CHANGES IN FLOOD CHARACTERISTICS AFTER A MAJOR EVENT: RE-EVALUATING THE EFFECT OF HURRICANE FLOYD ON FUTURE FLOOD RESPONSE

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Outline

- Immediate Impacts/Measures of Floyd
- Led to monitoring, modeling and policy changes
- Despite Urbanization, a relatively underdeveloped and unregulated watershed
- Generally know large floods can alter flood characteristics
- 10 years later allows a quantitative look at this

Immediate Effects of Floyd

- Historic flood heights
- Flood water estimated at 95% Pamlico Sound volume (Bales, 2003)
- Many location

exceeded 24hr, 100 year rainfall

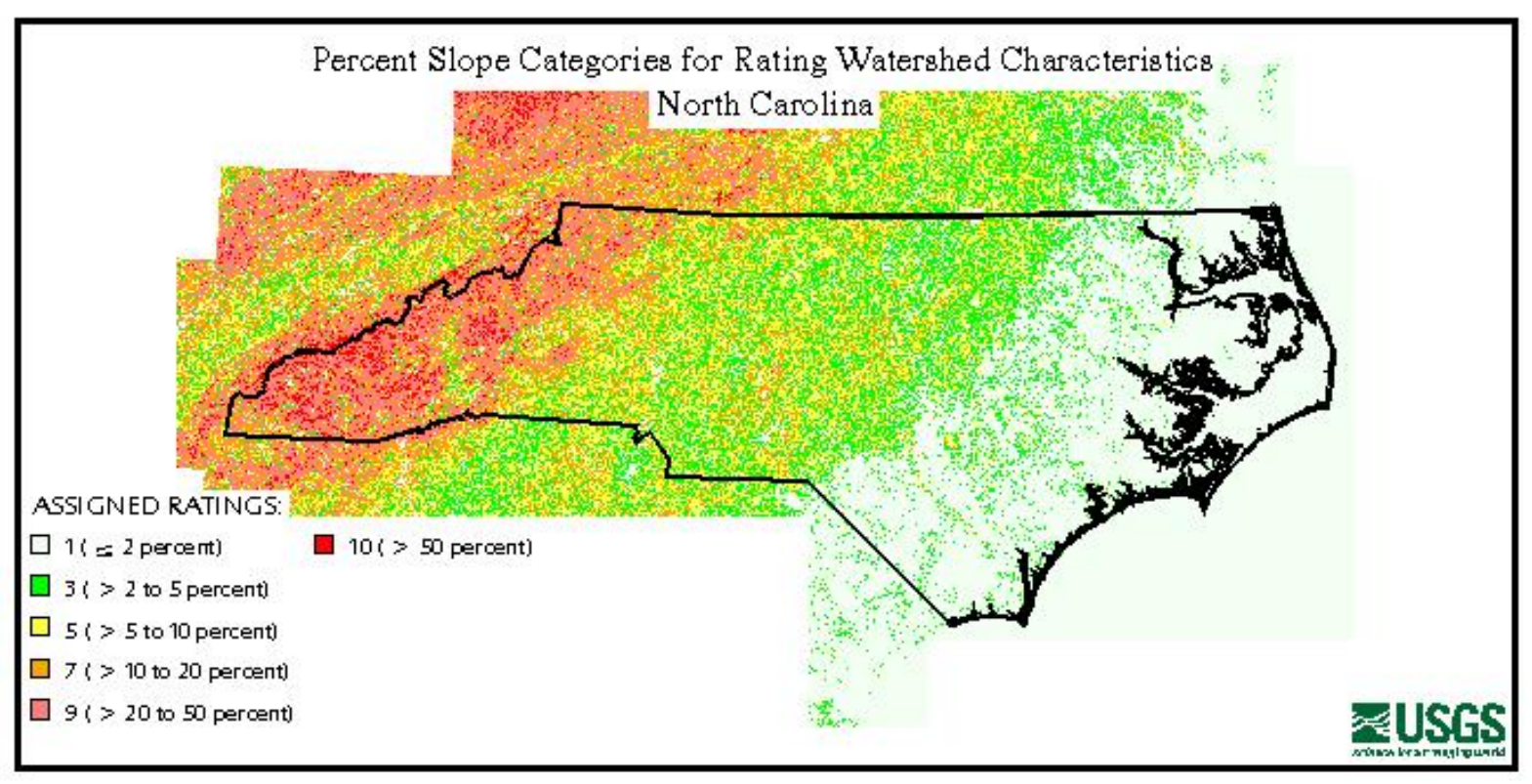
Legacies of Floyd

- North Carolina Flood Mapping Project
- demonstration project under the NWS Advanced Hydrologic Prediction Service (AHPS
- Landmarks and Histories

