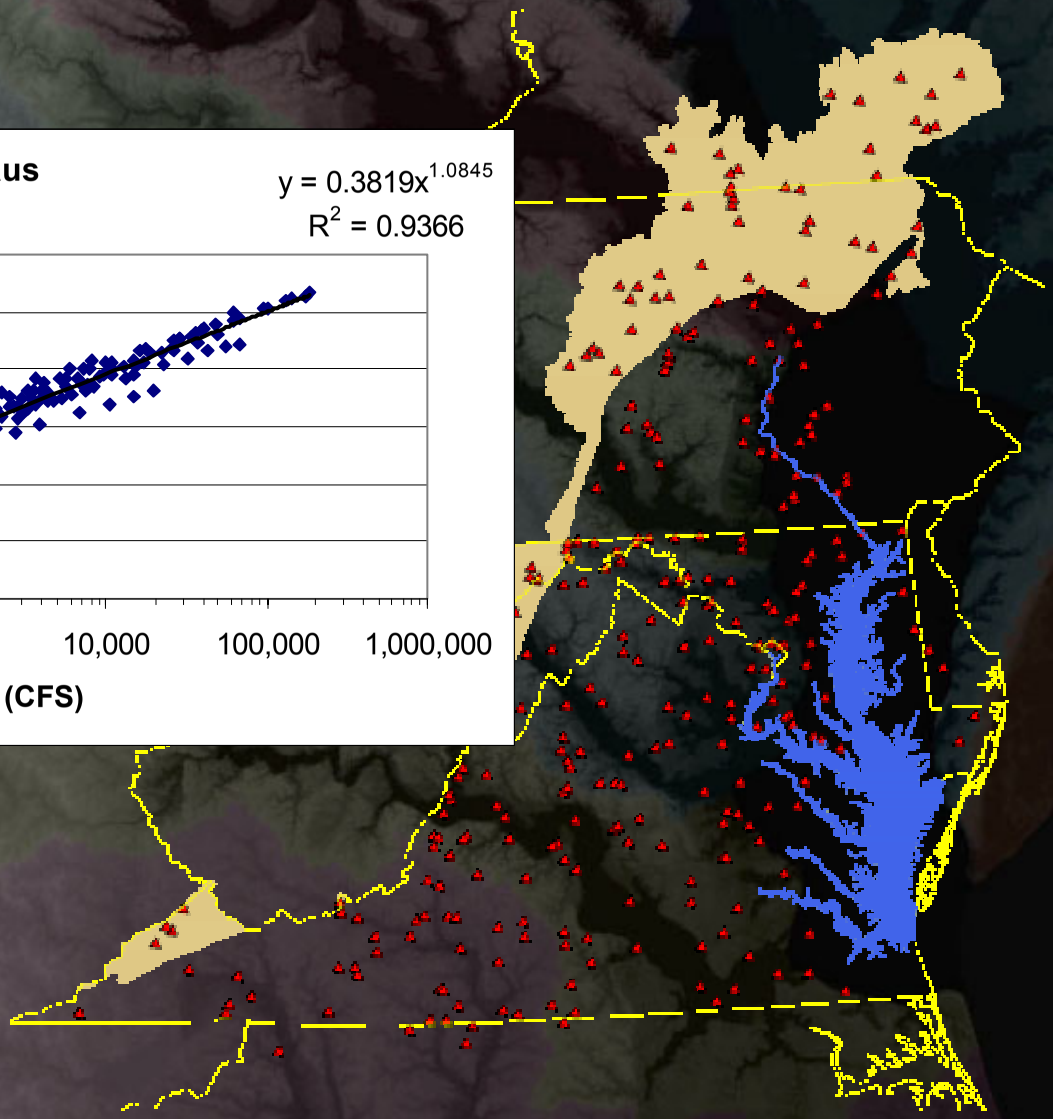
FTABLE Evaluation: Appalachian Highlands





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