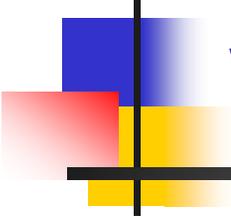
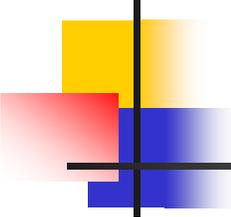


Regional curves for bankfull stream characteristics in the Appalachian Plateaus, West Virginia



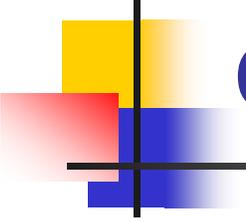
Terry Messinger

USGS, West Virginia Water
Science Center



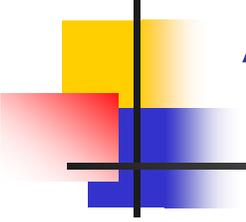
Main points

- Limited stream-gaging network required collecting additional information
- Variation in BF characteristics is substantial within reaches, but averages out regionally
- Curves for Appalachian Plateaus are different from adjacent areas



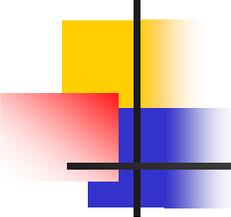
Regional curves/NSCD defined

- Regression equations describing regional relations in flow-calibrated bankfull channel characteristics
- NSCD, Leopold, Rosgen
- Wadable streams, riffle cross sections



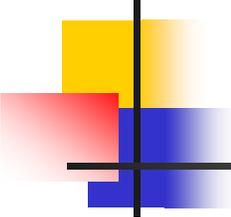
“Bankfull” key concept

- BF not necessarily top of bank
- Challenging or impossible to identify in some (generally unstable) channels



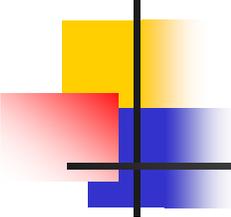
Extensive previous studies

- **Stream-gaging network**
- West Virginia: Flood frequency, BF dimensions from Q measurements
- Adjacent Regional Curves:
 - Valley and Ridge in VA, WV, MD
 - Pennsylvania
 - Ohio



Stream-gaging network

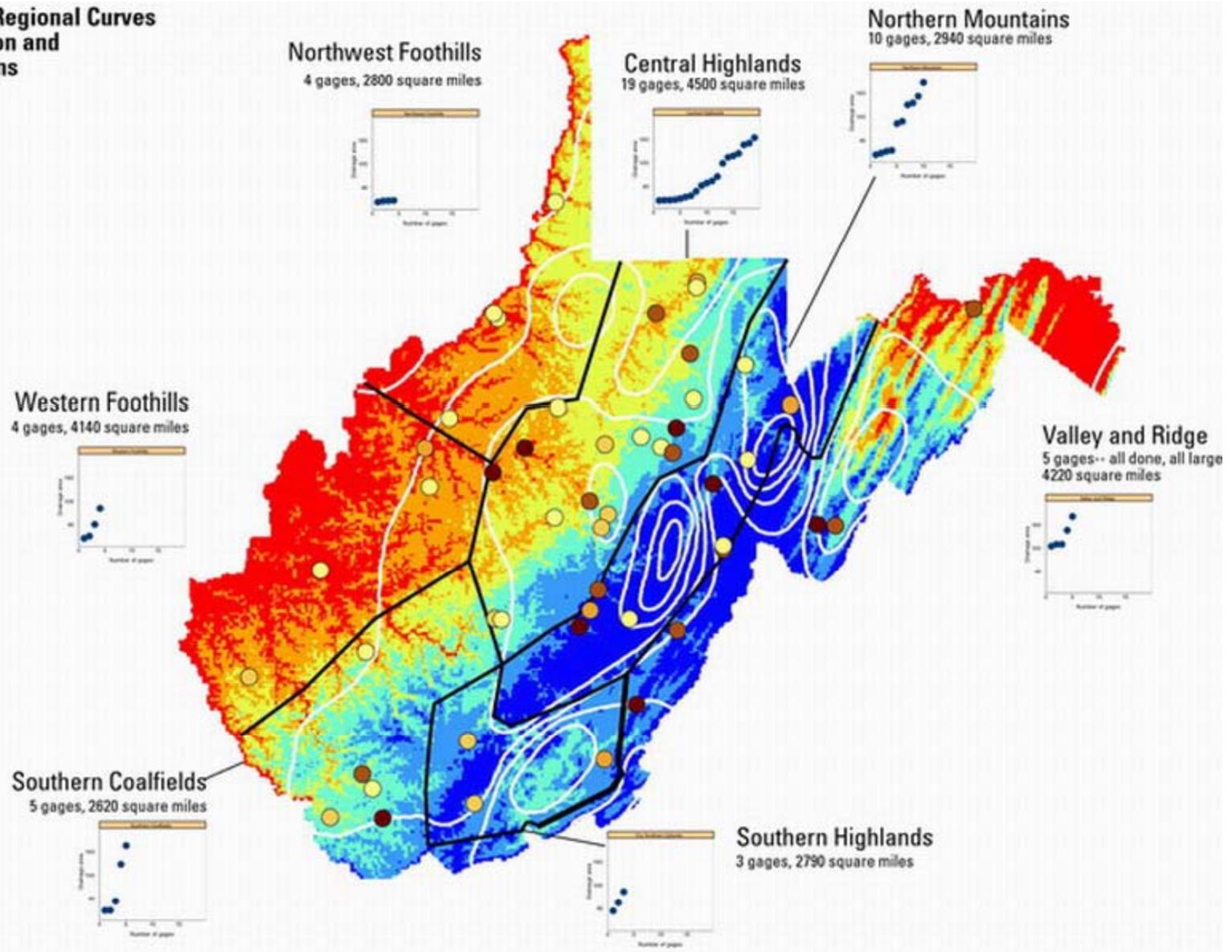
- Network designed in 1950s: water management and regional hydrology
 - Primary (long-term) and secondary stations, mostly on larger rivers and their headwaters
- 1960s: CSGs added to improve flood frequency estimates for bridge design
 - Generally short-term, sites [sensibly] selected partly for convenience and economy
- Geomorphology not even an afterthought

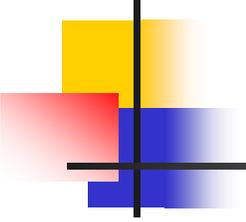


BF estimates from discharge measurements

- Valley and Ridge, Appalachian Plateaus distinct regions with clear differences
 - AP streams: wider, smaller XS
- Within AP: elevation, mean annual precipitation appeared significant

West Virginia Regional Curves
Gage distribution and
planning regions
2005



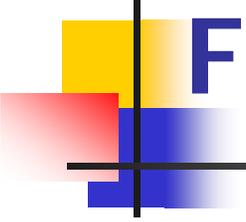


Ideal network:

- Abundant gaged sites with recent, long-term record
- At a range of sizes
- Throughout the area of interest
- In stable, natural channels with easily identifiable BF features