- Is there a *physical or hydrologic legacy?*

Eastern North Carolina

- Nearly level physiographic area
- Slow surface water (Carbone and Hildore 2008)



Eimers et al, 2000

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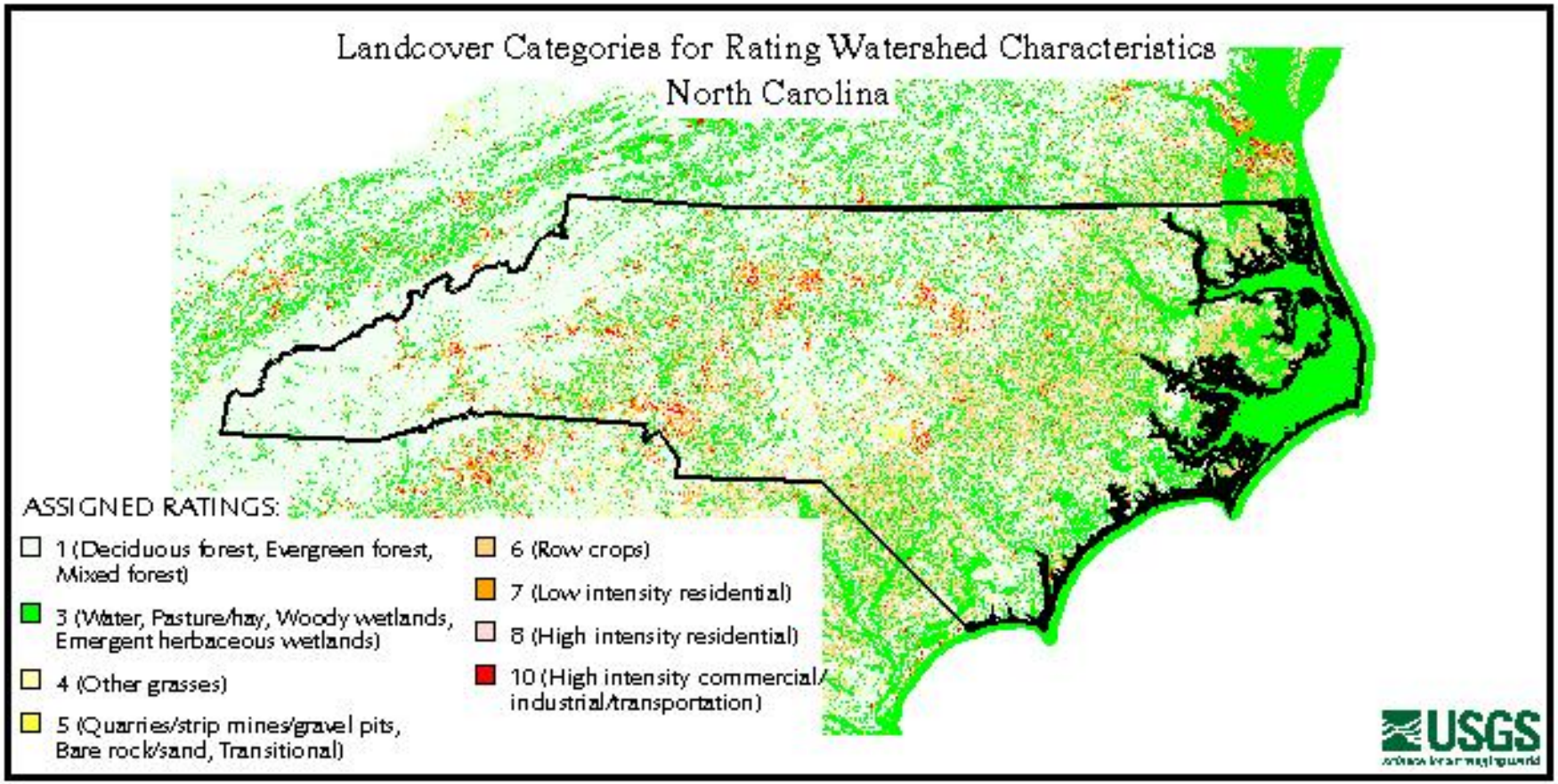