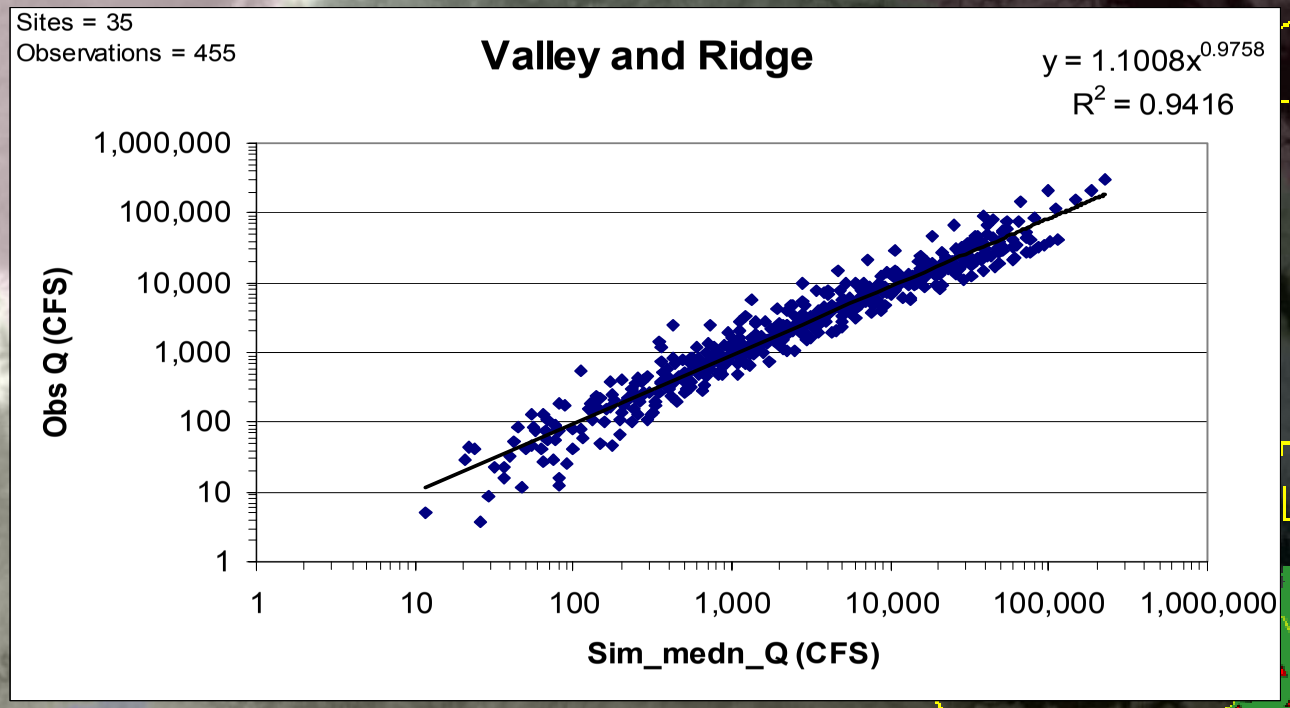
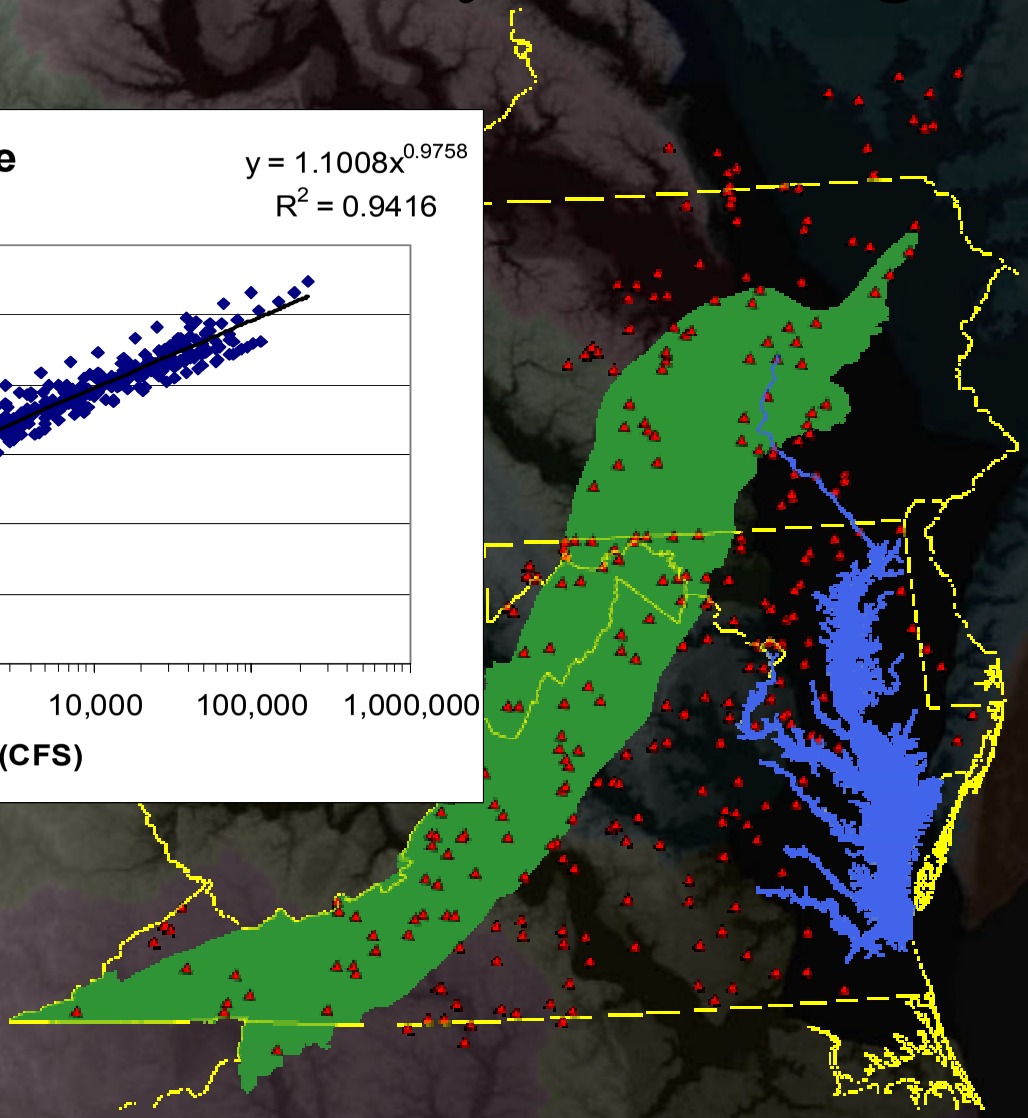
FTABLE Evaluation: Valley and Ridge