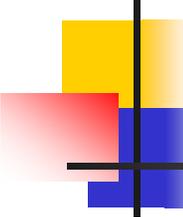
Marsh Fork at Maben





Filling data gaps

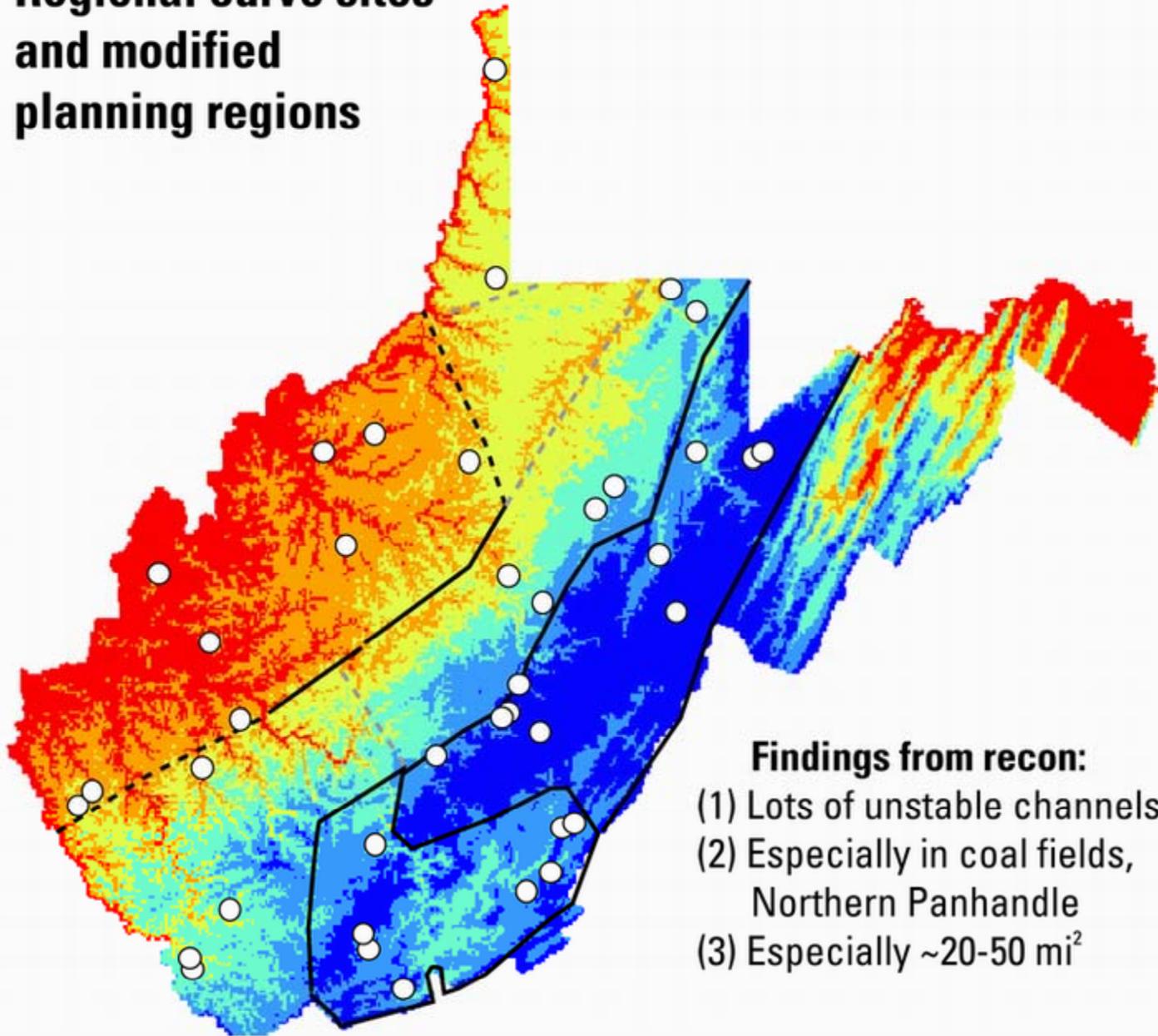
- Biggest gaps:
 - Size: small stream
 - Geographic: near Ohio River
- Prefer public lands



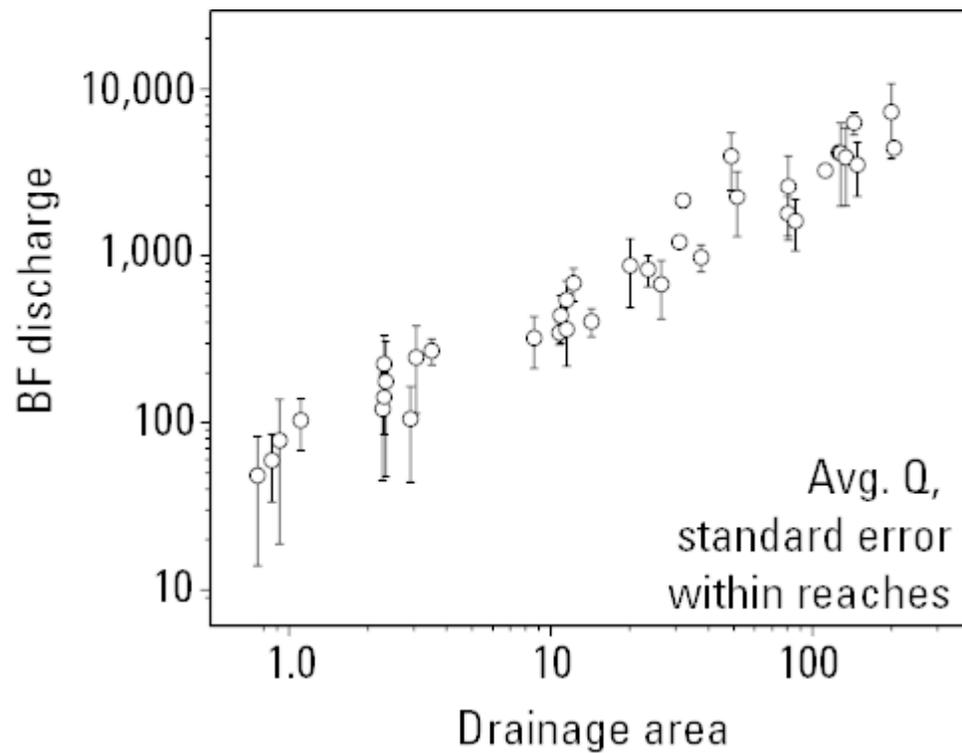
Filling data gaps- Methods

- Routine stream-gaging methods:
 - Develop partial ratings at ungaged sites to extend network; this required extra XSs, allowed us to measure variation w/in reaches
 - Add near-bankfull HWM profile at all sites to give a known discharge, roughness at all XSs
 - Use known discharge/verified roughness to move reaches away from bridges, failing banks