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Channel Characteristics

- Urban Stream System
  - Impervious surfaces cause channelization/incision
- Ditching and Drainage
- Floodplains themselves

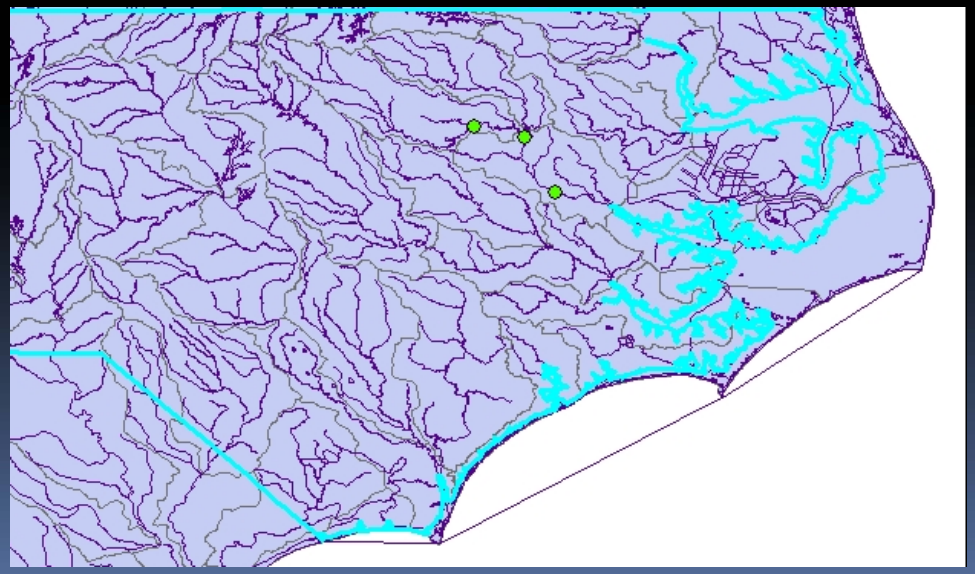
- Did the Hurricane Floyd Flooding change channel characteristics?
  - If so, we should re-evaluate established relationships

Stage – Discharge Relations

- Based on long term monitoring
- Power law curve
  - Breakpoint where disc↑≠ stage ↑
- Established relationships used for flood forecasts and modeling