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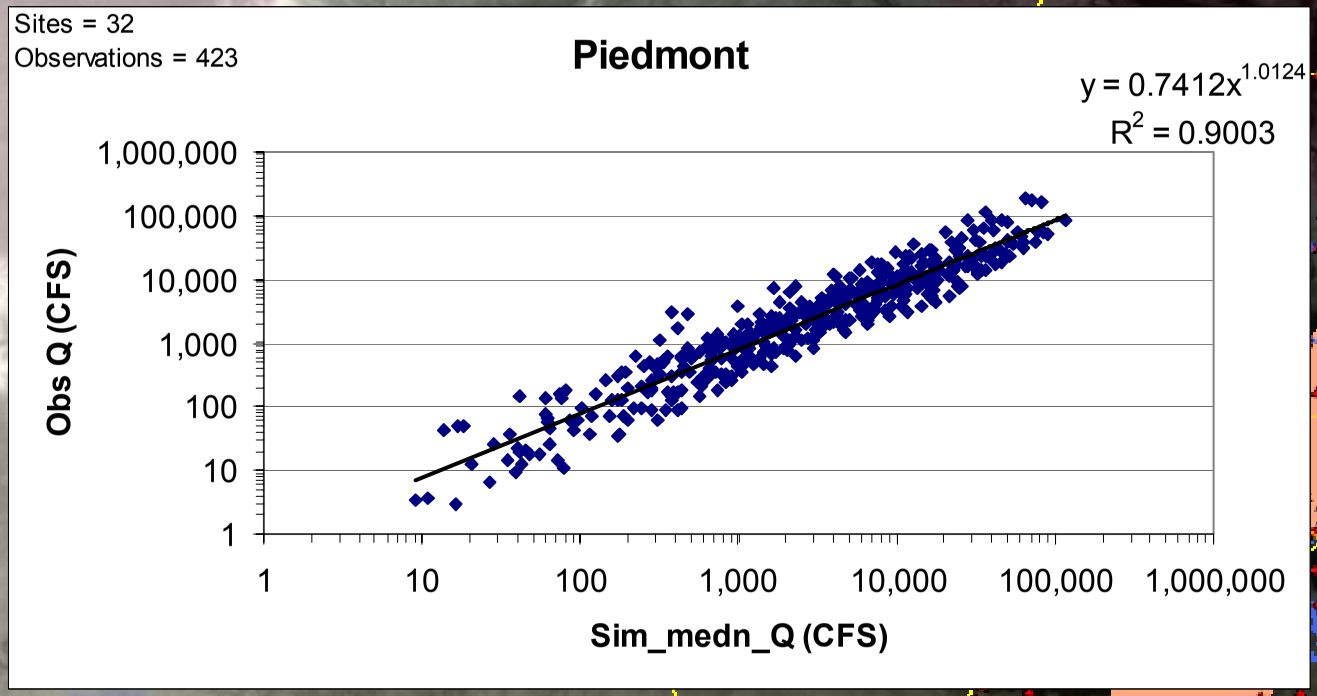
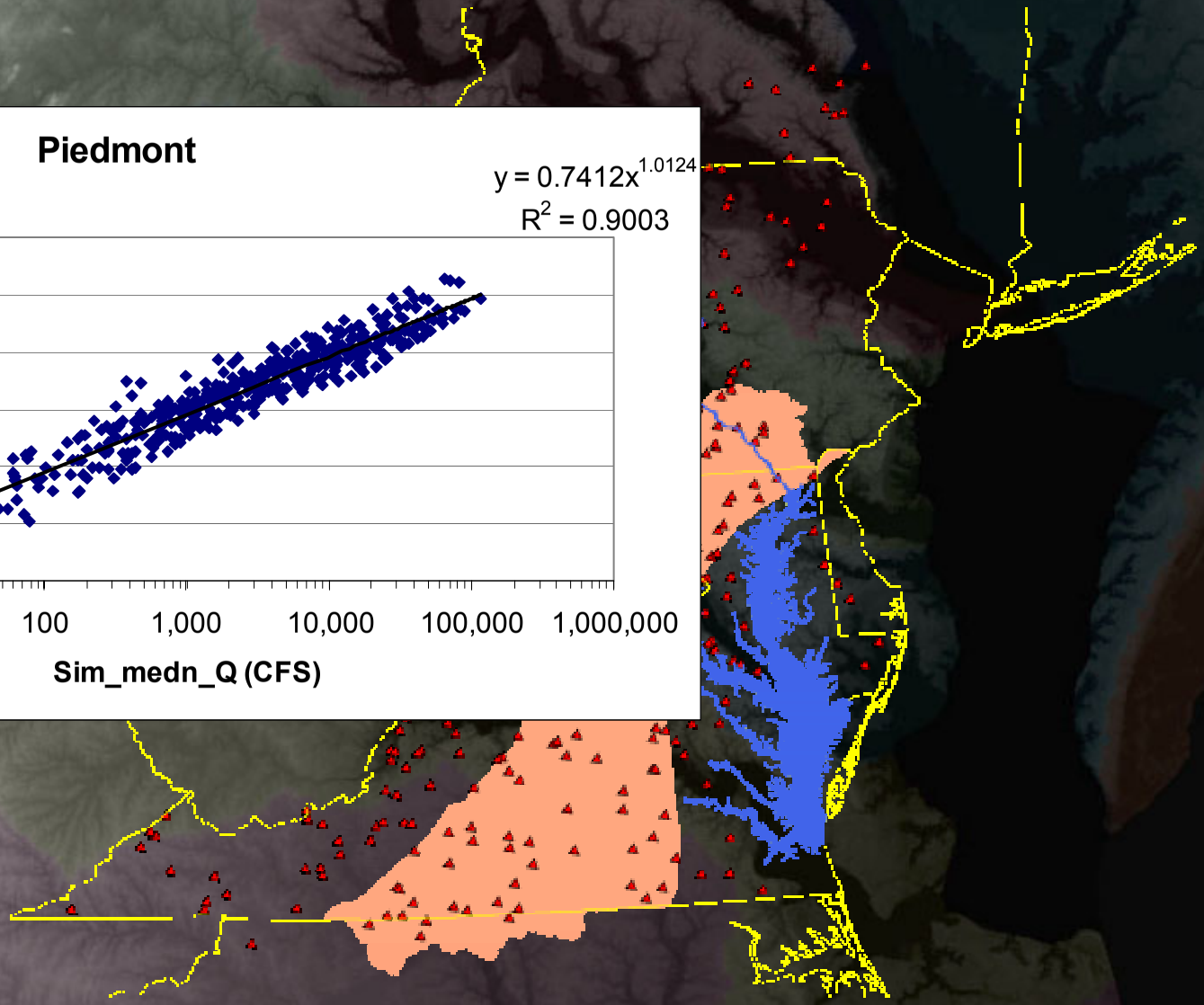