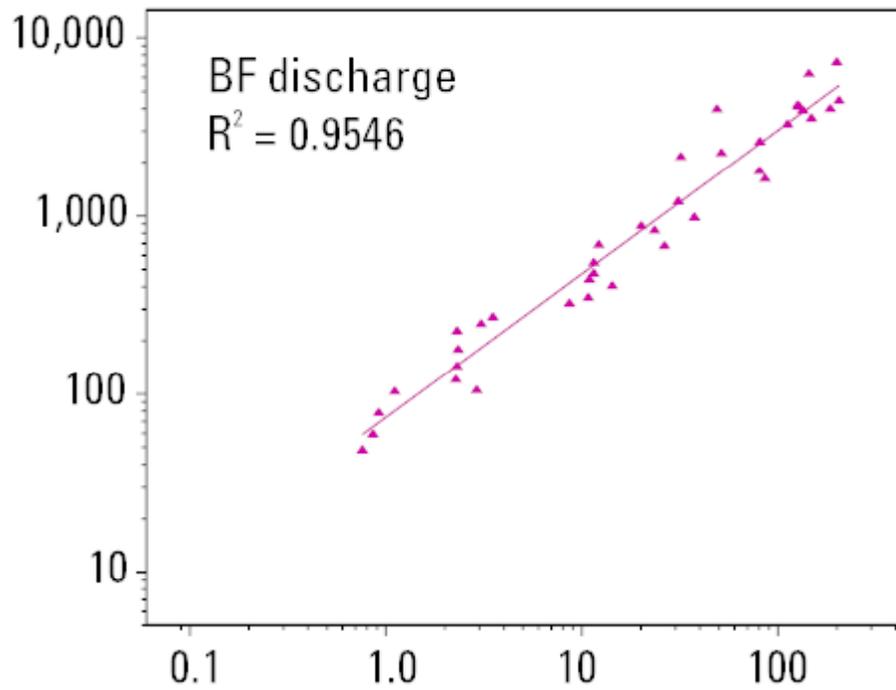
Regional curve sites and modified planning regions



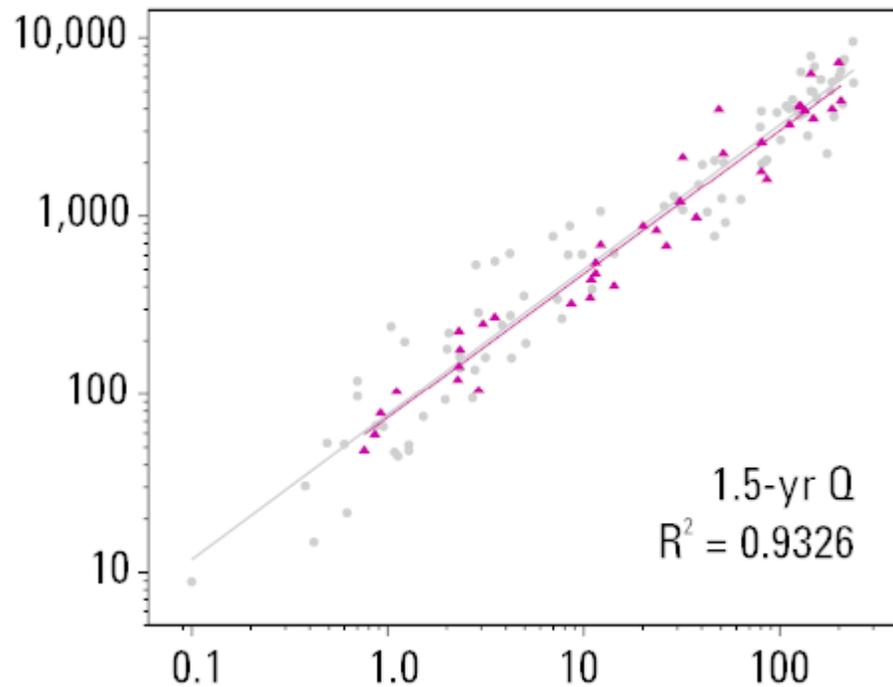
Variation within reaches



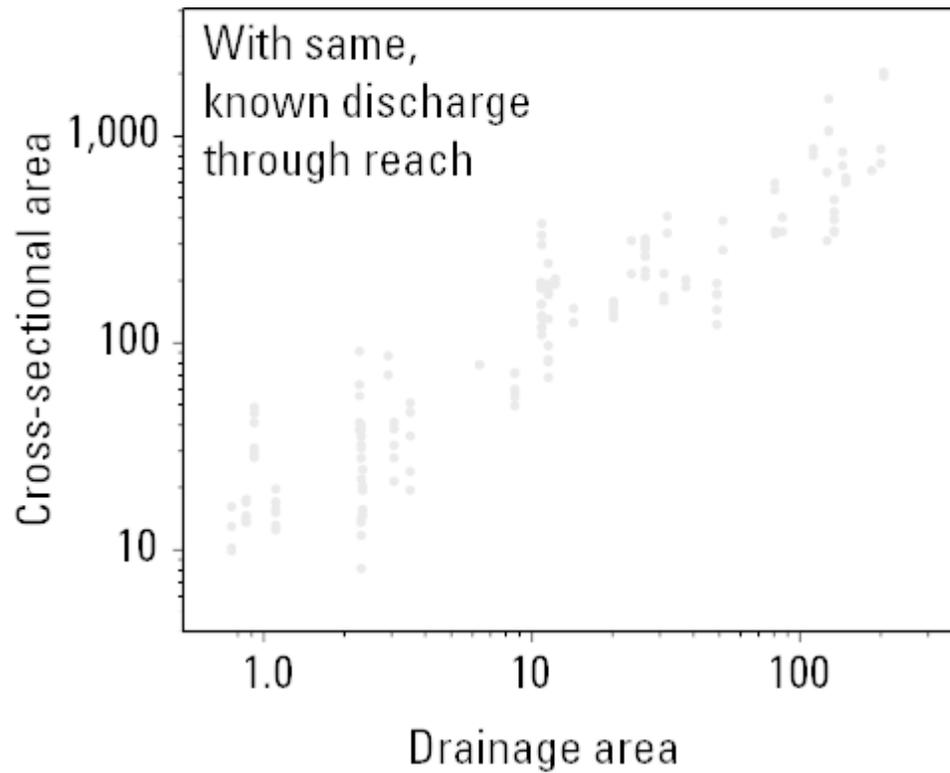
Regional pattern

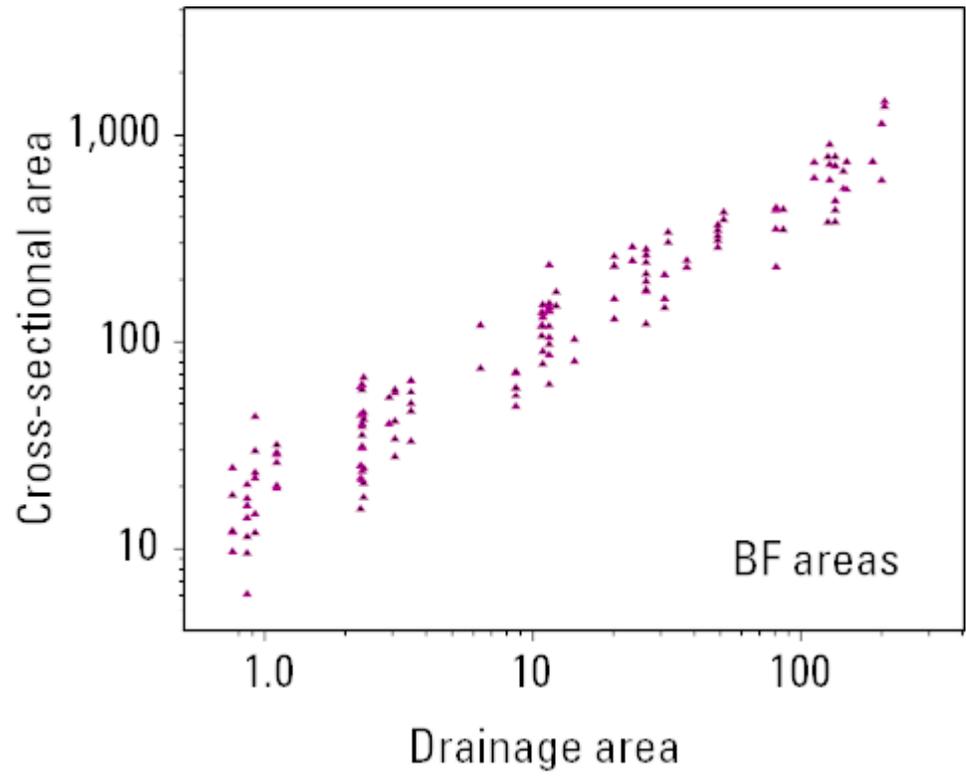
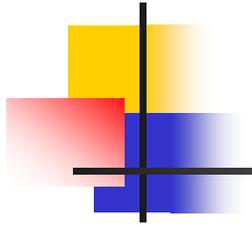