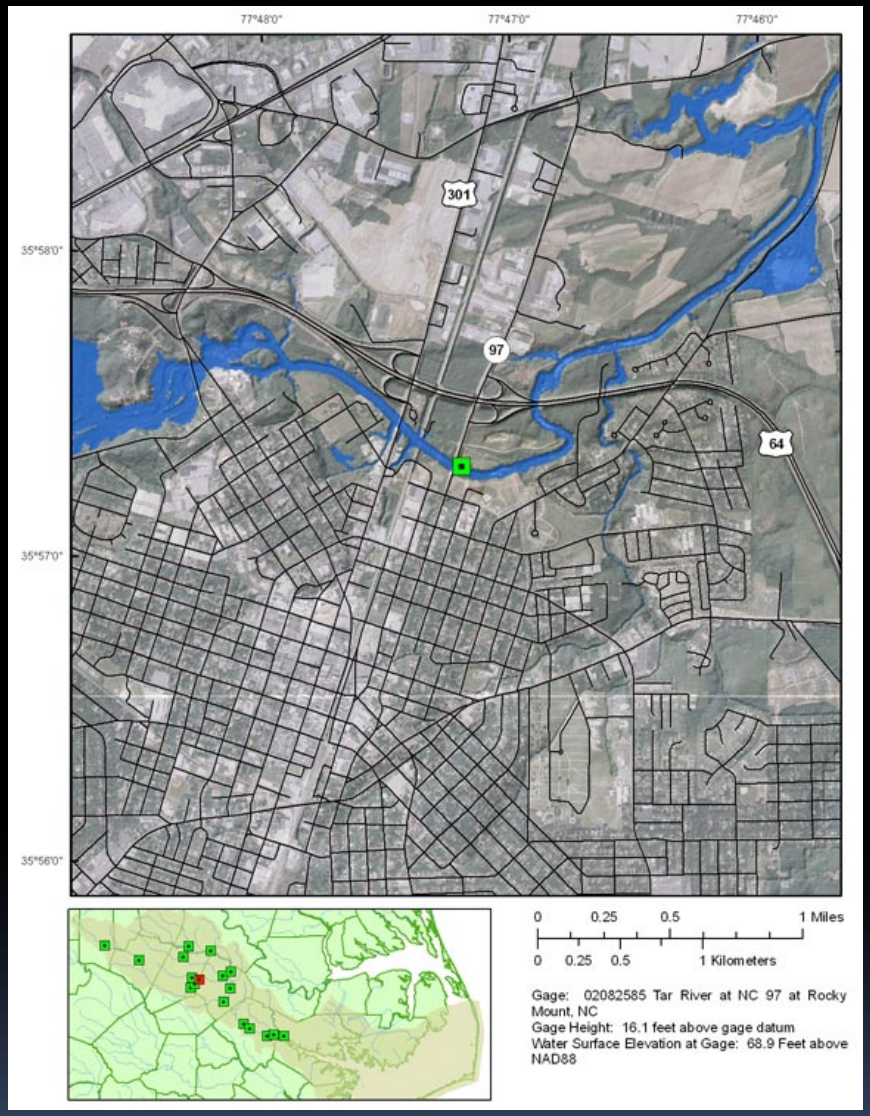
Methods: Examining Relationships

- Three Gage Sites based on NWS flood modeling program
  - Tar River @ Greenville (**USGS 02084000**)
  - Tar River @ NC97, Rocky Mount (**USGS 02082585)**
  - Tar River @ Tarboro (**USGS 02083500**)

