Figure 1

Map of sampling locations along the natural precipitation gradient in South-Central Texas.

10 USGS gaged Streams were sampled in the Spring of 2017. An annual precipitation overlay indicate that the sample sites span a gradient from 61 cm/yr in the Southwest to 121 cm/yr in the Northeast.

Figure 2

Regression analysis of diversity along a precipitation gradient.

Strongest relationships between environmental variables and (a-c) Annual Precipitation, (d-h) Fish Shannon Index, (i-j) Invertebrate Shannon Index, (k-l) Invertebrate Shannon Index. Fish diversity increases with increasing precipitation and Forested Riparian. Fish diversity decreases as NH4+ increases. Invertebrate diversity correlates negatively with Low Flow (LFPP). The second order polynomial fails to corroborate visual identification of a local maximum of macroinvertebrate diversity in the climate transition-zone. Conductivity, Surface Runoff, and Potential Evapotranspiration covary with precipitation and fish diversity. Slope, R^2, F-statistics, and *p*-values are reported in Appendix-regression.

Figure 3

NMDS of (a) fish communities and (b) invertebrate communities.

Sites are grouped by precipitation regime; Semi-Arid (yellow), Mesic (green), and Sub-Humid (blue). Arrows indicate the strongest fitted environmental variables (p-value < 0.1) with length and direction corresponding to explanatory power. Semi-arid communities are dominated by livebearers and snails. Mesic and Sub-Humid communities contain a variety of sunfish, mayfly, caddisfly, true-bug, and beetle taxa. Sub-Humid communities contain different species of mayfly, caddisfly, true-bug, and beetle, but uniquely contain catfish, shrimp, and dragonfly taxa. Relative Humidity and Low Flow Pulse Percent correlates strongly with variation along the NMDS1, on which community grouping separate.