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# A Hydroclimatological Assessment of Regional Drought Vulnerability: A Case Study of Indiana Droughts

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**ABSTRACT:** Characterizing and developing drought climatology continues to be a challenging problem. As decision makers seek guidance on water management strategies, there is a need for assessing the performance of drought indices. This requires the adaptation of appropriate drought indices that aid in monitoring droughts and hydrological vulnerability on a regional scale. This study aims to assist the process of developing a statewide water shortage and assessment plan (WSP) for the state of Indiana by conducting a focused hydroclimatological assessment of drought variability. Drought climatology was assessed using in situ observations and regional reanalysis data. A summary of precipitation and evaporation trends, estimated drought variability, worst-case drought scenarios, drought return period, and frequency and duration was undertaken, using multiple drought indices and streamflow analysis. Results indicated a regional and local variability in drought susceptibility. The worst-case (200-yr return period) prediction showed that Indiana has a 0.5% probability of receiving 45% of normal precipitation over a 12-month drought in any year. Consistent with other studies,

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