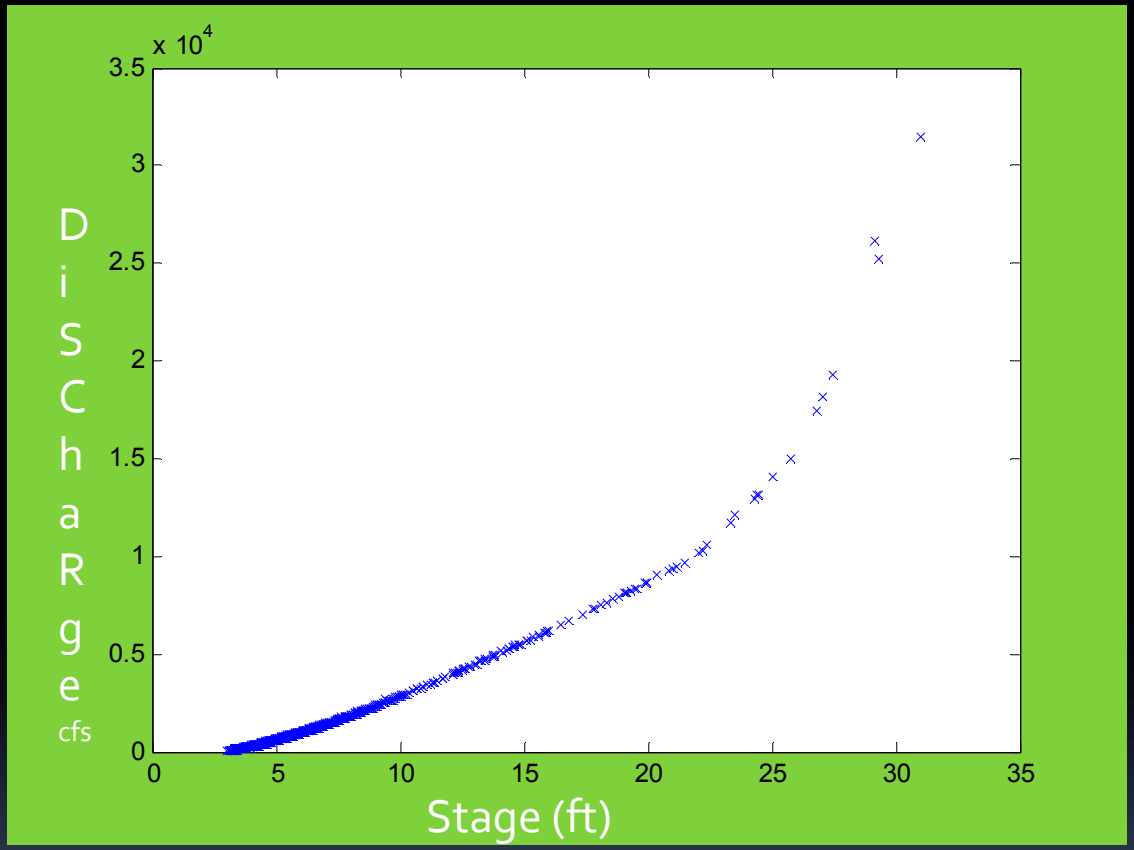


Rocky Mount

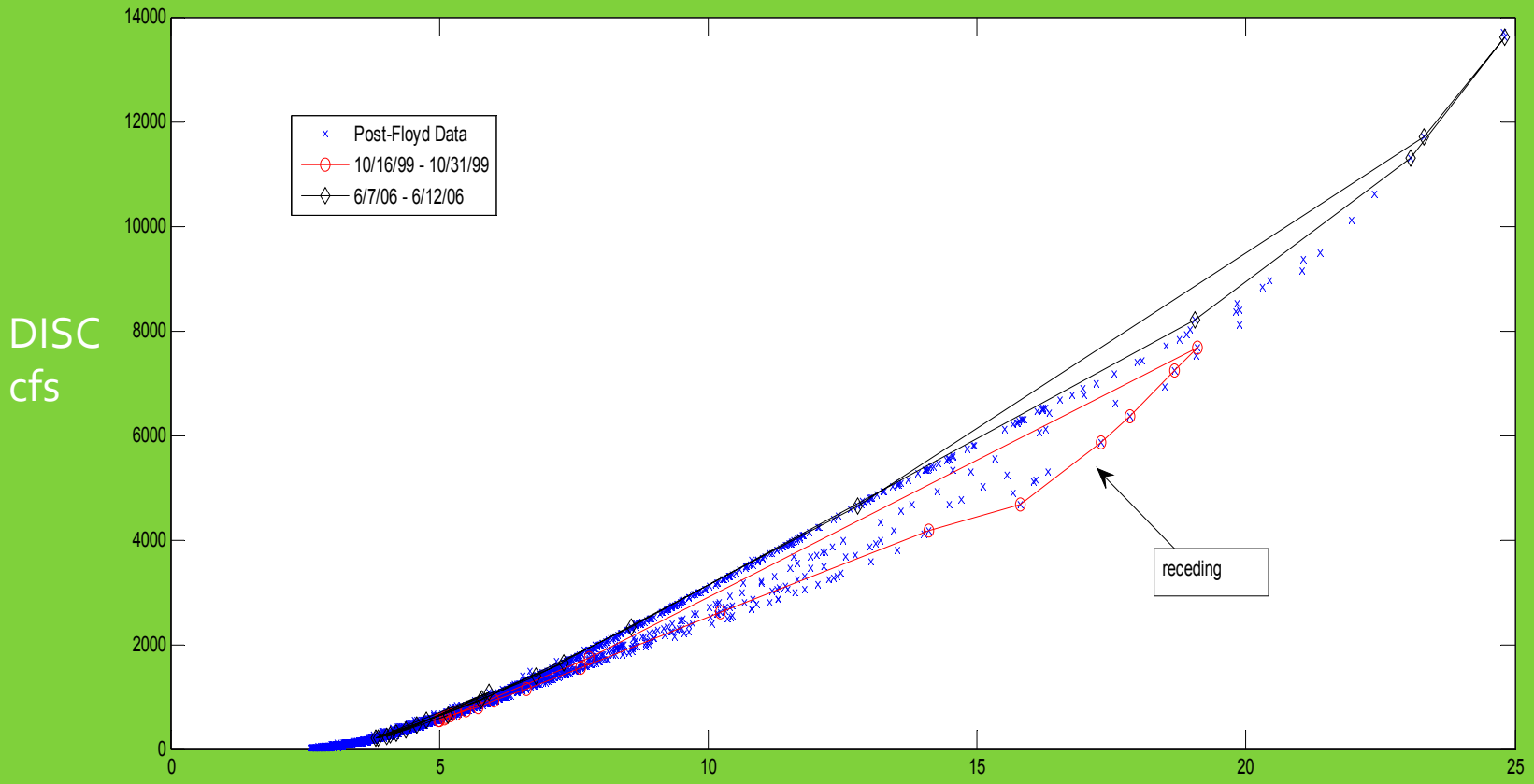
- Upstream of Tar Reservoir (since 60s)
- Inundation model based on gauge height