1.5-yr flows from gages; BF similar in size & scatter

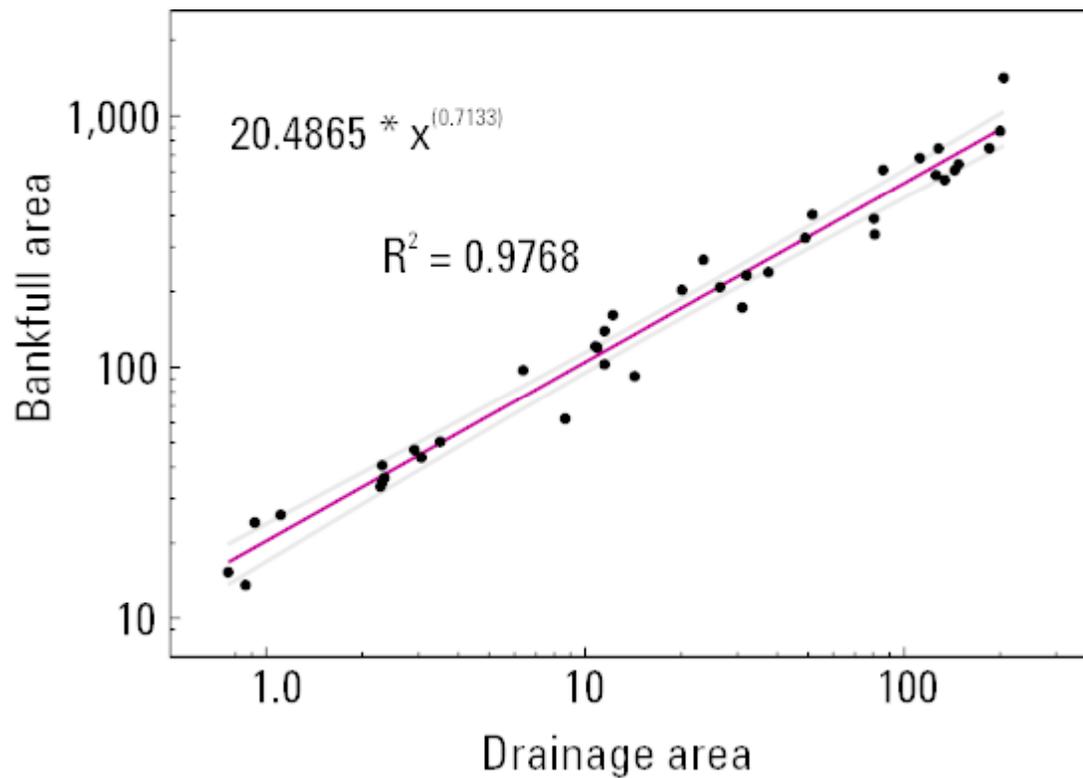


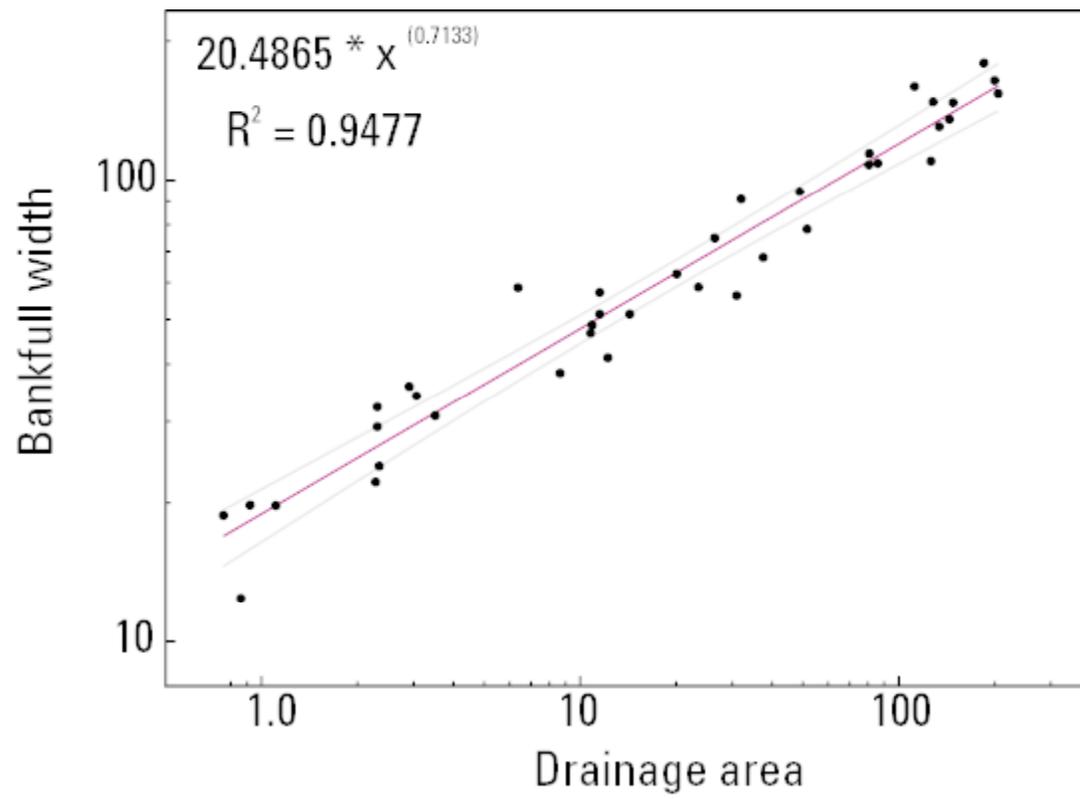
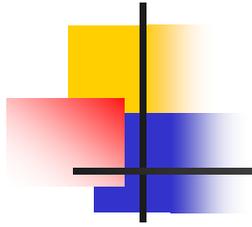
XS area from flow measurements