FTABLE Evaluation: Piedmont





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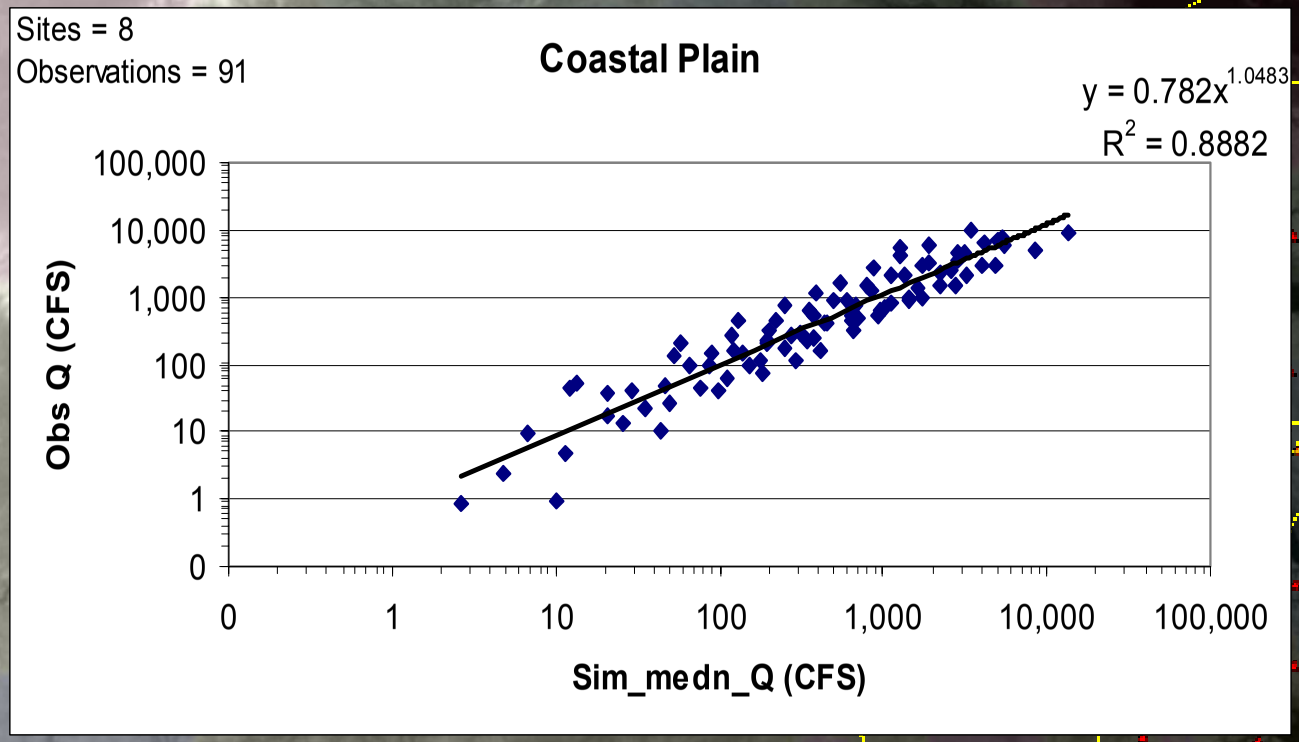
