ASSESSING PLANT STRESSES ASSOCIATED WITH THE APPLICATION OF BRACKISH WATER FOR WILDLAND FIRE MANAGEMENT ON CUMBERLAND ISLAND, GA

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Cumberland Island National Seashore (CUIS) manages over 19,000 acres of upland habitat with vegetation communities that are primarily either fire-adapted or fire-dependent. Along with fire ecology, land managers have other considerations that periodically require fire suppression. During peak fire periods, fresh water on the island is typically insufficient or unavailable for fire suppression, and mainland sources are not practical. Helicopters can effectively suppress fires by delivering brackish water from Cumberland Sound, but park managers need additional information to understand impacts on vegetation. A RCBD study with four replicates was initiated on July 7, 2016 to monitor changes in soil pore water electrical conductivity (EC), photosynthetic stress, and soil sodium concerns associated with CUIS wildfire suppression activities. Dielectric probes were installed to monitor pore water EC throughout the study. On Aug 16, brackish water with a salinity of 35.35 psu was collected from Cumberland Sound and applied as spot dump, line holding, trail drop, and control treatments (3, 1, 0.5 and 0 gal ft-2 respectively). An EC value of 3.125 dS m-1 (2 psu) was selected a conservative threshold indicative of saline soils that impair tree growth in southeastern forests. Excluding the untreated control, time required for EC to return below this threshold was 34.9 days, and no treatment differences were found. Quantum yield of photosystem II (Fv/Fm) of leaf tissue in each trt*rep combination was measured on Aug. 16 prior to fire suppression treatments and at the end of the study on Nov.14. No treatment differences were found, and mean Fv/Fm values were 0.72 and 0.71 for Aug and Nov. respectively. Similarly, neither differences in soil sodium concentration, nor sodium adsorption ratio were detected in the 0-15 cm depth for soils sampled on Nov. 14. Future research will investigate long term impacts of brackish water applications on plant communities.

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