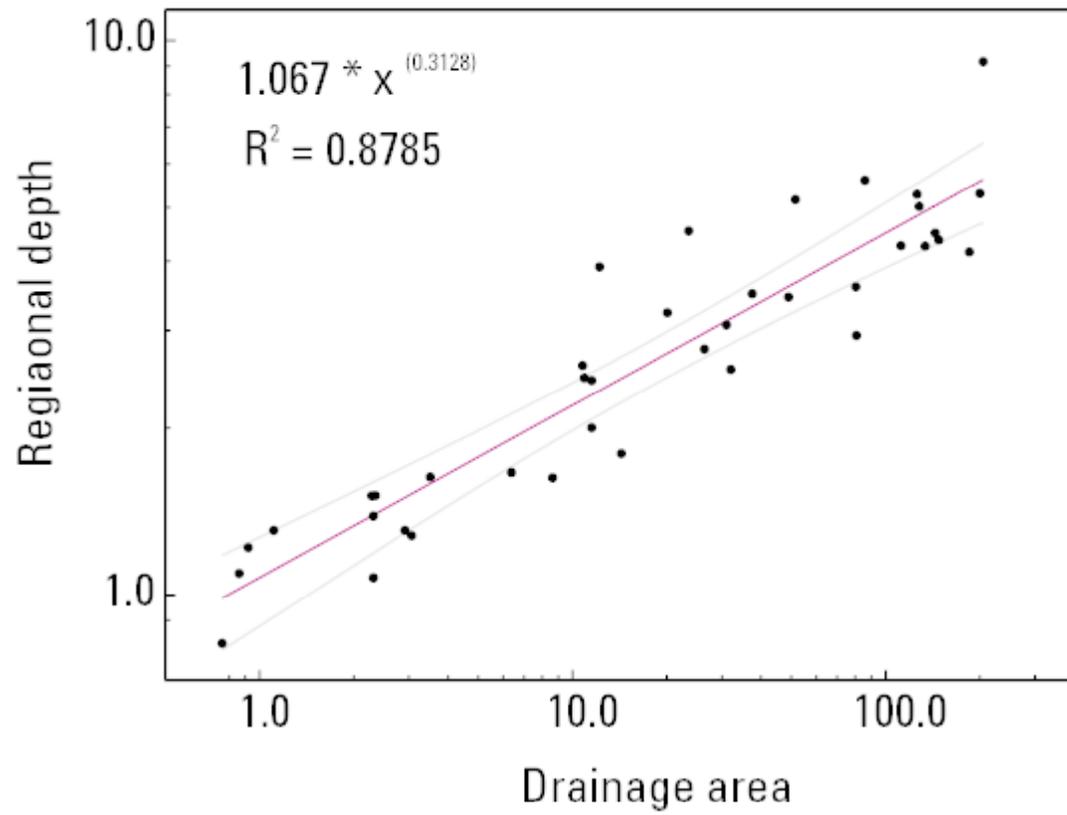
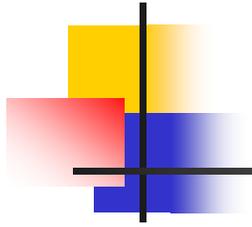




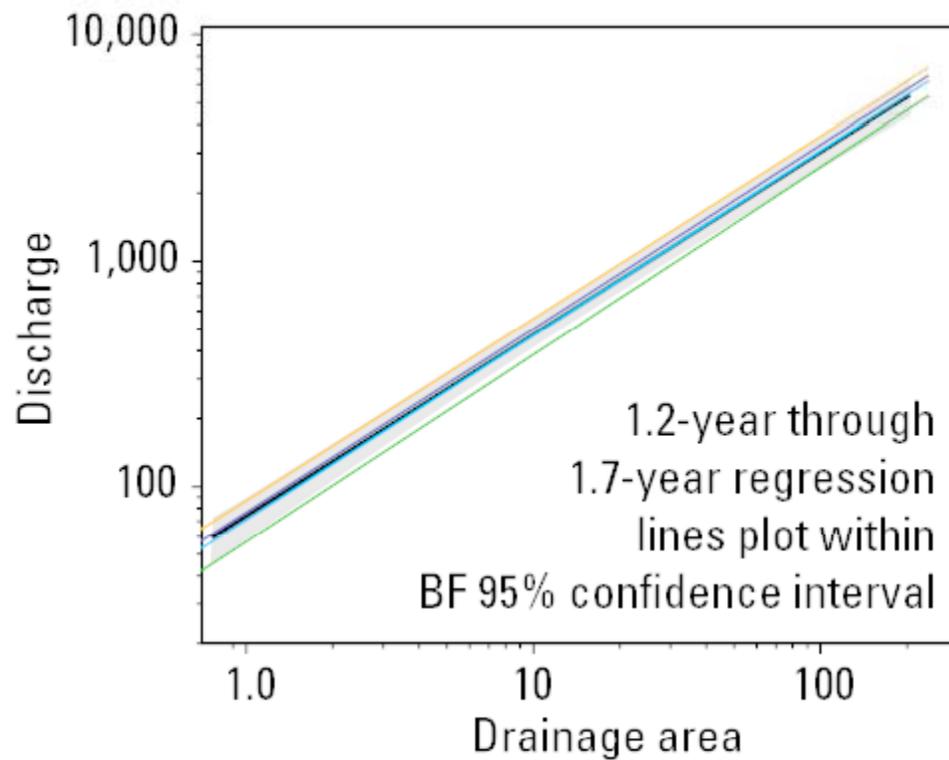
Regional pattern, XS area

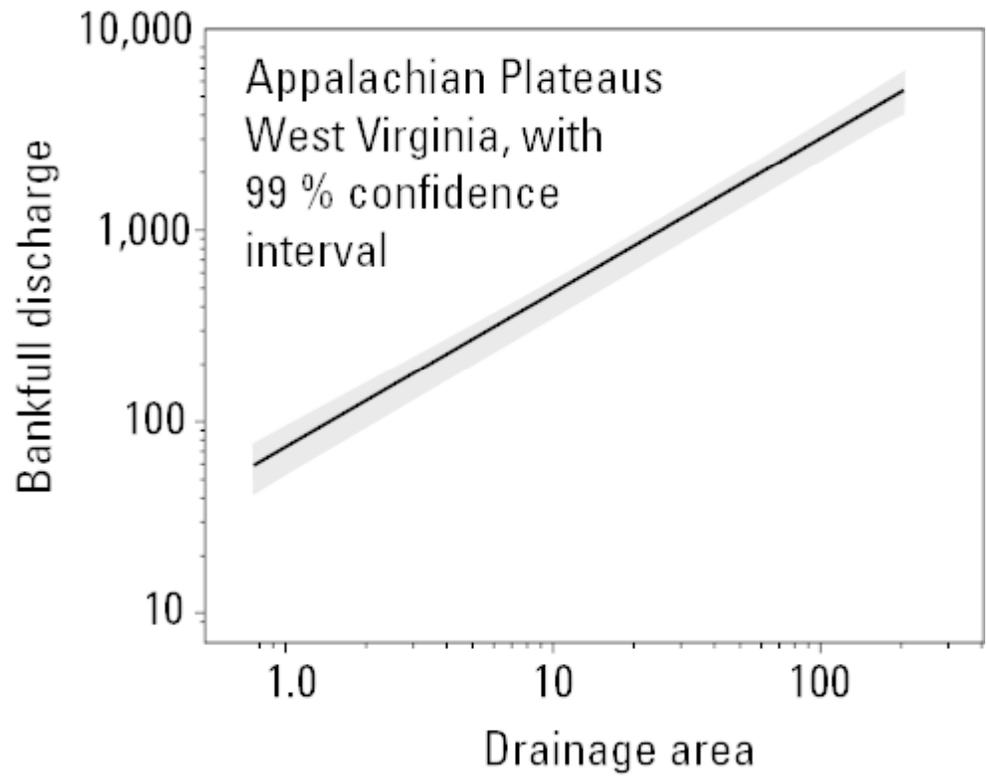
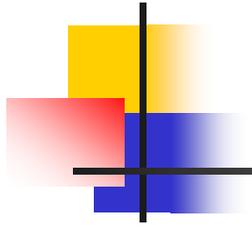


