The Performance of Retention Ponds and the Associated Fluvial Geomorphology

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The Plan:

Part I -Hydrology of Mulberry Place -Conclusions on Performance -Comparison to a "Pristine Stream"

Part II -Stream cross sections methods -Qualitative comparison -Data analysis -Conclusions



Retention Study Sites



Welcome To Mulberry Place



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-Matching postdevelopment peak flows to pre-development peak flows

-Retention Time

-Runoff coefficient

-Comparison to Pristine







Peak Outflows





Comparison to a Pristine Stream





Conclusions:

-Runoff Coefficient:

All storm events fall below the estimated runoff coefficient -Retention Time: No storms held for 24 hours, although most, moderate

No storms held for 24 hours, although most moderate sized up to the 1-yr 24 hours storm are held for around half a day -Peak Outflow:



Generally is below expected, minus one extreme. Need larger storms.

-Return to pristine, pre-developed state:

Volume of flow and peak flow significantly greater

The Geomorphic Effects on Streams Associated with Retention Ponds

Questions:

Do stream cross sections have noticeable changes upstream and downstream from a retention pond?
How do cross sections associated with retention ponds compare to pristine streams of comparable drainage areas?





Data Collection

- Leveled cross-sectional transects of the streams
- Vertical summing of the "slices" = area
- Calculation of a suite of measurements



Ironbound Upstream





Future Research

- Statistical analysis of my data set
- Collaborate geomorphic research with stream ecology, and water quality research for a macrocosmic look at the effects of Retention Ponds and the health of associated streams
- Look closer at certain downstream characteristics in comparison to upstream:
 - undercutting (take horizontal measurements into account)
 - type of sediment
 - -scour vs. depositional areas
 - -bank failure



Conclusions

In all sets of data, -slopes of bank -area -width to depth ratios, downstream sections are not as extreme as upstream, but still are not comparable to pristine conditions.



Thank You

Greg Hancock (advisor) and the "Storm Team," Lauren Hallett Emily Hathaway Brent Vickery Aigler





