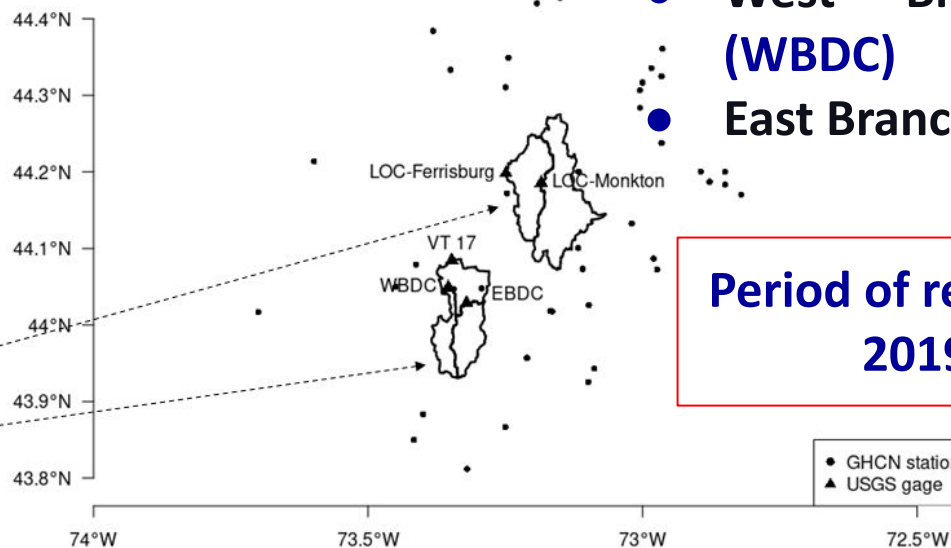
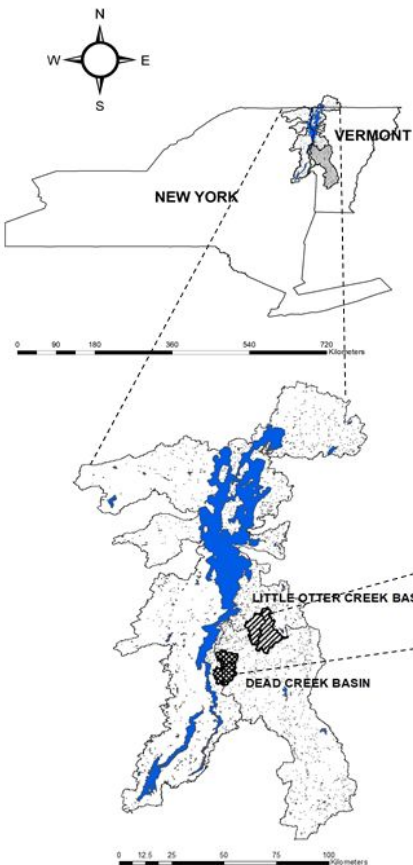


Watershed Model Parameter Estimation in Low Data Environments

Roja Kaveh Garna ¹, Daniel Fuka ¹, Joshua W. Faulkner ², Robin R. White ³, Elyce Buell¹, Sabrina Mehzabin ¹, Binyam W. Asfaw ¹, Barbara dos Reis ³, Amy S. Collick ⁴, Zachary M. Easton ¹

¹ Biological Systems Engineering, Virginia Tech; ² Extension Center for Sustainable Agriculture, University of Vermont; ³ Department of Animal and Poultry Science, Virginia Tech; ⁴ Agricultural Science, Morehead State University

Overview



- Little Otter Creek-Monkton (LOC-Monkton)
- West Branch Dead Creek (WBDC)
- East Branch Dead Creek (EBDC)

Period of record for streamflow:
2019-09 to 2021-11

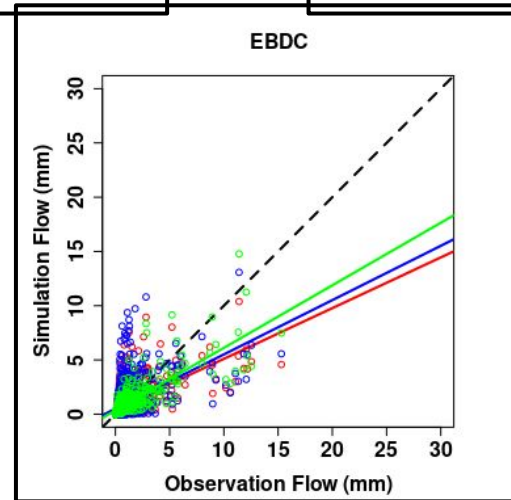
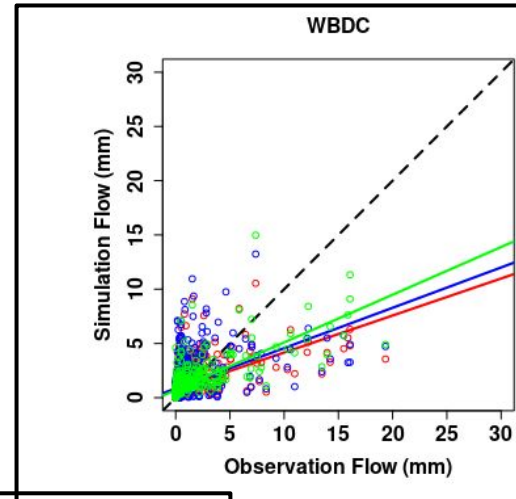
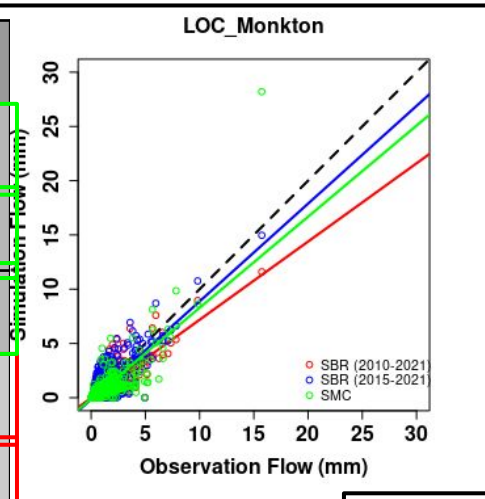
Model Calibration?

Calibration Results


| Source | Depth (mm) | AW (mm/mm) | Ksat (mm/hr) |
|--------------------|------------------------|------------|--------------|
| SBR (2010-2021) | 892-1270 | 0.19-0.31 | 20-38 |
| SBR (2015-2021) | 765-1089 | 0.19-0.30 | 19-35 |
| SMC | 2490-3545 | 0.22-0.30 | 5-9 |
| Field measurements | Mostly down to 3000mm+ | 0.24 | Very low |

SMC outperforms the SBR (traditional regionalization) method.

| | Watershed | NSE |
|------------------|-------------|------|
| SMC | LOC_Monkton | 0.52 |
| | WBDC | 0.49 |
| | EBDC | 0.60 |
| SBR 2010-2021 | LOC_Monkton | 0.57 |
| | WBDC | 0.25 |
| | EBDC | 0.29 |
| SBR 2015-2021 | LOC_Monkton | 0.60 |
| | WBDC | 0.04 |
| | EBDC | 0.01 |



Discussion

- SMC  better capturing of characteristics and parameter estimation of the regions
- Higher NSE values (2 out of 3) than regionalization method
- No need for the Donor watershed
- Applicable?
 - Most watersheds are not monitored, so this allows a quick install of several basins with much less history needed