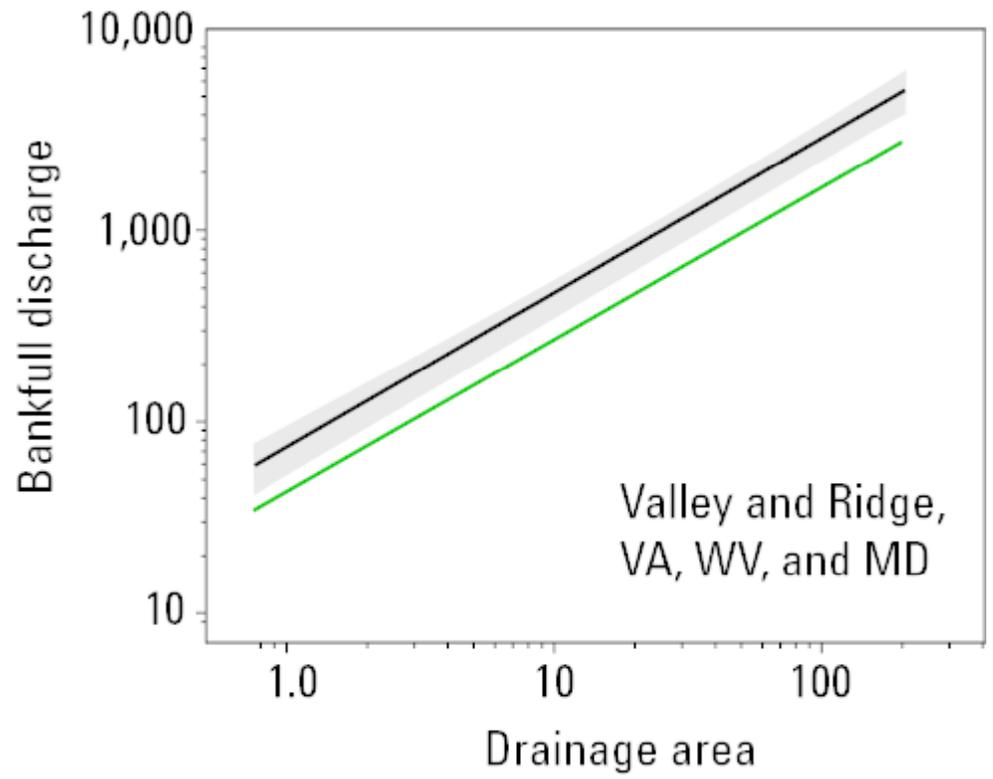
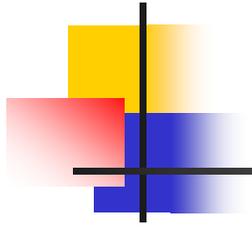


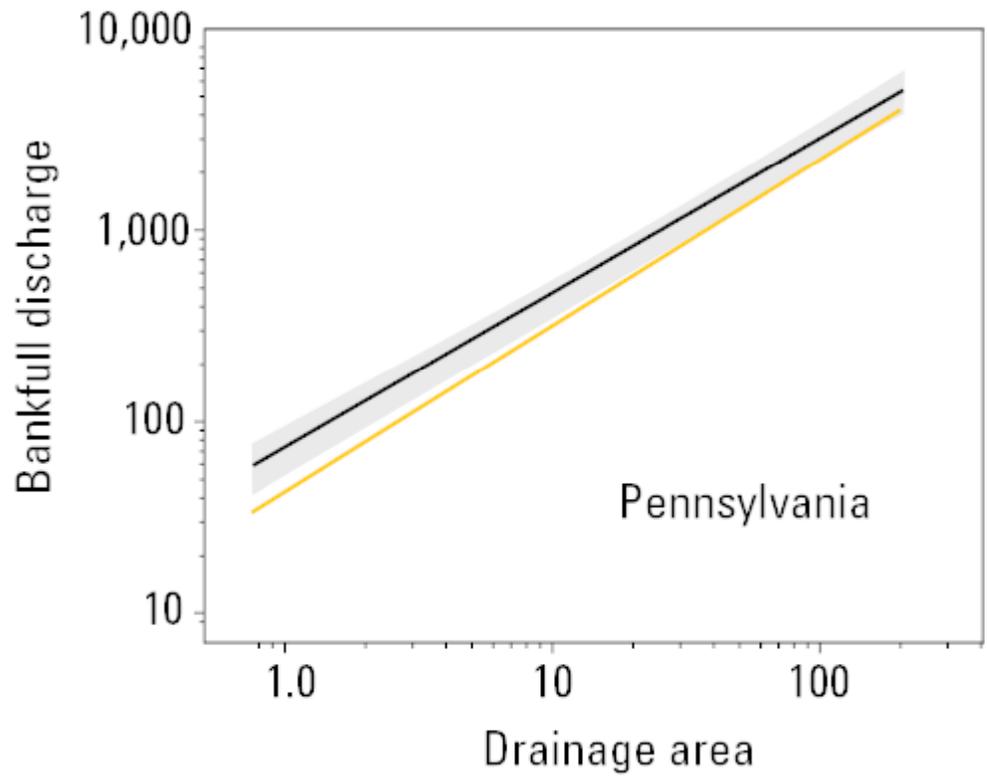
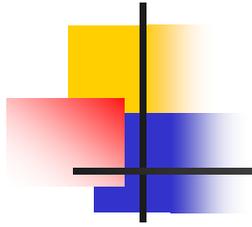


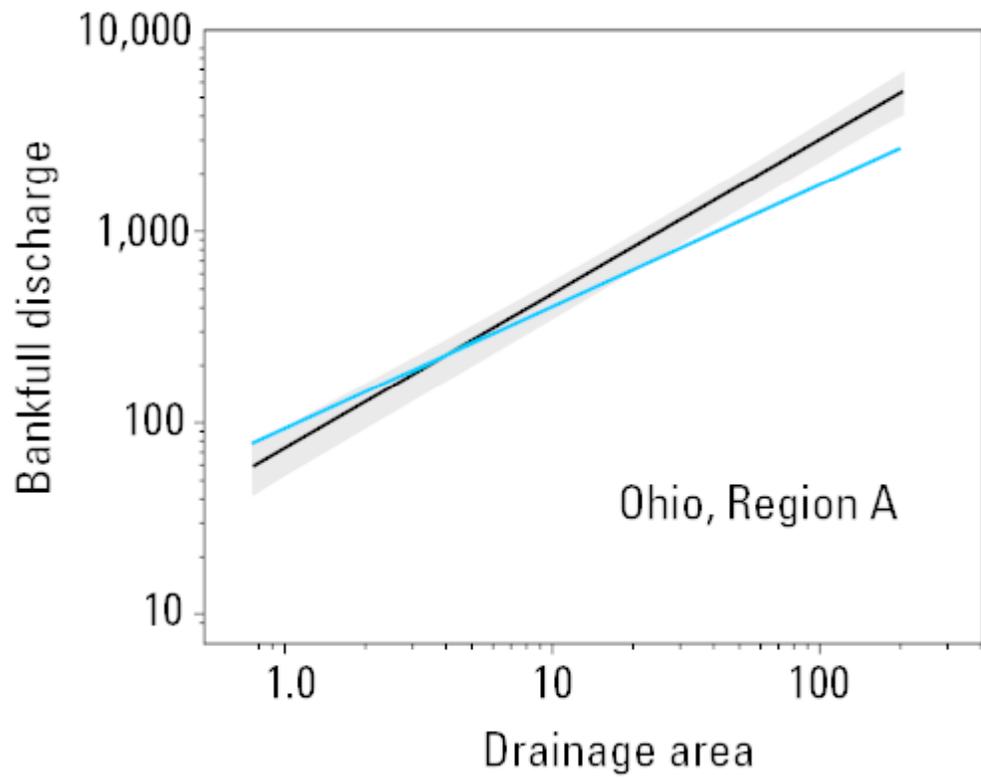
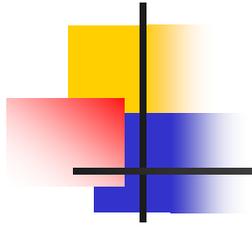
BF flow ~ 1.5-yr RI



