VALUE OF ADAPTIVE DROUGHT MANAGEMENT FOR THE ACF RIVER BASIN

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In recent times, severe droughts in the southeast US occur every 6 to 10 years and last for up to 4 years. During such drought episodes, the ACF river basin supplies decline up to 50% of their normal levels, and water stresses increase rather markedly, exacerbating stakeholder anxiety and conflicts. As part of the ACF Stakeholder planning process, GWRI has developed new tools and carried out comprehensive assessments to provide quantitative answers to several important questions related to drought prediction and management: (i) Can drought and other climatic periods be reliably anticipated? What drought indices can support reliable, skillful and long-lead forecasts?(ii) What management objectives can drought/non-drought forecasts benefit? How should benefits/impacts be shared? (iii) What operational adjustments are likely to mitigate stakeholder impacts or increase benefits consistent with stakeholder expectations? Regarding drought prediction, a large number of indices were defined and tested at different basin locations and lag times. These included local/cumulative unimpaired flows (UIFs) at 10 river nodes; Mean Areal Precipitation (MAP); Standard Precipitation Index (SPI); Palmer Drought Severity Index; Palmer Modified Drought Index; Palmer Z-Index; Palmer Hydrologic Drought Severity Index; and Soil Moisture—GWRI watershed model. Our findings show that all ACF sub-basins exhibit good forecast skill throughout the year and with sufficient lead time. Index variables with high explanatory value include: previous UIFs, soil moisture states (generated by the GWRI watershed model), and PDSI.

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