



KU

Stream Network Spatiotemporal Connectivity at Konza Prairie, KS

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Questions: What patterns are evident in a high-spatiotemporal record of connectivity in an intermittent watershed? Are flow intermittency metrics related to watershed physiographic metrics?

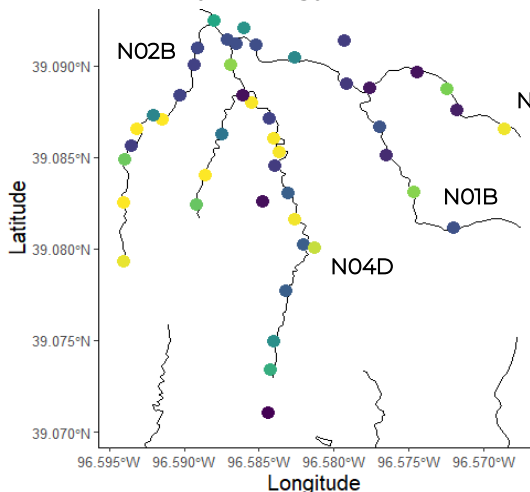


Fig 1: Map of STIC locations by wet duration

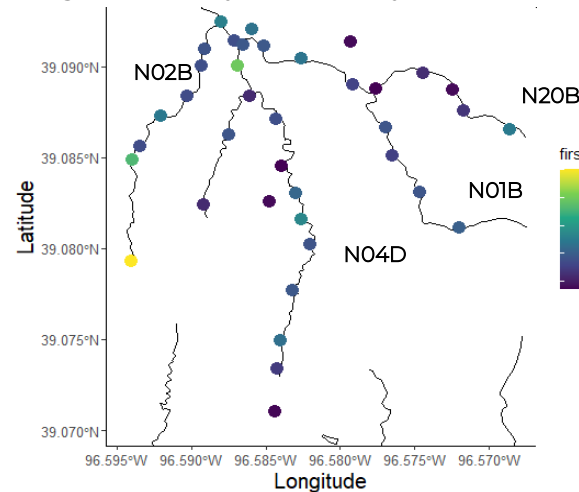


Fig 2: Map of high STIC locations by date of first drying (day of year). June 1 = day of year 152, Sept 1 = day of year 244.



Fig 6: STIC logger deployed in the field, summer 2021

Take Home Messages

1. Subwatersheds at Konza do not dry from top to bottom
2. Watershed area and TWI do not predict flow duration or drying

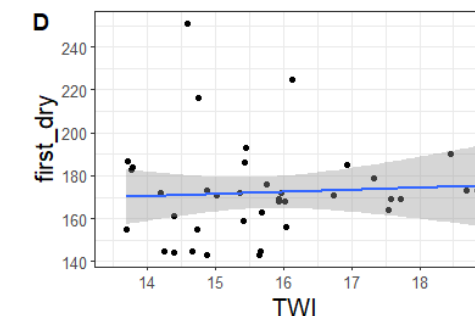
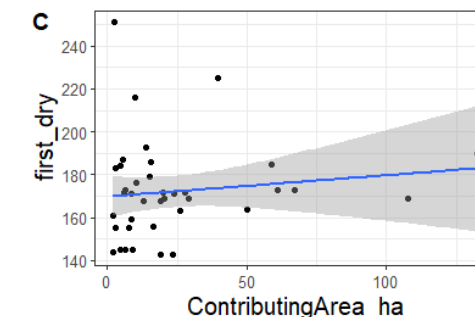
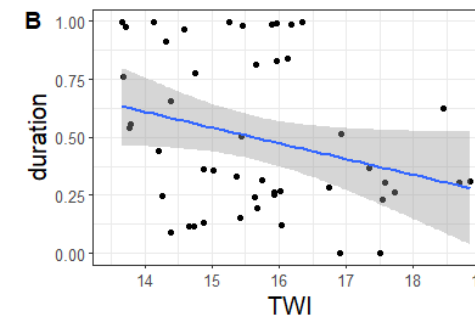
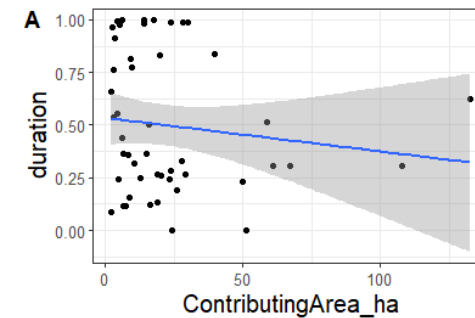


Fig 3: Plots of topographic wetness index (TWI) and drainage area (in hectares) versus flow duration for each sensor and date of first drying

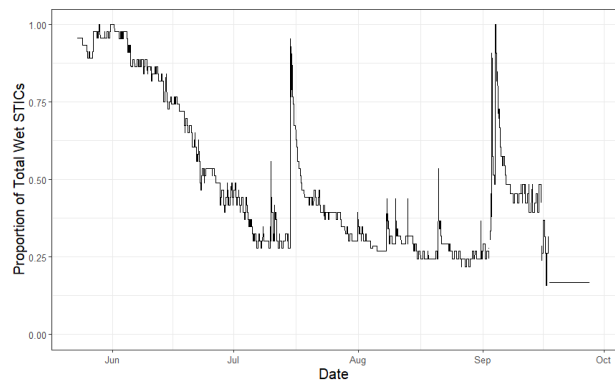


Fig 5: Time series of the proportion of all STICs showing wet readings

Background

- Konza Prairie LTER (1980)
- Subsurface characterized by merokarst terrain (complex lateral and vertical flow system)
- Site comprised of multiple subwatersheds with differing burn frequencies

Methods

- Field site instrumented with STIC loggers in May 2021
- Data downloaded in Sept
- Relative conductivity used to generate binary wet/dry dataset
- Additional metrics: flow duration for each logger, date of first drying, proportion of total STICS wet

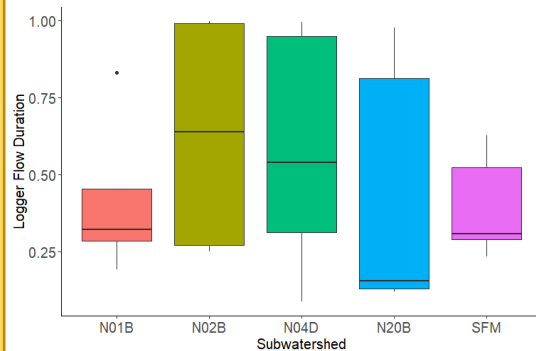


Fig 4: Boxplot of flow durations grouped by watershed

Conclusions and Future Work

- STIC locations close to the watershed outlet generally show lower durations than those at the middle or top
- Watershed with 20-year burn frequency (N20B) shows lower durations
- Relationships between these metrics versus watershed area and TWI are still unclear but appear contrary to hypothesized relationships
- Future work will incorporate measurements groundwater dynamics and potential subsurface connectivity