COOPERATIVE ECOSYSTEM STUDIES UNITS
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CESU Final Report Summary for
Surface-groundwater Interactions in Everglades Tree Islands - *W912HZ-10-2-0046*

Purpose: In the Everglades, tree islands are considered characteristic of the ecological "health" of the landscape. Phosphorus (P) levels in upland tree island soils are >100 times higher than P in adjacent marsh soils. Tree islands are hypothesized to be an active sink of P in the landscape contributing to the P balance of Everglades slough wetlands. This project was developed to compare hydraulic and hydrogeochemical patterns at multiple temporal and spatial scales of four Everglades tree islands in the Water Conservation Areas (WCA) and in Everglades National Park (ENP): wet, intact (3AS3-WCA3A); wet, degraded (Ghost Island-WCA3A); dry, intact (Satin Leaf-ENP); and dry, degraded (Twin Heads-WCA3B). The objectives of this project were to: 1) install wells on Twin Heads, 3AS3, and Satin Leaf tree islands, 2) monitor water levels, 3) collect water and plant tissue for laboratory analysis, and 4) prepare report describing a) initial findings which tests the predictions of the FNR and chemohydrodynamic models, b) recommendations for continued monitoring plan design, and c) the integration of the results with evaluation tools or tree island performance measures currently under development by RECOVER.

Location: Everglades National Park, Florida.

Methods: Our study was conducted in four tree islands in the southern Water Conservation Areas 3A (WCA 3A), 3-B (WCA 3B) and Everglades National Park in the Florida Everglades. Due to funding constraints, the sampling design selected was one that would provide the minimum level of information necessary to characterize variation in plant community hydrology and plant-water interactions. Precipitation and potential evapotranspiration (PET) data were obtained from a weather station operated by the South Florida Water Management District. Wells were installed on each tree island for hydraulic characterization and hydrogeochemical sampling was conducted. Water, stem and leaf tissue isotypes were characterized and soil cores were collected for phosphorus content.

Results: The project demonstrates that ET, soil water dissolved P and ion concentrations of plant stems and water sources are key indicators of healthy tree island function, but also provided new information on how these parameters could be applied and monitored as performance measures. Future monitoring should: 1) focus sampling on the High Head, Wet Head and Marsh communities and 2) reconfigure the study design to span a greater range in hydrologic conditions and degradation within the Water Conservation Areas or northern Shark River Slough (i.e. footprint of Tamiami Trail rehydration).

Researchers: Tiffany Troxler and Jennifer Richards, Florida International University. Leonel Sternberg, University of Miami. Paul Wetzel, Smith College. Vic Engel, Everglades National

Park. Carlos Coronado, South Florida Water Management District.
Prepared For: USACE, U.S. Army Engineer Research and Development Center.
CESU: South Florida/Caribbean