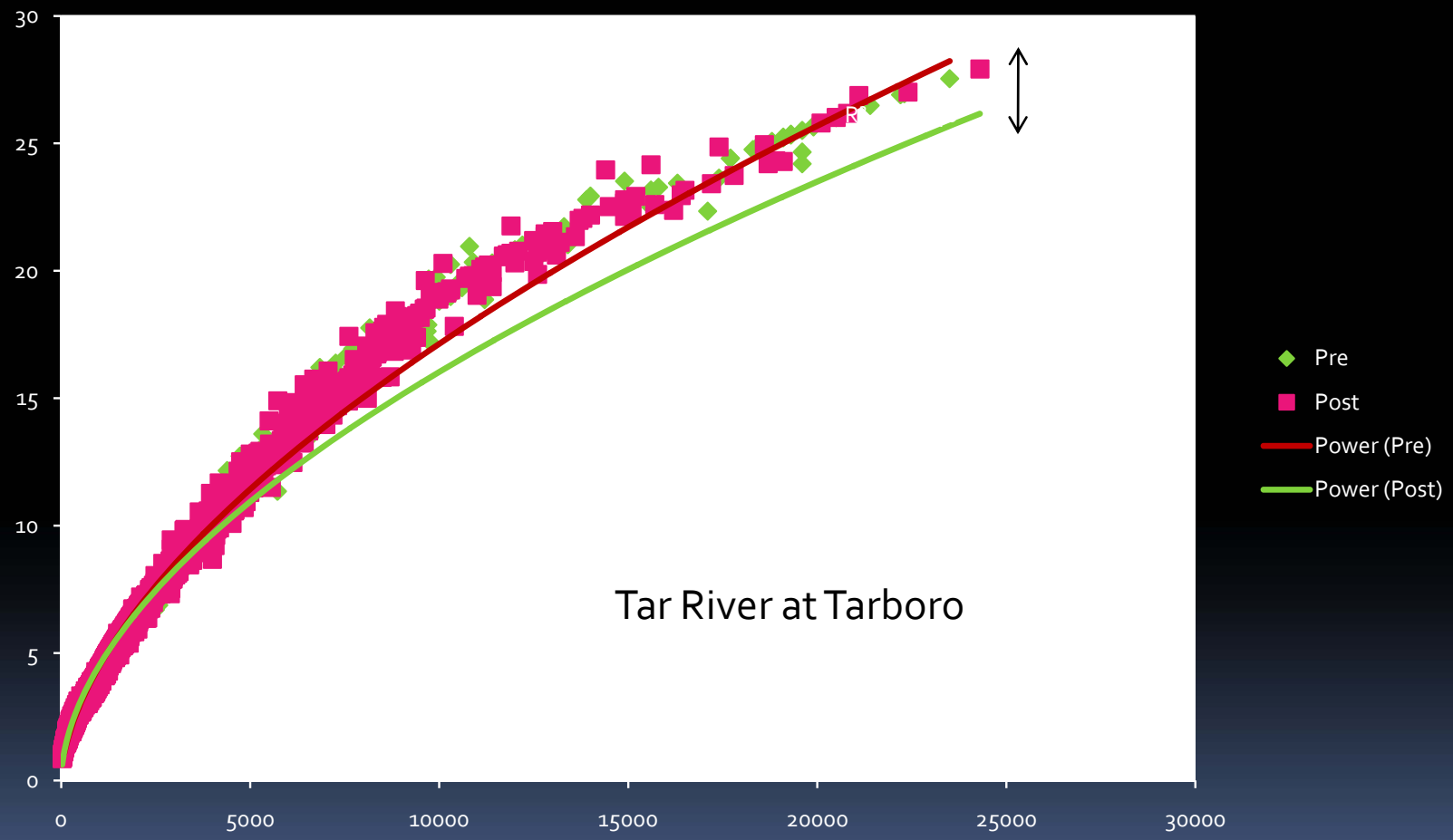
Previous SDC (1993 -pre 9/99)



