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CESU Final Report Summary for Cape Sable Seaside Sparrow Habitat Monitoring and Assessment - 2010

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Purpose: Goal of understanding the response of landscape-level processes to hydrological restoration and its interaction with fire, a study intended to monitor vegetation structure and composition throughout the marl prairie landscape as it pertains to sparrow habitat.
Location: Florida Everglades.
Methods: In the first three years (2003-2005), vegetation structure and composition was characterized in relation to the existing hydrologic regime and fire history. During 2006-2010, vegetation was re-sampled to assess vegetation change within the sparrow habitat. This document summarizes the vegetation change pattern observed between the two sampling periods in sub-population A, C, E and F, emphasizing the work accomplished in FY 2010. summarized the data using Non-metric Multi-dimensional Scaling (NMS) ordination, and used Analysis of Similarity (ANOSIM) to quantitatively examine the differences in vegetation composition among years. In the analysis, we used the Bray-Curtis distance metric as a measure of dissimilarity. Used Analysis of Similarity (ANOSIM) to test differences in vegetation composition, and vegetation-inferred hydroperiod to quantify the change in vegetation in response to hydrologic differences between the two sampling periods (2003-2005 and 2006-2009).
Results: In sub-population A, vegetation changed considerably over the sampling period (2003-2009), with distinct temporal and spatial trends. Plant species in the Everglades marl prairie showed increasing, decreasing or unimodal trends along the hydroperiod gradient. In Sub-population A, the species that showed a significant increase in species cover with increasing wetness were Bacopa caroliniana, Cladium mariscus ssp. jamaicense, Eleocharis cellulosa, Panicum hemitomon, Paspalidium geminatum, Rhynchospora tracyii and Sagittaria lancifolia. Cover of a few species that are usually present in dry sites decreased with an increase in wetness along the hydrology vector. They were Cassytha filiformis, Centella asiatica, and Schizachyrium rhizomatum. Several species, including Crinum americanum, Panicum tenerum, Panicum virgatum, Paspalum monostachyum, Pluchea rosea, and Schoenus nigricans showed unimodal distribution. In the southern Everglades marl prairies, particularly west of Shark River Slough which is also the habitat of CSSS sub-population A, hydrologic conditions have changed over eight years (2003-2010), mainly due to changes in water management activities. Such alterations in the hydrologic regimes have resulted in changes in vegetation composition that, in harmony with the hydrologic change pattern, showed distinct temporal and spatial patterning. Results suggest that the change in hydrologic regimes over eight years have caused

a gradual shift in species composition. The recent trend in sub-population E, i.e. increase in sparrow population habitat in 2010 is considered as evidence of habitat improvement, a similar response is likely to occur as well in both sub-populations C and F. However, not all the effects of pumping of water from the canal directly into the marl prairies or indirectly through detention ponds are positive. For instance, in other parts of the Everglades, researchers have demonstrated that water input from the canals has altered soil phosphorus in the adjacent marsh, resulting in vegetation change in the impacted areas. It may be important to monitor the phosphorus loading in the water directly entering the Park from the canal, and its impact on prairie vegetation. In summary, fire, an integral part of marl prairie ecosystem, is likely to create vegetation mosaics within the landscape, particularly when its effects on vegetation structure and composition are mediated through other disturbances, such as changes in hydrologic regime. While the interval between fire and post-fire hydrologic events is important in shaping the response of vegetation to the synergetic effects of these two disturbances, it is the relative strength and duration of secondary disturbance that determines the course of post-fire vegetation recovery trajectories, which in turn shapes the vegetation mosaic pattern. Our study of vegetation response to fire and hydrology also reveals that prairie vegetation recovering from a single fire is especially sensitive to annual variation in hydrologic regime.

Researchers: Jay P. Sah, Michael S. Ross, Pablo L. Ruiz and Diana Rodriguez (Florida International Univ.), James R. Snyder and W.T. Hilton (USGS, Big Cypress).

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CESU: South Florida/Caribbean