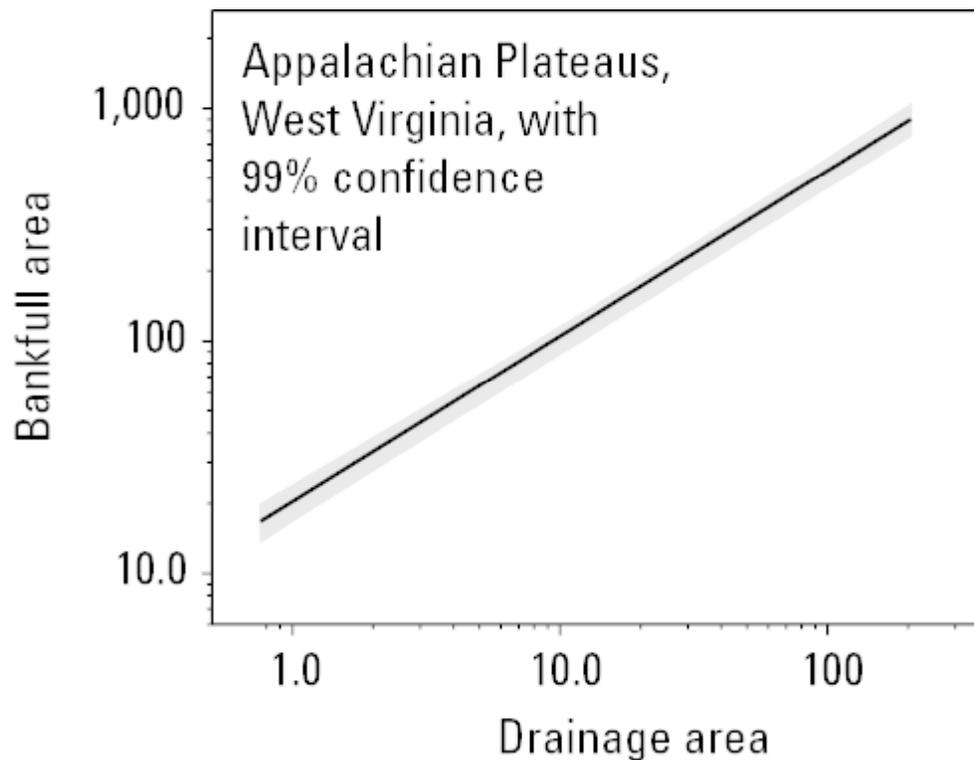


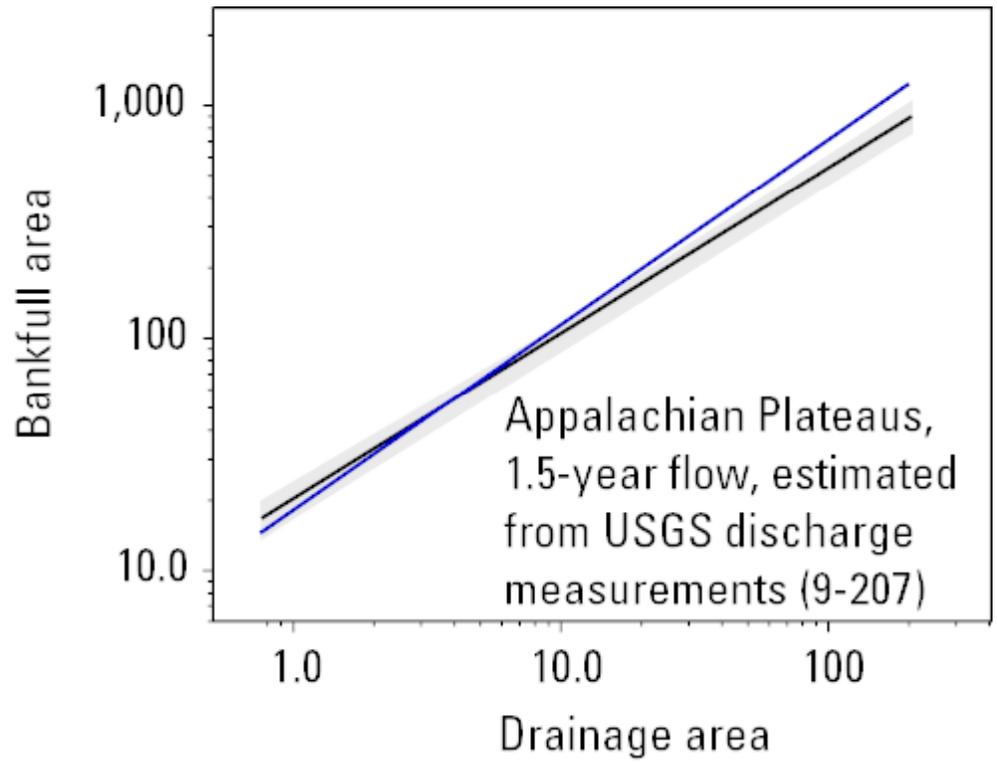
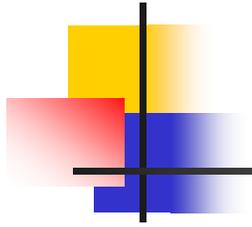