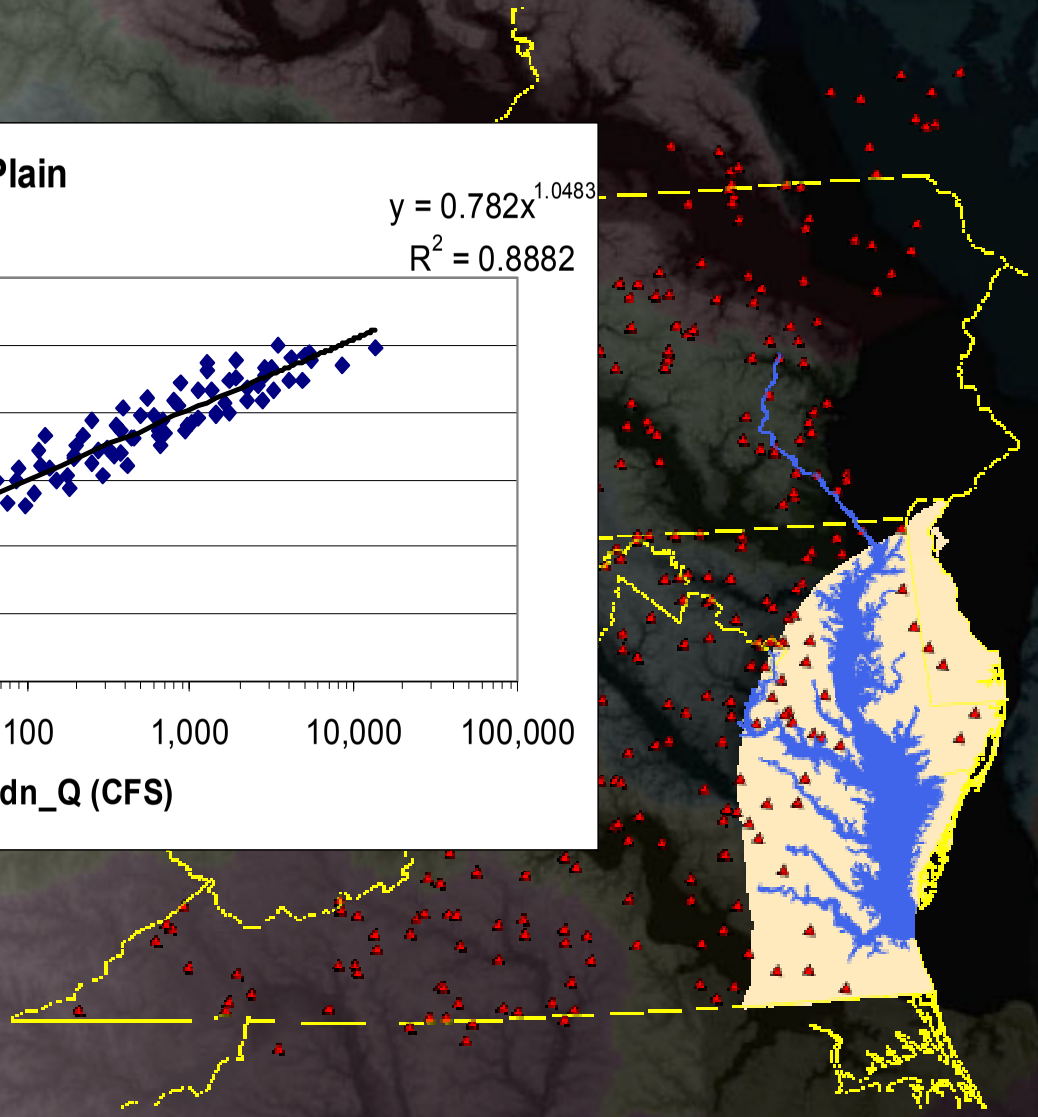
FTABLE Evaluation: Coastal Plain





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CONTACT INFORMATION

Doug Moyer
USGS—Richmond
dlmoyer@usgs.gov

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