

LOW FLOW TRENDS AT SOUTHEAST U.S. STREAMFLOW GAGES

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The southeast U.S. is widely perceived as a water rich region, yet recent droughts, highly variable streamflows, and rapidly growing demands for water have revealed vulnerabilities and the potential for widespread water scarcity. Recent studies have shown decreasing trends in low flows at many stream gages across the region, but have failed to identify the causal mechanisms underlying these trends. We describe low flow trend analyses of regional stream gage records in the southeast U.S. to assess water availability for multiple uses including thermoelectric power production. Low flows in gage records are quantified as the annual minimum 7-day mean streamflow. Statistical analyses, including the Mann-Kendall, Pettitt, and Ljung-Box tests are used to assess monotonic trends, the presence of abrupt shifts in data, and autocorrelation, respectively. We compare our results with other studies assessing trends in low flows and perform type II error analysis to quantify the likelihood of erroneously declaring stationarity in low flows. A type II error analysis is of particular importance when the consequence of missing an effect in the presence of one, results in under-preparedness for future changes in water availability. Further, we present preliminary findings of an investigation into potential drivers of trends in low flows across varying spatial and temporal scales. Trends in streamflow reflect interactions among climatic cycles, land use, flow regulation, and groundwater withdrawals.

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