Tree Rings as a Potential Monitoring Tool for Saltwater Intrusion

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This project assessed whether slash pine tree (Pinus elliottii) ring growth could be used to track rates of saltwater intrusion. If ring growth of non-halophytic pine trees is impacted by saltwater, then tree rings could be used to track saltwater intrusion since they would have smaller rings. Tree cores were collected at eight sites along a coast-to-inland transect near the Lower Suwannee River. The independent variable was sample site distance from the Gulf of Mexico. The dependent variable was tree ring width. The control group consisted of duplicate cores collected from one tree at each site to determine if ring growth was consistent within individual trees. Tree cores were collected using an increment tree borer, stored and dried in paper straws, mounted on wooden bases, and sanded to increase ring visibility. The cores were scanned, and ring widths were measured using photo-analysis software. The tree ring widths were compared between sites and to extreme high tide events. The hypothesis was supported because tree ring growth declined following extreme high tide events, demonstrating that trees are useful for saltwater intrusion monitoring. After extreme high tide events, ring growth rates declined by more than 40% compared to the average growth of the prior four years. Declines persisted for up to four years. After Hurricane Dennis in 2005, site ring width averages decreased by 46% to 60%. Saltwater intrusion impacts extended 25.6 kilometers inland from the coast. Rainfall was not a statistically significant driver of growth at six of the seven impacted sites.

Awards Won:

Florida Institute of Technology: Full Tuition Presidential Scholarship

University of Arizona: Renewal Tuition Scholarship