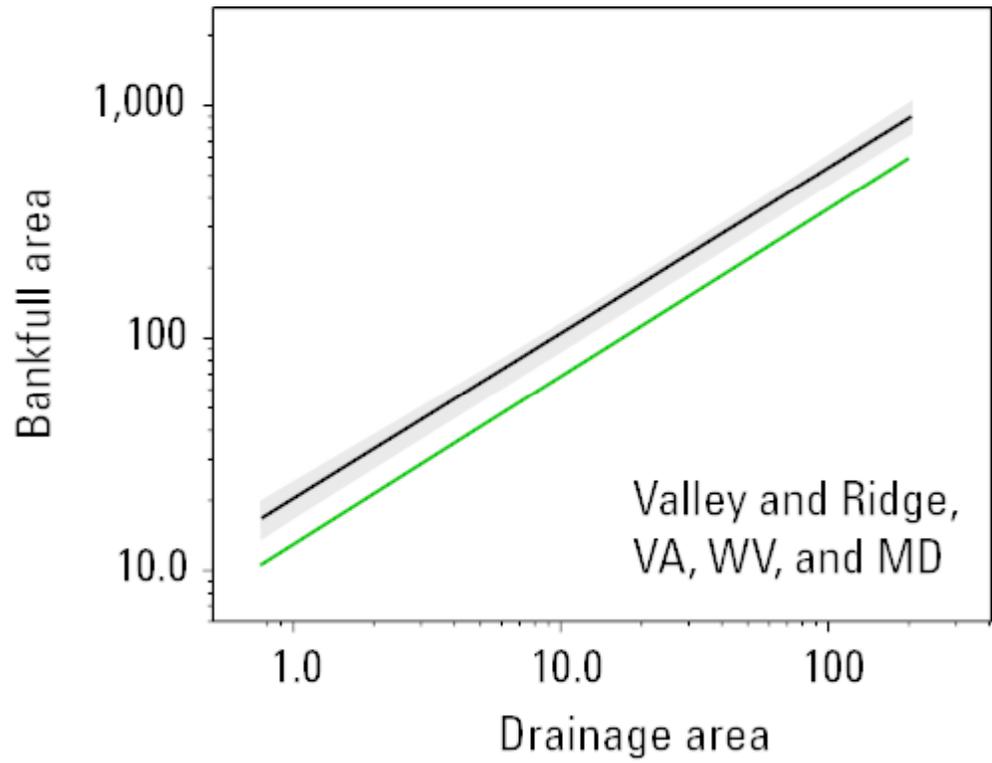
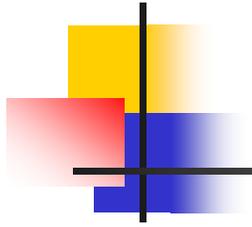


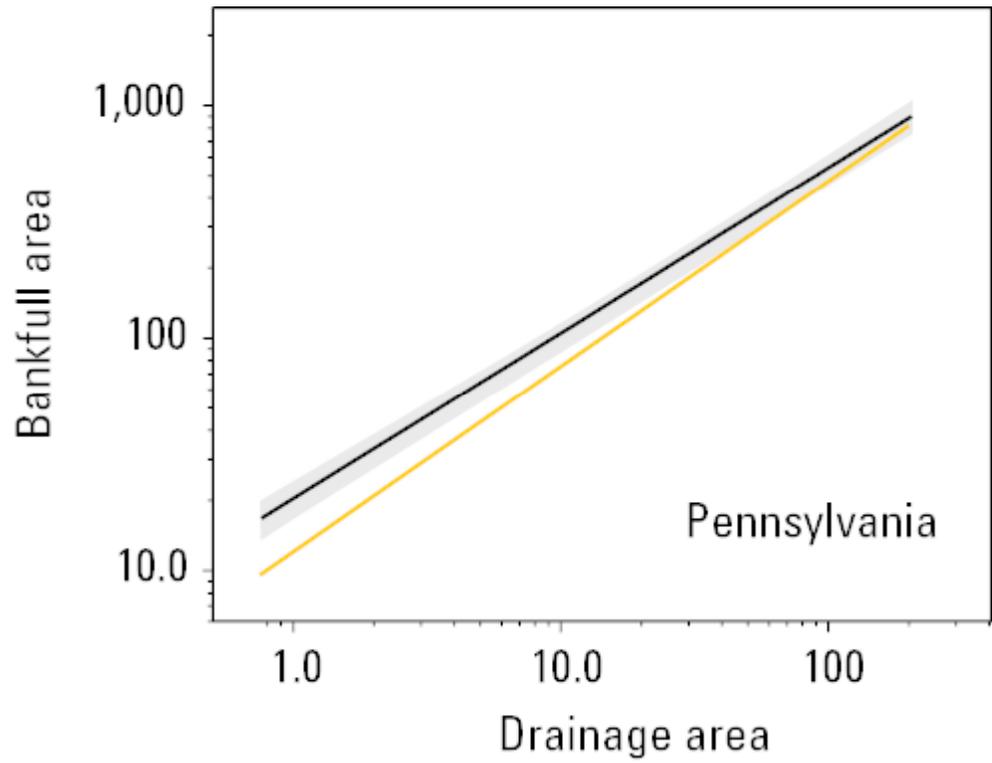
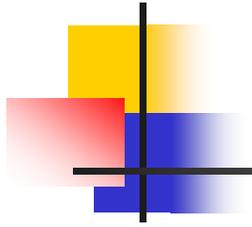


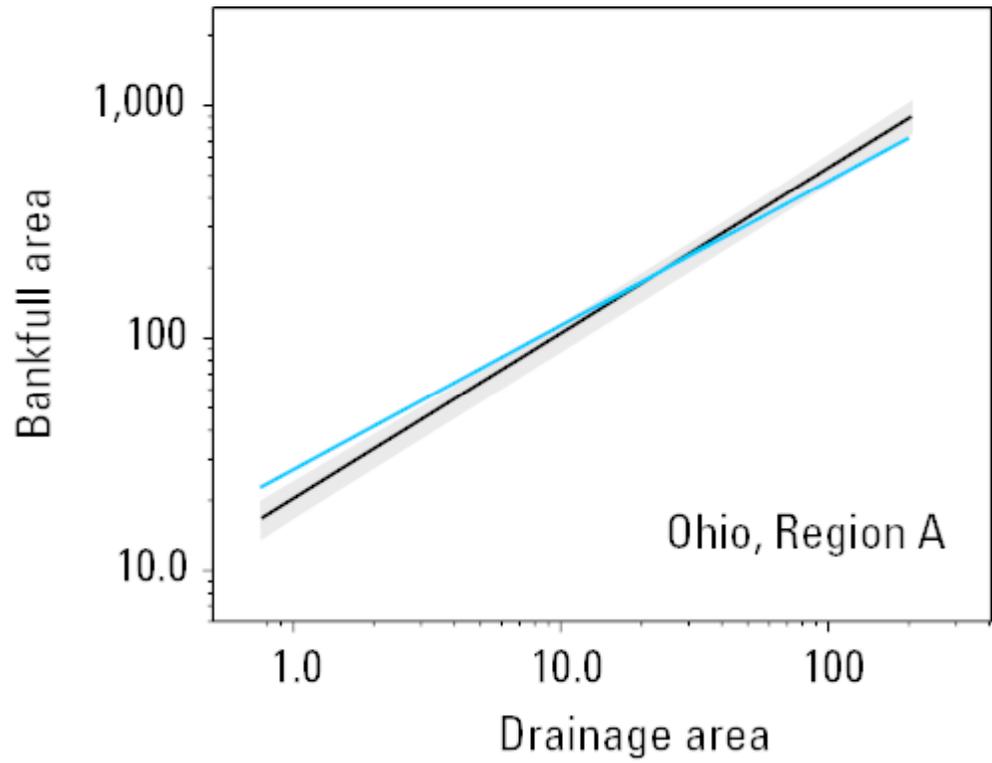
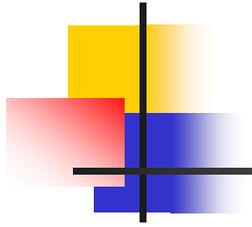
BF area: similar relations to adjacent regions

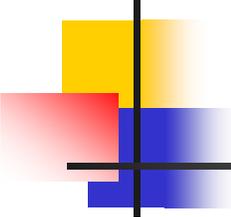






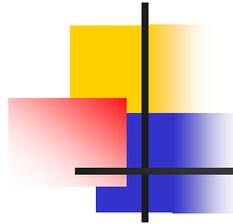






Project status:

- Analysis mostly done, first draft in progress
- Scheduled & on track for late fall publication



Questions?