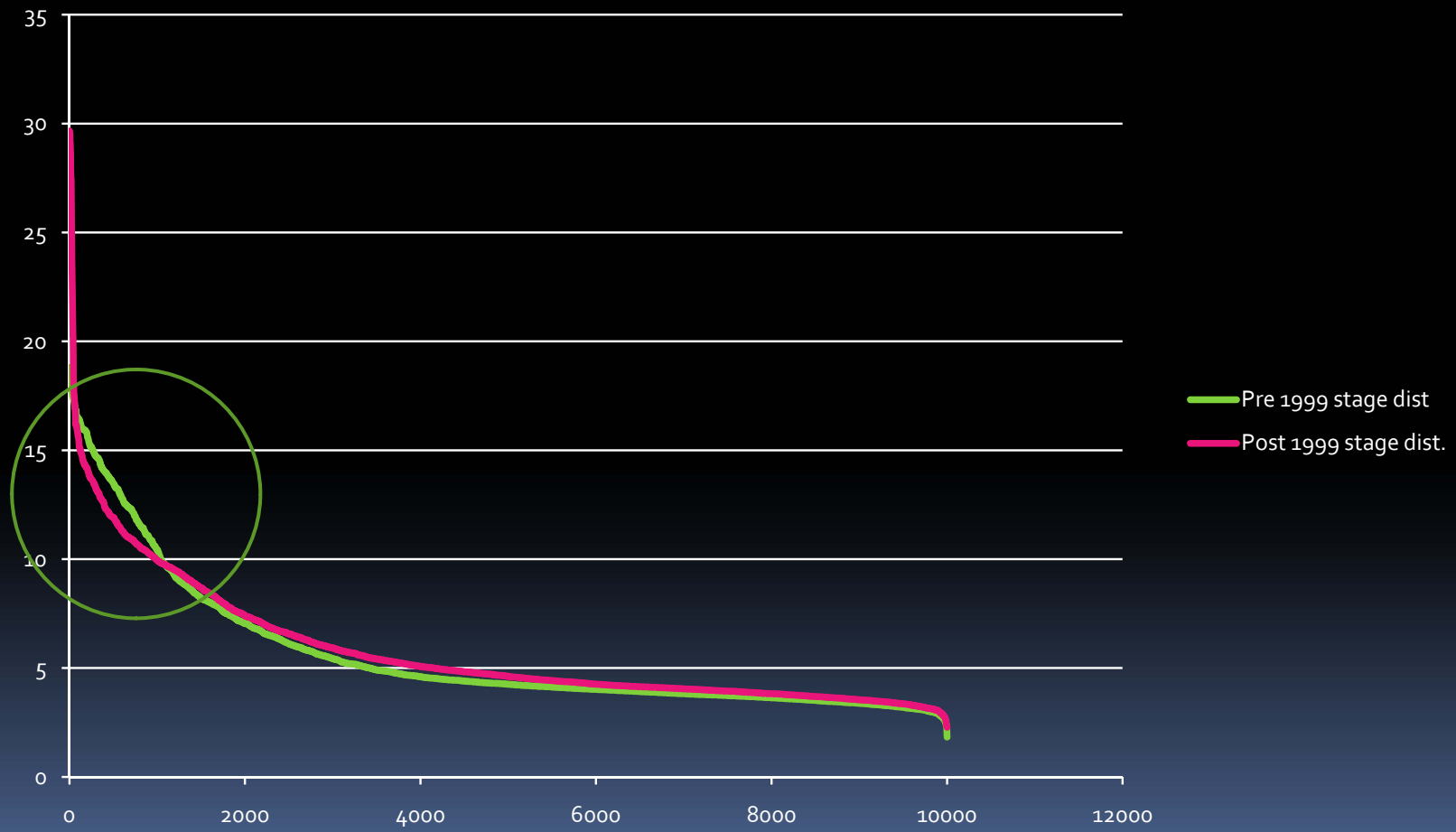
Variations in Stage-Discharge



Stage Discharge Relations



Partial Distribution Series: Greenville Gauge



Suggestive Results in SDC

- Rocky Mount SDC shows:
  - Variability
  - Possible hysteresis
    - Moderate rises vs. Extreme rises
- Tarboro/Greenville Gauges not as different
- Greenville PDS shows decrease in occurrence of moderate stage levels